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The Building Age

NEW YORK, JANUARY, 1912

A Modern Bungalow of Brick and Half-Timber Construction

THERE are two well-known classes of that cozy cottage type of architecture generally recognized as the Bungalow—one intended for occupancy only during the summer months, when the temperatures are mild and provision for heating outside of an open fireplace is unnecessary, and the other class designed for occupancy the year round and which is at the present day a quite common feature of the smaller cities and towns as well as of the suburban districts. A most interesting example of the latter type of Bungalow is that which constitutes the basis of the present article. It is a cozy, comfortable affair with the rooms disposed upon a single floor and communication one with another being established without the necessity of passing through any other room with the single exception of the dining-room.

It is constructed with exterior walls and veranda piers of brick, while the gables are treated in half-timber effects, the deep overhang of the cornice being one of the many features calculated to attract the attention of the interested architect and builder. The house is located upon a corner plot which gives entrance from two streets. It is one story in hight, although there is available space under the gable roofs for servants' quarters and storage purposes.

All walls and footings below grade are of concrete mixed in the proportion of six parts clean, sharp, coarse sand and gravel to one part Portland cement. The cement floor of the cellar is made with one part Portland cement and two parts sharp, screened sand, troweled to a smooth surface and jointed into blocks 24 in. square. The mortar for the rough brickwork was mixed one barrel of line to one yard of sharp sand, and the mortar for the exposed brickwork was colored to match the slate roof.

Photographic View of the Residence of Mr. William T. Briant, at Huntington, Ind.

A Modern Bungalow of Brick and Half-Timber Construction—Architect, Henry L. Wilson, Los Angeles, Cali.

The framing timbers and studding are carefully selected material, the mud sills being 2 x 6 in., the floor beams 4 x 4 in., the floor joists 2 x 8 in., the ceiling joists 2 x 4 in., the latter being placed 16 in. on centers; the rafters 2 x 4 in., placed 2 ft. on centers, the collar ties 2 x 3 in., and the studs and plates 2 x 4 in., the studs being placed 16 in. on centers. The studs are doubled at all corners and angles and all doors and windows have double headers.

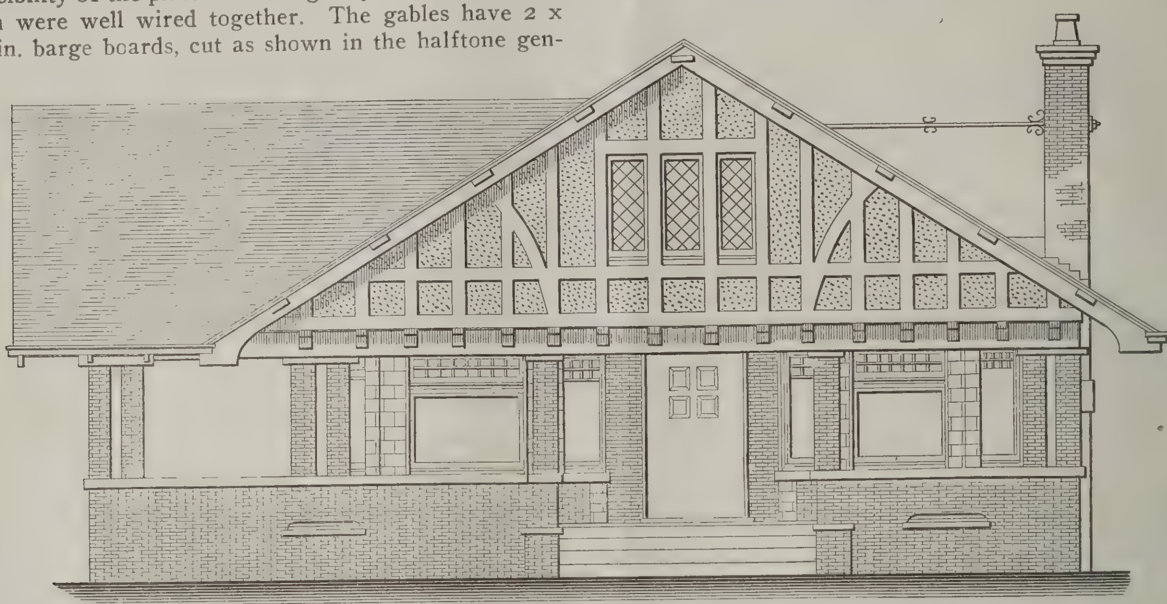
The floor joists running lengthwise under partitions are doubled and all openings 5 ft. and over are trussed. The rafters have 2 x 3 in. collar braces nailed to them half way between plate and ridge line.

On the rafters are laid 1 x 4-in. tongued and grooved pine sheathing boards, over which is a layer of building felt, and this in turn is covered with slate supplied by the Genuine Bangor Slate Company. The show rafters are cut from 2 x 6-in. stuff with ends as shown.

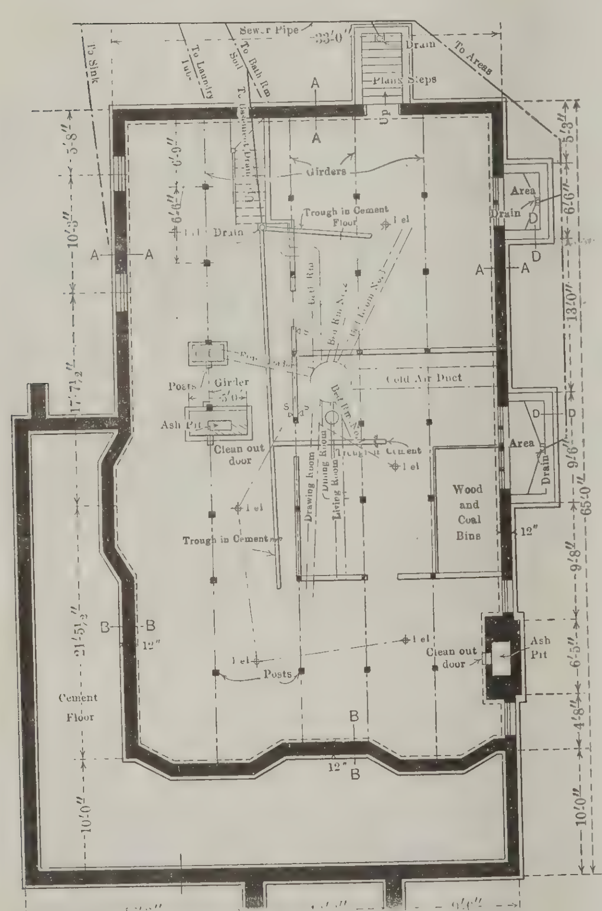
The gable ends are finished in half-timber effects, the plaster being laid on metal lath made by the General Fireproofing Company and stapled to 1 x 4-in. tongued and grooved pine sheathing. In order to prevent any possibility of the plaster cracking all joints of the metal lath were well wired together. The gables have 2 x 10-in. barge boards, cut as shown in the halftone gen-

7/8 x 6-in V and center V tongued and grooved material.

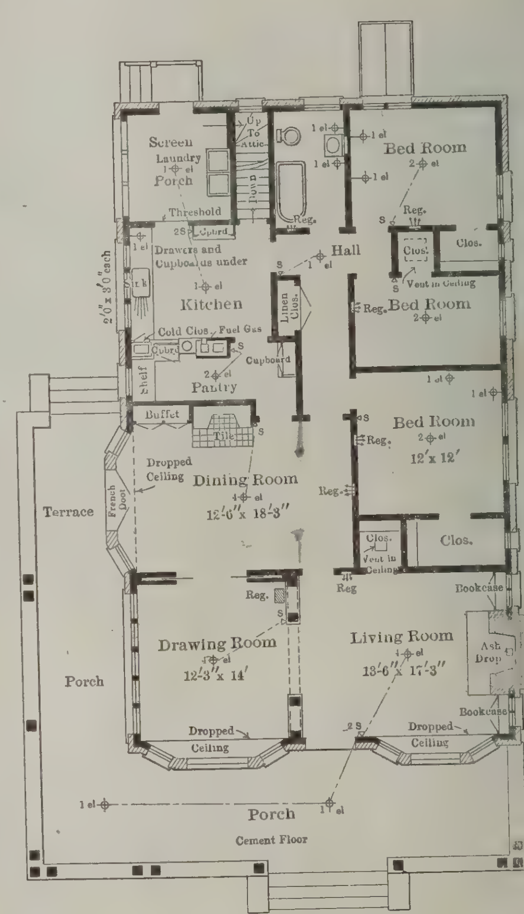
All walls and ceilings of the house are lathed and plastered with two-coat work, the kitchen and pantry walls being covered with a hard wall plaster finished smooth. The bathroom is wainscoted 5 ft. high with



Front Elevation—Scale 1/8 in. to the foot



Basement Plan



Main Floor Plan

A Modern Bungalow of Brick and Half-Timber Construction—Floor Plans—Scale 1/16 inch to the foot

eral view of the bungalow presented upon the first page and also indicated in the front elevation, the barge boards being supported by 8 x 4-in. purlins.

The porch floors are 7/8 x 4-in. tongued and grooved flooring, laid with wide joints. The ceilings are of

hard wall plaster and marked off into 6 x 6-in. blocks to represent tile. All corners of plastered walls are protected by metal corner beads nailed to the studs before the plaster was applied.

The front door is of 2 1/4-in. veneered quarter sawed white oak outside and slash grain Oregon pine inside. The panels in the front door are of plate glass. All inside doors are of the 5-panel Colonial pattern and the door between the dining-room and butler's pantry is double acting.

The interior trim is clearly indicated by means of the halftone interior views presented herewith as well as by the details which follow them. The drawing-room, living-room and dining-room are wainscoted 4 ft. 6 in. high and have a grooved plate shelf supported by brackets. The wainscoting is of ⅞ x 12-in. rabbetted boards, with wood strip the exact width and thickness of groove fitted in the opening under the skirting board and base, all as shown on the details.

The floors, except where otherwise specified, are ⅞ x 4-in. tongued and grooved No. 1 Oregon pine and blind nailed to every joint. All pine floors are furred to the level of the hardwood floors.

In the living-room, drawing-room and dining-room there are sub-floors covered with two-ply Giant building paper and with a finish floor of ⅜ x 2-in. clear white oak, well driven together and nailed every 8 in. with wire nails.

The bookcases at the right and left of the open fireplace in the living-room are built with movable shelves and glass doors and are lined with ⅞ x 4-in. tongued and grooved ceiling strips. All closets are finished in the same general style as the rooms into which they open and are provided with ⅞ x 12-in. shelves. The medicine cabinet in the bathroom is fitted with shelves and has a 1⅛-in. door with 16 x 20-in. plate mirror.

A buffet is built in the dining-room at the left of the open fireplace and is fitted with glass doors, countershelf, drawers, etc.

At the end of the shelf in the pantry opening into the kitchen is a cold closet or "cooler" as it is more generally known, having removable wire shelves.

The interior views presented herewith afford an excellent idea of the appearance of the three principal rooms, the first picture having been taken with the camera located at a point just to the right of the open fireplace in the living-room and looking into the drawing-room with a glimpse of the dining-room in the center background. The second interior picture was taken with the camera placed just in front of the buffet in the dining-room and looking into the drawing-room at the right and into the living-room through the door in the background.

The plumbing is of the open type and was installed according to city ordinances, the fixtures in the bathroom consisting of a 5½-ft. porcelain enameled cast-iron tub with 3-in. roll rim, supplied with Fuller combination cocks; a porcelain enameled wash basin or lavatory and a vitreous china syphon jet closet. In the kitchen is a 20 x 30-in. cast-iron enameled sink and a 30-gallon high-pressure galvanized iron water boiler with all necessary connections. In the laundry is a pair of cast-iron enameled wash trays.

The house is piped for gas and wired for electric lighting, the latter work being done in accordance with the rules of the National Board of Fire Underwriters. All switches are of the Perkins flush push type, installed at the various points indicated on the floor plan. The front entrance light is controlled by a switch just

View taken with Camera at right of fireplace in Living-Room and looking into Drawing-Room, with glimpse of Dining-Room in the center background

A Modern Bungalow of Brick and Half-Timber Construction inside the front door.

All bracket lights are controlled at the fixtures. Gang switches are used where two or more come together. Various circuits are run from the screen porch, at which point a fusible knife switch is placed to control all lights. Front and back door bells are provided to ring in the kitchen.

All exposed tin, porch floors and sides, screens, etc., have three coats of linseed oil paint, while the ceiling of porches, pulley stiles, etc., have two coats of linseed oil stain.

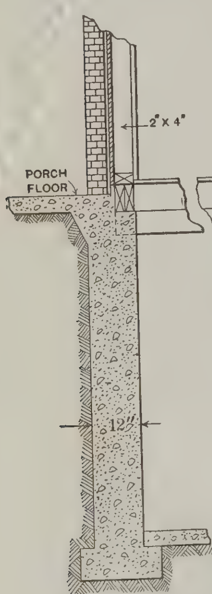
All wood trim in the drawing-room, living-room and dining-room was treated to a coat of Standard Varnish Works "Mission" finish, and after a lapse of 24 hours one coat of white shellac and a first coat of Flattine cabinet finish were applied. The woodwork of the bedrooms, kitchen, pantry, bathroom, hard wall-plaster wainscot in the bathroom, kitchen and entry were treated to two coats of white lead and turpentine and two coats of white enamel, rubbed between coats, leaving a dull gloss, the living-room, dining-room and drawing-room having rich colors while the other rooms have light colors.

All the flashings and sheet metal work used in the construction of the building were of N. & C. Taylor Company's Target and Arrow heavily coated roofing plate.

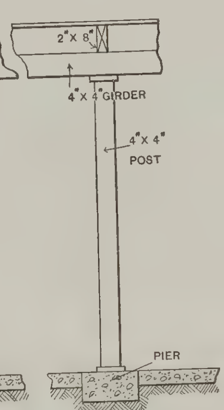
Naturally in a bungalow of this character, designed as it is for a city residence and to be occupied the year round, one of the most interesting features is the heating and ventilation. Covering as it does a ground area 30 x 60 ft. and being only one story in height, both the floor and ceiling are factors in the amount of heat transmitted at these points in addition to that lost by reason of the large amount of illumination provided. For this reason a furnace larger than would ordinarily be selected was installed to meet the requirements of the case, some of which were the long pipes necessary to reach some of the rooms.

For the heating a No. 200 Majestic double downdraft horizontal furnace with a heating capacity of 60,000 cubic feet and made by the Majestic Furnace & Foundry Company, Huntington, Ind., was installed under the supervision of the expert of the company. The furnace is located just back of the center of the building, where it is close to the chimney, which also serves the kitchen range. There are three inside cold air pipes leading to the furnace made of galvanized iron. Leading from the drawing-room is a 16-in. round pipe and from the dining-room a 20-in. round pipe, these two connecting into a 26-in. pipe, which in turn connects directly to the furnace at the back. In two cases the pipes from the furnace are utilized for heating two rooms, a 10-in. pipe being used to heat the bathroom and the bedroom at the rear corner of the building, while a 12-in. pipe is used for heating the other two bedrooms, a 9-in. branch running to one and a 10-in. branch being carried to the other. In the drawing-room a 12 x 16-in. floor register is used in connection with the 12-in. pipe to that room. In all of the other rooms side-wall registers are used. All registers are brush brass finish and made by the Auer Register Company, Cleveland, Ohio.

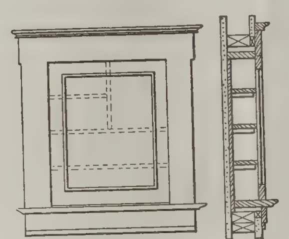
In addition to this provision for heating there are

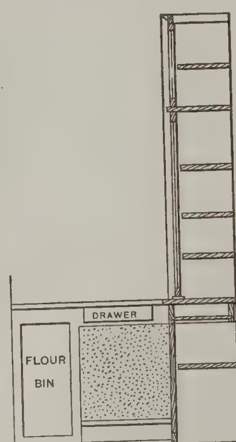


Section through foundation wall on line B-B of the basement plan—Scale ¼ in. to the foot

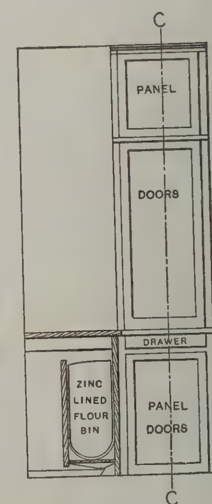


Piers and Posts

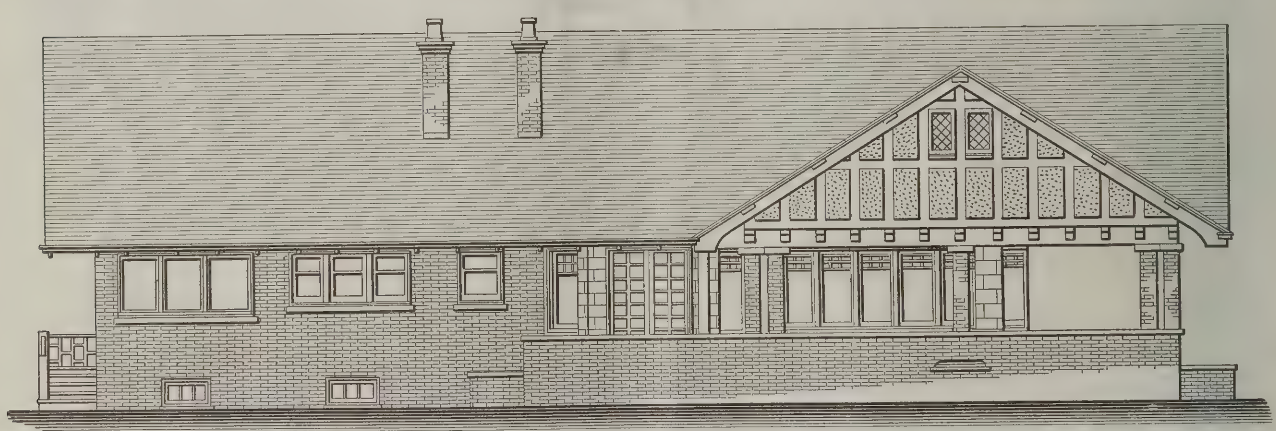

Elevation and section of medicine cabinet—Scale ⅜ in. to the foot



Looking toward the window in pantry—Scale ¼ in to the foot



Looking toward cupboard in pantry.—Scale ¼ in. to the foot.


Side (left) elevation.—Scale 3/32 in. to the foot

A Modern Bungalow of Brick and Half-Timber Construction—Elevation and Miscellaneous Details open fireplaces in both the dining-room and living-room which can be lighted in case of necessity for auxiliary heating and are always in service as ventilators. Provision is made for an ash drop from each fireplace and also from the kitchen.

To insure an even temperature throughout the furnace is fitted with the temperature regulating system of the Minneapolis Heat Regulator Company.

In order to prevent marring of the walls of the building while the fuel supply is being taken into the cellar the openings are equipped with the Majestic Cast Iron Fuel Chutes, provided with a lift door which can be automatically locked open while the fuel is being put into the coal bins and can also automatically lock itself closed, thus making it burglar-proof.

The bungalow here shown was built for William T. Briant and is pleasantly located in Huntington, Ind. It was planned by Architect Henry L. Wilson, 218 South Broadway, Los Angeles, Cal.

View with camera placed just in front of the built-in buffet in the dining-room and looking into the drawing-room on the right and the living room in the center background.

A Modern Bungalow of Brick and Half-Timber Construction

Reinforced Concrete in the Construction of Wood-working Establishments

The use of reinforced concrete in wood-working plants is a subject which is being given more and more consideration as the advantages of this material are made evident, says G. D. Crain, Jr., in a recent issue of the *Wood-Worker*. Attention has been recently centered upon the proposition by reason of the publicity given to a saw mill in Louisiana which was built of reinforced concrete and steel throughout, and which is regarded as an excellent type of this character of construction. The new mill cost $150,000, and according to its owners is worth every cent of it. The additional expense, as compared to a mill of ordinary construction, is probably $75,000, as it cost twice as much to use cement as lumber. The question that obviously presents itself is, how are the operators of this mill to make the interest on this added $75,000?

In the first place, say those who have erected the mill, a big saving will be made in connection with insurance, as the fire hazard has been eliminated, and no insurance whatever will be carried. Compare this situation with the average mill, where the rates for fire insurance are extremely high; so high, in fact, that many owners prefer to take the large risk which accompanies the operation of their mills and assume whatever loss results from fire.

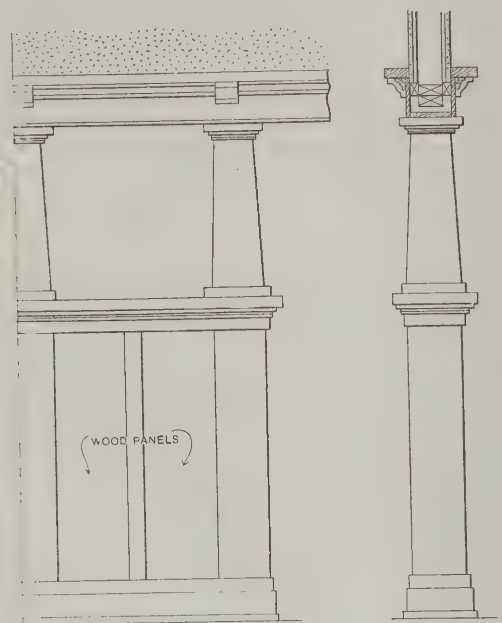
In the second place, the charge for depreciation, which must be made very great in the case of a mill built in the ordinary way, reaches, not the vanishing point, but certainly a figure much below that which must be allowed in the former case. The ordinary mill is figured to last ten years; the reinforced concrete structure should be good for twenty-five. Assuming an original cost of $75,000 for the cheaper type, it costs $7,500 a year to operate it, while if the reinforced concrete mill cost $150,000, each year's operation would involve an outlay of $6,000. The saving is comparatively slight, taken on this basis, but it is distinctly in favor of the mill of the advanced type.

By far the most important consideration, however, is that which has to do with the efficiency of the plant. The vibration which accompanies the operation of the average saw mill renders it almost impossible to cut lumber with absolute accuracy. In view of the situation which mill superintendents are confronted with, results are even better than could reasonably be ex-

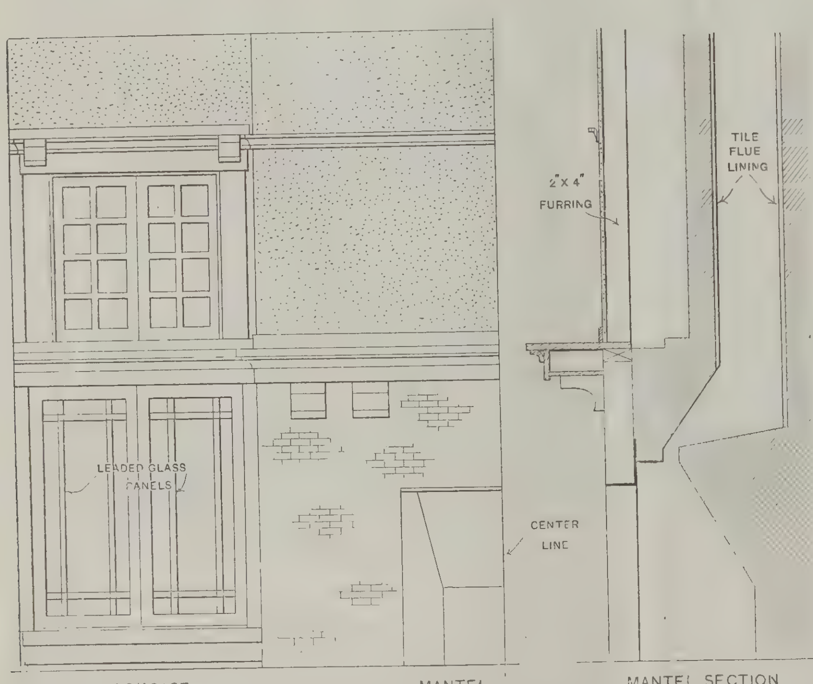
Whether it would pay larger dividends as compared with an efficiently operated plant constructed of wood is a question which would probably have to be determined by individual experience. In some cases it would, while it is fair to assume that there are many operators of wood-working plants who are now earning a maximum dividend on their investment without the advantage of a plant built of reinforced concrete.

Assuming that the plant is already in existence, and looking at the problem of using concrete to good advantage incidentally, the first and obvious suggestion is in connection with the foundations of the power machinery. The advantage of concrete in this connection is so great that most wood-workers have already utilized it, and the average planing mill, flooring mill and box factory is well taken care of in this respect.

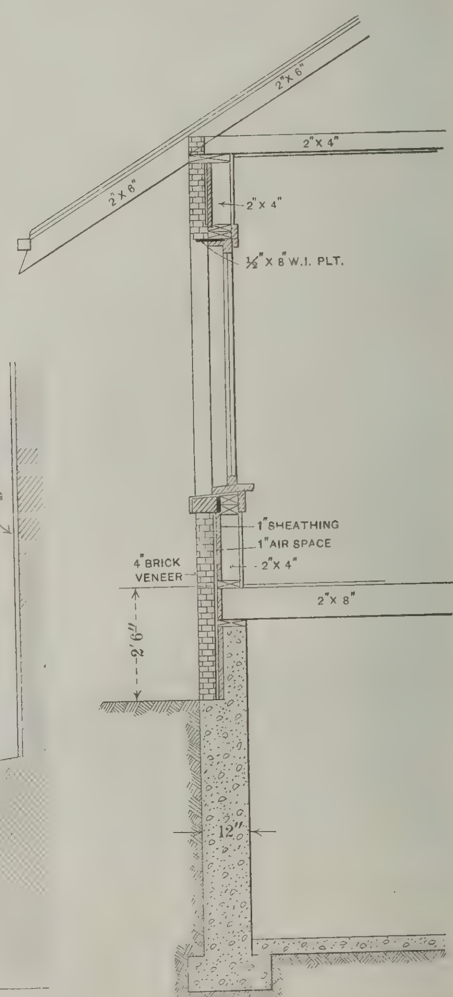
In the operation of the individual machines there is a chance to utilize cement with good results, and this is an opportunity that is not so often taken advantage of. Of course, it is too much to say that in the case of all wood-working machines concrete founda-



Cased Opening Between Living Room and Drawing Room.—Scale ⅜ In. to the Foot.



Partial Elevation and Section of Mantel with Open Fireplace.—Scale ⅜ In. to the Foot



Section on Line A-A of Foundation Plan. —Scale ¼ In. to the Foot

A Modern Bungalow of Brick and Half-Timber Construction—Miscellaneous Constructive Details

pected. When there is no vibration—which is the case where the mill is of reinforced concrete—the machines are able to do more accurate work, and it follows that the lumber product should be of greater value.

The average wood-working establishment could be built of reinforced concrete to advantage, for the reasons pointed out, since low insurance cost, lessened charge for deterioration and greater efficiency in operation would all contribute to make the plant a good investment.

tions should be employed, because in the lighter ones the vibration is not sufficient to interfere seriously with the accuracy of the work, and the percentage of error is so small as to be disregarded. This is not true of others, however.

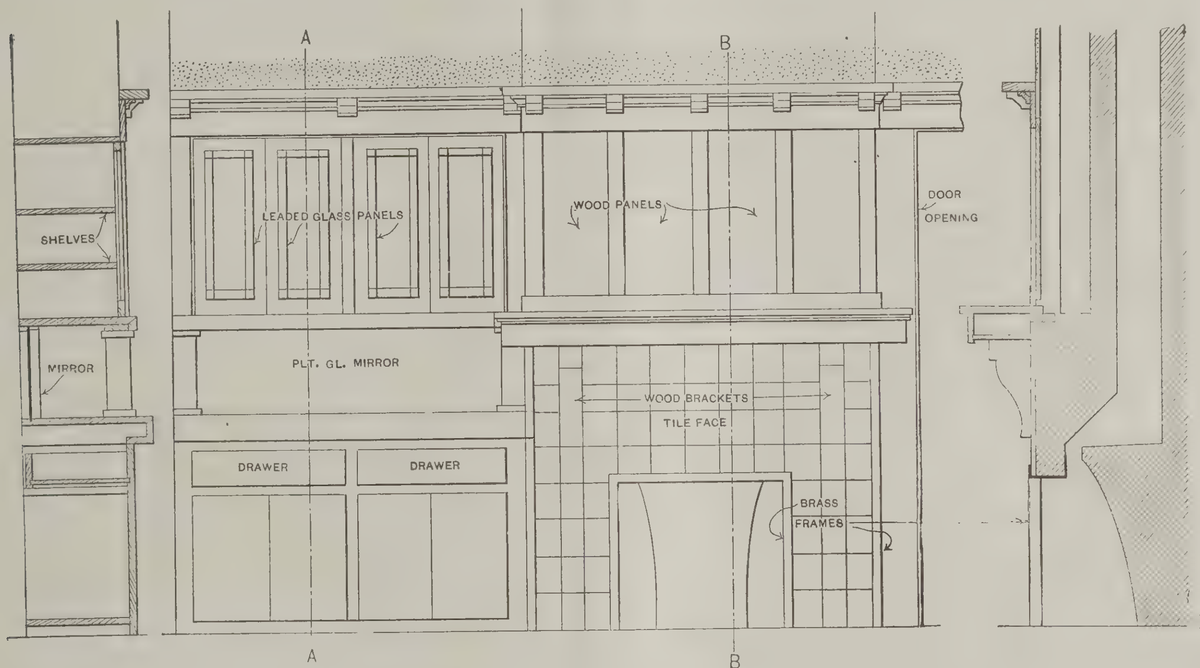
It is easily apparent that larger and heavier machines, which have not only greater weight, but also consume more power than others, cause a lot of vibration. Looking at the proposition from the standpoint of getting out accurate work alone, it would be advantageous to have these machines resting upon a foundation of concrete. The vibration would be entirely eliminated, the saws or knives could cut more accurately, and the chance for rejection, which always accompanies the turning out of material which is not correct in its measurements to the last fraction, is eliminated. Woodworking operators who have experienced the embarrassment of having work thrown back on their hands because of fractional errors in manufacture will appreciate the advantage of having the chance for mistakes of this kind reduced to as small a figure as possible.

A box manufacturer not long ago, in referring to the adoption of concrete foundations for his plant, admitted that one of the arguments which had the strongest weight with him was his own experience. He got a big order for some tobacco boxes. Partly due to the inaccurate work of some of the machines, and partly to the inefficiency of the sawyers in charge of that particular job, there was a slight error made in the dimensions of the packages, probably not more than one-thirty-second of an inch. The mistake was discovered only after the boxes were ready to ship. Thinking that perhaps they would answer the purpose anyway, the packages were shipped. They came back, however, the tobacco man saying that he had to have boxes that fit his tobacco, and that he didn't want to have to cut his tobacco to fit the boxes. They were, of course, a total loss, except for the small return which was gotten by selling them for kindling. If the machines had had proper foundations to start with, the mistake might have occurred anyhow, as that would not have eliminated the equation of the inefficient employee; but it would have prevented the latter from having the excuse of the vibrating machines when the error was made plain to him.

Another factor of importance in this connection is that when concrete foundations are used, the waste of power is reduced. When they are free to vibrate, the machines consume a large amount of power in this way, instead of applying it solely to the work of cutting the wood. The gain brought about by fixing the machines in a solid base, which requires the power to act along the line of least resistance and move the efficient part of the tool and not the machine as a whole, is enormous in the aggregate, and in these days of the study of business efficiency is better appreciated than would have been the case a few years ago.

While it is a comparatively simple proposition to construct a concrete foundation for a machine on the first floor of a plant, since it may be set directly on the ground, the same method may be applied to machinery which is placed on the second floor. In this case supports are required, but the resultant expenditure is worth while. It is by no means necessary to make the entire floor of concrete in order to have the individual machines rest upon a foundation of this character; but by providing the necessary supports under the slab upon which the machine rests, concrete may be poured over as small an area as is required.

Outside the plant proper there is plenty of opportunity to utilize concrete, as in the construction of foundations for lumber piles, whereby the air is enabled to circulate more freely, and the drying process is hastened; also the floors of sheds and other houses which shelter material, either in the rough or finished state, can conveniently be built of concrete. These are a few of the ways in which cement can be profitably used, and in view of the invasion which it is making into other fields, it is reasonable to expect that lumbermen will find it advantageous to apply it to their own particular problems in even larger volume hereafter than is now the case.



Section A-A of the Elevation — Elevation of Buffet and Mantel — Section on Line B-B of Elevation

A Modern Bungalow of Brick and Half-Timber Construction—Miscellaneous Details—Scale 3/8 in. to the foot

The most important building operation for 1912 thus far announced for Hamilton, Ohio, is the new Y. M. C. A. building to cost approximately $170,000. The structure will include six floors and a roof garden, and operations will be commenced shortly after the first of March or as soon as the site at Second and Market streets becomes available.

A rather novel feature of the nine-story and basement office building, which is being erected in West 42d Street for the New York Edison Company, is the treatment of the interior, which will have a grand staircase in the entrance hall with an electrical fountain having at the top a life-size bronze bust of Thomas A. Edison. The architects are D. H. Burnham & Co., and the cost is $120,000.

Joint Meeting of Boston Architects and Master Builders

Large Attendance—"Harmony" the Keynote—Prominent Speakers Discuss Trade Topics and the More Intimate Relationship Existing Between Architects and Builders—A Long Step Taken in the Right Direction

AT Young's Hotel in Boston on the evening of December 5 there was held a most successful joint meeting and dinner of the architects and builders of Boston. This affair was brought about through the efforts of R. Clipston Sturgis, president of the Boston Society of Architects, and William H. Sayward, secretary of the Master Builders' Association, with the co-operation and assistance of leading architects and builders of the city.

It had long been felt that an opportunity for representatives of the two great classes of "building makers" to "get together" for an interchange of views upon many problems of mutual interest would be of the greatest benefit. It could not fail to be of great assistance in clarifying the situation and eventually bring about permanent committees of the two interests which would operate to overcome many frictional points.

Success of the Meeting

The great success of this meeting bids fair to justify these assumptions. The demand for reservations following the announcement of the dinner was prompt and hearty and when the evening arrived the presence of some three hundred architects and builders meeting together in the spirit of greatest good fellowship was in itself a guarantee of the interest which was felt in the movement.

The singing of "America" preceded the dinner proper, after which those present seated themselves informally as their preferences dictated, save at the head of the table which was reserved for the officials and the speakers. The delightful freedom of the occasion was further increased as the dinner proceeded by the frequent singing of familiar songs by all present to the accompaniment of piano and cornet, and a song written for the occasion by W. H. Sayward, Jr., entitled "Architect and Builder," expressive of the unity of the two professions in their work and spirit, was received with great favor and was sung several times during the evening.

Keynote of the Meeting

At the meeting following the dinner R. Clipston Sturgis, president of the Boston Society of Architects, presided and in an exceedingly happy manner gave the keynote of the meeting as "harmony." He then introduced Parker F. Soule, president of the Master Builders Association of Boston, who was welcomed with great applause and who extended the best wishes of the master builders to all present, especially to the architects. Mr. Soule spoke appreciatively of the satisfaction of the builders in meeting the architects in this informal and friendly way and of the benefit to be derived from talking with them about matters which were considered of the greatest concern to the architect in his profession and to the builder in his business, and he felt that the meeting should be the forerunner of others for the discussion of points, the misunderstanding of which might menace their mutual relations.

Mr. Sayward's Remarks

Mr. Sturgis in presenting the next speaker, William H. Sayward, secretary of the Master Builders' Association, spoke very feelingly of his life-long work in the interest of the entire building fraternity, and especially of his efficient work in bringing architects and builders together in this meeting. Mr. Sayward was received with a spontaneous outburst of applause which continued some minutes, interspersed with "What's the matter with Bill?" "He's all right," the singing of "For He's a Jolly Good Fellow" and rounding up with three cheers and a tiger which were given with a will.

Mr. Sayward in his remarks stated in effect that the meeting was one to which he had been looking forward for very many years as the inauguration of better and more intimate relationship between the architect and the builder, who in ancient days were comprehended in one individual when conditions of construction were of the simplest character.

He said that it was through the earnest work of the president of the Boston Society of Architects, Mr. Sturgis, that this present very harmonious meeting had been achieved, and now that the two bodies were united in one common purpose it was only a question of moving forward to a more complete union. Prominent members from the ranks of both architects and builders should be delegated to serve upon joint advisory boards or committees for the quiet, careful consideration of points which may come up from time to time in the contact of the two fraternities and in this way friction might be effectively avoided. He complimented the Boston Society of Architects as standing at the apex of the profession in this country and indicated his belief that the profession as a whole is desirous of doing the "square thing."

The Labor Situation

Turning to labor matters, Mr. Sayward referred to the fact that contractors have been left to wrestle with the serious problems involved without the assistance of the Society of Architects and there was one point that needed correction. Referring to the McNamaras' case he pointed out that the running down to a successful issue the evidence in the case had tended to prove the justice of the position of the Master Builders Association which for 25 years has been vigorously combatting the forces of perverted trades unionism.

He said that the fight has not been waged against trades unionists as such; that the struggle has been against "trade despotism" rather than against "trade unionism." With the assistance of the Society of Architects the situation can be remedied to a great extent. Builders and architects may find a common viewpoint in this connection and starting from now they may join hand to hand as expressed in the original song which had been sung there that evening.

Mr. Sayward then proceeded as toastmaster for the builders to introduce George M. Fiske, who discussed the question of the relation of the manufacturer and dealer in building materials to those concerned in building construction, *i. e.*, owner, architect and builder. Mr. Fiske said he felt that the relation of the material man to the architect was most important and brought out very clearly the fact that 40 years ago the principal building materials were lumber, brick and stone, while to-day a great many others were used. The building material business had attracted many highly educated men, particularly in the field of steel, terra cotta, etc. Brick, for instance, are now used as decorative as well as a constructive material. Able engineers are engaged in making and selling all classes of materials and they are well qualified to give architects "points" in regard to these products. He concluded by referring to the master builders of Boston as "a splendid set of men."

Plans and Specifications for Estimate

Mr. Sayward then announced the next subject for discussion as follows:

1.—The manner of presenting plans and specifications for estimates so that the greatest accuracy in the estimate submitted may be anticipated.
2.—Kind of drawings needed.
3.—Desirability of large scale drawings and full size details.
4.—Relation of specifications to drawings.
5.—What the specification should cover.
6.—What the drawings should cover.
7.—The "blanket" clause.

Isaac F. Woodbury in speaking on the above topics remarked that his knowledge of the building business was the result of many years practical experience working from the foundation upward. He said he had been given but five minutes to discuss problems which if adequately and thoroughly treated would require at least five hours, a point which met with general approval. Mr. Woodbury said that if architects wish builders to understand just what they want and what they are trying to produce the clearer and simpler they present the matter the nearer will the builders' "guesses" approach that desire. But if there is much latitude given the builder through the architect's failing to state his wishes clearly the further removed will be his "guess" from what the architect had in his mind. The latter confronts a serious problem when he undertakes to make plans for an owner who wishes a building equivalent to an outlay of $100,000 but who desires to expend only $50,000, and builders realize this situation quite keenly.

Clear Details Necessary

Architects in persuading owners that they are on the wrong track in trying to build a $100,000 building for $50,000 will accomplish much and make the problem far easier for all concerned. Clear and sufficient details in submitted plans will save a large amount of time in the making of estimates. Specifications do not need to be *long*—few words are best, for a multiplicity leads to confusion. More details should be given. The so-called "Blanket Clauses" which specify that the work "be done as the architect shall direct" or the like imply a fear on the architect's part that something has been omitted.

Ira G. Hersey, the next speaker who considered this topic, thought that ideal plans are those presented to a ¼-in. scale. Specifications should be divided into trades and were best when printed. He considered the "Blanket Clause" bad for all concerned; it was often introduced merely from force of habit. Builders should not be expected to compare plans with local building laws in order to determine whether they were in conformity with the same.

Replying to the speakers on this topic, W. D. Austin, representing the architects, said that he had expected something rather more "red hot" than the remarks which had been made, but suggested that possibly builders are a little too much afraid of the architects. He agreed with the speakers, but would go them one better in their own cause.

Specifications

As regards Specifications he considered that they were in large part traditional and were often copied from old examples. He explained the theory of the "Blanket Clause" on the assumption that the architect sometimes does not know just what he wants and so introduces that familiar phraseology.

In the matter of scale of drawings he considered that with a ⅛-in. scale there should be furnished ¾-in. scale details for every part of the plans that needed explanations.

In elevation ⅛ scale is quite sufficient where 1-in. scale detail is given for one window, etc., etc. The object in specifications should be to make what is wanted perfectly clear to the builder.

In conclusion he felt that architects ought to ascertain from builders whether things which they might contemplate were feasible.

Letters were then read by President Sturgis from John A. Fox and Mr. Ware, architects, expressing approval of the joint meeting, the benefit that should result to builders and the need of further meetings of the kind.

The Contract

The next topic for discussion, "The Contract," was considered under the following heads:

1.—Which is for the best interest of the Owner, the Contractor and the Architect—the General Contract method or the Divided Contract method? If the former, how can the rights of sub-contractors be best taken care of not only in the matter of estimates but in the matter of conduct of the work and payments?
2.—The question of payments on contracts with especial reference to percentage of reservation.

George P. Bullard in speaking for the contractors considered that the General Contract was best for owner, architect and all concerned. The Divided Contract spelled chaos, but the architect should select responsible, experienced sub-contractors and require the general contractors to employ them. He thought that builders were not fairly treated in the matter of "holding up" payments. Final payments are delayed for reasons that to the builder appear trivial and owners often reserve final payments for long periods. They should be required to pay 6 per cent. interest on all delayed payments.

Charles Logue in rising to speak called for three cheers and a tiger for President Sturgis for bringing about the present meeting and they were given with great enthusiasm, following which he took up the matter of contracts, emphasizing the necessity that both parties should have a clear idea of what is to be done and to get this knowledge the plans and specifications must be absolutely clear.

He then referred to various methods of contracting—*"net cost plus fixed sum," "percentage"* and *"competitive."* Mr. Logue held that if the question of time is to be considered the single contract is better than the divided contract, for the general contractor is given absolute control over the sub-contractors.

Jackson H. Townsend, a sub-contractor, considered that divided contracts were best and that the sub-contractor was without the protection he should have in respect to payments.

Morton C. Tuttle, of the Aberthaw Company, next made some brief and interesting remarks on the Standardization of Measurements in Building Work with especial reference to the system of "quantity surveying." He stated his approval of the English method and hoped something of that nature would result from the combined work of the Society of Architects and Master Builders.

In replying to the arguments of the builders on the question of "Contracts," F. A. Kendall, for the architects, stated that 30 years ago there were but few building trades, whereas at present there are a great many and more "interlocked," hence the general contract was best.

W. S. Parker, architect, in referring to matters already discussed, considered that the reason for the "Blanket Clause" was that the architect might thereby protect himself from a nip of frost in case some unclosed window might be found in the contract. He was strongly in favor of seeing that all the windows were closed before starting work. Speaking of plans and specifications he made an ingenious comparison of plans and specifications as the two eyes through which the desire of the architect was to be read by the builder. These "eyes" should be so made that they should act perfectly together without astigmatism.

Fred Wilson discussed the question of working drawings and superintendence of the work with particular reference to the points enumerated in what follows:

1.—To the furnishing of shop drawings by the Contractor, and whether that system offers points which are open to adjustment.

2.—Superintendence by Architect;
  a.—On the job;
  b.—In the shop;
  c.—At the works, and

3.—The responsibility and authority of the Clerk of the works.

Mr. Wilson favored the Standardization of Clauses in Specifications in order that the personal equation might be eliminated as far as possible.

H. J. Carlson in closing for the architects said a few words in support of the attitude taken by the builders in relation to plans and specifications.

The discussion of the evening was brought to a conclusion by President Sturgis, who expressed the earnest wish that many meetings of a similar nature might follow.

The general consensus of opinion of both architects and builders was that a long step had been taken in the right direction and that much good might be anticipated from the future co-operation of the two organizations.

Every Farmer His Own Painter

Importance of Painting Farm Buildings -- Suggestions for Purchasing Paint -- Precautions To Be Observed in the Use of Paint

Any man can do an average job of painting, and can thereby not only improve the appearance of his place, but can add greatly to the durability of the buildings. The average farmer, if there is such a thing, seems to think that paint is used solely for ornament, and he is of all men most keenly practical; he eschews what he regards as an unprofitable luxury. It is perhaps the rule rather than the exception in some sections to see houses and agricultural implements sadly in need of repaint.

Of course, paint does improve the appearance of property, but it is far more useful as a protector rather than an ornament. The expenditure of a small amount of money and time in painting a valuable piece of farm machinery or a building will add greatly to the length of its life. Another useful object accomplished by painting is the improved sanitary conditions of buildings and outhouses. The cost of such work is small, the necessary equipment not expensive, and with proper care will last a long time.

In order to supply information which will enable the farmer to purchase the paints economically and apply them intelligently and to the best advantage, Secretary Wilson caused experts in the Bureau of Chemistry to investigate the subject and prepare Farmers' Bulletin No. 474, calling attention to the economic importance of painting farm buildings and equipment and giving details as to the cost, purchase and care of brushes, cost of the ingredients needed, how to mix and apply them.

Paint conveys to the casual reader the idea of a mixture of pigment with linseed oil, but the general conception of the word includes both whitewash and calcimine, but not varnish, and the bulletin gives several very valuable recipes for making both of those excellent coatings for both the outside and inside of buildings.

The secretary in addition to urging the proper use of paints for both useful and ornamental purposes, for he does not think anything too good or attractive for the farm homes, emphasized several precautions: "Do not use any paint containing compounds of lead about stables or outbuildings where the fumes from decaying organic matter occur, since these gases are likely to darken the lead paints. Do not use with lead compounds any pigment which may liberate compounds of sulphur. For example, ultramarine blue, which contains sulphur in a form in which it may be set free, is a beautiful and very permanent blue and may be used with zinc white, but should not be used with white lead or any other lead pigments. Prussian blue, on the contrary, does not contain sulphur and may be used with lead pigments.

"Remember that turpentine and benzine are very inflammable and especial precautions should be taken not to bring paint containing these substances near any light or open fire.

"Many pigments are poisonous, and the workman should be particularly careful to remove all paint stains from the skin, and not under any circumstances allow any of it to get into his mouth. A man should not eat in the same clothes in which he has been painting, and before eating should not only change his clothes but wash all paint stains from his skin. It is not advisable to use turpentine or benzine in removing paint stains from the hands, but by oiling thoroughly with linseed oil or, in fact, with any fatty oil, and then thoroughly washing with soap, the paint may be removed, provided it has not been allowed to dry too thoroughly on the hands."

Work and Methods of the Concrete Contractor--IX.

Shear in Concrete Floor Slabs, Beams, Etc.--Safest Method for Designing Beams--Cost Per Square Foot

By Ernest McCullough, C.E.

NEAR the bottom of the second column on page 640 of the December issue the writer went through the work of designing a reinforced concrete slab on a span of 8 ft. to carry a live load of 100 lbs. per sq. ft. In the article it was given as "150 lbs. per sq. ft.," the mistake being his, due to careless proofreading. Otherwise the article was correct.

In the design of an ordinary concrete floor slab shear does not have to be considered, but if the floor consists of small T-beams with tile between, the question of shear is often of considerable importance. The tile is not placed in the floor for strength, but is used to save the cost of form work and lessen weight. Actually there is very little saving in the cost of forming, but there is a considerable reduction in weight. The floor is also rendered somewhat sound proof and has a surface on the lower side which can be readily plastered.

In the design of all beams shear should be considered. A beam may fail by the crushing of the concrete in the upper half, this showing the concrete was weak, or it may fail by the steel breaking, in which case there was evidently more than enough concrete to balance the strength of the steel, or it may fail in diagonal tension, this being known as a failure in shear. It was stated in a previous article on wooden beams that a load on a beam causes a stress termed shear, which is in effect like a straight cut of a knife or a pair of shears. A square of butter resting at the ends on wires will be cut through, this being a perfect example of failure by shear.

A material like wood or metal having fibers cannot be cut like the soft butter by the edges of the supports for all the nearby fibers will come to help the ones attacked. Thus bending is set up with compression and tension. However, the weight of the load and the beam are a convenient measure of the destructive forces set up by the resistance due to shearing force. It was explained in the article on wooden beams that since there was tension in the lower side and compression in the upper side, that at the neutral plane, or axis, there is neither tension or compression, the forces changing direction at this place and thus setting up shear. We thus have a shear acting vertically downward and a shear acting horizontally. These two shearing forces are equal in amount and by the well known parallelogram of forces the resultant is in tension.

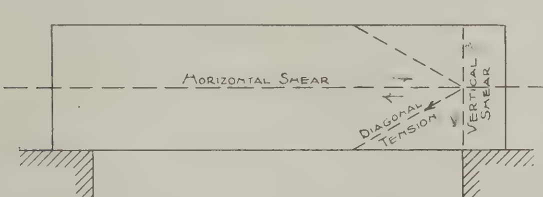


Fig. 1—Showing Shearing Forces

In Fig. 1 is given an illustration of the action of diagonal tension. The horizontal shear is shown along the neutral axis and the vertical shear acting near the end of the beam. The two dotted lines at the 45 deg. angle show the diagonal tension, but this figure is merely diagrammatic. In a framed truss the diagonal members carry the shearing stresses so that in the diagram here shown we may imagine the upper lines to be struts and the lower lines ties of a framed truss.

In Fig. 2 is another illustration showing the distribution of shearing stress in a beam uniformly loaded. Shear is always zero at the point where the bending moment is greatest. The stress-strain diagram for a uniform load has the shape of a parabola. A stress-strain diagram of the shearing forces in a beam would be a complete parabola starting from zero at the top and bottom where the compressive and tensile stresses are greatest to a maximum amount at the neutral axis where the compressive and tensile stresses are zero. This diagram is for a wooden or metal beam in which the material is homogeneous, or alike in every particle. A beam may be strong enough to carry a certain load without breaking, but very often a wooden beam may fail by splitting off, or shearing, along the neutral plane under a load that would not cause it to break by bending.

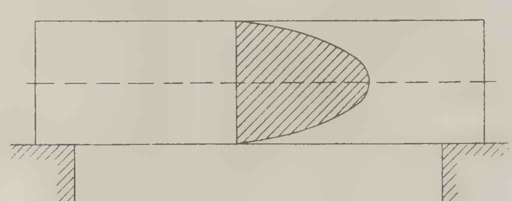


Fig. 2—Showing Shearing Force in Wood or Steel Beam

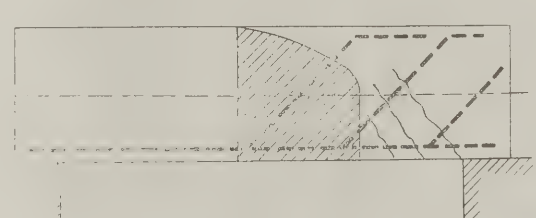


Fig. 3—Showing Shearing Force in Reinforced Concrete Beam

Work and Methods of the Concrete Contractor—IX.

In Fig. 3 is shown the stress-strain diagram for a beam of reinforced concrete. Above the neutral axis the diagram is a parabola because the concrete resists it. Below the neutral axis the force is equal over the whole area because the steel is at the bottom and all the tensile stress is located in the steel, the concrete below the neutral axis taking no tension. The heavy dotted line near the bottom of the beam is the reinforcement and the three bent up lines near the end represent shear reinforcement. The wavy lines across the shear reinforcement are supposed to represent cracks caused by shear, or diagonal tension. The shear reinforcement is placed so that it will practically cross the planes of weakness at a right angle. The shear reinforcement should go well up into the upper part of the beam and within an inch of the top should be bent to run parallel with the top for some distance for anchorage. The total length of the shear reinforcement measured from the middle of the beam to the end near the top should be not less than fifty times the diameter or thickness of the steel used for such reinforcement. The lower end should be fastened to the horizontal reinforcement. Looping the shear, or web reinforcement, around the lower steel is not sufficient.

The Question of Shear

The writer has replied to the inquiry of a correspondent about this question of shear on another page, so it will not be necessary to duplicate the matter here. The method of calculation is the same for all classes of beams. One-half the total load is equal to the snear at each end and the unit shear per square inch multiplied by the effective depth times the moment arm and multiplied by the width should not exceed the total end shear. For example, suppose a beam has a total load of 5120 lb. to carry and the unit shear is 60 lb. per sq. in. One-half the load = 2560 lb. and this divided by 60 = 42.7 sq. in. Assume the width as equal to 5 in. and the depth will be 42.7 ÷ 5 = 8.54 in. Assuming the moment arm = 0.87 of the depth to the center of the steel then 8.54 ÷ 0.87 = 9.8 in. Adding enough concrete to cover the steel we may assume the beam to be 11 in. full depth, the size then being 5 in. × 11 in.

Safest Way to Design Beams

The foregoing is the safest way to design beams for the man not regularly engaged in reinforced concrete design every day. First find the end shear as above and divide by the unit shear to get the area of concrete required to resist the shear. Assume the width of the beam; and the moment arm = 0.87*d*. With this data assume a steel fiber stress of 16,000 lb. per sq. in. for a deformed steel rod or bar, 12,000 lb. for a plain steel rod or bar and 10,000 lb. for wrought iron. Using the diagram given on page 640 of the December issue, obtain the steel ratio and concrete fiber stress, Taking the above example: On the diagram we find that a moment arm (j) = 0.87 is on the line showing 0.9 per cent. of steel. What is the area? The width being 5 in. and the depth to the center of the steel being 8.54 in., the area = 5 × 8.54 = 42.7 sq. in. The steel area = 42.7 × 0.009 = 0.3843 sq. in. The area of a bar ⅝-in. sq. = 0.3906 sq. in., which is very close and will be used. Entering the diagram at the top and following the 0.9 line down to an intersection with the line f_s = 16,000, it is found that the concrete stress = 725 lb. per sq. in. It is therefore unnecessary to supply any web, or shear, reinforcement or even turn up any bars.

Since, however, the bars will not be required for reinforcement the entire length in the bottom some may be turned up, if more than one be used. When several bars are used a very good rule to follow is turn up at the quarter span one-fourth of the bars. At one-sixth the span turn up one-third of the remaining bars, and at one-eighth the span turn up one-fourth of the remaining bars. These bars to go up at an angle of 45 deg. to within 1 in. of the top and then go along the top over the supports. The remaining bar, or bars, in the bottom to go clear to the end of the supports and be turned up for anchorage.

The question of bond comes in now. This should not exceed 80 lb. per sq. in. of the surface of the bars for plain steel, nor more than 120 lb. for deformed steel having a mechanical bond. The shear we have seen is uniform from the plane of the steel up to the neutral axis and the following notation can be used to give all the relations:

Let V = total shear in pounds.
v = shear per square inch in pounds.
j = moment arm (decimal).
d = effective depth in inches.
b = width of beam in inches.
u = bond stress per square inch.
o = circumference or perimeter of bar.
S = number of bars.

$$\text{then } v = \frac{V}{b\,j\,d}$$

which is what we have already given, but placed here as a formula. The bond stress is,

$$u = \frac{V}{j\,d \times S\,o}$$

This formula for bond stress is very important and fixes the sizes of the reinforcing bars. This must be used in slabs as well as in beams. Assume a bar 1 in. square and deformed. The unit bond stress is 120 lb. The perimeter of the bar is 4 in., so the total bond stress per lineal inch = 4 × 120 = 480 lb. The fiber stress = 16,000 lb. per sq. in. and the length of the bar, measured from the middle of the span, must equal 16,000 ÷ 480 = 33.3 in., or a total span of 5 ft. 6 in. If we used four ½-in. bars the sum of the perimeters would be 8 in., or double the surface area of the 1-in. bar, which has the same strength. All reinforcement should be investigated this way and the size of the bars fixed to give the maximum bond resistance. Smaller bars cost more to lay, as stated in the last article, so the size must be fixed by the bond resistance in order to get the largest size that will give the required strength. Many cracks in reinforced concrete work are due to a neglect to consider bond resistance and shear.

Reinforced Concrete Regulations

The values given heretofore for tensile strength, shear, bond and compressive strength of concrete are for purposes of illustration and taken from approved ordinances and regulations. In nearly every large city the building ordinance contains reinforced concrete regulations which designers must follow. There are no fixed standards yet as in steel design, but in a few years this will be settled. There has been a strong tendency of late years towards an increase in steel stress due to the fact that companies manufacturing reinforcement are pushing the sale of their products and the steel is cut down to the lowest posible limit. The average man would think these companies would try to load a building with steel and laughs when the concrete engineer tells him that steel is cheaper than concrete and the cheapest and strongest buildings contain much more steel than is now customary. It is true, however, that the more steel the cheaper the building, as concrete is cheaper than steel, but the steel companies are competing with each other and each company claims special virtues for the steel made by it. To the average architect who has not looked closely into the matter, and to the owner who knows nothing about it, the company offering to save on steel is the company whose product is used. The concrete contractor is not considered and no just comparison is made.

The cost per square foot for one inch thickness of concrete is 2½c., including formwork. This is a usual estimating price, and brings the cubic foot price to 30c. A slab on an 8-ft. span is wanted which will carry 50 lb. per sq. ft. in addition to the weight of the slab; an ordinary porch load. The steel area per 12-in. width will be so small that we must use a fabric. The purchaser does not consider the concrete, as a rule, for he always underestimates the cost, and looks to the steel dealer for his reinforcing. The cheapest he can get has an area of 0.162 sq. in. per 12-in. width and this requires a slab 5 in. thick. The total cost will be:

5 in. × 2½c., for the concrete	$0.125
One sq. ft of the fabric	0.030
Cost per sq. ft	$0.155

By using double the amount of steel the thickness of the slab will be cut down to 3½ in., and as the cost of fabrication for heavy mesh is no more than for light mesh, the cost per sq. ft. is only about 50 per cent. more instead of double. The cost of the thinner slab with the greater amount of steel is:

3½ in. × 2½c. for the concrete	$0.0875
One sq. ft. of fabric	0.045
Cost per sq. ft	$0.1325

By paying 1½c. more per sq. ft. for the reinforcement the owner saves 2¼c. per sq. ft. on the slab. He also gets a slab that will carry nearly double the load and the dead weight is much less, this last item making a big difference in the design of the columns and footings.

Facts For the Contractor to Remember

The contractor doing reinforced concrete work should bear these facts in mind, for the ability to figure such matters out often makes all the difference between profit and loss. The big reinforcing companies vie with each other in cutting the steel down to the lowest possible limit, and this has given the writer an opportunity several times to secure buildings for certain contractors, by making designs to secure the maximum ultimate economy. He has saved on the concrete and thus cut down his dead loads. This has enabled him to cut down the sizes of beams, girders, columns and foundations, so that while the steel bill was about double that of the men who gave the owner a "free" (?) design, the total cost was much less. He has, however, run up against some exceedingly dishonest and careless designers. In this material the owner, contractor and architect must be continually on guard against the many concerns that do "free"(?) designing. No one really does it, for it costs money, and the companies cannot afford to do too much for nothing, if they do anything for nothing. Getting out free booklets containing designing tables is different from preparing drawings which cost several hundred dollars and making the owner or his representatives a present of them. No one actually makes such expensive presents and the public needs to be warned.

Buildings Deteriorate

Buildings of wood, brick, stone and steel begin to deteriorate from the day they are built. Concrete buildings on the contrary improve with age, due to the aging of the concrete. This is an additional reason for using low stresses in the steel and thus using considerable steel. Suppose a design is made with the concrete stress = 650 lbs. per sq. in. and a steel stress = 18,000 lb. per sq. in. Concrete increases with age, and at the end of one year the safe fiber stress = 1000 lb. per sq. in. Owing to the fact that the neutral axis has been raised slightly the steel stress is reduced about 2 per cent. Thus a 50 per cent. increase in the concrete stress has resulted in only a 2 per cent. increase in the total strength, for it would be dangerous to try and stress the steel higher than 18,000 lbs. even with good mechanical bond. We might have designed with a steel stress of 15,000 lb. and a concrete stress of 650 lb. with a bond stress of 40 lb. per sq. in. In one year the concrete could be stressed up to 1000 lb. with a bond stress of about 60 lb. and a steel stress of practically 18,000 lb. Thus a 50 per cent. increase in the concrete stress calls for practically 25 per cent. increase in the steel stress, and the building is doubled in strength for the benefit of the owner by this small increase in the amount of steel. This doubling in strength applies to live load only, the actual increase applying to the total load.

In the next article we will take up the design of T-beams and give tables for the design of tile and concrete floors. In a following article a complete design will be carried through.

Annual Meeting Cleveland Builders' Exchange

At the annual meeting of the Cleveland Builders' Exchange, held November 15, the following directors were elected for the ensuing year: C. A. Carson, Ira S. Gifford, James R. Gloyd, A. C. Klumpt, J. H. Libby, F. M. Potter and R. R. Wills.

The newly elected board of directors met November 16 and elected officers. J. C. Skeel, former vice-president, was chosen president; George A. Rutherford, vice-president; Henry Waterson was re-elected treasurer, and E. A. Roberts and H. A. Hall were re-elected secretary and assistant secretary, respectively.

President-elect Skeel is vice-president of the Skeel Brothers Company, general building contractors. He is president of the Frontier Mason Builders' Association, comprising members of the trade in all of the large cities bordering on the Great Lakes.

The membership of the Exchange was increased during the year to 405. This included 245 contracting firms, 145 dealers in building materials and 10 bonding firms.

Elmer E. Teare, the retiring president, made the principal address of the evening, and among other things pointed out the forward steps taken by the Exchange during the year. Ira S. Gifford and Charles Noch were presented with silver cups for their work in enrolling new members.

Southeastern Carpenters' Association

At a recent conference in Chattanooga, Tenn., the final steps were taken in perfecting the organization of what is known as the Southeastern Carpenters' Association, with J. A. Norton, of Savannah, president; O. R. Jarrett, of Asheville, first vice-president, and H. Hamilton, of Chattanooga, secretary and treasurer.

Each of the states included in the organization, as well as Porto Rico, has a vice-president.

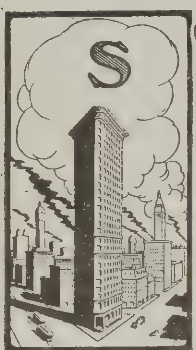
J. E. Henderson, of Chattanooga, was elected chairman of the Executive Committee.

The object of the association is a closer affiliation of the carpenters and to keep them acquainted with the building conditions all over the country. The organization takes in nine states known as the fourth district and includes Porto Rico. The states are North Carolina, South Carolina, Georgia, Florida, Alabama, Louisiana, Arkansas and Tennessee. At the conference were more than 50 delegates, representing a membership of nearly 8,000 carpenters.

The next meeting of the association will be held in Birmingham, Ala., on the first Monday in December, 1912.

Classified Costs of a Modern Office Building

Figures from Actual Cost Sheets--Classified List by Trades--Mason Trades the Largest Represented--High Percentage Cost of Equipment



SOME exceedingly interesting figures showing where the money goes in the cost of a modern skyscraping office building were presented in a paper read before the members of the Manufacturers and Contractors' Club of Pittsburgh at their regular meeting in the Lewis Block on the 21st of November. The paper giving the actual amount paid out in the construction of one of the largest skyscrapers recently completed in the city named was read by J. A. Strouss, of Knox, Strouss & Bragdon, but the authorship was not made public. The figures of cost of the various parts of the work are of such interest that we present the following extracts of the paper in question:

In these days, when the building trade is composed almost entirely of specialists in various sub-trades, there are very few of us who know, or, in fact, have even a remote idea, of the distribution of money that is made when a modern tall office building is constructed, and it has occurred to the writer that a brief resumé of the distribution of money used for the construction of one of our larger office buildings would be of interest to the club.

Needless to say, these figures are not original, but have been compiled through the kindness and good will of one of our larger builders.

The building in question I am not at liberty to name, but will say that it is a modern first-class office building, involving an expenditure of $1,270,000, and the division of this amount over the various parts of the work is given in tabulated form below:

		Per Cent.
Wrecking	$4,158	.33
Excavating	47,990	3.79
Shoring	34,876	2.74
Steel work	156,563	12.33
Stone, cement and concrete	95,525	7.52
Fireproofing	38,865	3.07
Brick work	56,222	4.44
Plastering	39,560	3.11
Painting	20,335	1.60
Mill work	86,100	6.77
Carpenter work	117,000	9.22
Terra cotta	40,000	3.15
Heating	75,330	5.93
Elevators	106,200	8.36
Electric work	40,500	3.17
Sheet metal	21,840	1.72
Plumbing	51,520	4.06
Waterproofing	9,500	.75
Metal lathing	9,100	.71
Ornamental iron	75,900	5.98
Tile and marble	90,000	7.09
Weatherstripping	1,025	.08
Vaults	24,750	1.94
Hardware	1,500	.12
Vacuum systems	5,000	.36
Mail chute	2,250	.18
Revolving doors, etc	5,700	.45
Steel lockers	8,335	.66
Refrigerating machinery	3,827	.30
Roofing	950	.07
	$1,270,421	100.00

The column at the right gives the percentage of the total cost involved in each item, from which it is seen that the biggest single item is the steel, amounting to 12.33 per cent, the second largest single item is the carpenter work at 9.22 per cent, followed closely by the item of elevators, and this in turn by the stone, concrete and cement.

The fact that the elevators form such a large proportion of the total cost of the building is surprising, as most of us regard the elevators as being merely part of the equipment.

Classifying this list by trades would make a division as follows:

1—Preparatory work, namely, wrecking of old buildings, excavating and shoring, $87,400, or 6.86 per cent.

2—The mason trades, meaning by this the stone,, concrete and cement work, fireproofing, brickwork, plastering, terra cotta, waterproofing, tile and marble work, total $359,672, or 29.13 per cent of the total.

3—The structural steel and ornamental iron work, $233,463, or 18.31 per cent.

4—Metal lathing amounts to $9,100, or .71 per cent.

5—Sheet metal work, amounting to $21,840, or 1.72 per cent.

6—Roofing, amounting to $950, or .07 per cent.

7—Group of trades, which might be called the "finishing," covering the painting, mill work, carpenter work, weatherstripping and hardware, amounting to $225,960, or 17.79 per cent.

8—The equipment of the building, meaning by this the heating apparatus, elevators, electric work, plumbing, vacuum system, mail chutes, revolving doors, etc., steel lockers and refrigerating machinery, amounts to $298,662, or 23.47 per cent.

9—Vaults, which might or might not be considered as part of the equipment, amounting to $24,750, or 1.94 per cent.

Looking at this group list we see that the big end belongs to the mason trades, being 29.13 per cent of the total, showing that those trades still have the largest interest in the modern buildings.

This list is also interesting as shedding light on the question as to whether a mason or a carpenter is a logical man for a general contractor on work of this type, as it is generally considered by most of us that the trade having the largest interest in the proposed structure is in the best shape to take the general contract.

It is also of interest as showing one of the reasons for the elimination of the general contractor and the subletting of work direct by the owner through the architect.

The writer will confess to being astonished at the cost of the equipment, as most of us would hardly consider it true that almost one-fourth of the total cost of the building goes into the various auxiliary devices which are now considered necessary to make an office building habitable.

A number of cement-block cottages are being built at Plymouth, England, but Consul Joseph G. Stephens says that the blocks are made by hand in rough molds, which is more expensive than concrete walls. Two men and a boy earning a total of $2 a day make 125 of the blocks a day.

Modern Barn Construction

The Old and the New Method -- Interesting Examples of Each -- Plank Frame Construction vs. the Mortise and Tenon Frame -- Low Labor Cost of the Work

By L. H. B. Hand

AS good construction in barns seems to be rather the exception than the rule in many parts of the country, and as "shacks" are very much in evidence in some places where good dwelling houses are the rule, I am sending photographs of two barns on practically the same farm, that is, the land is owned jointly by two well-to-do men, who in conjunction with a number of enterprises own and operate about 855 acres of Wabash bottom land.

A Barn Built Only Eleven Years Ago

The buildings are practically of the same size on the foundation, namely, 30 x 48 ft. The first one was built 11 years ago and will figure more feet of material in the frame than the second one. It has about the same amount of roof and perhaps 2/3 as much siding. It furnishes shelter, such as it is, for 8 horses and the mow might possibly hold 4 tons of hay. As will be seen, it is out of plumb level and square. It is unsightly and badly adapted to the needs of the farm and is to be classed with the costly makeshifts commonly called "barns."

The second structure accommodates 12 head of horses or mules; 30 tons of hay with storage capacity for 600 to 800 bushels of grain. It was erected by day labor at an estimated cost of $716, which, I believe, is somewhat over the real cost as there was considerable material used out of an old building which was razed to make room for the new structure.

The frame building sets upon a concrete wall 10 in. thick which extends 4 ft. above the stable floor. The floors in the feed way and storage are both of concrete. All the stalls are of a single thickness of hardwood securely battened together with 1 x 6-in. battens at the rear and 1 x 3-in. battens upon its center nailed both ways with 16d nails and clinched, making a complete barn with not a single cranny that a rat can harbor in and a stall and kicking-board that a mule can make his life a burden and cannot kick down. The rear battens of the stable extend 4 in. below the boarding and are bedded in concrete.

The footings are concrete 8 in. thick and 16 in. wide. The foundation walls and footings contain 35 yards of concrete as measured in a 1¼-yards mixing box in which 5 sacks (1¼ barrels) of cement were used to the box, making a mixture of one barrel of Portland cement to one yard of clean coarse gravel, which is the mixture I use for all light walls and which gives a good wall every time.

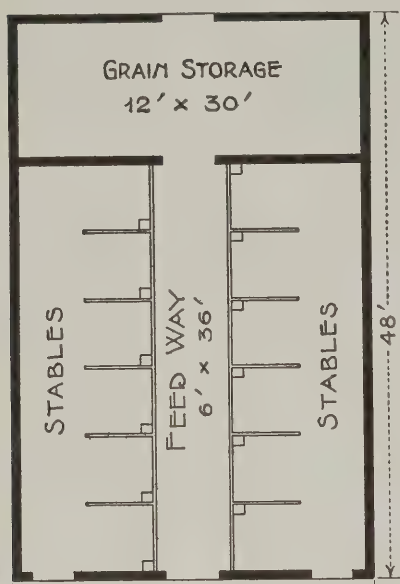
The 35 yards of concrete were put in at a labor cost of $54.40, which includes making and raising the casings. The casing was made of old sheeting lumber from the old building which cost more in labor than new material would have done as it was not possible to make the casing of any regular width. Each course of concrete had to be leveled by sight lines to in-

Another Barn of Plank Frame with Concrete Basement Walls

Modern Barn Construction

sure the casing raising plumb at the several corners.

As my meaning may not be clear on this point, I will explain the method of leveling concrete on all long walls or under water in foundation trenches. I establish a point 1 ft. above the finished wall and set up targets at all corners and cross walls by driving good solid stakes into the ground and nailing on a cross bar of say 1 x 3-in. stuff. Supposing then that my casing is wide enough to allow me to fill 18 in. I cut a sight stick 18 in. shorter than the targets. It is then only necessary to fill the casing up until the top of the sight stick will come in line with the top of the target when the sight sticks sets on top of the concrete to obtain the exact hight of the wall at any point.



Basement Plan

I usually endeavor to make my labor gang just large enough to raise the casing and fill it in a day. This method is not the best for rapid work on large contracts; but enough lumber to make a casing 18 in. high all around a large building is about all I care to damage and is usually about all a small gang will fill. I get an absolutely straight and level wall with less waste.

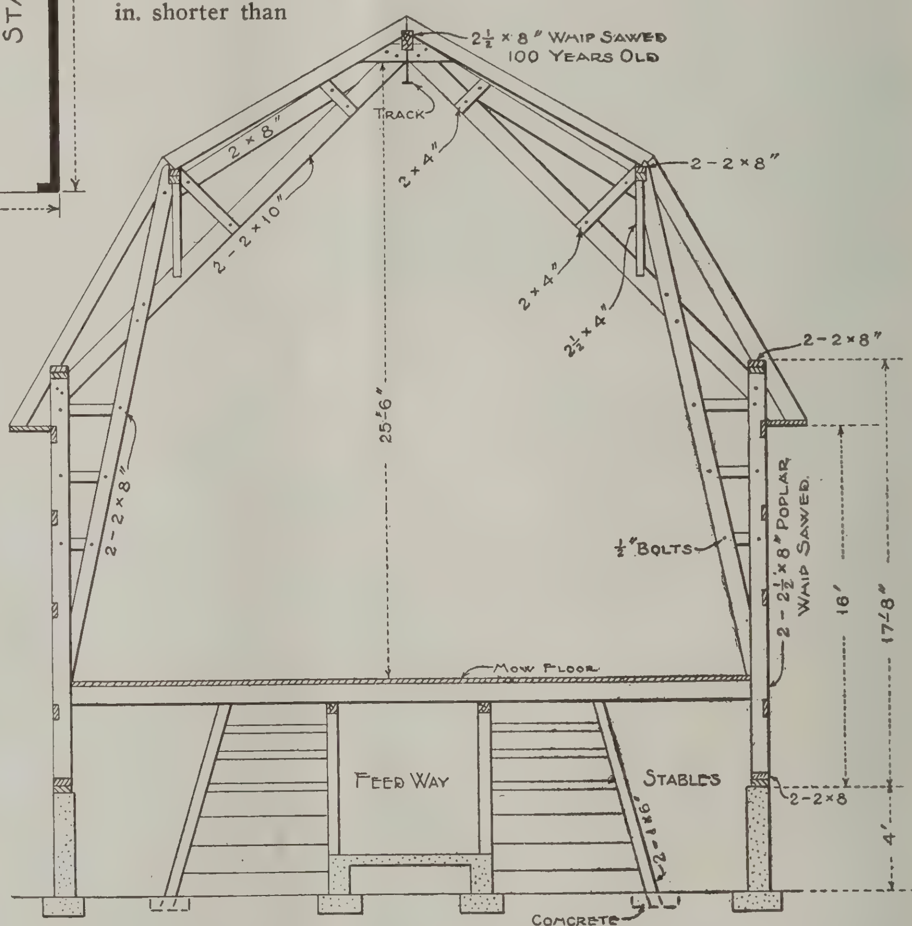
It is only necessary to line the top of the casing after the first round as the wall holds the bottom straight and I have no thick and thin places from bulged casing, neither is it possible to get a corner out of plumb or a wall wide or narrow at the top as the casing carries the exact sizes and would be the same on a 40-ft. as on a 4-ft. wall.

All concrete in this building was mixed to the consistency of mortar.

The storage floor has a finish coat of 1:2. The feedway floor was tamped and straight edged. The straight edge 1 x 4 in. was then turned flat and used as a float and when dry enough the surface was troweled. While all gravel used in the job was coarse, not a stone or hole appears in any place in the floor and the surface is hard and flinty; giving thorough satisfaction to the owner.

When the last round of concrete was put in and leveled I drove 1 x 1 x 6-in. pins into the top of the wall down to the level. The sills are 2 x 8-in. pine. The first round was bedded in fresh cement mortar and spiked to the pins in the concrete; the second round was spiked to the first. The stall studding are 3 x 5 black walnut; the posts in the two middle bents are 2½ x 8-in. yellow poplar and corner posts are made of one piece of 2½ x 8-in. yellow poplar and one piece of 2 x 8-in. yellow pine. The center purlin or ridge board is of 2½ x 8-in. yellow poplar. The yellow poplar and black walnut were timbers out of the old house; were over 100 years old and were sawed with a whip saw.

The siding and mow floor are 8-in. shiplap pine. The roof sheathing is 1 x 4 pine spaced as near 13-in. centers as the sheet metal roof would admit. This was done so that in case the galvanized steel proved to be a failure (I do not recommend galvanized steel for any purpose, much less for roofing we could drop a 4-in. lath between and have suitable spacing for shingles. The center purlin before raising was bored every 2 ft.



Elevation Showing Framing of One of the Middle Bents

Modern Barn Construction

for hay carrier track hangers and the carrier bolted in place in a very few minutes after the sheathing was on, working on top of the roof boards. No house was built out over the track in the gable but an inverted trough made of one 5-in. and one 6-in. board was nailed to the extension of the center purlin and the roof coping nailed over the joint. As the wood trough was of good old yellow poplar which would outlast about a dozen galvanized roofs we did not roof it.

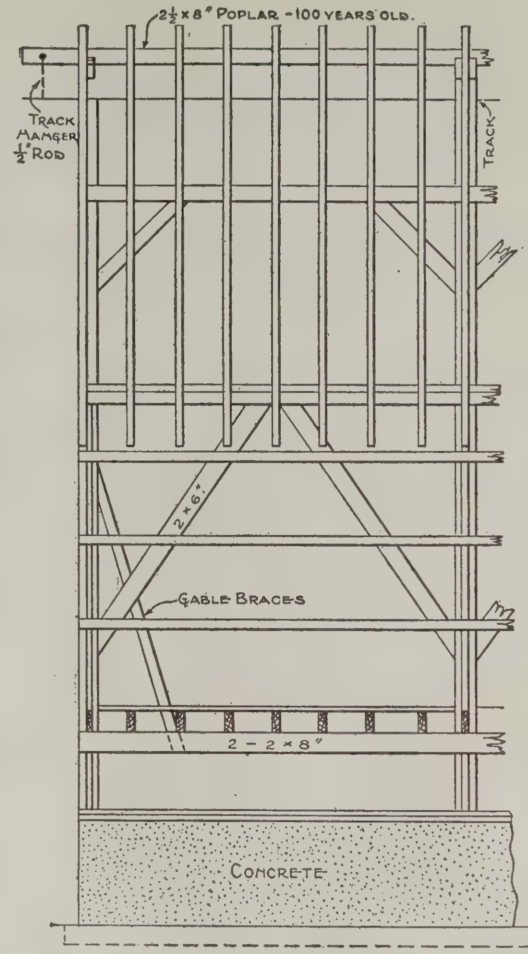
The door to take hay into the gable was not hinged or made to slide but was fastened in place with six hooks. To operate the door a heavy—2 x 4 oak—cross bar was bolted to one of the battens. When using the hay fork the hay rope is secured to this cross bar, the door unhooked and lowered to the earth; and when the hay harvest is over the hay rope is again secured to this cross bar and the door again raised to place and hooked for another year. This was done because the farm is operated by tenants and the owner abhors the sight of flapping doors and broken hinges and says that tenants do not as a rule pay much attention to hooking doors, etc.

The framing, as will be seen from an inspection of the picture, is of modern plank frame construction and is much more rigid than any mortise and tenon frame I ever saw, and I served three years of my apprenticeship on barns.

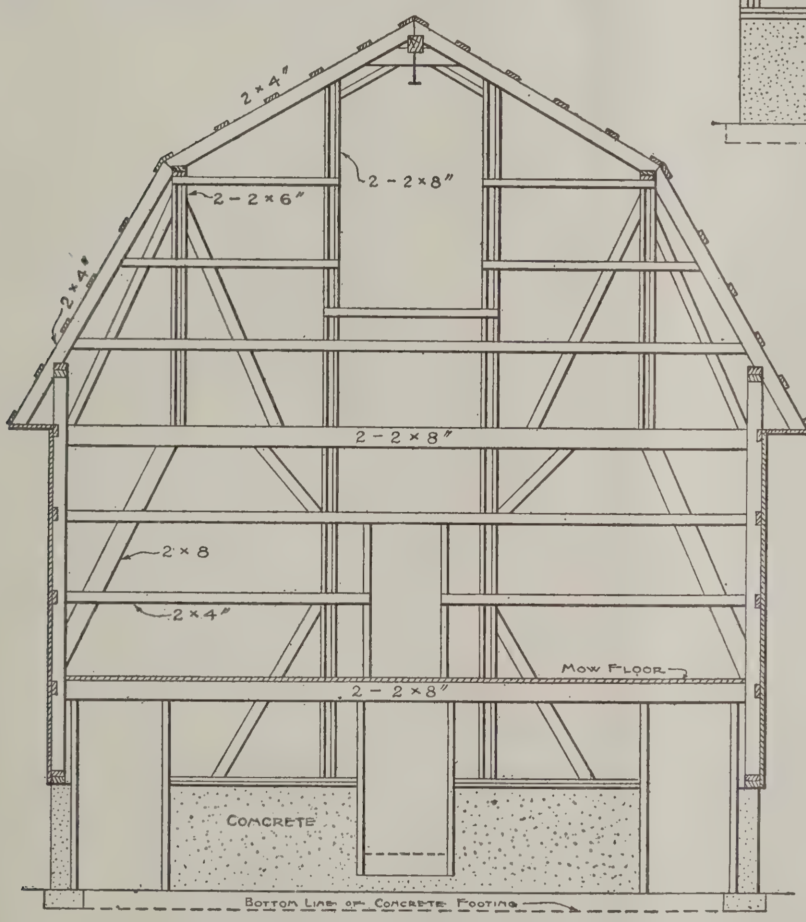
It would hardly be possible to get any whole timbers out of this frame if it was desired to wreck it as all spikes used were clinched.

To sum up this barn, it is convenient, economical to build, will resist great wind pressure and is strong enough to carry baled hay. It is neat and tidy in its finished appearance, has not a rat harbor or a bird hole in it and if kept roofed and painted ought easily to last 75 to 100 years.

The first barn built 11 years ago is now nearly a wreck, never was convenient, never looked well, is a den of rats and the forage is covered with the droppings of sparrows and barn swallows. Good farming means good barns; the better the barn the better the chance to save the products of the farm. To farm without stock is to rob the soil, to raise stock without barns is to rob the stock; to starve and freeze the stock is a sin and finally robs the farmer. Poor farmers mean an impoverished nation, hence good barns are



Elevation of Side Framing



Elevation Showing Framing of an End Bent

Modern Barn Construction

a foundation stone toward national prosperity.

The new barn was built for the most part by the writer with two helpers. We raised the end bents and had the assistance of two more men on the center bents using a small gin and 20-ft. gin pole. The total labor cost was about $217.

New Polytechnic High School for Pasadena

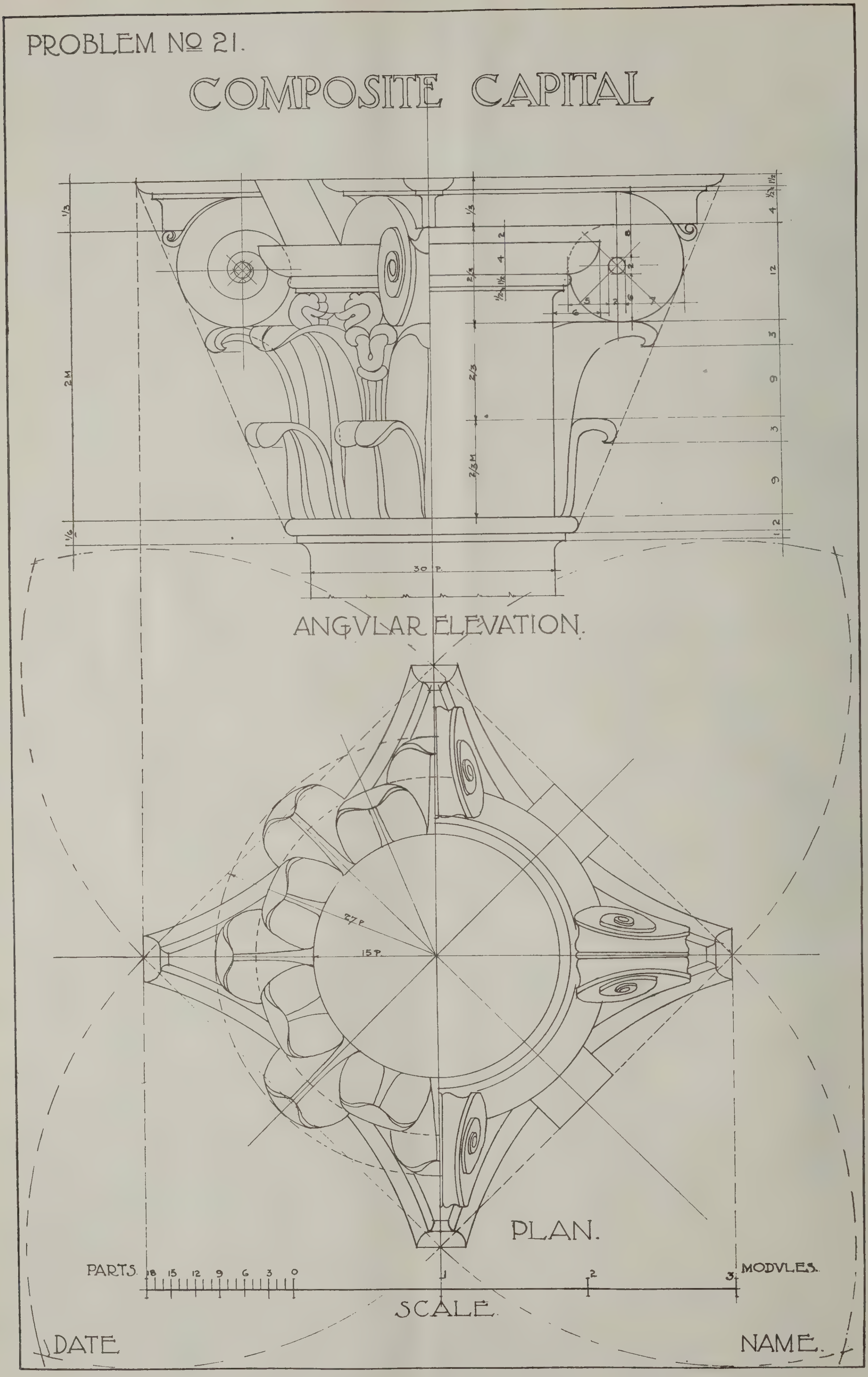
The contracts have recently been awarded for the erection of a group of polytechnic high school buildings at Pasadena, Cal., designed by Architect Norman F. Marsh, 212 Broadway Central Building, Los Angeles. The plans provide for a group of five structures of classical design and to cost a little over $300,000.

The Administration Building will be two stories and basement in hight shaped like a letter "E" with a frontage of 290 ft. and three wings extending back 230 ft. The Science and Agricultural Building will be two stories and basement in hight and cover an area 132 x 90 ft., while the Domestic Arts and Science Building will be of the same size without the basement.

The construction of the buildings will be fireproof with reinforced concrete frames, brick walls, hollow tile and concrete floors, hollow tile partitions, concrete roof slabs with composition covering, plate glass front windows, Oregon pine trim, etc.

The manual arts building will be one story with mezzanine floor, 94 x 222 ft., with concrete walls, cement floor and composition roof.

The gymnasium will be a one-story frame building covering an area 114 x 123 ft.



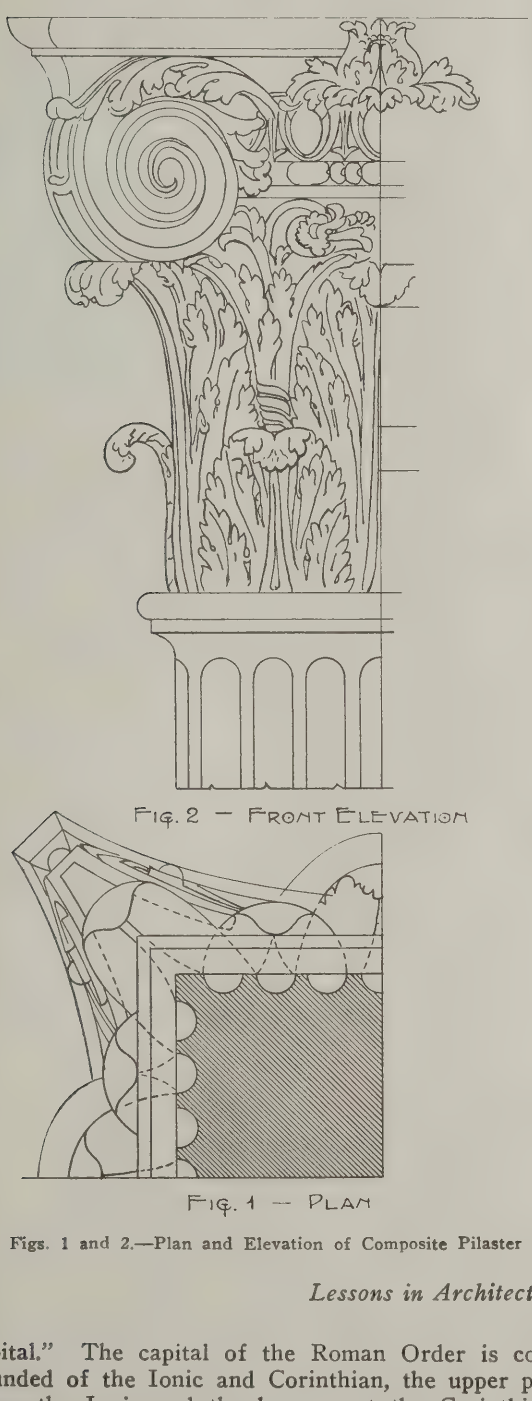
Lessons in Architectural Drawing for Beginners—Scale of Sheet One-half Original Size

Lessons in Architectural Drawing for Beginners

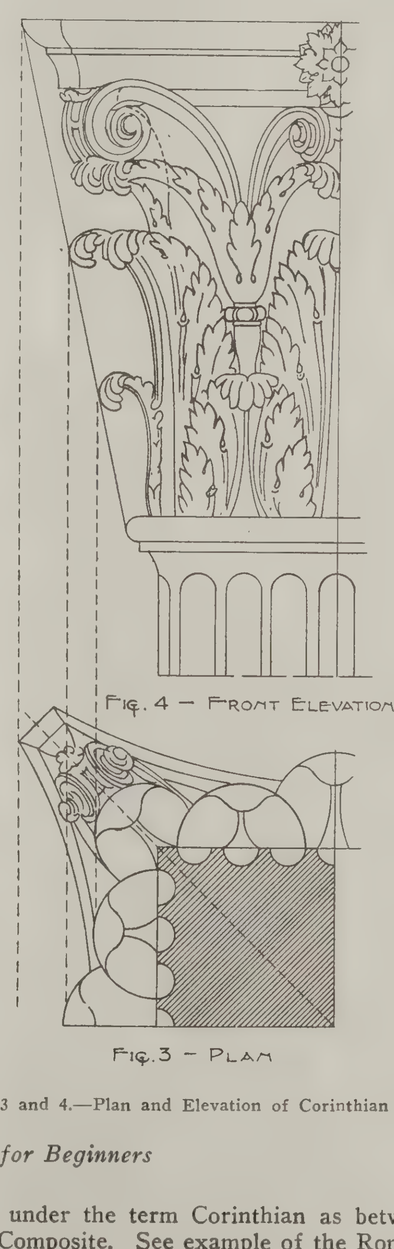
The Composite Capital--Its History in Brief--Method of Drawing--Some of Its Details

By Alfred Auslander

WITH this, the twenty-first lesson of the series, we take up the fifth of the capitals, which is the "composite capital." This capital was invented by the Romans; therefore it is also known as the "Roman capital." The capital of the Roman Order is compounded of the Ionic and Corinthian, the upper part being the Ionic and the lower part the Corinthian; hence it has also obtained the name of the Composite Capital.



Figs. 1 and 2.—Plan and Elevation of Composite Pilaster



Figs. 3 and 4.—Plan and Elevation of Corinthian Pilaster

Lessons in Architectural Drawing for Beginners

Some writers of architecture seem to make a difference between the two names, describing one of the Capitals under the heading of Roman and describing others under the name Corinthian. It does not seem satisfactory why one example should be especially entitled to the term Roman, for the Corinthian has quite an equal claim—they both owe their existence, as mentioned above, to the Romans. They are evidently but different modifications of the same idea, and we think there can be discovered as much diversity in examples included under the term Corinthian as between them and the Composite. See example of the Roman Order from the Arch of Titus at Rome.

We have already said that the upper part of this Capital is taken from the Ionic Order, but by comparing the plan on the opposite page with the plan of the Ionic Capital shown in the 18th lesson the student will see that they are not quite alike. While the abacus of the one is perfectly square in plan the abacus of the Composite Order is of such form as may be inscribed in a square (see dotted line of the square on full page drawing). The four sides of the abacus are concave, curving out towards the angles, with the corners cut off, which is quite similar to the abacus of the Corinthian, as described in our last lesson, or of the abacus of the Ionic known as the Scamozzian Capital. The four corners are supported by four volutes exactly the same as shown for the Ionic. The sides or flanks are the same on the fronts, and the two lower rows of leaves are what is usually found in any example of the Corinthian Capital; but there is some difference between the caulicoles or stalks that spring up between the leaves, which, though suitable to the Composition, are not so elegant as in the Corinthian Order.

The Astragal and Fillet

This capital is separated from the column shaft by an astragal and fillet, and is in the shape of a perfect cylinder, the same width as the upper radius of column, and is surmounted by a fillet, bead and ovolo, the last two always enriched with carvings, on top of which the abacus is placed and from which the corner spirals grow out. Immediately above the astragal is the first row, and above the first is the second row of leaves, the last ones being so disposed that under each corner and under the center of the abacus is one, making in all eight. The lower eight leaves are placed between two of the upper. The half plan on the left side, as well as the elevation, clearly shows the disposition of the leaves. The half plan on the right side shows the disposition of the volutes.

The leaves of the Capital on the elevation of the full-page drawing are shown in their general outline. This should be drawn by the student in pencil only after obtaining the general outline. The subdivision of the leaves should be drawn in very carefully and the general outline erased. These subdivisions are shown by Figs. 2 and 4. The student should note that the elevations in Figs. 2 and 4 do not show the thickness of the leaves, owing to the fact that they are elevations of bodies with straight surfaces, as shown by the plans Figs. 1 and 3, while the full-page drawing shows the leaves applied to a body with a round surface, the thickness of the leaves being indicated by double lines.

Pilaster is a Square Column

It may not be out of place to mention that pilaster in architecture is a *square* column, sometimes insulated, but more frequently set into the wall and only projecting a fourth or fifth part of its thickness. The pilaster borrows the name of each order, and has the same proportions, capitals, members and ornaments with the columns themselves. Pilasters are made usually without either swelling or diminution, as broad at top as at bottom; though some of the modern architects diminish them at top and make them swell in the middle, like columns, particularly when placed behind columns.

Pilasters are sometimes fluted, though the columns they accompany are not so; and, on the other hand, the columns are sometimes fluted when the pilasters that accompany them are not.

The flutings of pilasters are always odd in number. The student should compare the two pilaster capitals, Fig. 2 being the Composite and Fig. 4 the Corinthian. The student may also look at some executed work having foliated capitals. The New York Public Library Building at Fifth Avenue and Fortieth to Forty-second Street may serve as a good example, etc.

Laying Out the Drawing

To lay out this drawing proceed as follows: Place paper vertical and draw the vertical center line of a sheet twice as large as the pages in the Building Age. Draw a horizontal line 6½ inches above bottom margin line. The intersection of the two lines will be the center of the column on the plan. Draw another horizontal line 1¼ inches above bottom margin line, on which lay off the scale, using 2¼ inches to the module, which equal to the lower radius of the column. Divide the module into 18 parts, as shown. Draw the plan of the column cap, looking up first by showing the circumference of the upper part of column, using 15 parts for the radius. Lay off on each side and up and down of column center two modules and connect the points, giving a square, the diagonals of which will measure four modules. Take one side of the square as a radius and describe arcs on all four corners. The intersection of the arcs will give the centres for the curve of the abacus. The width of the ends of the abacus are 6 parts. Draw a circle with a radius of 27 parts for the extreme projection of the second row of leaves. At this point start with elevation, leaving the plan unfinished, as all other points are to be gotten on the plan from the elevation.

Some of the Details

Draw a horizontal line 2½ inches from the top margin line for the top of the abacus, and continue the centre line from the plan. Lay off for the abacus 1½, ½ and 4 parts. The extreme projection of the avolo at the centre line being 6, the fillet below 3 and facia 1½ parts. Produce these points to the plan, and describe arcs parallel to the outside line of the abacus already drawn. Then lay off on the elevation two modules for the rest of the height of the capital and divide this height into 3 times 2/3 mod. The first 2/3 mod. or 12 parts will give the extreme height of the lower row of leaves, the second 2/3 mod. for the height of the second or upper row of leaves. Now draw the astragal, projecting same 3 parts from the column shaft. Connect the extreme point of the astragal with extreme point of the abacus by a dotted line. This will give the extreme projections of all leaves and volute. You will now draw the volute as explained in one of our previous lessons, taking 2 parts for the eye of the same. Sketch in the leaves, front of volutes roughly and return to the plan. Produce all points of the volute from the elevation and draw in same as shown on the right side of the plan. Show a block in the centre measuring 9 parts in width for the fleuron and stopping same on the line of the square. Draw in the second row of leaves first and disposing same as explained and then first row of leaves.

Now finish the elevation by producing every point of the plan of leaves—blocks, etc., to the elevation. Figure all heights, projections, etc., in modules and parts. After the angular elevation is done, it will be advisable to draw on another sheet, the front elevation of the Capital, which will be somewhat similar to the Capital of the plaster shown in sketch, Fig. 2. Also compare such elevation with the one for the Corinthian Order explained in our last lesson.

Verdict in the Austin Dam Disaster

The coroner's jury which made diligent inquiry into the disaster at Austin, Pa., where some 80 persons were killed and the village wiped out by reason of the bursting of the dam of the reservoir, returned a verdict of gross negligence against George C. Bayless, president of the paper company, whose mills were operated at that place, and Frederick N. Hamlin, the superintendent of the company. Mr. Hamlin and Michael C. Bailey, an employee in charge of the dam at the time of the break, have been held for the December court in $1,000 bail, charged with involuntary manslaughter.

Forms for Reinforced Concrete*--I.

Materials to Use--Dressed Lumber the Best--Quantity Required--Cost of Form Lumber--Time to Remove Forms

By Frederick W. Taylor and Sanford E. Thompson.

THE variation in the cost of "forms" and the difficulty in estimating them are apt to play havoc with estimates and determine the amount of profit or frequently of loss in the building of reinforced concrete structures. Other items of cost—the cost of concrete material and the labor of mixing and placing—may be separated easily and estimated as accurately as in any other class of construction.

Forms must be so designed and built and the material used must be of such a character as to produce surfaces and lines in the finished concrete that are even, smooth and true, without noticeable warps, irregularities or lines of joints between different sections of the forms.

The most economical material is that which will produce this result with the smallest amount of manual labor in making and setting these forms, rather than the material of lowest first cost. The first cost of course must not be so excessive as to overbalance the saving in labor and material. As materials for form construction, wood, steel, cast iron, concrete, and brick, have been variously used.

Wood is most readily adapted to different designs, although it is expensive in construction and the waste is large. The treatment in this chapter is chiefly of wood forms.

Steel has been successfully used for conduits and is coming into use for other classes of concrete construction. The chief difficulties, as indicated in paragraphs which follow, lie in conforming to variations in design of the structure and in producing even surfaces.

Cast iron is expensive in first cost and costly to transport from place to place. In certain cases where it may be used repeatedly in buildings which are close together, it may be economical.

Concrete or mortar slabs sometimes have been made up in advance and then set in place to serve as forms. They are left in place permanently to make the finished surface of the structure.

Brick in the same way has been laid up for the faces of a column or wall and the interior filled with concrete. The brick, however, must be supported to resist the pressure of the concrete. The more common practice is to first build the concrete wall, using wood forms in the usual manner and then face the concrete with brick. Metal strips are attached to the form in such a way that they are cast in the concrete, and when the form is removed they tear loose from it and serve as ties to bind in the brick face.

Steel forms are very much more expensive than wood in the first cost, but can be used a larger number of times provided they can be adjusted to suit the variations in the design of the structure. When the structure is symmetrical throughout, as a conduit or tunnel, or where forms for certain parts, such as round columns, can be more readily shaped from steel than from wood and are repeated many times, the durability of steel may be a distinct advantage in reducing costs.

In ordinary work, such as building construction, the difficulty lies in adjusting the steel forms to different dimensions of members and to different buildings which vary even very slightly in design. If the steel is lapped to change the dimension, the joint is apt to show badly in the finished concrete surface. Furthermore, when the steel sheathing is made thin enough to be light in weight and of moderate cost, it dents and warps in handling, so as to produce uneven concrete surfaces.†

Lumber for Forms

The character of the work and the lumber markets generally determine the kind of lumber to use for forms. For very nice work where exceptionally smooth surfaces are required, as in moldings and other ornamental designs, white pine is the best material to use. For ordinary work, it is too expensive and too soft to be durable where forms are used over and over again. Spruce, Norway pine, and Southern pine are generally the most available. North Carolina pine makes excellent sheathing. Spruce, in sections where it is readily obtained, is perhaps the best material for studs, joists and posts. Hemlock is too coarse grained for sheathing and is unsafe for supporting heavy framework. The hard woods are too expensive to work.

Lumber should be free from shakes and rot and as free as possible from knots. Knots will show on the finished surface of the concrete and of course will weaken lumber which is used for supporting forms.

Partly dry lumber is better than kiln dried, which will swell and bulge at the joints, and better than green lumber, which will shrink if not kept wet so as to leak badly when the wet concrete is placed.

Finish of Lumber

Even for rough work it is generally best to use lumber for sheathing that is dressed at least on one side and two edges to make the boards of uniform width so that they will fit together. Even if the appearance of the concrete is of no account, the smooth form surface will reduce the labor of removing and cleaning the forms.

It is still better to use lumber dressed on all four sides. The first cost is so little more that it will be over-balanced by the convenience in handling and working up and placing.

Tongue-and-grooved stock is most common for sheathing, although shiplap is used sometimes and bevelled edge is preferred by many, especially with dry lumber, so that when it swells the edges will crush without warping. Bevelled edge stuff is cheaper than tongue-and-grooved because with the latter there is ¾-in. of waste in the width of every board or plank. On the other hand, for sheathing which is to be used

*This article is adapted by the authors for the *Building Age* from a chapter in their forthcoming book, "Concrete Costs," copyright, 1912, by Frederick W. Taylor. All rights reserved.

†Steel forms are discussed by W. L. Caldwell in Proceedings National Association of Cement Users, 1908, p. 286.

over and over again, the tongue-and-grooved stock holds its place better and gives smoother surfaces.

The thickness of face boards should be absolutely uniform to prevent unevenness in the surface of the concrete.

Economical Thickness of Sheathing for Building Construction

Studies from the unit costs of the authors show that 1-in. lumber, that is, ⅞-in. after dressing, averages for column forms about 16 per cent cheaper to make and about 7½ per cent cheaper to erect the first time than 1½-in. stock. The 1-in. (⅞-in.) is about 15 per cent cheaper to erect the first time than 2-in. This lighter stock is easier to patch also than the heavier. On the other hand, 1-in. stock is not so durable and is more apt to break when removing the forms, so that thicker material is advisable in certain cases where it has to be used a large number of times.

As to cost of material, the thicker sheathing permits spacing of studs or joists further apart, but since the quantity of lumber in the studs or joists is apt to be governed by the strength required to resist the weight or pressure, the saving in material here is not enough to balance the excess cost of the thicker sheathing.

In general, therefore, 1-in. stock (⅞-in. dressed) is recommended for slab forms and for sides of beam and girders. For the bottoms of beams and girders, 2-in. stock (1⅞- or 1¾-in. after dressing) should be used for ordinary work and 1½-in. for narrow members. For columns 1½-in. stock is recommended because of its greater durability.

If slab boards are not built in panels but are nailed on to joists at each resetting, 1-in. stock is too thin and 1¼- or 1½-in. should be used instead. Also, if sheathing is used many times for floor slabs, say, more than six times, especially if the lumber is soft, 1¼-in. is preferable to 1-in.

Salvage on the completion of the job is greater with thicker stuff, but not enough greater to balance the higher first cost and the more expensive handling, unless the builders have a structure practically identical in design which they are to put up immediately.

Form lumber should be ordered by definite schedule made up from the design of forms.

For estimating the cost of the structure, a common plan is to assume a certain thickness of lumber per square foot of form surface, using different thicknesses, which may vary from 2 to 5 in. for different parts of the structure.

Use of Old versus New Lumber

Since lumber for forms costs $20 to $30 or even more per 1000 ft. B. M., while labor on forms for building construction averages $15 to $20, it would appear to be cheaper to spend considerable extra labor on old lumber than to use new. It is a general principle in ordinary carpentry work that old lumber should always be used where possible. In form building the conditions are somewhat different because the cost of taking apart small sections may actually count up to a larger sum per 1000 ft. B.M. than the actual cost of the new lumber, while at the same time the cost of rebuilding it is also increased.

The cost of making over old forms when the dimensions are near enough alike to avoid excessive work has been found by observation to be about 90 per cent greater than making up the same forms from new lumber.

As a general rule, new lumber is advised for patching, especially where odds and ends from the saw mill are available.

It must not be understood from the above that the authors advise throwing away old stock that is in fairly good condition. On the other hand, where this old material has been used many times and is somewhat injured or in short lengths, its value is very small.

Where form lumber is to be taken apart and rebuilt or used for other purposes, very light nailing is of great advantage.

Number of Times to Use Forms

The cost of the form lumber, no matter what method of figuring is used, depends upon the number of times the forms are used. For example, in a one-story structure the whole cost of the lumber (less its salvage), as well as the entire cost of making, must be charged to the surface or volume of the concrete in this one floor.

The following example illustrates the error in not taking into account the number of times the forms are used. Suppose the column form lumber at $30 per thousand ft. B. M. averages in first cost $0.16 per sq. ft. of surface, including sheathing, supports and bracing. If used for a one-story structure, the lumber cost is therefore $0.16 per sq. ft. in addition to a labor cost of, say, $0.045 for making and $0.155 for erecting and moving, or a total of $0.36. If the lumber, on the other hand, is used three times without alteration, the cost per sq. ft. of surface is ⅓ of $0.16 = $0.053 for the lumber plus ⅓ of $0.045 = $0.015 for making, plus $0.150 for erecting and removing, or a total of $0.22 for the total cost per square foot of surface, as against $0.36 for the one-story building.

Notwithstanding this direct effect upon the cost, the number of times moving is frequently not considered at all in estimating even by those who are otherwise accurate in their methods.

The number of times that forms are used in building construction generally depends upon the size and hight of the building, which limits the number of times to use, rather than on the actual wear upon the forms. In other words, forms are not generally worn out when discarded, and frequently the same lumber can be used in two large buildings, provided the two are substantially alike in design, although of course with a greater labor cost.

The Life of Forms

As a rough estimate of the life of forms in building construction before they are worn out, we may suggest: walls, 16 times; columns, beams and girders, 10 times; floor forms, 6 times, if of soft lumber like spruce, or 10 times if of Southern pine. These times apply to 1-in. stock.

Number of sets of forms in a building.—The number of sets of forms to make up for any building varies with the speed of construction required, weather conditions, and shape of building.

On an average 1½ sets of forms is a fair allowance. With this number, erection on the floor above can begin while the concrete below is green, so that in good weather a story can be built in a week or ten days.

Some large building contractors have adopted the use of only one set of forms in a building, whether it be 2 stories or 10 stories high, with additional lumber for girder bottoms and supports that must be left in.

A building of large floor area may be built in sections, setting up, say, one-half of a floor area at a time, so that forms for only about three-fourths of one floor are needed with the extra beam bottoms and posts. On the other hand, if the building is small in area and high, two sets of forms may be needed in order to go fast enough.

Sometimes basements are lower in hight and the first floor has specially heavy beams and requires large supporting columns, so that forms cannot be remade quickly enough for the floor above; in other buildings, construction loads on the first floor may require the basement forms to remain. In such cases the basement forms must be figured as an extra set.

The weather has a decided effect upon the time of form removal. In the cool weather of the spring and fall, even if there is no frost, concrete hardens slowly. Concrete should never be allowed to freeze, and therefore the forms may have to remain for several weeks or even until the building is completed and then taken down very carefully.

The above discussion illustrates the necessity of considering each individual building independently in estimating form lumber, instead of assuming for all an approximate price per square ft. or per cubic yard of total concrete.

Time to Remove Forms

The time that forms have to remain in place depends upon the character of the members, weather conditions, the span, if a beam or slab, and the relation of the dead to the live load.

Vertical members, such as walls thicker than 4 in. or columns, will bear their own weight when quite green, while horizontal members, such as floors, must harden until the concrete can sustain the dead weight and the load during construction.

The weather conditions greatly affect the hardening of the concrete, the setting and hardening being greatly accelerated by heat and retarded by cold. If, through accident, the concrete should be frozen, it will not begin to harden until it has thawed and then it may require several months to attain the strength usually reached in two or three weeks.

A long span beam or slab must be supported, in general, a longer time than a short one, chiefly because of the larger dead load. If the dead load, *i. e.*, the weight of the concrete, is heavy in comparison with the live load, *i. e.*, the load which the floor must bear later on, forms must be left a longer time, because the compression in the concrete is large even before the live load comes upon it.

Experienced builders have definite rules for the minimum time which the forms must be left in ordinary weather, and then these times are lengthened for poor weather conditions and special members according to judgment.

Rules For Practice

As a guide to practice, the following rules are suggested:

Walls in mass work: One to 3 days or until the concrete will bear pressure of the thumb without indentation.

Thin walls: In summer, 2 days; in cold weather, 5 days.

Column Forms: In summer, 2 days; cold weather, 4 days, provided girders are shored to prevent appreciable weight reaching columns.

Slabs up to 7 feet span: In summer, 6 days; in cold weather, 2 weeks.

Beams and girder sides: In summer, 6 days; in cold weather, 2 weeks.

Beam and girder bottoms and long span slabs: In summer, 10 days or 2 weeks; in cold weather, 3 weeks to 1 month. Time to vary with the conditions.

Conduits: Two or 3 days, provided there is not a heavy fill upon them.

Arches: If of small size, 1 week; large arches with heavy dead load, 1 month.

All these times are of course simply approximate, the exact time varying with the temperature and moisture of the air and the character of the construction. Even in summer, during a damp, cloudy period, wall forms sometimes cannot be removed inside of 5 days, with other members in the same proportion. Occasionally, too, batches of concrete will set abnormally slow, either because of slow setting cement or impurities in the sand, and the foreman and inspector must watch very carefully to see that the forms are not removed too soon. Trial with a pick may help to determine the right time.

One large builder—C. A. P. Turner—requires that a 20-penny spike driven into the concrete must double up before it has penetrated one inch.

A plan which is being introduced on some of the best construction work is to take a sample of concrete from the mixer once or twice a day and allow it to set out-of-doors, under the same conditions as the construction work, until the date when the forms should be removed, then, before beginning to remove, find the actual strength of the concrete by crushing the blocks in a testing machine to see whether it is strong enough to carry the dead and the construction load.

Frontier Mason Builders' Association

A most interesting gathering of representatives of the building trades of the cities on the Great Lakes and of Canada occurred at the convention of the Frontier Mason Builders' Association in Cleveland, December 6 and 7, the meeting being held for the purpose of discussing building conditions and the outlook for the coming year in the territory of the association. The conference opened with a luncheon at the rooms of the Cleveland Builders' Exchange, and this was followed by a business meeting in the library of the Chamber of Commerce. In the evening the Mason Contractors' Association of Cleveland gave the visitors a dinner and theater party, and the conference considered as a whole was of a most interesting and enjoyable nature.

Among the subjects discussed were the new workman's compensation laws which are being considered in several of the states represented, and Ohio's new building law, which goes into effect the first of January.

James M. Carter, the well-known secretary of the Buffalo Builders' Exchange and of the New York State Association of Builders, spoke on the conditions in New York State, and Charles A. Bowen, secretary of the Detroit Builders' Exchange, reported conditions in Michigan.

Technology and Industrial Efficiency

Under the title "Technology and Industrial Efficiency," the Proceedings of the Congress of Technolgy, held in Boston last April at the Massachusetts Institute of Technology, have been published in a volume of about 500 pages. Some 70 papers are included, and these form together a valuable and up-to-date record of the present state of industrial science, and a presentation of some of its problems and probable solutions. The six sections into which the Congress was divided are represented by papers on Scientific Investigation and Control of Industrial Processes, Technological Education in its Relations to Industrial Development, Administration and Management, Recent Industrial Development, Public Health and Sanitation, Architecture.

Concrete can be tinted green, for residential purposes, by using cromium oxide. French ocher will give it a yellow or buff tint. Red is obtained by the use of red iron oxide. If a pure white concrete is preferred, use one part white Portland cement and two parts white marble screening. Run or press into molds and rub with a fine terrazze polishing stone. A white, shining surface will result—as the marble takes the polish.

The Supreme Court of Illinois has just handed down a comprehensive decision maintaining the constitutionality of the law licensing architects in that state.

The Jobbing Carpenter and Some of His Work*--XXVIII

Various Designs of Gates and Fences with Examples of Their Application--Methods of Construction

By Edward H. Crussell

IT has been mentioned that for some cases it is better to fit several sections of fence together before fastening the posts in the ground. In Fig. 210 is presented a photo-reproduction of a fence where this method of procedure was a necessity. The fence is built of 4 x 6-in. posts with old 2-in. steam pipe for rails. The pipes are long enough to reach two sections or panels and the fence is put together as illustrated in Fig. 211 of the sketches. The pipes that pass through the posts to their centers are inserted in the posts before the latter are placed in the ground and the holes in the ground are made a little larger than usual so as to afford more room for fitting the posts together.

In Fig. 212 is an enlarged view of the cresting shown on the top rail of this fence. It is cast in sections about 2 ft. long and is fastened to the pipe with

style of Bungalow fence is illustrated in Fig. 213. There are a great many variations of this fence which depend chiefly on the spacing of the pickets and rails. The spacing runs from 6 to 12 in. and the sizes of the material from 1 x 2 in. to 1 x 4 in., while the posts are 4 x 4 in. to 4 x 6 in.

The fences are most frequently built of rough lumber and are stained to harmonize with the house. They depend considerably for their artistic effects upon the vines and flowers that are trained over them and Fig. 214 is a very good illustration of what may be done in this way.

In the photographic reproduction presented in Fig. 215 is an illustration of a similar but more substantial fence. It is chiefly noticeable for being built in the opposite way to most fences; that is, with the posts on the outside.

Fig. 210.—Fence where the Sections are Fitted together before Fastening Posts in the Ground

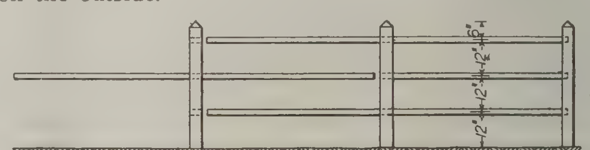


Fig. 211.—Method of Constructing Fence Shown in Fig. 210

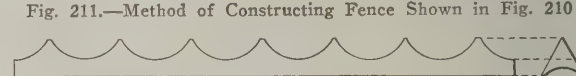


Fig. 212.—Enlarged View of Cresting on Top Rail of Fence Shown in Previous Figure—Scale 1½ in. to the Foot.

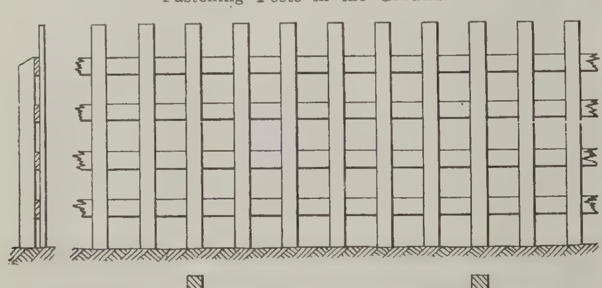


Fig. 213.—Popular Style of Bungalow Fence—Scale ¾ in. to the ft.

Fig. 214.—Fence Built of Rough Lumber

The Jobbing Carpenter and Some of His Work—XXVIII

stove bolts. It is partly for ornament but more especially to prevent the "rail birds" roosting on the fence.

The elaborate front fences that we used to build are not nowadays so much in evidence. The Bungalow type of architecture appears at present to be the most popular for suburban homes and a style of fence has been evolved to suit it. Usually this fence is used for the side and back of the house only, the front being commonly left open to the street. One very popular

*The author of these articles will be glad to discuss any phase of work in the line of jobbing carpentry that the reader may suggest.—Editor *The Building Age.*

The fence shown in Fig. 216 is rather an elaborate affair for a back fence. It certainly cost a lot more money to build than did either of those shown in Fig. 214 or Fig. 215 and as in all probability the carpenter got his share out of it "let's say no more about it."

The picture in Fig. 217 shows a shingled fence on the side of a corner lot. It looks very appropriate as a continuation of the shingled exterior of the house and offers a good idea to the fence builder.

The fence shown in the picture, Fig. 218, is altogether outside the carpenter's line but an excellent illustration of what can be made into an appropriate fence. There is a 2-in. iron pipe imbedded in the center of each of the small piers, the pipe terminating in a cast iron ball, and a heavy chain is attached to the ball and hung from one pier to the other. These details do not show very clearly in the photograph and probably will not show at all in the reproduction, which is just the reason why it has been mentioned here.

The lattice fence presented in Fig. 219 is another popular side fence for a Bungalow. It has some variations. Sometimes the lattice work is put together diagonally as indicated, sometimes it is put together with the strips running vertically and horizontally and sometimes a mixture of both is used as shown in Fig. 220.

A rather unique type of fence is that illustrated in Fig. 221. It is a high board fence built of matched and beaded lumber with openings cut in every panel just above the hight of an inquisitive youngster's head and with the openings filled with lattice work. The holes are cut in the fence after it is built. The lattice is just the thickness of the boarding and is held in place with a 1 x 3-in. casing that is mitered around the opening on either side of the fence.

We have in Fig. 222 something of an oddity that was designed for a person who wanted a close board fence but one through which he could train vines. As shown in the sketch the fence is boarded on both sides, but there is a small space between each board, the size of the spacing depending upon the widths of the boards and upon how much privacy is desired. Arranged as shown it is impossible to see through the fence, as is proven by the dotted line in the plan view. One of the chief merits of this fence appears to be in the fact that it is different from that of anybody else.

Figs 223, 224 and 225 represent designs for entrance gates. There is not much call for them at the present time—on the Pacific Coast at least—but perhaps at some future date the ideas contained in their construction may prove useful.

Fig. 215.—Fence Similar to Fig. 214, but Having Posts on Outside

Fig. 217.—A Shingled Fence

Fig. 216.—An Elaborate Back Fence

Fig. 218.—Fence Constructed of Cobblestones with Iron Chains Suspended from Pier to Pier

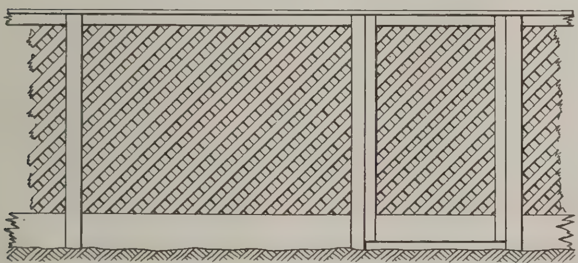


Fig. 219.—A Lattice Fence

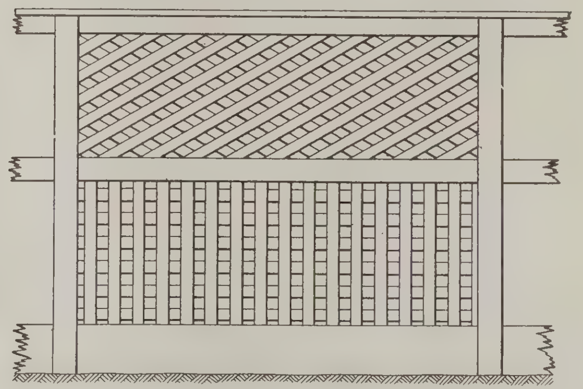


Fig. 220.—Showing Lattice Work Running Diagonally, Vertically and Horizontally

The Jobbing Carpenter and Some of His Work—XXVIII

It is stated that in the past ten years flat houses have been building in New York City capable of housing 1,204,000 persons and costing $755,000,000.

Concrete Foundations for Lumber Piles

In one of our issues for last year we presented a few particulars regarding the value of concrete pile foundations in the building of lumber yards, since which time we learn that experiments, so to speak, have proven most successful in the making of lumber pile foundations that are substantial and cheap. The point is made that they keep every pile in accurate alignment, afford ample space for the circulation of air, thus assisting in the prompt drying of lumber, and above all things else insure fredom from debris about lumber yards. The experiments were made by Henry Ballou, the general manager of Cobbs & Mitchell, Cadillac, Mich., and he states in a recent issue of *Hardwood Record* that so many inquiries have been made in regard to the matter that he gives the following additional particulars:

"At that time we had settled on the following sizes of blocks to give the best results as to elevation and support:

16 in. x 16 in.—4 in. thick.

16 in. x 16 in.—6 inch thick.

16 in. x 16 in. at the bottom, tapering to 12 in. x 12 in. at top—6 in. thick.

12 in. x 12 in. at the bottom, tapering to 8 in. x 8 in. at top—6 in. inch.

As these sizes have proven practical we see no reason to change, except that in arranging the forms for the first two sizes we give the sides a half inch taper so that the block when dry will free itself from the form when turned over, the same as the tapering blocks.

The forms are made of 4-in. and 6-in. strips, open both top and bottom, and painted on the inside with common black oil, and the process repeated as often as necessary so the concrete will not stick to the forms.

In making plans to produce blocks one should select a level place handy to deliver the gravel and water supply. Make the mixture of five parts of bank gravel to one part cement.

Place the forms on a smooth, level platform, fill with concrete, flush with top edge of the forms, and the surplus concrete scraped off with a straight edge.

When the concrete is set the use of the forms can be saved by turning them over on a plank, and lift off the form and let the block lie several days to harden. In order to work to advantage one should have from 100 to 200 forms.

The number of blocks used under a pile will depend on the firmness of the soil and the quantity of lumber in the pile. We have found by experience that less blocks will sustain the pile than we at first used.

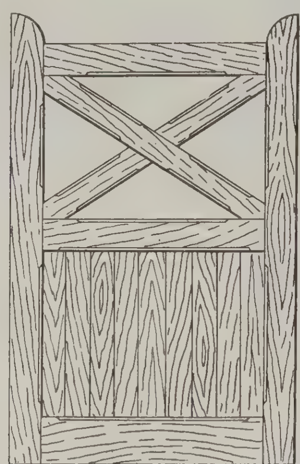


Fig. 223.—Design for an Entrance Gate

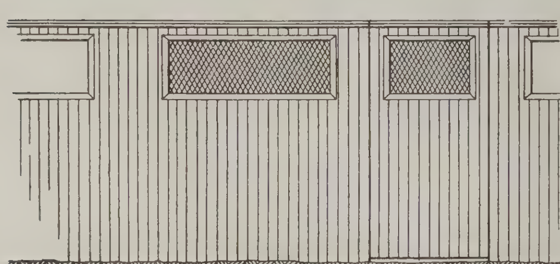


Fig. 221.—Unique Type of Fence Built of Matched and Beaded Lumber

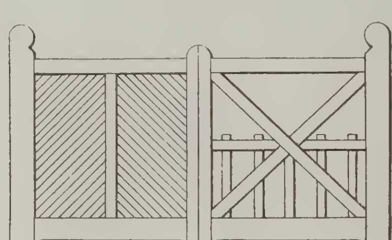


Fig. 224.—Another Design for an Entrance Gate—Scale ¼ in. to the Foot

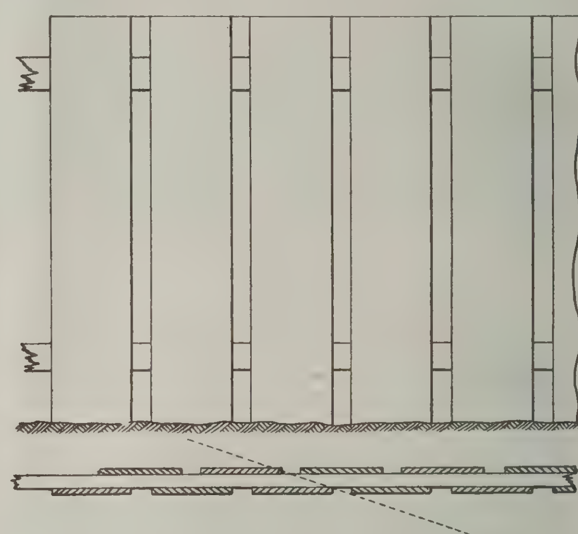


Fig. 222.—Elevation and Horizontal Section of a Close Boarded Fence

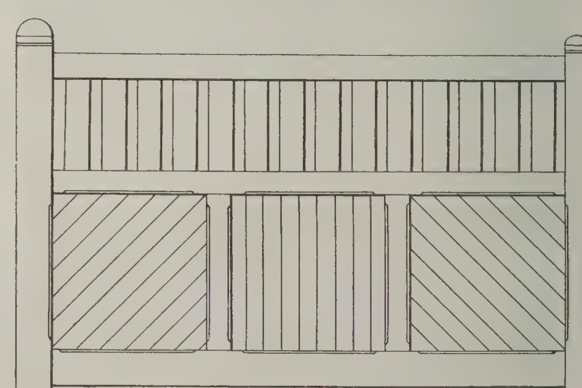


Fig. 225.—A Third Style of Entrance Gate—Scale ⅜ in. to the Foot

The Jobbing Carpenter and Some of His Work—XXVIII

Ohio Association of Builders' Exchanges

The annual convention of the Ohio State Association of Builders' Exchanges will be held in Springfield, Ohio, on January 9.

Speculative Building in New York City

Kinds of Speculative Builders--The Bonus System--Responsibility of Money Lenders--New Line Law Imperative--Reputable Builders Cannot Compete Under Existing Conditions

SOME inside pointers on financing building construction work and reasons why the building speculator is a victim of suspicion are presented in very forcible style in an article appearing in a recent issue of the *Record and Guide*. One of the most difficult problems that the building material man has to meet at the present day, says the writer, is the "shoestring builder" backed by money trust alliance.

"That is why the man who enters the building field as a business finds himself so pinched by creditors. Incidentally, it may be correctly ascribed as the reason why high class builders will not now even accept invitations to bid on work that is not thoroughly endorsed by an individual or concern of unquestioned rating, and generally refuse to become interested even then, despite apparent responsibility of the promoters.

"Yet these money interests bewail the fact that building construction has been overdone, not only in the city, but in the suburbs, where speculative construction has run rampant. Men who have gone into these operations as builders have, as a rule, lost heavily and so have the building material creditors. The lending company finds itself with an untenanted house or whole block of houses on its hands and no prospects of renting them because the renting season has gone by. Reference is here made to the unscrupulous lender specializing in suburban speculative building.

Two Kinds of Speculative Builders

"There are two kinds of speculative builders, the 'listed' and the 'shoestringer.' The former has a rating as a registered, incorporated or individual builder, who is known to building material associations as one who discounts his bills or satisfies his creditors in thirty or sixty days, who maintains an office that is more than a mere place for the delivery of mail and who can give plenty of references as to his cash credit in banks. Such a builder is not obliged to make any deals or alliances, he does not have to pay any bonuses and the man who sells him knows that he does not need to fear foreclosure over night.

"The 'shoestringer' is the man who is largely responsible for the over-supply of rentable space in the suburbs. Furthermore, it is the 'shoestringer' upon whom the blame generally can be put for over-construction, because the 'shoestringer' is the individual who will advise the operator to go ahead when every other authority will advise postponement. The result can only be over-production and all building interests suffer.

"But the day of the 'shoestringer' and the bonus system is quickly passing. The reason is because he has been foisting upon the renting public such poorly constructed houses that they cannot be rented to 'good' tenants. The 'good' average tenants of to-day know the difference between a stained door and a genuine laminated one. They know the difference between an old-style lime and mortar wall and a gypsum. They know the difference between hardwood flooring and No. 1 white pine planed, polished and stained, and they know the difference between a good and bad heating equipment and serviceable or unserviceable kitchen appointments. It costs too much to build good suburban residences or good city apartment houses for the 'shoestring' builder to attempt to compete with the 'listed' speculative builder. But while it took the 'shoestringer' ten years to flood Manhattan and the Bronx with flimsy structures, it has taken him less than four to so flood Brooklyn as to make it pleasant for some of them to go to New Jersey and Westchester.

Responsibility of Money Lenders

"The root of the trouble is known, and for the man who is just entering the building profession and wants to pursue it in an honest way, it is as necessary for him to know what to avoid as it is for him to know at the present time there is a strong undercurrent among reputable builders to solve the problem by reaching to the apparent seat of the trouble, the lien law.

"When the building material dealers' associations took this matter up originally it was thought that the solution to the problem would be found in a gentlemen's agreement between material supply houses, contractors and the laborers, but it has lately been discovered that the trouble lies in a perverting of the building and loan laws, and hence legislative restriction has become imperative.

"The honest builder should be cautious about entering the construction field until a law is enacted that will prevent money lenders of all grades from extending loans to entirely irresponsible parties, who are without reputation and without rating. It is an uncontrovertible fact that loans of tens of thousands have been made to 'shoestringers' who could not get credit for a single dollar's worth of goods from the corner grocery or market, where they are known.

A Reputable Builder

"The type of buildings put up by individuals and companies in certain parts of Brooklyn are the worst ever put up in a first-class city, despite the vigilance of the Bureau of Buildings, the inspecting force of which is totally inadequate in numbers, to properly note the kind of material that goes in such houses. The wool is pulled over the eyes of the inspectors for the lending companies, who frequently are designedly unseeing, and as the builder, instead of a reputable architect, generally superintendents, he can pass any kind of material.

"'To call these operators builders,' said a victim of 'the System' the other day, 'is an insult to the large number of honest and trustworthy men who are engaged in the building business and who are giving the public honestly built homes.'

"The following is a typical instance of the way the system operates:

"A clerk in some contracting office decides that he will go into the speculative building business. He probably has $150 to $200 saved up. He picks out a likely spot and gets an option on the property. He completes his negotiations for the purchase of it, all without having spent a cent, save in carfare and cigars. Then he goes to the money lender and states his proposition. The lender sends its experts over the field and upon his report the young man finds out whether he can get the loan. The reader will notice that no inquiry has so far been directed toward the young man's responsibility.

"Lenders of the type referred to are not particularly interested in the young man. They do not care whether the prospective operator is responsible or not, as they take care to make themselves safe. And this is how they make themselves safe:

"In the suburbs where a great deal of vacant land is to be had, and owners are anxious to sell their holdings, the landowners fall the first easy victim of the system. In the first place, the wily operator offers to pay more than the actual value of the land, which he promises to pay for on second mortgage, another source of profit. Then the operator goes back to the lending company, which tells him to incorporate. This he does, sometimes with poorly secured incorporators. By this means the lender avoids usury charges, but at the same time levies and gets from 12 to 15 per cent. bonus on the loans, which commission or bonus is collected at the first or enclosure payment.

"After that the lenders do not care whether the operation goes through or not. They have got their share of the operation and if the operator fails, and he is a very capable one that does not collapse with such a handicap as this entails upon him, the lender simply forecloses and with the help of the present lien law wipes out all the claims of the materialmen, subcontractors, laborers and, at times, even the second mortgagee, if he is not able to protect himself. The suffering caused by this system is appalling.

The Defense of the Money Interests

"The money interests of the class this article especially treats of, declare that they do not know that the people they deal with are irresponsible, as the business is brought to them through agents. Reputable builders say this seems improbable to them, because the money lenders invariably take the precaution to make these mushroom concerns incorporate. Furthermore, the companies take the position that they have building money to lend. It is not for them to pick out the character of the men to whom it is loaned, but to satisfy themselves of the safety of the money they are lending and the assurance that they will receive sufficient interest in return. To make positive of this they take advantage of the law governing incorporation, and they are thus protected. Regarding the bonus system they say it is not a bonus but a premium which the borrower is willing, not compelled, to pay to the company, for accommodation at a time when the company has not the money available. If the borrower is not willing to pay it, he does not have to take the loans.

What the Facts Tell

"The defense of the lenders of the charge made by the listed builders that they are discriminated against by money interests in this city, is in itself startling, but the extent of failures in 'shoestring' building operations is appalling. It is reported that in one section of Brooklyn, within a radius of ten blocks, 140 houses have been foreclosed this year, and that everyone furnishing material and labor on these buildings has lost money. The only ones who have profited, according to these victims, are the 'shoestring builder' and what they call his 'silent partner,' the money lender, who has not only received the full amount due him but also his enormous bonus, high interest, incorporation fees, legal expenses and outrageous foreclosing charges.

"The building-loan man is inclined to blame the dealer for selling these irresponsible people, and he may, in some instances, be correct; but at times it is difficult for the dealer or subcontractor to judge an operator's financial standing when the money lender is allowed to take the profits in the operation.

"Here is an illustration:

"A Brooklyn operator was apparently doing a good business. His transactions covered a period of several years; he paid his bills and he built on an average of fifteen to twenty houses a year. Each one was sold on completion. During the financial stringency of last year the operator collapsed and it was learned that he had paid in bonuses on an average of $5,000 a year during the last four years.

"Instead of working for himself, this man was virtually employed by the lending interests, like many other 'shoestringers.' In this case and in the hundreds of others, the money lenders got the profits while the dealer thought the operator was making money and getting stronger financially.

The Remedy Lies in a New Law

"'The only remedy,' said a well-known business man, 'is a good equitable lien law making the money lender who charges more than legal interest, through subterfuge or otherwise, a partner in the operation, or to make the building loan man, not the irresponsible operator, directly liable for material and labor going into the building operation.

"'This is a matter in which manufacturers, dealers, subcontractors and laborers are greatly interested, and the different associations of these interests should appoint delegates to a joint commission to work out the vital problem jointly. Now is the time to do it,' he continued, 'because building operations are at a standstill in some sections, as the money interests are frightened by the departure of the 'shoestringers' into New Jersey.'

"The builders charge that the money interests want a lien law forbidding builders to take a second mortgage, except with the permission of the materialmen, subcontractors and others. They say that such a law would not have the desired effect, as it would still leave open the door for the money interests to charge high bonuses on the building loan.

"Such is a phase of the suburban speculative construction business as it is followed to-day. Builders of recognized standing state that they cannot compete with conditions as they exist and the field is fast deteriorating because the poor class of houses put up here, there and everywhere by this type of builder are not sought by people of modest means, many of whom have learned discretion through bitter experiences."

Concrete in Greenhouses

Concrete benches for greenhouses, in place of cypress, which is usually considered the best material for moist conditions, have been used in thirteen 250-ft. houses at the plant of Behlmann Brothers Company, Morton Grove, Ill., and are being put into use in thirteen new houses of the same size. The bench consists of 6-in. tapered posts, with 10-in. bases, 1½ in. by 6-in. cross beams, 49 in. long, resting in slots in the posts, and 2-in. by 4-in. stringers, 6 ft. 2½ in. long, resting on the cross beams. The sides and ends of the box top are 10 in. high and 1¼ in. thick, with an angle of 3½ in. wide, cast at the bottom, forming the rest for the bottom slabs. The bench slabs, 1⅛ in. thick and 9½ in. wide, rest on the sides and the stringer at the center. With the exception of the stringers, which are reinforced with two ½-in. bars, each member has galvanized iron wire and several ¼-in. square twisted bars for reinforcement.

The plant has approximately 37 acres under glass, and all its new foundations, benches, drain and walk construction are of concrete.

Some Old Wrought-Iron Hinges

Excellent Examples of Old-Time Door Hangings -- Scroll and Leaf Work Prominent Feature

MANY of the wrought-iron hinges of the olden times were of large size, often with a central ornament covering the entire door, the upper hinge in very many cases having the upper scrollwork extended upwards so as to cover the arch portion of the door. These larger hinges were in most cases very elaborately worked, the scrollwork terminating in leaves or flowers, often in groups, a process involving very careful and good welding. Moulded bands were also used at the jointing of the grouped scrollwork, and sometimes where the scrollwork is made to start from the outer edges of the main framing. The examples illustrated here have been selected so as to show some of the varying scroll and leaf forms on the ordinary hinge work of those days, says Edward Tuck in a recent issue of one of our London exchanges.

Fig. 1.—Hinge from Merton College, Oxford.

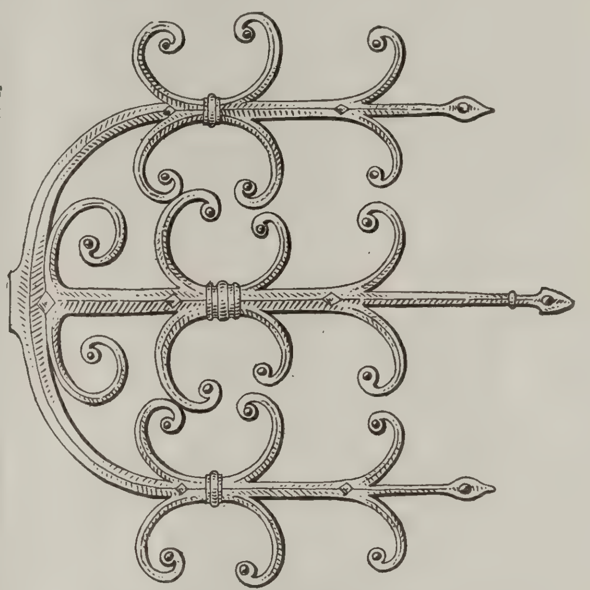


Fig. 2.—Hinge from Lincoln Cathedral.

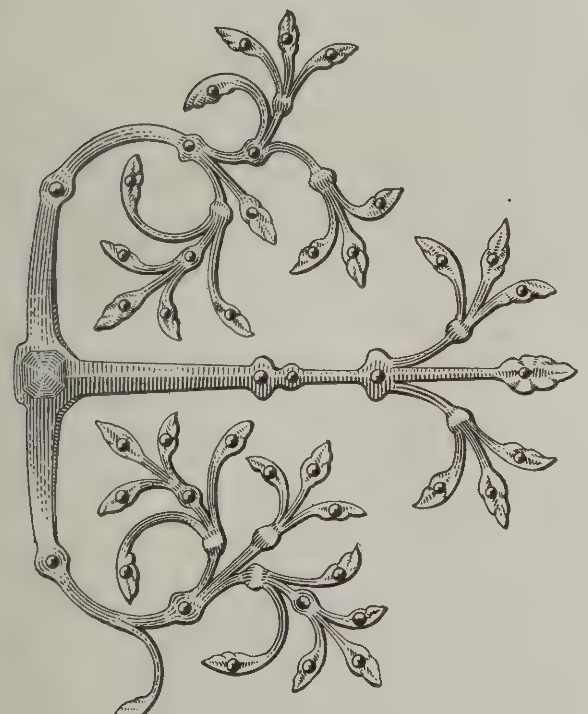


Fig. 3.—Hinge from Market Deeping Church.

Fig. 4.—Hinge from Old Church in Norfolk.

Some Old English Wrought-Iron Hinges

Fig. 1 illustrates the upper hinge of one of the Oxford Colleges, and is a remarkably good example of thirteenth-century work. This is of flat ironwork, the back of the hinge being of the regular crescent shape. The terminations of the crescent ends are of grouped scrolls, finishing in alternate leaf and flower. Where the grouped scrolls join the crescent end a moulded collar is affixed. The scrolls on the outer edge of the crescent are welded on by the moulded clip. In this upper hinge the end of the center strap is carried upwards, so as to fill in a measure the arch top of the door.

In Fig. 2 is illustrated one of the hinges from Lincoln Cathedral early in the thirteenth century. This is simpler in design. The crescent form of the back is continued straight instead of bending downwards to the central strap at the terminations, which are finished with the ordinary leaf form. In this example the scrolls branch twice from each side of the strap, and finish in a plain circle. Between these two hinges there is a central ornament of similar plain work to the hinge illustrated.

A hinge from Market Deeping Church is shown in Fig. 3. This is similar in character, but of much more slender workmanship. The central strap is of flat iron, but has been hammered to give it a sharp raised point in the center. The ends of the crescent back, which is more square in form, branch at their terminals into triple groups of simple leaves, hammered very flat on the one edge, welded together at the junctions by a ball shape. The upper and lower scrolls are a little varied in form. The illustration gives the upper hinge. The lower hinges, being fixed very low down on the door, have only the upper scroll above the central strap, which is itself somewhat plainer in shape.

A hinge from an old church in Norfolk is shown in Fig. 4, and is a very excellent example of late thirteenth-century work. The scrolls in this hinge branch from the central strap, terminating in a kind of trefoil flower, and having leaves welded to the scrolls at intervals on the outer edge. The leaves are all hollowed from the outer shaped edge inwards, showing excellent workmanship. The bosses at the scroll terminations are also hollowed in similar fashion to the leaves. The hinge illustrated is the upper one of the door. From the center of the middle scroll on the upper side of the hinge a center ornament is welded on, consisting of a double branching scroll with flower and leaf terminations, the central strap being finished with three leaves similar to the central strap. This carries the ironwork of the door upward to fill in the arch top. There is a central ornament on this door of similar work which gives an effect both striking and impressive.

Some Comments on Double Floors

BY J. CROW TAYLOR.

THE flooring business is getting on to a different basis these days from what it used to be. As a general thing where really fine work is to be done there is a sub-floor of common material and a top floor of hardwood made with maple or oak strips of parquetry.

Where only one thickness of flooring is laid, if it is a residence or business floor, there may be a few that are of common stuff for carpeting as in olden times, but the majority of them are laid in narrow strips neatly fitted together, carefully dressed or scraped off, stained and varnished. So, it becomes a more artistic job whether it is a single floor, or a sub-floor and a top floor.

In sub-floors the practice varies. Some use ordinary sheathing lumber of any width and lay it at an angle across the joists just as some put storm sheathing on the outside at an angle. Others use No. 2 6-in. pine. Some of this is laid at an angle and sometimes it is laid straight. Occasionally also there are some who use a comparatively good grade of narrow flooring even for their sub-floor. Say No. 1 common 4-in. pine or even 2½-in.

There is some difference of opinion as to just what constitutes the best sub-floor. For example, some prefer ordinary sheathing laid at an angle to 6-in. No. 2 laid straight. Really there are just two points involved in a sub-floor aside from strength and durability. One is to get smoothness of top surface and the other is to avoid shrinkage that may take place in the sub-floor, and disturb the top floor that is nailed to it.

It is claimed by some that laying the under floor at an angle not only makes less disturbance in shrinkage, but it graduates the unevenness of joists better and makes a better surface.

Really, however, defects in joists are things one should not seek to correct with a sub-floor. The joists should be gone over with a straight edge and made reasonably true on the top. It is a good thing if they can be made crowning toward the center of the room. This insures not only tigher joints in the floor, but a stronger floor.

To safeguard against shrinkage in a sub-floor it is best to use comparatively narrow stuff no matter whether it is sheathing or tongued and grooved flooring. Nothing wider than 6 in. should be used, and really perhaps the best sub-floor is to use 4-in. tongue and grooved stock, which finishes 3¼ in. wide. Then, have the sub-floor thoroughly dry before putting on the top floor.

In the matter of paper and deadening felt between the sub-floors and the top floors opinions differ. Where thin stock is used for the top floor, however, it is pretty generally conceded by those who know that thick papers and felts should be avoided. Ordinary rosin paper is about as good as anything. The deadening felts, especially if they are spongy, take the solidness out of the floor. They are good things where one is using thick stock in the top floor as well as in the sub-floor, but where one is using ⅜-in. stock in the top floor the way to get satisfaction is to carefully smooth off the sub-floor and then a comparatively thin paper about like the ordinary rosin paper used for building purposes, and lay the top floor on this.

To insure solidness in the top floor, if it is thin stock, use lots of nails and narrow stock. The best width in ⅜-in. strips for a top floor is 1½-in. face. With strips of this width nailed every 9 in. with three-penny finish nails one has a floor that will never buckle nor sound hollow.

Where thick stock—the standard thickness in flooring—is used for a top floor there is, of course, a better chance to use deadening felt and also to get a solid floor without buckling. Even with these, however, plenty of nails are essential and the narrow widths are better.

In parquetry the common practice is to use strips 1⅓ and 2 in. They make them in a variety of sizes, but these are preferred widths in parquetry block strips and in the square edged strips used for paving in, and the tendency to-day is to use more and more of the 1⅓ inch strips.

In the tongue and grooved hardwood flooring for a top floor the widths vary from 1½-in. face to 2 in. and some 2¼, with the tendency to-day centering toward 1½-in. as the preferred width in tongue and grooved hardwood flooring.

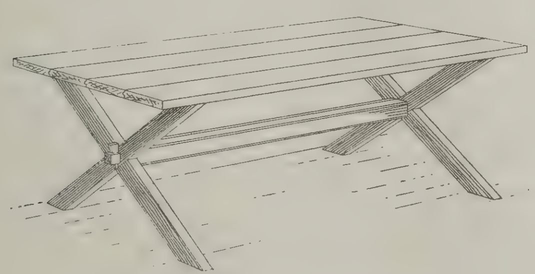
A Portable Drawing Board

Simple of Construction and Easily Made by Any Carpenter or Framer--Dimensions and Method of Doing the Work

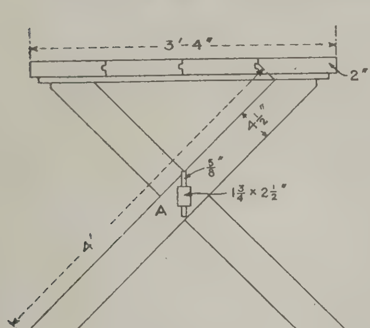
By Owen B. Maginnis

ARCHITECTS, builders and contractors who engage in large operations in widely scattered localities often-times have use for a form of drawing board or table which can be transported from one job to another with convenience and despatch and thinking that a brief description of such a drawing board may not be without interest to many readers of this journal I am submitting the accompanying sketches representing a form of board which will be found of great utility. The construction, which is simple in its entirety, may be easily carried out by any carpenter or framer who is in the least clever with his tools. The method of doing the work is along the following lines.

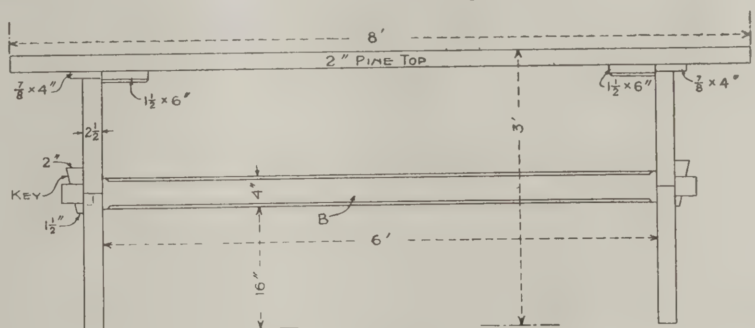
Two sets of cross-legs 3 x 4½-in. frames are halved together at any angle, say for example, 45 or 60 degrees, so as to give a hight of 2 ft. 6 in., or 2 ft. 9 in. If, however, it is desired to have the board sloping like a desk, one leg can be 2 ft. 6 in. and the other leg 2 ft. 9 in.



General View of the Completed Board



End View



Side View of Drawing Board

A Portable Drawing Board

The top and bottom ends must be sawn to the proper angles as shown in Fig. 1 of the sketches, which represents an end view of the drawing board. The sawing is done so that the legs will fit the floor and the board as shown.

When this is done the intersection, or halving, is mortised through, the mortise being 1¾ in. wide and 2½ in. deep, and the work may be neatly and accurately executed with a sharp chisel.

Next a 3 x 4-in. horizontal bar, designated as "B" in Fig. 2, which represents a side view of the drawing board, is gotten out of any desired length and with a tenon on either end 6 in. or 7 in. long. This is properly shouldered and fitted to enter into the mortise of the frames as indicated. The tenons are then mortised vertically to receive the keys which are each 8 in. long and taper from 2 in. at the top to ½ in. at the bottom and are ⅝ in. thick.

It will readily be seen that when the bar is inserted into the frames as shown and the keys or wedges at each end driven down tight the two frames will be held rigid and upright, thus forming an excellent standard for the board or table.

If the table is to be large it should be of 1½-in. or 2-in. stuff, but ⅞-in. stuff will answer for small tables, and can be made of pine, although the frames should be of spruce or yellow pine and the keys of oak.

The board is best tongued and grooved together at the joints and may be glued or not according to preference. The battens are screwed with slots to permit expansion and contraction of the wood and the whole mechanical work should be done in the best manner. Such a board as this will be found most valuable in the shanty or tool house of the contractor on the job for referring to plans, etc., and is a great addition to any plant engaged in large constructive building operations.

Some curious features of arrangement and construction are often revealed when plans are filed with the building bureau of a city for examination and approval. In the case of a set of plans recently filed in Duluth, Minn., provision was made for four inside bedrooms on each floor of a four-story building which would have neither light nor air except such as could go through adjoining rooms. There were also bathrooms provided, but without light or ventilation.

New York Lumber Trade Association

At the annual meeting of the New York Lumber Trade Association, held early in November at its headquarters, 18 Broadway, the following officers were unanimously elected to serve for the ensuing year: President, R. J. Perrine; first vice-president, J. F. Steeves; second vice-president, Frederick W. Starr, and treasurer, Charles F. Fischer.

The meet was largely attended and was preceded by a luncheon.

The Building Age

Formerly Carpentry and Building

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Index on reading matter, page 52.

JANUARY, 1912.

Exhibition of the Architectural League

Every year the exhibition of the Architectural League of New York commands widespread attention on the part of the architectural profession, and the arrangements which have been completed for the twenty-seventh annual display to be held in the building of the American Fine Arts Society, January 28 to February 17, inclusive, is likely to prove no exception. The exhibition will be illustrative of architecture and the allied fine arts and will consist of drawings and models of proposed or executed work in structural, decorative and landscape architecture; sketches and finished examples of decorative painting; sketches, models and finished examples of decorative and monumental sculpture; drawings and models of works in the decorative arts, together with photographs of executed work in the above branches. The New York Chapter of the American Institute of Architects has established a medal of honor for award to designers of buildings represented in the annual exhibition of the League, the jury in the case consisting of seven architects. The League has established a medal of honor for award to mural painters and also a medal of honor for award to sculptors represented in the annual exhibition. Announcement is made of competitions to be held under the auspices of the Architectural League for the Henry O. Avery prize and a special prize of $300. The subject is a chimney piece for a town hall to be placed at the end of an assembly room measuring 40 ft. wide, 60 ft. long and 25 ft. high, the fireplace opening to be about 5 ft. wide by 7 ft. high. The composition is to combine architectural, sculptural and mural treatment, the choice of style to be left to the collaborators. The competitions are governed by the General Rules Governing Competitions and will be conducted and the award made by the Committee on Competitions and Awards of the Architectural League, who will constitute the jury. Still another feature of the exhibition will be public lectures on January 31, February 7 and 14.

Novel Roof Construction

Architects and builders, more especially those from other cities, have been greatly interested in the latest architectural feature of the financial district of the metropolis—that of the tower-like structure which at the corner of Nassau and Wall Streets rises to a hight of 540 ft. The peculiar feature is the massive pyramidal-shaped roof 94½ ft. high in itself and which is conspicuous for miles around. The pyramid contains 23 steps each 3 ft. 9½ in. high by 1 ft. 4 in. wide, and the dimensions of its base are 70 x 69 ft. This roof is regarded as a unique achievement, in that it is the first of its kind ever actually built in this city. The structure towers 41 stories in hight and is one of comparatively few in the city faced with granite from sidewalk to roof. More than 150,000 cu. ft. of granite were used and more than 1200 cutters were employed in preparing the stone work, not to mention the machine men and quarry hands. According to Architects Trowbridge & Livingston, there are more than 8000 tons of structural steel contained in the building. The site was formerly occupied by the Gillender Building, 20 stories in hight, and one of the most notable examples of steel skeleton frame construction to be razed. The first stone of the present building was laid on the first of February, 1911, and the 41 stories were completed in eight months.

Movement for Prevention of Fires

The movement which is starting up in the West for the prevention of fires is to be most highly commended. The call which was made on the country for the conservation of its natural resources struck a responsive chord in the popular heart, as the people recognized the importance of taking care of the raw material out of which their wealth is waiting to be developed. The prevention of fires is the conservation of the finished product, for when a building or town is burned the fruit of forests, farms and mines disappears in smoke and flame. In it there is a diminution of our national accumulation, and at the same time of resources for further development. It is well that the public attention should be directed to this great evil, and that the facts in regard to the amount of the country's fire loss and its bearing on national and individual well-being should be popularized and scattered far and wide. Such presentation would set the people thinking. At the same time the causes of fires, the great majority of which would be prevented by the exercise of a little care, should be made known, and warning and suggestion thus given to which multitudes would give heed. Carelessness or wrong-doing that results in conflagration should be regarded as a blameworthy, if not a criminal, injury to the community and the State, approaching in the public estimation the hateful crime of arson with which the law deals so severely. When the extent of the evil is understood, and people realize that neglect in regard to fire is not only a wrong to the community, but a reproach as well as an injury to those whose property is destroyed, there will be a lessening of fire losses and ultimately a lowering of insurance rates.

Conventions of Brick Manufacturers

The twenty-sixth annual convention of the National Brick Manufacturers' Association will be held in Chicago March 6 to 9, inclusive, 1912, with headquarters in the Hotel Annex. The sessions will begin on the afternoon of March 6 with succeeding sessions on Thursday, Friday and Saturday, extending from 9:30 in the forenoon until 2 in the afternoon. By holding only one session a day the members will be given ample time and opportunity for visiting the Clay Products Exposition and indulging in sight-seeing trips as individual tastes may dictate.

The National Paving Brick Manufacturers' Association will meet at the same time and place, their first session being held in Hotel Annex, Monday forenoon, March 4.

The American Ceramic Society will meet the same week as in former years, beginning their sessions Monday forenoon, March 4. The Building Brick Association of America will hold its regular annual meeting in the Assembly Room of the Auditorium Annex, Wednesday, March 6, and the General Publicity meeting will be held Thursday forenoon in the main convention hall.

These meetings come about a month later than usual owing to the Clay Products Exposition, which will be opened in the Coliseum at Chicago, March 7.

Classes in Architectural Design

The Architectural Club of Duluth, Minn., has organized classes among the architects and draftsmen of the city for the purpose of studying architectural design. Abraham Holstead, a member of the Royal Institute of British Architects, will be in charge of the class work assisted by members of the educational committee of the club.

New and Old Building Methods

The progress which has been made in methods of building construction as contrasted with those which obtained a decade or more ago are well illustrated in the operation which has been going on at the northeast corner of 23d street and Sixth avenue, on the site occupied by what was known as the Masonic Temple. The contract for the razing of the old building was awarded in April last, but the house wreckers were obliged to ask for more time owing to the fact that the massive granite blocks forming the shell of the structure were so strongly anchored in cement that an entire month was consumed before the structure was demolished and the site ready to excavate for the modern structure which is rapidly nearing completion.

The bases for the steel columns were set on the 29th of July, but it was the middle of August before the steel work really began. The architect who designed the new building, Mr. H. P. Knowles, is authority for the statement that the building will be ready for tenants by the middle of January, 1912, so that it may be said a structure 19 stories in height and covering an area 142 x 98 ft. will have been built within the period of a little more than five months. In contrast with this it is interesting to note that it required nearly two years to build the old structure. The present record was made by the George A. Fuller Company, which has the general contract for the new building. The latter is similar in design and construction to the 18-story annex erected about two years ago on 24th street and abutting the building now nearing completion.

Iowa Association of Cement Users

The eighth annual convention and exhibition of the Iowa Association of Cement Users will be held at Sioux City, Iowa, January 10, 11 and 12. The show will be in the main city Auditorium, a structure admirably suited for the purpose. An instructive program has been arranged which will include the reading of papers, the making of addresses, discussions, etc. The secretary of the association is Ira A. Williams, Ames, Iowa.

Competitions at Coming Real Estate Show

Interesting features of the coming Real Estate Show which will be held in the New Grand Central Palace in March will be two competitions for which cash prizes will be awarded. The most important competition will relate to plans and elevations for suburban homes and the contest will be governed by the rules of the American Institute of Architects.

With a view to stimulating interest among the exhibitors in the decorating of their booths a liberal prize will be awarded for the best display, the contest to be decided by votes cast by those attending the exhibition.

Better Building Construction

A plan is being considered by the New York Board of Fire Underwriters which if adopted will make for better building construction. The proposition comes in the shape of a report from a committee of the New York Chapter of the American Institute of Architects in which it is suggested that the board include in the information about a new building which it gives to insurance companies the name of the architect and whether or not he supervised its construction.

This information about a building when given to an insurance company will it is felt be somewhat of a guarantee of proper construction of the building, for no reputable architect or firm of architects will want his or its name mentioned in a report that is of a public nature which will connect him or it with a piece of faulty construction.

The first prize in the competition for the auditorium at Portland, Ore., was awarded to J. H. Freedlander and A. D. Seymour, of New York. The second place, carrying a cash prize of $1,000, was secured by Lazarus & Logan, of Portland.

CORRESPONDENCE

A Department Where Those Interested Can Discuss Practical Trade Topics -- All Are Invited to Participate

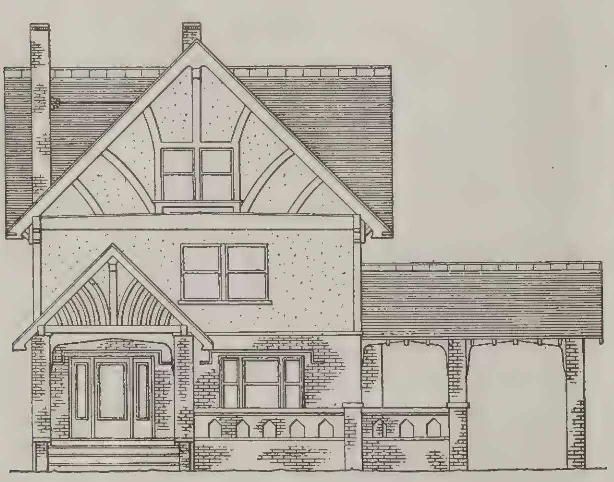
WE are constantly in receipt of interesting letters of inquiry and comment from readers of the paper, many of which have nothing about them to indicate from whence they come or by whom they were written. We have in the past called attention to the omission of this important information, and we take this occasion to again suggest that in writing to the Editor every correspondent sign his letter with full name and address, in order that he may be properly located. In publishing communications, however, we shall use the initials of writers, rather than their full names, except in cases where we are otherwise requested.—[Editor the *Building Age*.]

Lettering on Drawings

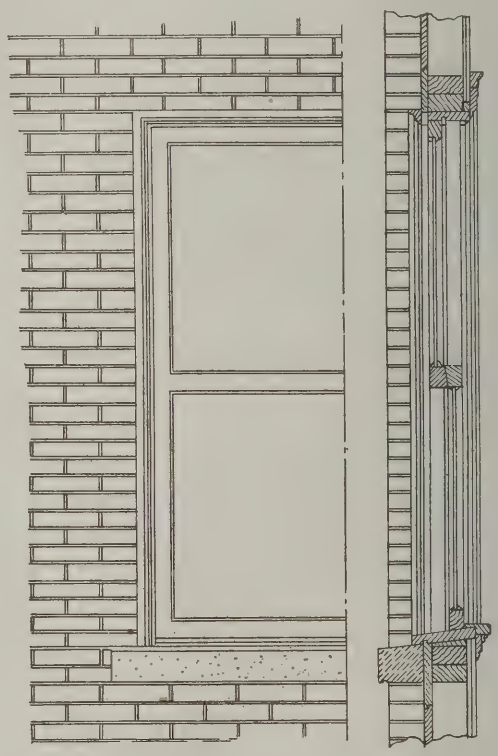
From W. H. M., Clebourne, Texas.—Will some of the readers who are interested along this line contribute a few neat designs of lettering for plans. The lettering which I have seen upon plans is of a decidedly varied character, and I would like to see some styles which would serve as models to follow.

Elevations for "Bert's" Floor Plans

From R. H. Randolph, Portland, Ore.—I have been reading your valuable journal for just about a year and have been greatly interested in what appears in



Front Elevation—Scale 1/16 in. to the foot



Detail of Window—Scale ⅜ in. to the foot

Elevations for "Bert's" Floor Plans—Contributed by R. H. Randolph, Portland, Ore.

the Correspondence columns. In answer to the request of "Bert," Indianapolis, Ind., in a recent issue, I am sending two elevations, which, if carried out in the proper manner, should prove very attractive. I have built three or four houses here of the same general style and find that they take very well.

The upper story can be either of stucco finish or of "pebble dash," which, in my opinion, is more durable and has a better appearance than the stucco finish.

In carrying out my idea I have changed the roof on the porte-cochere from a hip to a gable roof, also the front porch roof. However, the entire plan of roof can be changed from gable to hip except the front porch, which should be a gable roof.

I am also sending details of the buttress of the front porch and am giving a general idea of the construction of the window frame. The buttress cap can be made either of concrete or of tooled stone.

The estimated cost of this house complete is $5,600, based on an average grade of material.

Calculating Sizes of Wooden Beams and Girders

From F. L. T., Houston, Texas.—I have read with much interest the many instructive articles in the November issue of the paper and have noted particularly the contents of the Correspondence Department. Will the Editor permit me to say a few words more on the strength of beams as I wish to help "J. W. S." and J. Bremner. The formula given by "J. W. S." is correct and I shall try to derive it shortly. J. Bremner presents the method of calculating the sizes of beams in an admirable manner but his difficulty seems to arise in determining the bending moment and section modulus for particular cases. If he will turn to Kidder's "Architects' and Builders' Pocketbook," page 269 of the 1909 edition, he will find some simple cases of beam loading where the bending moment cannot be expressed by $W L \div Z$.

The section modulus $bd^2 \div 6$ is for a rectangular beam of homogeneous material and with the neutral plane parallel to the dimension b.

If the beam is "canted" like the rails in the familiar railroad cattleguard, $bd^2 \div 6$ no longer applies. It must also be modified in the case of a non-homogeneous beam such as reinforced concrete beams or two wooden beams strengthened by "flitch plates."

I trust that my article in the November issue will show J. Bremner that there is a good reason for the figures "6" and "8" in the formula under discussion.

It is difficult to make clear the meaning of the term "section modulus" even to students of technical schools. In most cases its calculation involves the use of higher mathematics so the moduli for the sections usually found in practice have been tabulated and will be found in the handbooks published by structural steel manufacturers.

Suffice it to say that it takes into account the shape of a beam. In this way we can account for the fact that a hollow tube cannot be made stronger than a solid round bar using the same amount of material in both cases. Thus the section modulus for a round timber or a steel rod would not be $bd^2 \div 6$, since the terms "breadth" and "depth" no longer apply. It is $\pi d^3 \div 32$ where π equals 3.1416 and d is the diameter of the circular section in inches.

J. Bremner's final formula $f\,b\,d^2$ equals $12\,W\,L$ is the one given by "J. W. S." We find this formula given in Kidder's, page 564, except that he uses A instead of f and omits the factor 12. On page 569 he states "the letter A in (the) formulas denotes the safe load for a unit beam 1 in. square and 1 ft. long loaded at the center." Since it will be evident from our formula that the strength varies as the breadth b, the square of the depth d and inversely as the length L, we multiply the constant A by b and d^2 and divide the final product by L.

Again, it is stated, "This is also 1/18 of the modulus of rupture or fiber stress for safe loads." This makes $f = 1{,}800$. The full formula then becomes

$$12\,W\,L \div 4 = 1{,}800\,bd^2 \div 6$$

from which it is seen that

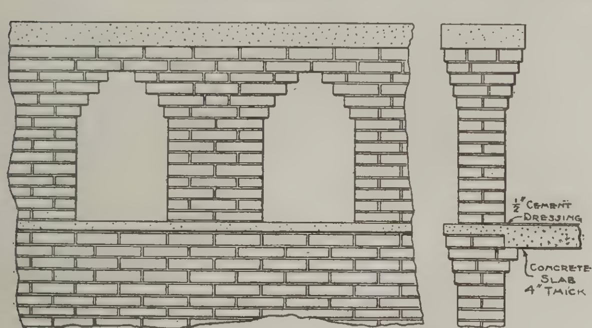
$$W = 100\,bd^2 \div L.$$

Kidder gives 70 for spruce and 55 for hemlock.

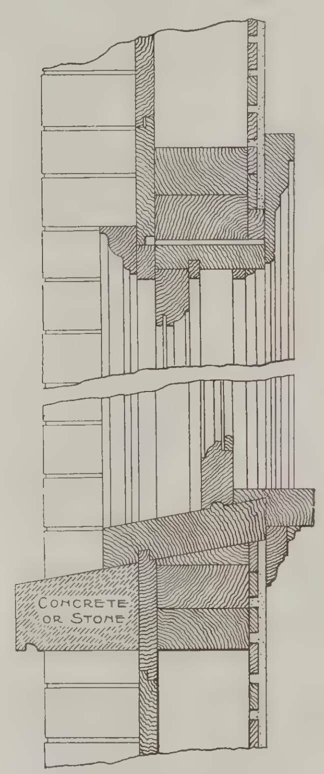
The factor 2 appears in the formula of "J. W. S." because a beam will support twice the load distributed uniformly along its length that it will if it is concentrated at the center. Kidder's "Architects' and Builders' Pocketbook," which the publishers of the *Building Age* will supply for $5, should be in the possession of every builder. It is almost a complete library in itself. It is written in a clear, simple, logical manner equalled by but few authors. The explanations seldom leave anything to be desired. "E. C." of Chicago should study this book carefully as his query cannot be answered in the space at the disposal of correspondents.

I trust that the subject of beam formula is now cleared up for some time to come. However, in designing columns the radius of gyration appears and this is fully as troublesome as the section modulus has been. If any readers desire help in this direction the writer will be glad to assist them through the Correspondence Department.

Side (Right) Elevation.—Scale 1/16 In. to the Foot.



Detail of Porch Buttress—Scale 3/8 in. to the foot



Sections through Header and Sill—Scale 1½ in. to the foot

Elevations for "Bert's" Floor Plans—Contributed by R. H. Randolph, Portland, Ore.

From J. Bremner, Portland, Ore.—Regarding my query which appeared in the first column on page 601 of the November issue asking Mr. McCullough how he obtained the divisors 6 and 8 in the resisting and bending moments of a uniform beam of rectangular cross section supported at both ends and carrying a uniformly distributed load, I would say that I had not seen or read his article in the September issue entitled "Calculating Sizes of Wooden Beams and Girders" before forwarding my question or it would have been quite unnecessary, as in that article he gives a thoroughly clear, complete and logical explanation which no one having the least smatter of mathematics could fail to understand. The 6 and 8 in this case are certainly necessary.

In the same issue there is another article upon the subject explaining it in a different way but, of course, arriving at the same result. It is entitled "Determining the Size of Wooden Beam to Support a Given Load." It is an excellent plan in teaching difficult or intricate subjects to give several methods and explanations for learners, especially where the teacher really wishes to educate or enlighten his readers. There is, however, a statement in the letter of "F. L. T." on page 599 referring to moments for a beam uniformly loaded which I do not quite understand. It is this: "The total moment is then $\frac{1}{2}\,Wx - \frac{1}{2}\,wx^2$."

He states what W and w and X are, but nowhere in the whole letter does he state or explain that for which x stands.

W equals the total load; X equals the length of the portion referred to of the beam, and w equals the load per unit of length.

From this I should infer that x would equal the unit of length or distance on which w, the weight for this unit, would act and would, therefore, be 1.

On this assumption $\frac{1}{2}Wx - \frac{1}{2}\,wx^2$ would equal $\frac{1}{2}\,W - \frac{1}{2}\,w = W - w$, which is simply the difference between the weight on the whole distance and the weight on a unit of distance.

How can a dead plumb weight without any leverage angular distance to operate on be considered a "moment" in this investigation. Any neophyte who undertakes the study of this article should clearly comprehend the meaning of the following statement of "F. L. T.," namely, "$\frac{1}{2}$ of wX^2" which might be put in a more explanatory though not so concise, technical or comprehensive a manner, as for example,

$$\frac{X}{2} \times wX$$

or "the half of W multiplied by wX."

The fiber-stress method appears certainly to be the proper scientific and systematic system. The fiber stress depending on the nature of the material being omitted the section modulus which only depends on the shape (in this case $\frac{bd^2}{6}$) can always be applied.

In the resisting moment represented by

$$\frac{fbd^2}{6}$$

the "6" is an essential part of the formula because no other figure can be substituted, but in Peoples' formula, which has been frequently referred to of late, any other figure as well as the "6" there used, above the figure "1," would have been a factor of safety, and it was only essential to insert a factor of safety as Peoples' formula was for a breaking load and in practice it would not do to load a beam to the breaking point. Of course, the safety or otherwise of practically applying Peoples' formula with so low a safety factor for a divisor as "6" has nothing to do with the question. The "6" in his formula was certainly used as a safety factor.

It has been suggested by Mr. McCullough that the factor of safety for Peoples' formula should have been eliminated by introducing into the numerator the quotient of C divided by the factor of safety. I cannot agree on this point for two reasons.

In the first place Peoples' formula, as I stated in my reply to "F. L. T." in the January issue for 1911, is for a breaking load which does not include a factor of safety. Then the factor of safety is introduced to make it a safe load. There would therefore be no advantage gained in first making the above mentioned division and in the second place such division would obliterate all trace of the steps leading up to the reasons for the appearance of the number representing the quotient so derived. In the other case the value both of C in the numerator and the factor of safety in the denominator are seen and known for what they each stand; then having all the terms of the whole equation together in as separate or analytical form as possible, balancing factors can be cancelled with all the greater facility. For a sort of example let

$$22 \times 14 \times 6 \times 3 = 5{,}544$$

go to one side of the line. The separate factors of which 5,544 is here composed will most certainly cancel many that may be on the other side but how can we get them out if we first multiply them together and only set down the product 5,544? Mr. McCullough says it simplifies things to work all the known quantities into one factor as soon as possible. I think it is the reverse way about. Instead of previous involution for simplification I would keep them analytically separated for facility in cancellation before final amalgamation.

The following are the formulæ referred to where W equals the breaking load; S equals the safe load; C the constant found by experiments, and is put in Peoples' book at 850 lb. for yellow pine:

$$(1) \qquad W = \frac{bd^2 C}{L}$$

$$(2) \qquad S = \frac{bd^2 C}{6L}$$

$$(3) \qquad S = \frac{850\, bd^2}{6L}$$

$$(4) \qquad S = \frac{141.67\, bd^2}{L}$$

No. 1 is Peoples' formula for a breaking load, although instead of W he uses the letter B.

No. 2 is "People's" formula adjusted by the factor of safety of "6" for a safe load.

No. 3 is Peoples' formula for a safe load showing the value of C put at 850 lb. for yellow pine, and also showing the factor of safety of "6."

No. 4 is Peoples' formula for a safe load with the $850 \div 6$ reduced to the equivalent of 141.67, the origin of which one cannot tell unless he knows the value of either C or the safety factor, and the remaining calculations of the equation have still to be made the same as equation No. 3.

Going to hair-splitting fineness equation No. 3 is exact but equation No. 4 is not exact and can never with the decimal be made exact. For exactness $141\frac{2}{3}$ would have to be substituted for 141.67, but, of course, such fractional nicety is of no significance and not required.

Now, instead of reducing equation No. 3 to the form of equation No. 4 as Mr. McCullough has shown and recommended to be done on page 496 of the September issue, suppose b and d—the breadth and depth of the beam or joist—were 2×6 in., or 6×8 in., or 12×16 in., etc., could not the factor "6" be at once eliminated at sight without any calculations and thus immediately reduce the whole equation to its simplest form for dividing by L and at the same time do away with the fraction—either common or decimal—and still retain the reason for the whole operation before one's eyes on the cancelled formula? Any one could see the force of all that. Let any one make the calculation by the two different ways and then they will find it out.

Although I am no professional and have seldom any necessity for making any of these intricate calculations in a practical way, still I can easily see from their articles that both "H. H. F.," Mt. Vernon, N. Y., and Mr. McCullough are complete masters of their subject.

Finding Safe Loads for Wooden Beams

From D. J. McLachlan, Calgary, Alta.—In looking over the columns of the November issue of the paper I find that "J. W. S.," Paterson, N. J., gives a formula for the safe load on a beam and asks if it is reliable. He also asks for a similar rule or formula for the "safe loads for floors," which appears to me to be the same thing.

By substituting in the well-known fromulas

$$\frac{WL}{8} \text{ and } \frac{bd^2}{6}$$

for bending moment and resisting moment respectively, a fiber stress of 1800 lb. for pine, 1440 lb. for spruce and 1260 lb. for hemlock is found for the loads given by his rule.

For the example given by the correspondent the figures are

$$\frac{9600 \times 8 \times 12}{8} = \frac{6 \times 8 \times 8}{6} \times f$$

Or $115{,}200 = 64\ f$.

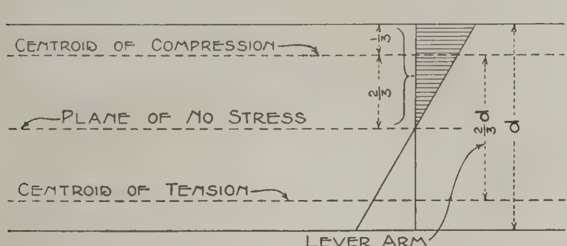
Dividing both terms of the equation by 64 gives

$$f = 1800$$

as the stress on the extreme fiber from the middle or the "skin stress" as it is sometimes called.

The rule of "J. W. S." gives the uniformly distributed load producing these stresses for the different span lengths and sizes of beams which I have tried and is probably correct.

The working stresses recommended by the American Railway Engineering and Maintenance of Way Association is for long-leaf pine, 1950; short-leaf pine, 1650; spruce, 1500; western hemlock, 1650; when protected from the weather and practically free from impact. To obtain these stresses the coefficients in the formula should be changed to 108 1/3 for long-leaf pine; 91 2/3 for short-leaf pine and hemlock and 83 1/3 for spruce.



Finding Safe Loads for Wooden Beams

I very much regret to notice that many of the correspondents of the *Building Age* appear to believe that a knowledge of algebra is necessary to an understanding of the mechanics of a beam. The proportion of stress to strain, or what is known as Hooke's law, is based entirely on experiment and observation.

The principle of the lever or what is referred to as "moments" can also be verified by experiment, as was done by the correspondents in connection with the carry-stick problem, if indeed it be not self-evident. This, together with the position of the center of gravity of a triangle, which is the point of intersection of lines drawn from the apexes to the centers of the opposite sides or of lines drawn parallel to the sides and at one-third the altitude, seem to be about all the mathematics required.

To calculate the bending moment except where the loads are uniform or symmetrical it is necessary to calculate the reaction of one of the supports, which is done by taking moments of the weights or loads about the other support and dividing by the span. To calculate the moment at any point in the span or on the beam, the moment of the support about the point is taken and the moment of any loads between the support and the point about the point is subtracted.

When this is practiced for a time and understood, the accuracy of the formula for uniform load given above may be verified by dividing it into an even number of equal parts and taking moments as above. They will invariably check when the work is right and after a time there will be no scruples about the constant 8 in the denominator, though the elegant process by which it was derived may not be understood. It can be used only for maximum moment at the center of a uniformly loaded beam or truss, but as this is the usual case it is very convenient.

The joist, beam or truss must have a resisting moment equal to the bending moment found by the above process and is represented graphically in the accompanying diagram, in which the vertical and sloping lines intersecting in the center form triangles representing the stresses, varying in intensity from the center outward.

As the area of a triangle is half tha tof a rectangle of the same base and altitude, half the area on one side of the center or one-fourth the area of the section may be considered as acting with a lever arm of two-thirds the depth and

$$\frac{1}{4} \times \frac{2}{3} = \frac{1}{6}$$

which is the section modulus of a rectangular section when the arm of the resisting forces is the depth of the beam or d.

This I hope will explain the formula

$$\frac{1}{6}\, b\, d^2$$

and why it is convenient to use 6 in the denominator although $1/4 \times 2/3$ would have done as well and might have avoided the recent controversy. This section modulus multiplied by the working stress of the material is the *resisting moment* of the beam and should equal the *bending moment.*

I would advise "J. W. S." to try and master the fundamental principles of the subject instead of using rules or formulæ which he does not understand, in which case he will be as stated by an engineer in an address recently, "either a slave to precedent or a dangerous guide to those who rely upon him."

Design Wanted for Six-Family Apartment House

From T. W. K., Cedar Rapids, Iowa.—Being a constant reader of your valuable publication I come to the Correspondence Department for assistance. I would be pleased to have some of the architectural readers send for publication plans and estimates covering a six-apartment house three stories high. There should be two apartments on each floor, each apartment to have living room, dining room, kitchen, bathroom, bedrooms and closets. The bathroom to be accessible from a hall so as not to compel going through either the bedroom or kitchen to reach it.

The size of the building on the ground is to be 32 ft. wide and 45 ft. long, including the back porches and back stairs, but not including the front porches and balconies; separate storage apartment in the basement for each family; the building to be of frame construction and to be heated by one heating plant; electric lights and gas to be provided and the building to have all modern conveniences.

I have carefully scanned the bound volumes of *Carpentry and Building* for several years back but I fail to find anything covering just exactly what I want.

In the volume for 1907 I found a three-family house which was the nearest to meeting my requirements, but what I want is something out of the ordinary by reason of the plot of ground being so small.

Obtaining Bevels in Roof Framing

From C. J. M., St. Johns, N. F.—Answering the query of J. F. Johnson, Nokomis, Ill., in the November issue I am sending a diagram, Fig. 1, with a few words of explanation which I hope will bring him out of his difficulty. The question as I view it is simply the old one of cutting the valley rafter to fit against the ridge and requires only the same explanation which has been given in the Correspondence columns of the paper when it was known as *Carpentry and Building.*

A mechanic well practiced in the use of the steel square would be able to remember all cuts for all angles in all kinds of roofs. It requires, however, a good knowledge of practical geometry and the coverings and intersections of planes and solids to be able to draw diagrams showing where those cuts are to be found.

In order to find the different cuts and bevels of the blade from *o* to *p* and observing the angles at *E* and *p*.

Next draw *D-I* equal to *A-B* and perpendicular to *D-C* and join *I-C*. Then the triangle *C-D-I* is the covering of one side of the hood.

Now, if the amount of backing to be taken off the hood rafter was known and the rafter was properly backed to make it coincide with the ridge and common rafter when in place, the bevels for the cuts to fit against the ridge and common rafter might be had directly from the angles *g-h-I* and *C-e-f* with bevel or square as explained above.

As, however, the amount of backing is not yet known we shall have to go further to find both it and the required bevels to fit the ridge and rafter from the square timber, which is the problem that is puzzling the correspondent.

In order to understand the problem the more clearly let it be considered that the hood rafter is part of a triangular prism, the sides of which are formed by the triangles *A-C-H, A-E-C, A-F-H* and *G-C-H*. To lay this out draw the line *C-H* at right angles to *A-C* and meeting the line *A-H* in *H*, thus forming the triangle *C-A-H,* which is the base of the prism.

Again, draw *A-F* perpendicular to *A-H* and equal to

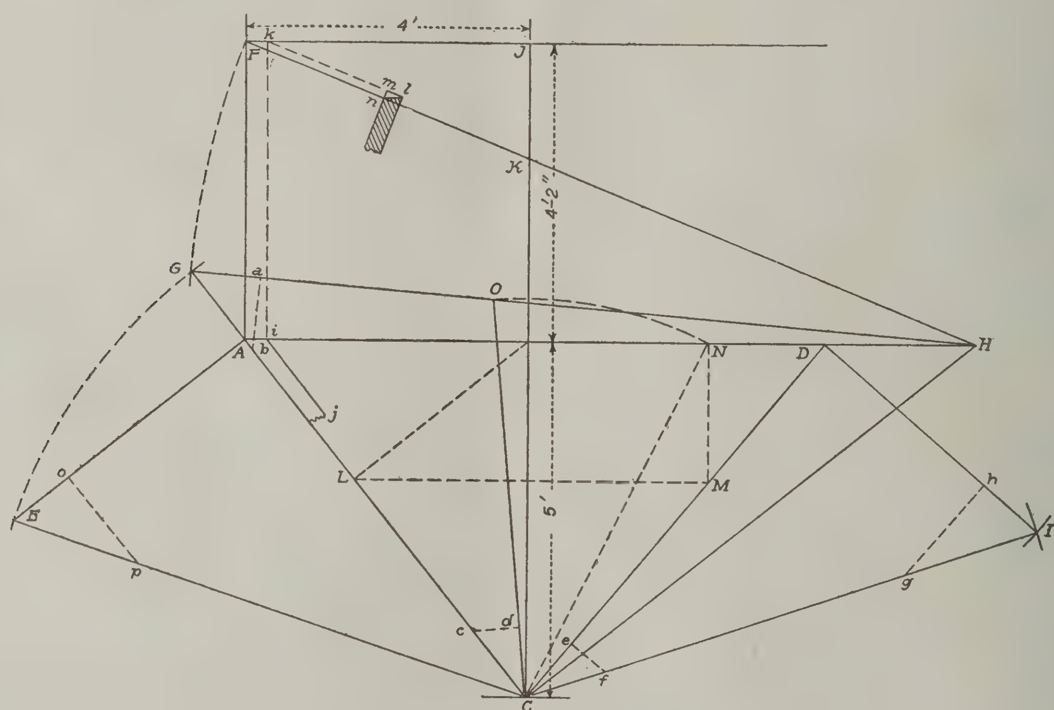


Fig. 1.—Method of Solving the Problem Suggested by "C. J. M.," of St. John's, Newfoundland

Obtaining Bevels in Roof Framing

piece of timber forming the hood rafter mentioned in the query of this correspondent proceed as follows: Referring to the diagram Fig. 1 draw indefinitely the line *A-H* and lay off upon it from *A* to *B* the length of the ridge projecting to form the hood—in this case 4 ft. Through *B* and at right angles to *A-H* draw indefinitely the line *J-C*. Upon it lay off from *B* to *C* the run of the common rafter included in the hood—5 ft.—and from *B* to *J* the rise for it, which at 10 in. rise to 1 ft. of run would be 4 ft. 2 in. Join *A-C.* The triangle *A-B-C* is the plan of the hood. Make *B-D* equal to *B-J* and join *D-C,* which gives the length of the common rafter included in the hood.

Draw *A-E* perpendicular to *A-C* and equal to *B-D.* Join *E-C,* which is the length of the hood rafter. The plumb cut of it may be obtained by setting a bevel to the angle *E-o-p* or by laying the tongue of the steel square along the line *E-A,* say from *E* to *o* and the *B-J.* Join *F-H.* Then the triangle *A-F-H* forms one side of the prism. The other side is formed by the triangle *E-A-C.* Now with *C* and *H* as centers and with *E* and *F* respectively as radii, draw the dotted arcs intersecting at *G.* Join *C-G* and *H-G* and then the triangle *C-G-H* will form the top of the triangular prism which would be formed by the hood rafter if it was continued each way to its extremity.

This will be more clearly understood if we imagine the triangles *C-E-A, C-G-H* and *A-F-H* revolved on their base lines and their apexes *E, G* and *F* brought together perpendicularly over *A.*

Now this prism is cut by a plane formed of the side of the common rafter, and in order to find the boundaries of this plane first join *F-J,* then draw the dotted line *L-B* perpendicular to *A-C,* also *L-M* parallel to *A-H* and perpendicular to this the dotted line *M-N.* The distance *N-D* will then be the hight of the point *F* over the point K and equal to *K-J.* Draw the dotted line *C-N* and with *C* as a center and *C-N* as radius draw the arc *N-O.* Join *O-C;* then the triangle *G-O-C* will be the plane formed by the top of the hood rafter if continued to the angle of the two planes formed by the continuation of the projecting ridge board *A-F-J-B* and the side of the common rafter *B-D-C.*

Again let us imagine that the points *E, G* and *F* were brought together perpendicular over *A* and that the points *J* and *D* were in an upright position over *B,* then it would be found that the line *G-O* would coincide with the line *F-K* and the line *C-O* would coincide with the dotted line *C-N,* while the points *N, O* and *K* would meet.

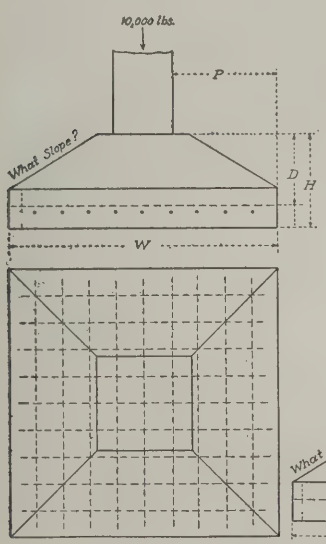
Now the triangle *G-O-C* being the plane formed by the hood rafter in the square timber, from it must be taken the bevels for the cuts where it fits against the ridge and the common rafter. The line *G-C* represents the rafter itself; the line *G-O* the bevel where it fits against the ridge and the line *C-O* the bevel where it fits against the common rafter. These bevels therefore may be found by setting bevels to the angles *c-d-C* and *G-a-b,* or by laying on the steel square as described above.

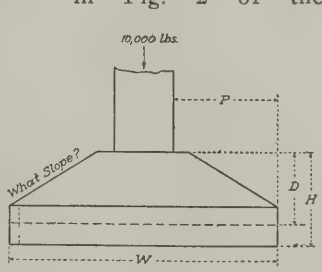
To determine the amount of backing required for the hood rafter draw the line *i-j* parallel to the line *A-C* to represent the thickness of the stuff. Draw *i-K* parallel to *A-F* and *k-l* parallel to *F-H.* At any convenient place as *m-l* draw a section of the timber used, making the line *k-l* its upper edge and having it lay at right angles to that line. Draw the line *l-n* and *m-n* will be the amount of backing required.

Designing Footings for Piers and Walls

From C. N. S., Chicago, Ill.—I have been greatly interested in the articles on Reinforced Concrete and would be glad if Mr. McCullough would discuss the following problems in connection with piers and walls. Referring to Fig. 1 of the sketches, what is the proper way to design the pier footings, of which plan and elevation are shown, and how are the different values obtained?

How are the wall footings, represented in Fig. 2 of the sketches, designed and how are the different values for them obtained?





Figs. 1 and 2—Sketches submitted by "C. N. S."

What is the proper way of finding the spacing and size of stirrups in reinforced concrete beams?

Answer.—In reply to the questions raised by our correspondent above Mr. McCullough furnishes the following comments:

A wall resting on a footing resembles Fig. 3.

Let W = total load in pounds per foot length of wall.
a = thickness of wall.
y = length of projecting area.
l = length of beam (footing), 1 foot wide, carrying the 1-foot length of wall $= 2y + a$.
M = maximum bending moment in foot-pounds.

then $M = \frac{M}{8}(l - a) = \frac{Wy}{4}$.

The process is to first find the total load coming on 1-foot length of wall. Assume a safe load on the soil, say, 3000 to 3500 pounds per square foot. Divide the total load by this safe bearing load and this gives l, the total width of the footing. Subtract from this width of footing the thickness of the wall and thus get the total projection from the edge of the footing to the wall. Dividing by 2 gives the projection on one side. Multiplying the total weight by this projection and dividing by 4 gives the bending moment under the middle of the wall in foot-pounds. This bending moment is necessary if a beam is to be used as a footing, the beam being of any material which the user prefers, either stone, wood, steel or reinforced concrete.

If the footing is to be a "stepped footing" it will look like Fig. 4, and he projections and thickness of steps are obtained in the following manner:

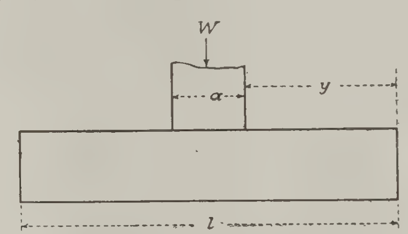


Fig. 3—Wall Resting on Footing

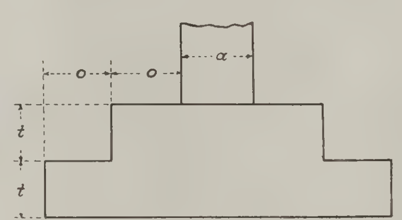


Fig. 4—A Stepped Footing

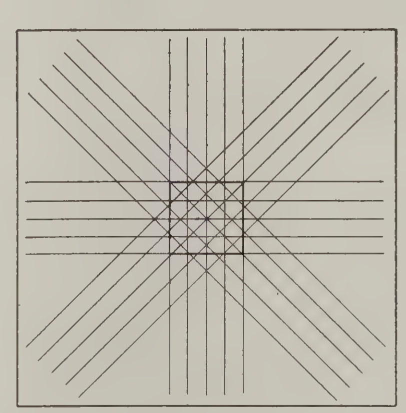


Fig. 5—Arrangement of Reinforcing Material

Designing Footings for Piers and Walls

Let P = pressure per square inch on foundation soil. This is obtained by dividing the safe load on the soil in pounds per square foot by 144, the number of inches in a square foot.
S = safe tensile strength per square inch of the material, being usually about 60 pounds for the concrete used for footing, a 1:3:5 mix.
t = thickness in inches of each step.
o = offset in inches for each step.

then $o = t\sqrt{\frac{S}{3P}}$ when thickness is assumed

and $t = o \div \sqrt{\frac{S}{3P}}$ when offset is assumed and thickness is wanted.

The process is exactly the same when the load is applied to the footing from a column instead of a wall. The total load, W, is divided by the bearing power of the soil and thus the number of square feet of bearing area obtained. The square root of this area gives the length on each side of a square footing. There is a waste of material in square footings. They should be round and the diameter is found by first dividing the area by 0.7854 and then extracting the square root of the quotient. However, no one ever sees a round footing except in reinforced concrete work.

The reinforcement in a footing under a column should be placed as in Fig. 5, the steel running to the sides and corners. Looking at the formula $M = \frac{W y}{4}$ it is seen that there are two beams, one projecting from each side of the wall. In a footing under a column there are eight beams so the expression for bending moment becomes, for a column footing, $M = \frac{W y}{16}$ in which W is total load and y is the distance from the edge of the column base to the edge of the footing.

The depth, d, to the center of the steel from the top of the footing is found by the formula

$$d = \sqrt{\frac{M}{102 \times b}}$$

in which d = depth in inches to center of steel
and b = width of column base in feet.

If b is taken in inches then M must be multiplied by 12 to convert it into inch pounds. The column base referred to is the iron or steel base in contact with the footing.

The area of the steel in the bottom $= d \times b \times 0.0065$ in square inches in each direction shown, d and b being in inches.

Sometimes a few bars or rods are placed around the edges of the footing to bind the reinforcing steel together. Sometimes the steel is placed running in two directions, crossing in squares. When so placed it is hard to figure out just how much good it does. See Fig. 1.

In putting down a footing there should first be placed 4 inches of concrete, after which the steel should be put in position and the rest of the concrete poured. It is not common these days to see the top of the footing sloped, for the concrete is so wet that it is hard to anchor the forms in place to keep them from floating up when the concrete is poured. The best way is to step off the footing in about 6-in. layers. Figs. 1 and 2 are not good, the best practice being as shown in Fig. 4.

If shearing reinforcement is not required in the footing, then some concrete can be saved by having the thickness of the edge of the footing above the steel $= \frac{1}{2} d$. At the edge of the column base and for one-third the projection it can $= d$, the difference being stepped off in one or more steps, depending upon the spread. When shearing reinforcement is required the designer must govern the thickness of the steps by the length of the stirrups.

"C. N. S." also asks for the proper way to find the spacing and size of stirrups in reinforced concrete beams and this applies also to his inquiry about column footings and wall footings. On a beam the maximum shear is equal to the reaction and when a beam is uniformly loaded this amounts to one-half the total load and is known as V. In designing a wall footing we have two beams, cantilevers, and V on each beam $= \frac{1}{2} W$. In designing a column footing we have eight cantilever beams and V on each $= \frac{1}{8} W$. The unit shearing stress $v = \frac{V}{j b d}$ in which j = moment arm or length between center of steel and centroid of compression of the concrete. This is converted into diagonal tension, for there is at the neutral axis a horizontal and a vertical shear equal in amount. The tension is at right angles to the resultants of these two shearing forces and steel must be placed across the resultant lines to bind the concrete. Whatever size steel the stirrup is made of the length of this stirrup above the neutral axis must be not less than fifty times the thickness or diameter in order to insure proper bond, even if it has to run along the top a short distance. Many failures occur because the stirrup steel is not properly anchored. It should go to within an inch of the top and then toward the support parallel with the surface. Having found the unit shearing stress there will be no necessity for stirrups or other shear reinforcement if the unit stress is less than 50 lb. per square inch. If it exceeds this amount then steel must be provided to take care of it. First assume the spacing of the stirrups, which should never exceed $\frac{1}{2} d$ when the stirrups are vertical and should never exceed d when the stirrups are inclined. Let s = spacing in inches of the stirrups, then the total tensile stress to be taken care of by the stirrups in the given width $= \frac{V}{d} \times s$ for vertical stirrups and $= 0.7 \frac{V}{d} \times s$ for inclined stirrups. Some designers supply stirrups to take care of the difference between the total unit shear and the allowable unit shear on the concrete. Other designers, and the writer is one, supply enough steel in the form of stirrups to take care of the total unit shear, thus not calling upon the concrete to take care of any shearing stress. The shearing stress in a footing being practically a punching stress we usually assume 100 lb. per square inch instead of 50 lb.

All stirrups should be rigidly attached to the bottom steel. The placing of loose stirrups is of doubtful value, unless the bottom steel is deformed and thus furnishes anchorage for the stirrups. The designer will frequently find in designing column footings that more steel will be required to care for shearing stresses than will be required for reinforcement. In such cases it will generally be found cheapest to use plain stepped concrete footings without any reinforcement. It is economical to bend up some of the bottom reinforcing steel and thus use it for shearing stresses, which are really diagonal tension stresses. First determine the number of rods required for tensile reinforcement. Determine the area of each and call the areas respectively a_1, a_2, a_3, etc., to a_n, the total area of the rods $= A_s$ and the length of the span $= L$. The lengths of the rods are l_{a_1}, l_{a_2}, etc., to l_{an}. Then

$$l_{an} = \frac{L}{\sqrt{A}} \sqrt{a_1 + a_2 + a_3 \ldots . a_n.}$$

This operation is performed by successively subtracting the area of one rod and extracting the square root of the remainder. Multiply the result by the length divided by the square root of the total area. The result is the length of each rod in turn, but 6 in. should be added in each case so the point where the rod is turned up will be 3 in. past the theoretical point. The length obtained is the length of the horizontal portion of the rod, half being on each side of the middle point of the span. Turning up these bars fixes the spacing, after which the formulas in the preceding paragraph can be used to see if sufficient steel is used.

Meeting of Minnesota State Association of Builders' Exchanges

President's Address—Work Accomplished During the Year—Officers Elected—Suggestions for Securing Uniformity in Plans and Specifications

THE tenth annual meeting of the Minnesota State Association of Builders' Exchanges was held in the rooms of the Builders' Exchange, St. Paul, on Wednesday, the 13th of December.

President J. W. L. Corning was unable to be present owing to his having met with an accident the day before the meeting, which confined him to his home. Vice-President Tuthill therefore presided.

There were about 100 delegates in attendance. The Committee on Credentials reported delegates from the five cities having local exchanges, namely, St. Paul, Minneapolis, Duluth, Stillwater and Faribault, and from 11 cities of the State having no exchanges. The attendance was the largest and most representative at any meeting in the history of the association.

The President's Address

After the preliminary work of the appointment of Committees on Resolutions, Nominations, etc., the President's Annual Address was presented. This report dealt at length with the subject of labor and how best for organizations to handle it; the necessity for upholding the "open shop" and the payment of wages on the basis of the value of the employee's services and not under the uniform wage scale rule. The president also again brought to the attention of members the matter of using every means and sparing no effort to safeguard the places where their employees were required to work. He also dwelt at length on the matter of the association adopting a fixed policy in reference to lien laws and of the value of securing in adjoining States uniformity of laws on this subject. He also went into detail on what had been done in the matter of extending the facilities for industrial education, speaking particularly of the necessity for giving instruction in schools within the reach of those who could not avail themselves of the more advanced schools, also mentioning particularly the value of giving this class of instruction in the night schools.

He again called the attention of members to what the State of Minnesota was doing for the so-called higher education, such as the University, Agricultural Colleges, Normal Schools, for which millions of dollars were annually appropriated; how but a few were able to avail themselves of the opportunities offered in such institutions, and then pointed to how little was being done by the State for the great mass of the less fortunate boys who were forced to become wage earners at early ages and for whom there was given in the schools but little practical instruction. He pointed out that it was from this class that practically all of those who follow trades come. He urged that this subject be followed up with the State Superintendent of Schools and others having to do with appropriations for schools and efforts made to have adequate facilities provided so that the youth of the State would have every opportunity to develop their ability along lines that would prove of value to themselves and make them better and more useful citizens.

The question of legislation, particularly the subject of the work done at the last session of the Legislature and the question of laws covering the question of workingmen's compensation, was also taken up in this report. No such law has yet been passed in Minnesota, but it is the opinion of those who have followed this subject that a law covering it will be passed at the next session of the Legislature. There are two committees now at work preparing bills covering this question, one appointed by the Senate of this State at its last session and another appointed by the Minnesota State Bar Association. This subject, in so far as the employers in Minnesota are concerned, is being cared for by the Minnesota Employers' Association.

Secretary's Report

The secretary and treasurer's report, showing the finances of the association, was also presented at the morning session, as were also reports of various committees, including a very exhaustive one from the committee to whom was referred the question of Uniformity in Plans and Specifications.

At 12:30 the delegates became the guests of the St. Paul Exchange at a luncheon at the Ryan Hotel.

After the luncheon informal addresses were made by the presidents of the several local exchanges.

Recommendations of President Adopted

The meeting reconvened at 3 o'clock P. M., when recommendations of the president contained in his report, above referred to, were adopted.

The question of the Minnesota Exchange affiliating with the National Builders' Exchange movement was discussed at length. Much opposition to the State Association affiliating with the national organization developed, and the experience of various organizations with former movements of this nature was cited. The question was finally disposed of by a motion to lay the subject on the table.

Officers Elected

The meeting closed with the election of officers, which resulted as follows:

President.........S. G. Tuthill, Minneapolis
First Vice-Pres.......Geo. J. Grant, St. Paul
Second Vice-Pres.......F. J. Nixon, Duluth
Third Vice-Pres......O. H. Olson, Stillwater
Fourth Vice-Pres......H. P. Leach, Faribault
Fifth Vice-Pres., John Lauritzen, Fergus Falls
Secretary and Treasurer,
Eugene Young, Minneapolis

Executive Committee

Eben Leighton..........Minneapolis
J. W. Devery..............Faribault
A. H. Krieger...............Duluth
A. P. Cameron..............St. Paul
L. Sargent................Stillwater

Suggestions for Securing Uniformity in Plans and Specifications

The letter sent out by the association addressed to the architects of the Northwest and relating to the matter of greater uniformity in plans and specifications reads as follows:

The economic and industrial conditions that have driven contractors and material men to a lower margin of profit have also in many instances compelled some architects to issue plans and specifications without that care and consideration that they would wish to give them. This in turn has brought about an increasing group of evils which have led to misunderstandings, delays and losses.

An era of specialized industries has developed a custom in building lines for material men to submit bids on their special lines to the general contractor upon which he in turn bases his general proposal. This custom has been of great value to the owner but has brought a train of evils that we believe could be eliminated to the benefit of the architects, contractors, sub-contractors and material men and result in bringing about a condition whereby the architect's ideals might be more fully carried out; the owner might receive what he thinks he bargained for; the contractor and material men might receive a rational and safe margin of profit; misunderstanding be lessened; and the product be a credit to all.

Remedying Existing Evils

In order that existing evils might be remedied and that the better conditions referred to be brought about, the Minnesota State Association of Builders' Exchanges appointed a committee of its members some time ago to confer with a committee from the Minnesota Chapter, American Institute of Architects, and as a result of conferences of these committees and of a canvass of hundreds of operators and architects throughout the State and adjoining terirtory, the following suggestions for securing uniformity in plans and specifications have been compiled:

First.—That specifications be indexed and divided into numbered paragraphs covering the various lines of material entering into the construction of buildings, with sub-headings of the various parts, so that each material man or sub-contractor may find his special part of the building clearly defined under its own heading. To assist the architects in getting results we have prepared a schedule, which we enclose, of headings and sub-headings, and recommend its general use.

Second.—That floor plans or elevations be drawn at not less than ¼″ scale.

Third.—That each set of plans have, when estimates are called for, scale drawings of interior fixtures, such as stairs, wainscoting, mantels, book cases, linen cupboards, kitchen and pantry fixtures, etc.

Fourth.—That each set of plans have, when estimates are called for, at least one sheet of details drawn at not less than ¾″ scale, showing stone, metal, terra cotta, or wood cornice, porch work, frames, interior finish, cut stone, etc.

Fifth.—That the size of glass be marked on plans or elevations for all outside windows and transoms and for all partition sash and transoms.

Sixth.—That the size of brick openings be marked on plans or elevations.

Seventh.—That the kind of wood for each room be well defined in the specifications or on the floor plans.

Eighth.—That the plans indicate the various parts that are brick, cement, stone, artificial stone, terra cotta, slate, marble, glass, metal, wood, etc.

Ninth.—That piping plans distinguish heating, refrigerating and water pipes for covering.

Tenth.—That finishing hardware be reserved for the owner to select and pay for.

Eleventh.—That leaded and ornamental glass be reserved for the owner to select and pay for, or that the price per square foot be stated in the specifications.

Twelfth.—That gas and electric fixtures be reserved for the owner to select and pay for.

Thirteenth.—That specifications should not contain clause requiring contractors, at their own expense, to furnish labor or material not shown on plans or called for in specifications.

Fourteenth.—That in order that further uniformity might prevail it is requested that the symbols prepared by the Standardization Committee of the Minneapolis Architectural Club and sent to the architects by that association, be generally used.

Builders Protective Association

The need for an association for the protection of builders from irresponsible sub-contractors in the Borough of the Bronx, N. Y., has been reflected in the formation of what is known as the Builders Protective Association. The organization was perfected at a meeting held on the evening of November 23 in Melrose Hall, Melrose avenue and 150th street, the principal business at that time being the election of officers and the appointing of an executive committee to draft the by-laws.

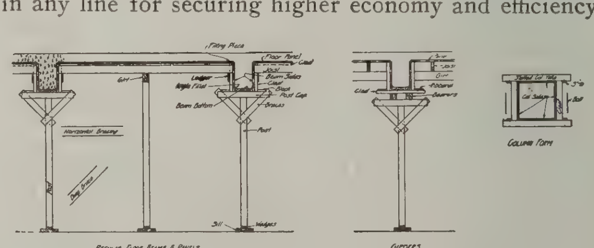
The following officers were elected to serve for the ensuing year:

President	P. J. Reville.
Vice-Presidents	Henry W. Perelman. Albert J. Schwarzler
Secretary	Charles Schaefer, Jr.
Treasurer	Harvey S. Plough.

The next meeting of the executive committee will be held December 28. In referring to the new organization Secretary Schaefer said that the existing evils are not only caused by irresponsible sub-contractors, but also by irresponsible builders, and it is the intention to try as an organization to drive these concerns out of business. He stated that the magnitude of the undertaking was fully appreciated, but it was felt that when the object of the organization was thoroughly understood it would have the co-operation of not only all responsible builders but also property owners and lending institutions.

Standardizing Names for Concrete "Forms"

There is a marked tendency at the present time to attribute to "scientific management" every change made in any line for securing higher economy and efficiency.



Standardizing Names for Concrete "Forms"

Whether this is correct or not, it is interesting to note the improvements which are taking place daily in the operation of construction companies. One of the most striking points to be noted is the standardization of all materials, etc. It is, therefore, interesting in this connection to note that the Aberthaw Construction Company, of Boston, have decided that it was worth while to even standardize the names of the different parts of the wooden forms so that the same piece will be called by the same name by the men located on the different jobs. They have sent blueprints to everyone concerned and these show clearly the names of the different parts. There is certainly every reason to believe that a great deal of time and many misunderstandings will be saved by the use of these standard names.

What Builders Are Doing

Bird's-Eye View of Building Situation in Leading Cities — Permits Issued and Estimated Value of the Projected Developments

IT is quite natural as the year is brought to a close and winter conditions prevail in many sections of the country to expect a quieting down in the building industry, and the figures which are available for November show, as compared with the same month of the year before, that this has been the case. The difference in the two periods is not particularly marked, the shrinkage being only about 5 per cent., the cities showing gains and losses being pretty evenly divided. There are several centers of building activity showing notable increases over the year before, but these include only a few of the prominent cities. For example, there are goodly increases shown in San Francisco, St. Louis, Portland, Ore.; Salt Lake City, Newark, N. J.; Hartford, Conn.; Grand Rapids, Mich.; Dallas, Texas; Baltimore, and Birmingham, Ala. On the other hand, cities in which decreases are appreciable include New York, Atlanta, Buffalo, Kansas City, Los Angeles, Omaha, Pittsburgh, Tacoma, Oklahoma, Minneapolis, Columbus, Ohio; Chicago and Chattanooga.

With the gradually improving conditions in the iron and steel industry, as well as in some of the other lines of business, the feeling is developing among architects and builders that with the opening of spring there is likely to be a resumption of building operations upon a scale which will compare most favorably with that of recent years. In many sections of the country work has already been conducted upon a record-breaking scale, and where this activity is based upon the natural growth of the community due to a legitimate demand for increased housing accommodations there would seem to be no reason why architects and builders should not feel encouraged as to the future.

Baltimore, Md.

As a general thing November shows a falling off in the number of permits issued for new construction work due in some measure, at least, to the weather conditions, and also to the close proximity to the end of the year. According to the report of Building Inspector Stubbs, however, the value of the buildings projected in November was considerably in excess of that for November, 1910. New construction work was planned to the extent of $692,977, and with permits for 74 additions brought the total to $772,817. As it is generally considered that the estimates submitted when plans are filed are 20 per cent. undervaluation, adding this amount would bring the total for the month to $927,380. Of this total two-story brick dwellings called for $267,550 and two-story frame dwellings $22,827. There was one apartment house planned to cost $200,000 and two manufactories and warehouses to cost $137,600.

For the first eleven months of 1911 the total value of new construction work and additions was $9,037,438, to which should be added the 20 per cent. for undervaluation, bringing the total up to $10,844,925. This is a slight falling off as compared with the first eleven months of 1910.

Buffalo, N. Y.

During the month of November the Bureau of Building, issued 206 building permits, representing an estimated investment of $606,000, which was a falling off of 28 per cent., as compared with the corresponding month of 1910, and of 33 per cent., as compared with October of this year

The permits for November include quite a number of factory buildings and new industrial plants, and several business structures; but the greater proportion of the building investment for the month is for dwelling houses of various classes—principally of moderate cost—workingmen's homes being largely represented.

Among the business structures to be erected are a six-story and basement warehouse for the Niagara Storage Company, structural steel, brick and concrete, from plans of Architects Bethune, Bethune & Fuchs; a three-story and basement café building, Lafayette Square, for the Beck Brewing Company, from plans of Architect George J. Metzger; business block at Broadway and Wilson street for Clarence B. Hunter, from plans of Architect G. Morton Wolfe; a brick freight house for the South Buffalo Railroad Company; a new passenger station and lake terminal for the Delaware, Lackawanna & Western Railroad at the foot of Main street, on Buffalo River, including a concrete dock 1000 ft. in length; city convention hall and exposition building on Broadway, remodeled from the Sixty-fifth Regiment Arsenal, to cost $150,000.

The list of industrial plants and additions includes two open-hearth steel furnaces at the plant of the Lackawanna Steel Company, South Buffalo, making a total of 13 open-hearth furnaces which will be operated by that company. New plant for the International Auto League Tire & Rubber Company, at Northland avenue and the New York Central Railroad Belt Line; foundry building, 65 x 250 ft., for the North Buffalo Hardware Foundry, a newly incorporated company, Hertel avenue and the Erie Railroad; pattern building for the Strong Steel Foundry Company, testing and pattern shop for the Augustine Rotary Engine Company, drop forgings plant for the J. H. Williams Company, of Brooklyn, to be built on a 90-acre site recently purchased at Kenmore avenue, Oneil street and the New York Central Railroad; two-story factory building for the Weavor-Naylor Company, Chandler street and New York Central Railroad Belt Line; addition to plant of the Buffalo Incubator Company, Bradley street; four-story concrete factory building to be added to the plant of the Niagara Machine & Tool Company, Northland avenue; an addition to the factory of the Buffalo Gasolene Motor Company, Breckenridge street, and a brick factory 60 x 200 ft., Babcock street and the Pennsylvania Railroad, for Manzel, to replace factory recently destroyed by fire.

Calgary, Alta.

The Builders' Exchange at Calgary, Alta., has made arrangements for regular meetings during the winter months, at which papers will be read dealing with practical trade topics. Arrangements have also been made with architects of the city for copies of all plans upon which competitive bids are being invited, to be sent to the Exchange.

The membership of the Exchange at persent is 110, but strong efforts are being made to increase the number to 200. The management is also endeavoring to establish a policy of friendly co-operation with the various unions in order to eliminate labor troubles so far as may be possible.

Chicago, Ill.

There has been a slight falling off in the amount of new work projected as compared with this season a year ago, but still the aggregate is of very fair proportions. During November permits were issued for 884 building operations having a frontage of 26,818 ft., and estimated to cost $7,174,000. In November, 1910, there were permits covering 920 buildings having a total frontage of 24,612 ft., and costing $8,282,700 In November, 1909, there were 891 operations having a frontage of 25,624 ft. and involving an expenditure of $6,825,700.

For the 11 months of the year just closing 10,351 permits were issued for buildings having a frontage of 276,553 ft., and valued at $98,464,400, while in the first 11 months of 1910 there were 10,882 permits issued for buildings having a frontage of 311,097 ft., and costing

$84,644,800. These figures established a new high record in 1910, but while the number of permits so far issued in 1911 shows a slight decrease the value of the buildings to be constructed exceeds that of 1910 by $13,819,600.

Cincinnati, Ohio

Considering the season of the year, November building operations were remarkably good. Excluding billboard permits and elevator inspections, 514 permits were taken out for construction work having a total estimated valuation of $554,990. In November, 1910, there were 492 permits issued, with improvements valued at $489,380.

October of this year was the banner month, and as previously reported, the Building Commissioner's records show estimated improvements for that month valued at $2,624,970. The Union Central Life Insurance Building was registered at $2,000,000, which accounts for the phenomenally large amount for the month in question.

For the eleven months ending November 1, the total value of permits issued was $12,688,590, which sets a record for Cincinnati. The nearest to this amount in the Building Department's history was approximately $9,000,000 in 1910, and that amount was for the 12-month period.

In the foregoing records neither Norwood, Oakley, Lockland and Wyoming, Ohio, nor those of Covington and Newport, Ky., are considered.

The outlook for a busy spring season is considered by both architects and builders as being very good.

Cleveland, Ohio

The building record in Cleveland during 1911 will show a gain of about 10 per cent. over 1910. During the first 11 months of the year the permits aggregated $14,663,877, as compared with $13,232,448 during the corresponding period last year. During November there were 548 permits issued for new buildings to cost $1,071,250.

Considerable new work is coming out for this season of the year in dwelling houses and mercantile buildings. Two of the largest jobs in the city, the Statler Hotel and the Central Y. M. C. A. building, will be under roof shortly, so that work can be continued on these structures during the winter. A good volume of new work is now being figured on and the outlook for a great deal of activity in building lines during the early spring is very promising.

Dallas, Texas.

According to the report of City Building Inspector Harry J. Emmins there were 132 building permits issued in November having a total assessed value of $693,873, while in November, 1910, the assessed value was $403,635.

For the first 11 months of 1911 the number of permits issued was 1591, and the total assessed valuation of the building improvements for which they were taken out was $5,359,663. These figures compare with 1659 permits for building improvements valued at $3,824,312 in the first 11 months of 1910 and for the entire 12 months of that year the aggregate valuation was $4,199,040.

Des Moines, Iowa

Statistics compiled by A. C. Frisk, chief clerk of the Department of Streets and Public Improvements, show that in November building permits were issued for construction work estimated to cost $189,685 as against $45,390 in November last year. The fluctuations in the value of new construction work projected during the 11 months of the current year were exceedingly varied, being, for example, $16,875 in January, $412,475 in February, then dropped to $88,629 in March and $77,930 in April. In the following month the value jumped to $196,795, then fell in June to $115,170, declined in July to $92,340. In August it jumped to $154,000; in September was $138,714, and in October was $112,860.

The total for the first 11 months in 1911 showed a valuation of $1,595,473, as compared with $1,183,662 in the first 11 months of 1910.

Grand Rapids, Mich.

The members of the Builders' and Traders' Exchange entertained a delegation of builders from the association at Muskegon on the afternoon and evening of November 11. There were about 105 members of the Grand Rapids Exchange who met the builders from Muskegon on their arrival and all marched to the Olympic Athletic Club Gymnasium, where a game of indoor baseball was played between nines selected from the different organizations, the score being 6 to 5 in favor of Muskegon. At 6 o'clock a banquet was served at the Pantlind Hotel, where, after the many good things provided had received proper attention, addresses were made by a number of members, in the course of whose remarks each carefully refrained from anything in the nature of business.

William J. Clark as toastmaster introduced S. A. Morman, who was followed by P. C. Connell, president of the Muskegon Association, he responding to the toast "The Things That Last." Charles A. Hauser, who had just returned from a tour of Europe, spoke on "Travels Abroad," and in the course of his remarks gave some interesting details of his observations in European cities. The toast "In Retrospect" was handled by George Schroeder and the speechmaking concluded by an interesting talk from Secretary W. S. Martin of the Grand Rapids Exchange, who told of many things of interest to builders in general and to local members in particular.

Indianapolis, Ind.

There was an appreciable falling off in building operations in this city during the month of November as compared with the same month a year ago, the figures compiled in the office of the building inspector showing a total of only $247,970, as against $546,642 in November last year.

Jacksonville, Fla.

The amount of construction work planned in November in this city shows a considerable falling off both as compared with the previous month and with November a year ago. The records of the office of the Commissioner of Buildings show that there were issued permits for 74 buildings valued at $154,300. Of this number 68 were frame buildings estimated to cost $123,550, while the remainder were brick and stone structures.

In November, 1910, permits were issued for 97 buildings costing $304,050, of which 88 were frame buildings costing $134,550, while the remainder were of brick and concrete construction costing $169,500.

Since the great fire a total of 11,804 permits have been issued for new buildings, of which 10,966 were for frame and 838 for brick and stone structures.

Los Angeles, Cal.

Notwithstanding a general feeling of uneasiness caused by the local election, the record of November building operations shows a fair degree of activity, being but little below that of October, and better than some months earlier in the year. No individual structures of high value have been started during the month, and aside from a few such buildings which will be under way before the end of the year, there is little large work in prospect. The amount of money invested in new homes is keeping well up to the year's average.

The number of permits issued in November was 1104, with a total valuation of $1,797,233, compared with $2,228,663 for November, 1910. In business and office structures of moderate size the record is considerably ahead of the previous month, and rather better than the average, showing three Class A structures valued at $390,000, and 18 Class C, valued at $197,340.

Frame buildings show a decrease, both in number and total value, from the previous month, though still in the neighborhood of $1,000,000. Counting the permits issued the first two days of December the valuation so far this year amounts to $21,690,000, compared with $21,684,100 for the entire year of 1910.

Carelessness on the part of certain contractors in failing to observe the ordinance requiring uninspected wiring to be left open until it is accepted by the city electrician's department has resulted in the announcement from that office that in future permission will be withheld from the lighting companies to provide service in any building in which the wiring has not been accepted.

The Municipal Art Commission has approved the plans of Architects Parkinson and Bergstrom for the new building of the Los Angeles Water Department, contracts for which will be let soon after the first of the year. It will be of Class A construction, six stories high, and will cost about $250,000. The exterior will be of light glazed terra cotta over a polished granite base, with large Ionic columns from the third to the sixth story.

The principal contracts recently let were the Los Angeles Times building, $210,000, to Carl Leonardt, and the Clark memorial home for the Y. M. C. A., general contract let to George H. Whyte, of Pasadena, amounting to about $200,000.

A number of notable school buildings are to be erected within the next few months in towns near Los Angeles. The principal buildings will be a polytechnic high school at Pasadena, estimated at about $400,000, and a high school at Fullerton, Cal., to cost $130,000, Norman F. Marsh being architect for both buildings.

Minneapolis, Minn.

In common with many other sections there has been a falling off in building operations in this city as compared with a year ago, the value of new construction work standing at $659,540 for November as against $785,675 for November, 1910. Taking the 11 months of the year and making comparison with the corresponding period of the year before, there is comparatively little difference, the balance, however, being slightly in favor of 1910. The figures for the two periods named are respectively $13,335,060 and $13,788,600.

Milwaukee, Wis.

Building has continued fairly active in this section of the country, and the number of permits issued in November called for an estimated expenditure of $994,267, while in November last year the amount of capital called for by the permits issued was $853,756.

During the first 11 months of 1911 permits were issued for new building construction estimated to cost $11,501,088 and the number of permits was 4243. These figures compare with $9,301,408 in the first 11 months of 1910. In this connection it is interesting to note that the $10,000,000 mark was reached in 1907, when 3625 permits were issued for buildings aggregating in cost $10,771,244. In the following year the number of permits issued increased to 4169, but the aggregate cost of these improvements was only $10,065,669. It now looks as if the desired record of an average of "a million a month" will be reached in the year just drawing to a close.

Nashville, Tenn.

At a meeting of the Nashville Builders' Exchange held on December 11 the following officers and directors were elected:

President................R. T. Creighton
First Vice-pres..............E. T. Lewis
Second Vice-pres..............A. J. Dyer
Treasurer................John Oman, Jr.
Secretary...................T. H. Evans
Assist. Secretary....Miss M. A. Womack
Sergeant-at-Arms.........E. Y. Fitzhugh

DIRECTORS.

D. Bush	J. S. Minton
C. H. Butler, Jr.	W. R. Murray
H. F. Cooper	H. H. McAlister
J. A. Daugherty	H. E. Parmer
F. J. Ehrhart	J. W. Patrick
J. P. Fulcher	Jos. H. Peter
H. M. Gould	H. M. Sawrie
W. H. Grewar	J. H. Stewart
Humphrey Hardison	Clarence Sutherland
A. W. Hutchison	W. R. Smith
J. Pink Lawrence	Chas. Sykes

J. N. Means

The annual meeting of the Exchange will be held on January 16, and arrangements are being made for a banquet during the month.

Newark, N. J.

A slightly better showing was made last month in building work than was the case in November last year, and this applies both as regards the number of permits issued and the estimated cost of the building improvements projected. According to the report of Superintendent of Building William P. O'Rourke there were 258 permits issued in November for buildings estimated to cost $898,964, while in November last year 211 permits were issued for buildings estimated to cost $696,525.

It is perfectly natural to expect a shrinkage in building operations at this season of the year, but all things considered the showing is regarded as most gratifying.

New York City

The local situation during November has shown no important change, building operations being conducted upon a fairly normal scale, but somewhat in excess, however, of the corresponding month in 1910. The report of Building Superintendent Rudolph P. Miller for the Borough of Manhattan shows that plans were filed for 56 new buildings, costing $8,917,875, which with the additions and repairs gives a total of $9,487,175. In November 1910, there were 36 new buildings planned, costing $3,144,865, and with the additions for alterations and repairs made the total cost $3,551,066.

The gain last month was due to the fact that there were 17 tenement houses planned, costing $3,925,000, as against nine costing $1,616,000, in November of the year before. There were four office buildings planned last month, costing $2,525,000, and five manufactories and workshops, costing $1,237,500. These figures compare with five office buildings costing $1,247,000 and two manufactories and workshops costing $35,000 in November, 1910. Another source of increase was in the five places of amusement constructed costing $345,000 against one costing $6,000 in November, 1910.

In Brooklyn there has been a little more activity than was the case a year ago, the figures for November showing permits to have been issued for improvements estimated to cost $2,799,899 as against $2,533,100 in November, 1910.

The reverse of the situation above indicated is found in the Borough of the Bronx, where there has been a heavy falling off in construction work. During November permits were taken out for building improvements to cost $2,186,205, while in November, 1910, the permits issued called for an outlay of $10,736,565.

For the 11 months of the year just closing the total value of building construction projected in the Borough of Manhattan was $104,092,287; in Brooklyn it was $35,064,385, and in the Bronx it was $22,233,077. These figures compare with $101,467,120 for the Borough of Manhattan, $37,807,952 for Brooklyn, and $44,561,580 for the Borough of Bronx in the first 11 months of 1910.

According to the report of Superintendent John J. Simmons, of the Bureau of Buildings, for the Borough of Queens, all previous building records were broken during the year just closing. For the 11 months 5000 permits were issued for building improvements having a valuation of $21,157,264, while in the first 11 months of 1910 there were 3894 permits taken out for building improvements valued at $14,507,322.

For every month during 1911 the value of new buildings in Queens reached a total of more than a million dollars, the month of June breaking all records, the permits issued at that time calling for an estimated expenditure of $3,128,366.

The general strike of the marble workers in the shops and on 55 buildings was declared off unconditionally December 16 after having continued for 19 weeks. The strike was for an advance of 50 cents a day and new working conditions.

Oakland, Cal.

Building operations have been more active than usual of late, the continued absence of wet weather enabling the numerous builders of small homes to rush their work through. The value of buildings for which permits were issued in November is estimated at $810,046, compared with $632,409 for October, and $351,557 for November, 1910. With the exception of last March, when the total ran over a million, the record is the best since October, 1910, and is far above the general average. It is pretty certain that the total for the year will greatly exceed that for 1910.

The total number of permits was 335, of which 139 were for alterations and repairs. Dwellings were by far the most numerous of the new projects, numbering 124, valued at $281,576. The only Class A permit was for steel work on the new city hall, amounting to $234,376. Otherwise, the largest single structures were a concrete store, $60,000, and a church, $59,000.

The general contract for the St. Paul's Cathedral, in this city, which when completed will cost about $100,000, has been let to the Lindgren Company, of San Francisco.

Omaha, Neb.

A much quieter condition in the building industry has prevailed during the month just closed than was the case in November last year, but all things considered, the volume of operations has been upon a normal scale. Last month 104 building permits were issued for construction work estimated to cost $307,817, while in November last year 100 permits were taken out for building operations costing $401,960.

For the 11 months of the current year the showing as compared with 1910 is relatively the same as that for November. The Bureau of Building Inspection shows that the total value of construction work for which permits were issued up to the first of December was $5,261,863, and during the corresponding period of 1910 it was $6,140,138.

Philadelphia, Pa.

An appreciable slowing down in the construction of two-story dwelling houses is to be noted in this city. While this is seasonable, it is also true that the heavy operations in some districts have not moved as freely as builders anticipated, and as the absorption has been slower than usual, there is less disposition to further exceed the normal demand. In some districts, however, there is a lively demand for dwelling houses of this character, and the growth will no doubt continue, but in a general way expansion is expected to go forward at a slower pace.

While the estimated cost for two-story dwelling houses begun in November totalled but $507,800, the aggregate for the past 11 months was $20,271,150, as compared with $20,900,640 during the same period last year. Operations covered 8539 dwellings, a decline of 367 as compared to the total for the first 11 months of 1910.

Statistics compiled by the Bureau of Building Inspection show that 629 permits for 827 operations were issued during November, the estimated cost of which was $1,615,115. This represents a decline in value of $731,015, when compared to the total for October, and a falling off of $606,520 when compared to November, 1910. The decline in total dwelling house operations, including two and three-story houses, comparing the past month with that of the previous year, shows a loss of nearly $500,000. Tenement and apartment houses, aggregating a cost of $40,000, show a material gain over October. There was also a decline in manufacturing buildings on which work was begun; office buildings, however, show an increase amounting to $125,000.

Notwithstanding the fact that November statistics have been unfavorable from a standpoint of comparisons, it is interesting to note that the total estimated cost of building work for the past 11 months of the year keeps well ahead of that for 1910, even though the actual number of operations was smaller by 76 than was the case last year. Totals for 11 months this year show an estimated expenditure of $38,293,145, as compared to $36,518,538 in 1910, being $1,775,607 in favor of the current year.

Builders continue actively engaged with work in hand, weather conditions have favored comparatively steady outdoor work, and in many cases operation work started late in the fall is further advanced than usual at this season.

George F. Lasher is, together with several other parties, having plans prepared for what will be the largest light manufacturing building in the city. It will be located at Broad, Wallace and Fifteenth streets, 400 x 100 ft., eight to ten stories high, constructed of concrete, brick and steel, absolutely fireproof.

W. K. Hunter has begun work, it is stated, on an operation of 22 two-story dwellings, to cost in the aggregate $47,900. They will be located in the vicinity of Haverford avenue and Master streets. The general dimension of the houses is 15 x 41 ft.

Portland, Ore.

There is more activity in the building trades in Portland at present than for nearly a year past, the valuation of buildings for which permits were issued during November being $2,046,785, compared with $1,688,580 for October, and $1,119,205 for November, 1910. This is the first month this year when the record has passed the two million mark, though that of December last year was $4,715,420. Construction is being started on a number of fine business and office buildings, one of the largest jobs for which contracts were let last month being the Oregon Journal building. One of the most encouraging features at present is the increasing investment of Eastern capital, not only in buildings but in local industries which will require buildings.

One of the most important factors at present is the building of fine residences in the high-class district on the east side of the river.

The lumber industry still occupies a leading position in Oregon, and the cheapness of this material gives it precedence over all others for building work. With the growth of urban communities, however, the demand for permanent and fireproof materials is growing very rapidly, and brick, stone and concrete are being used to a large extent, not only for the larger structures, but for many of the new residences. Oregon is still using large quantities of California cement, but manufacturers in this State and Washington are working on improvement projects which will probably enable them to supply the north coast market to the exclusion of outside materials. Considerable California brick is also used at Astoria and the Coos Bay towns, but the Portland market is well supplied by nearby plants.

The principal buildings for which plans will soon be out for figures are the following: The 12-story Oregon Hotel, to be built by S. Denson, at Seventh and Oak streets, at an estimated cost of $750,000, Patterson & Beach, architects; a seven-story warehouse for the Honeyman Hardware Company, at West Park and Hoyt streets, to cost $125,000, David C. Lewis, architect; the seven-story reinforced concrete Central Market building for H. S. Warren & Co., of Detroit, Mich., to cost $250,000, Bennes & Hendricks, architects; a three-story brick apartment house on Eleventh street, near College, to cost $35,000, E. Kroner, architect, and a three-story brick apartment house at Twenty-first and Overton streets, to cost $35,000, Claussen & Claussen, architects.

St. Paul, Minn.

The annual meeting of the Builders' Exchange of St. Paul was held at the headquarters of the organization on the 5th of December. One of the features was the report of the president, which dealt at length with the question of industrial education. In the course of his remarks he spoke of the necessity for and the justice of the various states in the country doing something to promote and encourage schools in which boys would be taught at least the rudiments of the trades. The question of legislation was also considered at length.

The officers elected for the ensuing year were as follows:

President................................John A. Seeger
First Vice-President......................J. D. Roberts
Second Vice-President......................E. W. Finck
Treasurer..................................F. H. Romer
Secretary................................A. V. Williams

The officials of the Builders' Exchange have renewed their lease of the headquarters in the Ryan Block, and have had the entire space redecorated and improved. A notable feature of the rearrangement is the providing of more small rooms for the use of estimators in figuring plans. We understand that the organization is looking forward to a very active year.

Building operations have been about on a par with those of this season a year ago, the value of the improvements for which permits were issued in November, 1911 and 1910, respectively, being $780,650 and $764,108.

For the 11 months of the year just closing there was an appreciable falling off as compared with the corresponding 11 months of 1910, the figures for the two periods being $8,495,704 and $9,686,707, respectively.

St. Louis, Mo.

There was a marked increase in the value of building operations planned in November as compared with the same month a year ago, but this was due in part to the permit for an office building which is estimated to involve the expenditure of half a million dollars. The report of the Bureau of Building Inspection shows the value of the improvements for which permits were issued last month to have been $1,611,662, as compared with $1,306,623 in November a year ago. Of the total for last month $1,518,103 represented the estimated cost of new construction work, the remainder being for alterations and repairs.

In addition to the plans filed for the half million dollar office building there were 71 brick dwellings planned to cost $233,755 and 45 brick tenements to cost $252,800.

Sacramento, Cal.

Considerable activity is noted just now at Sacramento, Cal., the largest recent contract being for the Farmers' & Mechanics' Savings Bank, taken by the Ransome Construction Company at $135,000. Fifteen other contracts on this building are still to be let, and will bring the cost to about $250,000. Figures are being taken by Sadler & Hoen, architects, on the LaRue residence, a 16-room mission style structure which will cost about $20,000. Preliminary arrangements are being made for the erection of a $150,000 Y. M. C. A. building. The total of building permits for November was $325,533, compared with $122,400 for October, and an increase of more than 400 per cent. over the record for November, 1910.

San Francisco, Cal.

Notwithstanding the approach of the rainy season, the local building situation shows a marked improvement, due mainly to the commencement of work on a number of rather large business and office structures which had been in the market for some time. Few new jobs of importance are coming up just now, but plans have been announced for an unusually large number of residences and apartments of the smaller class. Contractors and material dealers are laying their plans for a gradual improvement next year, and believe that the expected boom will reach its hight in 1913.

The valuation of building permits for November was $1,617,890, as compared with $1,255,892 for October, and $992,258 for November, 1910.

The building material market in general shows some irregularity. Lumber remains firm, while most steel products are easy, corrugated sheets being especially low. Cement until recently has been held at a uniform price, but there is now a feeling of weakness, and prices are lower than for nearly a year past. By shipping a considerable surplus to other markets manufacturers of common brick are able to maintain the price of $7 per M., and expect this figure to hold through the coming year. The brick men recently attempted to organize for an advertising campaign, and though unable to do so, they are working more in harmony than for several years past. Building stone is in good demand, but aside from Vermont marble and Utah colitic stone little eastern material is used.

There is considerable agitation among owners of tenement property over the provisions of the new Burnett tenement law, which they believe will cause heavy loss to owners in all the larger cities of the State. So far its application is not definitely known, pending court decisions, and its enforcement in some places has not been very rigid, but steps are being taken to secure its enforcement.

The principal contracts recently let are: The 10-story Standard Oil building, all but foundations, the steel amounting to $67,438; the Polytechnic High School, steel work and some subsidiary jobs, and the Leventritt apartment house, at the intersection of Franklin, Page and Market streets, a six-story building to cost $125,000.

The Sharon Estate Company is having plans drawn for buildings in this city which will cost altogether about $2,000,000. This project includes, besides a $600,000 building on New Montgomery street, a large apartment house on Sutter street, one apartment and one hotel building on Ellis street, and an addition to the Palace Hotel.

Buildings for which plans are about ready for figuring include a five-story brick and steel hotel and store building on California street, at an estimated cost of $65,000, Edward G. Garden, architect; a seven-story steel frame apartment house, containing 120 rooms, at Taylor and Geary streets, Righetti & Headman, architects; a hotel and theatre building on Eddy street, near Powell street, at an estimated cost of $250,000, O'Brien & Werner, architects: a $300,000 hotel at Ellis and Taylor streets, Miller & Colmesnil, architects; a seven-story Class C hotel on Mason street, near O'Farrell, to cost about $60,000, Cunningham & Politeo, architects; an eight-story Class A apartment to cost about $80,000, at Pine and Powell streets, C. H. Barrett, architect, and an eight-story and basement brick and steel apartment, containing 150 rooms, to be erected on Bush street, at an estimated cost of $125,000, Cunningham & Politeo, architects.

The more important plans recently announced in suburban towns are as follows: A $60.000 residence for H. O. Pillsbury, at Burlingame Park, Willis Polk, architect; a three-story brick and steel addition to the State School for Blind and Dumb, Berkeley, Cal., to cost $50,000; a $130,000 high school at Lodi, Cal., Stone & Wright, architects, and an $80,000 high school at Santa Rosa, Cal., W. H. Weeks, architect, bids opened Dec. 18.

The Carpenters' Union at Bakersfield, Cal., is raising $28,000 to erect a three-story stone and brick labor temple in that town.

F. A. Williams has taken a contract for a Class A addition to the chemistry building at the University of California, at $22,990.

Seattle, Wash.

A more conservative attitude appears to have been taken by builders as the year draws to a close and the number and value of the permits issued by the Department of Buildings in November shows a decided falling off as compared with the same month in 1910. This lessening activity is not confined to any particular class of building, but is found in residence construction, semi-fireproof buildings and office and retail store buildings.

According to the report of R. H. Ober, superintendent of the Department of Buildings, there were issued in November 687 permits for building improvements costing $449,105, as against 920 permits for construction work involving an outlay of $1,020,235 in November, 1910. Of this total 98 permits were for dwelling houses costing $132,425, as against 148 dwellings costing $182,505 in November, 1910, and there were permits for three office and retail store buildings costing $31,500 last month, while in November of the year before there were seven such buildings planned costing $469,100. In the way of warehouses, factory buildings, etc., five were planned last month costing $78,500, while in November, 1910, the same number was planned but costing $142,300.

For the 11 months of the year just closing 10,404 permits were issued by the department calling for an outlay of $7,164,266, while in the first 11 months of 1910 there were 12,277 permits issued calling for an estimated expenditure of $16,410,577.

Washington, D. C.

This city will probably stand high in the list showing estimated cost of building improvements projected in November, owing to the fact that Inspector of Buildings Morris Hacker has inaugurated a new plan of computing the amount of contracts on both federal and private building projects. His report for November shows the remarkable total of $4,274,915, which figures compare with $818,616 for November, 1910. The latter figures, however, are based on the value of permits issued for private projects.

The claim has recently been made that the figures issued by the Inspector of Buildings did not actually represent the total building operations in Washington by a very wide margin and in order to fully cover the ground it was decided to include with the private building projects those of a governmental nature.

The chief sources of the high figures for November were the new Bureau of Engraving and Printing to cost $1,197,420, and the new City Post Office, which brings the total for the two up to $3,471,349.

Inspector Hacker's report shows that the Northwest section of the city led the other sections in the extent of operations during November, having a total of $169,968. The total of private building operations for the month of November amounted to $803,566.

Wilkes Barre, Pa.

For the first 11 months of the current year Building Inspector Beck has issued permits for new buildings to cost $5,175,829, and with alterations and repairs amounting to $483,740, brings the total to $5,659,569. This amount exceeds the total of building operations for the entire 12 months of last year by nearly $1,000,000.

Another record was broken in November, when permits for new construction work, alterations and repairs amounted to $327,416, which is an increase over November last year of $135,623. The feature of November operations was the construction of brick dwellings, permits having been issued for 34 of these to cost $150,500. For the 11 months new brick dwellings costing $1,161,818 have been authorized and the demand still continues.

Law in Building Trades

BY A. L. H. STREET.

Ascertaining Damages for Breach of Construction Contract

In measuring damages claimed for breach of a construction contract, it was improper to receive evidence on the part of the owner that he received a bid to do the work at a higher price, as proof of the reasonableness of the price paid the contractor who did the work, accuracy and reasonableness of the bid not being verified by other evidence. (New York Court of Appeals, Gorham Company vs. United Engineering & Contracting Company, 95 Northeastern Reporter 805.)

Waiver of Provision Requiring Written Order for Extra Work under Contract

An owner may be found to have waived provision in a building contract requiring a written order from the architect for extra work, if it appears that the provision has been disregarded by the parties. (Washington Supreme Court, A. Gehri & Company vs. Dawson, 116 Pacific Reporter 673.)

Effect of Owner's Failure to Pay Installments when Due

An owner's refusal to pay installments on a building contract when due excuses further performance by the contractor. (California Court of Appeals, Vulcan Iron Works vs. Cook, 114 Pacific Reporter 995.)

Architect's Right to Compensation

An architect made plans for alterations in a building on an understanding that the owner should obtain the lowest bid possible from several builders, and that the architect should receive as his compensation one-half the money saved on the lowest estimate that he could obtain. After receiving a bid the owner abandoned the improvement. Held, that the architect cannot recover on the contract without showing what the work would actually have cost if done by the contractors obtained by him, but that he can recover the reasonable value of the service rendered by him. (New York Supreme Court, First Appellate Division: Hunter vs. Vicario, 130 New York Supplement 625.)

Benefits of Builders' Exchanges

Value of a Large Organization -- Its Obligations -- Opportunities for Service

IN the course of his annual address before the members of the Cleveland Builders' Exchange, in November, retiring President Elmer E. Teare presented some very pertinent truths touching the benefits of an organization of the character which he represented and the obligations of membership. He pointed out the relationship of his own Exchange to the city of Cleveland and its business life and activities. He stated that during the past year the Exchange had united with the Local Chapter of Architects, the Cleveland Engineering Society, the Chamber of Commerce, the Chamber of Industry, the Real Estate Board, the Employers' Association and the Municipal Association in various movements of a public and semi-public character. In this way he felt the influence of the builder was enlarged and became a greater factor in promoting not only the interests of the city but those of his own trade and calling as well.

Just and Equitable Principles of Dealing

In touching upon the benefits of acquaintance, and upon the value of a large organization such as that of the Cleveland Builders' Exchange with 400 names on its roster, Mr. Teare said:

"With our enlarged membership we also create a wider scope of agencies for advocating just and equitable principles of dealing between the contractor, the architect and the owner, and a greater force for operating in correcting abuses, obtaining recognition in matters of legislation and in handling the many problems that constantly confront the builder. Regarding membership in a practical sense, it may be said that more and more are the benefits of close personal contact and acquaintance recognized as essential aids to business. Speaking on this point, William H. Sayward, secretary of the Boston Exchange, recently said: 'Personal acquaintance is of priceless value and should be more strenuously striven for to-day than ever before. The get-together spirit is everywhere being emphasized nowadays, and that spirit can be made a hundred times more efficient when those who desire to get together have a chance to associate a man's name with something more than a commercial rating or a trade reputation. The more one knows of his fellows, and the better he knows them, the greater are the chances that he will turn to them for help and service when time or situation makes it advisable. No one can well deny that a face-to-face acquaintance facilitates the speedy and smooth operation of business through the readier appeal and more positive confidence which a known personality makes and creates.'

Value of a Large Organization

"In addition to these advantages from membership there is still another of equal importance, and that is the added strength given to builders as employers in their relation to the trades organizations. A large and compact association commands respect and consideration, whereas, a small and weak association may be totally disregarded. It is interesting to note, in passing, that many of our present members were admitted to the exchange at a merely nominal fee and with annual dues the smallest of any exchange in the large cities, and that with no increase in the cost of membership to them, the financial strength of the exchange has been multiplied until they have a part in an institution with actual value of five times the original fee for each member and with several times the opportunities for benefits that existed when they joined.

Opportunities for Service

"The enlarged membership and increased strength of our exchange places a greater obligation upon it as an institution than ever before. The organization should accept this added responsibility and endeavor to accomplish more in the way of results than ever before. While Cleveland has made remarkable strides in recent years, there are still many things to be done if our maximum progress as a city is to be attained. The relationship of capital and labor is still to be brought to that mutually satisfactory basis that will insure freedom from strikes and the attendant losses resulting therefrom. Our building regulations are capable of improvement and their administration could be helped by greater attention to the selection of inspectors and officials on the strict basis of merit and civil service. We still need the Union Depot, a music hall and auditorium, a city hall in keeping with the importance of our city, better water and lighting arrangements, the completion of the grouping plan, and many other improvements familiar to you all from frequent reference to them in recurring public discussions. Both as citizens and as an organization we should do all in our power to aid in securing these improvements for the up-building of the city and the betterment of conditions.

Workmen's Compensation Act

"One of the most important subjects now before the building interests of this city and state is the attitude to be taken on the Employers' Liability Law enacted at the last session of the Ohio Legislature. The State Liability Board of Awards is at work preparing a schedule of rates to be submitted shortly to employers in the various trades previous to establishing permanent headquarters and putting the law into effect. Considerable opposition to the law has appeared among manufacturers and large corporate interests, and it is at present questionable as to whether any large percentage of these employers will operate under the law. Our Exchange has recommended to Governor Harmon that a suit be brought in the Supreme Court to test the constitutionality of the law before it is applied, and it is assured that this will be done. There are some features of the law which are not altogether pleasing to builders, especially the provision which limits its operation to employers having five or more workmen.

"I believe that a full discussion of the merits of the plan should be had before the Exchange as soon as the Board of Awards submits its schedule of rates, and that the Exchange should give all possible information to its members to guide them in their decision relative to adopting the plan. All are agreed that a fair, reasonable, effective compensation act is to be desired, but whether the present act meets these requirements is a much-disputed question."

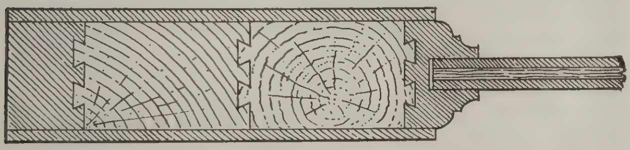
What will be, when completed, the tallest building south of Mason and Dixon's line is the 21-story structure which is to replace the old Chamber of Commerce building at the southwest corner of 9th and Main streets, Richmond, Va. It will cost about $1,000,000. George A. Fuller Company have the contract.

Construction of Veneered Doors

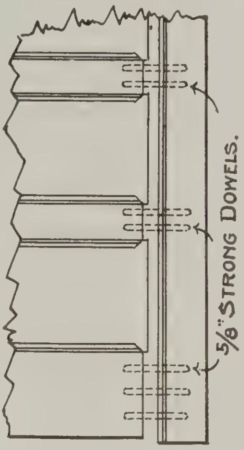
Novel Methods Employed--Distinctive Features--Some of the Results Accomplished

IN commenting upon the construction of hardwood veneered doors in our issue for last month we pointed out among other things that much of the work of making these doors at the present day was accomplished upon machines which almost automatically carry through the various processes to completion, even to the gluing up of the parts which compose the soft-wood core as well as gluing the face veneer on to it under heavy hydraulic pressures. Mention was also made of the fact that leading manufacturers of hardwood veneered doors have their own special forms of construction, and in the present article we illustrate some of the methods which have been adopted. In one of these, known as the "Max-Royal," the horizontal cross section of the door stile here given clearly indicates the manner in which the core is put together and the ends and veneer attached. There are also shown elevations of two types of finished doors built according to this method, one representing a five-panel birch veneer door and the other a vertical two-panel oak veneer door. Other styles which are popular include the one-panel and two-panel doors, although the five-cross-panel door is probably one of the most popular patterns with builders and house owners. The veneers used are Wisconsin red oak and birch.

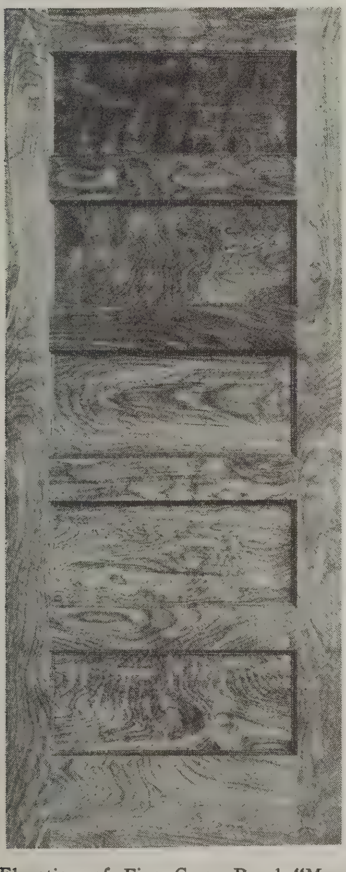
The distinctive feature of the "M. & G." doors is the system of strengthening dowels used to reinforce the joints between the stiles and the meeting rails. A good idea of this may be gleaned from the section through the top rail of a door showing the ⅝-in. holes for the dowels. This is still further shown in the partial elevation of the door here given, while the appearance of a finished single-panel door is shown immediately below it. Hardwood veneered doors admit of a beautiful finish and add much to the appearance of homes in which they are used. It is in fact the beautiful appearance of the hardwood door that is most admired, and this result



Horizontal Section Through the Stile of a "Max-Royal" Door



Broken Elevation, Showing Method of Doweling Meeting Rails to Stiles in the "M. & G." Door.



Elevation of Five Cross Panel "Max-Royal" Birch Veneer Door

Elevation of Vertical Two-Panel "Max-Royal" Oak Veneer Door

Single-Panel "M. & G." Interior Door of Birch Veneer

Construction of Hardwood Veneered Doors is obtained by reason of carefully selecting, applying and finishing the face veneer. In order, however, that the construction may be lasting and durable the core work must be honestly performed, this proving the real test of its lasting qualities.

Carpenter-contractors and builders quite often encounter opposition to their efforts to extend the use of hardwood veneered doors among their clients because of the unenviable reputation which the so-called built-up veneered doors turned out by some of the small local mills may have created. Practical builders, however, know the difference between such product and the standard brands, the worth and quality of which have long been established.

At the present day the tendency is more and more strongly in the direction of the use of hardwood veneered doors in modern homes—not only those of what may be termed a pretentious nature, but also in those of more modest cost, owing to the fact that the expense of the hardwood door is but little if any more than some of the other kinds.

Convention American Institute of Architects

At the forty-fifth annual convention of the American Institute of Architects held in Washington, D. C., the second week in December, more than 100 delegates were present at the opening session. President Irving K. Pond in his annual address briefly reviewed the progress of the year's work and paid a glowing tribute to the character of the membership.

Many interesting and instructive papers were read and on the evening of December 13, in the new National Museum and in the presence of President Taft, the French ambassador and scores of men prominent in the profession, George B. Post of New York City was presented with the gold medal of the Institute—the highest gift in its bestowal—for 50 years of distinguished service in architecture.

The election of officers resulted as follows:

President..........Walter Cook, New York City
First Vice-Pres............R. C. Sturgis, Boston
Second Vice-Pres.........F. C. Baldwin, Detroit
Secy.-Treas.....Glenn Brown, Washington, D. C.

At the opening session of the convention the table upon which President Madison signed the Treaty of Ghent was presented to the Institute by the San Francisco Chapter. This table was in the Octagon House, the present headquarters of the Institute, at the time President Madison had his residence there, following the burning of the White House by the British. Shortly after the War of 1812 the historical old piece of furniture was sent to San Francisco, where it remained until the earthquake and fire in 1906.

The annual banquet was held on the evening of December 14 at the New Willard Hotel.

Death of Henry F. Lord

Henry F. Lord, treasurer of the Lord & Burnham Company, the well-known designers and builders of greenhouses, Irvington-on-Hudson, N. Y., was accidentally killed while examining an automobile in his garage on the afternoon of December 16. Mr. Lord was of a mechanical turn of mind and the automobile was his hobby. In overhauling his car, and while underneath it, the engine weighing several hundred pounds became loosened and fell upon his chest. He was born in Buffalo 58 years ago, but had lived in Irvington for the past 45 years. He was formerly president of the village of Irvington-on-Hudson and at the time of his death was a trustee. Mr. Lord's father was the founder of the Lord & Burnham Company.

Some Rulings by New York Building Department

Among the more recent rulings announced by Rudolph P. Miller, Superintendent of Buildings for the Borough of Manhattan, New York City, are the following bearing dates November 8, 10, 21 and December 9, respectively:

Fireproof Enclosures for Stairs and Elevators

Hereafter the enclosure walls for elevators or stairs shall be of brick at least 8 in. thick, or terra-cotta blocks at least 6 in. thick in an angle iron frame, unless supported independently on fireproof construction at each story, reinforced stone concrete at least 3 in. thick, or reinforced cinder concrete at least 4 in. thick. Where conditions require it, these thicknesses must be increased to meet the circumstances.

Moving Picture Booth Construction

Any partition that has been tested and approved as a fireproof partition by the Bureau of Buildings will be accepted as the equivalent of the construction called for in Chapter 756 of the Laws of 1911 for enclosing apparatus for projecting moving pictures.

Any other material, such as asbestos board, used as a covering for the angle iron framework specified in the aforesaid law must be at least ¼ in. thick, and must comply with the following tests and requirements for transverse strength and fire-resisting qualities.

The transverse test is to be conducted as follows: Five samples 4 in. wide are to be placed flatwise on two rounded knife edge bearings set parallel 7 in. apart. A central load is to be applied through a similar rounded edge until the sample is ruptured. The modulus of rupture is then to be computed, and must average 4000 lb. per square inch and must not fall below 3500 lb. per square inch in any sample.

The fire test is to be the regulation test for fireproof materials and is to be conducted as follows: Two samples of the material about 12 in. square are to be placed over a 6-in. gas crucible furnace for thirty minutes, the temperature being raised from that of the air to 1700 degrees Fahrenheit within 20 minutes, and maintained at that temperature for the balance of the time. A pyrometer is to be placed immediately under the test pieces to determine and record the temperature. At the end of the heat test the material is to be subjected to a stream of water with pressure of 60 lb. per square inch for one minute. Under this test the material must not burn, wash away or disintegrate to more than half of its depth.

Main Exit Doors

Hereafter exit doors from buildings that are required to swing outward must be so hung that the doors do not project outside of the building line when open. Such doors must not swing directly out on a flight of steps, but must open out on a platform in cases where steps are provided.

Storm Water Sewers

Wherever separate systems of sewers are provided for house drainage and storm water drainage, it will be necessary to provide separate systems of drainage in all buildings to be erected or altered within the district affected. Both systems must be described in the application and shown on the plans for all new buildings and alterations. Both systems must comply with the present plumbing and drainage rules. Separate sewer connections at the proper levels must be provided.

Construction of a Concrete Silo

The cost of a concrete silo 15 ft. in diameter and 36 feet high, with solid walls, is said to be about $238. The forms are movable, consisting of two circular shells 3 to 4 ft. high, with a 6-in. space between for the wall and a horizontal framework of 2 x 4 in. timbers cut to a circle and covered with sheet metal or wooden lagging. A 1:2:4 mixture of concrete is used with ⅜-in. reinforcing rods 10 ft. long laid horizontally at variable distances on centers; vertical rods are spaced 18 in. apart. Concrete footings 1 x 2 ft. are set 1 ft. below ground and a 4-in. concrete floor laid on the natural clay bottom. The concrete roof is cone-shaped, with a rise in the center of 2 ft. and an overhanging of 1 ft.; the roof is reinforced with 3/8-in. rods laid radially and spaced 18 in. at the eaves.

Eliminating Gas Holders from Residential Districts

The beauty of the residential section of many of our cities is marred by gas holders which are used as reservoirs for the distributing mains. It is generally considered that district holders are necessary in every system. This is not so, for by using high-pressure gas they can be done away with. In their stead it is only necessary to erect a small brick or concrete house for the mechanical equipment consisting of compressors.

The accompanying picture well illustrates the comparative size and appearance of a gas holder and a compressor house (the small building at the left). This view was taken at the works of the New York & Queens Gas Company, Flushing, L. I., where by putting the gas under pressure by means of two compressors built by the Laidlaw-Dunn-Gordon Company, Cincinnati, O., a holder, which would have been located in a part of the city where it would have been objectionable, was not required.

Eliminating Gas Holders from Residential Districts

Architects working up plans for gas works will at once appreciate the advantage from an aesthetic standpoint of selecting a high-pressure system, as then no unsightly holders will interfere with the artistic treatment of the office, administration and other buildings.

Reinforced Concrete as a Sound Deadener

The charge has been made against reinforced concrete that it transmits sound too readily and is therefore not adaptable to dwellings, halls, etc. The sound waves penetrating into a solid body are propagated with less loss the more homogeneous a body may be. The various degrees of sonorousness are only functions of the surface hardness of the body which receives the sound waves. Thus wood transmits sound less than iron, because it reacts less to the activity of the shock as the sound waves strike it. The same applies to reinforced concrete. It is much less sonorous than iron, and reinforced concrete reacts infinitely less to the action of the sound waves than any other material. Concrete is of such a heterogeneous composition that it does not take up the sound waves that strike it, and therefore does not send them along as iron does. If there are any transmitted they are transmitted in such a bad form that they have no influence at all upon the acoustic qualities of a room.

Perfect deadness to sound can be obtained much more easily in a concrete building than in an iron one. It is only necessary to interpose a very thin body between the concrete and the sound to get this condition. A simple linoleum placed upon the floor of a concrete building is sufficient to insure perfect deadness to sound. This is impossible to obtain in a frame structure. However, care must be taken to avoid cement or brick floors placed directly over reinforced concrete floor-beams, for the change of medium in this case will transmit sound and counteract the good effects of the concrete. There is no reinforced concrete construction that cannot be made sound-proof with a little care and thought, says *Le Ciment Armee.* On the other hand, it is impossible to reach complete deadness to sound in construction where the metal is the predominating element. Iron transmits sound so perfectly that it is next to impossible to reach the desired effect as can be done in reinforced concrete.

Building in Vancouver, B. C.

One of the marked features of the industrial development of the city of Vancouver has been the gratifying showing in the building line, the figures for the first 10 months of the year being far in excess of those for the entire 12 months of any previous year. There has been a great demand for housing accommodations due to the steady growth of population and this has stimulated building operations in many directions.

According to the statistics available for the first 10 months of 1911 the value of building operations was $14,839,302, while for the 12 months of the year before the total was $13,150,365 and for the 12 months of 1909 the total was $7,258,565. Business blocks and modern construction are changing the character of the commercial sections of the city and where formerly two and three-story frame and brick buildings were located are now to be seen business buildings eight and 10 stories in height and of thoroughly modern equipment and finish throughout.

If the present rate of increase continues, and there is now every promise of witnessing remarkable activity in building circles for some time to come, the year 1912 will be another record-breaker.

Stone Industry in 1910

Some very interesting data relative to the value of the stone produced in the United States in 1910 is contained in a pamphlet just issued by the United States Geological Survey and prepared by Ernest F. Burchard. The statement is made that the year mentioned surpassed all previous years in the value of its stone output, the gain over 1909 being in excess of 7 per cent. In 1910 the total value of the stone output for Pennsylvania exceeded that for any other State.

Owing to the variety of uses to which stone is put there is no regular unit of measurement employed by the quarrymen, stone being sold by the cubic yard, the cubic foot, the ton, cord, perch, rod, square foot, square yard, square, etc. Building and monumental stone, especially the dressed product, is usually sold by the cubic foot, or the cubic yard, although this unit varies with the class of stone and the locality. A large quantity of the rough stone is sold by the perch, cord, and ton. Rubble and riprap, including stone for heavy masonry, are generally sold by the cord and ton.

Crushed stone is reported as sold by the cubic yard or ton, the short ton being more generally used.

The weight of a cubic yard varies from 2300 to 3000 lb., the average weight being 2500 lb. In certain localities this crushed stone is sold by the "square" of 100 sq. ft. by 1 ft., or 100 cu. ft. to a square. It is also of interest to note the selling of crushed stone by the bushel, 21½ bushels representing a cubic yard of about 2700 lb.

Factories and Warehouses of Concrete

Under the above title there has just been issued from the press by the Association of American Portland Cement Manufacturers, Philadelphia, Pa., an interesting volume of 224 pages, the purpose of which is to present to the attention of those intending to erect industrial buildings a few examples of factories and warehouses of reinforced concrete construction and to give important facts concerning these buildings, together with an expression as to their merit by their owners. Within the covers of the work there are 235 buildings illustrated, which house 198 industries. The facts presented have been gathered from 30 states of the country and the buildings illustrated represent the work of 132 architects, 193 engineers and 97 contractors.

The book is arranged in groups of four pages, on the first of which is a typical example of a building of a certain class of occupancy, while the second page is devoted to a description of this example, giving facts of interest to a prospective builder; on the third page of a group is an interior view, together with a letter from the owner of the building, and on the fourth page is a group of photographs of buildings used for similar purposes. So far as possible the four-page units are arranged in alphabetical order by the industries they represent. The last four pages of the book are devoted to showing the effect of fire on this class of construction.

A copy of the book will be sent to any architect, builder or engineer interested on receipt of 50 cents.

Modern Theory of Ventilation

One of the papers read before the Congress of Technology at Boston was that of C. E. A. Winslow, who touched upon the modern theory of ventilation and pointed out that the chief factors in air conditions are its temperature and humidity. In many establishments money has been spent for an elaborate system of ventilation but if the air has been too hot, too dry or too moist, the effect on comfort and efficiency has been worse than if there had been no attempt at ventilation. Heat combined with excessive humidity is the one condition in air that has been proven to be a universal cause of discomfort, inefficiency and disease.

Flügge and his pupils in Germany and Haldane in England have shown that when the temperature rises to 80 deg. with moderate humidity or much above 70 deg. with high humidity depression, headache, dizziness and the other symptoms associated with badly ventilated rooms begin to manifest themselves. At 78 deg. with saturated air Haldane found that the temperature of the body itself began to rise.

Overheating and excess of moisture is the very worst condition existing in the atmosphere and the very commonest. The importance of the chemical impurities in the air has dwindled rapidly with the investigations of recent years. . . . The main point in air conditioning is then the maintenance of a low temperature and of a humidity not too excessive. For maximum efficiency the temperature should never pass 70 deg., and the humidity should not be above 70 per cent. of saturation.

A feature of one of the building operations in the vicinity of New York City involves the construction of a single large building resembling a country house such as is to be found in England and France and this building is sub-divided into ten houses, each house containing nine rooms with bath room, hardwood trim, etc. The heat is supplied from a central heating plant as well as hot and cold water which is included in the rent of the houses. The buildings are of brick with green tile roofs.

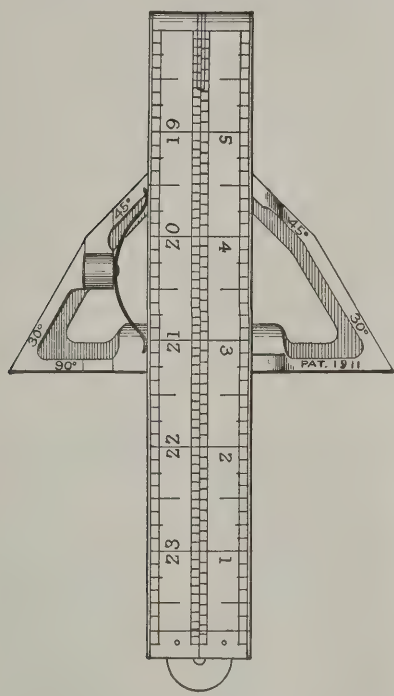
The annual dinner of the Architectural League of New York will be held Friday evening, January 26, and the League reception will be held on the afternoon of January 27.

CONTENTS.

NOVELTIES

New Combination Rule Tool and Level

The Stanley Tool Company, Santa Maria Building, San Francisco, Cal., is placing on the market a new rule tool and level which has just been patented. This tool is especially adapted for carpentry, machine and mechanical work where angles are to be determined. It is called the W. H. Stanley 3-Angle Rule Tool and Level. The tool is made of aluminum to insure lightness and may be attached or detached to any ordinary two-foot carpenter's



Novelties.—Fig. 1.—New Combination Rule Tool and Level

rule or inch-wide machinist's scales by means of a spring clasp. When the tool is attached, as shown in Fig. 1 of the illustrations, the carpenter can readily determine three angles, right or left hand, as the work demands; they being absolutely accurate 90 degrees, 45 degrees and 30 degrees, without removing the tool from the rule. When detached from the rule, 15 degrees, 45 degrees and 90 degrees can be determined. The tool can also be used as a T square, a depth gauge, a line gauge, a miter and a plumb level, as it is equipped with an accurate level glass. This handy tool, it is stated, may be used in many cases where it is impossible to use a large level and difficult to use a large square. The level or plumb glass is so protected that it cannot be broken. The tool weighs but slightly over one ounce and the illustration herewith is half-size. It can be conveniently carried in the pocket.

Improved Shingling Hatchet

A short time ago we called the attention of our readers to a shingling hatchet which was being placed upon the market by L. A. Sayre & Son, 332 Mulberry Street, Newark, N. J. Since that time the manufacturer has improved the utility of the hatchet by making the head oval and covering the full surface of the head to the very edge with points, 144 in number. The hatchet is therefore now called No. 144. This hatchet has a positive gauge and cannot shift as it is screwed through the blade. A view of the improved hatchet is presented in Fig. 2 of the engravings. The hatchet is referred to as being of special interest to the carpenter who is expert with his tools and more particular with his shingle hatchet, as with it he can cover a much larger roof area in a day when his hatchet is provided with a gauge than when the contrary is the case. Messrs. L. A. Sayre & Son also make lathing hatchets with the same head as that shown. This tool is known at Hatchet No. 140.

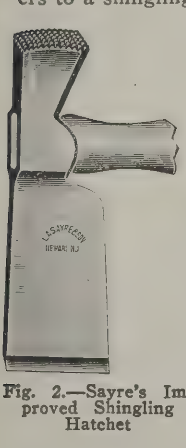


Fig. 2.—Sayre's Improved Shingling Hatchet

Crescent Universal Woodworker No. 51

Carpenter-contractors and builders operating small woodworking shops appreciate the advantages of having substantially built machines for turning out their work and recognizing the urgent necessity of this requirement and with the aim to give small shops the same substantial equipment as that used by the larger planing mills and factories the Crescent Machine Company, No. 2 Mission Street, Leetonia, Ohio, has brought out what is known as its No. 51 Crescent Universal Woodworker, a general view of which is afforded by means of Fig. 3 of the engravings. This combination woodworking machine is of such a nature that the small shop in which it is used is practically converted into an up-to-date planing mill. The machine is portable, being fitted with special devices for making it instantly available for transporting from one place to another. This feature cannot fail to appeal to the small contractor, who can thus take the machine out on a special job and effect a great saving on the cost of mill work. The machine combines a band saw, shaper, jointer, saw table and borer. The band saw is equipped with resaw attachments. The jointer is the regular pattern 8-in. jointer made by the company, and, when desired, can be equipped with round safety head. It is provided with tilting gauge and is adjustable over the full width of the table. It is also equipped with the Crescent jointer guard, which, in fact, is a part of the regular equipment of all Crescent jointers. The shaper spindle is conveniently placed and

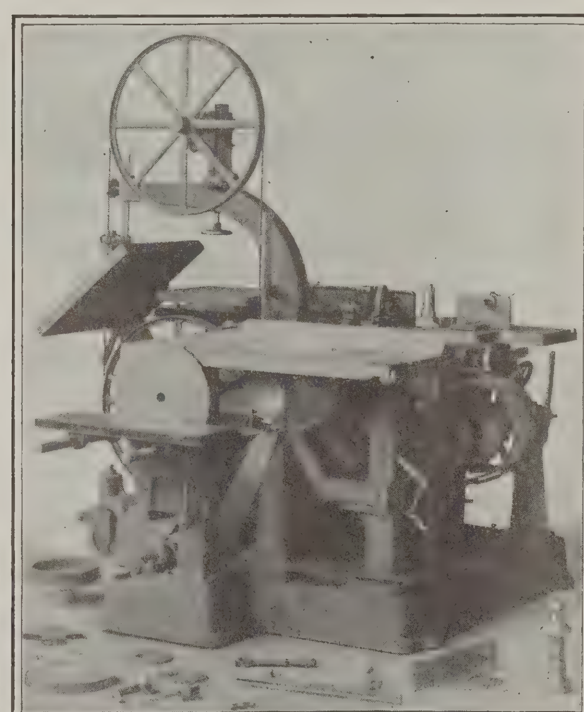


Fig. 3.—Crescent Universal Wood Worker No. 51

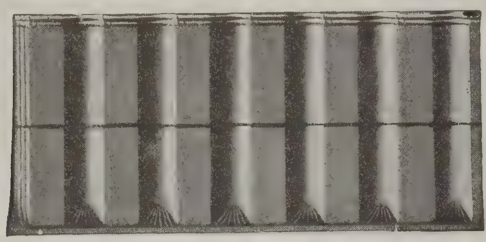
revolves in a vertical position. The machine is well adapted for surfacing one side and straightening one edge of the piece at the same time. The saw table is equipped with a ripping fence that is adjustable to an angle of 45 degrees; the adjustable cut-off fence is also graduated for setting to any angle up to 45 degrees. The borer is conveniently placed at the side of the saw table and operates entirely independent of it. An attachment for grinding planer knives is furnished, as is also a disk grinder attachment and emery wheel. The machine here shown is of such construction as to place the small shop on an equal basis with larger factories for getting out work quickly, accurately and economically.

Consolidation of Concrete Machinery Interests

Announcement is made that the Universal Concrete Machinery Company, formerly of Waterloo, has consolidated interests will be the same as that of the Universal Dodge, and the business will be conducted under the name and charter of the Iowa Foundry & Mfg. Company at Fort Dodge, Iowa. This change will enable the company to supply its customers more promptly than ever before, as it will not only have its own complete factory equipment, but will be able to do all of its casting and foundry work as well, thus placing it in a position to build its machines complete from the crude material to the finished product. The same high standard of product will be maintained and the company will add to its line of concrete machinery as circumstances may seem to demand. In addition to concrete machinery the company manufactures the Elk gasoline engine, which is equipped with the Ballard governor—an entirely new device which it is claimed controls the engine so perfectly that should the transmission be disconnected from any cause the engine retains the same speed regardless of the load. The management of the consolidated interests will be the same as that of the Universal Concrete Machinery Company and patrons will receive the same courteous treatment and consideration they have in the past.

A New Metal Tile

Another pattern of metal tile added to the variety from which a selection may be made by the Berger Mfg. Company, Canton, Ohio, is shown in Fig. 4 of the accompanying illustrations. The single tile occupies a space 7¾ x 10 in. and is made in the form of a cluster covering a space 21½ x 46½ in. The picture of the complete tile shows the ornamental finish at the eaves and along the left side of the water guards, to prevent any water entering the joints of the tiling during a rainstorm. Fig. 5 shows the construction of the joint and the manner of fastening the tile to the roof. The small numbers on this view indicate the points at which the nails are driven for fastening to the roofing, and also the water guard at the point where the shingles overlap each other. The numbers 5 and 6 show the character of nail that is used, and at 2 on the tile the nail is shown after the cap end is turned down, as in 6. In addition to the overlapping end water guard the tile is stamped with a side water guard, so that any water that might be blown into the overlapping joint would be gathered in these grooves and again run down onto the roof to be carried away to the gutter. These tiles are furnished in painted or galvanized steel, painted or galvanized Toncan metal or copper or zinc. The company, in addition to the illustrations given here, has circulars showing the construction of the special ridge finish tile and giving full particulars in reference to this new Spanish tile.



Novelties.—A New Metal Tile.—Fig. 4.—Appearance of Metal Tile When Laid

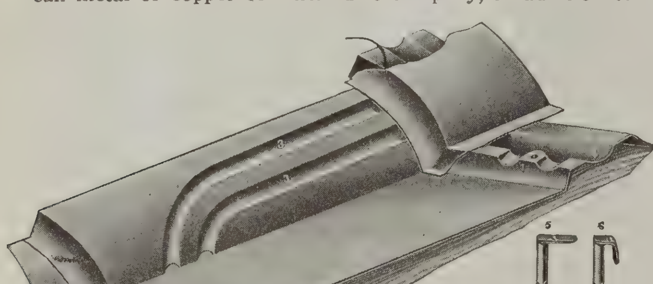


Fig. 5.—Detail Showing Construction of Metal Tile

Test of Utility Wall Board

There has recently been completed at the factory of the manufacturers a severe test of the imperviousness of Utility wall board to extremes of heat, cold and dampness with very gratifying results. The hardest problem which makers have to solve is that of producing a board that will neither shrink nor warp when subjected to extremes of heat and cold and which will not absorb moisture. About six months ago C. A. Heppes, of Chicago, Ill., felt very confident that he had solved this problem, but in order to satisfy himself absolutely he decided upon a test which is probably the most severe to which wall board has ever been subjected. He selected a thin brick wall in the most exposed portion of his factory building and to it attached the wall board, putting it on in the ordinary way as close to the bricks as possible. He then covered the wall with paper so that the slightest sign of shrinkage or warping would immediately manifest itself. Next he placed a row of steam pipes about 1 in. from the wall along its entire length. These pipes were used to heat the room, and, of course, became very hot during the day and cold at night. As the test was made in January the outside wall, of course, was subjected to the extreme cold of winter weather, while the inside was hot from the steam pipes. At night both the inside and the outside were subjected to the cold. Later in the spring the heat in the steam pipes was turned off and the moisture from the inside of the factory combatted the cold from the outside. The statement is made that after six months of this kind of severe treatment the wall board showed no sign of shrinkage or warping, and it is almost impossible to discern by feeling where the joints have been made, and even in the corner, which is the severest test, the wall paper shows no sign of pulling or cracking.

A Modern Single Cylinder Surfacer

When the carpenter-contractor or builder is about to increase the equipment of his woodworking shop by the addition of a modern surfacing machine there are certain things which he should consider in regard thereto. In the first place the machine should have a substantial frame which will carry the working parts without vibration; second, a capacity which will permit the machine to do a wide range of work; third, the ability to do this work smoothly and rapidly; fourth, an arrangement of parts which will permit of rapid and accurate adjustment; fifth, simplicity in construction and operation, and, finally, safety to the operator. In the No. 224 Single Cylinder Surfacer illustrated in Fig. 6 of the accompanying engravings these features are said to be combined in a way to produce satisfactory results. The frame of the machine is cast in one piece, and it will work material as wide as 24 in. and as thick as 8 in. The powerful driving system in connection with the cylinder running in self-oiling bearings enables the operator to produce satisfactory work on rapid feeds, while at the same time all the adjustments are within his easy reach. All exposed gears are covered in an efficient manner and the cumbersome and slow-acting weights common in many other types of machine are entirely eliminated by the spring pressures incorporated in the surfacer here illustrated. Every carpenter-contractor, builder or woodworker who has any considerable amount of surfacing or planing to do is likely to be interested in this machine, and the manufacturers, the J. A. Fay & Egan Company, 221 to 241 West Front Street, Cincinnati, Ohio, inform us that they will be glad to send a large picture of the machine together with full details of construction upon application to the address given.

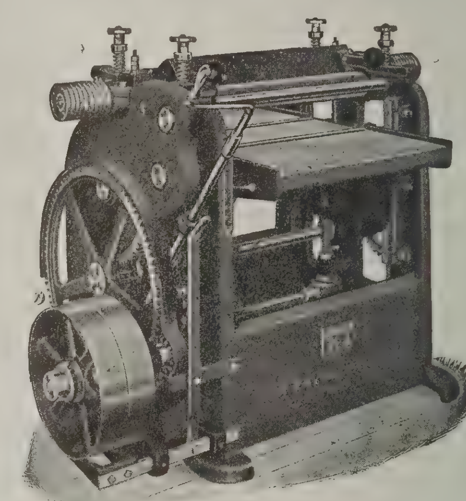


Fig. 6.—A Modern Single Cylinder Surfacer

Trinidad the Asphalt Lake

Many years ago Charles Kingsley, the English novelist, described Trinidad Lake on the Island of Trinidad, British West Indies, as "one of the wonders of the world." Here in a great bowl-shaped depression in the earth, 114 acres in area, there wells up, with steady, inexhaustible flow, a mighty volume of asphalt. The center of the lake is about three-quarters of a mile from the shores of the Gulf of Paria, and about 135 ft. above the level of the sea.

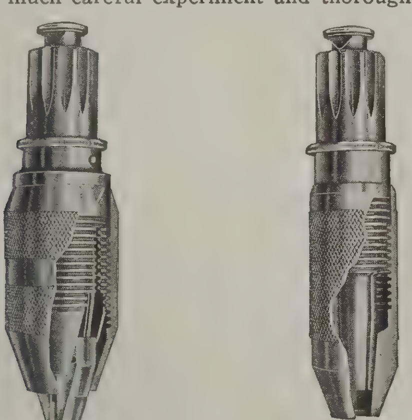
Out of this asphalt lake no less than 140,000 tons of asphalt are taken every year. But the quantity that remains is always the same. From the hidden and mysterious well-springs far below there issues forth a never-ending fresh supply. Teams can drive over the surface, except in the softer center portion; but it is necessary for them to keep on the move or they will be slowly swallowed up by the black viscous mass.

Borings have been made to the depth of several hundred feet in unsuccessful efforts to sound the bottom of this marvellous lake. The ceaseless motion of the heaving asphalt made it impossible to bore deeper. The soft, fresh-issuing asphalt slowly bubbling forth raises the center of the lake a foot higher than the edges.

The surface of the lake is dotted by a half-dozen islands from 50 to 150 ft. in diameter. They all have vegetation with trees 30 to 40 ft. high. Imperceptibly, yet almost constantly, these islands shift their positions, another weird feature of this weird freakish lake. The Barber Asphalt Company, Philadelphia, manufacturer of Genasco Ready Roofings, recognized in this queer, uncanny lake of asphalt the presence of a natural product of the utmost value to mankind. After a series of tests and a study of the proper process of refinement this concern has built up a great industry which supplies Trinidad Lake Asphalt to many branches of trade and for a great variety of building, paving and roofing purposes. The asphalt is dug right out of the surface of the lake by gangs of men wielding pick axes, is shipped to the Gulf of Paria, loaded into vessels and transported to the Barber refineries located at Maurer, N. J., where it is refined.

New "Precision" Auger Bits and Braces

A new way of holding tools in a bit brace which is the result of much careful experiment and thorough tests has



Novelties.—New "Precision" Auger Bits and Braces.—Fig. 7.—Views of the Holding Chucks

been devised by the Russell Jennings Mfg. Company, Chester, Conn., and the brace and bits are now being placed upon the market. By reason of the precise results uniformly obtained with these tools the name "Precision" has been applied to them. The new features relate principally to the shank of the auger bit.

In place of the commonly used square shank, the "Precision" tool has a patented turned shank about 2 in. long with a slot 3/8-in. deep in the end. This form insures that the tool be held in absolutely rigid and perfect alignment by the true surface of the turned shank and positively prevented from turning by the slotted end which fits over a key in the bottom of the chuck. The tool is held from coming out by a close-fitting split bushing in the patented "Precision" chuck which fits over a slight taper on the bit shank. In this manner the tool is held positively in all ways with unvarying perfection of alignment. A view of the holding chucks is found in Fig. 7.

The superiority of the "Precision" chuck over the old style braces whose chucks permitted the tool to play up and down, and actually wobble in operation, is apparent from the accompanying illustrations. Every carpenter realizes how bad the loose fit is for the work and how hard it is on the tool, as many a bent bit has shown.

The advantages of the new "Precision" tools are first—the perfect alignment from the head of the brace to the spur of the bit; second—the reduction of time required for placing or removing tools, and third—the tight grip on the shank even with slight effort applied to the chuck.

Electricians, millwrights and all carpenters who have frequent occasion to use the bit extension and the expansive bit, will appreciate the new "Precision" tools. The bit extension furnished with the "Precision" set is fitted with a small "Precision" chuck. With this combination the workman is assured that his brace extension and bit are in perfect alignment and that they will remain so throughout the operation.

The introduction of these new tools would ordinarily mean discarding all square shank auger bits, screw drivers, countersinks, etc. To prevent loss on the part of the carpenter the Russell Jennings Mfg. Company have made also a so-called "Universal Precision" chuck (patented), which readily takes either the common square shank tools or the new "Precision" tools. The brace

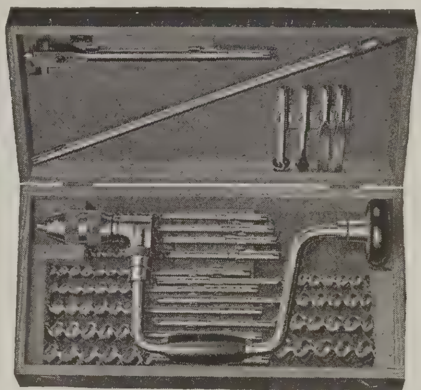


Fig. 8.—Set of "Precision" Tools Packed in Box

with the "Precision" chuck would naturally be selected in purchasing a new set of tools, but by using the "Universal Precision" chuck for a time the carpenter may replenish his outfit gradually with "Precision" tools while using up his supply having square shanks.

"Precision" tools may now be had individually or in sets packed in special boxes, as shown in Fig. 8, each containing one brace fitted with either the "Precision" chuck or the "Universal Precision" chuck, one bit extension having small "Precision" chuck, one expansive bit with large and small cutter, and a set of bits from 1/4-in. to 1-in. by sixteenths (32½ quarters), two screw drivers, and one countersink for metal and one for wood. This complete set of finely finished tools is made of selected tool steel and with the fine workmanship that characterizes all Russell Jennings bits.

The Allegheny Nailing Plug

In the execution of carpentry work, bricklaying, plumbing, electrical work, mantel and tile setting, framing and numerous other places a nailing plug is practically indispensable, and to meet the well-defined demand for a device of this nature the Allegheny Steel Band Company, 888 Progress Street—North Side—Pittsburgh, Pa., has brought

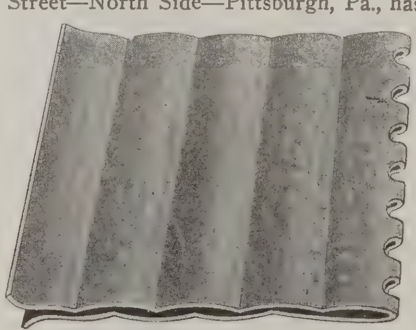


Fig. 9.—The Allegheny Nailing Plug

out what is known as the Allegheny Nailing Plug, a view of which we take pleasure in bringing to the attention of our readers by means of Fig. 9 of the illustrations. This plug is produced by corrugating a piece of galvanized iron, perforating the center and bending over the ends in such a way as to form a lip for the entrance of the nail. It is then folded together so that the corrugations alternate, as the picture clearly shows, one into the other. These corrugations extend the full width of the plug, thus assuring, it is claimed, a most powerful grip on the nail once it is inserted between the lips and driven through the grooves and perforations. For concrete work or for use between tiling or floors the advantages of a nailing plug of this nature are readily appreciated. The claim is made that the Allegheny can be laid in mortar joints as the wall is built up, also in cement work. The company states that it also makes the Allegheny Non-Furring Nailing Plug having round flanges to allow for the air space and thus save the use of furring strips.

Anti-Hydro Cement Waterproofing

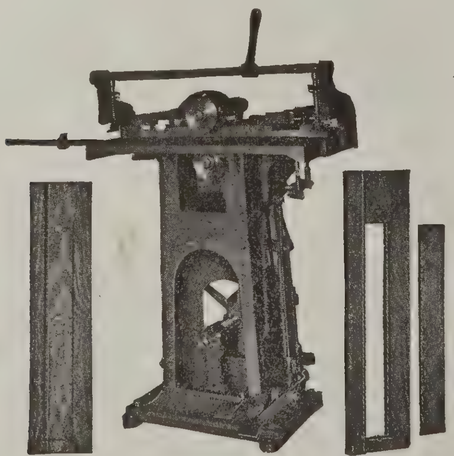
The waterproofing of cement in all kinds of masonry is one of the important factors to be considered in connection with all present-day construction work wherein cement is used to any appreciable extent. A solution which is said to be neutral to cement and which when added in certain percentage to the water used in mixing Portland cement in the usual way has the effect, without retarding its setting, of rendering the cement impervious to water, moisture, frost, gas, odors etc., is Anti-Hydro manufactured by the Anti-Hydro Cement Waterproof Company, 119 Central Avenue, Newark, N. J.

The claim is made that it hardens and increases the tensile strength very materially, makes more uniform and composite a texture and overcomes in a large measure the non-resilience of the cement mixtures to strains and shocks. Cement coatings with "Anti-Hydro" are fireproof besides being non-conductors, and in color they are light gray, although they can be given almost any color desired. The waterproof Anti-Hydro cement coatings can be applied to either the inside or outside walls of any class of masonry, but preferably upon the inside for economical reasons. The company points out that in order to accomplish the best results strong and faithful troweling and tamping are absolutely necessary for a homogeneous density, this being prticularly important in the finish coat.

Anti-Hydro is sold in quantities of 5 gallons and upwards, and is particularly adapted for cement waterproofing of cellars, vaults, reservoirs, foundations, concrete roofs, floors, tunnels, etc., and, in fact, wherever water resisting or water holding is required.

Enterprise Pocket Cutter

We take pleasure in bringing to the attention of our readers, more especially the carpenter-contractors and builders, a machine which is especially designed for cutting the pockets in window frames for the purpose of reaching the sash weights when the windows are hung with pulley and cord. The machine is simple in operation, and is shown in general view in Fig. 10 of the accompanying illustrations, the small picture at the right representing the two parts of the pocket, while the small picture at the left represents the appearance of the pocket after it has been closed. The machine, known as the "Enterprise," is being placed upon the market by Austin & Eddy, 121 Broad Street, Boston, Mass., who state that the number of pockets which can be cut on it depends largely on the operator and the convenience of the stock to be handled. The stile of the window in which the pocket is to be cut is placed on the table of the machine with the side against a gauge and the bottom end against a stop. The treadle which controls the splitting saws, four in number—there being two below and two above the table—is pushed down by the foot which brings the saws into the work. The stile is pushed ahead to a second stop which gives the length of pocket, the foot is raised and the stile brought back to a third stop, clamped down by a lever over the table and the second foot treadle is lowered, both ends of the pockets being cut at once by the four oscillating saws. This finishes the pocket, which is then ready to be knocked out at the lower end and can be held in place by either a common screw or by a drive screw. By rearranging the collars between the saws and putting on different width



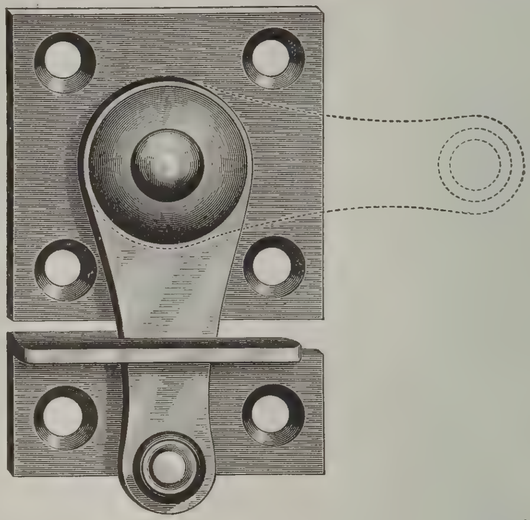
Novelties.—Fig. 10.—Enterprise Pocket Cutter

of end saws any width of pocket may be cut as well as any length ranging between 18 in. and 24 in.

Messrs. Austin & Eddy have issued circulars relating to this Enterprise Pocket Cutter and also relating to their Enterprise Pulley Mortiser and Pulleys, as well as to their Pioneer Molding Sander, which is made in four sizes and for which strong claims are made.

Griffin's Cellar Window Sets

Builders, contractors, architects and house owners generally are likely to be interested in the Common Sense Window Sets which are being introduced to the trade by the Griffin Mfg. Company, Erie, Pa., and with branch



Griffin's Cellar Window Sets.—Fig. 11.—Fastener for Bottom Sash

offices at 37 Warren Street, New York City, and 25 West Lake Street, Chicago, Ill. The appearance of the fastener and also of a cellar window equipped with one of the sets is presented herewith. The fasteners shown are used also for attic windows and small doors. The claim is made that shrinking or swelling of sash will not interfere with this fastener as it is always in working order. They are easy to put in place, can be used on the bottom or side of a window, and they are of such a nature that they show at a glance whether the window is fastened or not. The lever is held automatically in any position in which it may be

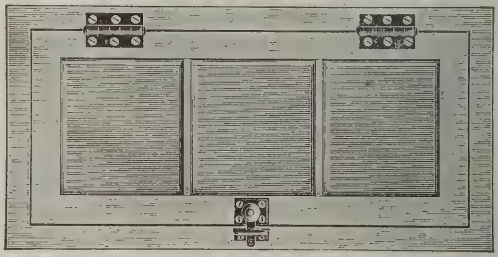


Fig. 12.—Cellar Window with Fixtures Applied

placed. The company points out that the fasteners are such that they will draw the window shut even if there should be a little dirt or snow behind it. In Fig. 11 of the illustrations is shown a Common Sense fastener for bottom sash, actual size, while in Fig. 12 is represented a cellar window with one of the sets applied to it. Each set consists of one pair of 2½-in. narrow butts, 2½-in. screw hook and eye to hold sash open and a Common Sense Fastener.

Sheet Metal "Forms" for Concrete Columns and Floor Slabs

Announcement is made that, having procured patents covering the invention of sheet metal forms for molding round concrete columns and concrete floor slabs, Messrs. P. A. Deslauries and L. P. Deslauries have formed a copartnership under the style and title of Deslauries Column Mold Company as successors to Lefebre, Deslauries Roofing & Cornice Company, 311 and 313 Chestnut Street, St. Paul, Minn. The molds and corrugated forms, we understand, are not for sale, but the business of the new company is to furnish and erect the molds in place at the building under construction and to remove them after the concrete is set—the molds remaining the property of the company at all times. Although specializing in metal forms for round concrete columns and corrugated steel centering for concrete floor construction, the new company makes announcement that it will continue to furnish architectural sheet metal and roofing work of all descriptions the same as in the past.

A four-page folder which the new company has issued calls attention to the economical features and advantages in construction of the round concrete column and corrugated steel centering as built by the company. One illustration shows the simplified method of supporting the centering columns while the work is being done.

(For Trade Notes see Second page following)

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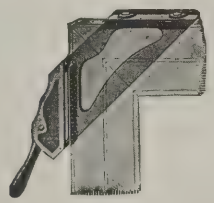
Time and labor are saved by using clamps for securing concrete forms, molds, face plates, etc., in concrete construction. Our line of clamps embraces special concrete form clamps, builders' carpenters' and woodworkers' clamps of many varieties. Complete catalog No. 2986 upon request.



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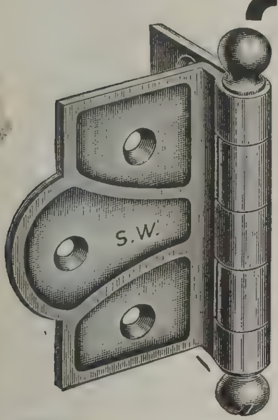

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Time and Labor Saved and the Owner Satisfied

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The Butts can be changed to either right or left hand by simply unscrewing the slotted tip and reversing the pin. A screw driver is enclosed with each box that fits the slot in the tip, and can afterwards be fastened on your key ring.

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Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company
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William Foster Mfg. Company

The William Foster Mfg. Company, Springfield, Ill., is the style and title under which in the future the business of manufacturing metal ceilings, zinc ornaments and other sheet metal work formerly carried on by the William Foster & Sons Company, of that place, will be conducted. The capital stock has been increased from $15,000 to $50,000, and the new officers are Francis L. Foster, president; Carey N. Posegate, vice-president, and John J. Foster, secretary-treasurer. Mr. Posegate was employed with the old concern as draftsman and bookkeeper, but under the present management he will have charge of the Ceiling Department. Heretofore the business of the company has been solicited by mail, but in the future it is the intention to increase the distribution of its product through the medium of traveling salesmen. The company is putting in new machinery and is getting out a new catalogue which will be of a high order of merit.

TRADE NOTES

Henry Disston & Sons, Philadelphia, Pa., have issued from the press a neatly printed and very interesting booklet relating to cross-cut saws. These are illustrated and described in a way to command the close attention of the lumberman and the woodworker, while in connection with each style of saw are given sizes and cost prices. The story of the manufacture of these saws is most interesting, and as showing the popularity of the Disston goods it may be stated that ever since the business was founded in 1840 the demand for the Disston brand of saws has steadily increased, necessitating from time to time the erection of new buildings, the employment of additional help and the installation of extra mechanical facilities.

Milwaukee Concrete Mixer & Machinery Company has taken possession of its new plant at 955 to 965 Thirtieth Street, Milwaukee, Wis., thus placing itself in a position with its increased facilities to handle its trade more promptly than ever before.

President Edmund H. Lunken, of the Lunken Steel Window Company, 912 Mercantile Library Building, Cincinnati, Ohio, has called a meeting of the stockholders of the company for January 17, "to authorize and direct the surrender of the corporate authority and franchise of said company and to abandon and dissolve said corporation and to authorize the filing of a certificate in accordance therewith with the secretary of state as is provided by law."

The "Red Book" is the title of a valuable booklet of a size convenient to carry in the pocket which is being sent out with the compliments of the United States Gypsum Company, Monroe Street and Fifth Avenue, Chicago, Ill., and with sales offices in many of the leading cities of the country. The matter in effect constitutes a hand book of useful information for architects, contractors, builders and plasterers. Some interesting information is given as to what hard wall plasters are and the advantages of the product of the company. Reference is made to Sackett plaster board instead of lath, to cement plasters, to wood fiber plasters, to prepared plasters and to finishes. Many pages at the close of the pamphlet are devoted to tables which every contractor and builder is likely to find useful. These relate to the number of square yards and feet in rooms with 7, 7½, 8, 8½, 9, 9½, 10, 10½, 11 and 12 ft. ceilings.

The Luther Grinder Mfg Company, 117 Michigan Street, Milwaukee, Wis., is distributing an interesting book setting forth in convincing style the merits of the Luther Dimo-Grit tool grinders, for which strong claims are made. At the very outset it is stated that "more progress has been made in sharpening methods during the last ten years than in all the previous history of the world." The information contained within the covers of this booklet cannot fail to be appreciated by every user of tools, embracing as it does a very wide range of detail. Not the least interesting feature is the story of "How a farmer boy built up the largest business of manufacturing tool grinders in the world." Reference is made to the Luther Hummer, which is the company's newest tool grinding machine, and in connection therewith the statement is made that Luther grinders and attachments are covered by 26 basic patents. The keynote of the company's success is decribed as high quality and big value as well as a big volume of business.

Monks & Johnson, architects and engineers, 7 Water Street, Boston, Mass., have associated themselves with Henry F. Keyes, architect, 161 Devonshire Street, Boston, for the preparation of plans and specifications for certain large industrial developments.

The St. Paul Roofing, Cornice & Ornament Company has recently moved its office in Minneapolis, Minn., to 909 Hennepin Avenue.

An attractive folder sent out by E. I. Church & Co., West Hanover, Mass., relates to the merits of the Axtell Metallic Weather Strip, for which strong claims are made. Talks about weather strips are timely and appropriate at this season of the year, and in referring to the Axtell the makers point out that it consists simply of two strips of steel 36 in. long, 1½ in. wide and which is easily cut with a file or cold chisel to fit norrower doors. The bottom plate is flat and to it is riveted the striker, the whole arrangement being hinged to the sill by two special galvanized staples. In closing the door the top plate engages the striker, raising the inner edge of the bottom plate under which the wedge on the latch side of the door easily slides. The statement is made that both plates make a perfectly tight overlapped joint when the door is closed.

Henry Bosch Company, 525 South Wabash Avenue, Chicago, Ill., and with New York offices at 890 Broadway, is directing the attention of architects, builders and house-owners generally to what is known as "Lin-o-Wall" and which is described as a wall hanging in solid relief. The effects produced by the use of this material are very rich and attractive, and what is said about the material in a catalogue issued by the company cannot fail to be interesting and instructive. Reference is made to other decorative material for interior work and a copy of the catalogue with samples can be obtained by making application to either of the addresses given.

Puritan Cordage Mills, Louisville, Ky., points out that its Regal sash cord makes windows work as if they were fitted with ball bearings. Particular stress is laid upon the flexibility of the cord, its flawless structure and its ability to withstand strain. It is easily distinguishable by the blue strand encircling the cord in a broken spiral.

The Newton Paper Company, 10 Canal Street, Holyoke, Mass., offers a varied line of paper specialties for builders which includes deadening felt well adapted for use between floors for keeping out dampness and dust from the cellar while preventing warping, shrinking and expanding of top floors; the "Elephant" brand of sheathing paper, which is noted for its great strength, and Plaster Boards especially made for finishing bungalows, cottages, summer hotels, factories, etc. One side is colored red and the other side blue. The plaster boards may be used either with or without wall paper or paint, thus making an attractive covering for walls and ceilings. Those readers who are interested can secure samples of any of the company's papers free of charge by making application for them.

Economy Gas Machine Company, 439 East Main Street, Rochester, N. Y., calls attention to the advantages of the Economy gas machine for use in lighting country homes. The gas machine is in effect a miniature gas plant and is claimed to automatically produce with absolute safety a uniform gas for lighting, cooking, water heating, ironing, laboratory work, etc., using the same piping and fixtures as city gas. The company has issued a very interesting booklet relating to this system of lighting isolated or country houses and a copy of it will be sent to any reader of the *Building Age* who may make application for it.

The Mastic Wall Board & Roofing Mfg. Company, 362 Este Avenue, Cincinnati, Ohio, has issued an illustrated book in which are set forth at length the merits of Bishopric Wall Board and Sheathing which is referred to as fire-resisting, moisture-proof, vermin-proof and as being air tight. The Bishopric Wall Board is made with Asphalt-Mastic, which is asphalt toughened by a patented process so that it will not burn. Kiln dried dressed lath are embedded in hot Asphalt-Mastic at a pressure of 500 lb. to the square inch while the other side of the Asphalt-Mastic is surfaced with heavy sized cardboard. The company claims that a month's time in building can be saved by the use of Bishopric Wall Board, which comes in sheets 4 x 4 ft., ready to be applied. A free sample of the wall board can be obtained by any interested reader upon application.

Pratt & Lambert, Inc., the well-known varnish makers, have leased for a long term of years an entire floor in the new Cameron Building at the northeast corner of Madison Avenue and 34th Street, New York City.

The Building Age

NEW YORK, FEBRUARY, 1912

A House and Garage of Stucco Exterior on Metal Lath

EVER since the use of cement as a covering for the exterior walls of buildings of various kinds became popular with the building public the "slip dash," "stucco" and "pebble dash" finishes have been most in vogue. In the case of dwelling houses especially, stucco for the outside walls has been rapidly growing in favor and the same style of treatment has been given to the garage, should there be one, in order that the two buildings may harmonize in their external architectural features. As a usual thing the garage of the suburbanite, and in many cases of the city dweller, is isolated from the residence of the owner, the distance being regulated very largely by the space available. Sometimes, however, the garage is made a portion of the building occupied by the owner as a residence, and the subject of the present article has to do with a case of this kind.

The unique feature of the plan is the location of the garage, which is so arranged that it may be reached from the dwelling without going out of doors and without passing through the service portion of the house, which is rather unusual for a dwelling as small as the one here illustrated.

An examination of the half-tone pictures representing three views of the exterior of the building shows that the garage is really a component part of the main structure, being separated from the rear end by a wall of terra cotta blocks. Noticeable features of the exterior treatment of the building are the roof effects, produced by the many irregularities in its outlines; the half timber treatment at the gable ends; the quadruple window which projects at the second story and affords basis for the commodious seat in the front chamber; and the triple windows in the living room and second story, the latter lighting the main flight of stairs and the hall on the second floor.

Residence of Mr. John W. Bell at Needham, Mass., Showing Garage Immediately at the Rear of the House and Communicating Directly with It

House and Garage of Stucco Exterior on Metal Lath—Cleveland & Godfrey, Architects, Boston, Mass.

Referring to the floor plans presented herewith it will be noticed that the entire front of the house is taken up with the living room, which measures 14 x 18 ft. in size and is fitted with an open fireplace, a view of which is afforded by means of one of the half-tone interiors presented in connection with this article.

The position of the main hall is such as to give direct access to the living room, to the dining room and to the kitchen, the hall being reached from the porch at the left front corner of the building. Under the window in the front hall is a seat with double covers to lift. A view in the hall showing the approach to the main stairs as well as the hall trim is found among the accompanying pictures. In the passage beyond, leading to the side entrance, is a coat closet with shelf and hanging rod. The dining room may also be reached directly from the outside by way of the veranda at the corner opposite that of the front porch.

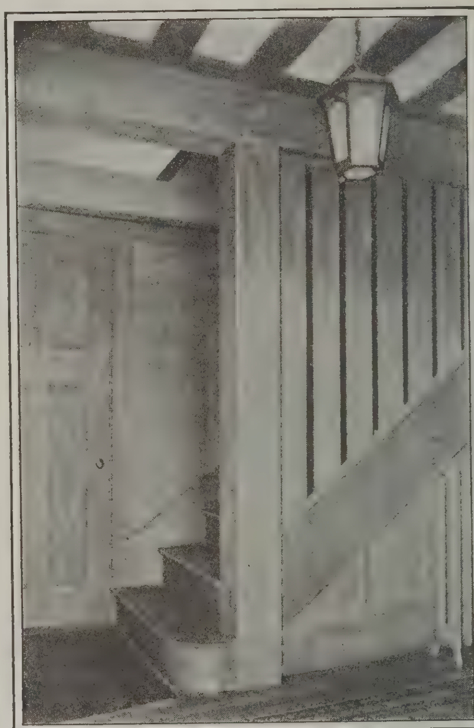
Communication between the kitchen and the dining room is established through a commodious pantry, the door between the pantry and dining room being of the double swing type. Under the main flight of stairs is the flight from the kitchen leading to the cellar. In what may be termed the rear entry is the refrigerator which occupies a space directly opposite the door opening into the kitchen. The kitchen sink is placed under the triple window which gives out upon the rear portico, the latter serving as the direct approach to the kitchen and also to the garage, the arrangement being such that one may pass directly from the house to the garage without the necessity of going out of doors.

On the second floor are three sleeping rooms, with ample closets and a bath room. There is also a good linen closet opening from the second floor hall and fitted with shelves and drawers. From the hall on the second floor a flight of stairs leads to the attic.

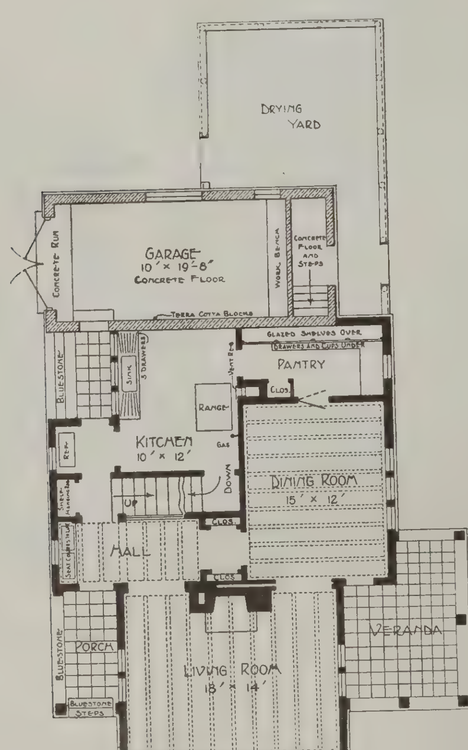
The building here illustrated has a stucco exterior

The floor of the kitchen and pantry is Asbestolith with sanitary base. The second story is finished in cypress with the floors of hard pine.

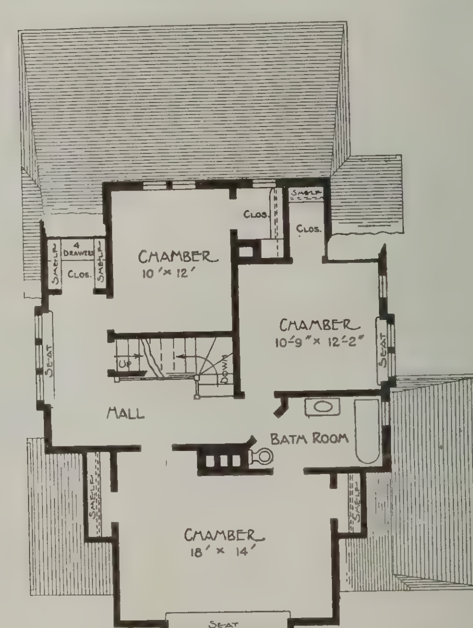
The floors of the porch and veranda are granolithic marked off in 2-ft. squares.



View in Main Hall Looking Toward the Stairs and Showing Door to Kitchen at the Left



Main Floor



Second Floor

Scale 1/16 in to the Foot

House and Garage of Stucco Exterior on Metal Lath

on metal lath stapled to wooden studs and is covered by a slate roof. The exterior stucco is three coat work, the finish being a dash coat to give a brilliant surface texture.

The principal rooms on the first floor have oak floors and are finished with ceilings of wooden beams having plaster panels. The walls are wainscoted with stiles and rails of wood and the panels are filled with Japanese grass cloth, giving a very attractive effect.

The plumbing fixtures consists of set tubs in laundry in the basement, soapstone sink in the kitchen and a bath tub, water closet and wash basin in the bath room, all supplied with fixtures for hot and cold water.

The walls of the garage are hard burned terra cotta blocks 8 in. thick, plastered inside and outside with cement and lime mortar. The granolithic floor is 2 in. thick. The house and garage are heated by an Arco boiler made by the American Radiator Company, the

Honeywell System of hot water heating being used.

Just beyond the garage is a drying yard enclosed on three sides by lattice work of wood construction and from the yard one may enter the cellar by means of a door and flight of stairs at the end of the garage, the door and space being clearly indicated on the first floor

House and Garage of Stucco Exterior on Metal Lath—View of Front and Right Side of Building

plan. Directly opposite the cellar door is a gate in the lattice fence, thus giving ready access from outside.

The residence and garage here illustrated and described are those of John W. Bell at Needham, Mass. The architects were Cleveland & Godfrey, 15 Beacon Street, Boston, Mass., and the general contractor was Alfred Parker, Needham, Mass.

The contract for the terra cotta work, brick work and plastering was executed by J. N. Brion, Needham Heights, Mass. The contract for the heating and plumbing installations was in the hands of Henry Thomas, Carters Block, Needham Heights, Mass.

According to the architects a house of the type here illustrated would cost between $8,500 and $9,000.

Specifications from a Contractor's Standpoint

At a recent meeting of the Architectural Society of Liverpool, a paper entitled "Specifications from a Contractor's Point of View" was read by James Parkinson, a contractor of varied experience, and some of the points upon which he touched may prove interesting to American readers. Among other things he said:

A specification is always preceded by a number of conditions making the contractor responsible for every conceivable act or damage to property or life. With the majority of these conditions I agree, as it tends to make the careless contractor more careful regarding the scaffolding, etc. There are some clauses, I think, which require leaving out and others inserted in their place. First is that of the architect appointing himself the arbitrator as to the full meaning of the specification and drawings, which is binding on all parties without appeal. This, to my mind, is not fair between man and man, and deprives one of them the right to sue, and is contrary to common reason.

Second, a clause reading: "No compensation will be made to the contractor for any losses or increased outlay he may incur arising from errors in the said drawings and specifications." Also another on the same: "If any portion of the work, reasonably and obviously to be inferred as necessary, shall not be expressly described, either in the quantities or on the drawings, the contractor shall execute the same in a satisfactory manner without any extra charge on the amount of estimate."

I think enough responsibility is placed on the contractor in being responsible for damage to property and life without being made responsible for the architect's and surveyor's mistakes and omissions in the drawings and quantities, with which he has had nothing whatever to do, except to have a casual glance at the drawings. I think every one should bear their own mistakes without trying to saddle others with them, and these clauses should be removed.

In place of the above conclusions a clause should be inserted regarding the final payment. As a rule, we are kept an unreasonably long time for the settlement. I would recommend a clause something like the following: "The accounts to be gone into and the final certificate granted within two months after the account is rendered, or 5 per cent. interest paid on the balance." I have been kept six to nine months when there was no reason why it should not be certified in a week or two. . . .

Another matter I wish to bring before your notice is

Another View of Residence of Mr. J. W. Bell Showing Garage in the Foreground

the fact, no matter what sort of a job is expected on completion, the specification never varies; the best is always specified.

Now, it is an undisputed fact that Mother Nature does not produce everything of the best quality; she always varies what she produces, which we, in our wisdom, divide and classify into grades or qualities. No matter what department of nature we look into, whether the mineral, vegetable, or animal kingdom, there is always good, middling and indifferent, and each have their separate value on the market, according to the grade or quality.

I have often heard the remark passed when an architect has found that his specification has not been adhered to and cheaper material substituted in place of that specified, "Have we got value for our money?" Now, to be fair to all concerned, that is not the question, "have I got value for money." The question is, "Have I got what was specified?" If not, you should insist on having it, otherwise it is not fair to those who tendered to faithfully carry it out.

House and Garage of Stucco Exterior on Metal Lath—View in Dining Room

Building Construction in China

There are two separate and distinct classes of building construction in China, each having its own architectural style and requiring its own material, while a third, which combines and draws from the other two classes, both in style of architecture and materials, is known as the "Hybrid" class. Foreign buildings on the Shameen are now being constructed much as they are in the United States—largely of steel and concrete—and the new Chinese factories, such as the Government Cement Works, are constructed of the same materials. The principal roofings employed on such buildings have been in the past galvanized iron or earthen tiles of local make, but during the past few years patent roofings have been introduced to a considerable extent.

The timber employed in local buildings is largely of domestic production, although Oregon pine and Japanese and other Oriental woods have been imported to some extent. As indicative of the volume of these importations, it may be stated that 5655 cu. ft. of hardwood lumber, 2,205,499 sq. ft. of soft wood lumber and 600 sq. ft. of soft wood lumber that was tongued and grooved, were brought into the city of Canton in 1909. The nails, screws, hinges, locks, fastenings, etc., all come from abroad, some from the United States, but to a still larger extent from Japan and Europe.

The ordinary Chinese building requires only wood, brick and mortar, roofing tiles and a small quantity of hardware, all of which can be supplied locally. In the better class of Chinese houses glass is now replacing oil paper in the windows and foreign nails, locks, etc., are finding a place.

The third class of building construction known as "Hybrid" is employed in a large number of structures in and about Canton and throughout this district, says Vice-Consul-General Hamilton Butler in a recent report to the Bureau of Manufactures of the Department of Commerce and Labor. There are many styles, each of which requires its own proportion of foreign and Chinese material. Such buildings are usually constructed of Chinese wood and brick, lime-washed, by local contractors, but in foreign style and shape.

The climate of Canton is semi-tropical, and the Chinese, therefore, seldom or never heat their houses. There is no demand among them for steam or hot-water radiators. The foreign dwellings and offices on the Shameen, and in the district generally, are usually built with open grates, although during extremely cold spells the grates are occasionally helped out by coal stoves put up temporarily or by oil stoves. The Chinese do their cooking entirely on Chinese stoves, which are built of brick and mortar, not unlike a blacksmith's forge, and many of the native cooks employed in foreign families prefer this stove to the modern arrangement. It seems rather queer at first to the visitor from abroad to note the peculiar methods, but he soon gets used to it.

View in Living Room Looking Toward the Fireplace and Mantel

Annual Convention Ohio State Association of Builders' Exchanges

Review of Past Year's Work--Reports from Affiliated Bodies--Election of Officers--Place of Next Meeting

AN unusually successful convention was held by the Ohio State Association of Builders' Exchanges at Springfield, Ohio, on Tuesday and Wednesday, January 9 and 10. Matters of importance to the building industry of that state, as well of the country at large, were considered at the meeting. All the exchanges in the state were well represented, including Cleveland, Cincinnati, Columbus, Youngstown, Toledo, Dayton, Springfield and Alliance. An informal reception was accorded the visitors in the rooms of the Springfield exchange, in the Mitchell building, preceding the opening of the convention, a reception committee of seventeen members being in charge of this feature of the program, aided by a general committee on arrangements, comprising A. J. Beckley, chairman; C. A. Schuster and W. F. Payne.

At two o'clock the delegates proceeded to the rooms of the Springfield Commercial Club on the top floor of the new Fairbanks building, where the sessions were held. An address of welcome was delivered by Guy D. Bayley, president of the Springfield exchange, who expressed the hope that the convention would be of a strictly business character and educational in its results.

The President's Address

The annual address of President W. John Bebb of Columbus was then given, in substance, as follows:

"In opening the second annual convention of the reorganized State Association of Builders' Exchanges it is my desire to call to the attention of the visiting delegates the importance of co-operation among the building fraternity of the state. Never in the history of the country has there been more need of organization in the building industry. The past decade has seen a marvelous development of this industry and a remarkable change in the kind of construction. As the result, the operation of the industry has widened into many new channels and unless these channels lead to one reservoir, namely, the organized unit, confusion will result.

"Legislative and industrial troubles are besetting us on all sides. In order to offset evil laws and unfortunate industrial conditions we must get together and work to one end, otherwise we shall wake up some day and find we have lost our opportunities.

"We must pay particular attention to the legislative activities of those who are unaware of the hard conditions under which the builders work. We must go hand in hand with the manufacturers' and employers' organizations to not only endeavor to prevent the enactment of bad laws, but to endeavor to create new laws which will benefit not only the building industry but all the people of the state.

"I believe in the proposed national association and think that the Ohio State Association will do well to aid the movement. The constitutional convention which opens today in Columbus should have its share of attention, for it is highly important that selfish interests be eliminated from any handiwork in this great fundamental law of Ohio. We should have a new mechanics' lien law that will work to the benefit of the whole industry. We should also pass some measure whereby members of one exchange will have all privileges in other exchanges in the state and all endeavor to unite not only the state but all the states into one harmonious working unit for the benefit of the building industry and the elevation of the craft."

The Secretary's Report

The report of the secretary was read by Edward A. Roberts of Cleveland, reviewing the work of the past year and making some suggestion for the future, this address being as follows:

"The object I have in mind in presenting this report is to center your thoughts upon the possible usefulness of our state organization and encourage you to foster and strengthen it in all possible ways.

"It is now more than ten years since the association was formed. Like many movements of the kind it has had its troubles, but it has survived them all and is at present in a healthy condition. True, it has not accomplished as much as many of its original promoters would have had it accomplish, but it has nevertheless done something for the good of the builders, and is capable of doing very much more with proper support and effort. Primarily the association was created for the purpose of expressing in a united way the voice of the builders of the state on matters of legislation. Secondary objects have been the promotion of a friendly feeling among the builders of the various cities, the advocacy of better local building regulations, extension of acquaintance and the discussion of subjects of mutual interest as well as action thereon. I firmly believe that it is the duty of every building contractor to belong to an organization of his fellows in his home city. I believe also that it is equally his duty to exert his influence through such an organization on matters affecting all the builders of the state. Herein alone can he hope to protect his business against the many hostile elements that continually threaten it. Lacking such a medium through which to operate he is sorely handicapped in this day and age.

COMPARISON OF ASSOCIATIONS

"In a general way the Ohio State Association compares favorably with similar organizations in other states. Such associations exist in New York, Pennsylvania, Minnesota, Massachusetts and other commonwealths. In some cases several contiguous states are united in a joint organization as is the case with Maryland, Virginia and the District of Columbia, where the Interstates Association exists. Then there are state and national organizations in the separate trades such as the master painters, sheet metal contractors, master plumbers, roofers, etc., and in some instances several states are here also represented in mutual alliances, as for example the mason contractors of Northern Ohio, lower Michigan and New York as well as Southern Canada, who comprise the Frontier Mason Contractors' Association, a recent convention of which was held in Cleveland. All of these associations are doing good work in the field in which they operate.. All of them are helping to uphold the rights of the building contractor and advance his welfare. Whether a National Association is feasible and desirable is just now a much discussed and disputed question, one on which the views of those assembled here will be sought before this meeting adjourns.

CONDITION OF CONSTITUENT BODIES

"As for the condition of the constituent bodies comprising our state organization, I believe that almost without exception they have prospered during the past year. We will undoubtedly hear from representatives of the different exchanges in proof of this statement. It is a matter of regret that the exchanges in Akron, Newark, Zanesville and Lorain have not continued their organizations, but it is hoped that in the future these exchanges may be revived. A new exchange was organized during the year in Alliance with the help of the secretary and is now in a fair way to becoming a useful and permanent agency for promoting the building interests of that city. It is probable that steps will soon be taken to organize an exchange in Canton, a request for aid in this direction having been received during the past month. There is no doubt that the builders of several other cities in the state should be brought together in this manner and it is hoped by the secretary that each of the successful exchanges will devote some attention to this matter in the particular section of the state in which they are located.

"The activity of the State Association has been largely directed toward matters of state legislation since the last annual meeting. We have kept in touch with other organizations of business men and have endeavored to co-operate with them on matters of mutual interest. The association was represented at hearings before committees at Columbus, especially when the state building code and

Employers' Liability Bill were under consideration. Its influence was given toward the defeat of the Irwin Bill, which undertook to tax the deposits of the building and loan associations. A lively correspondence has been kept up between the different exchanges in the state, this feature alone being worth the cost of maintaining the state relationship. The need of co-ordination in the work of all employers and business men to protect themselves against radical legislation is apparent as the result of the last session of the general assembly. In the meantime the best that we can do is to maintain, foster and strengthen our own organization as representative of the building industry and hold ourselves in readiness to co-operate with other similar organizations as opportunity may present itself.

"There is no doubt that the results of the past year in the realm of labor and capital have tended toward a better understanding and a more reasonable view of the relationship which should exist between these two great branches of industry. So much discussion has been given to this subject as the result of the dynamiting trials that even the thoughts of those who seldom give attention to such matters have been turned to its consideration. To this extent the discussion has been profitable to both employer and employee. As for the builder, he is neither to be regarded as a capitalist nor should he be classed with agitators, though he may be regarded as a progressive and yet not in a political sense. He certainly must be progressive or he will quickly go down into oblivion if the architect does not get him before he starts on the trip.

"In conclusion I may say that the object of this convention is not so much to listen to technical papers and discuss the same, the time rather having been set aside for business consideration of practical subjects affecting the welfare of the constituent bodies as such and also the welfare of each individual member both as a builder and as a citizen. It is to be hoped that the thought of this meeting may be settled wholly upon these subjects and that the sessions may be of sufficient profit to more than warrant the trouble and expense of the meeting.

"As secretary I wish to thank all of my fellow secretaries in the state for the valued assistance they have given in promoting this meeting and also for the friendly relationship which has existed throughout the year. Especially do I believe that our thanks are due to Secretary McIntire of the Springfield exchange and the other officers and members of the local committee for the unusual interest they have shown in this convention."

Reports from Affiliated Bodies

Reports were then presented from the various affiliated bodies. The exchange in Cincinnati, according to its Vice President, C. Taylor Handman, is growing steadily and is about to remove to new quarters.

The Springfield exchange is maintaining its strength and progressing satisfactorily, according to report given by W. F. Payne.

For the city of Dayton, Secretary F. O. Kemlein announced that an effort to increase the membership to 100 last year had resulted in success, with a margin of 36 additional members to spare. Mr. Kemlein reported that work was being performed on a new building code for his city, which at present is without satisfactory building regulations.

For the city of Youngstown Charles F. Wilkins reported that new quarters were about to be occupied and that the exchange was progressing along conservative but successful lines. An increased membership of 50 per cent. was announced by W. J. Albrecht, secretary of the Toledo exchange. Columbus reported through R. L. Watson that the membership had now reached 245. Secretary Kelley, also representing Columbus, stated that plans were under way to occupy an entire floor of a large office building about to be constructed, and to be known as "The Exchange Building," giving to the Columbus organization opportunities for exhibition and desk room features and a space four times as large as that occupied at present.

Vice President Rutherford of the Cleveland exchange called attention to the increase in membership of that organization to 400 firms and companies, making it the largest organization of its kind in the United States, and also to the fact that a cash reserve fund of $20,000 had recently been invested in Cleveland municipal bonds issued for the new city hall and other public improvements. Mr. Rutherford emphasized the magnitude of the building industry of Cleveland by citing the fact that permits for 1911 had reached a total of $17,000,000, as shown by the city records.

Mr. E. B. Silver of the exchange at Alliance reported that this exchange had 34 members and was about to move into new quarters, where an exhibition and desk room department would be maintained.

Greetings Extended

Greetings were then extended to the convention by R. L. Queisser of Cleveland, president of the Building Brick Association of America, who talked upon the value of co-operation among those engaged in the various lines of the building industry.

The new Ohio workmen's compensation law was considered as the result of a report by Secretary Kelley of Columbus, that the Liability Board of Awards were about to issue the schedule of rates to be charged in the various trades, these rates to be first reviewed by an actuary of national reputation and his recommendation to be followed on the same. Inasmuch as the law was being tested in the state supreme court, the convention decided to take no definite action as to the attitude of the builders, but referred the entire subject to the executive committee, action to be taken following the decision as to the constitutionality of the act.

A vigorous discussion ensued on the relationship which the various exchanges should bear to each other on the matter of exchange privileges. This subject was referred to a committee comprising C. Taylor Handman, W. J. Albrecht, George A. Rutherford, C. A. Schuster and John A. Kelley, who later reported a resolution expressing it as the belief of the convention that members from one exchange visiting any of the other exchanges should be accorded full privileges of the organization visited. This expression was adopted by the convention, a membership card in one exchange to be recognized by all of the other exchanges in the state.

The advisability of representation at a meeting announced to be held in St. Louis on January 30 for the purpose of considering the organization of a National Association of Builders' Exchanges along new lines was brought up and discussed by the convention, as suggested by a letter of invitation from the committee having this matter in hand. It was decided, on motion of John A. Kelley, that the Ohio State Association select a representative to attend this national meeting, the delegate elected being Edward A. Roberts of Cleveland.

The Dinner

In the evening a dinner was tendered by the Springfield exchange to the visitors in the Commercial Club rooms, this dinner being attended by about 100 persons. The toastmaster was Guy D. Bayley, president of the Springfield exchange, who introduced Mayor Miller as the first speaker, the mayor extending a cordial welcome to the visitors and appointing former President Beckley of the Springfield exchange as vice-mayor, with full authority to serve in all capacities during the convention. A response to the mayor's address on behalf of the association was given by Secretary Roberts, who told a group of stories and presented a set of "specifications" for an ideal builders' association.

The workmen's compensation law was then explained by Hon. H. R. Brenner, ex-member of the state legislature. Speeches were also made by S. S. King of Dayton, representing the lumber dealers of the state; Al Weist, president of the Cincinnati exchange; R. L. Queisser and Secretary Kelley, the entire affair being of a pleasant and profitable character and providing an attractive social feature to the convention.

Wednesday Morning Session

At the Wednesday morning session a committee comprising Messrs. Kemlein, King and Kelley were appointed to represent the association at a meeting of state lumber dealers to be held in Columbus to consider an improved lien law for the state.

The following resolution was adopted encouraging further investigation of dynamiting outrages:

"*Resolved,* by the Ohio State Association of Builders' Exchanges that this organization strongly commends the Federal authorities for the manner in which investigations are now being conducted to fix the responsibility for dynamiting outrages committed throughout the country in recent years.

"The vast amount of damage done by these assaults against life and property in the building industry make it important that the perpetrators shall be apprehended and punished in such manner as will insure safety from such demonstrations of violence and wanton law-breaking in the future. We also commend the prosecuting attorneys in the various counties of our own and other states who are conducting similar investigations and hope that their efforts will be continued until every person connected with the explosions which have disgraced this state and country shall have been brought to justice."

Place of Next Convention

On invitation of the Cincinnati exchange, it was decided to hold the next convention in the Queen City at a time to be selected by the executive committee. On motion of Mr. Payne, the state officers and the executive committee were requested to use every effort toward the organization of additional exchanges in cities of the state where such organizations do not at present exist.

Election of Officers

The following officers were elected for the ensuing year:

President......C. A. Schuster of Springfield.
First Vice-Pres....J. C. Skeel of Cleveland.
Second Vice-Pres.,
C. Taylor Handman of Cincinnati.
Third Vice-Pres...John W. Boren of Dayton.
Sec'y and Treas...E. A. Roberts of Cleveland.

A vote of thanks was extended to the retiring officers on motion of Mr. Albrecht and a speech was made by the new president as a concluding feature of the convention.

A Blacksmith Shop of Concrete Blocks

A Unique Application of the Blocks -- Method of Ornamenting Windows--Details of How the Work Was Done

A MOST unique example of the use to which concrete blocks are readily adapted in building construction is a blacksmith shop erected early last year, and wherein the main entrance and window openings are of the shape of horseshoes. These were made of reinforced concrete, the reinforcing material being old wagon tires. Another unique feature of this building, which is occupied by C. J. Johnston, Glendive, Mont., is a row of ten anvils, which extend across the top of the front of the building, each anvil carrying a letter of the owner's name and initials.

From the builder's standpoint, one of the most interesting features is the method by which the work was done, more especially, perhaps, the horse shoe shaped doors and windows. The work was executed by William Hurst, who states that operations were commenced by building a platform on the ground, great pains being taken to have it perfectly level and well blocked up, so as to render it rigid, as any slight "give" in the form while the concrete was in a green state would cause cracks.

After the platform was erected the men drew the outline of the shoe on it, took some white pine boards 14 in. wide by ½ in. thick and soaked them in water until they were thoroughly wet through. They were then bent into place and brackets nailed against the outside every 8 in. all the way around. The inside was made the same way, and all the nail holes were filled with ordinary plaster stucco so as to render the molds smooth inside. The short curves on the small horseshoe "forms"—being those intended for the front windows—were made of galvanized iron bent to shape. The nail holes were made by cutting small blocks of wood the shape of the nail heads and nailing them to the forms, their shape being such as to allow them to be readily removed.

The succeeding stages of the work are described by Mr. Hurst in the following words:

"We placed pebbles screened to about 1½ in. size over the face of the mold, and put in the concrete on top of them with plenty of reinforcement. The mixture was very rich, about four parts of bank gravel to one of cement.

"By placing an 8-ft. timber under the forms about 3 ft. from the toe of the shoe, we raised forms, shoes and all at one time. It came up to place so nearly right that we only had to move one side about ½-in. I would estimate the total weight at about 3½ tons. We raised this into place with a derrick just three days after it was cast.

"The blocks are cut and laid up against the horseshoe with a very rich cement and lime mortar. We made all of the small window shoes on the same form, taking the form off and lifting them to place afterwards. The sign is made of concrete anvils cast in molds made of tin worked to proper shape while still plastic. The wooden letters were fastened to the anvils by means of a small wooden block that was put into the face of each anvil for that purpose."

The building is 50 x 110 ft. in plan. The walls are 8 in. thick, made of single-air-space-blocks. There are cement floors throughout the building, and the forges are of concrete with coal trough and water on one side.

The hight of the side wall is 12 ft. 6 in. and that of the front wall 20 ft. Every 16 ft. on both side walls were placed reinforced concrete pilasters 6 x 16 ft., the entire hight of the wall, these serving not only to support the trusses of the roof but to stiffen the walls as well. There are seven queen trusses, all entirely under the roof, and these carry the line shaft for transmitting power to the machinery from an electric motor.

The work of demolishing the old buildings at the northeast corner of Broadway and Forty-second street, New York City, is well under way, and when finished will make room for the new 12-story commercial structure which will rise upon that site. The new building will have a frontage of about 113 ft. in Broadway and 104 ft. 3 in. in Forty-second street. According to the revised plans recently filed, the structure will cost about half a million dollars. One of the old landmarks being razed to make room for the new building is the 3-story brick structure so long occupied by Shanley's restaurant, one of the famous lobster palaces of Long Acre Square. The contract for the new building has been awarded to the Thompson-Starrett Company.

Some Interesting Features of Bank Building Construction

Raising Eleven-Ton Granite Lintel Into Place--Hoisting Apparatus Required--Swinging Steel Girders Into Position

AT the present day builders are constantly being confronted with problems in connection with construction work which involve interesting details and the execution of which by reason of local conditions often requires the exercise of no little thought and possibly ingenuity. Associated with nearly every important building operation certain more or less unusual features are apt to develop, brief mention of which would probably prove of suggestive value to builders generally. A case which we have in mind is that of the construction of the new building of the Thames National Bank at Norwich, Conn., and some details of which we take pleasure in presenting herewith.

In the first halftone illustration the side walls of the building are shown practically completed and a 4-ton steel girder 51 ft. in length has just been landed in position. The interesting feature here is the means employed for getting the girder into place. It was raised with double and triple steel blocks reaved with ⅝-in. steel wire cable. A large derrick mast was used as a gin pole. The triple block was shackled to a chain over a pin in the top of the mast, while the double block was used at the bottom of the tackle. The cable was carried from the triple block through a sheave at the base of the mast and then to the winch head of the hoisting engine, where 4 or 5 turns were taken around the winch head and the operator held and took in the free end. There were four of these girders, and all were placed in the same manner without accident or trouble.

The next half tone illustration represents a granite lintel about 12 ft. long, 2 ft. 9 in. high, 4 ft. deep and weighing about eleven tons, being hoisted into place. The entire front of the building is of granite and a majority of the stones weighed upward of 2 tons apiece. On account of the time required to cut the granite a heavy framework was erected about 4 ft. back from the inside of the front wall. This framework was boarded up, thus closing the building so that all work behind it was carried on as though the front wall was erected.

The concrete roof slab and steel beams carrying it cantilevered over the framework to the point where it intersected the front wall.

The derrick for handling the stone was a stiff leg set on the roof with the mast directly over the framework, which was especially reinforced at this point. The mast of the derrick was of hard pine 12 x 12 in. in cross section and about 20 ft. high. The boom was 8 x 10-in. hard pine and about 26 ft. long.

View of the Bank Building in Progress of Erection and Showing the Steel Girders Being Placed in Position

Some Interesting Features of Bank Building Construction—Architects, Rowe & Keyes, Boston, Mass.

The bed pieces to which the stiff legs were fastened were lashed to one of the steel roof girders through holes in the concrete roof slab, and in addition to this several steel guys were carried from the mast pin down over the rear of the building and fastened to sleepers inside of the basement windows.

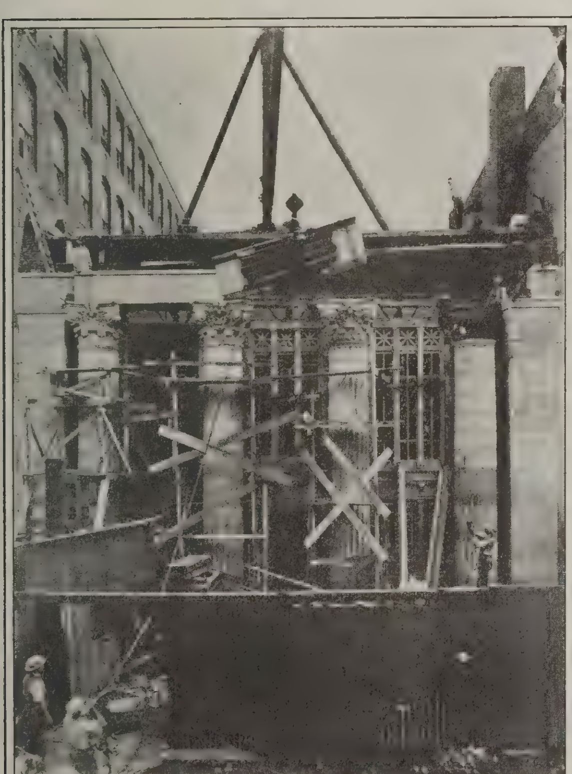
The tackle used when lifting the stones, which weighed 5 tons and upward, was quadruple and triple steel blocks, and the cable of ⅝-in. steel was carried to the drums of the hoisting engine. The latter was operated by compressed air taken from a main in the street. The city is unusual in having compressed air mains in its principal streets, these mains being owned and controlled by a public service corporation which sells compressed air for power the same as gas or electricity would be sold. It has a plant several miles above the city on the Thames River, where it runs compressors by waterpower. The main was tapped in front of the building and air was used in the engine instead of steam.

In doing the work the contractors also operated 8 or 9 compressed air tools for carving granite, which was largely done after the stone was laid in the building.

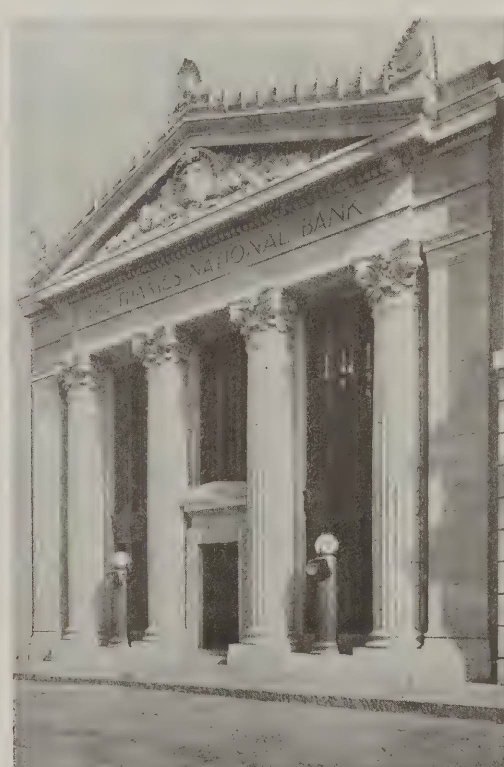
The entire building was erected in one year from the time of beginning operations, this period including the razing of the structures on the site occupied.

The architects of the building were Rowe & Keyes, Crompton Building, Boston, Mass., and the builders were the MacDonald & Joslin Company, 161 Devonshire Street, Boston, Mass.

A View in the Room of the Bank Directors



Hoisting the 11-ton Stone Lintels Into Place



Appearance of the Front of the Finished Building

Some Interesting Features of Bank Building Construction

There were three of the large lintel stones referred to, and all of them as well as other stone used in the front of the building were erected without the slightest accident of any kind.

One of the other halftone engravings presented in connection with this article represents the front of the bank building as it appears completed, while the other picture is a view in the directors' room.

Merger of Architectural Firms

The architectural firms of Oakley & Son, Elizabeth, N. J., and Hollingsworth & Bragdon, Cranford, N. J., announce their association to practice architecture under the style and title of Oakley & Son, with offices at 280 North Broad street, Elizabeth, N. J.

Standard Forms of Contract Documents

Advantages of Standardized Documents--Of What a Set Consists--The New Documents More Binding Upon Owner

WE have received from Grosvenor Atterbury, chairman of the Standing Committee on Contracts and Specifications a set of the Standard Documents of the American Institute of Architects, which have just been published and which are designed in general to cover the preparation and manipulation by architects of building contracts. The committee in question has been at work on these documents for the past five or six years and they have passed through seven or eight editions in an effort to make them as practicable as possible before issuing them for public use as is now done. Criticisms have been obtained not only from practicing architects outside of the Committee on Contracts and Specifications, but from representative builders in various cities.

The documents as now published are not designed to supplant the well-known "Uniform Contract" as heretofore published on behalf of the American Institute of Architects and the National Association of Builders. As the result of negotiations with William H. Sayward, the secretary of the National Association of Builders, however, an arangement was reached which permitted the American Institute of Architects to provide for the publication of these new documents without affecting the previous arrangement relating to the "Uniform Contract."

The many advantages of standardized documents of this kind, if they can be made to represent the best practice and by their clearness, equity and final interpretation in courts of law become generally understood and accepted by owners, architects and builders, are too obvious to call for extended comment. The documents embrace "Proposal Forms" consisting of the invitation to submit a proposal, the form of proposal, instructions to builders and instructions to architects; the General Conditions of the Contract containing the 63 articles and consisting of loose leaves enclosed in a cover, and the Agreement and the Bond, the Agreement being issued in two styles identical in wording. A note explanatory of the Standard Documents is presented which gives in general the history of the matter, but attention should be called to what is perhaps one of the most important features of the documents.

While of necessity the contractor must bear the burden of responsibility the Standing Committee on Contracts and Specifications feel that in a great majority of instances the general conditions of contracts as individually drawn by various architects have been in certain respects unfair to the contractor and even where clearly expressed and apparently binding on the face of the contract were not as a matter of equity enforcible in a court of law. Heretofore it seemed to have been assumed that all stringency of the contract is to be directed toward the contractor and that architect and owner are necessarily honorable persons.

The new documents, however, are distinctly more binding upon the owner than such documents have heretofore generally been, and distinctly more liberal to the contractor. Neither do they assume that the architects' decisions will necessarily in all cases be equitable, and, therefore, instead of the very few matters which have formerly been capable of arbitration, it is arranged that a number of classes of decisions made by the architect shall be subject to arbitration. Throughout the documents are to be found a number of specific instances of this attitude which make specific provisions; for example, for the termination of the contract by the contractor; interest on past due payments; claim for extension of time; damage, and extra remuneration.

Certain members of the Standing Committee on Contracts and Specifications have during the past year or more put into use forms substantially corresponding to the first standard edition of the Institute Documents as now published, and they have appeared to stand well the test of actual use. Provision, however, has been made by the committee for revisions by the American Institute of Architects at intervals and it is hoped that as amended by use and the criticism of both architects and builders throughout the country the Standard Documents of the American Institute of Architects will eventually become the basis of all building contracts as well as a recognized code of procedure representing the judgment of the Institute as to what in that respect constitutes the best practice of the profession.

The Standard Documents are published under a license which E. G. Soltmann, 134 to 140 West 29th Street, New York City, holds from the American Institute of Architects.

Sound-Resisting Walls and Ceilings

Quite a little attention has recently been given in Germany to experimentation in the direction of methods and means for rendering walls and ceilings capable of effective resistance to sound transmission. One of the more recently devised methods involves the use under the ceiling, or parallel to the wall, as the case may be, of a network of wire stretched tightly by means of pulleys secured into adjacent walls and not touching at any point the surface to be protected against sound. Upon the wire network is plastered a composition formed of strong glue, plaster-of-paris and granulated cork, so as to make a flat slab, between which and the wall or ceiling is a cushion of confined air. The method described is said to be good in two respects: first, the absence of contact between the protective and protected surfaces, and, second, the colloid nature of the composition recommended for the plaster.

An ingenious device suitable for garage doors or for closing large openings in churches and Sunday school rooms, etc., is a triple hanger carrier whereby three doors are suspended on a single hanger, the center door alone being attached to it, while the other two doors swing on hinges fastened directly to the center door. With doors of this kind a 9-ft. opening can be covered with only 3 ft. of pocket room into which to slide the folded doors.

House of Concrete Tile Construction

Attractive Example of Suburban Cottage or Bungalow-- Floors of Reinforced Concrete--Some Figures of Cost

A MOST interesting example of that cozy-cottage type of architecture, commonly recognized as the bungalow, in the construction of which concrete hollow tile have been used with an exterior coating of cement plaster, is illustrated in perspective view by means of the half-tone picture upon this page. The plan showing the arrangement of rooms will be found upon the page following. There is a hall running through the center of the house and opening from it upon the right are the living room, the dining room and the kitchen, while at the left is a "den," and beyond this are two sleeping rooms. At the end of the hall and lighted by a rear window is the bath room. This rather unique bungalow was built the past season at Lemont, Ill., for Dr. A. A. Mahle, in accordance with plans prepared by W. Stuart Tait of the place named and he was also the general contractor for the work.

The house is situated on a slope of the Desplaines Valley, and an admirable view of it is obtained from the tower room shown at the corner of the building.

The basement walls are of 10-in. concrete hollow tile, those from the footings to the grade line being slushed with concrete after being put in place, thus providing a solid wall. The proportions of the concrete mixture used in slushing the basement walls was one part cement to five parts limestone screenings and five parts of 1½-in. stone. This filling was used to give the wall additional stability over the hollow wall, although the tiles themselves produced a waterproof wall. It may not be out of place, however, to state in this connection that Mr. Tait now builds without the filling, as he finds it cheaper to use a wider tile and obtain stability in this way.

From the grade line to the under side of the floor slab the walls are also of 10-in. hollow tile, while above this 8-in. tile was used.

The basement is divided into storeroom, washroom, drying room, furnace room and coal room by 8-in. concrete hollow-tile partition walls, these walls being used to support the reinforced concrete floor slab. This floor slab is of tile and joist construction, using 4 x 12 x 12-in. concrete tiles with 4-in. concrete joists between and a concrete covering 1¾ in. thick. The ⅝-in. square twisted rods used for reinforcing are placed in the middle of the joists or on 16-in. centers.

On top of the slab 2 x 2-in. wooden sleepers or nailing strips were placed and in order to give these a secure hold on the slab spikes were driven well into the sleepers on the under side before bedding them in the moist concrete. The rough floor and the finish floor were then nailed to these sleepers and a very satisfactory floor was obtained.

The porch floor construction is precisely the same

General View of the Concrete Tile House of Dr. A. A. Mahle at Lemont, Ill.

House of Concrete Tile Construction—W. Stuart Tait, Architect, Lemont, Ill.

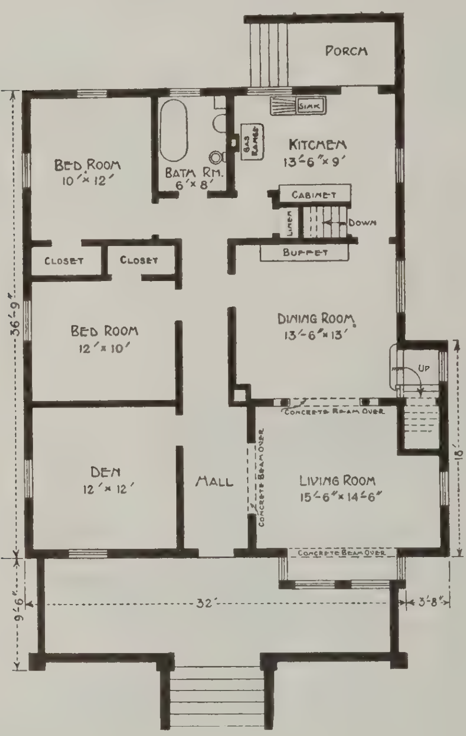
way, except that in place of a wood covering a cement sidewalk finish was applied to better withstand the wear.

The exterior of the house is treated with rough cast cement plaster or stucco, using very coarse sand for the rough cast.

Owing to the fact that concrete tiles are perfectly straight and true to dimension, it was possible to obtain a perfectly straight and even wall on which to plaster so that the cost of exterior plaster was reduced to 35 cents per square yard. The exterior plaster was mixed in the following proportions: The first coat was made up of one part of cement to three parts of clean, sharp sand to one-tenth part of hydrated lime putty. The throw-coat was made up of one part cement to two parts of sand or crushed stone sifted through a No. 3 screen and retained on a No. 10.

The roof of the bungalow is of frame construction covered with shingles.

The interior plaster was applied directly to the exterior walls, it being a feature of this class of construction that no furring is required to insure a damp-proof structure.



Floor Plan—Scale 1/16 in. to the Foot

House of Concrete Tile Construction

The living and dining rooms as well as the hall are finished in plain red oak. The kitchen and other rooms in yellow pine. The floors in the living and dining rooms, the hall and the kitchen are clear maple; in the den and bedrooms it is edged grain yellow pine, and in the bath room and in the tower room there are concrete floors treated with cement coating.

The heating is by hot air, the furnace being supplied and installed by the Robinson Furnace Company, Chicago, Ill. The concrete hollow tile used in the erection of the bungalow was made by the Chicago Structural Tile Company, Chicago, Ill.

The cost of the bungalow complete with plumbing and heating was $3,900 and taking into consideration the fact that this includes the reinforced concrete floors the cost is distinctly moderate.

Colombian Mahogany

It is quite probable that there are comparatively few users of mahogany who realize that the consumption of material passing in the markets of the world as mahogany amounts annually to about 40,000,000 ft., while the cut of real mahogany is only about 18,000,000 ft. This does not mean so much that deliberate deception is being practiced as it does that the demand for true mahogany greatly exceeds the supply. As a consequence of this the producers of mahogany have had to seek substitutes in order to meet the demand.

It is interesting to note that more than 20 mahogany-like woods are now offered as true mahogany, not to mention a considerable number of woods cunningly stained to imitate that wood. In the present circumstances, therefore, when the demand for mahogany is greater than the supply unusual interest attaches to such woods as Cariniana or Colombian mahogany, which is acknowledged not to be mahogany, but which is so similar to it in color, grain effects and working qualities as to serve for the rarer wood.

Practically all the Colombian mahogany now marketed is cut at points from 100 to 200 miles inland and shipped from Cartagena, Colombia. The trunks of the trees are straight and cylindrical, ranging from 24 to 70 in., with an average of about 36 in., often having a clear length of 50 ft.

The statement is made that while Cariniana differs widely in its botanical and anatomical characters from true mahogany, its close superficial resemblance to mahogany and its physical properties at once distinguish it as a high class cabinet wood. When properly seasoned it does not warp, check or shrink, while much of the lumber is beautifully figured. It works well, takes a filler readily and can be highly polished.

"Architect and Builder"

Tune, "Onward, Christian Soldiers."

The following verses, composed by W. H. Sayward, Jr., were sung with great enthusiasm at the joint dinner-meeting of the Boston Society of Architects and Master Builders' Association at Young's Hotel on the fifth of December, a report of which appeared in our issue for last month:

When man's first endeavor
Sought to raise on high
Shelt'ring wall and roof tree
'Gainst a lowering sky,
One conceived the building,
Then, with ready hand,
Stone and wood combining,
Wrought what he had planned.

Chorus.

Architect and Builder,
Bodied forth as one,
Wrought each mass and detail
'Til the work was done.

But, when tasks grew mighty,
Then the single man
Could no longer fashion
What his brain might plan.
Called he then his brother,—
"Lend thy strength to mine,
Thou shalt raise the fabric
As I draw the line!"

Chorus.

Architect and Builder,
"Building makers," twain;
Each with separate powers
Sped the task amain.

But, though reft in body,
We two, hand with hand,
Plan and rear what steadfast
Through Time's march shall stand;
Proud of common purpose
We our tasks pursue,
That each arch drawn truly
May arise as true!

Chorus.

Architect and Builder,
Still in spirit one!
Raise your work in honor
'Til the task is done!

Some one says it is laughable to see how some buildings are planned. The stoves and the ice boxes bump into one another. The ice box is there to cool off the stove, and the stove is there to keep the ice box warm.

Forms for Reinforced Concrete*--II.

Notes on Design--Important Details--Forms Should Be Built from Plans--Lumber Should Be Cut by Saw-mill

By Frederick W. Taylor and Sanford E. Thompson

A PRACTICAL foreman or superintendent is apt to see the points of advantage for cheap construction and quick removal, and his judgment is better than that of a draftsman of ordinary experience. However, the plan of leaving the design entirely to the discretion of the men on the job results in haphazard design, delays of the carpenters and usually an excessive amount of lumber. A careful, practical man is bound to average farther on the safe side than is necessary, while occasionally he will make an error in judgment in a place where computation of strength is the only means of determining the proper spacing of supports.

It is absolutely wrong, therefore, on any important job to leave the design in the hands of the foreman alone. On the other hand, it is just as bad to leave it to the draftsman of little or no practical experience.

Forms Should Be Built from Plans

The forms are not a part of the permanent structure, but this is no reason why so little attention should be paid to their design. As already stated, they constitute the most expensive part of the labor cost in reinforced concrete and time spent on plans in the drafting room is repaid over and over again by saving in the field, provided the plans are made up under the direction or with the assistance of the builder or superintendent so as to take advantage of his practical ability.

Form Lumber Cut by Mill Saw

Even on a comparatively small job a mill saw run by power should always be provided. It will pay for itself in the saving of time of the carpenter.

In systematizing construction work, Mr. Thompson has found it usually the cheapest plan to make out a lumber schedule from the drawings so that the lumber will be ordered direct from the mill to exact widths and even foot lengths. By ordering the boards or planks in two or in three standard widths the number of sizes will not be excessive and the waste will be small. Before making up, the boards can be routed to the sawmill and cut to exact lengths. Either before or after making up, the odd boards can be ripped on the mill saw.

In certain cases where forms are of fairly uniform sizes, it may be cheapest to schedule all the pieces, ordering to the exact lengths and widths required. This plan has been followed by the Howe Construction Co.

Important Details in Form Design

Economy of labor, not only in making, but in removing the forms, remaking and resetting depends upon the small details of design and construction. A few points, therefore, may be mentioned which are conducive to cheapness in making up, erecting and removing.

Design to Permit Removal in Definite Order.—The most convenient and logical order of removal is (1) column sides, (2) joists, (3) girder sides, (4) beam sides, (5) slab bottoms, (6) girder and beam bottoms. Walls are often built independently of the rest of building and the forms may be removed whenever the concrete is hard enough.

Design Forms to Be Easily Removed.—The forms must be designed so as to be easily freed without damage to themselves or to the concrete.

Wall Forms between pilasters are liable to bind if in one piece and some builders advise dividing them in the center. An objection to this middle joist, however, is the danger of its showing badly in the finished concrete.

Slab Forms in a floor bay are preferably divided into four sections with joints at right angles so that they can be removed without binding.

Beam bottoms may rest on column sides, but should be made with a slight play so that swelling will not bind the beveled end.

Where a length of form cannot be prevented from binding, a narrow strip may be nailed across the end to be broken out with the aid of a crowbar when the forms are being removed.

Tapering Beams

If the beam form is to be taken down as a unit, it is advantageous to slightly taper the sides of the beam, making it narrower at the bottom. This also makes it easier to free the column forms which have to be taken down first.

Mill Widths of Boards.—When fixing the exact dimensions of a concrete beam they frequently may be arranged to fit mill widths of boards or planks or else a slight leeway in the dimensions may be allowed the builder. For example, instead of making a beam 9½ in. in width, it will be cheaper to make it 9¾ in. wide so as to fit a 10-in. plank planed on its edges. In some sections of the country widths do not run exact enough to make this plan worth considering.

Buying Lumber to Length and Width.—Sometimes the design of the concrete, even to the length of the beams, may be made to conform to standard lengths and widths of lumber in the locality, thus saving expense and waste of cutting. The ordering of lumber in the mill to exact lengths and widths has been already referred to.

Uniform Story Hights.—Keep the story hights the same throughout the building where possible. In a wood frame building, or even in a steel frame, there is little advantage in uniformity. In reinforced concrete work, however, the cutting down or lengthening forms is very expensive.

Exterior Columns of Uniform Width.—The appearance of a building is improved by running up the exterior pilaster of the same width, or, possibly, with a single change in width. This also results in a saving in the cost of column and wall forms. To save concrete, the thickness of the wall columns may be reduced coincidently with the change in the dimensions of interior columns.

*This article is adapted by the authors for the *Building Age* from a chapter in their forthcoming book, "Concrete Costs."

Reducing Size of Columns.—To avoid frequent changes in column sizes, the column reinforcement may be varied in successive stories. It is frequently cheaper to use the same size of columns on successive floors than to reduce the size. Leonard C. Wason states that in one case the saving in concrete by reducing the size was $2.30 per column; on the other hand, the increase in form cost was $5.70 per column, entailing a loss of $3.40 per column. This reference is of interest because of its close agreement with results from tables in this book. Computing the average cost from these tables we find the loss to be $3.37 per column, thus checking almost exactly with Mr. Wason's figure.

A reduction in column size necessitates lengthening the beams and girders running into it, as well as reducing the column forms.

Bevel Strips.—The appearance of all members is improved by avoiding square corners. Triangular pieces, usually called V-strips or bevel strips, may be inserted in all corners, or the edges and ends of the sheathing lumber may be beveled. Triangular strips across the end of planks or boards prevent the end grain of the wood showing on the finished concrete. They also make form removal more easy.

Strength.—Forms must be strong enough to bear the weight of the concrete and of the construction load which comes upon it. For floors, 75 pounds per square foot is sufficient to cover ordinary construction work, except storage piles of cement or sand, even where the concrete is handled in cars. In most cases a still smaller construction load of 50 pounds is enough.

Rigidity.—While the rigidity of the forms must be left, in a measure, in the hands of the field superintendent, the plans for the forms should show the amount and dimensions of the bracing so that they will not be omitted, nor an excessive quantity used.

Smooth Walls vs. Pilasters.—Long, smooth walls are cheaper than pilaster construction but do not look so well. In a long wall it is difficult to make and keep the forms in perfect alignment.

(*To be continued*)

Permanent Exhibit of Building Material and Supplies

The favor with which permanent exhibits of building materials, appliances, equipments and furnishings have been received as evidenced by the interest manifested in those which have been established in many cities of the country has resulted in the opening of another exhibition of this character, the location being the ground floor of the new Hume-Mansur Building, East Ohio street, Indianapolis, Ind. The principal idea of the exhibit is to educate the public as to the use of a better and more artistic class of building materials, while another purpose is to concentrate the exhibits in a central and convenient location. It is intended to make the exhibit as attractive as possible and full of interest to any one contemplating building.

The principal scheme of attraction is what the management designates as "feature exhibits," these consisting of the latest and highest class of production in the particular line that is being featured. As an illustration, it is proposed that one month the exhibit will be devoted to art glass, when all prominent manufacturers of art glass will be requested to submit samples of some of their special work or newest designs. These will be displayed under the supervision of a committee of architects who will see that they are mounted with proper surroundings to show them to the best advantage. Another month marbles of various kinds will be exhibited in the same general manner and the next month some other building material and so on until a wide range has been covered. These exhibits are intended to be of such a character as to attract a large number of people visiting the displays who otherwise might not be interested.

The exhibitors have the privilege of keeping a salesman on the floor, although the management will have trained salesmen present at all times to explain the exhibits to visitors and to distribute the literature prepared for the purpose. They will also gather information regarding contemplated buildings and improvements.

The project was introduced at a meeting in November of the Indiana Chapter of the American Institute of Architects and it will be governed by a committee from that organization. The display will be under the management of the Indianapolis Exhibit Company, of which W. R. Spencer is the representative. A study of the various exhibitions and showrooms throughout the country has been made and the management of the new undertaking is of the belief that the one which they opened the first of the current year will result in much good and will reach the owner direct as well as the architect.

President of the American Institute of Architects

As announced in our last issue the newly elected president of the American Institute of Architects and chosen at the annual meeting held in Washington the second week in December is Walter Cook, a member of the firm of Babb, Cook & Welch, 3 West Twenty-ninth street, New York City. He is a New Yorker by birth and has practiced in the city since 1877. He is a graduate of the *Ecole des Beaux Arts* of Paris, the Royal Polytechnic School of Munich and of Harvard University.

He is a past president of the New York Chapter of the American Institute of Architects; a past president of the Society of Beaux Arts, and for several years was the architectural member of the Municipal Art Commission. He was the American member of the International jury which judged the Phœbe Hearst Competition for the University of California, and he was also a member of juries in competitions for the New York Public Library, the Washington University at St. Louis and for the remodeling of West Point.

The firm with which he is associated were the architects of the residence of Andrew Carnegie, the residence of F. B. Pratt in Brooklyn, the New York Life Insurance Company's buildings in Montreal, Minneapolis and St. Paul, and also of many Carnegie libraries scattered throughout the country.

Illinois Statute Governing Architects Upheld

An Illinois statute requires architects, who are defined to be persons engaged in the business of planning or supervising the erection of buildings, to obtain licenses to do business. Theodore F. Laist obtained the highest rating on a civil service examination to fill a vacancy in the office of city architect for Chicago, but was denied the right to fill the position because he was not licensed under the law mentioned. In a suit prosecuted by him to compel his appointment Mr. Laist contended that the law was unconstitutional as unjustly discriminating against architects by providing that its terms shall not prevent any person, mechanic or builder from making plans for, or supervising the erection or alteration of, buildings constructed by himself or his employes, without such license. The Illinois Supreme Court decided, however, on an appeal in the case, that the statute is not open to the objection urged, sustaining the civil service officers in the action taken by them.

The Jobbing Carpenter and Some of His Work*—XXIX.

Some Kinks and Wrinkles—Clamps and Their Varied Construction—The Brace and Bit

By Edward H. Crussell.

A FEW years ago there appeared in the correspondence pages of our old friend, *Carpentry and Building*, a discussion as to the best method of erasing ink lines from paper. After different correspondents had expressed their views—one using a piece of broken glass, another a piece of fine sandpaper, and so on—a contributor to the columns came forward with the suggestion that they try a piece of rubber ink eraser. So in presenting the following collection of kinks and wrinkles (call them what you choose) the writer will state at the outset that in many cases they are only makeshifts to be used in the absence of the proper equipment. A number of them are, so far as he knows, original with himself, but as we may safely assume that the reader is more interested in their utility than the source of their origin we will say no more on that head, but proceed to business.

There never seems to be a sufficient number of clamps in the jobbing shop to meet all requirements, and nearly every large job calls for a number of wooden makeshifts. In Fig. 226 there is presented a plan and elevation of one that is sometimes used. It consists of two pieces of board with holes bored through them at the proper distance and the holes fitted with wooden pins. The pins are made fast in the lower board with a couple of nails, but their upper ends are of such a size as to permit the top board to lift off without the least trouble.

In use, the material to be cramped is laid between the pins on the lower board, while the upper board is dropped down on to it and a hardwood wedge driven in between the material and one of the pins, as clearly indicated in Fig. 227. The pins may be round or square in section, according to choice.

At first sight this appears to be a first-rate clamp, and one can certainly get a lot of power with it, but it is awkward to handle and cannot be used so easily as the clamp shown in Fig. 228. This one is perhaps used more than any other style of temporary clamp. It is well known to most woodworkers, but when constructed as shown in the sketch—which it frequently is—it has a number of serious faults. Fig. 229 illustrates a much better form of construction.

As made in Fig. 228 the body of the clamp is generally a piece of 1 x 4-in. stuff with two pieces of the same material nailed across it. The bevel of the piece at the wedge end is usually a matter of guess, and the wedge is chopped out with a hand axe—also by guess—with the result that it is frequently made much too wide.

In Fig. 229 the body of the clamp is of 2 x 4-in. stuff in cross section, which permits better nailing of the blocks at the ends and also obviates the tendency which a long clamp has to buckle when the wedge is driven up tight. The blocks at the ends are placed lengthways

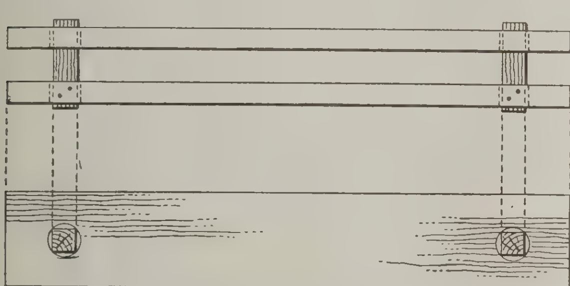


Fig. 226—Plan and Elevation of Form of Clamp Sometimes Used

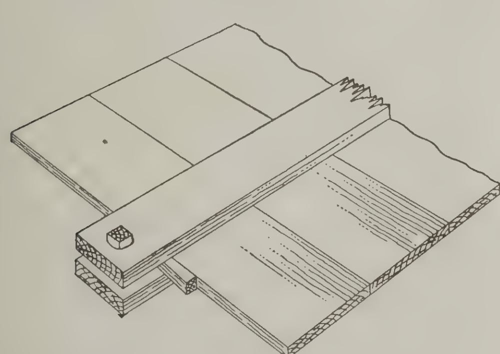


Fig. 227—The Clamp in Use, Showing Wedge for Tightly Holding the Material Together

Fig. 228—Style of Temporary Clamp Frequently Used

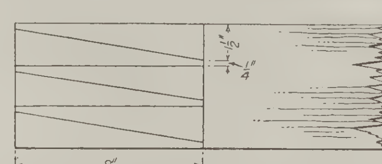


Fig. 330—Size and Method of Cutting Wedges

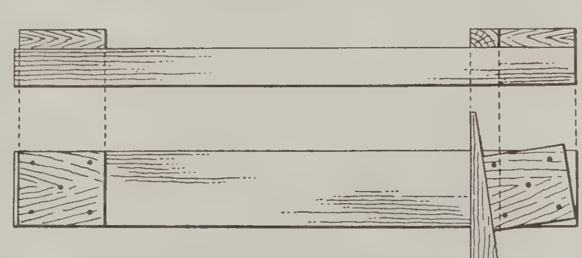


Fig. 229—A Much Better Form of Construction than that Shown in Fig. 228

The Jobbing Carpenter and Some of His Work—XXIX

*The author of these articles will be glad to discuss any phase of work in the line of jobbing carpentry that the reader may suggest—Editor *The Building Age*.

with a clamp instead of across it, and one will never believe how much of an improvement that is until he has tried both methods. The bevel of the block at the wedge end is found by cutting the wedge first, laying it against a square line marked across the clamp and then nailing the block close up to the wedge. Fig. 230 shows the size of the wedges and how they are cut from the end of a scrap piece of hardwood. This is perhaps a small matter, but when six or eight of these temporary clamps are in use a lot of time can be saved by having the wedges all alike, so that any wedge will fit any clamp.

On such work as gluing up thin stuff for drawer bottoms the writer prefers this style of clamp to the steel variety. In the making of pantry fixtures for a number of dwelling houses the writer has had as many as twenty or thirty drawers to make, all of a size. In cases of that kind the clamps would be made double; that is, with cleats on both sides of the 2 x 4, and a drawer bottom would be clamped up on one side with a 1½ in. brad driven through the center of it into the clamp to prevent the bottom buckling out of place when the clamp was turned over. The brad is first driven through a small scrap of ½-in. board, which helps to better hold the bottom in place, but is used chiefly for the advantage which it offers of withdrawing the brad after it has served its purpose.

It may be observed in passing that the brad is often useful on the single clamps. The thin material of which drawer bottoms are made is usually more or less warped and difficult to squeeze together, so that it is well to arrange the pieces forming the bottom in such a way that the pressure of the clamp will tend to buckle the center upward and then drive a brad down through the center, as already explained. The hole made by the brad is never noticed in the finished drawer bottom. If it should be it is easily plugged with a sliver of wood.

Fig. 231 shows the double clamp with the two bottoms in position and the blocks of wood with the brad in place.

This scheme of using a block of wood under the nail head can be employed to advantage in lots of cases where the nail is driven only temporarily. The usual method is to leave the head of the nail projecting a short distance, so as to enable the clawbar or hammer to take hold of it. This does not always answer, for sometimes the nail is required to draw two pieces together, and to do this it must be driven up to the head. Where the block of wood is used the hammer or clawbar may be inserted under it, or it may be split out with a chisel, which leaves the nail free to be taken hold of in the usual way.

In Fig. 232 is presented another form of wooden clamp. This is by no means a temporary affair. We had a pair of these clamps for gluing up sash, and outside of the wonderful contrivances that are used for that purpose by up-to-date sash and door factories—in which a foot lever clamps all corners of the sash at once—it is the best thing for the purpose the writer ever saw. The clamps are fixed to the bench or saw horses and made out of winding and square with each other; the sash is laid on them and a couple of taps with a mallet on the wedges brings everything up tight. The width of any of these wooden clamps may be varied by inserting parallel strips of wood between the material and the square end of the clamp. This is better than using different sizes of wedges. The various screw clamps, hand screws, etc., do not come under the heading of the present article, so the writer will pass them by.

Most of the readers are familiar with the spring clothes-pin illustrated in Fig. 233. A dozen of them can be bought for a dime; they do not take up much room, and can often be used to advantage on repair work and other jobbing-shop items.

In Fig. 234 is shown a small clamp made from a piece of spiral door check spring. It can be made with teeth, as shown in Fig. 234, or with ends that will not mar the material, as in Fig. 235. Of course it is not necessary to get a door check spring to make this article, as a piece of heavy steel wire bent to the proper form and with the ends pointed will serve almost as well. The original of Fig. 234 was made from a door check spring because the writer happened to have a broken spring on his bench when the need for the clamp arose.

The expansive bit is a first rate emergency tool, but it takes considerable power to turn the larger sizes through hardwood. This, however, is naturally to be expected. Before the invention of this bit almost any hole larger than 1½ in. had to be bored with an auger, but nowadays many people expect to bore a 3-in. hole through a hardwood floor with one of these bits held in a brace of 6-in. sweep.

When boring in hardwood a good deal of the power required to turn one of these bits is used up in forcing the nose of the bit through the material, and the writer has found it a good scheme to first bore a small hole, say, about ⅛ in., in diameter and have the nose of the bit to follow. It is sometimes difficult to bore a straight hole with one of these bits, but this scheme of running the small bit through first will help out every time. Of course the small hole must be straight and should be of such a size that the thread on the nose of the expansive bit will take hold in it.

Sometimes it is necessary to bore a straight hole between two pieces of wood. To do this make a saw kerf across each piece about 1-16 in. deep; clamp the two pieces together so that the saw kerfs coincide and form a small hole through between them; insert the nose of the bit in this small hole and bore away. If the saw kerfs are straight and square with the stick the

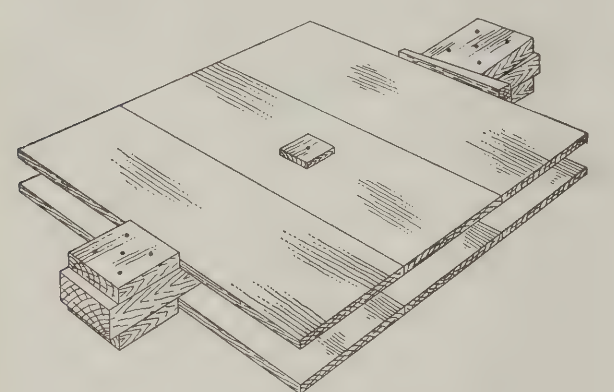


Fig. 231—View of Double Clamp with the Two Bottoms in Position and the Blocks of Wood in Place

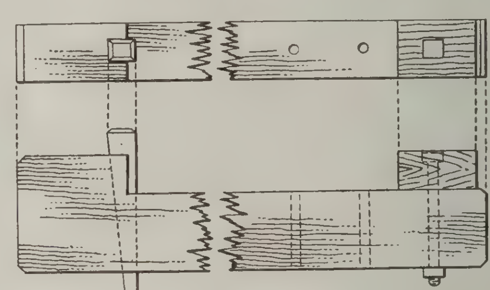


Fig. 232—Another Form of Wooden Clamp Which Serves an Excellent Purpose

The Jobbing Carpenter and Some of His Work—XXIX hole will be the same, for the bit will always follow the saw kerf.

In Fig. 236 is shown a support for pipes or shafting. Two of these can be cut at one time by the scheme just described.

Sometimes when inserting long wood screws a bit of just the right size is not at hand. A wire nail held in the brace and used like a bit is a good makeshift. Some carpenters use the nail for this purpose by driving it in with a hammer and then pulling it out again. Using it in the brace, however, is a better and more workmanlike method.

A quill bit of the proper size will remove any of the old nails that are met with in repair work. This style of bit will cut around the nail and the nail will come out with the core. The first time the writer used this "kink" was in removing a broken screw from the lower end of a table leg. The screw had to be removed to make way for the shank of a caster. The bit used was just the right size, so that one operation took out the old screw and made the hole for the caster—the slickest thing you ever saw. A nick made with a three-cornered file in the ends of these bits improves their cutting qualities. Fig. 237 shows the nick in the end of the bit.

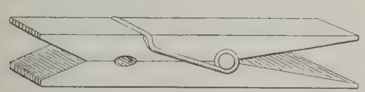


Fig. 233—A Spring Clothes Pin

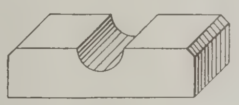


Fig. 236—Support for Pipes or Shafting, Two of Which May Be Cut at One Time

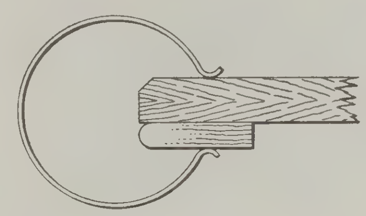


Fig. 235—Clamp with Ends So Made as Not to Mar the Material

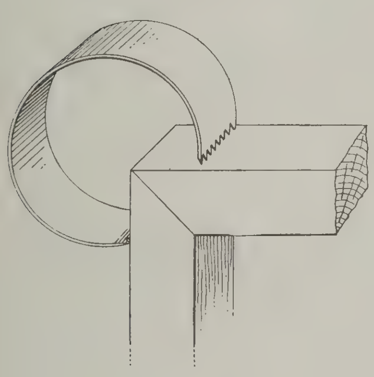


Fig. 234—Small Clamp with Teeth Made from Piece of Door Spring

Fig. 237—Bit with "Nick" for Removing Old Nails or Screws

The Jobbing Carpenter and Some of His Work—XXIX

When cutting circular holes from 5 to 12 in. in diameter through plank 3 in. or more in thickness it is usually much easier to cut them with a bit than with a compass saw. Just strike out the size of the hole with the compasses and then bore around the outside of the circle with a ½-in. bit until the piece falls out. With a little trimming a hole cut in this manner usually presents a better appearance than one cut with a saw, and anyone who has ever tried to cut heavy planks with a compass saw knows just what kind of a job it is. Quite often timbers or beams in awkward places can be cut through with a brace and bit when it is impossible to cut them with axe or saw.

The writer, with an assistant, was at one time working on a repair to the boom of a steam shovel. The boom was composed of two sticks of oak 8 in. wide and 22 in. deep. Heavy plates of steel were to be fastened along the edges of these sticks by means of 1½-in. bolts which passed through the sticks the 22-in. way. We had nothing to do with the steel plates, as they were the machinist's work, but we had to bore holes for the bolts, and as the sticks were as green as the hills of old Ireland, believe me, the boring was something of a job. We were using an auger with a cross handle—known in the catalogues as a nut auger—and were working overtime by lantern light. We had everything finished excepting these holes, and the machinist crew was waiting for us to get through so they could get the ironwork in place and have the shovel ready for work the next morning.

What happened? We broke the auger off in the center of the stick. How's that for a fix? We had three or four more holes to bore and this was the only auger in our possession. A bolt *must* go through where the auger was now embedded in the wood, and in figuring out some method of removing it the fact must be remembered that it was in so tight that we twisted the stem of the auger off when trying to turn it. The stem of the auger had been lengthened at some previous date, and it broke at the scarf where it had been welded. The end of the stem left in the stick was some inches below the surface; if it had been projecting above we might have turned the auger out with a pipe wrench, or if we had had another auger we might have bored from the other side and driven the broken one out with a drift. The trouble was we needed what was left of it to finish the job.

It was the pipe wrench that suggested the idea; we took a piece of ⅜-in. pipe—the stem of the auger was ⅜ in. diameter—and about 3 in. from one end of it we hammered it flat. We slipped this end of the pipe down over the end of the auger and then drove it down until the tapered end of the scarf on the stem was forced into the flat portion of the pipe; the other end of the pipe we bent at right angles, and, securing a good leverage by this means, we turned out the broken auger. The pipe held so well that we formed a crank on the upper end and bored the balance of the holes with the auger fixed up in that way rather than wait until the blacksmith welded the stem together again.

This can hardly be called a jobbing-shop item, and it happened long after the writer had severed his connection with the old shop; but for a simple way out of a rather trying situation it is surely worthy of notice, and for that reason the writer has included it among these kinks relating to the brace and bit. It is possible that there may be in it some hints of value to others.

Scope of an Architect's Authority

Some Legal Aspects of the Matter--Question of Substitution of Materials

By A. L. H. Street

QUESTIONS touching the nature and extent of an architect's authority being a source of considerable litigation, it is the purpose of this article to give the readers of The Building Age a general view of the legal principles involved, as heretofore decided by the appellate courts of the country.

While an agreement engaging the services of an architect in the construction of a building may expressly constitute him a general agent of the employing owner, general agency does not rise by implication. It may be said, as a general rule, that his authority is limited by the terms of his contract, whether the employment be merely to prepare plans or plans and specifications or extends to superintendence of construction. It has been decided by the courts of several States, including New York, Illinois and California, that a supervising architect or engineer has no implied authority to agree with the contractor upon a modification of the terms of a construction contract, nor to agree to a departure from the plans and specifications, nor to obligate his employer for extra work done. The Kentucky Court of Appeals has held that an architect cannot bind the owner by an agreement to pay a sub-contractor.

Extension of Time for Completing a Building

According to the Iowa Supreme Court an architect can agree to an extension of time for completing the building only in accordance with the construction contract. Under a building contract which made the supervising architect agent of the owner for the purposes of the agreement, the Massachusetts Supreme Judicial Court determined that he could not waive conditions of the contract imposed for the benefit of the owner, such as terms upon which payments should be made. Construing another agreement giving the architect the same general authority, it was held by the Michigan Supreme Court that he could not waive a provision in the building contract requiring the contractor to pay agreed damages for failure to complete the work on time.

The Wisconsin Supreme Court has decided that an architect cannot relieve a contractor from his contract duty to make written claim for an allowance due for delays caused by the owner, within twenty-four hours after the delays arise, as a condition precedent to the contractor's right to such allowance. But the Massachusetts Supreme Judicial Court has upheld the authority of a supervising architect to agree that the contractor should receive an allowance on account of extra expense in constructing a foundation on discovery of quicksand—a condition not foreseen when the contract was made. It was also decided in the same case that authority given an architect cannot be revoked by the owner after exercise thereof.

In a case where it was discovered during construction of a building that the architect had made a mistake in the plans and specifications, entailing changes at an increased expense, the Nebraska Supreme Court concluded that he could bind the owner by directing that the changes be made, though probably, as between him and the owner, he would be liable. Notice to an architect that the contractor has assigned his right to receive payments was held by the California Supreme Court not to constitute notice to the owner as affecting the assignee's rights.

Substitution of Materials

Agreement by an architect to a substitution for the principal contractor is not within the scope of his implied authority. It has been adjudged in New Jersey that an owner is not bound by his architect's agreement to a substitution of brick for marble as building material, or blue flagstone for brownstone steps or a 12-in. wall for one 16 in. thick. The Georgia courts have denied right to recover against the owner for injury received by one invited by the architect into a building in course of construction, due to defective condition of the building, the theory of the decision being that the architect was not authorized to bind the owner by the invitation.

The general principle of the law of agency, that a principal's ratification of his agent's unauthorized act is equivalent to original authority, applies to the architect's relations with his employer. Hence, the Georgia Supreme Court has decided that an owner is bound by a purchase of material made by the architect on the owner's credit, with the latter's knowledge. But there is a decision of the New York Court of Appeals that an owner's acceptance of work does not constitute ratification of an unauthorized contract made by the supervising engineer unless the owner knew thereof.

In an English case an architect was held liable for the price of materials which he falsely represented to the seller he was authorized to buy. No American decision on this point has come to the writer's attention.

Delegating Authority to Another

Since employment of an architect implies that the employing owner has special confidence in his particular skill the architect cannot delegate his authority to another unless directly authorized so to do by the owner. It has been decided, however, that though an architect cannot delegate to his partner powers under a personal contract the owner is estopped to deny the partner's authority to act in the other's absence if he acquiesces in such arrangement.

It will be noted that no attempt is here made to treat questions relating to the powers of architects in certifying the performance of building contracts or in arbitrating disputes between owners and contractors. These questions are left for treatment in a separate article.

One of the best ways for the building mechanic to develop an exact knowledge of his work is by writing of it for the edification of others, for, as reading makes a full man, writing makes an exact one.

New York's Regulations Governing the Use of Reinforced Concrete

Proportions of Mixtures—Basis for Calculating Strength of Girders and Slabs—Limit of Stresses—Protection for Steel Reinforcement

WE take pleasure in presenting to the attention of our readers the regulations governing the use of reinforced concrete as adopted December 28, 1911, by the Superintendents of Buildings of the five boroughs of Greater New York, the regulations becoming effective January 1, 1912. This is the first time uniform regulations of this kind have been adopted to apply to all boroughs of New York City.

1.—The term reinforced concrete in these regulations shall be understood to mean an approved concrete mixture reinforced by steel of any shape.

2.—Reinforced concrete will be approved for all types of construction if the design is in accordance with good engineering practice and stresses are figured as required by these regulations.

3.—Before permission to erect any reinforced concrete structure is granted, complete drawings and specifications must be filed with the superintendent of buildings, showing all details of the construction, the size and position of steel reinforcement, and the composition of the concrete.

Composition of the Concrete

4.—The concrete for reinforced concrete structures shall consist of a wet mixture of one part of cement to not more than six parts of aggregate, fine and coarse, either in the proportion of one part of cement, two parts of sand and four parts of stone or gravel, or in such proportion that the resistance of the concrete to crushing shall not be less than 2,400 lb. per sq. in. after hardening for 28 days.

5.—Only Portland cement meeting the standard specifications for cement of the American Society for Testing Materials shall be used in reinforced concrete structures.

6.—Fine aggregates shall consist of sand, crushed stone or gravel screenings, passing when dry a screen having ¼-in. diameter holes, and not more than 6 per cent. passing a sieve having 100 meshes per lineal inch. It shall be clean and free from vegetable loam or other deleterious matter.

7.—Mortars composed of one part Portland cement and three parts fine aggregate by weight when made into briquettes should show a tensile strength of at least 240 lb. per sq. in. at 28 days.

8.—Coarse aggregate shall consist of crushed stone or gravel which is retained on a screen having ¼-in. diameter holes and graded in size from small to large particles. The maximum size shall be such that all the aggregate will pass through a 1-in. diameter ring. The particles shall be clean, hard, durable and free from all deleterious material.

Steel for the Reinforcement

9.—Steel for reinforcement of concrete shall meet the requirements of the standard specifications for steel reinforcement of the American Railway Engineering and Maintenance of Way Association.

10.—Wire used for column hoops shall be drawn from open hearth billets and shall have an ultimate tensile strength of not less than 85,000 lb. per sq. in.

11.—The span length for beams and slabs shall be taken as the distance from center to center of supports, but need not be taken to exceed the clear span plus the depth of beam or slab. Brackets shall not be considered as reducing the clear span.

12.—Length of columns shall be taken as the maximum unsupported length.

13.—All reinforcement shall be accurately located and secured against displacement. The reinforcement for slabs shall not be spaced farther apart than two and one-half times the thickness of the slab.

14.—Slabs shall not be less than 4 in. in thickness for floor and 3½ in. for roofs.

15.—As a basis for calculations for the strength of girders, beams and slabs, the following assumptions shall be made:

(a) A plane section before bending remains plane after bending.

(b) The modulus of elasticity of concrete in compression remains constant within limits of working stresses fixed in these regulations.

(c) The adhesion between concrete and reinforcement is perfect.

(d) The ratio of the modulus of elasticity of steel to the modulus of elasticity of concrete is 15.

(e) Concrete has no value in resistance to tension.

(f) Initial stress in the reinforcement due to contraction or expansion in the concrete is negligible.

The Bending Moment

16.—The bending moment of slabs uniformly loaded and simply supported shall be taken as ⅛ *Wl*, where W = total load and l = span.

17.—The bending moments at the center and at intermediate supports of floor slabs continuous over two or more supports shall be taken at 1/12 *Wl*.

18.—The bending moments of slabs that are reinforced in both directions and supported on four sides and fully reinforced over the supports (the reinforcement passing into the adjoining slabs) may be taken as 1/*F Wl* for loads in each direction, in which $F = 8$ when the slab under consideration is not continuous or when continuous over one support, and $F = 12$ at both center and supports when the slab is continuous over both supports. The distribution of the loads shall be determined by the formula

$$r = \frac{1^4}{1^4 + b^4}$$

in which r equals proportion of load carried by the transverse reinforcement, 1 equals length and b equals breadth of slab.

19.—Simply supported beams shall be considered as simple beams with bending moments of ⅛ *Wl*.

20.—Beams supported at one end and continuous at the other shall be considered as partially restrained with a bending moment of 1/10 *Wl* at the center and ⅛ *Wl* over both directions shall be assumed to take the proportions of load as determined by the formula in section 18.

21.—Beams supporting rectangular slabs reinforced in intermediate support.

22.—The bending moments at center and support for beams or girders continuous over two or more supports shall be taken at 1/12 *Wl*.

23.—The bending moments due to other than uniformly distributed loads shall be computed according to accepted theory.

When Slab Is Part of Beam

24.—Where adequate bond between slab and web of beam is provided, the slab may be considered as an integral part of the beam provided its effective width shall not exceed on either side of the beam 1/6 of the span length of the beam nor be greater than six times the thickness of the slab on either side of the beam, the measurements being taken from edge of web.

25.—Members of web reinforcement shall be so designed as to adequately take up all involved stresses throughout their entire length. They shall not be spaced to exceed three-fourths of the depth of the beam in that portion where the web stresses exceed the allowable value of concrete in shear. Web reinforcement, unless rigidly attached, shall be placed at right angles to the axis of the beam and carried around the extreme tension member.

26.—Reinforced concrete structures shall be so designed that the stresses in the concrete and steel shall not exceed the following limits:

	Per sq. in.
Extreme fiber stress on concrete in compression.	650 lb.
Concrete in direct compression................	500 lb.
Shearing stress in concrete when all diagonal tension is resisted by steel................	150 lb.
Shearing stress in concrete when diagonal tension is not resisted by steel...............	40 lb.
Bond stress between concrete and reinforcing bars	80 lb.
Tensile stress in steel reinforcement..........	16,000 lb.
Tensile stress in cold drawn steel wire used as column hooping...........................	20,000 lb.

In continuous beams the extreme fiber stress on concrete in compression may be increased 15 per cent. adjacent to supports.

27.—Axial compression in columns without hoops, bands or spirals, and with not less than one-half nor more than 4 per cent. of vertical reinforcement secured against lateral displacement by steel ties placed not farther apart than 15 diameters of the rods nor more than 12 in., shall not exceed 500 lb. per sq. in. on the concrete nor 6,000 lb. per sq. in. on the vertical reinforcement.

28. Axial compression in columns with not less than one per cent. of hoops or spirals spaced not farther apart than one-sixth of the diameter of enclosed column and in no case more than 3 in., and with not less than one nor more than four per cent. of vertical reinforcement, shall not exceed 725 lb. per sq. in. on the concrete within the hoops or spirals nor 3,700 lb. per sq. in. on the vertical reinforcement.

29.—Axial compression in structural steel columns thoroughly encased in concrete having a minimum thickness of four and reinforced with not less than one per cent. of hoops or spirals spaced not more than 12 in. apart may be taken at 16,000 lb. per sq. in. on the net section of the structural steel, no allowance being made for the concrete casing. The hoops or spirals of the concrete casing shall be placed not nearer than 1 in. from the structural steel or the outer surface of the concrete. The ratio of length to least radius of gyration of the structural steel section shall not exceed 120.

30.—In reinforced concrete columns the compression on the concrete may be increased 20 per cent. when the fine and coarse aggregates are carefully selected and the proportion of cement to total aggregate is increased to one part of cement to not more than four and one-half parts of aggregate, fine and coarse, either in proportion of 1 part of cement, 1½ parts of sand and 3 parts of stone or gravel, or in such proportion as will secure the maximum density.

31.—The vertical steel bars in reinforced concrete columns shall bear squarely on steel plates or casting bedded on top of the footing.

32.—Bending stresses due to eccentric loads shall be provided for by increasing the section of concrete or steel until the maximum stress shall not exceed the allowable working stress.

33.—Whenever it is necessary to splice bars, the connections between them shall be of sufficient strength to carry the stress.

34.—In columns, the splicing of longitudinals, having an area less than 1¼ sq. in., may be done by lapping, the lapped bars to be wired securely to each other. Longitudinals having areas in excess of 1¼ sq. in. shall be spliced by butting the bars squarely one over the other and tying the same securely together by some mechanical means that will not utilize the adhesive strength of the concrete. All such splices shall be made above floor levels but not more than 12 in. above the same.

35.—In columns the ratio of length to least side or diameter shall not exceed 15, but in no case shall the least side or diameter be less than 12 in.

36.—The concrete members of floor construction in which hollow tiles, concrete blocks or other fillers are used, in combination with reinforced concrete, shall be designed in accordance with these regulations, except that the slab portion cast on top of the fillers may have a minimum thickness of 2½ in. provided the fillers do not exceed 60 per cent. of the construction.

37.—Exterior and interior bearing and enclosure walls of reinforced concrete supporting floor and roof loads shall be securely anchored at all floors, and of such thickness that the compressive stress shall not exceed 250 lb. per sq. in. but in no case less than 8 in. The thickness shall not be less than 1/20 of the unsupported height. Steel reinforcement shall be placed near both faces of the wall, running both horizontally and vertically and weighing not less than ½-lb. per sq. ft. of wall.

38.—Footings for walls and columns may be constructed of reinforced concrete provided the working stresses for concrete and steel are not exceeded and the steel is protected by at least 4 in. of concrete.

39.—The steel reinforcement in columns and girders shall be protected by a minimum of 2 in. of concrete; in beams and walls by a minimum of 1½ in., and in floor slabs by a minimum of 1 in. of concrete.

40.—The contractor may be required to make load tests on any portion of a reinforced concrete structure within the reasonable time after erection. The tests shall be made under the direction of the superintendent of buildings, and shall show that the construction will sustain safely a load of twice the live load for which it was designed.

41.—These regulations do not apply to any construction for which provision is otherwise made in the building code.

Douglas Fir as a Building Material

Some of the Uses to Which It Is Adapted in House Construction

THE properties and uses of Douglas fir are interestingly set forth in Bulletin 88, which has just been issued by the Forest Service of the United States Department of Agriculture. The exhaustive series of tests presented were made in the laboratories of the Forest Service, and the results are of special interest to the users of structural timber. The facts presented in regard to the commercial uses of the timber have been gathered from lumber manufacturers and other industrial concerns that use Douglas fir, which, in passing, it may be stated, is regarded as the most important of American woods. It is manufactured into almost every form known to the sawmill operator, and much round or hewn timber is used which never passes through a sawmill.

For house construction Douglas fir is manufactured in all forms of dimension stock, its strength and comparative lightness fitting it for joists, floor beams, rafters and other timbers which must carry loads. The comparative hardness of the wood fits it for flooring, and Douglas fir edge-grain floor is often considered superior to that made from any other American soft wood, it being used on the Pacific Coast to the exclusion of nearly all others. Fir comes in direct competition with Sitka spruce and Western red cedar in the manufacture of beveled siding, and it generally yields place to them where they are conveniently had.

In the Northwest, where the merits of Douglas fir are best known, the wood has recently gained an important place for finish. Clear lumber, sawed flat grain, shows pleasing figures, and the contrast between the spring and summer wood has been considered as attractive as the grain of quarter-sawed oak. It takes stain well, and by staining the beauty of the grain may be more strongly brought out and a number of costly woods can be successfully imitated. Its chief use is for door and window casing, base boards, panel work, &c.

The best grades of "yellow fir" lumber are used for sash and door work, and for this purpose it competes in the Northwest with spruce and Western red cedar.

Douglas fir is also made into rotary-cut veneer, which goes chiefly into the manufacture of door panels. The logs intended for veneer are steamed about three days to soften the wood and make it easier to cut.

A list of the forms and uses to which Douglas fir is adapted would represent many industries and would include mine timbers, bridge and trestle timbers, railway ties, timbers for car construction, material for the furniture maker and boat builder, special products for tanks, boxes, pulpwood, fuel and a long line of miscellaneous commodities, including wood for distillation.

Rustic Carpentry and Joinery

Constructing Window Flower Boxes, Furniture, Settees, Etc., and Tools Required for the Work

By Owen B. Maginnis.

So many unusual and interesting items come within the province of the carpenter in his every-day practice that it is to be regretted more of them are not recorded and made a matter of reference, and it is to be sincerely hoped that the suggestions which follow may be only the beginning of what will prove valuable contributions to the subject of rustic carpentry and joinery from other readers who have had practical experience along the lines indicated. Nowhere have I seen anything published on the methods of properly putting together circular or elliptical timbers, so in this article will be presented some elements of this class of mechanical practice.

At the outset it may be asserted by some that it is of a nature to be rarely executed and may perhaps never come within the scope of a carpenter's or builder's requirements, but in refutation of this I would draw attention to the growing popularity and recent erection of multitudes of bungalows or cozy cottages in all parts of the country, numerous examples of

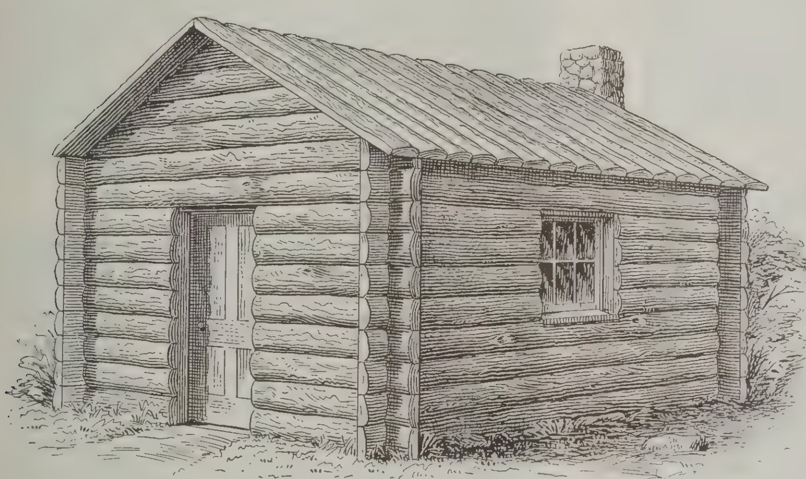


Fig. 1.—A Small Slab or Half-Log Cabin

Rustic Carpentry and Joinery

which have been illustrated in the columns of this journal, built wholely of logs or tree timbers, so that a knowledge of the manner in which the pieces are put together cannot fail to prove useful. In the natural tree the horizontal section is never circular nor square. It usually varies from an irregular circular to an elliptical form according to the natures of the woods, so that in this class of carpentry and joinery we must consider their specific sections as modifications of these geometrical forms.

Take, for example, the construction of a small slab or half-log cabin such as that illustrated in Fig. 1 and built ostensibly of trees sawn vertically in half through their axis or the pith. How should it be built? The task is not difficult when one knows how, but as seen, the slabs must average a near size of diameter of trees and must be sawn with square, straight edges, say of 1½ in. width as represented in Fig. 2. It is not essential that all the trees be of the same width provided each tier is uniform, but their irregularity however will produce a handsome design if the work is properly executed and an average degree of judgment and taste used in the disposition of the slabs of which the cabin is constructed.

When all the timbers have been sawn to parallel

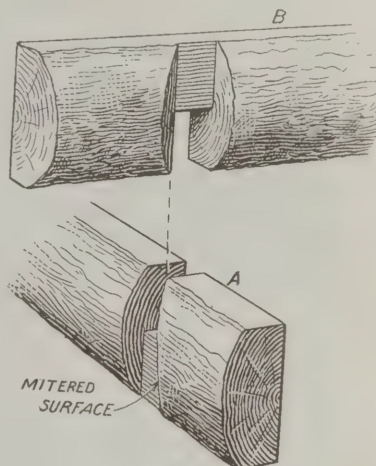


Fig. 2.—Showing How the Slabs Are Joined at the Corners

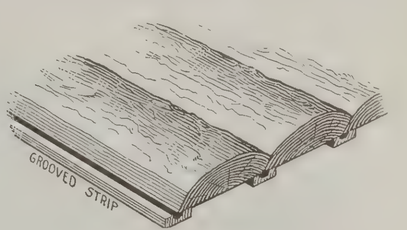


Fig. 3.—Arrangement of Roof Slabs with Grooved Strips Under the Joints

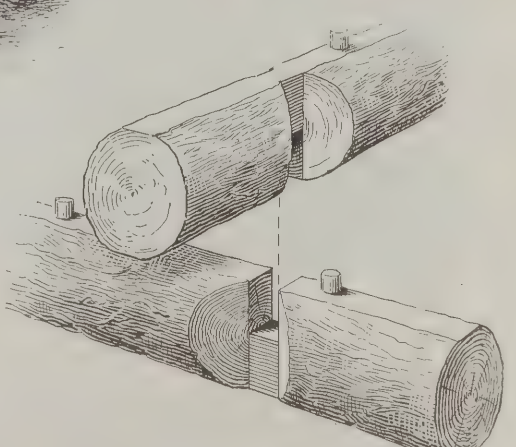


Fig. 4.—Method of Framing Whole Logs Together by Halving

widths, the corners must be halved and mitered together after the manner indicated in Fig. 2 of the sketches. This can be readily done by halving the top edge of the piece marked "A" half way down the width of the slab and mitering it for the curved surface of the log similarly with the bottom edge of "B." The miters may be laid out with 45-deg. bevels from the inside flat surfaces but these will only be approximate on account of the irregularity of the curved outer surfaces, hence the necessity for obtaining for each tier as nearly as possible the same diameter of horizontal section.

Again if the wood has the bark on, it must not be marred but preserved. The judicious use of good, keen, well set saws and broad chisels combined with taste and tact will render this job comparatively easy to any carpenter of skill even though unaccustomed to it.

The joints are stripped to make them air and weathertight, as are likewise the roof slabs as indicated in Fig. 3 of the sketches and which for drainage purposes have the strips grooved or guttered to carry off the snow or rain water which otherwise would be likely to percolate through the joints.

A careful study of Fig. 4 will clearly indicate the methods of halving and mitering full-log or tree timbers when it is desired to maintain the rustic character complish with entire satisfaction the end sought.

For small work few tools are necessary and, apart from the broad axe or large cross-cut saw used in separating the branches from the trunks, no fine tools are needed. A work bench and good sharp rip saw, fine and coarse toothed hand cross cut saw, a compass saw, a hand plane, a ½-in. and a 1½-in. chisel with handles sufficiently strong to withstand the necessary pounding or hammering; brace and set of bits, an oil stone, files, spoke-shave, nail-set, chalk line, steel and hand squares, straight-edge with of course a 2-ft. rule are all that will be required outside of the usual hammer and hand or shingling hatchet.

White or red cedar is for obvious reasons the best wood for this kind of work if it be available. It is lasting, offsets and repells insect life, has a pungent, agreeable odor and in addition to giving workable timber nature has also given it the most delicate curvature in its branches. It comes short and curved in these, but straight and long in the trunks. If it be not available then cherry, ash, cypress, butternut, maple or sycamore will do, although the latter is likely to warp

Fig. 5.—Various Styles of Window Flower Boxes

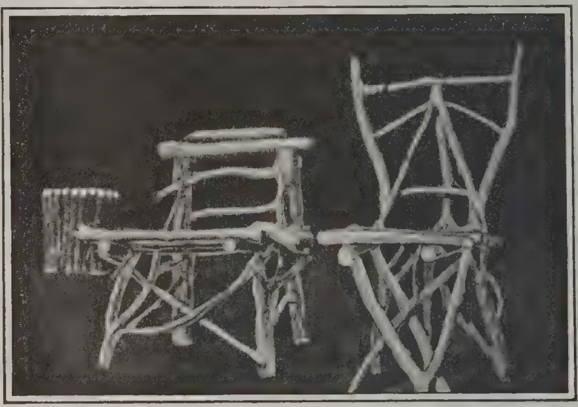


Fig. 6.—Two Examples of Rustic Chairs

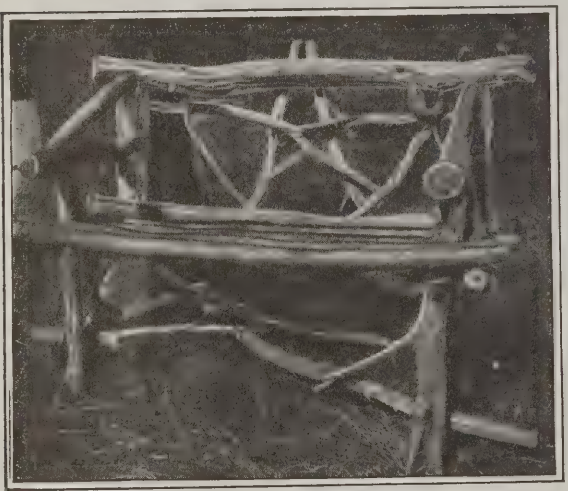


Fig. 7.—Rustic Settee for the Lawn, Garden or Park

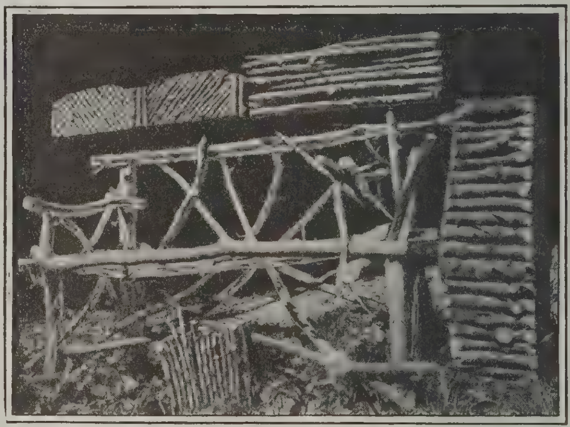


Fig. 8.—Rustic Settee Built of Wood of Lesser Quality Than That in the Previous Figure

Rustic Carpentry and Joinery—Various Examples of Rustic Work

in-doors. A similar mechanical operation is performed at each end of each piece at each corner and the joints may be held together by long 2-in. or 3-in. hardwood dowels fitted tightly into holes bored about 16 or 24 in. apart on the jointed edges. With this lateral preventative and the gravity of weight of the trees themselves the slabs or logs will never move, but all the same the corner joints and halves should be fitted snugly.

As it is perhaps in its joinery value that this art will be found most useful, we will here take up the matter of constructing useful articles such as window flower boxes, flower pots, pieces of furniture, etc., and show how one must proceed in order to ac- and twist. Boughs, branches and twigs are better sawn than hewn apart, as this gives more effective and ornamental knots which with the economy of the timber will justify judicious cutting.

Except for bridges, locust is too hard in texture and difficult to obtain; maple and oak are the same and rough in bark, so the softer woods are preferable under the circumstances. All woods, however, should be weather seasoned and dry. It is preferable to use wire brads in nailing the parts together and these should be greased to prevent rustling while at the same time giving ease in driving.

Commencing with the making of the window flower box shown in Fig. 5 the reader will observe that at the left each is simply an oblong open box with bottom, sides and ends made of ⅞-in. spruce or pine wood nailed together and lagged and coated or sheathed with ⅝-in. or ⅞-in. natural tree branches cut to straight lengths, jointed neatly to close joints and nailed on. This facing may be either set plumb or diagonal on a miter of 45 deg. by cutting the ends of the pieces in an ordinary miter box, or they may be as shown on the top box—reversed half the length of the box—or have the corners accentuated by nailing on thicker pieces of 1½ in. and mitering between. The rustic work should project ½ in. beyond the edges to conceal the flat wood which is first painted to suit the color of the bark or skin of the tree.

To mark the rusticity, the exercise of a little artistic taste will be found to add much to the appearance of the design. For instance colors should be varied, knots, cal joints should radiate as closely as possible to the center of the base. The top ends can be sawn off after the staves are all set and nailed and it is a good scheme to notch the latter to fit the bottom to strengthen the entire construction. Six or eight-sided flower pots and boxes may be similarly built also of square form or plan. The two first named are however the more graceful. All boxes and pots can be stripped with 1 or 2 in. bark or bent boughs at the margins of say 1 or 2 in. from the top or bottom edges or ends, thus increasing the decorative effects. The stripping may either be done diagonally or horizontally as desired.

Coming now to the construction of lawn or garden chairs we find it very interesting and useful work. Observe those in Fig. 6 which are comparatively simple examples. To build any like these the backs may be put together first by sawing the legs from 2 ft. 6 in. to 3 ft. long and bracing diagonally. Occurring branches

Fig. 9.—Rustic Bridge Constructed of Locust Tree

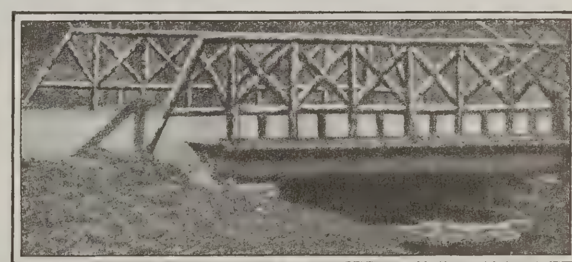


Fig. 10.—Rustic Bridge of Cedar with Diagonal Bracing

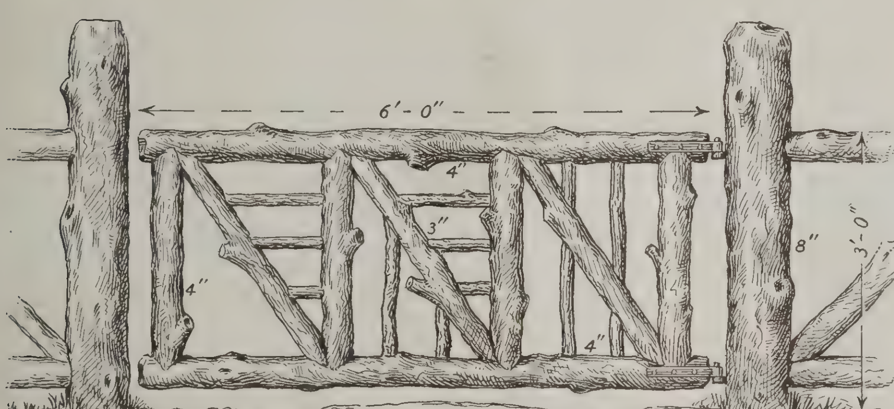


Fig. 11.—Rustic Gate for Fence About a Bungalow or Cottage

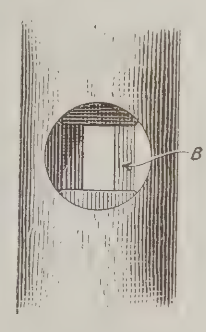


Fig. 12.—Front Post Prepared for Receiving the Rail or Tie

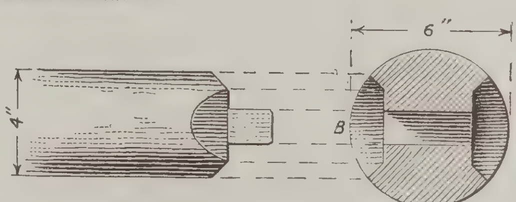


Fig. 13.—Horizontal Section of Joint as Mitered

Rustic Carpentry and Joinery—Examples of Rustic Bridges and Details of Construction

wens and cup shakes should be staggered and scattered; and the grains distributed and assorted, in such a way as to balance and emphasize the effect. Too much mechanical accuracy is not well, provided the construction be strong and staple, and the carpenter's own judgment should be the best guide.

"Side" or blind nailing is best and the ends should be chamfered or trimmed off with chisels before varnish is applied, although cedar wood, with its old golden tinge or hue, is better left unfinished; likewise with rough barks.

There is also shown in Fig. 5 a large flower pot constructed of cherry tree on a ⅞-in. circular oak base 12 in. in diameter, its depth being 14 in. inside. The bottom is kept up 1 in. from the lower ends of the staves or lagging pieces to conceal it from view and give stability to the pot. These joints are fitted with the hand hatchet. The staves average 2 in. in diameter and are nailed joint to joint vertically and at bottom horizontally so as to conceal all the heads. As the pot flares from the bottom to the top each stave must be ¼ in. narrower at least at the bottom end and all verti-

may be used to tie the two legs together without sawing them off but they must balance in order to have the work satisfactory. The natural forks which constitute the front legs are distinctly shown with their necessary diagonal bracing and the seat lagging which averages round stuff about 1½ in. in diameter. The rear legs of the seat to the left are 2½ in. in diameter and those of the seat to the right are 1½ in. Both are of cedar and simple to build. The seats are 21 in. wide and lagged parallel to the back, the slats being about 1 in. apart.

The next example which we shall consider is illustrated in Fig. 7. Here the readers will observe a garden, lawn or park settee which was built by the writer of red cedar wood and it fully exemplifies how the adaptation of the natural forks of the branches enters into the structural value of the completed piece of work. The front legs and braces are Y-forks which also constitute supports for the end arms. Similarly with the ornamental bracing of the back and the four legs which cross and interlace in diagonal and triangular directions, thus acting as ties for all the right or square angles. This piece of furniture measures 3 ft. 6 in. in the clear of the length between the arms; is 18 in. high to the top of the seat and 36 in. to the top rail of the back.

In Fig. 8 is presented another example of settee built of wood of a lesser quality than that already described although involving the same principle of construction. In this connection it may be stated that the lagging or slats of chairs, seats or settees may be laid square to the backs or diagonal as shown on the window box just above the settee.

Swinging rustic piazza benches are likewise built thus but without the legs.

The application of this method of construction to bridges, gateways and fences depends as in the foregoing upon the diagonal system of bracing combined with accurate carpentry and joinery, which is in bearing structures of paramount importance. In Fig. 9 is an excellent example of a bridge built of locust tree showing the artistic effects which may be produced by the use of this wood, especially by reason of the unusual curvative of some of the pieces. This bridge measures 12 ft. in span and 8 ft. in width in the clear of the guard rails. The wood is almost everlasting in its constituency and the pieces are framed and nailed in the manner clearly indicated in the picture. The bearing timbers are heavy pieces 8 in. and 12 in. in diameter, hewn to a nearly square section with rounded edges. It will be noticed that the coping and fitting are poorly executed and in the actual work the presence of bent nails and open joints indicates that it was done by mechanics inefficient in this class of carpentry. The design, however, is artistically good and well worthy of a place in the discussion of rustic work.

In contrast with this, notice the neat workmanlike execution of the cedar rustic bridge with diagonal fencing timbers shown in Fig. 10. This example shows how the rustic work can be applied as fences or for gates. For small cottages and bungalows a fence with gate similar to that shown in Fig. 11 is appropriate. Any one handy with tools should be able to build this in his back yard.

This form of construction has been utilized on a large scale not only for band stands, rustic out-door arbors, auditoriums, shelters, etc., but also for theaters in public parks and for places of assemblage, especially in wooded localities where its adaptability and suitability to the surroundings make it most appropriate. Here, not alone is the timber available, but when the whole structure is rustically completed it lends itself naturally to the situation to form as it were a part of it. The lightness of open framing obviates the necessity for any heavy stone or concrete foundations or footings as on good clay, usual in wooded land, crib or grillage footings of locust or chestnut logs in two or three layers will be found sufficient for the purpose. I call to mind an open-air theater built in the heart of the Maine woods out of fallen tree timbers which is both artistic and useful either for an amusement place or for public functions. It is cool and shaded in hot weather and delightfully sylvan in its character. It seems unwise to build to growing trees, even to those of slow growth, as structures become awry and distorted, though it has been done. It is, however, much better to build clear around them.

Although one might call the bamboo houses of our Philippine colonies "rustic," still they can scarcely be said to come under this caption. Suffice it to say that work of this character is of beauty and utility and to the student of building construction it is interesting and can be made profitable if so executed as to be attractive to those who are weary of the stereotype forms so generally turned out by machinery. An interesting example of a rustic arbor is found at the entrance to Central Park in New York City at 72d Street and Eight Avenue. The construction is of locust and constitutes a shaded bower or resting place for those who care to tarry awhile.

In order to explain the practical carpentry of the cope and miter I would ask the reader to consider Fig. 12 which represents the front view of the post or upright as prepared for receiving the rail or tie. Comparing this sketch with Fig. 13 we find the circular incision "B" in both cases to be a miter of four sides mortised and tenoned. The mortise goes entirely through the upright and the tenons enter from both sides and are toe nailed. Fig. 14, which represents a vertical section of miter curved work, gives a clearer idea of the joint, but it is not so strong constructively as that shown in Fig. 15 where the joint is coped. These two joints with that of the oblique example, Fig. 16, constitute the joint-principle necessary in this work, but the fitting must be accurately done to obtain perfect strength.

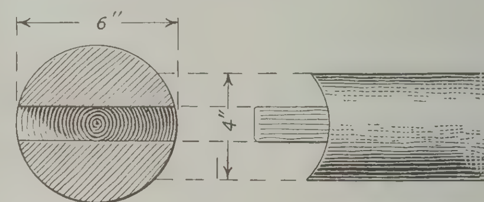


Fig. 15.—A Coped Joint or Arm

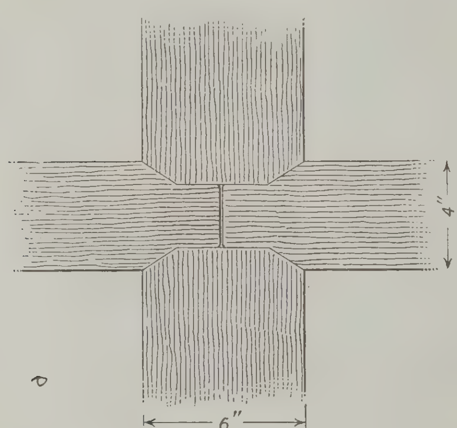


Fig. 14.—Vertical Section of Mitered Curved Wood

Fig. 16.—An Oblique Intersection

Rustic Carpentry and Joinery—Some Details of Construction

The mortising and tenoning are not essential in small details, as furniture and fittings, but in building bridges and fences or in connection with any detail subject to jar, strain or stress they are essential to maintain the construction apart from nailing; in other words, they should be framed by carpenters.

Should the structural pieces be curved to elliptic, parabolic or hyperbolic outlines then the mechanic's own judgment must be his best guide as no system of geometrical lines will be of assistance to him. This is well exemplified in the case of the bridge shown in Fig. 9.

In the way of general remarks it may be stated that the wood must be durable and well seasoned, also free from rot or decay. Cedar is not liable to be attacked by insects but in it as in cherry the carpenter will perhaps find sometimes evidence of the teredo or boring worm. This destructive agent seems to germinate in the pith or center of the trunk or branch and bore lengthwise at times to the bark surface. Their action and presence may be detected by small holes. They honeycomb the wood and of course impair its strength. Decayed branches should never be used and the soundness of the wood may readily be determined by striking it with a hammer. Its soundness will be indicated by the clear ringing reverberation. Thin cedar or any hardwood should be bored for nails especially toward the ends, as they will split if this is not done. All nails ought to be greased as this will greatly reduce the labor of driving them and the liability of their bending under impact of the blows of the hammer. At the same time the coating prevents early corrosion.

All structural parts must be of sufficient thickness to withstand the strain likely to be put upon them, as for example in chairs and settees the uprights or bearing pieces must be strong enough not to bend. The braces must be sufficiently rigid to prevent springing and all must be so placed and nailed as to constitute a solid construction. On account of handling and moving the work must not be fragile. All projecting thorns, sharp knots and other parts liable to injure the clothing or person must be hewn or sawn off. The lagging slats or the lattice of seats should be slightly hollow to render them comfortable. The backs should be slightly pitched with the top rails of a height to cross the shoulders of a person of average stature. Seats average 16 to 18 in. in height and tables 2 ft. 8 in. to the tops. Finally the workmanship should be clean and so executed as to show as little as possible of the mechancial means necessary to complete it. Like a good picture it should look, as an architect once expressed it, as if it had "grown together" which constitutes, as far as nature can devise, "perfect skill."

Metal Roofing as an Insurance Policy

Coincident with the bumper cotton crop is a growing demand for metal roofing. The protective feature of the metal roof is becoming more manifest to those who own their own homes. The wide-awake farmer or landlord of to-day appreciates that metal roofs are a good sort of insurance policy against fire and other minor troubles with which all who live under shingle roofs are conversant. Rates for insurance are lower, too, on metal-covered dwellings.

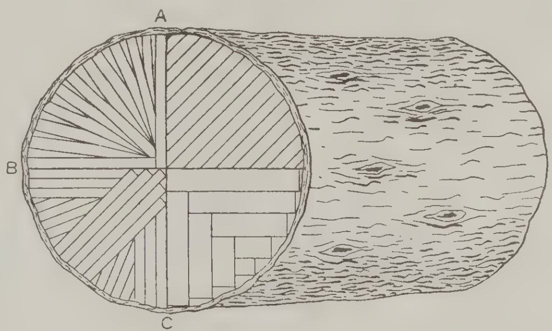
A good metal roof is recognized as leak-proof, windproof, rust-proof and last but by no means least, fireproof. Those having metal roofs, metal shingles or metal siding on their homes or barns, and whose abode is miles from the nearest fire-fighting apparatus, feel secure to know they are at least better protected from that source of alarm which gives more trouble in the country than any other, destructive fires, than they would be if they had not protected themselves by using metal, where they have heretofore used wood.

Throughout the Southern States, statistics show that about 42 per cent. of the fires start in the roof, which is a strong argument for the use of the metal shingle. During the past ten years, many metal workers throughout that section of the country have been kept busy replacing the old wooden shingle with the modern metal type, and it is felt that there is good business ahead for the sheet-metal roofer who is sufficiently energetic to place before his customers the merits of metal roofing as a fire-protective material.

Quarter Sawing Timber

Occasionally some reader desires to know about quarter sawed lumber and evinces an interest in learning of the ways in which different kinds of sawing are produced. With a view to throwing some light upon the question we present a sketch and comments furnished by a correspondent in a recent issue of the *Wood-Worker* and showing one method of quarter sawing logs which appears to have given great satisfaction. In his comments the correspondent says:

If the saw is large enough to reach through the log, saw first line down center of log, leaving enough timber at back end to gig back outside half, dropping it on log deck; then turn remaining half flat face to



Showing How Timber Is Quarter Sawed

headblocks and saw second line down center, leaving enough timber at end to gig back outside quarter, dropping same on log deck, leaving last quarter on the carriage, which is ready to be cut up into lumber by one of the four methods shown in the accompanying sketch.

The method shown between *A* and *B* gets best results if full-faced grain is wanted, but the waste is greater. The method shown between *B* and *C* is next best. If the log is too large for the saw, run the first line down center of log, gig back and quarter-cant the log from you, and saw second line down center, taking out a quarter of the log. Get second quarter in same manner.

Regulate Size of Brick

Something less than a century ago there was a tax on building brick in England, and in order to evade it the brick were made of larger and larger sizes. These were used for cellars and other concealed places. To stop this fraud, says *Brick*, an act was passed in the reign of George III fixing the legal size of brick. Early in Queen Victoria's reign the tax was taken off, and brick may now be legally made of any size whatever, but any change from the standard size would bring about great inconvenience. All calculations for building are made on this standard size, and the London building acts have practically fixed it at 9 by 4½ by 3 in. for all aime.

The Building Age

Formerly Carpentry and Building

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Index to reading matter, page 106.

FEBRUARY, 1912

The Equitable Building Fire

The recent destruction by fire of the well-known Equitable Building in this city, and the distressing casualties incident thereto, carries with it lessons which must forcibly impress themselves upon the attention of those having the safety and welfare of the city in their keeping. The building was erected many years ago with exterior walls of massive masonry and in its day was regarded as about the nearest approach to "fireproof" construction of anything then extant, there being nothing burnable save the flooring and trim, and much of this was of stone and marble. How far this form of construction has been able to withstand the ravages of fire is seen in the entire destruction of the interior of the building with its tangle of twisted and distorted iron beams and its massive walls, tottering and ready to fall, as a result of the intense heat. The location of the building was such as to place in jeopardy millions upon millions of property and it was only by the most energetic efforts that the flames were prevented from reaching the skyscrapers which surround the Equitable Building on all four sides. In order to prevent the spread of fire beyond the building in which it may originate, it has been recommended that all space on a floor of 5000 square feet or more in loft and factory buildings be divided by horizontal 8-in. brick walls or 6-in. terra cotta block, 40 per cent. of which may be of polished wire glass and with swinging doors to admit of the escape of the occupants from one part of the floor to another; that all fire escapes shall be of what is known as the tower type—that is, the tower be independent from the building and shut off by smoke-proof doors, the entrance in this type of fire escape being only through doors reached by balconies and not directly from the building where a fire may be raging; that the stairways be increased in width in accordance with the hight of the building, and that in the case of structures used for manufacturing purposes automatic sprinklers be installed. Still another and quite as important lesson to be derived from the conflagration in question is that heavy fireproof roofs in connection with large buildings should be abolished. In the opinion of Fire Chief John Kenlon the fireproof roof of slate and metal is in itself a menace, as it is especially liable to crash through the building, carrying floor after floor with it to the ground. It was in fact the heavy roof of the Equitable Building that did serious damage by carrying down the several floors and which resulted in the death of Chief Walsh. The Equitable fire has also been the means of bringing prominently to the front the question of limiting the hight of buildings in congested districts and the conflagration in question has developed a strong argument in its favor, as much of the work of the firemen in extinguishing the blaze had to be done from the windows of buildings facing the burning square.

The Coming Cement Shows

By the time this issue of the paper reaches the majority of our readers the doors of the Madison Square Garden will have just been opened for the Second Annual Cement Show to be held in this city. Primarily the show is held for the general good of the concrete industries, which are many and varied. The idea is to interest people in concrete and to increase the use of it in every form of construction. Wherever a new building is constructed of concrete there is a market made for the manufacturer of cement, of concrete mixers, of sand, of gravel, of steel reinforcement, of hoisting apparatus, buckets, wheelbarrows, etc., etc. The function of the show is to promote business, and the constant development of the concrete industries year after year may be considered as evidence that the agencies which are operating to promote the advancement of concrete are doing a good work.

The architect, the builder, the contractor or the engineer who is desirous of studying the latest improvements in machinery and contractors' equipment, in systems and methods, or in building supplies of any kind, cannot fail to absorb valuable information relative to these matters by carefully inspecting the things which will be on exhibition at the Cement Show. The visitor will be benefited by the exchange of ideas and experience with others in his line of business, and at the same time he will gain inspiration from meeting old acquaintances and making new ones. No doubt architects and builders will be especially interested in the representative collection of designs and drawings showing that which is best in concrete design in office buildings, factories and homes, as this feature was considered one of the most valuable at the Chicago exhibition last year. A special appeal is made this year to building supply dealers, as well as those handling lumber, lime, cement and building appliances required in modern reinforced concrete construction.

The New York Cement Show will be held in Madison Square Garden, January 29 to February 3; the Chicago show in the Coliseum, February 21 to February 28, and the Kansas City show in Convention Hall, March 14 to 21.

Licensing of Builders

In his annual report covering operations during the year 1911 John Thatcher, Superintendent of the Bureau of Buildings for the Borough of Brooklyn, N. Y., presents some pertinent suggestions touching the licensing of builders. He says:

It has been my constant endeavor to bring about better workmanship and the use of good and safe materials in the construction of what are termed "speculation" buildings. The major portion of all building in this borough come under this head. I would call attention, at this time, to the changed conditions existing in the building trade. In times past it was considered necessary that a builder should have a thorough knowledge of construction; commencing with an apprenticeship to the trade, and then followed by some years of experience as a journeyman, finally becoming a master builder, capable and able, of his own knowledge and skill, to put up buildings properly.

A positive danger exists here to-day in that a large number of buildings are being put up by men who know absolutely nothing about building construction, and whose sole purpose and aim is to make money by the use of the cheapest material and labor in the market. This results in buildings that will always be unprofitable to the purchaser, as the cost for maintenance will be sure to exceed any possible returns on the investment. This condition, in a large measure, could be prevented if a consistent law were enacted, requiring builders to pass an examination as to their fitness, and if fit, to be given a *license* before being allowed to build. This will have to be done very soon, as present conditions are dangerous and a positive menace to the public. The Bureau of Buildings can only hope, by constant vigilance, to secure present safety of this class of buildings. The quality of workmanship is largely beyond control.

Concrete Costs

Ever since concrete began to be extensively used in building construction of all kinds the question of costs has been one of never-ending interest. There have been so many features to be determined and so varying have been the conditions under which work was executed that difficulty has been experienced in reaching definite results which could be regarded as a perfectly safe guide in the execution of work of a somewhat similar nature. It is probably not generally known that for a considerable number of years Sanford E. Thompson in conjunction with Frederick W. Taylor has been quietly but very exhaustively studying the individual elements of construction operations with a view to establishing an accurate basis for the determination of costs in work involving largely the use of concrete. He has made thousands of actual observations and computed therefrom tables and diagrams showing costs for both unit operations and complete processes in the construction of concrete work. These results are soon to be presented to the building public in a volume entitled "Concrete Costs" and through an arrangement with the authors we are enabled to present in current issues of the *Building Age* some interesting extracts from advance pages dealing with the "forms" used with reinforced concrete construction in connection with which the question of costs is variously considered.

Meeting of Buffalo Builders' Exchange

The Builders' Association Exchange of Buffalo held its forty-sixth annual election January 9 and chose the following officers: Henry M. Feist, president; George W. Morris, vice-president; Avery C. Wolfe, treasurer.

Trustees for a term of three years each were chosen, consisting of John H. Black, George T. M. Tilden and James H. Ross.

The exchange, which was organized in 1860, had two classes of members up to the time of this election—corporate, comprised exclusively of builders, and noncorporate, comprised of material and supply men, without voting privilege. At this meeting both classes were made active members, the sentiment being that in matters of strikes, wages and other labor situations, etc., coming before the association for action the material and supply men were equally interested with the builders and should be upon the same footing as to voting power. The Builders' Association Exchange now has about 200 members.

"Building Age" at the Cement Show

Our many friends residing within convenient distance of New York City will be interested in knowing that the *Building Age* will have an exhibit of new and standard books relating to all phases of building construction which they are cordially invited to inspect while visiting the Cement Show in Madison Square Garden, which opens on January 29.

The booth, which has been arranged with a great deal of care and with a view to presenting a most attractive appearance, will be found in the balcony to the left of the main entrance.

Fire Losses in the United States

The losses by fire in the United States and Canada during the month of November, as compiled from records kept by the New York *Journal of Commerce*, aggregate $18,680,600, as compared with $16,407,000 in November last year and $14,808,550 for November, 1909. The fires last month were unusually heavy in all sections of the country, and no special class of business was prominent in the record. The fire losses for the first eleven months of 1911 reach a total of $211,614,400, as compared with $212,942,650 for the first eleven months of 1910.

The well-read, skilled wood-worker is now being called for as a teacher in industrial schools. Just another instance showing that it pays to read as well as work.

CORRESPONDENCE

A Department Where Those Interested Can Discuss Practical Trade Topics -- All Are Invited to Participate

Remodeling an Old Frame House

From Hee H. See, Oroville, Cal.—I noticed the query of "E. C. W.," Whiting, Vt., under the above heading in a late issue of the paper and having had some experience in work of the nature referred to, I would be glad to help him out if I was a little more certain of just exactly what he requires.

If the Editor will permit, I would like to point out that in all probability many correspondents fail to receive replies to their queries simply because they do not supply enough of the necessary details and specific information to enable the readers to intelligently consider them. Take, for example, the query under discussion; a job of this kind is quite a little problem even when one is on the ground and knows all of the circumstances. Naturally, then, it must be more of a problem to supply help from a distance when only a few of the details are known. I will, however, try to answer the questions of "E. C. W.," taking them in the order in which they were presented in his communication.

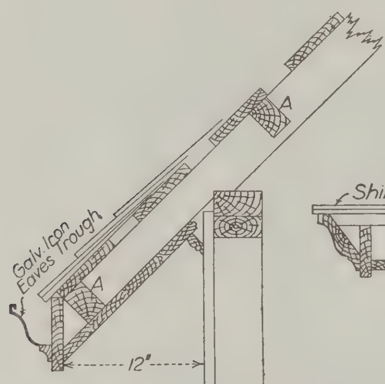


Fig. 1—Rafters Project Sufficient Distance to Support Cornice

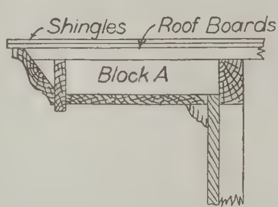


Fig. 2—Finish of Gable Cornice

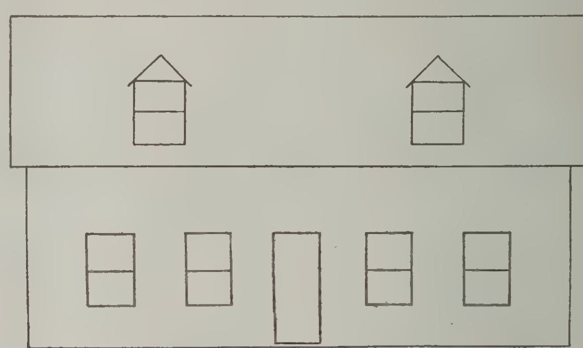


Fig. 3—Cutting Plate Can Be Avoided by Placing Windows Where Shown

Remodeling an Old Frame House—By "Hee H. See"

First, as to the suggestions concerning the proportions of a cornice of a building for the size stated. I remember reading years ago of a method of proportioning cornices to the hight of the building—a building so many feet in hight requiring so many inches projection of cornice and so on. I hardly think the rule is in general use and am quite sure it is not in this part of the country, for here many of our lowest buildings have the widest cornices.

Personally I would not think of putting an extra wide cornice on the building mentioned by "E. C. W." —not more than 12 in. from the wall to the facia and perhaps less than that—because the cornice is to be carried over the upper windows and, if made very wide and heavy, will give them a clumsy appearance. I would advise "E. C. W." to take note of the buildings around him and see if one among them does not carry just about the size and shape of cornice he desires.

"What support should the cornice have other than the roof boards?"

Along the front and rear of the building the rafters should be left projecting a sufficient distance to support the cornice as indicated in Fig. 1 of the sketches presented herewith; but as the correspondent says the present building has no cornice it will probably be necessary to spike false rafter ends on to the side of the old rafters, cutting their outer ends to the proper bevel and allowing them to project the correct distance. They should extend up the roof alongside the old rafters as far as they project over the plate or a little farther and should be firmly fastened in place. place.

For supporting the cornice that runs up the gables of the main roof, it will first be necessary to cut the roof boards back to the second rafter from the end of the building—always supposing of course that there is a rafter directly over the gable wall—and then fill out again with roof boards that will project the necessary distance. Blocks should then be nailed to the end rafter under the roof boards as shown at A-A in Fig. 1 where the blocks are viewed in end elevation. The width of these blocks is the same as the rafter ends; they are as long as the cornice is wide and they serve to uphold the plancier and faci of the cornice. If they are well fitted and nailed both to the gable rafter and to the roof boards nothing more is required to support a cornice of this width. For wider cornices these blocks are sometimes cut right through the end rafter and are fastened to the second rafter so that they will support the cornice, cantilever fashion. Still another scheme for these wide gable cornices is to support them on heavy wooden brackets; or where purlins are used they are sometimes left projecting over the end of the building and the cornice is carried on them.

The finish of the cornice where it runs up the gables is clearly indicated in Fig. 2 of the sketches. The molding used has the same outline as the galvanized iron gutter and can of course be used on the level cornice also if the gutter is not desired. Where the cornice runs up and over the windows the blocks are used the same as for the gable ends, but the roof boards are of course left projecting far enough when they are put on so that it is not necessary to piece them out afterwards.

"Will the cutting of the plate weaken the structure so much as to make the scheme impracticable?"

My opinion is that "E. C. W." is in the best position to decide this point. It may weaken it some, but it should be quite possible to strengthen the building at some nearby point so as to make up for this. A cross section of the present building showing the second floor joists and the collar ties of the roof would have helped greatly to decide this point. I should say the scheme as outlined is practicable, but of course "E. C. W." is aware that he can avoid cutting the plate by setting his windows over it as I have indicated in the outline sketch, Fig. 3.

While writing the foregoing I remembered seeing something pertaining to cornice construction some time since in the columns of the *Building Age,* and looking through my files I found an article by J. Gordon Dempsey entitled "Details of Wooden Cornice Construction," published in the issue for May, 1910. If "E. C. W." has or can procure this number of the paper he may find something in it of use to him.

Lettering on Drawings

From E. H. Bentzel, Instructor in Drafting, Hampton Institute, Va.—In reply to the request of "W. H. M.," Clebourne, Tex., which appeared in the January issue of the *Building Age,* asking for models of letters to be used on drawings, I am sending the inclosed samples, Fig. 1, which I trust will prove of interest to the correspondent making the inquiry.

Explanatory notes very often have to be crowded into a small space so that a plain and easily made style of printing should be used.

Titles of drawings can be printed quickly and neatly by using the third style, which is made by means of the 30-deg. and 60-deg. triangle, the spacing and size of the letter being governed by the eye.

The styles here shown are used in the trade school of the Hampton Normal and Agricultural Institute at this place.

From H. J. J., Milwaukee, Wis.—I am inclosing samples of lettering, Fig. 2, in reply to the request of "W. H. M.," of Clebourne, Tex., in the last issue of the *Building Age.*

From A. B. C., St. Louis, Mo.—Replying to the query of "W. H. M." for works on lettering, I would advise him to buy a book entitled "Free-Hand Lettering," by Victor T. Wilson, for this book is used as a text-book on lettering in schools of architecture and engineering. After studying this book he can obtain other styles if he wishes from the books issued by type founders. The book mentioned, however, he will find adequate, for it gives a number of styles of letters with instructions for making them. The price is $1.

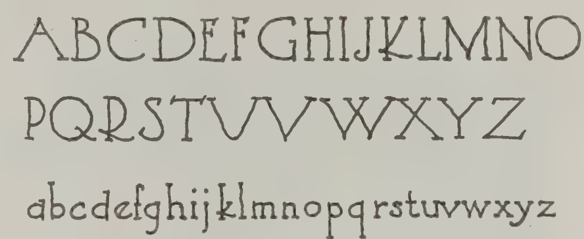


Fig. 2—Samples Furnished by "H. J. J."

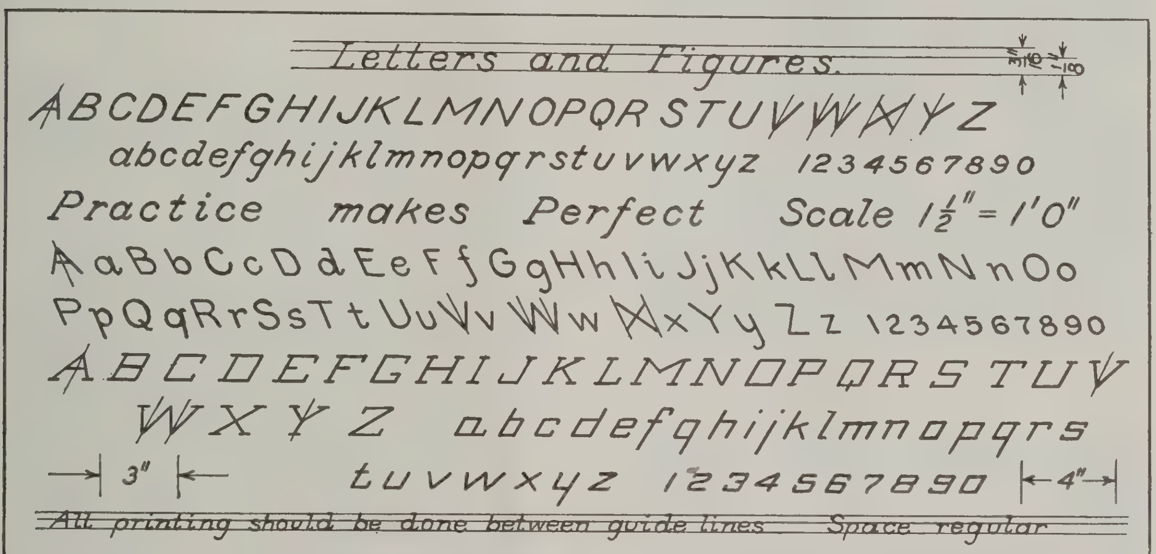


Fig. 1—Samples of Lettering Contributed by E. H. Bentzel, Hampton Institute, Va.

Lettering on Drawings—Contributed by Different Correspondents

Some Questions in Building Construction

From G. T., Montreal, Canada.—I am contemplating building a house for myself, and, having the time but not the experience, I would be glad if some of the readers of the *Building Age* would assist me. I want to build a house 25 x 40 ft. in plan and arranged for two families; each flat to consist of five rooms and a bath. I want to put in a concrete foundation, and would like to know what proportions to use in making the mixture and how to proceed after the foundations are in.

I do not expect the readers to go into all the little details, but some of them might perhaps give me briefly sketches and descriptive particulars which would assist me.

I would especially like to have some hints as to the best method of putting on the roof. The information which practical readers might furnish along these lines would doubtless be interesting to others besides myself.

Note.—We shall be glad to have our readers consider the questions raised by our correspondent above, and in addition would suggest that he secure some of the leading books bearing upon building construction, any or all of which can be furnished through the Technical Book Department connected with the David Williams Company. Among others, we would mention Kidder's Building Construction and Superintendence, Parts I, II and III; Hicks' Builders' Guide, and Sylvester's Modern Carpentry and Building. A careful study of these cannot fail to give our correspondent most valuable information along the lines indicated.

Building a Circular Brick Silo

From W. J. W., Hillsboro, N. H.—Will some of the practical readers of the paper who have had experience along the line indicated tell me the proper inside dimensions for a circular brick silo having a capacity for supplying feed for 20 cows for six months in the year? I would like to know the thickness of the walls and if they are reinforced in any way.

What kind of mortar is used, and what is the material best suited for a roof and the roof covering? What are the necessary openings in the walls, and what are their dimensions?

Trouble from Freezing in Basement

From W. T., Binford, N. D.—I have a question which I should like to have the practical readers answer through the columns of the Correspondence Department. I have been a reader of the *Building Age* for about 5 years and have found in it much that was of interest and value to me. My present predicament is this:

Last summer I built a large house on top of a concrete foundation which consisted of solid 12-in. walls up to the grade line. Above the grade line there were four courses of cement blocks.

The basement is 28 x 34 ft. in plan and 9 ft. deep. There are eight windows or cellar sash with storm sash fitted tight. The outside door from the basement is on the north side. In this basement it freezes quite hard in weather no colder than 15 degrees below zero.

Can any reader give a reason for this freezing and how it can be prevented in the cellar?

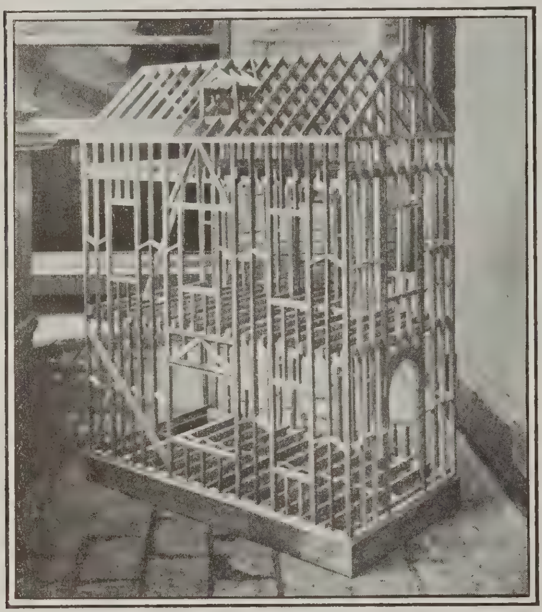


Fig. 1—View of Model Showing Front and Left Side Elevations

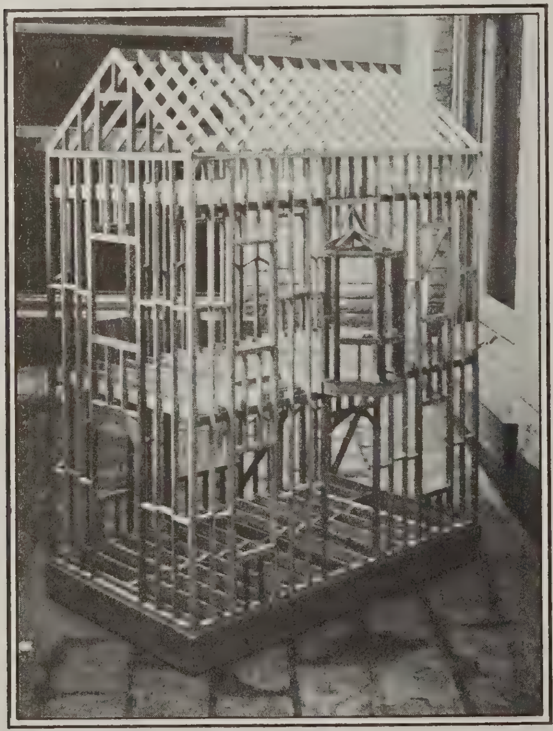


Fig. 2—Perspective of Framing, Showing Front and Right Side Elevations

Practical Value of Articles on Architectural Drawing

Practical Value of Articles on Architectural Drawing

From Charles Nussbaum, New York City.—For some time past I have been following the "Lessons in Architectural Drawing for Beginners" which have been running through successive issues of the *Building Age* and I find them as well as the paper in general, not only interesting, but very valuable. In addition to studying these lessons as they appear from month to month I have at different times, built models in accordance with the instructions there given and photographs of one of these I am sending to you as their publication may possibly prove of suggestive value to some of the other readers of the paper who are closely following the course of lessons presented. This model is built to a scale of 1½ in. to the foot and it shows the balloon framing lesson which was given in the issue of the *Building Age* for July, 1910.

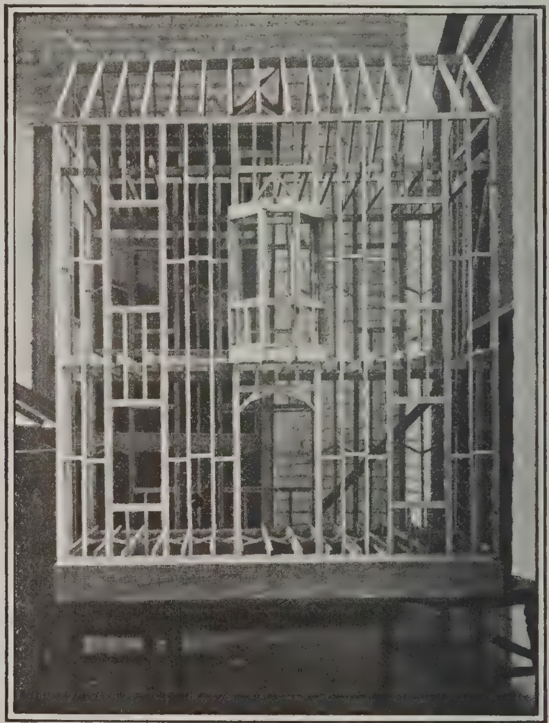


Fig. 3—Right Side Elevation of Framing

I sincerely trust that this series of articles will be continued as they are certainly of great practical value to the student who desires to know something of architectural drawing.

Details Wanted of a "Creeper" Pile Driver Derrick

From T. M., New Iberia, La.—I would like to have some practical brother chip furnish the Editor for publication a working drawing or detail of a "creeper" pile driver derrick—sometimes called a top driver. It is such a device as that used on railroads before the track is laid.

I have recently built the bridges (pile trestles) on the Iberia, St. Mary & Eastern Railroad and all before the track was laid. In fact, it is considered poor executive ability to have to stop track-laying and wait until the bridges are built. The pile trestles referred to were short, the longest being, I think, only 84 ft., and I drove these with a derrick known as a "Joe Heaver."

The "creeper" or top driver is used on longer trestle work and in bridge construction ahead of the laying of the track and consists of two sills long enough to take three 14-ft. bents. On one end are the shear legs and leads kept in place by wire guys fastened to the head of the shear legs and back to the gunwales or sills. The donkey engine is bolted down to the gunwales and the whole thing is moved along on a bridge by a block and tackle fastened to the cap of the last bent driven and back to the nigger head on the engine.

I have a good general idea of what I need, having seen them in operation, and as I have some work that can be more profitably done with a top driver than with a "Joe Heaver," I come to the Correspondence columns for help.

In this connection I might add that I have been a reader of *Carpentry and Building* and the *Building Age* for a period of 20 years.

Obtaining Square Cuts of Rafters in Roof Framing

From John Parkhill, Rochester, Minn.—I have noted the inquiry involving the above problem by "I. G. Norant," Woodland, Cal., and also the reply of

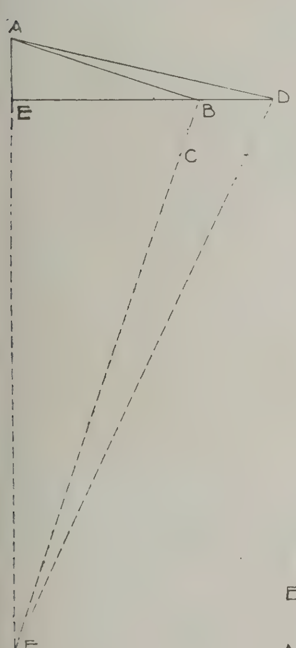


Fig. 1

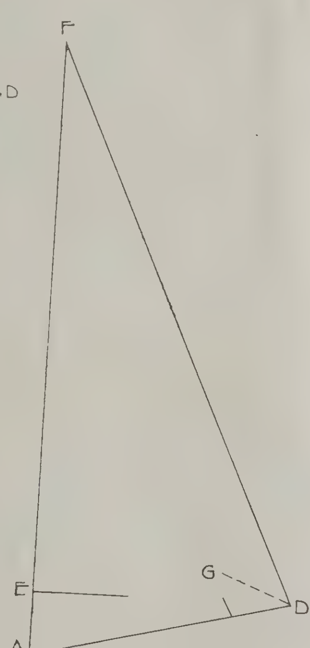


Fig. 2

Obtaining Square Cuts of Rafters in Roof Framing

"R. M. R.," Salem, Ore., which appeared in a late issue. I take the liberty, however, of presenting the following solution which I trust may prove of interest. The problem as stated, read: Supposing in a roof with projecting eaves the end of the common rafter is cut square instead of being cut plumb, what figures on the steel square shall I use to cut the ends of the valley or hip rafters and how do I get them."

Assuming that this refers to a regular hip, as it evidently does, let E-A in Fig. 1 of the accompanying diagrams equal 4 in., E-B equal 12 in. and E-D equal 16.97 in. Then A-B will represent the side view of a common rafter which, with reference to the horizontal line E-D, stands at a pitch of 4 in. rise to 1 ft. run and A-D will represent the side view of a hip rafter for the same pitch. In a roof, however, A-B and A-D must lie in the same plane and coincide when viewed at right angles to the length of the common rafter.

The problem specifies that the end of the common rafter is cut square so A-B-C must be a right angle. Extend the lines A-E and B-C until they meet at F. This gives us another pitch with a rise E-F of 36 in. to the same run E-B of 1 ft.

This may be called the complimentary pitch to the first one, F-B representing a side view of the common rafter and F-D a side view of the hip rafter. In the roof, however, F-B and F-D must lie in the same plane and coincide. Therefore F-D marks on the hip A-D the correct end cut to correspond with a square cut on the common rafter A-B; also A-D marks on the hip F-D the correct end cut to correspond with a square cut on the common rafter F-B.

From this the writer derives a rule which may be stated as follows:

From a straight edge mark the horizontal cut of the hip for which the end cut is desired and from the same straight edge in the reverse direction mark the horizontal cut of the complimentary hip across the first, which gives the desired end cut.

In the diagram, Fig. 2, is shown the correct end cut D-A on the hip for a pitch of 36 in. rise to 1 ft. The dotted line D-G also shows this cut when marked by the rule given in the August issue of the paper by "R. M. R.," Salem, Ore. His rule is not only far from correct, but with a large majority of all possible pitches it would be farther from right than a square cut would be. It is so in Fig. 2.

Out of a thousand pitches there could be one pitch and one only where his rule would coincide with the correct cut. However, one book at least (Hicks) gives the same rule as "R. M. R." and it is possible that this is where the correspondent in question obtained his information.

That "6" in Peoples' Formula

From R. S. E., Philadelphia, Pa.—In your January issue I notice that Mr. Bremner states he understands fully the reasons given by one of your correspondents for using a divisor "6" in the formula for resisting moment and a divisor of "8" in the formula for bending moment of a freely supported beam. On the following page he reverts to his original opinion about the "6" being a factor of safety, which shows that after all he does not understand the matter he says he does understand. I have read over very carefully all the discussions on the subject of the strength of beams during the past year and fail to see how the matter can be presented any more clearly than Mr. McCullough has presented it. Mr. Bremner still needs light, but the only way he can get it will be to study very carefully the articles referred to until he understands them. It seems to me that after all the discussion we have had on the subject that Mr. Bremner should see by this time that the "6" in the formula called Peoples' is not a factor of safety.

In regard to the other point raised by Mr. Bremner about the bending moment, according to "F. L. T.," on page 599, the statement appears "The total amount is then

$$\tfrac{1}{2}Wx - \tfrac{1}{2}Wx^2."$$

The correspondent states that he finds the definition of W, X and w, but cannot find the definition of x. In my opinion the writer of the article that confused your correspondent was trying to establish the fact that "Reaction must equal action in order to preserve equilibrium." The mistake lay in using X and x when both should have been x. This x represents a certain part of the span. The W is the total load, and $x \times w = W$. Now if any length of the beam x be loaded with a load $= W$ it will tend to fall if one end rests on a support and the other end is free. What amount of reaction will be required to push up on the other end to hold it? In other words with what amount of pressure will the opposite end of the beam press on the supports.

Since $w \times x = W$, then $w \times x^2$ must equal Wx. Now substitute L for x and we have $x =$ span, so we say $L^2 = wx^2$.

If a cantilever beam is used we know that a concentrated load on the end will produce a bending moment $= P \times L$ where $P =$ amount of load.

$L =$ distance from support to center of gravity of load.

If the load be uniformly distributed over the whole length then the weight acting through the center of gravity which is at the center of the load must be $W \times \frac{1}{2} L$. In the case of a uniformly distributed load we use W and for a concentrated load we use P.

When the beam rests at both ends on supports we have two cantilever beams (theoretically), each equal to half the span and each carrying half the load. That is, we consider the beam as cut in the middle and at the middle it requires some support. If the support is not a post or wall placed there we have to consider the other half of the beam as furnishing the necessary reaction. So the bending moment equals

$$\frac{1}{2} W \times \frac{1}{4} L = \frac{1}{8} WL.$$

It can be readily seen that the distance to the center of gravity of each half load must be $\frac{1}{4} L$. The expression $\frac{1}{2} Wx - \frac{1}{2} wx^2$ should be completed by placing it this way: $\frac{1}{2} Wx - \frac{1}{2} wx^2 = O$, meaning that the moment tending to carry down one end of the beam is resisted by a moment of equal amount tending to hold the end of the beam up.

Reverting to the expression $\frac{1}{2} W \times \frac{1}{4} L = \frac{1}{8} WL$ we get the amount of bending moment tending to break the beam, or to perhaps make it plainer, the amount of force which would have to be exerted in the middle of the beam to force it up and keep the fibers from being stressed. One-half the load acts a distance of one-fourth the span to force the beam down in the middle. One-half the load acts upward at each end of the span to support the beam in place, these being the end reactions.

Figuring Cast Iron Base for Columns

From R. L. S., New York City.—I have been a reader of your paper for a long time and now come to the Correspondence Columns for some expert information. I would like to ask Ernest McCullough to explain through this department of the paper how to figure the size and height of a cast-iron base as used in distributing the loads on the footings of a column. I would also like to know in regard to figuring the sizes of the ribs and the number of them; the sizes and thickness of top and bottom plates, also the thickness of the barrel or shaft, supposing the same is to support a column which is designed to carry a total load of 418 tons. Also to show how to figure the sizes of a cast-iron plate to carry a steel Bethlehem H-column of any size.

Answer.—Replying to the question of the correspondent above I would refer him to the illustrations here given.

Let $B =$ length of base on footing.

$D =$ outside diameter of column.

$P =$ projection of base $= \dfrac{B - D}{2}$.

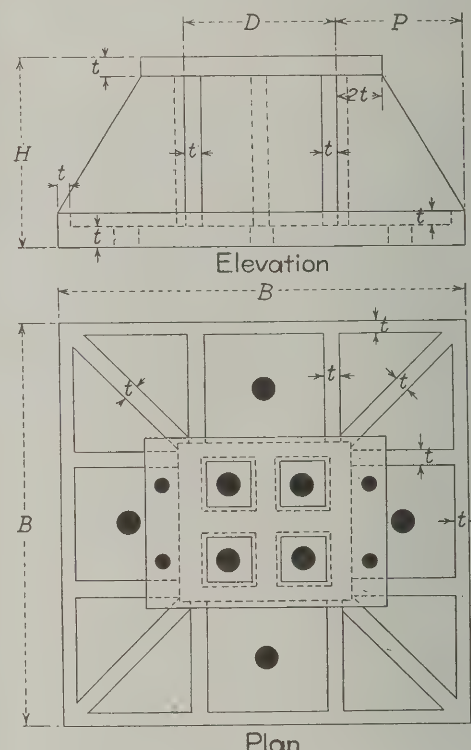
$H =$ height $= P$.

$t =$ thickness of barrel of column.

The thickness of each rib and the projection on the edge of the bottom of the base is made equal to the thickness of the barrel of the column in order that undue shrinking stresses will not develop in the casting.

The space between ribs at the outer edge of the barrel is usually not permitted to exceed the thickness of the rib, no great exactness being necessary.

Example.—The inquirer asked for the dimensions of a base plate for a column carrying 418 tons (too large a load, by the way, for a cast-iron column). First to find the dimensions of the footing. It is assumed that concrete will be used and the soil will carry 3500 lb. per square foot. The total number of pounds to be carried $= 418 \times 2{,}000 = 436{,}000$ lb. This divided by 3,500 gives a footing 15 ft. 6 in. square. It may be built up in layers 12 in. thick, each layer being 2 ft. smaller each way than the layer below, thus forming an angle of 45 deg. on the edge, or the offsets and



Figuring Cast-Iron Base for Columns

thicknesses of the steps may be figured by the following rule:

Let $s =$ safe tensile strength per square inch $= 75$ for a 1:2:4 concrete $= 40$ for a 1:3:6 concrete.

$p =$ soil pressure per square inch $= 3{,}500 \div 144$, the number of square inches in 1 sq. ft.

$t =$ thickness of each step, in inches.

$o =$ offset of each step, in inches.

$$\text{then } o = t\sqrt{\frac{s}{3p}} \quad \text{or} \quad \frac{o}{t} = \sqrt{\frac{s}{3p}}$$

After computing the number of steps and the size of each, find the total weight of the footing, add it to the weight originally used and go through the calculations again to get the exact area of the footing.

It is assumed that the pressure per square inch allowed on top of the concrete $=$ 300 lb. per square inch. Dividing the total weight by this allowable load and extracting the square root gives the size of the cast-iron base. This we find will be 52¾ in. on each side. From tables in Kidder and other books the size of the column is found to be 16 in. outside diameter with metal 1⅞ in. thick. Every part of the base marked t in the illustration will be 1⅞ in. thick. The flange projection to which is bolted the column will be not less than 3 in., no matter what the size of the column, but when the thickness of the metal exceeds 1½ in. need be only twice the thickness.

To find the number of ribs: The outer circumference of the column $= 16 \times 3.1416 = 50.265$ in. Calling the rib thickness 2 in. and the space between the ribs at the barrel being equal to the thickness, then $50.265 \div 4 = 12.25$ ribs, so we will use 12, which is near enough for all practical purposes. There should be a rib to each corner, as shown, and the number of ribs between the corner ribs should be the same on each side. If the calculation had given 15 ribs we would use 16, or if it gave 13 we would use 12, taking always the nearest even number divisible by 4. The black spots on the drawing represent bolt holes.

When a cast-steel or cast-iron base is designed for a steel column of plates or a Bethlehem H-column the rules are the same for width of plate and height of base. Cast steel is generally used with a fiber stress in direct compression of 14,000 lb. per square inch and cast iron with a fiber stress of 10,000 lb. per square inch. Divide the total load in pounds by the allowed fiber stress and thus obtain the area of the vertical webs forming the base. Having found this area provide a web under the cross-section of the column and then solve for t, the thickness of the web pieces, or walls of the base. If this thickness is less than the thickness of the sections of the column, increase it. To avoid unequal shrinkage stresses which might cause cracks, make the plates, ribs, and the projection around the edges of the base plate all of the same thickness.

The rule for number of ribs for a base under a round column has been given. For a rectangular base under a rectangular column three ribs will meet at each corner as shown. With a radius equal to one-fourth of B describe a circle which will have a diameter equal to one-half of B. The spacing of the ribs on this circle should not be greater than the spacing between the three cornering ribs. These rules are empirical for no satisfactory methods have yet been evolved for figuring each item theoretically. In *The Technograph* for 1907-8, published by the University of Illinois, there was an article by C. E. Noerenberg, Research Fellow, on the design of ribbed cast-iron base plates giving the results of some investigations he made into the matter. When at school a number of years ago the professor in structural design had the students check a base designed by the above empirical rules.

The assumption was made that the entire load was distributed uniformly over the base and the portion directly under the webs of the base was deducted, leaving the remainder of the load to be carried on the brackets as reversed cantilevers. Upon this assumption the plate would crack along the outside of the barrel of the base, which we now know is incorrect, for in all base plates tested to destruction, whether plain or ribbed, the crack is along one of the diameters and therefore directly under the load. The formulas of Mr. Noerenberg applied only to eight-ribbed circular base plates with the safe allowable pressure on masonry not exceeding 174 lb. per square inch, so are of limited value. The empirical rules presented by the writer are in common use everywhere and seem to give satisfaction. When the projection P is less than three-fourths of the diameter D of the column, a plain plate is used to save metal, and it can be designed by following the formulas given in Bulletin No. 35, University of Illinois Engineering Experiment Station.

Ernest McCullough.

Cobblestones for Foundation Walls

From Young Mason, Alameda, Cal.—Will some of the many readers of the *Building Age* give me through the Correspondence columns some practical points on cobblestone foundations and piers. I would like to know the best manner of laying the stone, the amount of cement required, etc.

What Are the Requisites of an Oilstone

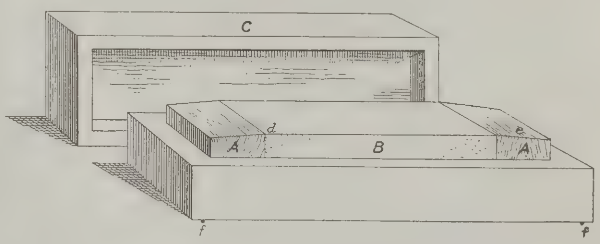
From J. S. W., Hillsboro, Ohio.—When looking over the issue of the paper for December my eye caught the inquiry of "M. M. I.," Canton, Ohio, in regard to the requisites of an oilstone. As I have had some experience in the use of this tool sharpener I will give him a little information along that line. I have used an emery, Lily White Washita, Hard Arkansas and India. The emery is a cheap stone and is not recommended for mechanics' use.

The Lily White Washita is a good stone for almost all kinds of work, but is just a little slow for tools used for ordinary house finishing.

The Hard Arkansas is a very fine and slow-cutting stone, and I would only recommend it for carving tools and chisels for hard wood.

According to my judgment the India is the best stone I have ever used. It is a fast and smooth-cutting stone of which there are three grades—fine, medium and coarse. For ordinary work I would suggest the medium, but if the correspondent in question does a great deal of hardwood finish I would recommend the fine quality.

The reason I have not mentioned corundum stones is



What Are the Requisites of an Oilstone

because I have used them but very little. From what little experience I have had with them, however, I would recommend a very fine grade, as it cuts fast—even the finest. There are several other grades and makes of stone, but these are the ones most commonly used.

In regard to mounting the stone and sharpening tools, the accompanying sketch represents the stone mounted, the parts AA being flush hardwood blocks, B is the stone and C is the lid or cover to the case containing the stone. The flush blocks A A are for the tool to run on when it leaves the surface of the stone. In sharpening a tool push it from d to e for example with medium pressure and pull it back lightly. Do not use the center of the stone, but keep on the edges and the center will wear down fast enough.

Use the stone as you pick it up, and it will keep both ends about even. If you use the circular motion use the end from you and run the tool on the wood every stroke.

In mounting the stone be sure that the grain runs from the stone so that the edge of the tool will not gouge in. Make them about 1½ in. long, just a little sloping from the stone. Put 4 small nails in the bottom of the mounting as represented at f-f. If the stone is mounted and used as directed there should be no trouble in keeping it in condition.

Design for Four-Family House

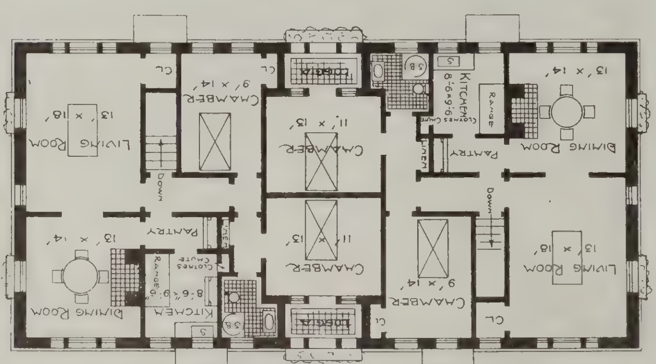
From Frederick J. Meseke, Metropolitan Tower, New York City.—The accompanying plans and elevations are furnished in response to the request of "F. H. W.," Pasadena, Cal., which appeared in the issue for October and wherein he expressed a desire for drawings for a two-story frame apartment house arranged with two apartments of five rooms on each floor and with front entrance to each floor or one front and one side entrance.

The drawings here forwarded show a building on a corner lot and exactly 35 by 70 ft. in plan; each apartment is composed of five rooms and bath. The plan being rather unusual, it may call for some explanation. It has one entrance on the side, one on the front, and the kitchen entrances are placed as indicated, on the front and rear.

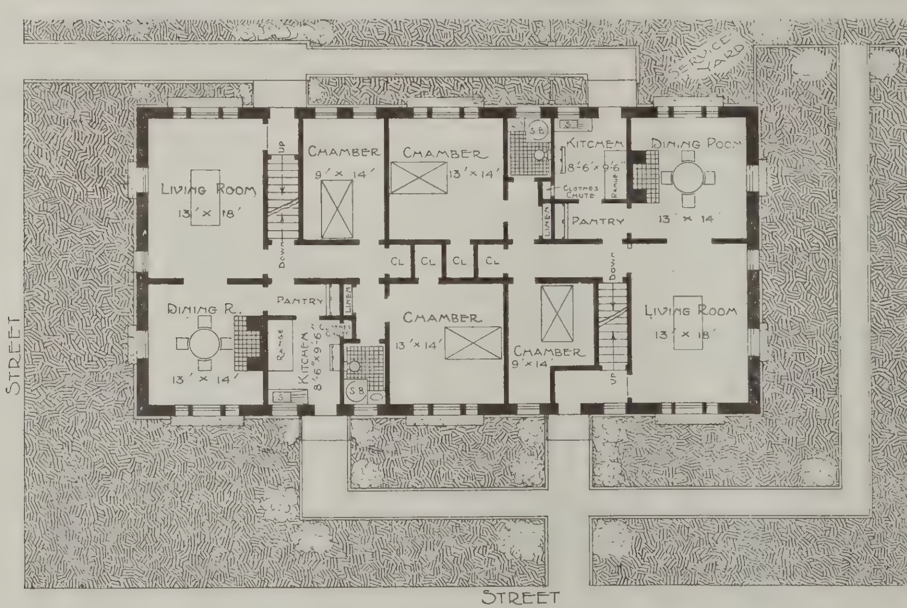
On the front floor the main entrance leads directly into the living room, while on the second floor the stairs enter the hall just off the living room and thereby allow of direct access to all rooms from the hall. This plan enables one to pass into the kitchen unobserved from either the living room or the dining room. Each bathroom has a hand basin and water closet. Since this room is of such small area a shower bath is used in place of a bath tub, thus giving more floor space and at the same time saving expense for the owner, since there is 15 per cent. less water used. A general laundry is located in the rear of the cellar nearest the service yard and has an outside entrance. There are metal-lined chutes for soiled linen, which extend from each kitchen into a metal-lined box or receptacle locker at the cellar level. These chutes are ventilated through the roof space.

Paths lead from the kitchen or main entrances to a service yard. The kitchen doors and main entrance doors are shielded with trellis at either side of each entrance. The kitchen doors are also shielded with shrubbery.

Front Elevation of Building



Second Floor Plan



Main Floor Plan and Building Plot

Design for a Four-Family House—Frederick J. Meseke, Metropolitan Tower, New York City

System of Bookkeeping for Builders

From Skookum, Vancouver, B. C.—Will some kind reader of the paper tell me what is the best and simplest method of bookkeeping for a building contractor? I understand there is a system used by some contractors consisting of specially prepared sheets by which the status of each job can be arrived at very easily.

I am an old subscriber to the *Building Age* and I will be very glad for any information on the subject which may come through the columns of the paper.

A Portable Drawing Board

From C. B. C., Charlottetown, P. E. Island.—With regard to the sketch of drawing table published in the January issue of the paper permit me to state that while this table is very good so far as it goes, I would like to ask Mr. Maginnis what sort of table he considers best for large work. This kind of table is difficult to reach over and the tilting tops have their disadvantages.

I would like to know what kind of tables are in general use in large architects' offices in New York.

Nearly $10,000,000 is being spent in erecting model dwellings, schools, etc., for the workmen employed by the State Railways in their shops in Budapest.

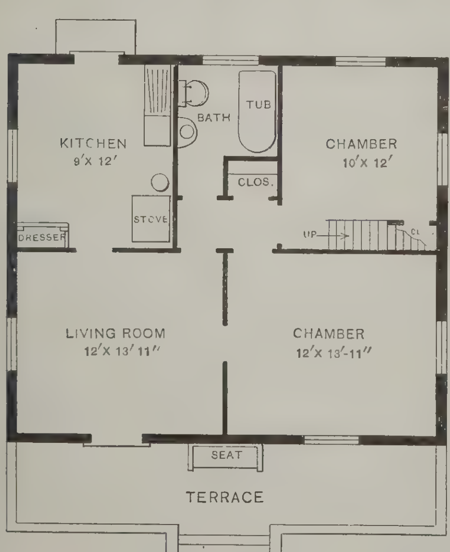
A public comfort station to cost $30,000 has been authorized for the Williamsburg Bridge plaza in Brooklyn, N. Y.

Land Office and Railway Station Modeled as a Workman's Cottage

Building Constructed Throughout of Cement, Sand and Cinders--Garden Furniture, Flower Boxes, Etc., of Concrete

SOME months ago we had occasion in these columns to refer to a model sanitary workingman's cottage built entirely of concrete, and incidentally made reference to buildings of a similar nature that were about being erected in connection with development operations in progress at Virginia Highlands, a short distance from the city of Washington. We now take pleasure in bringing to the attention of our readers a few particulars, with plan of the building which is used

Photographic View of the Combination Station and Workman's Dwelling at Virginia Highlands



Floor Plan

at Virginia Highlands as the railroad station, although it was constructed as a model workman's cottage to demonstrate the practicability of utilizing cinders as aggregate in houses of this kind. An inspection of the floor plan shows that there are living room, kitchen, two sleeping rooms and bathroom, and that instead of a second story there is a roof garden with pergola effects.

The building throughout is constructed of cinders, sand and cement. The walls, partitions, floors and roof are of concrete, while the garden furniture, flower boxes, and even the letters of the sign which extends across the front of the building just above the pergola

Land Office and Railway Station Modeled as a Workman's Cottage

are of cement. In fact, the only wood in the building is the sash, doors, blinds and trim. The cement roof has been utilized as a roof garden, and a pergola covered by rough timbers surrounds the structure.

Adjoining the building, as will be seen from an inspection of the half-tone engraving, is a small sunken garden and gold-fish pool, which is filled with crimson water lilies and other water plants.

The building was designed by Milton Dana Morrill, architect, Corcoran Building, Washington, D. C., and was erected in accordance with his method of using metal plates or molds which can be readily set up and the concrete poured in place. The cinders were used in the present instance to demonstrate to the owners of large factories the possibility of constructing by this method healthy, sanitary homes for their employees by utilizing the waste from furnaces. In the half-tone picture there are shown to the right the first two of the "poured" houses erected at Virginia Highlands, these also having been made by means of the steel mold equipment referred to. The walls above grade were cast in eleven days.

The station and office here illustrated is somewhat different in its requirements from the usual railway station, as the electric cars pass every few minutes, but no tickets are sold and no station agent is employed. The building serves as a waiting room and land office as well as quarters for the night watchman of the company carrying on the development operations.

English Garage Construction

The garage has become such an important adjunct of every city and of every section of the country, displacing as it does to a very large extent the old-time carriage house and stable, that a few hints regarding the construction used in England for housing automobiles may not be without interest to some of our American readers. In writing on "Motor Garage Building," as it is termed, an English author says:

The keynote in the construction of a motor garage is simplicity, which must extend to all its details and can only be insured by the exercise of ample forethought and by a little ingenuity. First consider the position or location. A good motor house may be spoiled by the difficulties involved in getting the cars in and out. The need for sufficient manœuvring ground is frequently overlooked and no more space allotted than would be required for horses in a coach yard.

Position of Motor House

The motor house should be erected in such a position that it can be approached and entered quite easily by the cars, while there should be sufficient space before the entrance doors to allow cars to be turned around, so that they may be housed head or tail first. Where a motor house must be approached through an awkward winding drive, a turn-table at the mouth of the entrance will overcome all difficulties in manœuvring. Assuming that there is a certain amount of freedom in choosing the site of a motor house, it should be placed with the wash yard to the north, or the yard may be sheltered on the south by an adjacent building, because it is always difficult for the men to wash a car when the sun is streaming down upon it, as the water dries off before it can do its work properly. Then, again, it is never desirable that a hot sun should play for any length of time upon varnish and upholstery, as is the case when a car is standing outside for some time during the process of cleaning.

As an abundance of light is always advisable in a motor house, the position of the windows and roof light should be considered before the plans are finally settled, because, in the case of the roof light, a north aspect is to be preferred. If the exigencies of the site compel the wash yard to be sunny, the difficulty may be overcome by roofing over the yard with glass carried on a light iron framework, one or other of the patent glazings being employed. The glass in all cases should be of the kind known as rough rolled. Roofing over the wash yard is an excellent feature because it is seldom desirable or even practicable for a car to be cleaned down while rain is falling. Wet weather, if the wash yard be not roofed over, is often an excuse for not cleaning a car, whereas, so far as the owner is concerned, wet weather not infrequently provides a good opportunity.

Converting Existing Coach Houses

In the majority of cases existing coach houses and stables, as they become useless for their original purpose, can with advantage be converted into motor houses, the alterations mainly consisting in the provision of considerably more light, of work benches—perhaps a pit or some substitute for it, of shelves and lockers, of heating apparatus, and of fire appliances. Light, and plenty of it, is essential because work is necessary in a motor house, whereas it is scarcely required in a coach house. Hence full provision for natural and artificial light must be made, and, if at all possible, part of the roof should be glazed and pendant lights (electric or gas) should be employed in place of wall lights. Work benches, proper tool racks, cupboards, shelves and drawers, are necessary, and it is also desirable to provide a suitable oil store.

Nowadays, with the gradual diminution of the need for a pit, many motor houses are being built without one, but it can scarcely be said that a pit may be dispensed with, because when a pit is wanted it is wanted badly. In place of the pit a couple of portable elevated car runs, each from 12 in. to 18 in. wide and perhaps 30 in. high, with a sloping approach, could be employed, so that the car is on the gallery instead of over the pit. Should a pit be built, however (and it must be remembered that, unlike the "gallery," it does not form an obstruction or require to be stored when not in use or to be moved about when wanted), the possibility of a car being inadvertently driven or moved into it must be taken into account. If there is such a danger a raised combing should be built 3 in. or 4 in. high all around the pit so as to form a stop to the wheel of a car that might be moving into danger. The pit, or its substitute, should be located near the bench with ample working room between, and overhead a pulley carriage should travel on rollers or wheels on a couple of beams, so that an engine or gear-box can be lifted out of the chassis and moved to the bench; or a portable crane can be installed if much work of this description is contemplated.

Materials to Be Used

The material of which the motor house should be built depends upon local conditions and upon the taste of the owner, but, besides stone and bricks, the usefulness of cement blocks should not be overlooked. As regards the floor, cement is good, but is cold to the feet and absorbs oil. Asphalt and tar are both excellent. Wood is the most comfortable, but absorbs oil and petrol. Perhaps the best compromise is a granolithic floor with removable wood gratings.

The wash yard should also be paved with granolithic and sloped from all directions toward the central drain, yet with the car run level. In the drain should be a collector to trap mud and dirt so that the drains should not be choked, and a filter chamber should be installed in the drainage system to trap vagrant petrol.

Dimensions of the Building

The dimensions of a motor-house entirely depend upon requirements, but where the number of cars is small the house should be so arranged that the cars are placed side by side with a doorway for each, so that any car can be taken in or out without disturbing the others. The doorway should not be lower than 9 ft., so as to permit a car to enter or leave with luggage on the roof. The doorways should for preference be closed by sliding doors carried on an overhead rail or by roll-up shutters, the latter form being better, particularly in the case of the "side by side" type of motor-house. The yard should have one or two lights in convenient positions. Windows should be equipped with blinds to shut out the sun's rays on very hot days; water and gas supplies should be brought to convenient positions; the petrol store should be far enough away to be safe yet near enough to be convenient.

A motor-house and workshops are best warmed by hot-water pipes fed from a boiler, which is placed outside in a boiler-house. No naked flames are desirable wherever petrol fumes may gather. If rugs and heavy coats are kept in a wardrobe in the motor-house, let the hot-water pipe pass through the wardrobe.

Plumbing System for a Cottage

Suggestions on Installing Plumbing in a House Which Cannot Be Connected to a Sewerage System

AN interested reader in discussing a plumbing system suitable for a cottage which was so situated that it could not be connected to any sewerage system presents the following suggestions:

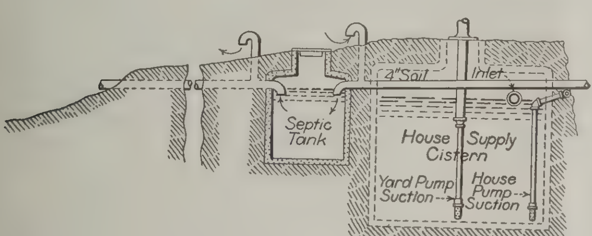
There is in plumbing, as in other lines, a vast difference between necessity and expediency. The household of a given premises is doubtless safe from possible direct harm from discharging the drain over the surface of an adjacent hillside. It may not be necessary, because no law compels, to treat the matter previously, but it is expedient to do so in order to avoid pollution of the water supply to others. Every inch of surface, however remote, is a water shed contributing more or less directly or indirectly to some supply or other, possibly that of the immediate residence. For this reason it is recommended that the septic process of disposal be employed to the extent of passing the house outfall through a chamber, as indicated in the accompanying illustration, after which it will be practically harmless and may be discharged on the surface and allowed to oxydize in the open without fear of contaminating the supply of anyone.

The septic process means merely the reduction of sanitary sewage from its dangerous and very complex nature to a more simple and harmless mass through the aid of two forms of bacteria—anærobic, propogating without air or light, and ærobic, thriving only with abundance of light and air. The latter, the oxydizing end of the process, would in the given case be taken care of on the hillside by the atmosphere. The former would of course act in the chamber shown as isolated from air and light by the close manhole cover, and absolutely so protected by the crust, resembling wet ashes, soon forming on the surface of the contents of the chamber. Placing the tank in the ground so as to bring the contents below the frost-depth insures no trouble from low temperature, the heat of the domestic warm water serving to keep the mass in the tank up to or above the minimum, 55 deg. Fahr., essential to septic action.

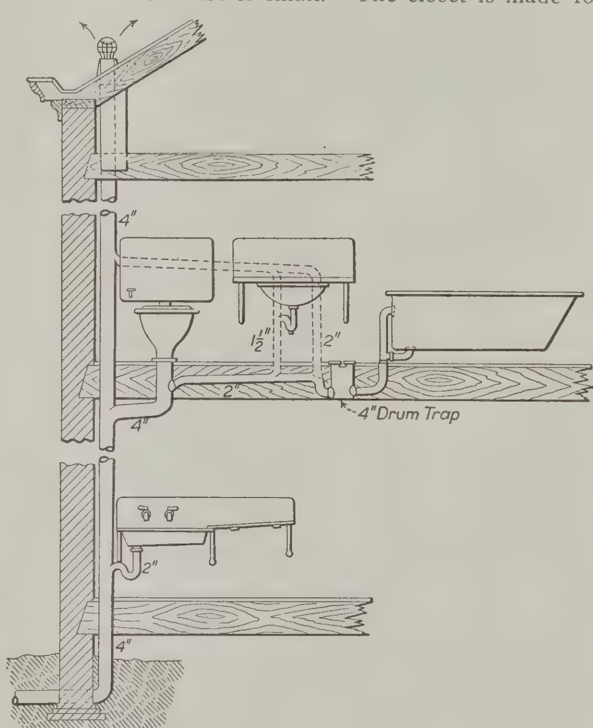
The outlet and the inlet of the tank should be placed on the same level, with bends projecting downward 6 in. or more so as to bring the mouth of the bends below the ultimate surface crust. The outfall vent bend, terminating above the snow level, ventilates the outline and helps more or less in the work of oxydation through the air passing through the line. The vent on the house side allows a free ingress of air and is a means of keeping the house vents, soil and waste pipes filled with fresh air. The tank may be round or square, of concrete or of brick, in cement, mortar, plastered and of a capacity to hold several days outfall from the house. With the supply cistern so close, it would be wise to use cast-iron soil pipe with carefully calked joints from the house to a point beyond the cistern, unless the cistern wall is unusually substantial.

With reference to the interior work, a 4-in. soil and vent stack is showed extended through the roof, with a wire conductor basket in the top. This is usual practice when the house is small. The closet is made for a 4-in. connection and any vent less than 4 in. would generally be increased to 4 in. below the roof to avoid frost closure. Concerning the traps, the septic chamber interrupts communications with the rest of the drain and is in this sense an effective house drain trap. Any closet worthy of use in the house will have an integral trap. A vent is not so necessary for a single closet as there is no other fixture that can effect the seal and the after-fill insures the seal at flushing.

A closet vent could be taken from the closet trap or from the vent below it, to the branch waste vent line dotted in. The other bathroom fixtures have vertical branch-waste line vents. The sink, lavatory and bath might have non-siphoning traps in place of the type shown, with the lavatory branch-waste vent optional. Were the sink and lavatory traps shown less directly connected they would need crown vents carried vertically as far as the fixtures would allow to avoid chok-



Elevation of Septic Tank and Connections



Elevation of Plumbing for a Cottage Remote from a Sewerage System

Plumbing System for a Cottage

ing as nearly as possible and siphonage. The crown vent if added would make the sink and lavatory connections equivalent to what the lavatory is now, provided a vent from the crown were carried up as far as slab and then over and into the line vent, other connections of the lavatory remaining as shown. The line vent of the bath waste acts as a crown vent for the 4-in. drum trap, to which it is connected. It will be noticed that sewer air does not reach the trap cover. The sink and lavatory traps entering the waste lines direct, connected straight in, as shown, makes the crown vents unnecessary. Were S traps or three-quarter S traps used in place of the P or one-half S style, they would likely siphon unless provision to prevent such action were made by installing a crown vent for the common open wall trap or unless non-siphon traps were used instead.

The arrangement of fixtures shown is good in that the large volume of water discharged from the tub at one time thoroughly flushes the branch waste. If the bath were between the lavatory and the closet, part of the branch waste would get only a small amount of water from the lavatory service to cleanse it.

If supply fittings of the high nozzle type are used at the bath, water for the rooms upstairs may be drawn at the tub in any kind of vessel while bell supply fittings force one to draw water at the faucets through a hose or carry it from the sink. Faucets in the tub are not so universal as in cases where the supply must be hand pumped or is limited.

Floor Construction in Reinforced Concrete Buildings

Reinforced concrete construction is becoming so common just now, more especially for industrial buildings, that to describe one gives a very general idea of the method employed in connection with the others. There are occasionally, however, somewhat unusual features connected with some part of the work, and this is found to be the case in the floor construction of the reinforced concrete building nearing completion opposite the Northwestern Passenger Terminal in the city of Chicago. The building measures 77 x 180 ft. in plan, and when finished will be nine stories above the level of the street, with two below. The columns are 25 in. square in the lower stories and are of latticed steel construction, filled and encased with concrete.

It is, however, in the type of floor construction that the distinctive feature of the building consists. The floors are divided into panels by 12 x 14-in. beams, the latter being reinforced after the system designed by L. Gustav Hallberg, 812 Oxford street, Chicago, who is the architect of the building. Each floor panel, which measures 18 x 20 ft., is divided into a series of smaller beams and panels by the use of a series of smaller box-like structures, which are placed bottom up and form recesses or auxiliary slabs in the under side of the main slab, so that the concrete which flows between them with the reinforcing, which is placed in it, in like manner forms inferior beams. These boxes are about 2 ft. one way by 2 ft. 3 in. the other, although special shapes and sizes are used where irregularities in the building occur and to fit around columns, etc. The boxes, which are 6 in. high, are placed on the panels, 7 each way, allowing 5 in. between them. In this 5-in. space are placed two reinforcing bars 1 in. wide and ½ in. thick. These are placed 1 in. from the lower surface of the concrete. Over these boxes are laid narrow widths of triangular mesh fabric, and the concrete is poured, covering the tops of the boxes to a depth of 2 in.

The boxes constitute the larger part of the floor form, the only other space to be provided for being the 5 in. between them. In order to provide for this space a skeleton form work of 8-in. boards was first erected, supported in the usual manner, and spaced in such a way as to constitute the bottom of the auxiliary beams. The boxes were placed over the openings so made, thus completing the form ready for the laying of the steel and the depositing of the concrete. Each box was held in place by two small wire nails, so that they could be readily removed without injury to the boxes when the work was completed, thus permitting the boxes to be used over and over again.

An interesting feature in connection with the work was the mixing of the concrete, which was done in the basement. A Cropp mixer was used, which discharged into a side-dump bucket attached to a Sasgen derrick, made by Sasgen Brothers, 2053 Racine avenue, Chicago, Ill., by which it was elevated to the floor where work was in progress and dumped into a hopper, from which a chute carried it to the desired point of deposit.

The architect states that, in addition to the saving on form work, he will, by the use of the boxes used in the floor construction, reduce the weight of the building at least 2500 tons from what would have been the case had the usual construction been employed.

The reinforcing bars were furnished by the Inland Steel Company, 164 Dearborn street, Chicago, Ill.

The Winona Technical Institute

The fate of the Winona Technical Institute, at Indianapolis, Ind., has been practically settled by the decision of Judge Clark of the Circuit Court at Danville, Ind., to whom the case was taken by change of venue, that the property belongs to the school city of Indianapolis. The Institute has been in the hands of a receiver since 1909, donors to it were presenting claims against it, and the trustees began suit in court against them to ascertain what powers they had and to clear up the title to the property. The Institute has been kept in operation by the receiver and at present has about 100 students. It will take some time to learn the exact position of the Institute, as an appeal may be taken from the court's decision by the donors, who have been seeking the sale of the property and the return of subscriptions. The present curriculum will be followed until all disputed points are finally settled.

Correct Aggregate for Concrete

One of the essentials in working in concrete is to adhere strictly to formulæ of aggregates for various kinds of construction, and with a view to affording assistance to those builders, contractors and others having to do with concrete work upon a large or small scale, Albert Moyer has prepared a booklet along this line which is intended for gratuitous distribution. The purpose of the matter contained within the covers of the little work is to afford a practical method which will enable any concrete constructor to make economical use of the best aggregates, so proportioning them as to give the maximum strength and density with a minimum amount of cement. The book takes up all the aggregates generally used in the manufacture of concrete, and tells what is good and what is not good to use. There are something over 30 pages of matter and the booklet is now in its third edition. It is published for free distribution by the Vulcanite Portland Cement Company, 200 Fifth avenue, New York City.

The greatest lumber-producing State at the present time is Washington, followed by Louisiana, Mississippi, Oregon and Wisconsin in the order named.

Laying Hardwood Floors by the Carpenter

Securing Profitable Jobs--Best Time to Do the Work--Some of the Details

By W. L. Claffey

AT this season of the year when outside work is somewhat slack for the carpenter a splendid opportunity presents itself in the laying of ⅜-in. thick oak flooring over old floors in old residences. A little canvassing by the carpenter among some of the old homes that were built before the advent of hardwood flooring, will secure agreeable and profitable jobs. This line of work is being carried out by a great number of carpenters during the winter season. In fact, it is the best time of year for the laying of oak flooring in old homes, for the reason that the rooms are heated, making the old floors dry and in good condition to receive the thin oak flooring.

No Special Training Required

The average carpenter requires no special training to lay oak flooring. It is necessary, however, that he should acquire a full knowledge of all the grades, thicknesses and faces in the plain and quartered oak flooring, as well as prices from the local dealer before estimating any jobs.

It brings to the writer's mind how a progressive carpenter in a small town in Michigan, who having a few days' leisure time, went around and secured jobs for the laying of oak flooring in old homes. It proved so agreeable and profitable that he is now what is termed "a professional floor-layer." The dealer in his town would not supply all the different kinds of oak flooring that he required, so he was obliged to make working arrangements with an oak flooring manufacturer who now supplies his needs. To-day he is securing jobs within a radius of 100 miles of his home town and employs about 10 men the year around.

It seems to be the general impression that in order to make a successful hardwood flooring job one must be a professional floor-layer. This is not true. Any ordinary carpenter with any judgment at all can lay oak floors. After the floor is laid, the process of scraping is necessary to make a good job. On the finer jobs a hand scraper is recommended, but in places where there is a large surface there are many types of power-scraping machines on the market that will do this work cheaper and easier. Sometimes No. 1 sandpaper is used after the scraping process.

Finishing of an Oak Floor

The finishing of an oak floor is a matter of taste. It is always best, however, to apply a good liquid floor filler first and then a coat of pure white shellac. This gives a firm basis for the final finish, which is usually wax or the numerous finishes offered by different paint concerns. Any of the large paint companies will send complete information on the finishing of oak floors upon request.

Carpenters can secure from their local dealers or get information that will inform them where a catalog as issued by the oak flooring manufacturers can be secured. This book gives complete and valuable information on all the different kinds of oak flooring, thicknesses and faces, besides it tells how to lay, the kind of nails to use, how to estimate and other pertinent information that the carpenter should have knowledge of before undertaking jobs of this nature.

Cost of Building Construction

With the single exception of San Francisco it has been said that it is more difficult to carry on building construction work in the city of New York than in any other in the whole United States. In the case of the former city the difficulties are those imposed by labor, while in New York City the difficulties are due to complexity of building laws. In discussing this subject and that of simplifying legal building requirements a writer in a recent issue of the *Record and Guide* gives some rather interesting figures showing the cost per cubic foot of construction in several of the leading cities. In New York City construction is about 2 cents a cubic foot higher than in San Francisco, while in San Francisco construction costs run from 12 to 15 cents more than in other cities similarly situated with regard to shipping and railroad facilities. As a matter of fact construction in both New York and San Francisco should be lower than in Chicago, Denver and New Orleans, yet the range of cost for average buildings in American cities is as follows:

CONSTRUCTION COSTS.

	Cents per cu. ft.
New York (Greater)	23 to 28
San Francisco	21 to 26
Chicago	20 to 25
Boston	20 to 23
Pittsburgh	20 to 22
New Orleans	19 to 20
Oakland	18 to 21
Denver	18 to 19
New Haven	18 to 19
Philadelphia	16 to 18

From the above it is apparent that the local operator in Greater New York has to pay more for the legal requirements imposed upon his contractor than do operators in other cities, due allowance being made for the fact that union wages are higher here and in San Francisco than they are in any other city.

Mayor Henry T. Hunt of Cincinnati, Ohio, has selected George W. Rapp of the architectural firm of Rapp, Zettel & Rapp, as Building Commissioner to succeed George Kuhlman. The firm with which Mr. Rapp is associated has been the architect of some of the largest buildings of the city of Cincinnati, and the readers of the *Building Age* are more or less familiar with the concern by reason of its participation in the Competition in Two-Family Houses conducted under the auspices of this journal when known as *Carpentry and Building*. Their design was published in the issue for September, 1908.

Suggestions for Building a Modern Dwelling

Analysis of an Ideal Plan--Some Important Points to Be Considered--The Basement and the First Floor

By William Arthur

N the analysis of an ideal plan, a clearer understanding as to how to treat another will be reached by going over it somewhat in detail. The following arrangement is intended to meet the wants of an average family. Some might want the side of the house turned to the street, rather than the gable. There are many possible ways of changing a plan around and modifying the rooms.

A study of the plan will show readers things that the text does not altogether make clear.

Size.—The house is 24 x 28 ft. over the main part, but the pantry extension is extra. Considering that there is a sun parlor as a part of the house, the size might be said to be 24 x 35, for this space is used on both floors.

This given size can, of course, be changed, and the same interior arrangements followed. It depends upon the amount of money it is desired to spend.

The Lot.—The plan was made to suit a particular lot. It is an east-front lot with a heavy slope to the southwest. This gives chance for a wide lawn on the south side, and a door to the rear without steps.

Space.—The accommodations of a four-story house are thus obtained when the attic is considered. The lot is not half covered as when a bungalow is built with all the rooms on one floor.

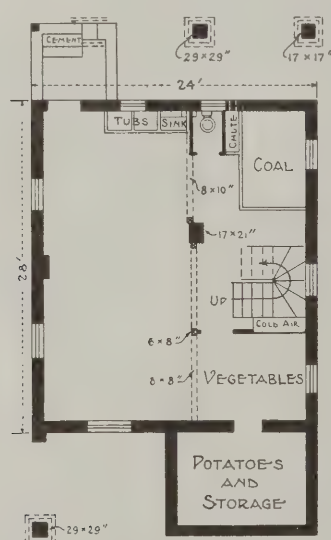
Walls.—They are straight without projections for the bay window or stair. The bay overhangs only 2 ft., and the stair, 2 ft. 6 in. The joists are easily extended and protection made against frost.

It is better to extend the masonry, but costs more, specially if cement stone is used. Special cement molds are not always on hand; and country bricklayers do not always make neat brick angles. These troubles are avoided with the straight wall.

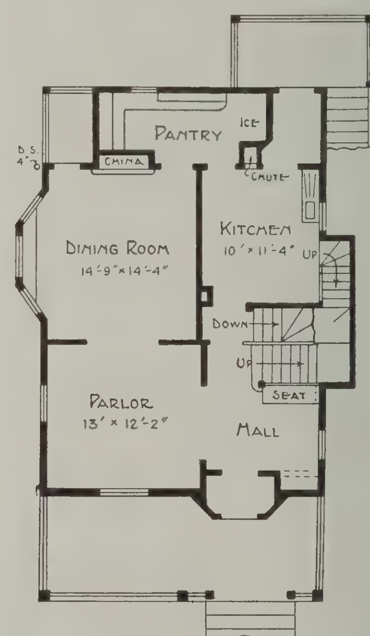
The thickness of the wall is 9 in. As already explained this is strong enough if cement mortar is used. Besides, this wall is well buttressed. On the north, in the center where it is required, is the basement stair; and there is also a coal partition. On the west there are two partitions, and the brick pilaster with all the weight of the girder resting on it—and the west wall is 4 ft. shorter than the one on the north. On the east, or highest and weakest side, there is a heavy pilaster in the center. The east side is the strongest because it has the vault and potato bin beneath the porch.

Plates.—But above all these safeguards there is yet another when plates are used as shown in Figs. 2 and 3, on page 449 of the *Building Age* for October, 1910. The bolts reach down 2 ft. in the walls, and when the joists are spiked on top the mass is all strongly bound together.

A vault is easily enough constructed. The floor of the vegetable cellar should be level with the main floor, but the one in the vault should be 3 ft. higher. A fireproof door, about 16 x 20 in., is built in and opens near the floor at a convenient height for anyone standing. Galvanized iron shelving might be put in. The space could be made 2 x 5 ft., which is large enough for all requirements. With hollow walls and an arch on top, or expanded metal and concrete, the farmer or suburban resident has a fine hidden safe.



Basement Plan



First Floor

Suggestions for Building a Modern Dwelling—Floor Plans—Scale 1/16 in. to the Foot

The potato cellar might be dispensed with, and many do not require a safe. The furnace pipes should be protected with asbestos or other good covering, and the heat need not be great enough to spoil potatoes.

The cold-air duct goes down at the hall seat and runs through under the floor to the furnace.

The coal bin is put in the corner where it takes up least room, and where the coal may be fed from the side in this case.

Starting in the bathroom, with an opening in the kitchen, the clothes chute ends near the tubs between the bin and the closet. On the second floor it is started in the corner of the sun parlor, where no one can see it. A small part is shown outside the main wall below the pantry, where it is easily protected.

The closet is put where it suits the plumbing above as nearly as practicable. The small window should be glazed with obscure glass and hinged.

Tubs and sink are close to the door, so that clothes may be easily handled and taken to the yard, and yet near the line of supply and sewer pipes. Only a two-piece tub is shown.

The idea all through is to leave one side of the small basement free of obstruction. In this case this side is also the one where the ground is very low, so that full windows may be used for light and ventilation.

It will be noticed that the girders of the basement are not in line. They are set to receive the ends of the partition studs from above. The one with the larger span is made 8 x 10; the other with the post in the center is 8 x 8 in.

So far as the basement goes, it would be better to move the chimney over to the south, but one floor hinges on another, and the dining-room partition settles the position on the first floor and for the rest of the house.

The furnace is set in rather a confined space, but it is out of the way, and the pipes have a short run. The pipes go on the north side of the basement girder.

In some particular cases where the ground is of the proper slope a high basement is built with a kitchen and dining-room. Most of the work is done downstairs. It is a handy arrangement in some ways, but there is one drawback that sometimes gives the name of "woman killers" to such a house, and that is the trouble of reaching the front door on the main floor. When the bell rings it has to be answered and the work left. Before getting well started again to do the interrupted work the ringing may recommence, and it does not add to the housewife's good humor to go up and find a man selling shoeblack.

If a passage can be carried through to the front, as is done in thousands of Eastern houses, the trouble is done away with; but in the West, at least, such houses are not popular. The basement door in the front of the house scarcely satisfies the average householder.

If a few iron hooks are built in the wall a ladder may be hung out of the way under the pantry.

The basement stair has too many winders, but the room is limited on account of not running out the wall.

On the rear it opens at the lowest point of the ground, and does away with the necessity of steps. It is a basement where no steps or only a few are required to reach ground level.

The First Floor

There is a total workable space of 24 x 44 ft., for the porch is a part of our dwelling-place. With respect to the porch, it is made 8 ft. 11 in. over the flooring and 8 ft. 9 in. over the brick below. This leaves room for the base and projection of the flooring. It is better to allow an inch for cutting flooring. The boards in this case would be 18 ft. long, to be cut in two.

The vestibule is but a small space, but it is large enough to permit of a double door arrangement to keep the wind and cold out of the house when the front door is opened.

Hall.—The opening to the parlor is made large enough to practically make the two rooms into one. Part of the stair railing is shown facing the door, where it adds to the beauty of the hall much more than if run up straight against the wall, as used to be the custom. Only a half window is shown.

When detailed out the hall may have the main newel running clear to the ceiling and a wood cornice around, or it may be left of the usual hight and an electric light fixture put on top.

There has to be an extension on the side for the stair to keep it without winders and from landing too far to the south on the second floor. Apart from winders, which should scarcely ever be permitted in a front stair, another way of avoiding the extension is to start the rise between the hall and the kitchen and running up from both sides. This blocks the way to the front door, and should never be so arranged. A level passage is imperative.

Parlor and Dining-Room.—Laying aside the extra space furnished by the hall, the dining-room is made the larger of the two, because the table always takes up space, and usually more people gather here than in the other.

The opening is made only 6 ft. instead of 7, which is the size of the other. A sliding door is not shown, but may be used. It cuts off about 6 in. in a house that is not any too large. There is also the extra expense.

Many dining-rooms are built without a china-closet, but in this case the pantry is wide enough to allow one in the center of the room. It is worth all it costs in a small home.

The bay window not only adds beauty to the design, but extra space and a fine view to the southwest. In the center space there is only a half window to allow for flowers or pictures on the shelf. A shelf about 18 in. wide with a couple of drawers and doors below makes an excellent finish in a room.

A square bay may be substituted for the one shown and the line at the floor be straight with the projection at a height to suit either for a seat or shelf.

Pantry.—The pantry is large enough without being run clear over the width of the house, and a space is left in the corner for a little "conservatory" or a few shelves for plants. If desired a glass enclosure can be run around clear to the floor of the sun parlor. A door 2 ft. wide is put in. This might be made a very useful corner by those who have a fancy for flowers.

The swinging door was originally put in the partition between the kitchen and dining-room, but was changed. As noted elsewhere, this is a matter of personal choice, with the advantages in favor of the door through the pantry.

Ice-Chest and Chute.—Inside the pantry there is a space for an ice-chest with a feed arrangement from the outside, and the clothes-chute is taken out of the space unnecessary for the chest rather than out of the kitchen, where the area is already small.

Entry Hall.—A small one is used at the rear for the milkman or the milkmaid, and also for a windbreak. The partition is kept out far enough to receive the sink. The door has to be left-handed in order to fold against the sink and take up less floor space.

Protection.—It is a common practice to have a sliding chain catch on the rear door in case of a tramp calling on a dark night. The better way would be to have a sliding panel, and not open the door at all. Another method is to have an electric attachment on the inside of the kitchen door to open the outside one, and then examine the visitor through a panel while standing safe in the kitchen, the electric light being in the center of the entry hall. This system is employed in all large cities where doors on the street level are opened from the upper stories, especially in the case of "flats."

Kitchen.—This room is made as large as possible for such a size of a house. The sink is placed in the corner where the room is lost by the folding of the door in any case, and to have plenty of light a window is placed above it.

After the original plan was finished the old question came up about a separate stair from the kitchen, and it was solved in the manner shown. The extension already made for the main stair was carried to the west far enough to receive a narrow flight of steps with winders, which are sometimes necessary to save room. The kitchen is too small to put the stair inside of the main line. The ceiling is carried clear across to the main wall.

With this arrangement anyone can walk from the kitchen, open the door on the main landing and go upstairs without attracting notice from callers in the parlor. I recently saw this economical plan used in a house costing about $18,000, and the architect so spoiled it that the door at the landing was only 18 in. in the clear instead of 24, as in this case. For such a house an entirely separate stair is usually put in. With a small door Aunt Dinah could not go upstairs by the rear way if she had filled up on her own pancakes. She would have had to walk clear through the end of the grand hall-parlor extending across the whole front of the house.

Closets.—In general it is dangerous to leave a small space below a stair to be used. In this kitchen there would be one for a few useful shelves. Doors should not be put on, or the old trouble of enclosed sinks would arise, where every kind of rag, and brush and soap was stuffed in the unhealthiest and worst-smelling part of the house. Open shelves would have to be kept in order. Some might prefer a door between the partition and chimney, but it is not really necessary, since there is one in the main hall, and it would take up floor space.

The door at the head of the basement stair is made low enough to swing in. In some ways it is handier to have it turn out, especially when coming up from below with a load in the arms, but it takes up less room, as shown.

Chimney.—As already noted, the position of the chimney is settled for the whole house by the dining-room partition for a north and south line; it cannot be moved to the east, for this would block the entrance to the basement stair; nor to the west, for it is too far west as it is to suit the furnace. A straight wall in the dining-room is more important than in the kitchen. If the chimney projected into the dining-room any piece of furniture set against it would be kept away from the wall and take up too much space. It makes what the bungalow people would call a "cozy corner" for a sofa, where Aunt Dinah or Uncle Ephraim might repose after the feast of pancakes.

One reason for moving the door to the panty entrance style is that the partition is required for a gas stove or range near the chimney. A fireplace might be put in the dining-room if desired and the chimney then moved straight on the kitchen side, but there is not much room for that in such a width of a house, where even the corner space is useful.

Even the studs at the side of the kitchen stair are placed flat to gain two inches. They are so braced and nailed to the stair that this method is satisfactory.

Platform.—A good-sized one is allowed on the rear. If a servant is kept, she is entitled to a little porch of her own, where she may set pails, baskets, brooms, chairs and her "steady" in a grand indiscriminate confusion.

Steps.—The front steps extend far enough without running clear to the posts. A short railing is then put in. But if a potato cellar is used it would look better to have the steps run from post to post, so as not to show brick under that end of the porch and wood lattice work under the other, unless willing to pay for brick all around. This, however, cuts off the light and ventilation.

(To be continued.)

What Builders Are Doing

Bird's-Eye View of Building Situation in Leading Cities

THE closing month of the old year witnessed a considerable shrinkage in building operations as compared with the corresponding month of the year before, this being due no doubt to the general conservative attitude assumed by prospective builders throughout the country. Notwithstanding this fact, there is a feeling of hopefulness pervading all branches of the industry, and unless some serious shock to confidence results by reason of political uncertainties or otherwise the spring should open with a gratifying volume of business in sight. An analysis of the reports from leading centers of the country indicates the gains and losses fairly well divided. It is quite natural to expect a practical cessation of operations in those cities where the weather is unusually severe, and a majority of the losses reported are in cities of this class, or in those where, by reason of some unusual local conditions, great activity prevailed a year ago.

Taking the 12 months of the year just closed, there has been a decline of something like 15 per cent in the value of building operations for which permits were issued as compared with the 12 months of 1910. Some of the more important cities showing gains for last year are Cincinnati, Milwaukee, Cleveland, Buffalo, Hartford, Evansville, New Haven, Worcester, Louisville and Dallas, while the cities showing important decreases include Seattle, Spokane, and Tacoma, in Washington; Salt Lake City, Portland, Ore.; Atlanta, Cedar Rapids, Denver, Duluth, Newark, Nashville, New York, Omaha and Oklahoma City.

Atlanta, Ga.

The report of city building inspector Ed. R. Hays shows that during 1911 there were 4402 building permits issued calling for an estimated outlay of $6,215,892, while in the 12 months of 1910 there were 4,519 permits taken out for construction work amounting to $7,405,950. The reason for the falling off in operations during the past year was due to the fact that many large buildings were started in 1910 and were not completed until 1911. Then again the city erected many school buildings in 1910 the permits for which swelled the figures for that year to an abnormal degree.

The record for 1911 is ahead of that of any recent year except 1910, which was in a way phenomenal in the matter of building improvements.

Baltimore, Md.

The annual report of Building Inspector C. E. Stubbs shows that for the 12 months of 1911 the estimated value of new buildings for which permits were issued was $8,901,-198, and, counting the amount expended for additions, alterations, etc.—$803,450—brings the total to $9,704,648.

Of the work planned during the year 2393 two-story brick dwellings were included calling for an outlay of $3,542,442. There were, on the other hand, only 95 three-story brick dwellings costing $262,501. Builders express the opinion that the reason for this small number of three-story houses is that the great majority of the two-story dwellings now being constructed are much larger and more convenient than the ordinary two-story brick dwelling so common a few years ago. Most of the new two-story houses have eight rooms, while many of the three-story houses have but nine rooms, and the difference in the number of rooms does not make it worth while to build the three-story house.

There were 73 manufactories and warehouses planned costing $1,851,817, and there were 13 apartment houses costing $597,842. In the way of office buildings there were three planned costing $825,000, and there were two city schools costing $464,150.

During December new construction work was planned calling for an outlay of $614,520, and there were 44 additions to cost $52,790. Of this total $487,112 was for 280 two-story brick dwellings.

Boston, Mass.

The members of the Master Builders' Association held their annual meeting at noon December 20 at the headquarters of the organization, 166 Devonshire Street, the meeting marking the beginning of the 28th year of the life of the organization. Officers for the ensuing year were chosen and several measures intended to increase the effectiveness of the organization were adopted. The annual report showed a membership of 258.

Parker F. Soule was re-elected president; D. Bradford Badger was elected vice-president, and William H. Sayward was elected secretary-treasurer for the twenty-eighth time.

Following the transaction of the formal business the rooms were thrown open to members and their friends for an informal banquet.

Chicago, Ill.

The city established a record for building operations in 1911, the only years anywhere near approaching the estimated cost of the improvements for which permits were issued in the last 12 months being 1909 and 1910. The figures of the Building Department show that permits were issued in the year just closed for 11,201 buildings having a frontage of 305,603 ft. and costing $105,269,000, which is an increase of a little more than $6,000,000 over 1910.

August was the biggest month during 1911, with a record of $26,200,000, this being due to the building regulations which went into effect September 1 limiting the hight of buildings to 200 feet. The next nearest month was July, with building permits aggregating in value $11,300,000. January was the lightest month, with $3,143,000.

Assurance of a new railroad passenger depot on the site of the present decrepit Union Terminal has added greatly to the boom of West Madison street property. Several important deals have taken place recently in that section of the city. The close proximity of West Madison street to the Chicago & Northwestern and the Union railway terminals will make that thoroughfare more valuable for building purposes.

The contract has been awarded to the Vierling Iron Works for the steel structural material for another Loop office building, to be located at the northwest corner of State street and Jackson Boulevard, and will be nineteen stories high. Its cost will be $2,000,000.

Cleveland, Ohio

Building permits issued in Cleveland during the year 1911 broke all previous records. During the year there were 7,860 permits isued for buildings, the estimated cost of which is $16,994,677. This is a gain of $3,460,246, or 2- per cent. over 1910. The previous banner year was 1907, when 8,174 permits were issued for buildings to cost $15,800,407.

During December there were 512 permits issued for buildings to cost $2,230,880.

The building outlook for the coming year is very promising. Among the larger structures now under way are the Cleveland Leader and the new City Hall buildings. Foundations for the latter are in and the contract for the superstructures is about to be let. The other buildings upon which the construction of which is more advanced are the Statler Hotel and the Central Y. M. C. A. building, both of which are under roof. There are several large building projects under consideration, and some of these are likely to develop into actual work early in the year.

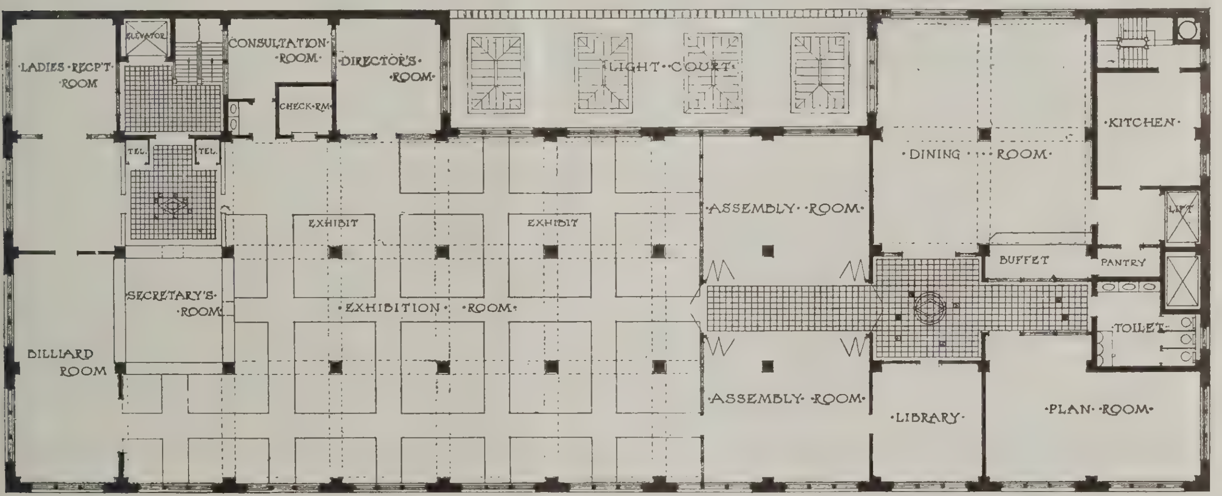
Columbus, Ohio

The officials of the Builders' and Traders' Exchange have for some little time past been seriously considering the advisability of taking larger quarters where an exhibition department could be made a permanent feature—something after the nature of those to be found in connection with quite a number of the leading exchanges of the country. Secretary John A. Kelley states that the matter has now come to a head, and it has been practically decided to take the second floor of the new five-story Jeffrey office building on the east side of Third Street, between Long and Gay Streets. This floor contains about 13,000 sq. ft. of space, or four times as much as the quarters at present occupied by the Exchange. It is well lighted on all sides and is especially adapted for a large exhibition department of building materials and appliances. The building, which was designed by Architect Otto C. Darst, of Columbus, will be completed about the time the lease expires on the present quarters of the organization in the Brunson Building.

A plan of the second floor of the new building is given herewith, and clearly shows the general arrangement of the rooms and the manner in which the space available is to be utilized. There will be more than 3000 sq. ft. of exhibition space, and it is the intention of the management to make the exhibition department one that will attract all prospective builders—something that has long been needed in the city of Columbus. The department of exhibits will be divided into large areas, and the cost of space will be governed by size, position, etc.

The owners of the new building have agreed to call it the "Exchange Building," and an endeavor will be made to centralize builders and those connected with the building business in this structure.

The management of the Exchange has issued in attractive form a "Brief Review of Exchange Activities During 1911." This gives the names of the officials, the standing committees, a list of the entertainments given, and brief



Proposed New Quarters of the Columbus Builders' Exchange—Otto C. Darst, Architect mention of some of the important happenings, among which are the following: Fifty-seven new members were received during the year, breaking all records, even those of 1910; the secretary secured and placed on file during the year plans for more than 200 buildings, the aggregate cost of which the records indicate to have been close to $6,000,000. The secretary's records indicate that general contractors of the Exchange secured during the year a major portion of this work and the sub-contractors also secured a good percentage of it. About 2500 bulletins of information were posted during the year, including all the detailed lists of bids that could be secured.

Duluth, Minn.

At the annual meeting of the Builders' Exchange the following officers and directors were chosen for the ensuing year:

President......F. J. Nixon
First Vice-President......F. A. Carlson
Second Vice-President......L. J. Klippen
Secretary......E. R. Cobb
Treasurer......Thomas Thorburn
Sergeant-at-Arms......James Quigley

The following directors were also elected: John Schleunes, J. P. Hollihan and E. E. Burns.

Standing Committees for 1912.

Membership—Frank A. Carlson, Chairman; R. J. McLeod, M. J. Harney, J. O. Porlier, H. Homa, F. H. Farrell and E. J. Bunker.

Finance—Alexander Anderson, Chairman; Wallace Wells and D. R. Black.

Legislative—C. E. Evens, Chairman; H. R. Armstrong, William Burgess, R. G. Borland and J. P. Hollihan

Resolutions—Theodore Nauffts, Chairman; W. G. Zimmerman, J. R. Quigley, E. E. Burns and A. H. Krieger.

Labor—J. F. Schleunes, Chairman; G. H. Lounsberry, A. W. Deetz, A. W. Lindgren, H. A. Hall, Louis Ramstad, J. T. Stack, W. B. Dunlop and Emil J. Zauft.

Public Affairs—R. A. Webster, Chairman; Z. D. Scott, Emerson Vokes, Alexander Anderson and John Hogan.

Fargo, N. D.

At the recent annual meeting of the Builders and Traders Exchange of Fargo, which was held in the rooms of the organization, at 64½ Broadway, the following officers were elected for 1912:

President......P. L. E. Godwin
First Vice-President......T. P. Riley
Second Vice-President......H. A. Klinsmann
Treasurer......H. T. Alsop
Secretary......Victor H. Leeby
Sergeant-at-Arms......Henry Johnson

Messrs. W. H. McDermott, J. H. Bowers and M. R. O'Neill were elected to succeed the three members of the Board of Directors of nine, whose terms expired in 1911.

The report of Victor H. Leeby showed that 60 plans were displayed during 1911, aggregating fully $1,000,000 worth of work. Of the buildings of which the plans were displayed 98 per cent were designed by North Dakota architects, and were constructed by North Dakota contractors, Fargo contractors securing 50 per cent. of the business. In view of the fact that the past season was rather a dull one in this section of the country, the above showing is regarded as most encouraging.

Houston, Texas

During the year which has just closed there were 920 dwelling houses constructed within the limits of the city of Houston at an expenditure of $1,224,613, which was approximately 35 per cent. of the outlay for the erection of buildings of all kinds in the city. The figures compiled from the records in the office of City Engineer show that the total estimated outlay for new construction work, alterations, repairs, etc., in 1911 was $3,500,849, while in the 12 months of 1910 the total expenditure was $3,752,645.

The erection of dwelling houses in the numerous suburban sections of the city was a noticeable feature of the year's operations, and, taking everything into consideration, the year has been one which furnished employment to thousands of mechanics in the various branches of the building industry.

Jacksonville, Fla.

The year 1911 was without doubt one of the most active in the building industry which the city has witnessed in a long time. According to the records in the office of the Building Commissioners 1343 permits were issued for the erection of new buildings valued at $3,590,805, which is an increase over 1910 of $405,865 and an increase over 1909 of $1,280,780. In 1910 there were 1268 permits issued for new structures and in 1909 there were 1058 permits issued.

Since the great fire of May, 1901, there have been 11,911 new structures erected, including residences and business houses having a total valuation of $32,089,941. Even this record of building activity does not supply the demand, and residences and business houses are much in request. The population is constantly increasing and the business interests of the city are expanding in a way which indicates that 1912 may show even greater results than those attained during the year just closed.

Los Angeles, Cal.

Local building operations in December followed about the same lines as for the two preceding months, the only change being a slight decrease in the valuation of the larger buildings undertaken. This condition is but natural at the close of the year, and with residence work fully up to the average and a number of large jobs pending, contractors are well satisfied with the situation. According to the report of Building Inspector J. J. Backus, permits were issued in December for buildings valued at $1,421,875, compared with $1,797,233 for November, and $1,472,791 for December, 1910.

The calendar year just closed was the greatest in building construction in the history of Los Angeles, the number of permits issued being 12,498, at a total valuation of $23,004,185. This is the highest valuation for the year of any city on the Pacific Coast. In 1910 the total was $21,684,100, the number of permits being 10,738. It is interesting to note that the value for 1911 was nearly double that of 1909, the record year up to that time, when the total was $13,260,703.

A closer analysis of the year's figures shows that nearly half the valuation consisted of one to 2-story frame buildings, nearly all residences, while over 11,000 of the permits (including alterations) were for frame construction. Only 22 Class A buildings were erected, and of these only 4 were over six stories in height. Two of these, 12 and 13 stories, were valued at $1,000,000 each, the other two, of 11 stories, amounting to $1,860,000. It is certain, according to architects, that the construction of dwellings will continue to be a feature of building operations during 1912, and that the average of approximately $1,000,000 per month placed in homes in 1911 will be sustained if not materially increased.

The general contract for a 9-story Class A reinforced concrete store and hotel building, to be erected for C. W. Gates at Sixth and Figueroa streets, has been let to Carl Leonardt on a bid of $118,000. The building will cover a lot 96 x 120 ft., with eight stores and the hotel lobby on the ground floor, with 264 guest rooms in the upper floors. The interior woodwork throughout will be of birch, with finished cement floors. The carpentry contract has been let to H. H. Hinds at $72,814, and the plumbing to H. Babcock at $27,500. The plans were drawn by Wm. Curlet & Son, San Francisco, and Eisen & Son of this city were the supervising architects.

Figures have been received on the Garland Theatre building on Broadway, near Eighth street, to cost about $400,000; Morgan, Walls & Morgan, architects. The building will be 11 stories high, with 200 offices on the upper floors, a theatre with seating capacity for 1500, and several stores on the two lower floors.

The Alta Planing Mill Company has the construction contract for the Los Angeles Soap Company's new building at $42,246.

The principal buildings for which contracts will be let during January and February are the following: a 6-story reinforced concrete warehouse covering a lot 100 by 200 ft., to be built for F. W. Braun on Avery street, near Third, at a cost of $150,000, W. J. Saunders, architect; the 11-story Clark hotel, with a frontage of 166 ft. on S. Hull street, to be built of reinforced concrete at a cost of about $700,000, Harrison Albright, architect; the 7-story Baldwin apartment house at Seventh and Garland streets, to cost $250,000, Eisen & Son, architects; and a 4-story concrete building at Los Angeles Harbor for the Bank of San Pedro, to cost about $60,000, Edelman & Barnett, architects. The new city council is also having plans prepared for many alterations and additions to the present city hall and other municipal buildings, including an addition to the city jail amounting to $125,000, to provide accommodations for the police department.

The local militia has employed an architect to draw plans for an armory building, for which the sum of $200,000 is available.

Louisville, Ky.

For the calendar year ending December 30, 1911, the estimated outlay for building construction was, according to a statement issued by City Building Inspector Tilford, $8,951,123.75.

For the purpose of comparison and to illustrate fully the rapid and steady increase of building in Louisville, Inspector Tilford gives the figures covering building operations for the calendar year of 1901, when $2,572,147.50 were expended for building construction. He states that the increase shown does not partake in any respect of a "boom," but the increase has been gradual, and only buildings absolutely required for dwellings, factories, stores, office purposes, etc., have been erected.

The outlook for the coming year is full of promise, and Inspector Tilford expects to see the high water figures of 1911 fully maintained.

Miles City, Mont.

At the annual meeting of the Builders' and Traders' Exchange of Miles City, Mont., the reports presented show that the organization has enjoyed a reasonably satisfactory year, and the feeling for 1912 is one of encouragement. The officers for 1912 are:

President.............................. E. Lum
Vice-President..................George Harrigan
Secretary........................ R. H. Deebach
Treasurer........................Fred Clearman
Sergeant-at-arms.................. M. K. Nybo

Minneapolis, Minn.

A most interesting affair was the annual meeting of the Builders' Exchange of Minneapolis, held in its quarters on South Sixth street on Jan. 2. After the usual buffet luncheon had been properly considered, President H. M. Gardner called the meeting to order, and in a brief address reviewed the work of the year. He touched upon the question of accident compensation and legislation; the matter of trade education, and recommended that the Exchange affiliate with the new Minneapolis Civic and Commerce Association which has just been formed. One of the most important moves that the Exchange has made was the institution of a Labor Bureau through which to secure men for employers and work for the men. The Public Library has agreed to maintain a circulating library in the rooms as soon as provision can be made for it. President Gardner favored the Exchange instituting a satisfactory credit bureau to be associated with different credit associations which are maintained by different branches connected with the Exchange.

The report of Secretary Eugene Young showed that 36 new names had been added to the membership during the year, bringing the total, including resident and non-resident, up to 283. There were 625 sets of plans handled through the Exchange during the year, which came from cities outside of Minneapolis. These plans were figured by 3240 firms.

The election of officers for the ensuing year resulted in the following choice:

President........................H. M. Gardner
1st Vice-Pres.........................W. C. Pike
2nd Vice-Pres......................E. C. Kischel
Secretary...................... Eugene Young
Treasurer.................... Harry B. Cramer

The Minneapolis Architectural Club gave its annual holiday entertainment at its headquarters in the Meyers Arcade on the evening of December 27, when there was presented a playlet entitled "An Architectural Competition," which dealt with incidents pertaining to the average architectural contest. It was humorous to such an extent as to excite the risibilities of those present, and the whole affair was very cleverly managed.

Nashville, Tenn.

The falling off in building operations during the past year, as compared with the preceding 12 months, amounted to about half a million dollars, but this was due almost entirely to the fact that the new high school building, involving an expenditure of $400,000, required no permit, and if this should be added to the total for 1911 the results would be almost identical with those for 1910, which was a very fair year in the way of building operations. The total for the year just closed was $1,209,977, as compared with $1,623,599 in the 12 months of 1910.

The general feeling among architects and builders as regards 1912 is one of encouragement, and plans are now on the boards for a number of costly structures, among them being the new Galloway Memorial Hospital, which will cost something like $150,000.

New York City.

The building year closed very quietly in this city and the attitude at the moment of architects and builders appears to be more or less of a waiting one. The filing of permits in December in the Borough of Manhattan was practically the same as in December of the previous year and there is very little difference in the estimated cost of the new structures planned in the two periods. According to the report of R. P. Miller there were 48 plans filed last month for new buildings, estimated to cost $6,319,600, while in December of the year previous 49 new buildings were planned involving an estimated outlay of $6,159,784. Prominent among the work last month were two private dwelling houses costing $280,000 and 12 high class apartment houses costing $1,845,000. In December 1910 there were 10 buildings of this class planned costing $2,380,000. Of stores, lofts, etc., estimated to cost over $30,000 each there were 12 planned in December last costing $3,065,000, while in December 1910 there were 9 buildings of this class planned costing $2,320,000.

For alterations, repairs, etc., 200 permits were issued in December last, estimated to cost $878,521, and in December 1910 there were 223 permits issued in this class of work calling for an estimated outlay of $1,016,193, and these figures must be added to those for new construction work to find the months' totals.

In the Borough of the Bronx there was more work planned in December than was the case in December, 1910, but this was somewhat exceptional, for the total for last year is far behind that of the year before. According to the report of James A. Henderson, Superintendent of the Bureau of Buildings, there were 130 permits issued in December for building construction, estimated to cost $2,180,230, while in December, 1910, only 68 permits were taken out for construction work costing $870,950.

The record for the past year in the Borough of Manhattan shows 840 buildings to have been planned estimated to cost $98,537,275, while in 1910 there were 838 buildings planned costing $96,703,029, and to these totals must be added $12,753,133 as the estimated cost of the alterations for which permits were issued in 1911 and $11,940,066 as the cost of the alterations for which permits were issued in the 12 months of 1910. The greatest activity was in the construction of apartment houses and store and loft buildings. Of the former 194 were planned, estimated to cost $29,178,000, as against 208 costing $36,923,000 in 1910. Of stores and loft buildings estimated to cost over $30,000 each, 116 were planned last year costing $19,961,000, while in 1910 there were 149 buildings of this class planned, costing $29,466,000.

In the Borough of the Bronx there were 1970 permits issued for new buildings, alterations and repairs calling for an outlay of $24,413,307. These figures represent a tremendous shrinkage so far as the value of the building operations are concerned, as compared with 1910, when 2,672 permits were issued for construction work estimated to cost $45,432,530. A goodly portion of this heavy shrinkage is due to the lessening activity in what is known as tenement house construction; that is, flats and apartment houses, the figures for 1911 showing 368 buildings of this character to have been planned costing $14,292,500, while in 1910 there were 969 of such buildings planned costing $34,845,000. Nearly all class of construction work, however, fell off during the year. It must, however, be remembered that in 1910 there was a great rush to file plans of buildings before a ruling of the Building Department went into effect which prohibited projections beyond the building line. It is hardly just therefore to accept the figures for 1910 as a true indication of the condition of the building situation that year.

In the Borough of Brooklyn the building industry has been adversely affected during the past year by reason of the general attitude of conservatism which has prevailed generally in most lines of business. There were permits issued for 5288 buildings, which called for an estimated outlay of $37,218,384, which was less by $2,576,456 than was the case in 1910.

According to the report of Superintendent John Thatcher the total amount of new buildings and alterations actually completed during the year was $29,857,320, a decrease of $11,703,996 as compared with the year previous.

As in other years the construction of one-family, two-family and store and two-family dwellings largely predominated, there having been 3720 dwellings of this class calling for an outlay of $14,624,495 and 510 tenements estimated to cost $8,017,725. There were 170 factories planned costing $3,471,715.

The average cost of buildings constructed in 1911 in this Borough was $6,165, which is a slightly higher average than that of 1910.

Oakland, Cal.

While the past year as a whole has been fairly active, building operations fell off badly in December. Important single items are entirely lacking, and builders of the usual type of frame dwellings are not willing to begin construction at this season, when work is likely to be interrupted by continued rains. Figures are now being taken, however, on several business structures of unusual magnitude for this city, and if the contracts are let acording to expectations within the next month or two the new year will start with a material gain.

The year just closed has brought some increase in building activities over 1910, and, while in figures the gain is insignificant, a healthy condition is indicated by favorable reports from material dealers and contractors, and the fact that the number of building mechanics out of work is considerably smaller than a year ago. This is partly accounted for by the fact that the latter half of the year has been much better than the earlier months. Permits were issued during 1911 for buildings valued at $6,992,260, compared with $6,913,640 for 1910, and $5,318,525 for 1909. The number of permits issued in 1910 and 1911 was practically the same, amounting to nearly 4000 for each year. Of these, in the last year, only 31 were for brick and steel structures, for which the total valuation was $1,620,951, the largest single item being the steel for the new city hall, $234,376; and only 17 were for reinforced concrete. Dwellings and apartments numbered 1679, while permits for alterations and repairs totaled 1736.

The principal local structure on which figures are now being taken is to be erected for Cohn Bros. at Washington and Twelfth streets, and according to the plan of Architect Walter J. Matthews will be 20 stories high, exceeding in height any building now existing around San Francisco Bay. Other buildings on which figures will be taken shortly are an 11-story concrete hotel at Thirteenth and Harrison streets, to cost $100,000, R. J. Pavert, architect, and a 12-story office building at Broadway and Thirteenth streets, to cost $400,000, C. W. Dickey, architect.

J. H. Corey, a pioneer building contractor and brick manufacturer of this city, died Jan. 1 at his home in Alameda, aged 77 years. He was a native of Vermont, and came to California in 1857. He supervised the construction of many of the largest brick buildings in Alameda County.

Omaha, Neb.

The annual election of the Omaha Builders Exchange was held in the headquarters of the organization, 601 Barker Block, on January 2. Officers and directors for the ensuing year were chosen as follows:

President......................William Redgwick
Vice-President..................Robert Sanderson
Treasurer..........................Thomas Herd
Secretary.......................Charles A. Grigg

The annual dinner was held at Courtney's Café, and was a most enjoyable affair. The printed menu was a novel feature in that the various courses were designated by terms familiar in building work.

We have received from the secretary a copy of the Official Directory of the Omaha Builders' Exchange for 1911, this consisting of a 72-page publication containing the by-laws and directory of the members of the Exchange; rules to govern the measurements of material and labor of mason's work; names of the architects of the State of Nebraska and Iowa, and business classification of advertisers and an index to the contents. Scattered through the directory are half tone illustrations of some of the important buildings of the city erected during the past year.

Philadelphia, Pa.

While the real estate market during 1911 was in a rather depressed condition during the greater part of the year, the volume of new work begun within the city limits was exceeded in but two years—1906 and 1909—since the establishment of the Bureau of Building Inspection. Dwelling house operations approximated very closely in value the total for 1910, although the number was smaller. Operators were cautious in their undertakings, as it was evident that dwellings were not being disposed of as readily in some districts as had been the case for several years past. Financial difficulties embarrassed several large operators and a disposition not to overbuild was to be observed in several of the usually active districts. Increased building of manufacturing plants, municipal and office buildings was a factor in bringing the year's total to the figures recorded.

Statistics compiled by the Bureau of Building Inspection show that 8870 permits were issued for 16,215 operations, at an estimated cost of $40,030,985, which indicates a gain over 1910, when 8502 permits for 16,383 operations, costing approximately $37,866,565, were issued. In the two years during which the figures for 1911 were exceeded, 1909 and 1906, the authorized expenditure was $42,881,370 and $40,711,510, respectively.

Of the total building work during 1911 dwelling houses, including apartments and tenements, represented an expenditure of $21,638,150, or slightly over 53 per cent. of the total volume. Of this total $15,959,075 represented two-story dwelling operations, or about 70 per cent. of the total dwelling house building, and representing close to 38 per cent. of the total building operations for the year. During 1910 aggregate dwelling operations under the same classification named above totaled $22,995,940, representing a decline of $1,357,790 during 1911, largely represented by a decrease of $733,300 in three-story and $218,900 in four-story dwelling operations, and $303,500 in apartment houses. In two-story dwellings the comparative statements show 1226 permits for 7633 operations, costing approximately $15,959,075, in 1911, as compared to 1298 permits for 8009 operations, at an estimated cost of $15,944,775, in 1910, or an average cost of $1,991 per dwelling during 1910, and $2,091 per dwelling during 1911, which would appear to indicate that the cost of building this class of work was gradually becoming higher, although it is also true that the standard, as far as building and finish are concerned, is steadily improving in character.

The total expenditure authorized last year for apartment and tenement houses was $1,066,700, as compared with $1,468,500 in 1910. Municipal expenditures during the past year, embracing schools, bath houses and miscellaneous municipal buildings, almost doubled that of the previous year, $2,567,180 representing the authorized expenditure in 1911 and $1,381,575 that of 1910.

Factories, warehouses, garages and power houses contributed a large share of the total of the past year's business, upward of $5,000,000 being expended for this class of work. Office buildings authorized represented an expenditure of $1,033,480, almost double that of the previous year.

Miscellaneous work, comprising additions, alterations, repairs, etc., was on a comparatively even basis, that authorized in 1911 aggregating $6,576,010, as compared to $6,798,910 in 1910.

The building trade for 1912 is viewed with considerable encouragement. While two-story dwelling house work will probably not go forward so rapidly in certain sections of the city, other districts heretofore undeveloped to any great extent will be the field of greater activity. A considerable amount of large building work will develop in the center of the city early in the year. In instances bids have already gone in, in others specifications are, in the majority of cases, ready for estimate. These include the new Stock Exchange Building, $750,000; additions to the Bellevue-Stratford Hotel, $1,000,000; the new Manufacturers' Club, $750,000, and the new Hotel Vendig, $500,000. It is also stated that plans for the Thomas W. Evans Museum and Dental Institute will be approved in a short time. Bids have gone in for a clubhouse for the Automobile Club of Philadelphia, to cost $250,000, and plans for a number of other large projects are on architects' boards, and are expected to develop during the early part of the year.

A number of moderate building operations in dwelling houses have been started, while others are being planned. Permits have been taken out by J. M. Holmes for 22 two-story dwellings 18 ft. 5 in. x 34 ft., to be erected in the vicinity of 24th and Cambria streets, and a further operation of 50 dwellings in the same vicinity is projected. Martin Maloney, it is stated, is having plans prepared for 58 two-story houses 15 x 42 ft. to be erected at 58th street and Osage avenue, while E. Allen Wilson, architect, is planning 60 two-story dwellings 15 x 46, 15 x 50 and 14 x 34 ft. to be built at 28th and Clearfield streets by George H. McCracken.

The Builders' Exchange celebrated, on December 30, the closing of the old and the beginning of the new year, in the Exchange Building, Seventh above Chestnut street. The affair was largely attended. President James Johnston made an interesting opening address. John D. Carlisle and Frank H. Reeves also made brief speeches. A vaudeville entertainment, luncheon and general goodfellowship filled the afternoon hours. Plans for a subscription dinner of the members of the local exchange are under way. This will be held on January 24, at the Bellevue-Stratford Hotel.

Secretary Smith of the Builders' Exchange announced that the following delegates will represent the Philadelphia Exchange at the convention of the Pennsylvania State Association of Builders' Exchanges, held in Scranton on January 16: John R. Wiggins, Patrick Smith, J. Atkinson, F. M. Harris, Jr., H. Andrus, J. J. Ryan and James Johnston.

Portland, Ore.

While contracts let in November will provide work for several months to come, the letting of new contracts dropped off materially in December, making it one of the poorest months since last February. The total of building permits for the month is $1,288,476, which makes a very poor showing as compared with that of $4,715,420 for the same month of 1910 and shows a sharp decrease from the $2,046,785 for November. The decrease is attributed partly to the seasonable rains, which are causing much delay in all classes of construction work, though it must be admitted that there is less work either on hand or in prospect than at the same time last year.

The year as a whole has, nevertheless, been a fair one. The total value of building operations for 1911 is $19,-

095,840, compared with $24,604,957 for 1910, but a considerable part of this valuation was due to unusual conditions, and would normally have been distributed through the early months of last year, making the two years about equal. The total for 1909 was $13,489,580, compared with which last year's record is quite encouraging. There was some fear of overbuilding a few months ago, but the demand for store space is apparently reviving and more important buildings are being planned and talked of than for several months past. The demand for dwellings is also increasing and there is little doubt that the present year will bring a material improvement in the building trades.

The Westminster Presbyterian Church, of this city, is taking figures on the construction of a new edifice designed by Architect Ellis F. Lawrence, the cost of which is estimated at $150,000.

Lee Decamp, architect for Sullivan & Considine, is preparing plans for the new theater to be erected at Seventh and Yamhill streets, this city.

Among the larger buildings for which contracts will be let early this season are the following: A seven-story reinforced concrete building, of strictly fireproof construction, to be used by Eastern firms as a machinery warehouse; it will cover a large area at the corner of First and Ash streets, and the cost is estimated at $600,000; Claussen & Claussen, architects; the first unit of the Reed College, cost estimated at $350,000; a six-story home for the Portland Women's Union at Tenth and Montgomery streets, Whitehouse & Fouilhoux, architects; and a two-story frame apartment house at East Eighteenth and Salmon streets, to cost $75,000, N. Henkle, architect.

Sacramento, Cal.

Building in Sacramento is more active than ever before, permits for December reaching a total of $982,691. This month was perhaps exceptional, yet the requirements of the city are rapidly increasing, owing to its importance as a distributing center for a growing agricultural district. An enormous proportional gain has been made in the last year, the valuation of buildings for which permits have been issued in 1911 being $3,087,392, compared with $2,326,606 for 1910, and slightly over $2,000,000 for 1909.

Several good sized buildings are scheduled for construction early this year. The State Engineering Department has completed plans for the $100,000 State arsenal and armory, figures on which will be taken very shortly, and the permit has just been issued for the erection of the county court house, Lindgren Company contractor, at a cost of $560,000. Local Masons have succeeded in financing a project for a $500,000 temple, for which plans will soon be completed.

San Diego, Cal.

The total valuation of buildings for which permits were issued in December was $424,770, compared with $602,305 for November and $277,900 for December, 1909.

The total for the past year shows a large gain over the year before, the figures being $5,713,605, as compared with $4,005,200 for 1910 and $2,632,100 for 1909.

San Francisco, Cal.

The usual interruption of business during the holidays and the tendency to postpone the letting of large contracts until the beginning of a new year have been felt to some extent in the building trades, as the amount of new work undertaken in December was less than for any other month of the year. According to the official record, permits were issued for buildings valued at $1,207,484, compared with $1,617,890 for November. This decrease, however, was not unexpected, and the record is considered fairly satisfactory as compared with that for December, 1910, when the total was only $958,758. While figures were taken on several rather important structures, contracts on such buildings were all withheld until the first of the year, and few jobs of over $100,000 have been awarded. The total is made up mainly of small business buildings and small to medium-sized apartment houses, very few of either type being of Class A construction, while brick and frame residence work is an item of some importance.

The record for the year 1911 is $20,915,484, a slight gain over 1910, when the total was $20,546,547, though the total for 1909 was $25,403,571. The totals of the last three years are small as compared with the years immediately after the fire of 1906, when yearly values varied between $28,000,000 and $50,000,000; but a continuation of such abnormal activity could not be expected, and the past year's record compares favorably with that of 1905. The present feeling among local financial interests is that the city is well built up for the present, and that construction should be limited to the demand for accommodations, whether commercial or residential. Money is readily available, however, for the ordinary needs of the city in building operations, and contractors are entering the new year with confidence of gradually increasing activity.

Labor conditions in the building trades are more satisfactory than for several years past. In practically all lines agreements have been made regarding hours and payment, to remain in effect through 1915, with satisfactory arrangements regarding the adjustment of differences. Employment is easily obtained in San Francisco and suburban towns, and many carpenters have had steadier work for the last six months than for a long time previous, though conditions are not yet such as to require more workmen than are now in the city.

Some lines of building material show increasing firmness, though the only noticeable advance in prices is on steel products. Dealers in lumber, however, predict some advance in the near future, and while cement is still easy, with some surplus on hand, manufacturers look for a strong market by the time the leading plants resume operations in the spring. Brick remains steady, the demand being about equal to the present output, while manufacturers of standard brands of lime report an unusually large demand. Local imitations of "tapestry" brick have recently been used on several handsome buildings and are finding considerable popularity, though pressed brick and terra cotta are the facing materials most used.

It is evident that public buildings will be an important factor in this year's work. According to Supervising Architect Taylor of the U. S. Treasury Department, plans for the Subtreasury building in this city are complete and bids will be solicited very shortly. The local board of public works will receive bids January 24 for the construction of a Class A pumping station for the auxiliary fire protection system in the Fort Mason reservation, and $300,000 has been appropriated to cover the cost. There are also a number of important school buildings to be erected during the year and the Geary street power house will come up within a few months.

The most important municipal work in prospect is the erection of a permanent city hall in connection with the proposed "Civic Center," in which the new Mayor is cooperating with the officials of the Panama-Pacific Exposition. It is announced that the first work of the new supervisors will be the financing of this project, and suggestions from local architects regarding the civic center are being informally discussed by the city officials. When the general scheme has been adopted it is expected that an architectural competition will be inaugurated for the construction plans.

One of the principal buildings for which contracts have recently been let is a seven-story Class C hotel at Bush street and Grant avenue, L. B. Dutton architect. The general contract was taken by Stockholm & Allyn, at $72,437, the structural steel, amounting to $9563, going to the U. S. Steel Products Company. Contracts are now being let on the Mount Zion Hospital, to cost about $250,000, J. E. Krafft & Sons, architects.

Aside from the numerous large structures on which figures have already been taken, the principal buildings on which contracts are to be let in the near future are as follows: a five-story reinforced concrete apartment house on O'Farrell street, to contain 100 apartments, estimated to cost $175,000, C. J. Rousseau, architect; a seven-story Class A hotel at the southwest corner of Bush street and Grant avenue, to cost $200,000, F. H. Meyer, architect; a three-story and basement brick veneer apartment house on Washington street near Gough, containing 18 apartments and a roof garden, to cost $40,000, A. F. & C. M. Rousseau, architects; a five-story brick and steel apartment house containing 45 two- and three-room apartments, on Jones street near Ellis, to cost $50,000, O'Brien Bros., architects; and a five-story brick warehouse of semi-mill construction for the J. I. Case Threshing Machine Company, to cost about $60,000, G. A. Lansburgh, architect.

San Francisco architects have shown some ingenuity of late in designing apartment houses of the "terrace" type, in which the various apartments, in small groups, are arranged on the steep hill slopes of the city in such a way as to give a maximum of light and view to each apartment and at the same time present a highly picturesque exterior. A structure of this type is now being designed for the corner of Green and Taylor streets by Architect Henry G. Smith. It will contain 20 apartments of two to five rooms, and will cost about $40,000.

Architects Wm. Curlett & Son are drawing plans for a two-story concrete and frame country residence for former Mayor James D. Phelan, of San Francisco, to be erected near Los Gatos, Cal., at a cost of $75,000.

The members of the Masons' & Builders' Association of the city held their thirty-sixth annual banquet and ball at the Palace Hotel on the evening of December 9. The affair was most enjoyable in every way and the spirit of good fellowship prevailed.

James A. Wilson acted as toastmaster and his reference to the first banquet, when he with Matt Gale and Jerry O'Connor sat down to coffee and doughnuts, drew attention to the bountiful tables at which the members were then seated and the difference the years had made in the growth of the organization. Among the other speakers were S. H. Kent, Supervisor E. L. Nolan and John J. Phillips. At intervals during the evening a program of music was most acceptably rendered by vocal and instrumental soloists.

Seattle, Wash.

The closing month of the year witnessed a considerable shrinkage in the amount of new construction work as compared with the closing month of 1910. This applies both to the number of permits issued and to the estimated value of the improvements. The report of Superintendent R. H. Ober for last month shows that 555 permits were issued by the Department of Buildings for construction work valued at $326,890, while in the same month of 1910 there were 794 permits issued for buildings valued at $752,503.

A study of the figures for the 12 months of the year just closed shows that the very conservative attitude of builders during that period is sharply reflected in the totals when contrasted with those for the corresponding months of 1910. According to the authority in question last year witnessed the issuance of 10,959 permits for building improvements carrying a valuation of $7,491,156, while in the 12 months of 1910 there were 13,071 permits issued for construction work valued at $17,163,080.

An analysis of the figures shows that something over three and a half million dollars was due to the falling off in office and store buildings; something over a million dollars to the lessened construction of churches, hospitals, theaters and municipal buildings; something over a million and a half to the falling off in apartment houses and hotels, and a little more than a million to the falling off in residence construction. The shrinkage in warehouse and factory construction also accounted for a little more than one and a half million, there having been 79 of this class of buildings erected during the year just closed as against 123 in the 12 months of 1910.

St. Louis, Mo.

Building operations in 1911 were of about the same volume as for the year previous, the list including 11 office buildings, 208 stores, 23 schoolhouses, 96 factories, 44 warehouses, 12 mercantile buildings and 35 theaters. The estimated cost of the new improvements has been about a million under the cost of those projected in the twelve months of 1910. According to the report of the Bureau of Building Inspection there were 6324 permits issued for new buildings costing $16,574,482 and 2658 permits for alterations involving an outlay of $2,033,307, thus making a grand total for the year of $18,607,555.

In the twelve months of 1910 there were 8704 permits issued for new buildings and alterations calling for an outlay of $19,600,063.

The month of December showed a slackening of building operations as compared with December, 1910, the figures being 304 permits for new buildings costing $526,847 and 161 permits for alterations costing $108,561, giving a grand total of $635,408. The cost of the building improvements for which permits were issued in December, 1910, was $836,879.

Washington, D. C.

The building done by private enterprise in the District of Columbia during the calendar year 1911 amounted in value to $16,362,108 for the 5749 permits issued from the office of Building Inspector Morris Hacker. Out of this total $6,660,570 represented building and repairs in the Northwest section of the city. The month of June led the year with 634 permits for new buildings and repairs valued at $2,143,816, while October showed the lowest activity with 480 permits for work estimated to cost $640,853.

The Builders and Manufacturers Exchange held a meeting January 8 at its headquarters on H Street, N. W., at which the work of the year was reviewed and plans for 1912 were discussed. Music, entertainment and refreshments were features of the evening.

For the fiscal year ending June 30, 1911, the total value of building construction, including alterations and repairs, was $14,698,034. During the year there has been an increase in the number and size of buildings of fireproof construction, particularly hotels, theaters and office buildings.

Boston Master Builders' Association Changes Scheme of Administration

According to the Secretary's Monthly Letter the twenty-eighth year of the existence of the Master Builders' Association of Boston is to be marked by a distinct departure in the scheme of its administration. It has been felt for some time that the entire membership of the organization should be brought into closer touch with its common life. For the fullest measure of good to result to each and all of its members there should be some mechanism by which the experience, opinion and influence of each one shall have opportunity for expression and thus react upon the body as a whole and count for something to all the other members.

With this idea in view the association at its annual meeting December 20 voted the appointment of the following standing committees: On extension of membership; on entertainments; on publicity; on legislation; on forms of contracts; on practices in architects' offices; on code of practice between general and subcontractors; on disputes; on relations of employer and workmen; on compensation for accidents to workmen, etc., and on docks and public works.

It is proposed to assign every present member of the association and all future members as they may be admitted to one or the other of these committees or such others as may hereafter be created. In this way opportunity will be offered to each one to effectively aid in the work and through the channels thus opened the achievement of conditions ever more and more satisfactory to the association, to its individual members and to those with whom they have dealings will be reached.

Officers of Consolidated Building Trades Employers' Association

At a recent meeting of the Consolidated Building Trades Employers' Association officers for the ensuing year were elected and committees announced. The officers chosen were:

President......................A. C. Horn.
Vice-President..............Thomas Smith.
Treasurer...................John Wegman.
Secretary...............W. H. McAllister.

The new finance committee consists of Charles M. Murtha of the firm of Murtha & Schmohl, dealers in building material; E. L. Barnard of C. E. Gates, lumber, and Charles L. Adams of Cross, Austin & Ireland Lumber Company.

Thomas Mannion of the Monumental Plaster Company was elected chairman of the board of trustees.

The Association at present has a membership of more than 500 leading firms and its headquarters are at 1943 Madison Avenue, New York City.

Convention of United Brotherhood of Carpenters and Joiners of America

The seventeenth biennial convention of the United Brotherhood of Carpenters and Joiners of America will be held in Washington, D. C., September 19 to October 1 of the present year. Although conventions held in other cities in the past have been attended by many thousands of delegates and their friends from all parts of the country and Canada, every effort will be made to have the coming convention surpass all others in the way of attendance and interest and a contributing influence will undoubtedly be the holding of the meeting in the capital city. A feature of the meeting will be an elaborate souvenir book of Washington, which will be presented to guests as a fitting remembrance of their visit to the nation's capital.

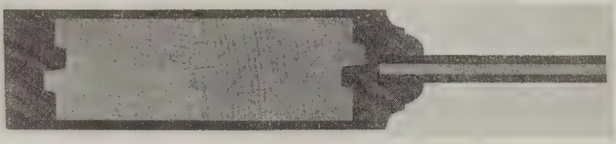
Construction of Craftsman Doors

Some of the Many Designs Available--Distinctive Features

IN the recent past attention has been drawn to the rapidly growing popularity among builders of hardwood doors in modern residence construction as well as in connection with other buildings where a high-grade interior finish is desired. It is a well-known fact that a hardwood door admits of a most beautiful finish and it is not surprising that the architect, the builder and the owner should give serious consideration to the selection of the doors to be installed in any specific building.

It requires no stretch of the imagination to realize that the artistic effect of an otherwise ideal interior is nothing more quickly noticed perhaps than the style of finish and the character of the doors which are used.

There is a great deal of point in the saying which



Cross Section of Stile and Panel of a "Morgan" Door

A Craftsman Door in Wisconsin Brown Ash

Another Style of Craftsman Door, Also in Wisconsin Brown Ash

Construction of Craftsman Doors

very often ruined by reason of the fact that the doors do not accord with the architectural *motif*. The most attractive trim in a house can be cheapened and the interior made to look anything but attractive by the use of flimsy and poorly made doors. In fact when one of keen observation enters a dwelling there is one often hears that "doors make the house," for it is generally recognized that when the doors are substantially made, showing evidence of high-grade cabinet work and are adapted to the general style of their environment they give character to the building and create an impression of harmony and good taste. In the Morgan doors, two examples of which are here illustrated, the designs and construction are along original ideas. The horizontal cross section through the stile and part of a panel affords an excellent idea of the construction involved. The problem of the manufacture of a hardwood door which shall be light, strong, durable, weather and wear-proof and at the same time have all the beauties of the hardwood grain would appear to have been solved. One of the distinctive features of these doors is that every piece of wood going into them is made absolutely dry, and after having once been dried the wood is kept in rooms heated to a high temperature so that no moisture can reenter the pores. After thorough preparation in this manner, the cores or foundations are built up with narrow strips of pine with edges of harwood glued together and then subjected to powerful hydraulic pressure. When this operation has been completed the cores are planed to an even thickness; the face or surface veneers are applied and again subjected for many hours to heavy hydraulic pressure. The grain of the core or center piece is always placed at right angles to the grain of the veneer, which increases the strength and prevents swelling, shrinking or checking.

Death of Henry C. Valentine

Henry C. Valentine, for many years president of Valentine & Company, the well-known varnish manufacturers, died at his home in New York City, January 15, in the eighty-second year of his age. He was born April 21, 1830, at Cambridge, Mass., and entered the varnish business with his elder brother late in the fifties. In 1882 he was elected president of Valentine & Co., which position he occupied continuously until January 1, 1900, when he resigned to become chairman of the board of directors. This latter position he occupied until he retired from business in 1909.

Architectural and Engineering Exhibition

At the second annual Architectural and Engineering Exhibition to be held in the Seventy-first Regiment Armory, Park avenue and Thirty-fourth street, from March 25 to 30, inclusive, a feature which is likely to attract widespread attention is the drawings and models which will represent the architecture of the world. Models have already been completed of buildings in China, India, Africa and Japan and leading architects have been invited to contribute models of prominent buildings contemplated or in course of construction in this country. Architectural and engineering schools and colleges will also exhibit models or drawings made by their students.

Other features will include comprehensive exhibits of building supplies, materials and accessories, and in conjunction with the exhibition there will be a conference of architectural, building contracting and engineering interests. Special attention will be devoted to the subject of fire waste and its reduction, also to suburban home building.

The details of the exhibition are in charge of A. D. V. Storey, 1269 Broadway, New York City.

Drafting of Forms Effects Big Saving Even on Small Plain Job

It is generally recognized that one of the prime reasons for the comparatively high first cost of reinforced concrete buildings is the cost of the material and labor put in the forms. Therefore continued efforts to reduce this item to a minimum are being made by many construction companies. A recent case of the Aberthaw Construction Company of Boston is illustrative of the possibilities of saving even on small jobs by designing the forms in the drafting room instead of putting the fitting up to the carpenter shop.

The job in question was a small structure costing about $26,000 and 50 ft. x 50 ft., four stories high. The design was of the beam and girder type and was made as regular as possible in order to keep the cost down. In spite of this 113 different kinds of forms were required, making a total of about 600 forms in all, taking about 10,000 sq. ft. of stock.

According to the Aberthaw Construction Company's former methods the carpenters not only made the beam sides but fitted them as they went along and each one had to be sawed out. A large saving is therefore made by designing the forms for this small job in the drafting room, as the cost of drafting is very much less than the cost of making up the beams and fitting.

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NOVELTIES

Myers Giant Door Hanger

A large class among the readers of the *Building Age* cannot fail to be interested in the new door hanger which has just been placed upon the market by F. E. Myers & Brothers, Ashland, Ohio, and the general appearance and construction of which is indicated in the accompanying illustrations. The device is known as the Myers Giant Door Hanger and special reference is made to the perpendicular and lateral adjustment, the size of the trolley wheels, which are roller bearing; the great strength of the track, etc. An excellent idea of the construction and operation of the hanger may be gained from an inspection of Figs. 1 and 2, the former representing an end view of the hanger with a cross section of the track, while the second picture represents a side view of the hanger detached from the track. The adjustable features of this hanger are very important, as they enable the user to adjust the door to and from the building in order to prevent snow or rain from blowing in. The perpendicular adjustment permits of the door being raised or lowered, as is necessary, especially in cold weather, when the ground freezes and bulges upward, thus locking the door. Under such conditions by simply turning up the nut or round bar at the side of the hanger the door is raised slightly from the ground, just enough to allow it to clear. The lateral adjustment is made in the same way to shove the door to or from the building, as may be desired. The claim is made that the hanger can be used on doors varying in thickness from 1½ in. to 3 in., or more. It is not only adjustable to every required condition, but is flexible as well.

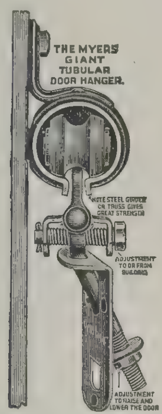


Fig. 1—End View of Hanger

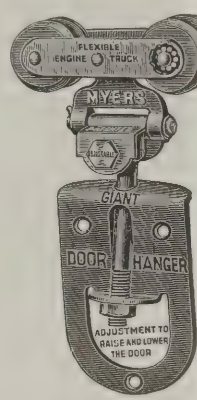


Fig. 2—Side View of Hanger

Novelties—Myers Giant Door Hanger

The Giant Patent Tubular Track, a section of which is represented in Fig. 3, is made of steel with two flanges turning downward at the lower edge, making the truss or girder which stiffens the track and enables it to carry a much heavier load than would otherwise be the case. The point is made that the great strength of the track decreases its liability to spread or sag, while the peculiar shape of the inner side of the track is such that no dirt or dust can lodge therein. The brackets are used every 4 ft. to support the track, the bracket being of press steel with a heavy reinforced rib for stiffness.

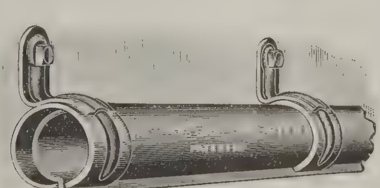


Fig. 3—Section of the Giant Tubular Track

The firm a few years ago introduced the Myers Stayon Hanger, which attracted a great deal of attention at the time, and it is now manufacturing 12 different styles of hangers for flat and tubular track. In order to afford those interested an idea of the extended line now made, the concern is distributing a pamphlet illustrating and describing some of the leading styles, and a copy of it can be secured by any one making application for it.

New Catalogue of Stanley Tools

A new catalogue and illustrated price list, No. 110, just published by the Stanley Rule & Level Company, New Britain, Conn., includes some original features in cataloguing carpenters' and mechanics' tools. Among the most important is a method of showing in a condensed form, avoiding unnecessary repetition, the diifferent lines of tools manufactured, at the same time more fully describing the various articles than in any previous catalogue that the company has issued. The different lines of tools, so far as possible, are listed in classes and are so arranged that one opening of the book will show a complete line. Where the same general description covers more than one article this description is given before the articles are listed and priced. The differences between the various articles of the same class regarding materials, finish, weight, prices, etc., are clearly shown in the lists or tables. Illustrations are new and all mechanical details are distinctly brought out. Electrotypes of any of the tools shown in the catalogue will be furnished free to the company's customers for local newspaper advertising. Recent improvements have been made in Bailey planes, Bed Rock planes, mitre boxes, zig-zag rules, etc. There is also a new line of breast drills and small vises, as well as individual additions among screw drivers, boxwood rules, planes, levels and bit braces.

Richards New Steel Folding Builders' Bracket

The Richards-Wilcox Mfg. Company, Aurora, Ill., has brought out an improved folding builders' bracket constructed of steel and having the appearance of that shown herewith. The bracket is known as No. 231, and is provided with hook and tail screw for fastening to the studding, thus insuring positive safety. A sway brace prevents any swinging motion of the bracket when it is in use. In Fig. 4 of the engravings we show a side elevation of the bracket as it appears when ready for use, also its appearance when partially folded together, with a view of it when completely folded, thus indicating the compactness of it when not in use and the ease and convenience with which it may be handled or stored away. The point is made that the bracket is strong and very easily applied, while costing no more than wood brackets. Building contractors who have made use of the device refer to it in flattering terms and its popularity is growing wherever its merits are recognized. It is durable and economical, the claim being made that there is a saving of their cost on any job requiring two dozen or more brackets. It is made in two sizes, the No. 1 being 3 ft. long and the No. 2 being 4 ft. long.

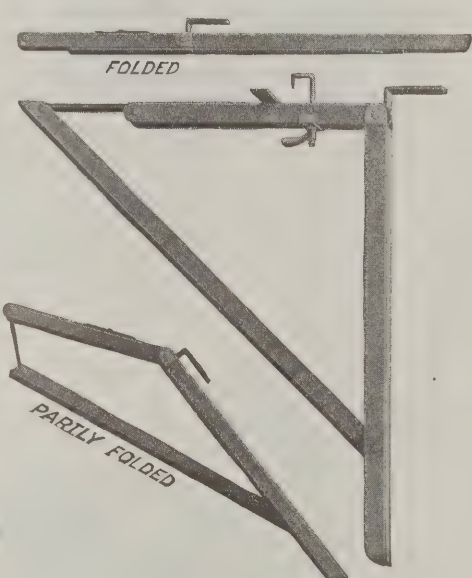


Fig. 4—Richards New Steel Folding Builders' Bracket

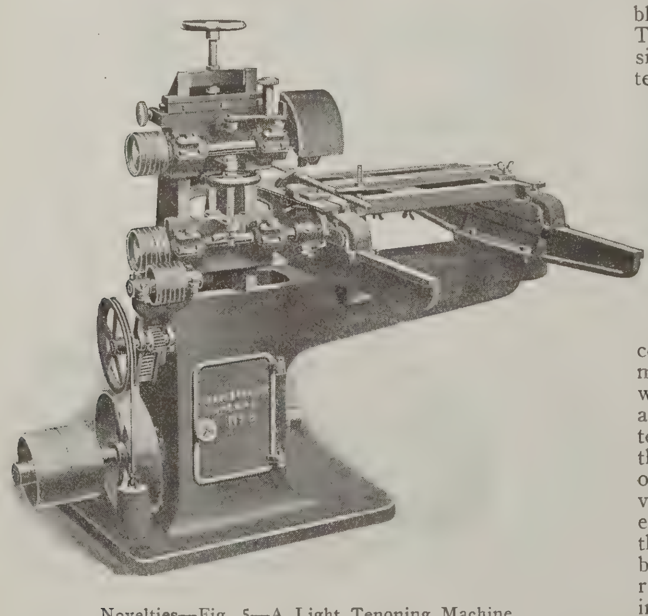
Deco-Veneer

A very attractive booklet daintily printed, bound in parti-colored covers and designed for the lover of the artistic be he decorator, houseowner or one who contemplates building or remodeling, has just been issued from the press by the Deco-Veneer Company, Indianapolis, Ind. The matter contained within the covers of this little work is a compilation of facts concerning that very attractive decorative material known as "Deco-Veneer"—

a product which is said to contribute a distinctly new element to the possibility of handsome decorative interiors. "Deco-Veneer," it may be stated, is a thin veneer of wood mounted on pulp-board. The veneer is 1/100 of an inch in thickness; this thickness it is stated being such as to eliminate the possibilities of checking and thus reduces the pulling and twisting to a minimum while insuring pliability sufficient to meet the requirements of coves and columns as well as of arched ceilings without the use of "forms." It also prevents loosening of the veneer from the pulp-board. The material is made up in panels 24 x 72 in. in size which meets the usual commercial demand, although the company manufactures special sizes up to 48 x 144 in. when required. The claim is made that the pulpboards on which the veneers are mounted will not expand or contract to any appreciable or harmful extent under the influence of heat, cold or moisture in its application for the purpose for which the company recommend it. Panel strips and moldings are furnished in veneered woods to match the panels and in stained woods. Another point is that Deco-Veneer is suitable for every style of architecture from the rustic bungalow to the costliest mansion and in the wide variety of woods from which it is manufactured it lends itself to perfect harmony to the development of the decorative scheme. In residences it is admirably adapted for the living room, the dining room, hall, library, bath room, bed room, the conservatory, den and kitchen; in office buildings, cafes and other public interiors for wainscoting, columns, coves, beamed ceilings and door panels. For fireproof construction Deco-Veneer is made on sheet asbestos of uniform thickness in panels up to 48 x 96 in. in size. Much interesting information relative to the manner of installating Deco-Veneer is given together with the cost and suggestion for decorative schemes. Several illustrations are printed in colors showing the effects which may be produced by the use of Deco-Veneer.

A Light Tenoning Machine

A machine which cannot fail to be found of great service in the equipment of any small woodworking shop operated by the carpenter-contractor or the builder is that which is designed for doing light tenoning. More or less work of this character is constantly arising in the business of the contractor operating a shop of the character indicated and in Fig. 5 of the illustrations we show a No. 2 Single End Tenoner, which is being manufactured by the J. A. Fay & Egan Company, 221 to 241 West Front Street, Cincinnati, Ohio. It is designed to meet all the requirements in the way of light tenoning that arises in a small woodworking shop and it has a capacity for cutting off material 20 in. wide and will make a tenon up to 3¼ in. long at one cut, or 6½ in. long with two cuts.



Novelties—Fig. 5—A Light Tenoning Machine

The machine is of such a nature that it will be found especially serviceable in making sash, doors, blinds and other interior finish. Coping attachments consisting of upper and lower cope spindles and heads can be attached to the tenoning head gateway and adjusted simultaneously with them. They also have independent vertical and lateral adjustment. A cut-off attachment can also be applied when desired.

The Reliance Saw Vise

What is known as the Reliance "Instant Contact" Saw Vise or clamp and which embodies interesting features of construction has just been placed upon the market by C. P. Frick, 409 South Los Angeles Street, Los Angeles, Cal. The new device is intended to meet the demands for a moderate priced saw vise and combining advantages which cannot fail to appeal to those having occasion to

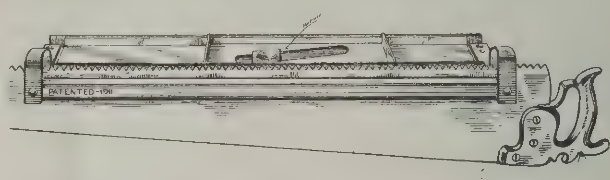


Fig. 6—The Reliance Saw Vise

make use of a clamp of this nature. It is made without ratchets, screws, dogs or other mechanism to get out of order and the few simple parts of which the vise is composed are designed to withstand the roughest legitimate usage to which a saw vise is likely to be subjected. It is "always ready" to clamp the saw in either direction without any adjustment and obviates the loss of time consumed in the screwing back and forth as with the old style clamps. It is made of steel heavily galvanized and is 12 in. long and 2 in. wide. A special feature of the device is the friction clamp which is said to fill a long-felt necessity among practical mechanics. The application of the saw vise is clearly shown in Fig. 6 of the accompanying illustrations.

Special Hack Saw Outfit

C. E. Jennings & Co., 42 Murray Street, New York, have recently patented a special hack saw outfit, Arrow Head brand, numbered 1776, a view of which is shown

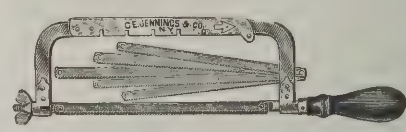


Fig. 7—Adjustable Hack Saw Frame with Six Blades

in Fig. 7. The feature of the saw frame is that it is adjustable for blades from 10 to 14 in. long, inclusive, which is larger than adjustable frames have been made heretofore. The frame is of steel, full nickel plated and the blades may be faced four different ways. The saw blades are of the highest quality and tempered very hard. The outfit consists of the frame and a complement of six blades, assorted, having fine, medium and coarse teeth, suitable for many kinds of metal cutting.

The Luck Poured Cement Post

The growing scarcity of the timber supply of the country and the constantly increasing appreciation of the merits of concrete as a substitute for it in a vast variety of cases lend added interest to the information presented in an illustrated booklet sent out by the Luck Cement Post Mold Company, Aurora, Ill., and relating to the Luck Poured Cement Post. By means of the Luck System posts can be made by common labor and by one person, the standard size of mold producing a smooth octagonal post 7 ft. long which weighs about 90 lb. It is designed for beauty as well as for strength, the gradual slope from a 5-in. base to a 3-in. top giving it a graceful appearance, while at the same time it places the greatest strength where it ought to be and makes it easy to be set, while preventing it from heaving with the frost. There are eleven small holes cast in the post through which to pass the staples for holding the fencing in place, but the number and location of the holes can be arranged to suit the requirements of any fence. The posts are made by "pouring" the mixture into the mold, so that no tamping is required and there is no danger of breaking the bond of the cement. The system employed with the molds is the wet system, which gives a most compact post, the particles becoming closely assimilated and adhering closely to the reinforcement. The point is made that with the company's mold almost any kind of reinforcement may be used; that the posts can be made anywhere about the place or on the farm, as no buildings are needed in which to manufacture them; that the posts can be substituted for wooden posts where needed and that the longer the post stands the harder it becomes. The posts are practically indestructible, and one of the points made which is likely to be of interest to those living in the rural districts is that weeds and brush can be burned along the line of the fence without destroying or injuring the posts.

Catalogue of Burt Mfg. Company

We have received from the Burt Mfg. Company, Akron, Ohio, a copy of a catalogue which it has just issued from the press illustrating and describing ventilators, oil filters and exhaust heads in profusion. The catalogue consists of 128 pages printed upon a fine quality of paper and bound in embossed covers. A bird's-eye view of the company's plant at Akron faces the title page and following it are some introductory remarks regarding the history of the company and its specialties. Oil filters occupy the first 57 pages of the catalogue, after which the subject of factory ventilation is taken up and half-tone engravings are presented, showing some of the many buildings in connection with which the Burt ventilator is used. The ventilator itself occupies nearly half of the concluding portion of the catalogue, and its merits are set forth in a way to convince the most skeptical. Not the least interesting feature of the catalogue is a classified list of some of the more recent sales of Burt ventilators, which shows the widespread popularity of the company's product. The catalogue concludes with an illustrated description of the Burt and of the Standard Exhaust Heads. The make-up of the catalogue is exceedingly neat and attractive, and is well calculated to serve the purpose for which it was compiled.

The Standard Earth Auger

Concrete piling as foundation for buildings is gaining in popularity among contractors and builders, and in this connection a new use has been found for earth augers commonly utilized for boring holes for fence posts. They have proved a decidedly useful tool in making holes for concrete piles in building construction. An example of the time-saving qualities of an earth auger was shown in the construction of the Evansville, Ind., plant of the Bucyrus Company, of South Milwaukee, Wis. The soil on which the machine shop is located is a heavy clay and wet, and to bring the machine shop floor to grade a fill of several feet was required for a large portion of the floor area. The problem was thus presented of putting in a concrete foundation of a depth at least as great as the amount of the fill or of devising a means to avoid this

Novelties.—The "Standard" Earth Auger—Fig. 8—General View of the Implement

excessive cost. After the fill was made holes about 10 in. in diameter were put down about 3 ft. apart over the entire area of each foundation. These holes were carried to the solid ground below, which varied from a few ft. to 12 or 14 ft. These holes were filled with concrete and served as concrete piles for the concrete foundation slab, which was then required to be only 3 ft. deep.

The plant of the Illinois Brick Company, Rogers Park, Chicago, was also laid on a foundation of concrete piles.

The making of all these holes would have involved an immense amount of labor without the use of earth augers.

The "Standard" earth auger, manufactured by the Standard Earth Auger Company, 1126-34 Newport Avenue, Chicago, Ill., has been used for this work. The

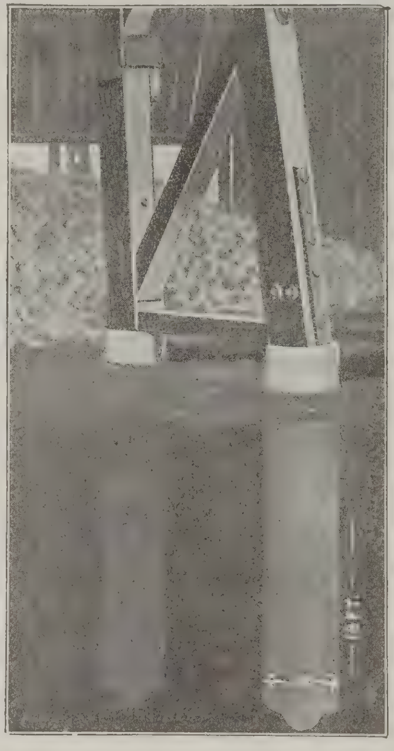


Fig. 9—Concrete Piles Built in Holes Made by the "Standard" Auger

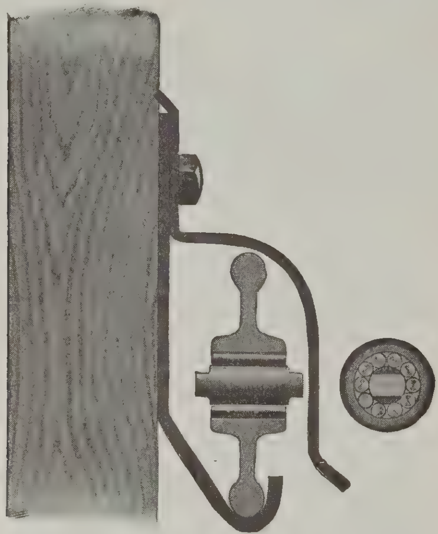
"Standard" auger is illustrated in Fig. 8, while Fig. 9 shows the concrete piles as constructed in the holes bored by this auger. The "Standard" auger has expansion blades, making it possible to bore different size holes with the same auger by a slight adjustment. The No. 10 auger, for example, will bore ten different sizes holes, ranging from 8 to 16 in. in diameter. When a hole is bored with this auger no other mold is required for building concrete piles. This auger is made of the highest grade materials and the blades cannot become sprung or bent, the manufacturer guarantees. The blades are constructed of the most resilient locomotive tire steel obtainable. The castings are made of air-refined malleable iron. The auger is equipped with a movable blade, which makes it possible to discharge the contents with ease, no matter how sticky the clay may be.

James Sanitary Barn Equipment

Within the covers of a most attractively printed booklet of a size to carry in the pocket are set forth the merits of what is known as James Sanitary Barn Equipment, made by the Kent Mfg. Company, Fort Atkinson, Wis. Reference is made to the fact that James stalls and stanchions are far more than mere cow ties, being designed specifically to enable the dairyman to keep cows and stalls cleaner; to cut square in two the cost of caring for cows and the barn; to save feed, time and labor; to make possible the feeding of cows according to individual needs, and to save expense in other ways. The James Sure Stop Swinging Post and Lock-Open device is intended to steer the cow right into the stanchion, thus saving time and trouble, and when the stanchion is closed the Sure Stop Post swings out of the way. Another feature of the equipment is the Double Curve Stall Partition, which on account of its length and shape protects the cow and it also braces the stanchion frame, thus doing away with all ceiling posts and supports. Reference is also made to the James Self-Cleaning Sanitary Manger, which embodies features that cannot fail to attract the attention of all those interested in barn construction and equipment. The booklet carries numerous illustrations showing the appearance of the equipment in question, and there are also numerous pictures of barns in which the company's equipment has been installed. Accompanying the booklet is a folder entitled "Barn Work Made Easy," which relates to the specialties referred to.

New Storm-Proof Barn Door Rail

A departure in a barn-door rail which requires no brackets and in itself forms a perfect housing is the new



Novelties—New Storm-Proof Barn Door Rail—Fig. 10—Cross Section of Hanger and Rail, Showing Bearings

Stormproof rail now being placed on the market by the National Mfg. Company, Sterling, Ill. The rail is made of heavy gauge steel and has great carrying capacity. It fits tight against the building and forms a continuous bracket. A cross section of hanger and rail showing bearings is presented in Fig. 1. The rail is made in 4, 6, 8 and 10-ft. lengths, packed two pieces of a length in a bundle. The Stormproof hangers for use with this rail are made both rigid and flexible. Fig. 2 shows the No. 77 Flexible Stormproof hanger. It is simply constructed and each hanger has two wheels, in tandem, with anti-friction roller bearings.

The hanger has a flexible hinge joint. When the door hangs straight down there is no vibration in the hanger,

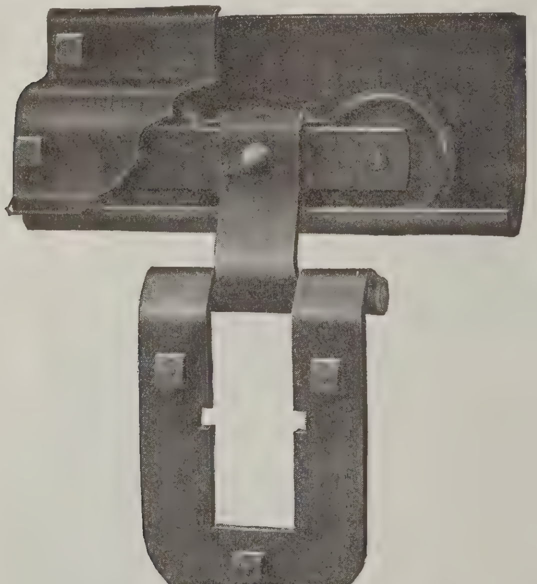


Fig. 11—Side View of the No. 77 Storm-Proof Hanger

but the hinged joint allows the door to swing out should anything bump against it. The No. 66 Stormproof hanger is the same construction as the No. 77, except the flexible-hinge joint. An illustrated descriptive circular will be mailed by the company on request.

The "Tuec" Air-Cleaning System

The United Electric Company, Canton, Ohio, has issued some interesting and attractive literature in the way of posters of liberal proportions designed for tacking up where they can be displayed to advantage. One of these illustrates the 13 sizes of "Tuec" Stationary Vacuum Cleaners, which are made in 264 sizes. The claim is put forth that the Tuec air-cleaning system is not made with rotary or diaphragm pumps, but with a powerful centrifugal fan, and that there are no complicated parts to cause trouble or to wear out. The machines are made in an admirably equipped factory designed exclusively for the manufacture of stationary air cleaners, and every part of each machine is made in the company's own factories. Emphasis is laid upon the fact that this cleaning system is easy to install in any building.

A second poster carries photographs of the district managers of the company, there appearing under the likeness of each manager his name and address.

Accompanying these posters is a copy of the "Tuec Special," showing "Who's Who and Why." It relates largely to the prize offered by the factory and office forces to the territory selling the most No. 200, No. 240 and larger machines that were to be installed in residences. When the contest closed it was found that there was a tie in three territories, namely, Detroit, Milwaukee and Toledo, and instead of dividing up the "pot of gold" it was decided to furnish one to each of the three territories. A likeness of the winners is given in the issue of the paper in question and there are interesting comments as to the business outlook for 1912.

New "Katz" All-Steel Floor Hinge

The Lawson Mfg. Company, 215 West Huron Street, Chicago, Ill., has just placed upon the market a new all-steel upright surface floor spring hinge, details of

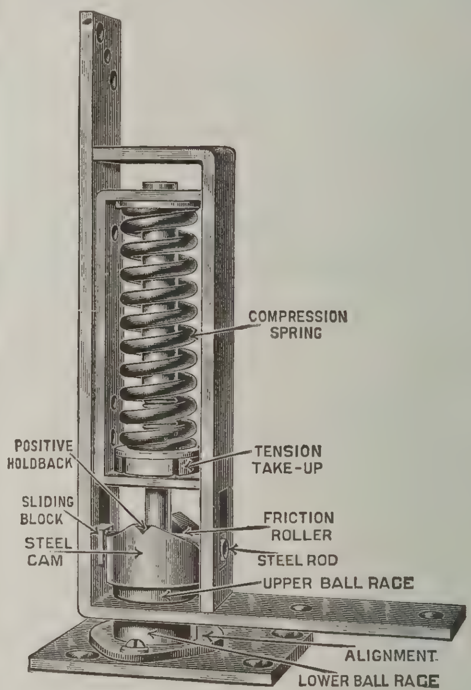


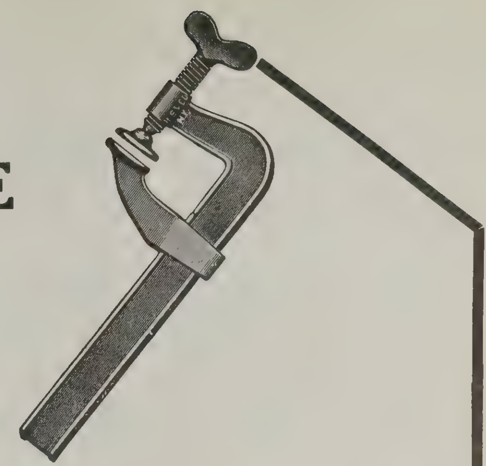
Fig. 12—The New "Katz" All-steel Floor Hinge

which are clearly indicated in Fig. 12 of the accompanying engravings. This hinge, known under the name "Katz," is referred to as a radical departure from other hinges of the same type, controlled as it is by an oil tempered steel adjustable compression spring and having a positive hold-back at 90 degrees. There are two sets of ball races provided to alternately receive the weight of the door. There are also two steel rollers provided to reduce friction to a minimum. The steel rod bearing the rollers is journaled in steel sliding blocks, guided by slots in the steel frame. The hinge is also provided with an interlocking alignment plate. This size of hinge is said to be suitable for doors 1¾ in. by 2 ft. 10 in. to 2½ in. by 3 ft. The company points out that a templet is packed with each hinge so that no mortising is required. The claim is made that the swing of a door hung with a "Katz" upright hinge is nearly equal to an oil-checking hinge. The hinge is finished in planished steel, polished steel and bronze or brass metal.

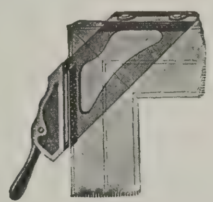
The merits of the various lines of floor and jamb spring hinges made by the Lawson Mfg. Company are set forth in an attractive catalogue of 24 pages which it has issued from the press. Those who are interested can secure a copy of it by application to the address given.

(For Trade Notes see second page following)

FOR HOLDING CONCRETE FORMS



Time and labor are saved by using clamps for securing concrete forms, molds, face plates, etc., in concrete construction. Our line of clamps embraces special concrete form clamps, builders' carpenters' and woodworkers' clamps of many varieties. Complete catalog No. 2986 upon request.



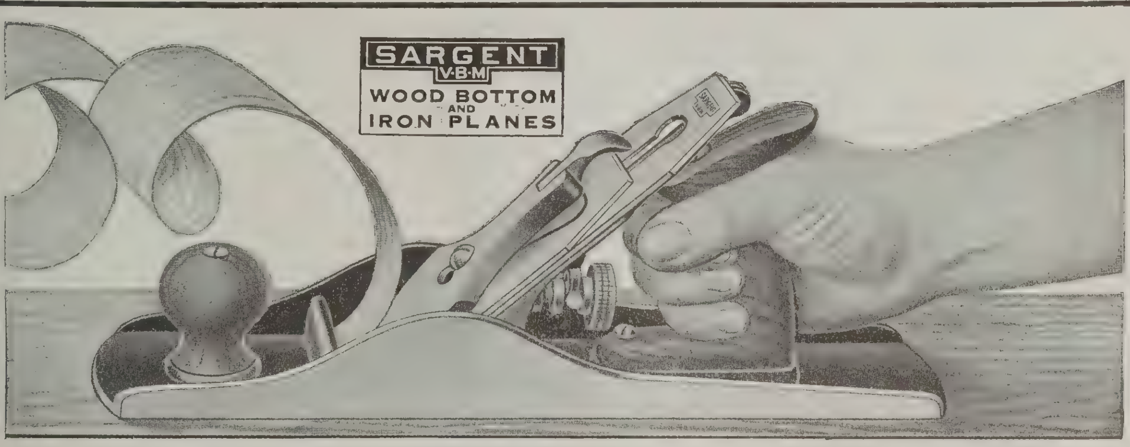
We make an Automatic Mitre Clamp for use in setting up frames. It grips the corner and holds the frame at its true angle until nailed. Ask for description.

Hammacher, Schlemmer & Co.

Hardware, Tools & Supplies

NEW YORK, SINCE 1848

FOURTH AVE. & 13th ST.



VERY BEST MADE

We Warrant All Planes Upon Which the Name Sargent Appears

The Cutters are made from the best double refined English cast steel, tempered by the very best improved process, then highly polished and sharpened ready for use, and are WARRANTED. The Cutters are made from heavy steel, which insures no chattering, even when the plane is used on cross-grained hard wood.

The Sargent Tool Book—Free on Request

gives a description of the full line of Sargent Planes and other tools for mechanics. This 250-page text-book on tools is worth sending for.

SARGENT & COMPANY

1153 LEONARD STREET ***NEW YORK***

TRADE NOTES

In the notice of the improved hatchet which has been placed upon the market by L. A. Sayre & Son, 332 Mulberry Street, Newark, N. J., and which appeared on page 53 of the January issue, the cut there shown illustrates the company's No. 140 Lathing Hatchet and not the Shingling Hatchet.

The striking feature of the December issue of *Graphite*, issued by the Joseph Dixon Crucible Company, Jersey City, N. J., is a double page of photographs of the company's sales force for the Chicago district. The Chicago offices occupy a large section on one side of the Monadnock Building and in a business-like way are attractively decorated with a myriad of Dixon posters, cards, hangers and other specimens of the printer's and lithographer's art. The central picture in the group referred to is Sam Mayer, who for almost 15 years has been untiring in his efforts to build a bigger and better business for the company in the district covered from the Chicago headquarters, and with flattering results. Other features of *Graphite* are a New Year's greeting, the coal handling plant of the Long Island City Power Station, together with numerous articles on the merits of graphite as a lubricant.

Among the calendars which have reached us for the new year is one of the poster type from the Thibaut & Walker Company, makers of japans, varnishes, dryers, etc., with office and works at Long Island City, N. Y. The various sheets composing the calendar are nearly 17 in. in width by something over 21 in. in hight and are bound together by a wooden strip at the top. This strip is provided with a metal eye for hanging the calendar upon the wall. The printing is in large type and in colors, so that the day of the week or month can be readily distinguished at a distance. Upon each sheet brief reference is made to the company's specialties, particular emphasis being laid upon "Yezo," a liquid amber lacquer for floors, linoleum and oil cloth.

Samuel H. French & Co., York Avenue, Fourth and Callowhill Streets, Philadelphia, Pa., have in accordance with the custom which they established many years ago sent out a memorandum calendar for the new year. It is in the shape of a pad arranged with a metal eye for hanging up within convenient reach, and in addition to more or less information relative to the specialties manufactured by the company, there are rates of postage with a list of classified mail matter. Each leaf is arranged for six days with a space beside each day of the week for memoranda. The printing is in two colors and the general make-up is in keeping with previous calendars sent out by this enterprising house. In sending it out the company expresses the wish for a "Prosperous and Happy New Year."

Sargent & Co., 1153 Leonard Street, New York City, has issued what is known as the "Sargent Tool Book," which gives a description of the full line of Sargent planes and other tools for mechanics. It consists of 250 pages and is in effect a text book on mechanics' tools. Any reader of the *Building Age* who is interested in having a copy of this book can secure one free of charge upon application to the company.

The Pennsylvania Wire Glass Company, formerly known as the Continuous Glass Press Company, Pennsylvania Building, Philadelphia, Pa., calls attention to a decision of great importance to builders and users of wire glass which was handed down October last by Vice-Chancellor Stevens of the Chancery Court of New Jersey. This decision indicates that the goods of the company are "standard, approved wire glass products" and not "inferior imitating material," as some had contended.

The Northwestern Floor Surfacing Company, of Minneapolis, has been incorporated with a capital stock of $50,000. The incorporators are George H. Jay, of Toledo, Ohio, and A. L. Cahaley and M. H. Cahaley, both of Minneapolis.

A modern and economical method of hanging sash and which is claimed to be much cheaper than tying knots in the sash cord is that which involves the use of "Titan" (tight-on) cord and weight fastener made by the S. & I. Company, Springfield, Mass. The device is of wrought steel and can be quickly applied with a carpenter's hammer. The fastener is adapted for four sizes of cord and the use of the device insures the weight hanging plumb. A catalogue which the company has issued can be obtained by any interested reader upon application. The company also makes a fine line of carpenter's flooring and roofing chisels, screw drivers, bits, nail sets, cabinet scrapers, drawing knives, saws, try squares, etc.

F. E. Myers & Brother, Ashland, Ohio, have been mailing to more than 30,000 dealers and friends copies of the 1912 poster calendar, which has attracted a great deal of attention. This is a particular style of calendar that the firm adopted about 30 years ago and has become so familiar to many hardware dealers that they have set aside a special nail on which to hang it. Some of the dealers have kept all of the 29 calendars previously issued and each year covered over the others by the latest one issued and use it as a sort of ready reference. Although the body of the calendar has shown the firm's different lines of barn door hangers, pumps, hay unloading tools, etc., the heading and calendar pads have been changed each year. The calendar was sent out with the firm's New Year's Greetings and the wish for a satisfactory volume of business during 1912.

The Carborundum Company, Niagara Falls, N. Y., has issued an interesting announcement to the effect that the presence of Carborundum sharpening stones in a carpenter's kit stamps him as a capable workman, for it means that he always works with tools in good condition for properly executing the jobs upon which he may be engaged. It is claimed that Carborundum sharpening stones are very durable; that they do not fill or glaze, and are positively uniform. They are referred to as being distinctly different from other stones in that they cut clean and keen—a feature which cannot fail to be appreciated by mechanics generally.

Crescent Specialty Company, 476 Monroe Avenue, Rochester, N. Y., calls attention to the merits of the Crescent Eave Trough Hanger, which is made of deep channel steel and then galvanized. It is of such a nature that it fits any roof or cornice, and the company states that those who are interested can secure circulars and free samples on application.

Trussed Concrete Steel Company, Detroit, Mich., has been favoring its friends in the trade with a copy of the 1912 calendar which it has issued. It is a very neat affair, intended for hanging within convenient distance of the desk, and in addition to the days of the week and month, the card carries brief reference to the specialties of the company, emphasizing "The Kahn System Idea."

The January issue of "Simonds Guide for Millmen," published by Simonds Mfg. Company, Fitchburg, Mass., contains a lot of interesting information relative to the extensive plant of this enterprising concern. The matter consists of a description of a trip through the company's plant at Lockport, N. Y., and tells how Simonds saw steel is made. The account is most interesting and a perusal of what appears within the covers of the booklet cannot fail to command the closest attention of every one into whose hands a copy may come.

On the evening of December 28 the Edwards Mfg. Company, Cincinnati, Ohio, gave a banquet at the Business Men's Club, at which were present its local employees and outside salesmen, including a large number of its foreign representatives. President E. W. Edwards made the principal address.

The Idealite Company, South Bend, Ind., tells all about the nature and uses of Idealite, which it styles "the modern mosaic," in an attractively illustrated booklet which it is distributing among those likely to be interested. The material in question is referred to as a combination of bonding material in conjunction with permanent colors and various sizes and kinds of aggregates which, when mixed according to instructions, bring about a reaction and amalgamation of all the ingredients. It is applied in a semi-plastic state to concrete, stone, brick, wood or iron in any design and may be used for flooring and wainscoting of rooms, as well as for the treads and risers of stairs, also for various decorative effects.

E. A. Langenbach, president and general manager of the Berger Mfg. Company, Canton, Ohio, proposed a novel New Year's toast to the customers of his company while he was taking a 150-mile ride in Germany in a Zeppelin dirigible airship and while soaring 1000 ft. or more above the earth. Mr. Langenbach reports that the airship was a virtual aerial Pullman car, equipped with every luxury known to modern convenience and comfort. It was his second trip and was delightful in every detail. The natural beauty of Germany, he said, can only be fully appreciated after viewing it from such a hight. He finally landed at Schwaben after one of the pleasantest journeys it had ever been his good fortune to enjoy.

The Building Age

NEW YORK, MARCH, 1912

A Decatur Residence Showing Combination Shingle and Brick Effects

THE residence which forms the basis of the present article constitutes an interesting example of the pleasing effects which may be obtained by the judicious use of shingles and brick in combination for the exterior treatment of a building. The first story walls are built of dark colored, hard burned vitreous brick, are 9 in. thick and are furred on the inside, while the walls of the second story are of frame construction, being sheathed on the outside with shiplap, then covered with 4 in. dimension shingles. The rafters are covered with 1 x 4 in. boards on which are laid red cedar shingles. All the shingles of the second story and roof were treated with Cabots brown shingle stain before being laid. Between the sheathing and shingles heavy building paper is used.

The appearance of the finished building is shown by means of the half-tone engraving presented upon this page, while the floor plan arrangement and details of construction are shown upon the pages which follow.

The second half-tone view was taken from a point near the window seat in the living room and is looking toward the main flight of stairs at the left and into the dining room at the right. The triple window in the latter room is clearly shown, also the double swing door leading to the pantry.

The third half-tone picture is a view looking directly into the dining room from the living room, while the fourth picture is a view from the stair end of the living room looking toward the open fireplace and the bookcases.

An inspection of the main floor plan shows that the living room extends across practically the entire front of the house, being lighted by the triple window at the front and single windows at the ends.

The Front Approach with Living Veranda at the Right End of the House

A Decatur Residence Showing Combination Shingle and Brick Effects

The main entrance to the house is at the left of the center and as one enters a coat closet is found at the extreme left lighted by a window opening to the inside. The main stairs rise from the small hall which establishes communication between the living room and the kitchen. Beneath the main flight are the stairs leading to the basement, these being so placed as to be readily accessible from the kitchen.

A cased opening separates the dining room from the living room, while communication between the kitchen and dining room is by means of a commodious pantry, fitted with ice box and "California cooler."

On the second floor are three sleeping rooms and bath, also an outdoor sleeping room if it is desired to use it as such. The main flight of stairs lands near the center of the house so that there is no waste hall space. The linen closet is in the bath room, but there is also a closet with shelves, opening into the hall and so placed as to be within convenient reach from any of the sleeping rooms.

In the basement are the laundry, a cold-storage room and space for the furnace and fuel. The floors are of concrete.

According to the specifications of the architect, the first and second-floor joists are of 2 x 10 in., the attic joists 2 x 8 in. and the roof joists or rafters 2 x 6 in.

The floors of all the rooms in the first and second stories are double, the under floor being laid with ship-lap, while the finish floors of the living and dining rooms and the hall are of ⅞-in. red oak with 2¼-in. face. All the other floors are of ⅞-in. yellow pine with 3¼-in. face.

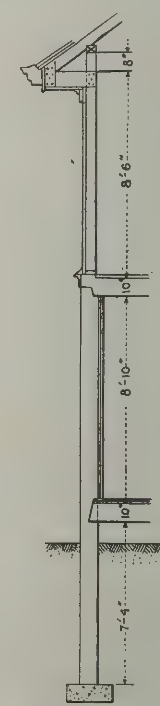
The finish of the vestibule, the living room, the dining room and the hall is of clear plain red oak with practically all straight lines. All other finish throughout the house is of selected light-colored yellow pine stained in colors to suit. The oak finish is stained rather dark and has a final finish of Flat Lac.

All oak doors, including the front door, are veneered.

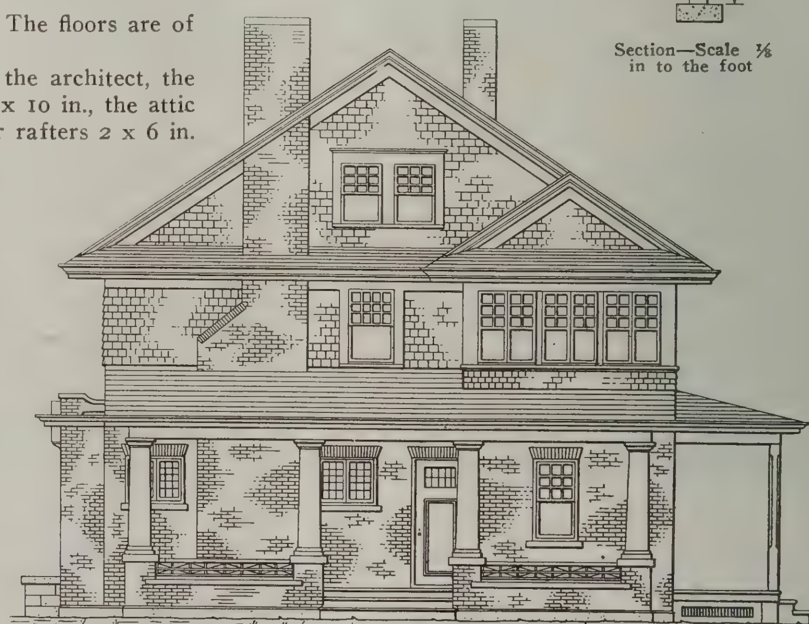
On the first floor there is a toilet room, containing a closet and lavatory, and on the second floor the bath room is equipped with tub, lavatory and closet. All plumbing fixtures are of enameled iron, first quality, and were furnished by B. C. Adams, of Decatur, Ill.

A special feature of the house is the living porch, which extends entirely across one side and is away from the street, thus making it private and very desirable for the purpose for which it is intended. Another feature which might be mentioned is the arrangement of the front entrance, the living room and the dining room.

Front Elevation—Scale 3/32 in. to the foot



Section—Scale ⅛ in to the foot



End (Right) Elevation—Scale 3/32 in. to the foot

A Decatur Residence Showing Combination Shingle and Brick Effects

Still another special feature is the cold cupboard in the pantry, which is connected to the outside air at the top and bottom, as clearly indicated in the details, thus affording cold storage in the early spring and late fall without the use of ice. In passing it may be mentioned that this is something after the nature of the "California cooler" so common in bungalows and other houses on the Pacific coast.

The house is heated with a Kelsey hot-air furnace, made by the Kelsey Heating Company, Syracuse, N. Y. The plant was installed by the Morehouse & Wells Company, Decatur, Ill.

The general lighting of the house is electricity, with some emergency gas outlets.

The residence here shown was erected for Dr. T. W. Galloway at Decatur, Ill., in accordance with plans prepared by Barkley S. Brooks, architect, of that place. The general contractor for the building was Fred J. Goldenstein, also of Decatur. The cost complete was approximately $5,000.

Refinishing Old Furniture

Collecting old furniture is not necessarily expensive, if one knows where to look for bargains. Many enthusiasts have joined in its search, and it is safe to say that almost every old attic in the country has been ransacked at least once by treasure-seekers—either dealers or collectors. As a result, many really fine pieces of old mahogany have been brought to light, and after refinishing, are occupying places of honor and distinction once more.

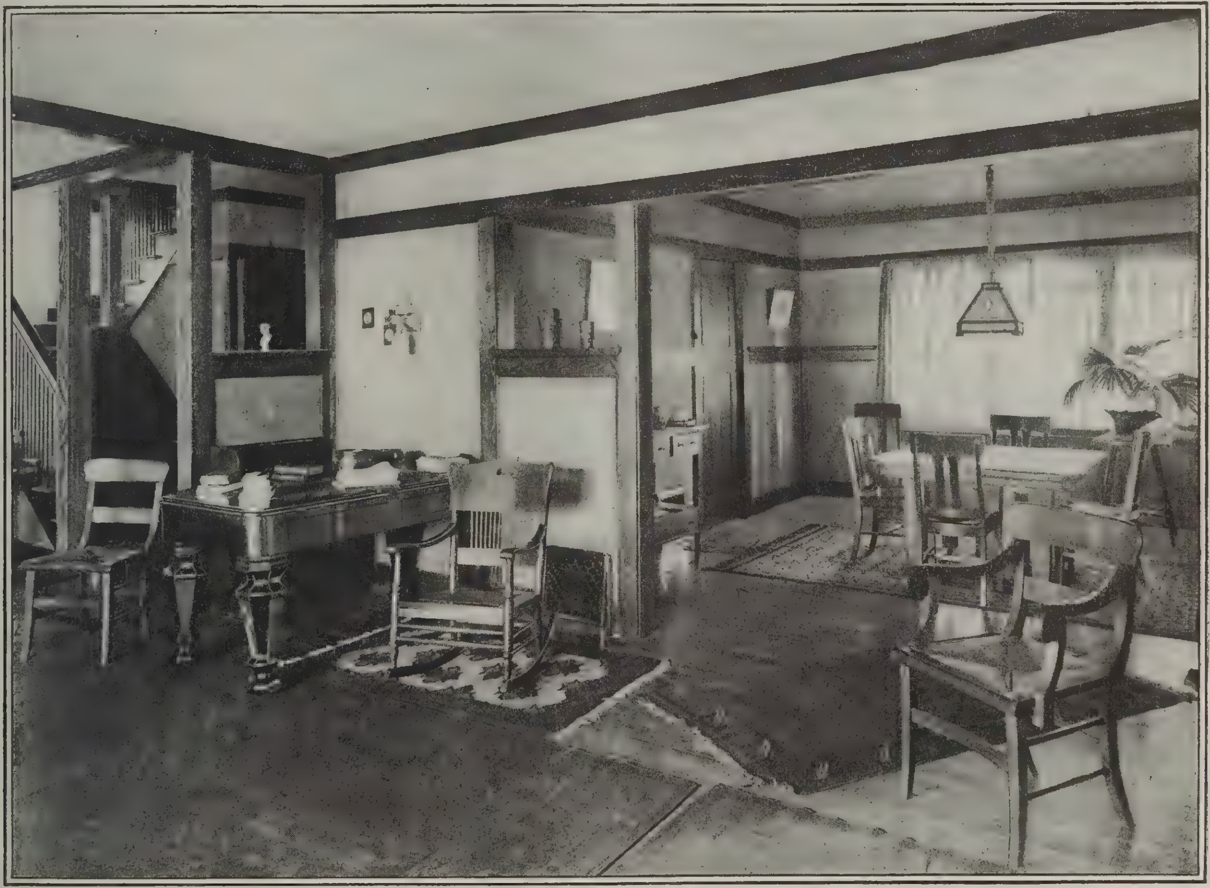
It is safe to assume that when you have found your old piece it will be suffering from general instability. The first thing to do is to go over it very carefully, and reglue all the loose joints, says Robert Searn in a recent issue of *American Homes and Gardens.* Scrape off the old glue, put on fresh, and clamp the parts together tightly, with cabinet-maker's clamps, and leave them till the new glue is thoroughly dry. Scrape off the surplus glue that is forced out of the joint. It is well to put on new casters, and if the piece is heavy the new ballbearing casters will be found much better than the ordinary kind. The old brasses, if you are fortunate enough to secure them, should be removed and repolished. If the piece has wooden knobs, as sometimes happens, they may be replaced with reproductions of the old-time brasses that are to be found in some of the larger hardware stores. Glass knobs are worth while, and should be retained. If the piece is a bureau or a desk, the drawers will generally be loose, and the runs badly worn. The old runs should be removed, and new ones, of hard wood, put in their place.

The draw slides should be planed off, and thin strips of hard wood screwed on. The drawers will pull easier if the runs and drawer slides are rubbed with a piece of tallow, paraffin, or soap.

It may also be necessary to replace broken or missing parts. Practice is necessary to enable one to do this work neatly; the only suggestion that I have to offer in this connection is that in order to secure well-seasoned wood for this purpose I visited the yard of a firm that makes a business of tearing down old buildings, and, for almost nothing, secured several good mahogany panels.

After all repairs have been made, the next step is to remove the old finish. There is always varnish to scrape off, sometimes paint; one of the best tables I ever found was hiding under four thick coats of paint. Boiling water and washing powder applied with a stiff brush may sometimes be used to remove old finish, but this method is not recommended, for the reason that the hot water may loosen the glue in the joints, and if used on a veneered piece, will cause the veneer to swell, and to separate from its base. There is always danger that the washing powder will bleach the wood, turning mahogany, for instance, to a dirty yellow color. There are various brands of paint remover that may be used. These do very well, if used with care, though I have found them rather messy and unpleasant to use. The remover is brushed on, allowed to stand for a moment, and then the finish is scraped off with a putty knife. It is well to apply the remover a second time, and to wipe off the last vestige of the old finish with a cloth, or better still, with a handful of steel wool, such as the painters use. After using varnish remover, it is wise to wash the surface with turpentine, or benzine, and allow it to dry thoroughly, before applying new finish.

Though the process takes much longer, I have found the best way to remove old finish is to scrape it off with a well-sharpened putty knife. There is a knack in sharpening a scraper properly. It is easy to describe



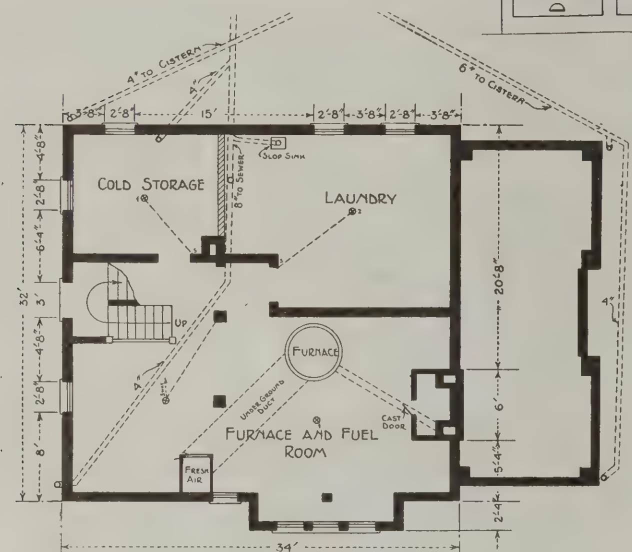
Interior View Looking Toward Main Stairs at the Left and Dining Room at the Right, with Door to Pantry in the Background

A Decatur Residence Showing Combination Shingle and Brick Effects but not at all easy to do. The best way is to get a good-natured painter or cabinet-maker to give you a lesson. The idea is to file the edge of the scraper square across the end, in such a way that a burr edge is turned over. It is this burr edge that does the cutting, and when it is flattened back it is again turned to a cutting position with the point of a steel burnisher. Some times broken glass is used, but it is not as good as a steel scraper. The important thing to remember is to take off every particle of finish, down to the bare wood.

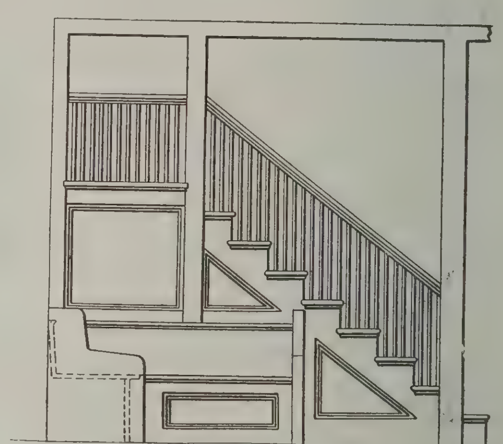
After scraping it will often be found that the wood of the different parts of the piece are of different shades. This is sure to be the case if repairs have been made. In order to darken mahogany, dissolve five cents' worth of permanganate of potash in boiling water. This will make a quart or more. Apply with a brush to the light portions of the wood. It is well, in order to avoid darkening the wood too much, to use the solution very dilute, and apply it several times, until the wood is the exact shade desired. The permanganate is not a stain. It seems to burn the wood, and must not be used too strong.

There are two methods of refinishing. A bureau or desk may have a shellac finish, rubbed down, while a table-top, which may have hot or wet dishes placed upon it, should be rubbed to a hard oil finish, which will show no marks. To get the hard oil finish brush on a mixture of raw linseed oil and turpentine, mixed in the proportion of two parts of the oil to one part of the turpentine. Allow this to stand for a few minutes, then rub off the surplus oil with a clean cloth. Repeat this process several times, at intervals, being careful not to get too much oil on any particular part of the table, or that part will sweat, as it is called, and must be rescraped. After several coats of the oil have been applied, and they have had a chance to dry in slightly, go over the tabletop with an iron weight, wrapped in a soft cloth, and rub to a polish.

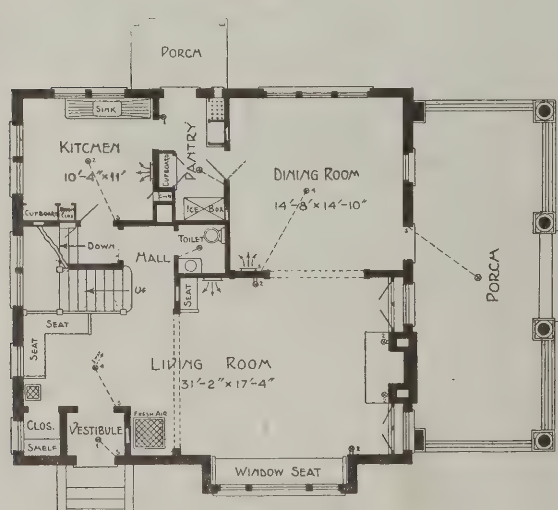
Detail of Book Cases and Open Fire Place



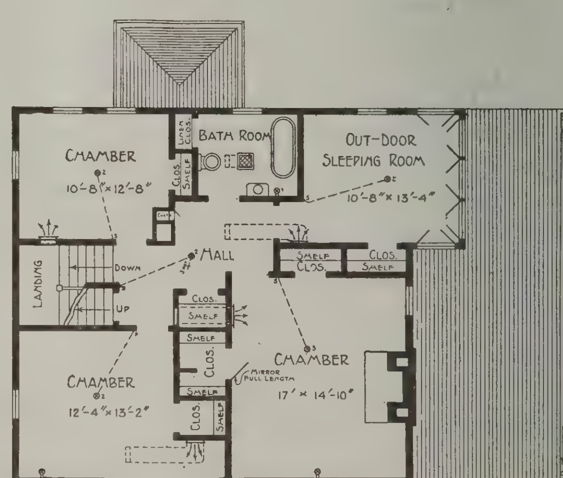
Foundation



Detail of Main Flight of Stairs



First Floor

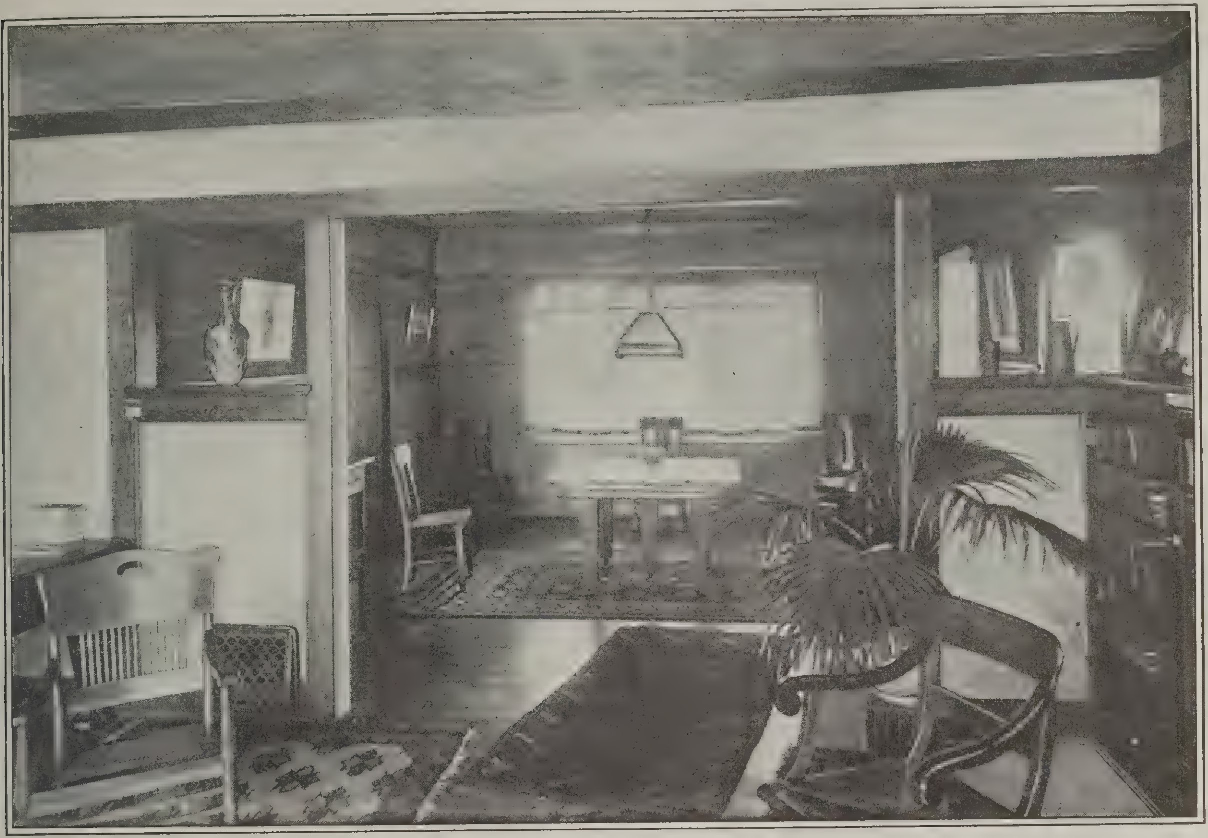


Second Floor

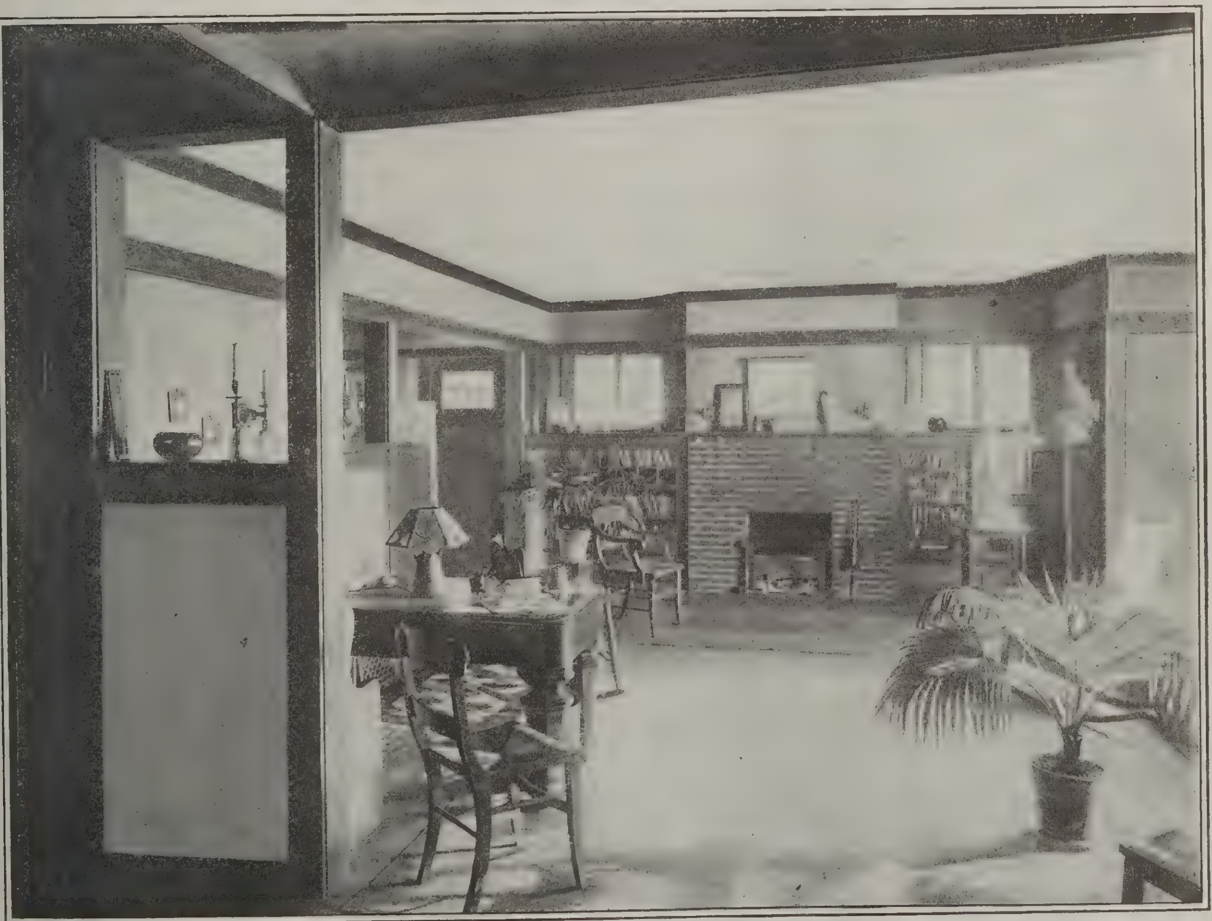
Scale 1/16 in. to the foot

A Decatur Residence Showing Combination Shingle and Brick Effects

This will not come immediately, but patient work, and been put in use, will eventually give the desired result.



Interior View Looking from Living Room into the Dining Room and Showing the Triple Window at the Rear

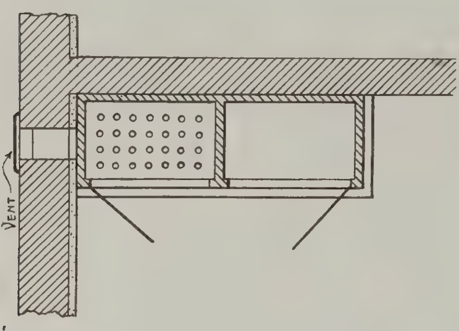


View in Living Room Looking Toward Open Fire Place with Book Case Either Side and Lighted by the Windows Directly Above

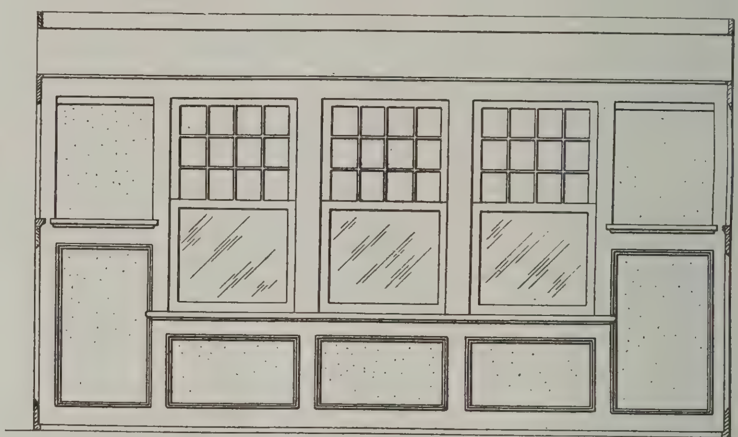
A Decatur Residence Showing Combination Shingle and Brick Effects

an occasional rub with an oiled cloth after the table has Table-legs and pieces of furniture not exposed to heat and moisture may be finished in shellac. First apply a coat of oil as described for the hard oil finish. Then go over the piece with a thin coat of white shellac. When the shellac is dry, sandpaper lightly with fine sandpaper. This will, of course, remove most of the shellac except what has gone into the inequalities of the wood. Then put on another coat of shellac, rubbing down as before, until four or five coats have been put on and rubbed down. For the last rub-down use powdered rotten-tone and oil, applying it with a piece of haircloth. Rub only hard enough to kill the gloss of the shellac and to secure the dull satiny finish that is so pleasing. Rub off the surplus oil and rotten-stone with a soft cloth. Some of the paint companies sell lacquers that give a dull finish without rubbing, but as I have had no experience in their use I cannot say how they would work out.

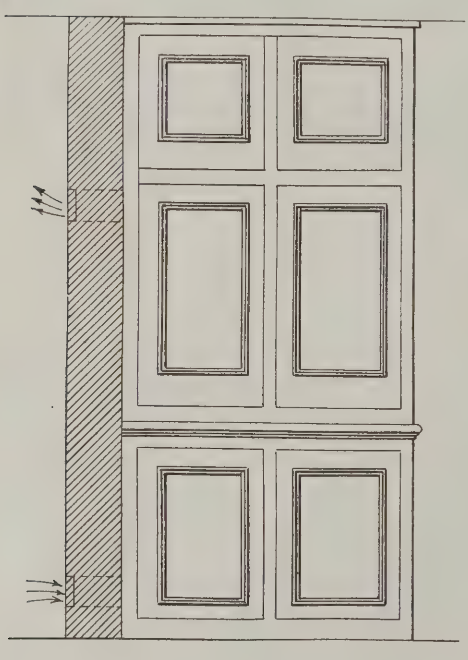
The directions given apply to refinishing old mahogany. I prefer to finish each piece in the color of its natural wood. It is sometimes necessary to finish a piece of light-colored wood to represent mahogany. To do this, apply a wood dye or a penetrating oil stain. Do not use varnish stain. This does not go into the grain of the wood, but merely forms a colored coat on the surface. After applying oil stain, wait a few minutes for it to strike into the wood and then wipe off any surplus that remains on the surface.



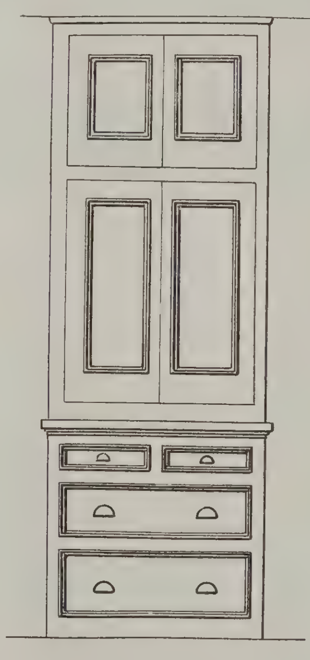
Horizontal Section Through "Cold" Cupboard. —Scale ⅜ in. to the foot



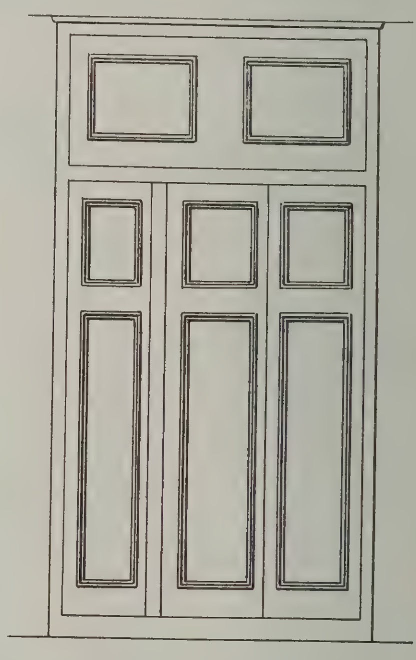
Elevation Showing Style of Wainscoting for Dining Room, Living Room and Hall.—Scale ⅜ in. to the foot



Section and Elevation of "Cold" Cupboard.—Scale ⅜ in. to the foot



Elevation of China Cupboard.—Scale ⅜ in. to the foot



Elevation of Kitchen Cupboard.—Scale ⅜ in. to the foot

A Decatur Residence Showing Combination Shingle and Brick Effects

Reinforced Concrete Buildings in Japan

The modern office building recently completed in Yokohama, opposite the American consulate general, was designed by a Japanese architect, and is made of and furnished almost exclusively with Japanese products, the most notable exception being an Otis automatic elevator, says Consul General Thomas Sammons writing from Yokohama. The reinforced concrete features of this structure are attracting favorable attention among builders. Representatives of the American system of reinforced concrete structural methods are now in this district and are confident of securing satisfactory results. The building has a roof garden.

Bricklayer (to mate who had just had a hodful of bricks fall on his feet)—Dropt 'em on yer toe! That's nothin'. Why, I seen a bloke get killed stone dead, an' 'e never made such a bloomin' fuss as you're doin.' "—*Tit Bits.*

The brick used in the new capital buildings to be erected at Camberra, Australia, will be made by the government.

Meetings of Societies of Masters and Craftsmen in the Building Trades

Their Purpose and Operation--The First Successful Attempt to Bring the Employer and His Workmen Together in One True Trade Union--Rates of Wages

THE "Massachusetts Society of Brick and Stone Masons, Masters and Craftsmen" and the "Massachusetts Society of Carpenters and Joiners, Masters and Craftsmen" held their annual meetings in Boston on Jan. 9th and 16th, respectively. At these meetings the scale of wages and the working rules to apply for the ensuing year were established, and Boards of Governors elected as indicated below.

A brief outline of the origin, purpose and operation of these societies should prove interesting to all builders, particularly as these societies from small beginnings have grown consistently in strength and in helpfulness to those whom they were created to serve, namely, employing builders and journeymen in the crafts involved.

Origin of Movement

The Masters and Craftsmen movement originated in Boston, under the inspiration of Secretary Sayward of the Master Builders' Association of that city, some 4½ years ago with the organization of the Brick and Stone Masons' Society, which was incorporated under the laws of Massachusetts on July 8, 1907.

It followed as a result of the dissatisfaction of certain employees and workmen with the arbitrary and unwarranted conduct of trade unions, which organizations, originally capable of producing beneficent results, have been frequently distorted from their proper course through the evils of bad leadership. At the same time the employers concerned recognized that some form of organization was necessary for the workmen and for the reasons outlined below a union of both employers and employees in one body was effected.

Upon May 24th, 1909, a similar society of "Carpenters and Joiners, Masters and Craftsmen" was incorporated. Both these societies have been most successful.

Society of Painters and Decorators

Similar steps have been taken by painters of Boston and vicinity, and a meeting for incorporation of a "Massachusetts Society of Painters and Decorators, Masters and Craftsmen" has been held. The act of incorporation will follow in the near future.

A Worcester Division of the Massachusetts Society of Carpenters and Joiners has also been organized recently, the movement receiving the support of a goodly number of Worcester contractors.

A communication likewise has been received by the Massachusetts society from so far distant a point as Birmingham, Ala., inquiring as to the nature and method of operation of these societies, with the possible formation of such bodies in that city in view. This form of organization has also been copied by the Association of Masters and Craftsmen in Washington, D. C.

These Massachusetts societies are an example of the first successful attempt to bring the employer and his workmen together in one true trade union, and are dependent on the principle that the interest of the employer and worker are vitally one. For the successful operation of these trades as in all others it is recognized that the two elements involved, i. e., the directing worker (employer and the practical worker (journeyman should not contend as opponents but should take counsel together as fellow agents in the prosecution of the work which confronts their combined attack.

By this "true trade union" it is possible to avoid the bitterness of feeling which so often arises when the two elements do not meet in common for the rational discussion and adjustment of their common problems. When employers and workmen meet separately the character of their deliberations is bound to be one-sided. The demands and conditions which they "put up" to the other side have become hardened and fixed and when they come together in an effort to adjust matters the sparks are very prone to fly, whereas, when the deliberations are held in common, the opinions of the two elements undergo a mutual and quiet leavening due to the fact that both are acting together in intimate contact.

The three cardinal principles upon which these societies operate are in brief as follows:

First Principle.—Grading of journeymen in two classes—associates and craftsmen—according to their demonstrated skill. Craftsmen are given a higher wage than associates, but associates are eligible to be advanced to the grade of "craftsman" by the Board of Governors (which consists of 5 masters and 5 craftsmen) as soon as they have demonstrated their ability.

Second Principle.—The journeymen members of the societies are entitled to first consideration when there is an opportunity for employment, since they have assumed the risks and responsibilities of joining these societies and making them workable.

Third Principle.—There should be complete cooperation of all—masters, craftsmen and associates—in keeping the commissioner of the society in touch with current conditions, so that he shall have every opportunity to supply journeymen members with employment and master members with desired workmen.

All work is conducted on "Open Shop" principles.

At the annual meetings of the societies, in which masters and craftsmen both take part, the wages and working conditions for the year are determined. At the annual meeting of the Brick and Stone Masons' Society, held Jan. 9th, 1912, the principal conditions to govern for the year may be summarized as follows:

An eight-hour day; Saturday half-holiday during June, July, August and September, with privilege for any workman to work Saturday afternoon at the regular wage if he so desire and work is available; overtime to be paid at the rate of time and one-half; holiday work to be paid double the regular wage; wages of craftsmen to be 60 cents per hour and exceptionally competent and efficient men may expect to be paid a higher wage.

"Associates" are not absolutely entitled to more than 48 cents an hour, but this does not prevent masters from paying them more if they deem them competent and satisfactory; wages to be paid weekly not later than before quitting time on Saturday; cash payment on the spot on discharge or pay for time in which to reach office (at least one hour); all work to be conducted on "Open Shop" principles.

The "conditions" adopted at the annual meeting of the Carpenters and Joiners' Society were similar to those adopted by the Brick and Stone Masons, the principal difference being that for June, July, August and September Saturday afternoon should be a holiday, no work to be done then except on emergency, such work to be paid double time; craftsmen to receive 50 cents per hour; "associates" not absolutely entitled to more than 40 cents per hour.

The board of governors of the Brick and Stone Masons' Society for the current year are: On the part of the masters, John W. Duff, Parker F. Soule, E. F. Willcutt, J. Arthur Jacobs, Isaac F. Woodbury; on the part of the craftsmen, George R. McClellan, William H. Cheney, David T. Bates, David Carozza, Ralph B. Ross.

The board of governors of the Carpenters and Joiners' Society were elected for the year 1912 as follows: On the part of the masters, John W. Duff, Isaac F. Woodbury, Edwin P. Bliss, George L. Perkins, W. E. Burke; on the part of the craftsmen, E. P. Pitfield, Elmer E. Lunt, Thomas A. Brown, Thomas E. Daly, Robert S. Sylvester.

Demolishing Reinforced Concrete Structures

The recent demolition of a notable structure in Cincinnati, erected only ten years ago, is possessed of points of interest, not only as illustrating the growing tendency to demolish the old and construct the new, but because it was of reinforced concrete and not only presented difficulties but was one of the first concrete structures of size and importance to be razed in this country, says the *American Contractor*. Its demolition showed the great strength of concrete construction and likewise suggested improvements that have been made within the passing of a single decade.

The structure referred to was the reinforced concrete grandstand of the Cincinnati Baseball Club. Though erected so recently as the spring of 1901, it was the first notable structure of that class to be constructed in Cincinnati and the first to yield to the demand for something greater. It was erected by the Ransome Concrete Company and in accordance with the Ransome system.

Baseball has kept pace with the general forward movement of the times and a grandstand that was seldom filled to its capacity ten years ago had proven inadequate to present demands. To obtain great seating capacity and likewise secure a larger field, the old structure was doomed and orders for a new one, a little distance removed from the old site, placed. Both contracts were let to the Kaps-Brehm Company, engineers and general contractors, of Cincinnati. The work of razing began upon the close of the baseball season for 1911, early in October.

The structure was literally battered into fragments, a pile-driving hammer weighing 3000 pounds being employed. This was operated from a derrick with a 50-ft. boom. The derrick was erected on the roof of the grandstand and was moved along as the work of destruction progressed. Falling a distance of 50 ft., this immense hammer struck tremendous blows, which even reinforced concrete could not resist. The roof destroyed, work was begun upon the floor. The columns were pulled down with a traction engine. This was readily enough accomplished after the vertical column bars had been cut by an oxygen-acetyline torch. With but trifling exceptions the structural material was found to be well preserved.

The work of razing attracted the attention of architects, engineers and concrete builders, all anxious to study conditions and gain information. In some respects the building demolished was found to conform with the practice in vogue at the present time. This was particularly true of the concrete mix, the cold-twisted steel reinforcement and the tensile and compression stresses. Engineers decided, however, that the subject of shear was not so well understood ten years ago as at present. The beams were narrow as compared with their height and bent tension rods and web reinforcement were lacking. When the hammer broke but did not crush a beam, the failure was always in the web by diagonal tension or horizontal shear. The decision of experts was that reinforced concrete construction has been considerably improved during the past ten years, since the structure wrecked was built after the best methods known at the time.

Two different concretes were employed in the construction work, each a 1:2:4 mixture, and their condition after being broken up proved of considerable interest. One of these, in which the aggregates were crushed limestone, broke into quite small fragments, producing considerable dust. The other, formed of washed river pebbles, were broken into larger fragments with very little dust.

Identification of Important Oak Woods

The first of a series of Bulletins dealing with the distinguishing characteristics of North American woods —exclusive of Mexico—has just been issued by the Forest Service of the United States Department of Agriculture as an aid in the identification of the principal oaks. While the matter has been prepared by George B. Sudworth and Clayton D. Mell "for the assistance of all students of woods," special effort has been made to render it helpful to manufacturers of lumber, to architects and builders and to other wood users.

Of the approximately 300 different species of oaks known in the world about 53 exclusive of varieties and hybrids occur within the United States. Three or four of these are mere shrubs, while the remainder are small, medium or large-sized trees. In the Bulletin in question 35 oaks are described which include practically all of the commercially useful ones and a number of other species, the woods of which are likely to become more or less useful in the future. The illustrations accompanying the Bulletin were made by outlining with a pen photographs of enlarged transverse sections of the wood, and they show the exact appearance of each section as seen under a microscope magnifying the structure 20 times its natural size. Structural characters of the wood having the most distinct value for identification are confined principally to transverse sections in which the size, form, arrangement and other relations of elements are clearly shown. A great many measurements of the fibres of each species were taken and their average length computed.

Another invader of what was once the fashionable residential section of Fifth avenue, New York City, is the 18-story office building which has been designed by Architects Davis, McGrath & Kiessling. This building will have a frontage of 30 ft. on Fifth avenue and 100 ft. on Thirty-first street, with a 74-ft. extension adjoining the Hotel Wolcott. It is expected that the building when completed will be one of the finest in the city in point of equipment and arrangement.

Reinforced Concrete Milk Receiving Station

Walls of Monolithic Reinforced Concrete--Details of the Reinforcement--Mixtures Employed--The Cooling Room--Figures of Cost

By Oliver Randolph Parry

N order to successfully comply with the new standards required on the part of those furnishing milk supplies to the larger cities and to conform with the stringent laws which are already in force and likely to be enacted in the future, great attention is being devoted to the construction and finish of the buildings in which the milk is handled. It goes without saying that the nearer sanitary all buildings having to do with the supply are made, the purer will be the product and the more economical the result. An illustration of a modern type of milk-receiving station well adapted for rural localities and one which serves to perform missionary functions, as well as guarantee cleanliness at one of the most vital points of our food supply, is that which is here presented. Situated at a country cross roads and designed along simple lines, with walls of pure white and trimmings of dark green, the building stands as an example of one of the best uses to which concrete can be devoted.

The structure is 32 x 60 ft. in plan with the main floor at the grade level and the storage basement at the original grade before filling to the present lines. The area is subdivided into storage cellar main working floor, cold, boiler and compressor rooms and platform. The building which is here illustrated is the reinforced concrete milk-receiving station built at Yerkes, Pa., for the Wills-Jones-McEwen Dairies of Philadelphia, Pa., from plans and specifications prepared by and under the supervision of the writer.

Photographic View of the Building With Boiler Room End in the Foreground

Reinforced Concrete Milk Receiving Station—Oliver Randolph Parry, Architect, Philadelphia, Pa.

The construction is monolithic reinforced concrete with 6-in. and 8-in. walls and 5-in. floor, including the top coat. The walls outlining the boiler room are insulated by the insertion of insulating felt 2 in. from the inside face of the walls, thus separating the outer 4 in. of walls, as far as any condensation might be concerned, yet not forming two distinct and independent walls, as the horizontal cross reinforcing steel and the walls themselves, every so often where insulation was purposely torn, served to tie both together.

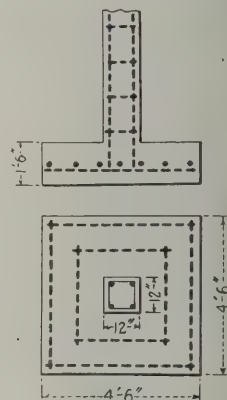
The reinforcement consisted of ⅜-in. rods set, except around openings and at corners where it was doubled, about 2 ft. on centers both ways, horizontally and vertically. At points of embankments the vertical rods were set about 12 in. on centers.

The reinforcement of the floor slabs was by ⅜-in. rods 6 in. on centers transversely. The reinforcement of the beams, girders, and columns was special and is shown on the detail drawings. All bars were fastened together by wire clamps.

The soil encountered was clay, wet from the site, being the low point of the natural drainage, so the footings were spread to carry load to be superimposed.

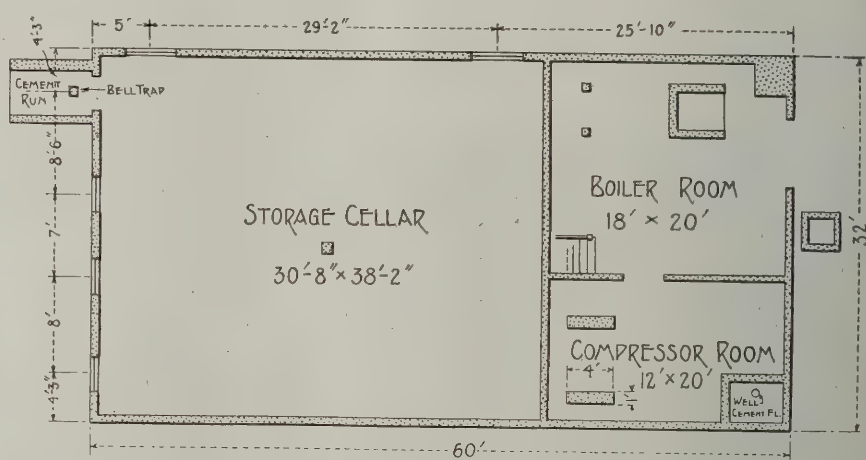
The forms were sectional 8 ft. long x 2 ft. 6 in. high above; two runs of forms in height being maintained throughout the work from foundations to top of gables. It might be well to note that the unit dimension of the forms worked out to full lengths on the short sides of the building and to full lengths and a half on the long sides; also that the height of 2 ft. 6 in. would be about correct for window sill heights above the floor levels.

Rear Elevation—Scale 1/16 in. to the Foot

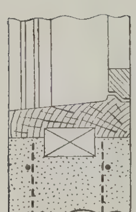


Details of Footing for Columns—Scale ⅜ in. to the Foot

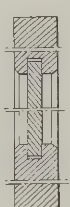
Section Through Sill and Head of Double Hung Windows—Scale ¾ in. to the Foot



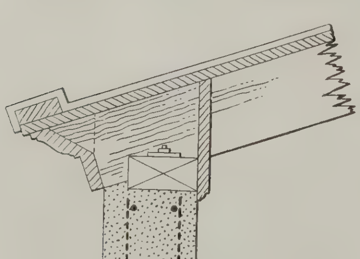
Basement Plan—Scale 1/16 in. to the Foot



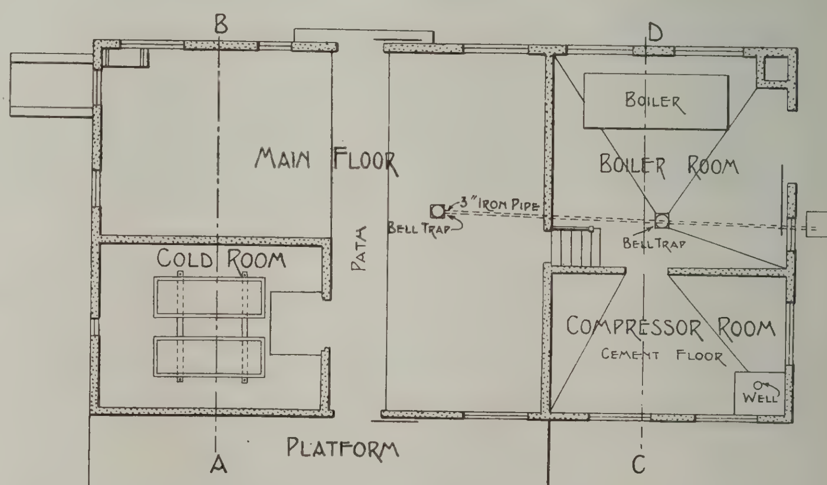
Section Through Sill of Basement Window—Scale 1 in. to the Foot



Section Through Batten Door—Scale 1 in. to the Foot



Detail of Main Cornice—Scale ¾ in. to the Foot



Main Floor Plan—Scale 1/16 in. to the Foot

Reinforced Concrete Milk Receiving Station—Miscellaneous Details, Plans, Etc.

and were made of N. C. pine boards surfaced on four sides and held together by 3-in. x 3-in. vertical braces carried 1½ in. above the top board, and a like distance from the bottom edge of the lower board to provide for moving of the lower run of forms to their new position

The scaffolding shown in the pictures was rather elaborate, being along the lines required for other methods of construction, but is of interest as serving to test out the relative merits of full scaffolding and wheelbarrows against scant scaffolding and buckets—the old "bugaboo" of concrete construction. In this case the writer believes, as he has invariably found in small structures, the buckets would have proved the more advantageous, notwithstanding much of the timber was later on used in the roof construction.

The concrete was formed of one part cement, two and one-half parts sand and five parts of stone, for foundations, and one part of cement, two parts of sand and four parts of stone, elsewhere. The mix was a wet one, and the concrete was thoroughly spaded. The cement used was Alpha and Sailor Portland; a carload and a half of the former against one carload of the latter. The sand was good sharp yellow Jersey sand, the stone was a good hard stone of the trap character procured from an adjacent point further up the road. The labor employed was Italian, the men being brought from Philadelphia to this point, as local labor was difficult to procure. An interesting feature in connection with this labor was the difficulty experienced by the contractor to retain his men during the pouring of the floor beams and girders, the Italians insisting upon not working over eight hours nor on Sunday and thought that they were being driven when the contractors tried to explain that it was necessary to "pour" the whole of the floor work at one time in order to procure monolithic construction. This was accomplished, however, through the rushing of other labor to the site.

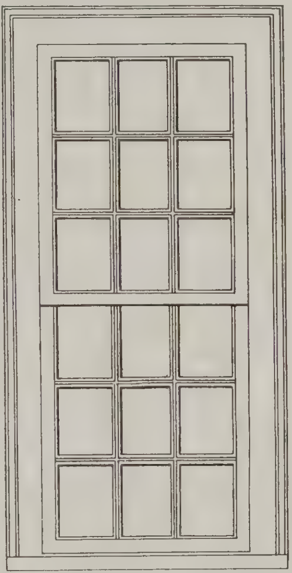
The concrete was mixed on the ground alongside of the railroad track and, as elsewhere noted, was conveyed to the forms and poured through the use of wheelbarrows, thus reducing unnecessary labor to a minimum.

The water for the mixing was obtained from a well some little distance away, water being pumped through a hose carried under the railroad tracks. An artesian well had been bored before the erection of the building in a location readily accessible to the boiler room, can washers and cooling room. This well was not used, however, for building purposes.

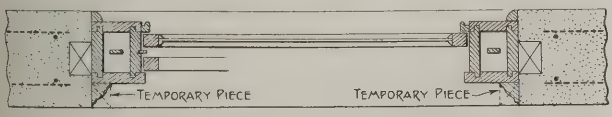
The main and cooling rooms being subjected to extreme usage through the constant wheeling of the cans on edge, it was decided to use some other substance as a top coat, Masters builders patent flooring being chosen and laid from ½ in. to 1 in. thick, depending on the slope from the various points to the bell trap in the floor.

Erecting Scaffolding and Floor "Forms" Preliminary to "Pouring" the Concrete

Photographic View Showing Receiving Door at the Left and Cold Room Entrance at the Front



Elevation of Typical Plank Front Double Hung Windows—Scale ½ in. to the Foot



Horizontal Section Through Double Hung Windows—Scale ¾ in. to the Foot

Method of Conveying Concrete to "Forms" and Showing Water Supply Hose Under Railroad Track

Reinforced Concrete Milk Receiving Station

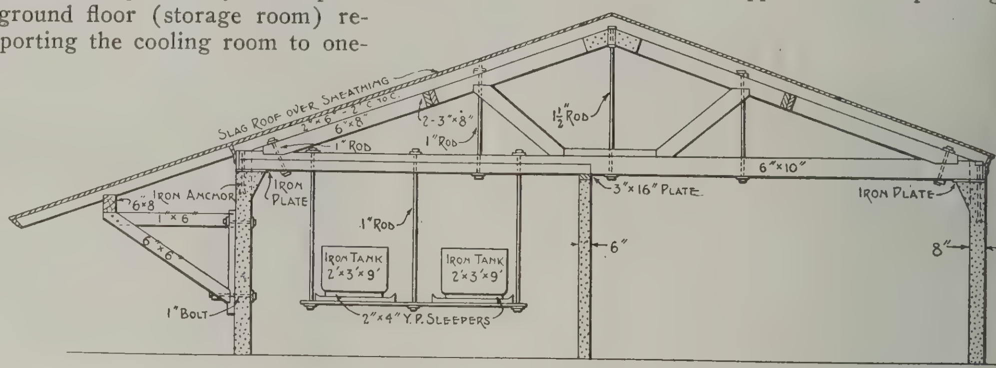
It was discovered after the installation of the beams and piers supporting them under the cooling room that it was desirable to store an extra row of milk cans in this room, therefore the reinforcement was figured over and to sustain the additional weight, safely, other piers were placed on the ground floor (storage room) reducing the spans supporting the cooling room to one-half. The exterior of the cooling room is shown in one of the halftone engravings.

The cooling room proper was formed of 6-in. solid reinforced concrete walls with Stevenson's Automatic Air Tight window and door frames. The ceiling and inside of the room was insulated with thick cork insulation of the Union Fiber Company's manufacture, applied over a coat of cement, afterwards receiving another coat of cement plaster. The space between the ceiling rafters was filled in with ground cork and ceiled on top with boards.

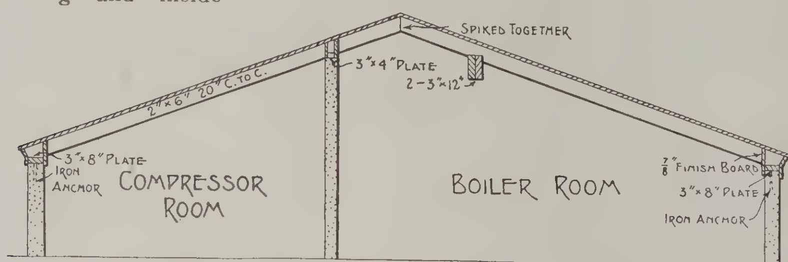
The testing table in the corner of the working room opposite the cooling room was also made of reinforced concrete.

The concrete on the exterior of the building was finished by rough casting over the rough walls, particular care being taken to perform the work while the concrete was in condition to tie with the coating and the weather favorable for its application. Rough casting was applied with force upon drenched walls and was not any thicker than required to procure a good finish. This portion of the concrete work is of particular interest from the fact that it is generally considered unfavorable to apply a coating of this character on smooth walls and have same adhere to the walls permanently. In this case, however, with the care exercised the coating remains to date without any evidence of cracking or pealing.

Over the walls there was applied a waterproofing compound composed of five gallons of benzoil (Barrett Mfg. Co.) to one pound of paraffine, force being used in this application. The principle involved was that of the benzoil penetrating into the pores of the concrete and carrying with it the paraffine which would remain after the evaporation of the benzoil, any heat

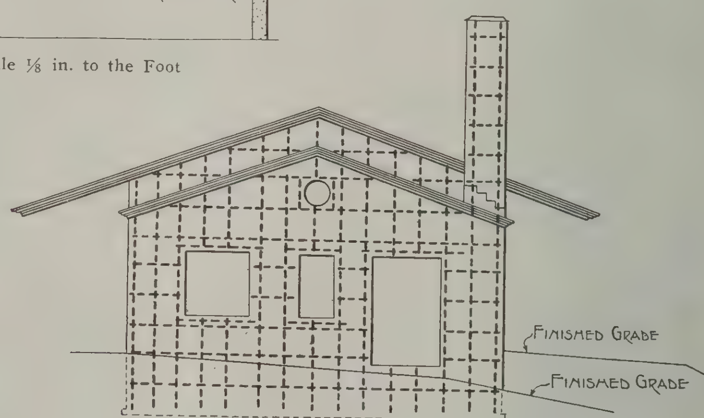


Cross Section of Building on Line A-B of the Main Floor Plan—Scale ⅛ in. to the Foot

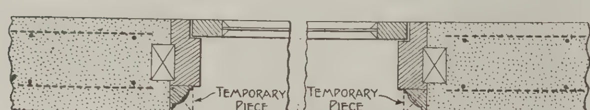


Cross Section of Building on Line C-D—Scale ⅛ in. to the Foot

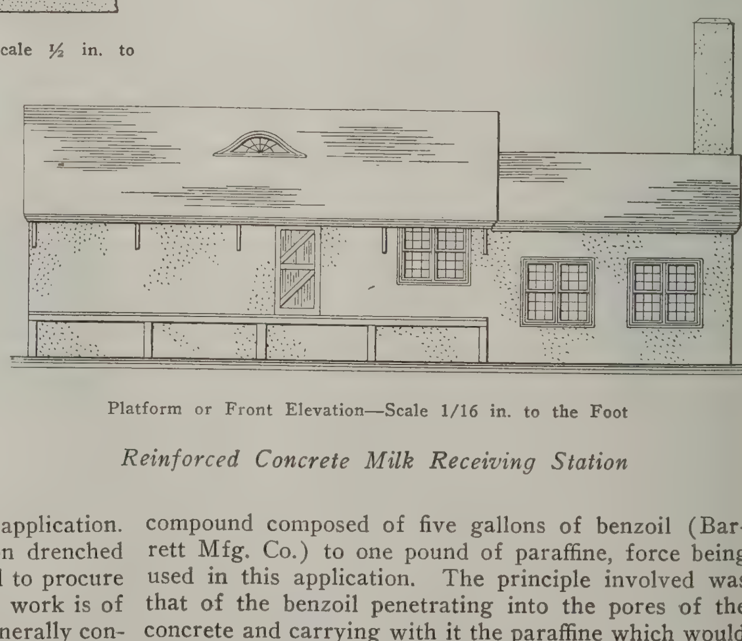
Elevation of Basement Window—Scale ½ in. to the Foot



Side Elevation of Building, Showing Position of Reinforcing Rods

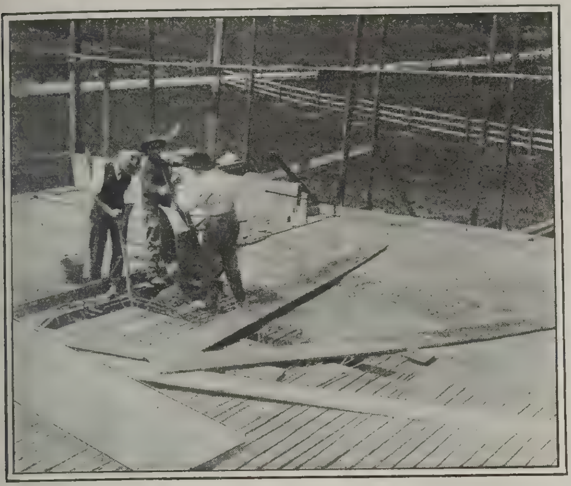


Horizontal Section Through Basement Window—Scale ½ in. to the Foot

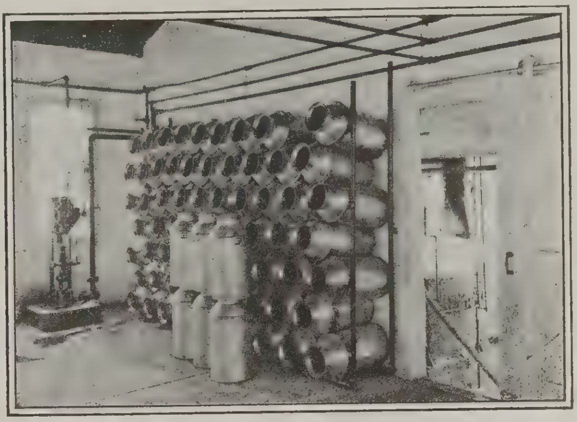


Platform or Front Elevation—Scale 1/16 in. to the Foot

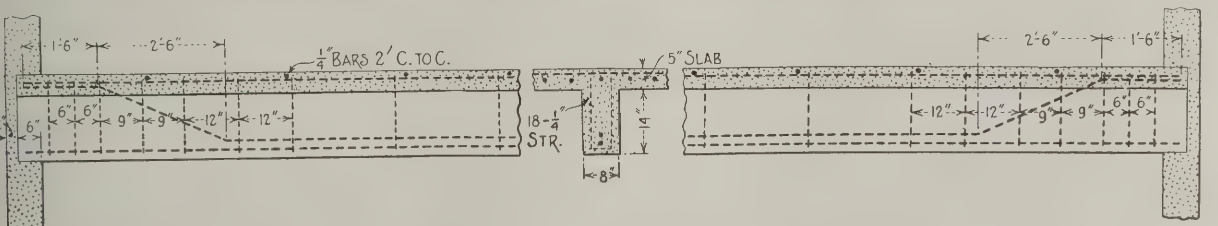
Reinforced Concrete Milk Receiving Station from the sun which might occur having a tendency to soften the paraffine and still tighter close the voids. Over the benzoil and paraffine was applied a coat of whitewash made along the U. S. Government formula for lighthouses and similar buildings. The white coating over the waterproofing was attempted shortly after the former had been applied with the result that the



"Pouring" Concrete Floor Beams and Girders



Can Rack with Pump Over Artesian Well, and Showing Boiler Room at the Right



Details of Typical Floor Beams Which Run Parallel to the Side Walls of the Building

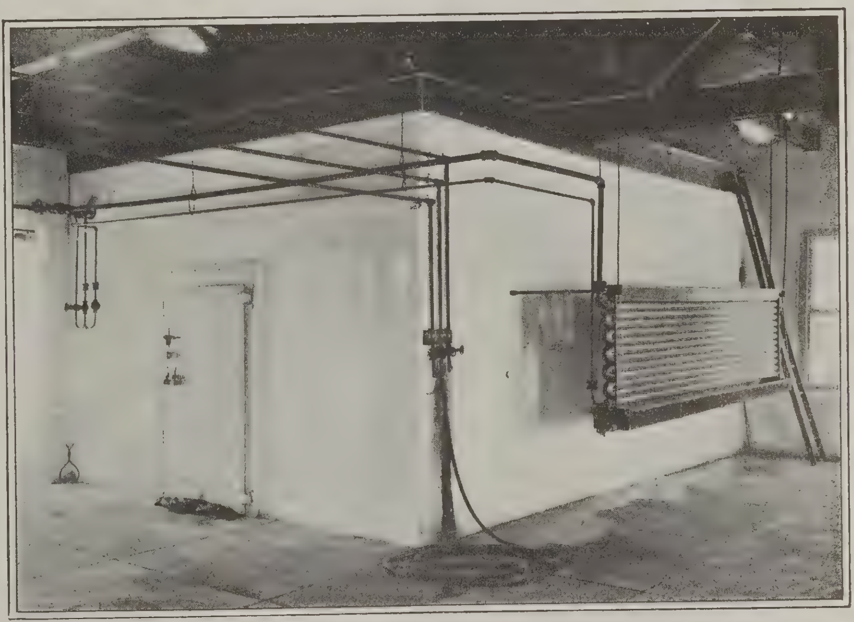
wash refused to adhere and it was found necessary to postpone the finished coat of the latter until the action of the weather and dust had sufficiently cut the same on the outside to allow adhesion.

The interior walls were coated with a white enamel with the rafters and roof stained green of a somewhat lighter shade than that of the exterior woodwork of the building. All other interior woodwork was enamel painted with a white gloss. The roof was of slow burning construction, granolithic roofing being used owing to the danger of sparks falling on same from passing locomotives.

The equipment of the mechanical plant was made up of Babcock tester, ice machine and engine of the Cleveland Ice and Machine Co.'s manufacture, boiler of the Ames Engine Co.'s make and refrigeration work by the Mechanical Refrigeration Co. of New York City.

Inside of the cold room was a large iron tank suspended from special supports overhead, in addition to which tank there was a water supply tank erected under the ridge of the boiler room above the door to the working space, it being supported on iron beams resting on the concrete isolation walls dividing the boiler room from working space and compressor room.

The contract called for the completion of the building within forty (40) working days. There was, however, considerable delay caused by the excessive amount of filling to procure the hight desired for the boiler and compressor rooms and to bring the ground outside of the building to the desired point shown (Fig. 2), especially at the rear of the building where it was necessary to provide a driveway sufficiently above the natural grade to allow of the floor of wagons to reach the receiving platform at a level point. There was also



Photographic View of Exterior of "Cold Room," Conveniently Placed to the Loading Platform.

Reinforced Concrete Milk Receiving Station

considerable delay caused through the installation of the mechanical equipment where the building work and the equipment depend upon one another. The actual time consumed from the start of the work to its completion amounted to a little over two months, which considering that there was considerable bad weather did not make a poor showing for the time of construction.

The contract figure for the work was $3,535, but there were numerous items purposely not included in the beginning and some few others which the owners later desired, the same being as follows:

No.		
1	Unloading cinders	$ 43.43
2	Unloading gas engine and compressor	4.34
3	Girder over cold room	14.89
4	Sheathing underside of ceiling, cold room	20.91
5	Sheathing top of rafters, cold room	25.00
6	Boring 12 ⅝-in. holes for brine tank holders	1.75
7	Insulation of cold room	101.97
8	Supports for piping in cold room	3.97
9	Alteration to shipping platform	17.34
10	Strengthening shipping platform	3.25
11	Steps for shipping platform	9.46
12	Engine foundations, vol. 8.2 cu. yds	81.85
13	Window between compressor and working room	9.38
14	Tank support in boiler room	42.29
15	Forms for condensor pipe foundation	4.20
16	Cutting holes for pipe lines com. to cold room	1.21
17	Hardware grinding track	2.33
18	Cutting out concrete below boiler and comp. room doors	1.06
19	Heater foundation in boiler room	8.50
20	Hoist for lowering pipe into basement	.58
21	Foundation for pump and work room	5.08
22	Four concrete columns under cold room	10.00
23	Transfer platform for train	2.57
24	Cutting seat in wall for cooler girder	.40
25	Girders for cooler	1.90
26	Manhole, frame and cover	5.69
27	Conduit in boiler and engine room	18.68
28	Enlarging door	2.00
29	Length of hose	1.80
30	Bonds	17.68
		$463.51

This brings the total cost of the structure complete to $3,998.51, thus providing a sanitary reinforced concrete building at a figure which would compare most favorably with the same building if constructed of frame without the sanitary feature.

The work of construction was executed by the Linker-Losse Company, Philadelphia, Pa.

New Building Regulations for New York City

The Superintendents of Buildings of the several boroughs constituting Greater New York adopted in January the following rules governing the use of hollow tile building blocks; the top floor partitions in fireproof buildings, and the use of lime in cement mortar:

Hollow Tile Building Blocks

Hollow tile building blocks may be used for buildings not more than 35 feet in height under the following conditions: Hollow tile blocks shall be true and square and be of uniform shape and thickness when laid in courses.

No such blocks shall be used until complete and satisfactory tests have been made by the manufacturer under the direction of the Superintendent of Buildings and until an approval for the use of such blocks has been obtained.

No blocks shall be approved that do not develope a compressive strength of at least 2,000 pounds per square inch of net section. In no case shall the hollow spaces of any such blocks exceed 50 per cent. The thickness of walls or webs of such blocks shall not be less than 1 inch.

The thickness of walls for any building where hollow tile blocks are used shall not be less than is required by the Building Code for brick walls. All such walls shall be laid in Portland cement mortar. All outside walls below grade must be filled in solid with Portland cement concrete.

No wall composed of hollow tile blocks shall be loaded in excess of 100 pounds per square inch of the gross section of the wall; i.e., no deduction being made for hollow spaces in figuring the area.

Where wood beams or girders rest on such walls suitable templates of either iron, continuous tile, or stone shall be provided under their ends, or the blocks under them shall be solid.

Hollow tile lintels spanning an opening over 3 feet 6 inches wide shall be reinforced with cement and steel bars.

All walls of hollow tile blocks and beams used in same must be anchored in accordance with Sections 41 and 60 of the Building Code.

No walls constructed of hollow terra cotta blocks shall be broken to receive pipes, but must be recessed when molded.

Every block must have stamped thereon the name of the manufacturer or manufacturer's mark.

Top Floor Partitions in Fireproof Buildings

In fireproof buildings where the roof beams are sloped and there is a hung ceiling in the top story, the fireproof partitions, except those inclosing stair halls or elevators, in the top story need not be carried higher than the hung ceiling. This applies to the top story of the building only, it being understood that a so-called pent house, if used for other purposes than the inclosure of elevator machinery, tanks or forming the bulkhead of stairs, is considered a story of the building.

Lime in Cement Mortar

The use of lime putty or hydrated lime in cement mortar to the extent of not more than 10 per cent. is permitted in any case where cement mortar is required by a building permit or by the Building Code unless the approved application or any amendment thereto calls for pure cement mortar, and provided that no lime of any kind shall be used in cement mortar for foundations or foundation walls.

The New Ohio Workmen's Compensation Law

Frequent inquiries for information relative to the provisions of the new Ohio Workmen's Compensation Law which was recently upheld by the Supreme Court of that State and which will go into effect on or about March 1 of the current year have been received by Secretary Edward A. Roberts, of the Ohio State Association of Builders' Exchanges, and with a view to making clear the salient features of the law a series of questions and answers has been prepared by him with help from legal and other experts and the matter has been issued under authority of the State association.

It is pointed out, among other things, that the rates of compensation under the new law for various trades and industries will be obtainable about the first of March, as the State Liability Board of Awards is now engaged in preparing the schedule. As to what class of employers the new Workmen's Compensation Law applies the State Liability Board of Awards has been asked for a ruling as to whether the provision limiting the application of the Compensation Law to those who employ 5 or more workmen regularly in the same business means "continuously employ."

One of the matters submitted to the Attorney General is whether the Ohio Compensation Law covers injury to workmen who may be employed in another State to work for an Ohio contractor operating under the law.

Drafty Bedrooms

An English architect recently visiting this country remarked that one thing which struck him on examining our houses was that our architects do not plan bedrooms with the idea of preventing drafts. They usually have windows directly opposite the door, which from a health standpoint is rather dangerous. This brings up a point which must some time receive more consideration, says a writer in the Toronto *Builder and Contractor*. At present ventilation is left too much to chance. In many cases no adequate provision is made for fresh air. The improvements in building construction and materials all tend to make our buildings draft-proof, cutting off the supply of fresh air except through the open doors and windows, where the supply, if utilized, is too violent. This, of course, has given rise to many patent window ventilators now on the market. Some of them are good, but most of them are unsatisfactory. The future design must take more notice of the needs of ventilation.

If the plans recently filed with the Bureau of Buildings for the Borough of Manhattan, New York, are carried out, a tower-like structure will shortly rise to a hight of 204 ft. from the corner of Lafayette, Duane and Center streets. It will cover an irregular site, the frontage on Center street being 40 ft., that on Duane street 38 ft., and that on Lafayette street being 45 ft.

Twenty-fifth Anniversary Banquet of the Master Builders' Exchange of Philadelphia

A GATHERING of over one hundred prominent builders and contractors, members of the Master Builders' Exchange of Philadelphia, Pa., assembled at the Bellevue-Stratford Hotel, in that city, on Wednesday evening, January 24th, to join in the celbration marking the twenty-fifth anniversary of the establishment of the Exchange. The "old guard" as well as the younger generation of builders, were largely in attendance and reminiscences of the older days and deeds of the Exchange were many. Previous to the banquet a formal reception was held in one of the parlors of the hotel by President Johnston and other officers of the Exchange.

Address of President Johnston

Following the service of a most excellent *menu* President James Johnston made an interesting address touching on the history of the Exchange. Its inception, he said, was the idea of James Reeves and Wm. H. Albertson, and at its foundation its function was to serve as a means of protection for the building industry in connection with labor troubles; that in uniting the various trade interests in one body great strength would be obtained. In its early days it was a factor in this direction, but broadened out and its influence was felt in various reforms in connection with the city building laws, which it aided in framing and revising when conditions demanded. In this work the Exchange has been of inestimable benefit to the engineer, architect and practical builder.

TRADE SCHOOL ESTABLISHED

In 1888 the Exchange formed a trade school, where the young men might learn the practical and technical side of the business. This was supported by members of the Exchange, as well as interested individuals; later the Board of Education, through the efforts of Murrell Dobbins, one of the early presidents of the Exchange, was interested and from this beginning was established the present trade school system of the city of Philadelphia, now an important branch of the public school system. The organization has also been prominent in charitable work. It was instrumental in the establishment of the adoption of a penal bond system in connection with municipal work, by which any person furnishing material or labor, be he sub-contractor or workman, is fully protected and assured payment for the work performed or material furnished.

MATTERS OF LEGISLATION

In State and National matters of legislation the Exchange has also played a prominent part. Apprenticeship matters are the subject of careful consideration. Through its advisory board difficulties between members of the Exchange and labor interests are frequently adjusted without the loss of time and with a large saving of expense.

ARBITRATION COMMITTEE

Its arbitration committee acts as a mediator between one business branch and another identified with the Exchange, or between builders and owners, settlements, without long legal action, being frequently arranged. The Exchange is also a factor in the adjustment of fire losses, in that its representatives often are called upon to serve as umpires between the insurance companies and those suffering fire losses. Its importance in city, State and National affairs grows day by day. He also referred to the class of building now being done, which he claimed was of the enduring character. Schools built in this city 25 years or more ago were now unfit for use and, in comparison with the present structures were poorly built. The structures of the present day are of the enduring type, century buildings, he termed them, and closed with a plea that as such buildings would serve for generations that they be made presentable and pleasing to the eye, with some adornment rather than the plain type of construction so frequently used.

Administration of Municipal Affairs

President Johnston then introduced Thomas F. Armstrong as toastmaster for the evening, who briefly referred to President Johnston's brilliant "conversation," as he himself had termed it. A silent toast in the memory of those members of the Exchange who had passed to the great beyond followed, after which the toastmaster introduced Morris L. Cooke, Director of Public Works, who made an interesting address on the subject of the "Administration of Municipal Affairs on a Business Basis." He said in part: "That many industrial concerns had grown so rapidly that the economic side of the business had been lost sight of. In some of the industrial establishments this is now being given careful consideration and with a large measure of success. The business of a municipality is, however, a more difficult proposition; the public does not realize the extent of the business of a city like Philadelphia; few officials size up the situation from a purely business standpoint, and the general employees have no ultimate object in view, so that there is a lack of unity and entire absence of the concerted action so essential to the proper conduct of business. In public service it is difficult to get the efficiency and esprit de corps which has been possible in the business forces of the larger industrial concerns. There is little inducement for the employees, such as is found in other branches of service, no pension system, no rational scheme for advancement and many changes are frequently necessary before the best service can be obtained. The present administration will do its best, he said, and asks for the co-operation of the Master Builders' Exchange, in fact must have it, if the best measures of success is to be obtained. The University of Pennsylvania, Franklin Institute, the American Institute of Architects have offered their assistance to the city officials and have all been put to work, and the services of the Exchange can be of equally great value."

General Housing Conditions

Dr. Joseph S. Neff, Director of Health and Charities, followed with a brief address in which he called attention to general housing conditions, particularly the moderate and small size dwellings, in which the subject of heating and ventilating is being neglected. The old-fashioned heating system, he said, is the best; the air furnace taking its supply of fresh air from outdoors is far better than the indirect heating systems which heat the air of the rooms over and over again. The larger industrial and educational establishments are far more sanitary than the ordinary dwellings. Open air treatment and abundance of fresh air produce the best sanitary results. Present improvements have resulted in a materially lower death rate in this city, and a betterment in housing conditions would bring it still lower.

Builders Should be Licensed

Edwin Clark, Chief of the Bureau of Building Inspection, made a brief address in which he said the safety of the public depended upon the efficiency, reliability and responsibility of the builders, and in order to accomplish the best possible result he offered as a suggestion that a commission, composed of a representative of the Master Builders' Exchange, one from the American Institute of Architects, one from the Engineers' Club and one from the Bureau of Building Inspection, should pass on the fitness of every operative builder, who should take an examination and be licensed to engage in business. With such a commission in force the character of building would be on a materially higher plane.

Trade Schools

Murrell Dobbins also made a brief address, referring particularly to the Trade Schools originally started by the Exchange, from which grew the present municipal trade school system, which now accommodates 1500 scholars, with several hundred on the waiting list, due to lack of accommodations.

Wm. T. Tilden, president of the Union League and a member of the Board of Education of the city, also made a brief address, while the Hon. J. Hampton Moore, who in his earlier years was closely associated with the work of the Exchange, made an interesting address, largely reminiscent in a way. He referred prominently to the subject of Inland Deeper Waterways and the benefits to be derived by the city of Philadelphia from the proposed Atlantic Inland Waterway System, which was practically assured.

Committee of Arrangements

The committee having charge of arrangements for the banquet consisted of Frank H. Reeves, chairman; Thomas F. Armstrong, Joseph E. Brown, Wm. R. Dougherty, A. Ramond Raff and Secretary Charles Elmer Smith.

Septic Tank for Sewage from a Cottage

The question of sewage disposal in isolated cases where there is no opportunity for connection with a trunk sewer is one of constantly growing interest, and more or less reference to the matter has appeared in these columns at intervals in the past. Supplementing what has already been published, we present at this time some comments by an English writer touching the size of septic tank and filter beds necessary to take care of the sewage from a cottage where the water supply is not over abundant. The writer in question states that as the water supply is limited it will probably be sufficient to make provision for 10 gallons per head per day

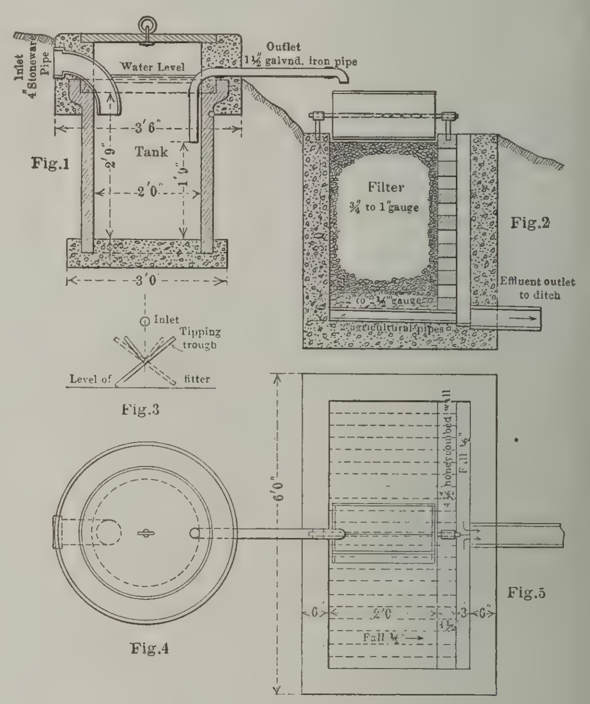
Assuming that the cottage will be occupiel throughout the year by an average of four persons, the septic plant may be designed upon this basis. Four persons at 10 gallons per head per day give a dry-weather flow of 40 gallons. An economical arrangement for this amount is indicated in the accompany illustrations, where Fig. 1 is a vertical cross-section through the tank; Fig. 2 is a section through the filter showing tipper above and outlet below; Fig. 3 is a cross-section of tipping trough; Fig. 4 is a plan of the tank, and Fig. 5 is a plan of the filter, showing tipper.

The tank is formed by utilizing a 24-in. diameter stoneware pipe and making a concrete top and bottom to it. The whole is of such a nature that it could be constructed with such labor as would be available in any village or hamlet.

The work and materials for the tank would involve the excavation and removal of 1½ cu. yd. of earth, the making of ½ cu. yd. of cement concrete, a 4-in. stoneware inlet bed, a 1½-in. galvanized-iron outlet pipe, a 24-in. stoneware pipe and a 2-in. stone cover 2 ft. 6 in. in diameter, fitted with a lifting ring.

For the filter there would be necessary the excavation and removal of 3¼ cu. yd. of earth, the making of 1½ cu. yd. of cement concrete and providing 16¼ sq. ft. of honeycombed brick wall; 53 lin. ft. of 2-in. agricultural pipes; 1⅓ cu. yd. of filter medium; a tipping trough and a 4-in. stoneware outlet pipe.

To construct the tank it is necessary to dig a hole



Septic Tank for Sewage from a Cottage

3 ft. in diameter of the requisite depth, and then lay in the bottom 6 in. of cement concrete. The 24-in. pipe should then be pushed into the concrete and the surface of the latter tamped or "punned" both inside and outside the pipe so that the concrete will be solid and will adhere to the unglazed portions of the pipe and give a water-tight bottom.

When the concrete is set the ground may be filled in around the pipe up to the level of the under side of the concrete curb. The concrete should be in the proportion of 1:2:4, the aggregate being broken to pass a ¾-in. mesh.

The filtering medium should consist of the hardest and least friable material that can be obtained locally. After the material is broken to gauge, all dust should be carefully screened out and then a depth of about 6 in. of the large material should be laid at the bottom around and over the agricultural pipes, leaving about 3 ft. for the finer material. The space of ½ in. should be left between the ends of each abutting agricultural pipe and the outlet ends carried through the honeycombed wall into the effluent channel.

Concrete Garage and Waiting Room

A Frame Work of Metal Tubing to Which Expanded Metal Lath Is Attached and the Cement-Concrete Applied

ONE of the tendencies of the present age on the part of those having the management of large industrial enterprises is the provision of accommodations looking to the comfort of their workmen and the families dependent upon them. In some cases this takes the form of the erection of an entire village laid out upon sanitary lines and involving sewers, gas, electric lighting, water works, etc., while in other cases it involves a few houses or possibly a single building. A most interesting example of this tendency to look after the comfort of employees is found in connection with the concrete building which forms the basis of this article and which is one of several concrete houses erected at what is known as their North Works by the National Tube Company at McKeesport, Pa. For the most part the structure is used as a garage, but at one side is a waiting room which is intended especially for the convenience of the women and children who bring the lunches and dinners to men employed at the mill. The building itself is unusual in its features of construction in that its frame work consists of metal tubing to which was attached a series of vertical and horizontal wires and then expanded metal was fastened to them, after which the cement-concrete was applied.

A view of the building is presented by means of the accompanying half-tone engraving, the double doors giving entrance to the garage, while the doors at the side open into the waiting room. On the following page is a view looking down the waiting room toward the watchman's office, which is immediately beyond the large window shown in the background. The floor plan shows the general lay-out of the interior space, while the vertical section on the line A-A of the plan indicates the general construction employed.

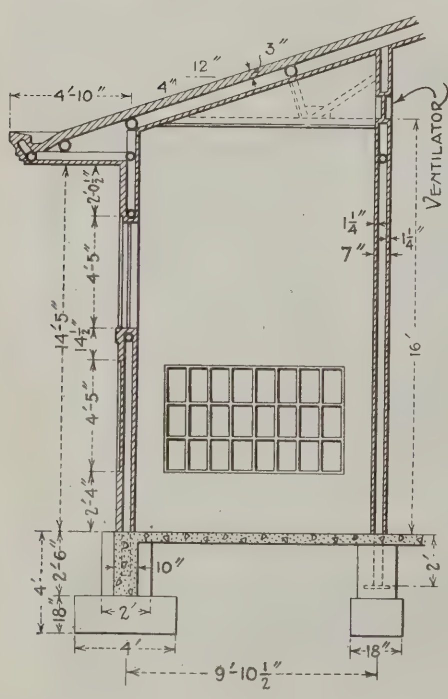
It may be interesting, however, to give a little more in detail the construction of the framework. No foundation walls are really required, because the cast iron base rests directly on a concrete pier and the upright columns rest on the cast iron base. The columns and beams are filled with concrete before erection and to the upright columns are bolted the horizontal beams. When necessary the beams and columns may be reinforced by trusses of pipe and wire, these trusses in all cases coming between the floor and the ceiling and between the outer and inner walls of the structure. The next step is to stretch wires around the beams to make the horizontal planes for the floors and ceiling and to make the vertical planes for the inner and outer walls. As the wires are passed around the beams and columns there results two planes of wires, each plane separate from the other by a distance equal to the diameter of the pipe used. In most construction work 4-in. pipe is used, which is 4½-in. outside diameter, thus leaving a space of 4½ in. between the wires.

General View of the Concrete Building as Erected by the National Tube Company at McKeesport, Pa.

Concrete Garage and Waiting Room—Erected Under the Supervision of George T. Snyder

For the floors metal lath is tied on the under side of the wires and for the walls on the inside of the wires. Concrete is then spread on the metal lath and around the wires for the floors in the same manner as would be the case if used over "forms." The walls and ceilings are plastered by the

Interior View of Waiting Room Looking Towards Watchman's Office



Vertical Cross Section Through Waiting Room on Line A-A of the Plan—Scale ⅛ in. to the Foot

usual methods. After these operations are completed there is left between the floors and ceilings and between the outer and inner walls a confined air space. In case a wood floor is desired wooden sleepers are laid in the concrete before it sets.

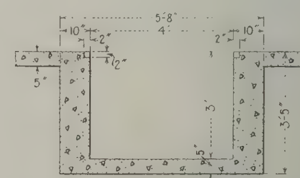
This form of construction results in a monolithic building, every part of which is completely bonded to every other part in a most thorough manner.

The building is 50 x 60 ft. in plan and the roof is a slab of reinforced concrete. The floor of the garage proper drains from all sides to the 14-in. cast iron bell trap in the center. There is also a bell trap in the corner of the automobile pit, the latter being 4 x 12 ft. in plan and covered by 2-in. planks. The cesspools at the corners of the building are 2 ft. square by 2 ft. deep and the down spouts drain under the sidewalk to the gutter.

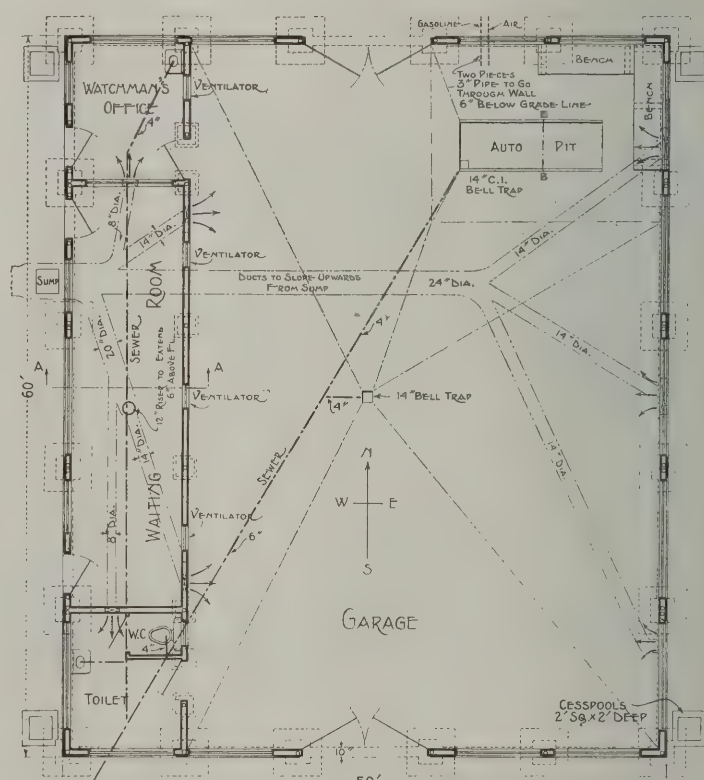
A cross-section of the pit on the line B-B of the plan is shown herewith. For the air and gasoline connections two pieces of 3-in. pipe 10 in. long extend through the rear wall of the building 6 in. below the grade line.

In the waiting room all ventilators in the wall are 16 ft. above the floor level. The risers for the 14-in. pipe are 4½ x 36 in. and the registers are 12 x 18 in. The risers for the 8-in. pipe are 4½ x 15 in. and the registers for it are 12 x 12 in. At the "sump" the duct enlarges from 18 x 30 in. to 24 x 36 in.

The swing doors at the front and rear entrances to the garage are each



Cross Section Through Automobile Pit, Taken on Line BB of the Plan



Plan of Garage and Waiting Room—Scale 1/16 in. to the Foot

Concrete Garage and Waiting Room

2⅞ in. thick, 5 ft. wide and 12 ft. high. The outside doors to the waiting room and to the watchman's office are each 2⅞ in. thick by 3 ft. wide and 8 ft. high.

George T. Snyder, of the National Tube Company, was the engineer in charge of this work, which was executed by employees of the company under patents of the Suspension Steel Concrete Company, 1808 Fisher Building, Chicago.

In the execution of the work Universal Portland cement was used.

Artistic Use of Terra Cotta in Home Building

Tendency Toward a Higher Ideal in Home Construction—Materials Used for Ornamental Effects

By Warfield Webb

THE present day tendency on the part of those who devote their time and attention to the art of building is undoubtedly in the direction of artistic improvement. There is a deeper significance given this feature that denotes the trend toward a higher ideal in the matter of house construction and the designs

Artistic Use of Terra Cotta in Home Building—A Decorative Panel

have much to do with making this a realization although the materials are not by any means to be overlooked. An artistic design would lose its greatest charm without equally artistic materials, and when it is possible to combine the two there is the highest conception of beauty obtainable. With respect to the materials that will make possible this ideal in exterior finish, architectural terra cotta lends just claim to the consideration of the public.

Terra cotta, as it is popularly known, is a structural material used largely for fireproofing purposes. It is different from architectural terra cotta and so far removed in its outward appearance as to place it in a totally different class. In addition to being a fire retardant the latter material also combines in its manufacture the highest effects artistically obtainable in any form of structural material.

It is possible to mold this kind of terra cotta into any conceivable design and into any desired color. The patterns are made by artists where the highest types are demanded and the work of manufacture is done by experts in their line. It requires skilled labor to obtain the effects that make possible this ideal and the results that have been placed in some of our present-day structures prove the wisdom and the art that have become a prime factor in attaining the highest effects.

The history of architectural terra cotta dates back only about 40 years. The crude specimens then manufactured were of the most commonplace types as compared with the attainments to-day. Perfection has been sought and realized in the latter day work with this material. The results are everywhere about us and the industry is growing with a rapidity that has a significance for the future artistic embellishments of our cities and our suburban districts.

In the past there has been more consideration given the use of this material in our business structures than has been the case in connection with our homes. We have built imposing structures with this material and the results of our labors prove that there are still possibilities yet to be realized. Into the homes there will come, and has come to a limited extent, a use for such building materials as will make possible a higher art in the treatment of the exteriors. Design, color, cost, weight, fire-resisting, damp-proof, aloofness from clinging dirt and grime—these are a few of the features which are worthy of consideration when a house of more than passing beauty is contemplated. All these things are not only possibilities with architectural terra cotta but they are in a measure at least realizations. If it is desired to imitate another material, using the terra cotta as an added decorative feature, then the color scheme can be imitated so as to partake strongly of it.

Terra cotta for this purpose is manufactured of a high grade of clay. It is designed and molded by artists in plaster of Paris, the more intricate effects being first made in artists' clay, and to render them more perfect the colors or the enamel are sprayed on with compressed air, after which it is placed in the kilns where it is baked for days. It is polished, the rough edges removed and the varying parts numbered and

A Brick Residence Trimmed with Enameled Terra Cotta placed in correct position to insure proper handling in the work of erecting the structure. The terra cotta is baked to vitrification, thus making it impervious to moisture, heat and cold, yet still retaining its original color.

Where we desire the highest in artistic ideas with

Artistic Use of Terra Cotta in Home Building—Detail of a Decorative Spandrel

reference to attractive homes this material holds out the most pleasing possibilities. It gives the best in appearance, durability, fireproofing, cost and other essentials which are of value to the prospective home builder and which should possess much of interest for him. He has found it admirable for business, park, theater, public buildings, and there would seem to be no good reason now why it should not be applied to the home building regardless of cost or size. It becomes a spacious mansion, cottage and the summer residence equally as well as it becomes the gigantic structure that rears its head into the clouds.

Where there are special designs wanted this becomes a feature in the artist's hands. Particularly is this true of the part that it will play in the home that desires special features in the way of medallions, nymphs, panels, gargoyles and kindred specimens of artistic adornment. It is adaptable to intricate designs and there is in this respect a solution of the most costly designs within an outlay that will be possible where there is at least some limit to the original cost of construction. In a word, it seems to be a material which offers a rare combination of attractive features and with which is combined the best in durability and fire-resistance, so that it lacks nothing to commend it to the seeker after the highest in effects most artistic and beautiful.

The Steep Pitched Roof

The pitching of residence roofs at a steep angle was originally to make a shingle roof rain-proof. Considering the preponderance of shingle roofs over those of any other material, in this country at least, it is not surprising that the steep pitched roof has become our standard. We have even attempted to follow it with materials which do not require such construction. The architect knows that the flat roof, covered with tar and gravel, is the cheapest, most water tight and most lasting. But it adds no attractiveness to a residence design, at least as ordinarily worked out. We are coming, however, says the *Bulletin* of the Universal Portland Cement Co., to an age when materials are studied and their uses adapted to their possibilities.

The concrete house, whether it has block or monolithic walls, should have reinforced floors, stairways and a reinforced roof. Why make this roof other than flat? Why not give it a pitch sufficient to carry away the rain but flat enough so that its cost is low, and add, if necessary, a parapet or other architectural features which will make possible the use of the roof much as our porches are now used? It is perhaps not feasible with timber or the usual materials of construction. With concrete it is simple and most economical.

We have had a wonderful adaptation of design to material in the case of concrete as applied to factory buildings and warehouses, and the time is ripe for a new residence architecture. There are already a few striking examples of departure from common practice, and forerunners of a residence construction which will combine strict utility of each part, reasonable economy, perfect fireproofness and architectural beauty.

Another Record in Skyscraper Construction

The facility with which the skeleton steel framework of the modern office building may be erected is shown in the numerous records which have been made in the recent past by leading contractors making more or less of a specialty of this line of work. Several

A Brick Apartment House Showing the Use of Enameled Terra Cotta for Ornamental Purposes

records have been established in New York City for rapid skyscraper construction and now Pittsburgh has a towering office building framed in record time.

The topmost girders of the new 26-story First National Bank Building, at Fifth avenue and Wood street, Pittsburgh, were placed in position on January 3, and as the work was commenced on November 7 last just 47 working days were utilized in completing the steel skeleton frame of the building. The contract is in the hands of the Thompson-Starrett Company and the building is designed to be ready by May 1.

Work and Methods of the Concrete Contractor--X

Allowance to Be Made in Reinforced Concrete Design for Continuous Action

By Ernest McCullough, C.E.

THE old question has come to the writer, "What allowance should be made in reinforced concrete design for continuous action?" and the best answer in the majority of cases is "Follow the requirements of the building ordinance."

However, it will do no harm to refer to this point, as it is an important matter when dealing with T-beams. When a beam—a slab being a shallow beam—rests freely upon supports at each end the bending moment is found by the formula

$$M = \frac{wl^2}{8}$$

in which w = weight in pounds per square foot for a slab 12 in. wide, or weight in pounds per lineal foot for a beam of any width.

l = length of span, being the clear span plus a bearing at each end. In the case of continuous beams, or slabs, the span length is from center to center of supports.

M = bending moment, to which the resisting moment must be equated, or made equal. When the span is in feet the moment is in foot pounds and must be multiplied by 12 to give it in inch pounds. The resisting moment is always in inch pounds, for the dimensions are in inches.

When there are three supports, thus making two spans, the common practice is to find the bending moment by the formula

$$M = \frac{wl^2}{10}$$

and if there are four or more supports, thus making three or more spans, the two end spans are counted as partially continuous and the formula for two spans is used, while the intermediate spans are considered as continuous and the bending moment is found by the formula

$$M = \frac{wl^2}{12}.$$

Building ordinances are generally worded as follows: "When calculated for ends partly fixed for intermediate spans with an equally distributed load where the adjacent spans are of approximately equal lengths, the bending moment at center of spans shall not be less than that expressed by the formula $\frac{wl^2}{12}$ for intermediate spans and $\frac{wl^2}{10}$ for end spans. The moment over supports shall not be less than $\frac{wl^2}{18}$ and the sum of the moments over one support and at the center of span shall not be taken not less than the formula $\frac{wl^2}{6}$."

To obtain inch pounds directly instead of foot pounds, the bending moment for a continuous beam is as follows: $M = wl^2$; for a partially continuous beam, $M = 1.2\,wl^2$; for a freely supported beam $M = 1.5\,wl^2$.

The above conditions from building ordinances limiting the sum of the moments is an attempt to fix the bending moment at an amount practically equal to that of a freely supported beam, $M = 1/8\,wl^2$. For a freely supported beam there is theoretically no bending over supports, so no steel is required there, except as stated below. When a beam is designed as continuous the bending moment $= 1/12\,wl^2$, and the difference between these two expressions is found as follows:

$$1/8 - 1/12 = 3/24 - 2/24 = 1/24,$$

so the bending moment over the support is $1/24\,wl^2$. If the partially continuous condition is assumed and the bending moment in the middle of the span $= 1/10\,wl^2$, the moment over supports becomes

$$1/8 - 1/10 = 5/40 - 4/40 = 1/40,$$

but according to the building ordinance the bending moment over supports cannot be less than $1/18\,wl^2$, therefore we must use this expression and provide steel to take care of it. This is true of the expression for a moment of $1/12\,wl^2$ in the middle of the span. It is also true of the expression for a moment of $1/8\,wl^2$ in the middle of the span. Theoretically there is no tension in the top over supports for a freely supported beam or slab, but actually there is some, due to deflection of the beam, because the construction of reinforced concrete structures is monolithic.

When a beam bends the fibers in the bottom stretch and those in the top are compressed, the greatest stresses existing at the middle of the span with a uniform load, or with a load concentrated at that point. If the beam runs over a support or is tied to it there can be no deflection, or, at most, very little deflection in the middle, because the fibers near the end at the top are pulled, which causes compression at the supports in the bottom. In a continuous steel beam, or any beam of homogeneous material and uniform cross section, the bending moment at the middle of the span $= 1/24\,wl^2$ and at the supports $= 1/12\,wl^2$, the supports being assumed as perfectly rigid. To make allowance for a possibility of the supports lacking perfect rigidity the theoretical moment in the middle of $1/24\,wl^2$ is not used, the expression $1/12\,wl^2$ being employed instead, thus giving a construction having less deflection.

This subject of continuity may be carried out to great lengths theoretically, and many quarts of printers' ink have been expended in printing articles on the subject. The conclusion of the whole matter is that anything more than is permitted by building ordinances is not warranted by experience and a proper conservative spirit. In the design of T-beams this is a very important factor, for in the middle of the span all the compression is carried by the slab above the rib. At the supports, however, all the compression is carried by the lower part of the rib and the tension by the steel placed over the supports, as if there were cantilever beams hung to the supports, with a section of ordinary beam between the cantilevers. This compression at the bottom of the rib in T-beams at supports is taken care of in several ways:

1. By deepening the rib so it assumes a bracket-like form. This complicates the cost of forming, and is not generally used by American designers.

2. By using compression steel in the bottom.

3. By using an assumption for bending moment in the middle of the span so the bending moment over supports will be kept low enough to guard against crushing the concrete in the lower part of the rib.

It is generally considered good practice to consider a beam or slab as only partially continuous when there are less than four spans. Above four spans consider the end spans as partially continuous, $M = 1/10\,wl^2$, and the others as continuous, $M = 1/12\,wl^2$. The following table is useful in converting factors found for one condition to those found when assuming another condition of loading.

S = span required under new assumption.
S' = span given in tables.
w = total load per square foot required.
w' = total load per square foot in tables.

Total load is sum of weight of slab and the live load carried.

Given.	Wanted.	1/10wl²	1/12wl²	1/8 wl²
S'	S	S'×1.12	S'×1.22	S'×1.58
w'	w	w'×1.25	w'×1.50	w'×2.50
S	S'	$\frac{S}{1.12}$	$\frac{S}{1.22}$	$\frac{S}{1.58}$
w	w'	$\frac{w}{1.25}$	$\frac{w}{1.50}$	$\frac{w}{2.50}$

To the formulas already given the designer may add the following: To determine the economical ratio of stresses find the concrete fiber stress by the formula

$$f_c = \frac{f_s}{1.8\,n}$$

in which f_c = the concrete fiber stress in pounds per square inch,
f_s = the steel fiber stress in pounds per square inch,
n = ratio of deformation.

The ratio of steel to use is found by the formula

$$p = \frac{\frac{1}{2}}{\frac{f_s}{f_c}\left(\frac{f_s}{n f_c}+1\right)}$$

the ratio being the steel area divided by the concrete area $= \frac{A}{b\,d} = p$.

The data given in the earlier articles refers only to plain beams and slabs. Since the concrete below the neutral axis is used merely to transmit shear or diagonal tension from the steel to the concrete in compression, much of the concrete below the neutral axis is of no use and may be omitted in a number of cases. Cases will arise where the concrete is insufficient and steel must be provided to take care of shear, but steel is cheaper and lighter than concrete, so T-beams are used to economize weight and cost. A T-beam, or rather, a concrete beam of T section, is one in which the rib is made as narrow as possible, consistent with the requirements that it contain the steel and transmit shearing stresses, while enough concrete is left above the neutral axis to take care of the compression. Merely as an illustration we can assume a beam 12 in. wide and 12 in. deep. Cutting away some concrete from each side so the beam will be 12 in. wide on top with a flange 3 in. thick and a stem only 4 in. wide, containing all the steel bunched in one or two bars, we have a T-beam. Some men calculate these beams by using the formulas already given. The depth is assumed, as there may be some considerations of head room affecting the depth. The stresses are fixed for concrete and for steel and the percentage of steel arrived at. Form the depth assumed, the width is obtained and the thickness of the slab fixed so it will be not less than one-fifth the total depth. The total area is multiplied by the steel ratio to obtain the area of the steel in square inches. Then the size of bars to use is found. The space center to center of bars is fixed at twice their thickness or diameter and the concrete on the side of the two outside bars is fixed at the amount required by the building ordinance. Adding these sizes gives the width of the stem.

To illustrate: A beam is assumed to be 12 in. deep and the width is found to be 18 in. The total area $= 12 \times 18 = 216$ sq. in. The steel ratio being assumed at 0.007 the steel area $= 216 \times 0.007 = 1.512$ sq. in., which will call for two ⅞-in. square bars, the nearest commercial size. The thickness of the slab should be not less than one-fifth the depth, which gives $12/5 = 2.4$ in., which we will fix at 2½ in. The building ordinance requires a covering of 1½ in. of concrete for the bars, so this gives 3 in. of concrete outside the steel. Adding the thickness of the bars and twice the thickness for the space between them gives $3 \times 0.7635 = 2.29$ in., making a total thickness of the rib $= 5.29$, which we will make 5½ in. To determine shear use the width of the stem, 5½ in., and not the total width, 18 in. It must be remembered that this is merely an example of an empirical method and is not to be commended, the object in mentioning it being to show how the shape and general dimensions of a beam of T section are obtained. The following formulas should be used.

There are two cases in the design of T beams, the first being when the neutral axis is at the junction of the rib and the underside of the flange, or located somewhere in the flange. For this case there is no formula by which to ascertain the resisting moment of the concrete, for the flange is generally much stronger than the steel. In the first place the depth d to the center of the steel is always assumed and the design of the beam falls under Case I when d is equal to or less than $t\left(\frac{f_s}{n f_c}+1\right)$

in which t = thickness of slab in inches.
d = depth to center of the steel in inches.

$$\text{Steel area, } A = \frac{M}{\left(d-\frac{1}{3}t\right)f_s}$$

$$M_s = f_s A\left(d-\frac{1}{3}t\right)$$

$$f_s = \frac{M}{A\left(d-\frac{1}{3}t\right)}$$

When the neutral axis falls below the bottom of the flange the design of the beam falls under Case II. That is, d is greater than the above expression.

The expression for steel fiber stress and the expression for the resisting moment due to the steel are the same as above, with the difference that the factor given as $\frac{1}{3}t$ is now $\frac{1}{2}t$.

The resisting moment due to the concrete is found as follows:

$M_c = \frac{1}{2} f_c bt (d - \frac{1}{2} t)$,
C = total compression,
T = total tension

and $T = C = \dfrac{M}{d - \frac{1}{2} t}$

$$f_s = \frac{T}{A} \text{ and } f_c = \frac{2C}{bt}$$

The depth to the neutral axis in inches $= c = \dfrac{d}{\dfrac{f_s}{n f_c} + 1}$

and the total width b may be found as follows:

$$b = \frac{2nA(d-c)}{t(2c-t)}$$

Beams of T section are used to lessen weight more than for any other reason, for heavy floor loads call for strong columns and large footings. To make the floors as light as possible is necessary, for it saves expense from the roof to the bottom of the foundations. The forming of such beams is expensive, and when a floor is designed with many narrow beams, thus imitating the joist construction of wooden floors, the forming cost is not only high but the appearance of the joists is objectionable. They are also unsanitary because of the corners in which dust may collect, and the lighting is interfered with. The majority of owners want smooth ceilings, so floors made of joists consist of a combination of tile and concrete. Tile 12 in. square are placed at intervals equal to the width of the rib or joist, and thus act as forms, between which the steel is placed and the concrete poured. The tile is not depended upon for strength, but is merely intended to save the cost of forming and give a smooth surface on which to plaster for the ceiling.

In calculating such floors the designer must remember that the width is equal to the thickness of the rib plus the width of the tile. It is usual in floors to have the ribs 4 in. thick and use tiles 12 in. square, thus making the width center to center of rib 16 in. Take for example, a floor 6 in. thick with 5 in. tile, thus making the flange 1 in. thick. The weight of this floor per square foot is as follows:

$$\text{Slab (flange)} \quad \frac{1.33 \times 150}{12} = 16.7 \text{ lbs.}$$

$$\text{Rib} \quad \frac{4 \times 5 \times 150}{144} = 19.8 \text{ lbs.}$$

$$\text{5 in. tile } 12 \times 12 = 18.5 \text{ lbs.}$$

$$\text{Total,} \quad 55.0 \text{ lbs.}$$

The weight therefore from center to center of ribs for 1 ft. in length of the floor = 55 lbs., and to reduce this to weight per square foot divide the weight by the width in feet $\dfrac{55}{1.33} = 41.3$ lbs. per square foot. Add to this the allowance per square foot for partitions, usually 10 lbs., and the live load per square foot and we have the total floor load in pounds per square foot.

At this point a very serious error often creeps into the calculations for such floors. In order to determine the resisting moment of the joist and the amount of steel we must remember that the joist carries a width of 1.33 ft., so the load per running foot of each joist is the total load per square foot multiplied by 1.33 instead of the load per square foot, such as would be used if we were calculating a strip of floor 1 ft. wide. Taking the example above and assuming the live load to be 50 lbs. per square foot and the partition load to be 10 lbs., the total load $= 41.3 + 50 + 10 = 101.3$ lbs. per square foot. If this load is used, however, in the calculations, as designers sometimes unfortunately do, the floor will not have enough strength. The correct load by which to fix the amount of steel in each rib will be $101.3 \times 1.33 = 135$ lbs. per lineal foot. In the next article will be given a method for computing a table for small T-beams, and a table will also be presented for a common combination of stresses.

Uniform Specifications for Millwork

The following very interesting communication upon a phase of the building business which cannot fail to command widespread attention, more especially that of architects and contractors who have occasion to draw off their own plans and specifications for millwork, reaches us from a correspondent in the Northwest:

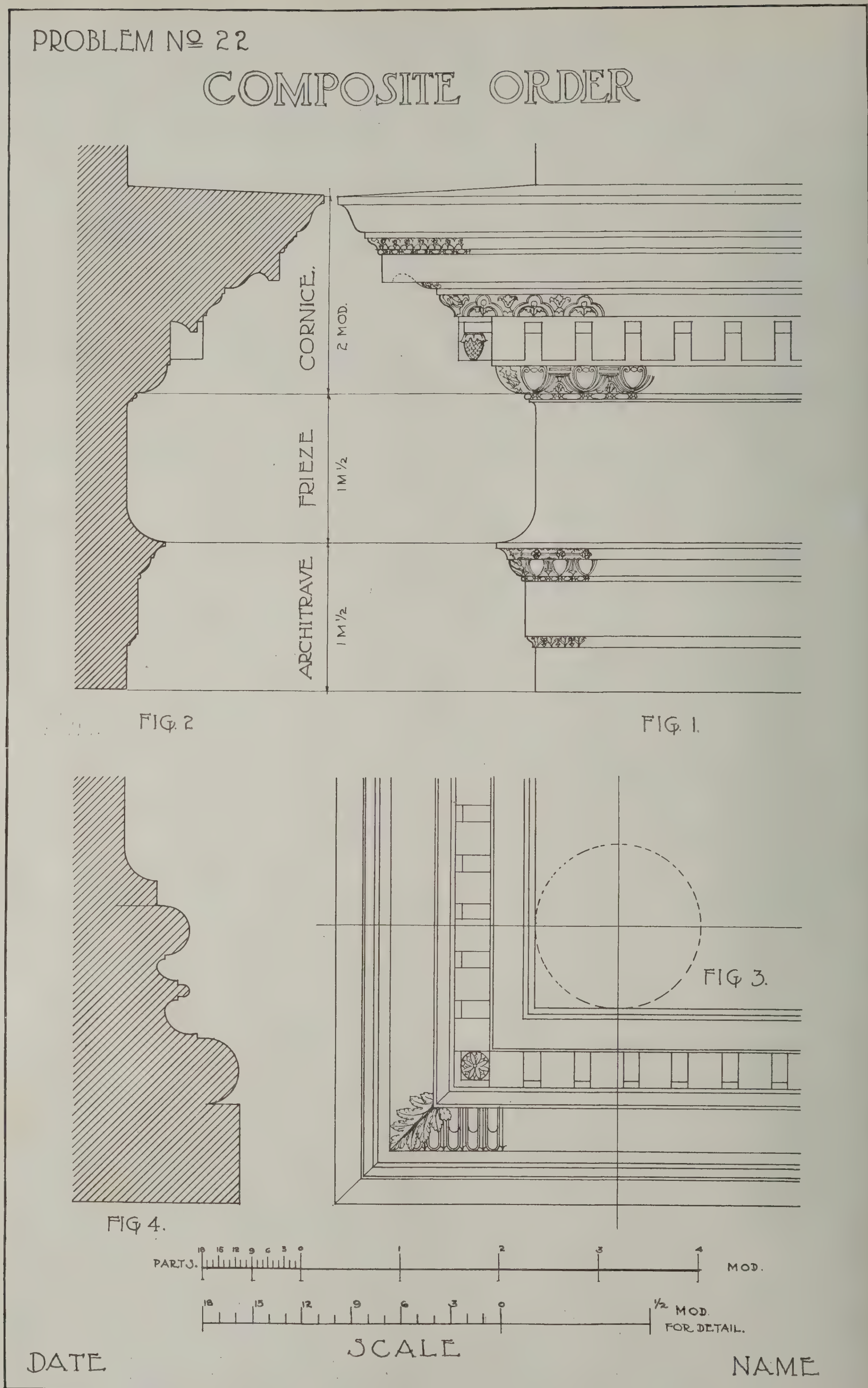
"The *Building Age* is always interested in benefiting the carpenter-contractor and the builder, and we take this occasion to call attention to a phase of the building business in which both of these classes of men are deeply interested. Every manufacturer of millwork receives hundreds of sets of plans on which he is asked for an estimate. This in the first place requires experienced help to properly do the work and some one has to pay for it. Various little angles come to light in doing this kind of figuring whereby the manufacturer necessarily adds slight amounts here and there to protect himself on quantities, sizes, etc. In addition he must protect himself against the chances of his having overlooked some items or of not having figured on exactly what was wanted. These little differences, additions, etc., will average at least 5 per cent. of the entire bill.

"Now, all of this could be avoided if the architect or contractor would draw off his own plans and submit a 'uniform list' of specifications to each manufacturer.

"There is always a difference in the grades that the different manufacturers agree to furnish when figuring on a set of plans, whereas if each manufacturer knows exactly the item that he is expected to furnish, the grades, the sizes, etc., there will be no guesswork and he will be enabled to quote them intelligently. One can hardly realize what the 5 per cent. wasted amounts to in a year's time."

The suggestions contained in the above communication are in line with the growing tendencies of the present day toward greater uniformity in the wording of contracts and specifications to the end that the millman will in all cases know exactly what is required of him and the contractor will make no mistakes in his interpretation of what the architect intended in his specifications. None but those who have had experience in building can realize the annoyances, extra expense, delays and misunderstandings which arise from this lack of uniformity in specifying exactly what is wanted and of designating materials and parts by names which are universally recognized. Action has been taken from time to time by those variously interested looking to greater uniformity in contracts and specifications and the movement has received such an impetus as would seem to assure ultimate success.

The subject is one, however, which affords the basis for interesting discussion, and we are quite sure that much that is of suggestive value will be forthcoming if architect, builder and contractor will get together with a view to reaching a mutual understanding along lines which will eliminate much of the trouble that now exists in connection with contracts and specifications.



Lessons in Architectural Drawing for Beginners—Scale of Sheet One-half Original Size

Lessons in Architectural Drawing for Beginners

The Composite Order--Its Origin and Details--Comparison of Orders of Architecture

By Alfred Auslander

WITH this, our twenty-second lesson of the series, we conclude the orders of architecture. The composite order, as seen by the full-page drawing, also consists of an entablature (architrave frieze and cornice) and the column. The name "composite order" is of modern application and has been applied in consequence of the numerous examples to be found in Rome and other parts of the ancient Roman territory of an order compounded of the Ionic and Corinthian, which is of a very uniform character.

The capital of the composite column is compounded of the Ionic and Corinthian, the upper part being the Ionic and the lower the Corinthian, as shown by sketch in Fig. 5, drawn to a larger scale.

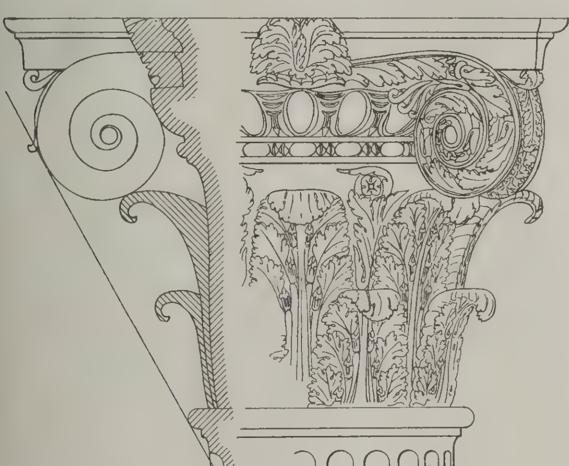


Fig. 5.—Capital of Composite Column

The entablature, as found in the ancient remains of Roman architecture, is Corinthian. The composite border, as is to be found in several of the works of the Italian architects, has been compounded from the remains of the frontispiece of Nero, which is entirely Corinthian, and from the Temple of Concord at Rome.

In our last lesson we gave a clear description of the capital, and it is unnecessary to repeat it here, so we will only describe the column base, which is drawn to a large scale on the left-hand corner of the opposite page and marked Fig. 4. It consists of a plinth, 2 modules and 14 parts square and the mouldings above, the entire hight of the base being 1 module (18 parts). The projection of the plinth from the column shaft is 7 parts.

The entire hight of the column is 10 lower diameters, including cap and base. The lower diameter of the column is 2 modules, the upper 30 parts. The construction of the Entasis is exactly the same for this column as described in one of our previous lessons. The entire entablature is 5 modules high, the architrave being 1½ modules, the frieze 1½ and the cornice 2 modules. The subdivisions in parts are as follows: Beginning with the lower facia of the architecture, 8, 2, 10, 1, 3, 2, 1; the frieze 25, ½ and 1 parts, and cornice, beginning at bottom, is 5, 1, 7, 1, 4, 1, 1½, 5, 1, 2, 1, 5, 1½, making a total of 5 modules or 90 parts. The architrave and cornice are always elaborately ornamented with carvings, a few of which are indicated in the full-page drawings. The Arch of Titus at Rome being an example of the Roman order, has all the mouldings of the entire entablature carved, while the frieze has plastic ornaments, consisting of figures, animals, etc.

This being the fifth of the orders, we thought advisable to give a comparison of all the orders, and the student will see from Fig. 6 that all orders being drawn the same hight the difference is taken in the thickness of the columns. The first in Fig. 6 shows the Tuscan order, the column of which has 14 modules for its hight and the entablature is 3½ modules. The next is the Doric order; the column hight is 16 modules and the entablature 4 modules high.

Fig. 6.—Comparison of Different Orders of Architecture

Lessons in Architectural Drawing for Beginners

Third is the Ionic, the column hight being 18 modules, entablature 4½ modules. Fourth is the Corinthian order, the column hight of which is 20 modules, the entablature 5 modules, and finally the composite order, having the same hights as the Corinthian, both being classed under the name Roman order. The cornice of the composite order is either a dentil, as the one in the full-page drawing, or modillion cornice, or a combination of both. The above mentioned Arch of Titus in Rome has modillions and dentils. It will not be out of place to mention the various kinds of cornices.

Cornices are divided into several kinds: An "architrave cornice" rests upon the architrave, and the frieze is entirely omitted. An instance of this may be seen in the famous Carijatic Portico at Athens. Cornices of this description are adapted to situations where a regular entablature would be out of proportion to the body, which it crowns. A *"mutule cornice"* is appropriate to the Doric order, the mutules having inclined soffits.

A "dentil cornice" has a denticulated band, and is usually employed in the Ionic order, though very appropriate also for the Corinthian and *composite.*

A "modillion cornice" is one with modillions, which are a kind of mutules carved into consoles (brackets). It has been chiefly applied to the Corinthian order.

A "block cornice" is that where plain rectangular prisms with level soffits are employed to support the corona instead of mutules.

A "cantilever cornice" is constructed of a horizontal row of timber projecting at right angles from the naked part of a wall, for sustaining the superior parts of the cornice. Sometimes the cantilevers are placed on the soffits and vertical sides, and sometimes they are cased with joinery.

To lay out this drawing use the description given for the Corinthian order. Fig. 1 is the elevation of the entablature, Fig. 2 is the vertical section and Fig. 3 the plan of the entablature. The student shall continue all ornaments shown in elevation. The plan should contain all ornaments of the elevation, although we have some either in plan or in the elevation. They both must agree and can be gotten by projecting same from one to the other.

We would also suggest that the student draw all the orders as in Fig. 6, but using the same diameter explained in our previous lessons the plan of the column cap, the elevation and section of which is shown to an enlarged scale in Fig. 5 of the sketches.

Peculiarities of Acoustics

During the past winter Professor Wallace C. Sabine delivered a course of lectures on Architectural Acoustics before the Lowell Institute, and in the second of the series he gave consideration to some of the puzzling features frequently encountered in connection with this phase of building construction. When the acoustics of a room are considered the architect has two problems before him, one to make the sound go where it is wanted and the other to keep it from straying outside of its intended field or room. Some of the points covered we present herewith.

One recent private mansion in New York City was a remarkable example of failure to make a sound-proof room. The owner was exceedingly sensitive to sound and in addition to his great house had built next to it his own private apartments. A brick wall of 18 in. separated the two houses, with only two openings through it and no pipe passing into it or through it. The private portion of the house consisted of a library on the first floor, the roof arched and concreted, 3 in. of sand laid on that for a deadener, then 3 in. of blocking and then the floor of the sleeping room. This room was really a box, its walls separated from the brick walls on every side. But, nevertheless, a tapping on the wall of the servants' quarters, in the main house two floors below, the striking of it with a chairback or any such noise was heard intensified in the chamber of the private apartment.

An investigation showed that in the first place the wall was of hard brick laid in cement. These two items have about the same transparency to sound and it goes through it in much the same fashion as through a wall all of the same material. This might not have mattered so much, but to steady the inner wall of the chamber certain braces connected with the brick wall, and thus it became a sort of sounding board. "If the wall had had soft bricks and hard mortar," said the lecturer, "the successive surfaces where the coefficiency of transmissibility changed, which would be at every joint, would have absorbed the sound, or, if it had been the same hard brick with soft mortar it would have been sound proof, but in the desire to have the best construction the materials were used that made the wall homogeneous in its ability to transmit sound."

Results Not Commensurate With Expense

Two other examples were noted of buildings in which practice rooms for musicians were designed with best intentions, without regard to expense, and the use of many intermediate partitions, wall space and even deadening packing, but without nearly the success that the efforts warranted. In both these it appears to have been an unsuspected relationship between the walls and the floors that caused the trouble. The sound progressing along the floors was caught up by the partitions. In this relation a most telling experiment was shown of the transmission of sound practically in a telephonic way by a wire from a cylinder containing a music box to a diaphragm. The music box was so well insulated as to be normally inaudible, and with a plain wire its tune could be heard all over the hall. A second wire differing from the first only in being loaded with lead weights reduced the sound greatly, "because," said the lecturer, "each of the sinkers gives a point where the sound is reflected and dissipated."

Sound Better With the Wind than Against It

Professor Sabine said that when the plans of Symphony Hall were under consideration an architect not connected with the building suggested that since sound is better heard with the wind than against it, the acoustics might be improved by bringing all the air for ventilation in at the back of the stage, and blowing it toward the audience, taking it out at the back of the hall. It is interesting to see what the outcome of such a plan would be, and fortunately here it is possible to compute the effect of such a proceeding. It would be equivalent, the lecturer noted, to moving the back seats 2 in. forward or raising them ½ in. And this led to the question: Why does one hear better with the wind?

The answer is in general that to any one in the direction toward which the wind is blowing, the velocity of the wind is added to the velocity of the sound, so that one down the wind is more advantageously placed. There are various complexities in all this, since there must be assumed an equal velocity of wind in all the layers, which never happens. Sound at night is stronger than sound by day in the sunshine because the sun heats objects irregularly according to their nature, and these objects, grass, bricks, sidewalks, rivers asphalt, etc., heat the air above them very differently.

Curious Results of Heating System

The final consideration for the evening by Professor Sabine was one of the curious results of heating systems. It was noticed in the House of Parliament that when the furnace was running, which sent up a great column of heated air centrally from the floor, a speaker on one side of it could not be heard by those directly through the current of heated air coming from the register. The experiment was successfully repeated by Professor Sabine, using for the purpose the interesting and delicate sensitive flame. This is a peculiar jet of gas that dances to the sound of sibilants and whistles.

By means of a whistle the experimenter showed its extreme sensitiveness, and using an improvised heater, he caused sound to pass through a column of heated air and the sensitive jet hardly noticed it, although quite as ready as before to bow before a hissing sound when the fire was not there. The reason as given was that the different temperature distorts the wave of sound and dissipates it so that only a fraction of it reaches the flame.

New York's Latest Cement Show

National Exposition of the Cement Industries--Brief Mention of Some of the More Important Exhibits

THE Second Annual Cement Show to be held in Madison Square Garden, New York City, has come and gone, leaving a deep impression upon all those who attended of the widespread interest manifested in cement concrete in its varied application in building construction and also in the machinery, tools and appliances utilized in connection therewith. The interior of the Garden was arranged in booths much after the manner of a year ago, with many of the exhibitors demonstrating the practical application of the machines which they manufacture. The exhibits were of a varied nature and included among others concrete mixers, cement brick and cement block machines, molds for fence posts, porch columns, sidewalks, curbs, pile drivers, sand and gravel washers, wheelbarrows, carts and wagons built for concrete work, etc. Many of those who visited the Garden were attracted by the varied series of drawings showing concrete designs in office buildings, factories and homes, which were a conspicuous feature.

A display that attracted no little attention on the part of the general public was the model of the concrete village now in course of construction near Scranton, Pa., the houses to be occupied by the mine workers in the employ of the Delaware, Lackawanna & Western Railroad. Another interesting feature was the model of a farm showing seventy-eight purposes for which cement may be used in farm buildings, including residences, poultry houses, cattle barns, dairies, etc.

Among the more important exhibits of interest to readers of the *Building Age* were the following:

ABBEY-BROOKS CO., 3 Passaic St., Newark, N. J.—Koehring Concrete Mixers—Novoid Waterproofing Compound.

ALLENTOWN PORTLAND CEMENT CO., Allentown, Pa.—Allentown Portland Cement and Products made from it.

AMERICAN MASON SAFETY TREAD CO., 180 N. Dearborn St., Chicago.—Mason Safety Treads, Lead or Carborundum filled—Karbolith Magnesite Flooring.

AMERICAN SAW MILL MACHINERY CO., 50 Church St., New York.—Contractors' Portable Saw Benches—Model Saw Mill in operation—Various machines for contractors' use.

AMERICAN STEEL & WIRE CO., 72 W. Adams St., Chicago.—Triangle Mesh Reinforcement.

ASHLAND STEEL RANGE & MFG. CO., Ashland, Ohio.—U. S. Standard Concrete Mixer—U. S. Standard Block Machine.

ATLAS PORTLAND CEMENT COMPANY, THE, 30 Broad St., New York.—Ornamental Concrete—Model of Panama Canal—Model of Gatun Locks and Dam.

BLYSTONE MANUFACTURING CO., Cambridge Springs, Pa.—Blystone Batch Concrete Mixers with power, mounted on skids, on hand trucks and on horse-drawn trucks.

SAMUEL CABOT, Inc., Boston, Mass.—Waterproof Cement and Brick Stains for interior or exterior decorating—Damp and Waterproofings—Lampblack Tintings—Sheathing Quilt for sound deadening.

CENTURY CEMENT MACHINE CO., Rochester, N. Y.—Hercules Cement Block Machines in operation—Exhibit of ornamental stone made by Hercules machines.

CERESIT WATERPROOFING CO., 72 W. Adams St., Chicago.—An exhibit of Cement and Concrete—Integral Waterproofing by "Ceresit," showing its water-repelling qualities.

CLINTON WIRE CLOTH CO., Boston, Mass.—Wire Cloth.

COCKBURN CO., Jersey City, N. J.—Cockburn Cubical Concrete Mixer—Concrete Block Machine—Cockburn Grout Mixer and Ejector—Aero Pulverizer—Lockwood Automatic Bucket.

CORRUGATED BAR CO., Buffalo, N. Y.—Corrugated Square and Round Bars for reinforcing concrete.

DETROIT STEEL PRODUCTS CO., Detroit, Mich.—"Fenestra" Solid Steel Windows—Crittall Metal Casements.

DEUTSCH SYSTEM OF DETACHABLE CONCRETE CONSTRUCTION, New Haven, Conn.—Model concrete house, made in detachable units by Deutsch Systems.

DEXTER BROS., Boston, Mass.—Petrifax, a damp-resisting coating for exterior or interior concrete, stucco and brick—Petrifax Enamel, a gloss over Petrifax—Roman Calx, decorative interior coating—Dextrolite, decorative interior enamel.

ELITE MANUFACTURING CO., Ashland, Ohio.—Concrete Mixers and Scaffold Brackets.

EUREKA MACHINE CO., Lansing, Mich.—Concrete Mixers—Mortar Mixers.

HAYDEN AUTOMATIC BLOCK MACHINE CO., THE, Columbus, Ohio.—Block Machines—Cement Molds—Concrete Batch Mixers.

KENT MACHINE CO., Kent, Ohio.—"Kent" Portable Precision Concrete Mixer—"Kent" Stationary Precision Concrete Mixer in continuous operation—Demonstrating Feed Hoppers—Mortar Mixer.

KEYSTONE VARNISH CO., 71 Otsego St., Brooklyn, N. Y.—Keystone Wall Finish—Kaveco for Damp Walls—Concrete Binder and Preservative for Floors.

KEYSTONE WATERPROOFING CO., 2 Rector St., New York.—Keystone Waterproof Cement and Powder—Keystone Konkrete and Watertite Koatings—Imitation Caen Stone Cement—Heat Resisting Paint.

THE KNICKERBOCKER CO., Jackson, Mich.—Coltrin Concrete Mixer.

KRAMER AUTOMATIC TAMPER CO., Peoria, Ill.—Automatic Concrete Block Tamper—Concrete Block Machines and their products.

LA GRANGE SPECIALTY CO., La Grange, Ind.—The Little Giant Brick Machine—The Acme Tile Machine—The Leader Post Machine—The Acme Post Machine.

LANSING COMPANY, Lansing, Mich.—Concrete Mixers—Concrete and Mortar Carts and Barrows.

MILES MANUFACTURING CO., Jackson, Mich.—Simplex Concrete Mixer, Cement Block Machines and Molds.

OSHKOSH MANUFACTURING CO., Oshkosh, Wis.—Oshkosh portable saw rigs, driven by electric motor and by gasoline engine.

OHIO POST MOLD CO., Nicholas Building, Toledo, Ohio.—Battery of Post Molds to make 20, also 30 concrete posts at one time.

PEERLESS BRICK MACHINE CO., Minneapolis, Minn.—Peerless Cement Brick Machine in operation—Pure Oxide Colors for Concrete.

RABER & LANG MANUFACTURING CO., Kendalville, Ind.—Crescent Continuous Mixer—Sewer Pipe and Tile Molds—Vertical Tamping Brick Machine.

READ & MORRILL MOULDS CORP., 223 E. 17th St., New York.—Steel Forms showing process of Pouring Houses—Models of Poured Houses, Bungalows, etc.

SASGEN BROTHERS, 2053 Racine Ave., Chicago.—Derricks (circle swing, pole and setter).

SCHLUETER, M. L., 104 N. Canal St., Chicago.—Electric Floor Surfacing Machines.

SIMPSON CEMENT MOLD CO., THE, 115 Vine St., Columbus, Ohio.—Iron Molds for concrete porch trimmings and for ornamental blocks.

STANDARD PAINT CO., 100 William St., New York.—Insulating and Sheeting Papers, Tapes, Varnishes and Compounds—Ruberoid, Roofings and Floorings—Preservative Damp-Proofing and Roof Paints—Flexite, Metal Preservative Paints.

STANDARD SCALE & SUPPLY CO., THE, 136 W. Broadway, New York.—Low Charging Eclipse Concrete Mixer—Eclipse Stone or Block Machine—Gasoline Engine—Pumping Outfit—Concrete Carts and Barrows.

STOWELL MANUFACTURING CO., 240 Culver Ave., Jersey City, N. J.—Trinidad Asphalt Roofings and Roofing Felts—Milled Granite—Monarch Waterproof White Granite Stucco and Waterproof Blocks.

TOCH BROTHERS, 320 Fifth Ave., New York City.—R. I. W. "Anhydrosol," "Toxlxpore" and "Toxement" Paints for waterproofing—"Liquid Konkerit," "Tockolith" and "Cement Filler," cement paints for floors and metals.

TWENTIETH CENTURY TILE ROOFING CO., Rochester, Mich.—Satterlee Cement and Shingle Machinery, Shingles and Molds—Roof Exhibit, showing cement shingles.

UNIT BRICK & TILE CO., 1123 Broadway, N. Y.—An exhibit of Unit Cement Tile and Unit Cement Brick.

UNIVERSAL PORTLAND CEMENT CO., Chicago-Pittsburgh.—Display of Ornamental Concrete and Scenographic model of Plant No. 5 at Universal, Pa.

VAN GUILDER HOLLOW WALL CO., Rochester, N. Y.—Machines for building double monolithic steel reinforced concrete walls with continuous air space.

VULCANITE PORTLAND CEMENT CO., New York City.—Model silos, cow barns, drinking troughs, cesspools and other concrete farm appliances.

WERT, C. S., Kendallville, Ind.—The Perfect Brick Machine—The Perfect Brick Molds—The Perfect Well and Cistern Molds.

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MARCH, 1912

Fire Loss in the United States

The great conflagrations which occur all too frequently have the effect of calling public attention to the fact that the tremendous annual fire loss in the United States is a waste and a folly which almost reaches the dimensions of a national calamity. The appalling loss of property and life which occasionally results from exceptionally extensive and destructive fires stirs the public mind temporarily to the seriousness of the evil, and perhaps serves as a warning which has some influence in leading municipalities and individuals to wiser methods of constructing buildings, greater vigilance in guarding against dangerous conditions, more care in preventing fires, and better methods in extinguishing them or keeping them within bounds. The recent burning of the Equitable Building is an event of more than local importance in view of the prominence of the structure, the startling character of the event, the loss of life and property and the well-nigh boundless amount of wealth which was almost within reach of the flames, but fortunately hidden in vaults in which it was secure. Such catastrophies serve as a reminder to the people of the country of the unenviable position the United States holds as suffering an annual loss of from $200,000,000 to $400,000,000, which is from $2 to $4 per capita for every man, woman and child in the country, while the per capita loss in Europe ranges from 30 to 35 cents. Recent fires have brought out the statement that the amount of timber annually destroyed far exceeds the value of the timber that goes into buildings, and the still more startling claim that the cost of fires each year is more than half the cost of all the new buildings erected annually. These facts are impressively presented in the statement of a prominent fire official giving special attention to the prevention of fires, who points out that this fire loss is more than $30,000 an hour, or $500 a minute.

Loss of Heat from Concrete Walls

Buildings of concrete construction are being erected quite generally throughout the United States and many of the contractors who are accustomed to consider the size of the building as the controlling factor when computing how much heating capacity is necessary to heat it fail to realize the wide range of character presented in concrete construction. Some close observers have already come to the conclusion that concrete walls, particularly those of the coarser character, are more or less porous and therefore transmit heat freely. Sufficient information has already been given on the subject to induce some men who have had experience to increase the amount of radiating surface installed in factory buildings of this type. It is well known that when a building is of brick, with the plaster on the inside applied directly to the brick, the heat transmission is very much greater than when there is a frame to which the lath and plaster are applied, leaving an insulating air space between the plastering and the outer wall. Apparently there is as wide range in the character of buildings of concrete construction and the common statement that such buildings as those that may be found everywhere, of concrete blocks and of concrete walls, are as readily heated as other types of construction needs to be taken with some consideration in order to avoid complaint because of an inefficient heating system. When a frame house is to be heated it is well to investigate the situation a little and ascertain whether it is sheathed and clapboarded with good heavy building paper between or whether the clapboards are applied to the studs without either sheathing or paper, so is it important that the heating contractor look into the character of the construction of the concrete wall. Wherever there are organizations of tradesmen in this field there can be no more interesting or more important subjects brought up for discussion at their different meetings than their experiences as to whether or not concrete buildings require a larger provision to be made to offset the heat losses from them.

Sizes of Chimney Flues

Nothing exerts so potent an influence for good or bad on the heating apparatus of a building, be it dwelling or shop, as the chimney with which the apparatus is connected. A picture of an attractive residence has been preserved by a busy engineer who was asked to aid in getting better service from the heater that somebody had been foolish enough to connect to a 5 x 7-in. flue. Do the men who design buildings have no knowledge of the size that the flues in a chimney must have if they are to develop the full capacity of the heaters connected with them? A magnificent residence in a large city has recently been occupied, and soon after there appeared on the tops of the chimney a copper construction that was a credit to the tinsmith but a monument to the discredit of the men who had the authority to provide a chimney with flues that would have furnished an effective draft. Possibly continual working to get architects and builders to understand that it is not fair to their clients to build poor chimneys may lead to the observance of rules for chimney construction that will insure higher chimneys with larger flues and thus minimize the troubles of the heating contractor on this score.

Convention of the National Association of Builders' Exchanges

The National Association of Builders' Exchanges will hold its annual convention at Washington, D. C., February 27 and 28, with headquarters at the Hotel Continental. The organization committee, of which I. H. Scates, secretary of the Baltimore Builders' Exchange, is chairman, has prepared an extensive report and plan for the reorganization of the National Association which will be presented and acted upon at this meeting.

Representation from New Jersey, Pennsylvania, north and South Carolina, Ohio and Maryland Builders' Exchanges, as well as from the local Exchange, has been assured and the convention promises to be the most important that has been held.

Officers of Ohio Builders' Supply Association

At the recent convention of the Ohio Builders' Supply Association, held in the city of Dayton the last week in January, the following officers were elected for the ensuing year:

President.........Howard Arnold of Dayton
1st Vice-Pres.........W. O. Holst of Toledo
2d Vice-Pres....J. M. Van Wagner of Toledo
3d Vice-Pres......J. W. Smith of Portsmouth
4th Vice-Pres..E. E. Stillwell of Bellefontaine
5th Vice-Pres......J. Q. Adams of Coshocton

New York's New Municipal Building

The new Municipal Building which is under construction at the Manhattan end of the Brooklyn Bridge and which will be largely occupied by various municipal departments, involves some exceedingly interesting statistics. The structure is expected to be ready for occupancy some time before the close of 1913, and it will be fireproof throughout. Even the chairs, desks, cases, etc., will be constructed of metal.

The hight of the building to the cornice line is 337 ft., the hight to the top of the tower 560 ft. and the hight to the top of the statue surmounting the tower 584 ft. As the foundations go down to a depth of 144 ft. the hight from them to the top of the statue is 726 ft. The gross area of office floors is about 43,000 sq. ft. and the net area of office floors is about 32,000 sq. ft.

The rock underneath the building slopes sharply downward from one end of the foundations toward the other and at the lower side the rock was 210 ft. below the surface and at a depth below which caisson workers could not operate. At the southern end of the building the caisson workers went down 139 ft. below the curb line or 107 ft. below the sea level at one point.

A curious feature of the Municipal Building is the reduced hight of the fourth floor. It was decided to place the distributing system of the heating plant on this floor, doubtless because so much of the cellar was to be used as a subway station.

Convention of the National Association of Cement Users

According to an announcement recently made from the office of R. L. Humphrey, President of the National Association of Cement Users, the next annual convention of the organization will be held in Kansas City, Mo., from March 11 to 16, inclusive. From the program of papers and addresses which have already been prepared it is expected that the convention will exceed in scope and interest that of any previous meeting of the Association.

Simultaneous with the above the first annual Kansas City Cement Show will be held during the week beginning March 14 and the outlook is very promising for a most successful exhibition.

New York's Tallest Loft Building

The site of the old Central Baptist Church in West Forty-second street, New York City, between Seventh and Eighth avenues, is about to be improved by a tower-like office and loft structure which will rise to a hight of 24 stories and will be the tallest structure north of the Metropolitan Tower. The exterior will be of marble and terra cotta and all four sides of the main building will be treated alike. The roof, which will be of tile, will be 342 ft. above the sidewalk, while to the base of the 32-ft. flag staff the hight will be 356 ft.

For the entire hight of the main building a fire tower will be constructed consisting of an iron stairway enclosed in masonry walls and having no connection with the interior floors except by means of a balcony in the open air with doors entering the fire tower at each floor level well away from the walls of the building. This will give the latest advanced type of fire protection and will carry out the best recommendation of experts who have investigated the subject anew in consequence of recent disastrous fires in New York City.

A feature of the new building will be the hight of ceilings in the clear. Rooms on the first floor will be 18 ft. high; on the second floor, 13 ft.; on the third, 13½ ft.; on the fourth, 13 ft., and then will come 12 floors of 12½ ft. each. The seventeenth and eighteenth floors will be 15 and 14 ft., respectively; the next four will be 12½ ft.; the twenty-third floor, 12 ft., and the twenty-fourth floor, 15 ft.

The building is expected to be ready for occupancy by the first of January next and the contract for the construction has been awarded to the Cauldwell, Wingate Company, 381 Fourth avenue, New York City. It will be known as the Candler Building because it is being erected by Asa G. Candler of Atlanta, Ga., and will be the home of many Southern firms having headquarters in New York City.

According to the architects, Willauer, Shape & Bready, 156 Fifth avenue, New York City, the structure will approximate $1,000,000 in cost.

CORRESPONDENCE

A Department Where Those Interested Can Discuss Practical Trade Topics -- All Are Invited to Participate

Properties of Reinforced Beams

From D. J. McLachlan, Calgary, Alta.—As indicated by the letter of Mr. McCullough and of "H. H. F." in the December issue of the paper, there is no doubt that the use of symbols instead of figures in representing quantities renders the matter discussed somewhat obscure to the average reader, and very often deters him from pursuing the subject. This is due to an uncertainty as to what the symbols refer to and sometimes to a not very clear understanding of the principles involved. With a view to throwing a little light upon this matter a reinforced-concrete beam has been proportioned by the following specification:

Compression in concrete, 640 lb. per square inch.

Tension in concrete, neglected.

Tension in steel, 16,000 lb. per square inch.

Modulus of elasticity of concrete, 2,0000,000 lb. per square inch.

Modulus of elasticity of steel, 30,000,000 lb. per square inch.

Straight-line law of stress deformation.

As illustrating the use of symbols the arithmetical operations to be performed are first represented by their use; then immediately to the right after the sign of equality their numerical value is given, and finally the result of the operation.

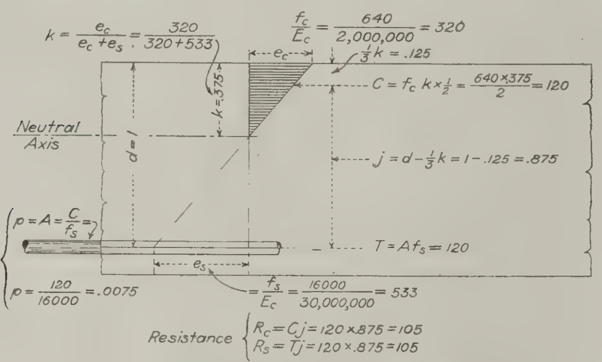


Fig. 1.—Properties of Reinforced Beam

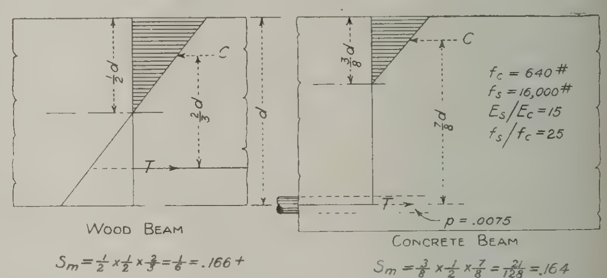


Fig. 2—Comparison of Section Modulus of Wood and Concrete Beams

Properties of Reinforced Beams—Contributed by D. J. McLachlan

For convenience the dimensions of the beam are made one or unity, as multiplying or dividing by this number does not change values and it will not be necessary to perform operations with the figures representing the breadth or depth.

To locate the neutral axis graphically first draw horizontal lines representing the top of the beam and the center line of the steel at a unit distance apart by a scale, depending on the accuracy desired. This scale should be decimally divided in order to give direct reading.

A vertical line is next drawn and from its upper end the shortening of the concrete under compression is laid off to the right along the top of the beam. This shortening takes place at such a rate that could it be continued long enough 2,000,000 lb. would be required to cause a shortening equal to the original length acted upon. The amount of shortening provided for is represented by the fraction, the numerator of which is the working stress, and the denominator of which is the modulus of elasticity.

It is much exaggerated in the drawing, but we require relative values only when compared with the stretching of the steel, the amount of exaggeration and the location of the decimal point may be neglected—dividing by the significant figures only.

We know that although the steel is 15 times as stiff as the concrete it is stressed 25 times as great, and that, therefore, its deformation (stretch) is greater than that of the concrete. It is found and laid off to the left along the line representing its center as was done for the concrete.

A line connecting the two points thus found intersects the vertical at the neutral axis, or where the stress changes from one kind to another. Measuring from the top by the scale to which the depth of beam was laid off gives the depth across which the stress varies from zero to a maximum as indicated by the scored triangles. It is in this case .375, or exactly three-eighths the depth of beam.

It is readily calucated from the values of e_c and e_s by dividing either of them by the sum of both, according to which side the measurement is taken, as is shown at the upper left hand of the diagram, Fig. 1, for k. This is easily deduced from the similarity of the triangles, their vertical sides being to each other as are their horizontal sides.

The amount of concrete in compression is now known, its average stress being one-half the working stress of that on the outer fiber. Its amount C and the location of the resultant is indicated in the diagram.

The steel required for tension in the bottom is now found from the known compression C, which it must equal. As given in the diagram it is a percentage of the effective size of the beam or the portion above the center of the steel.

The lever arm j is now known, its upper end being at the center of gravity of the compressive stress, and its lower end at the center of the steel, as shown in the diagram.

The moment of resistance R is the stress in either the steel or concrete—which equal each other and are of opposite kind—multiplied by the lever arm. It equals and resists the bending moment of the beam and its load.

The beam may be regarded as a truss, the concrete in compression being the top chord, the steel the lower chord and the lever arm corresponding to the depth or distance between the chords. The value of R is given in the diagram.

All the properties of a beam answering the above specifications are now known, and as the neutral axis is at the same proportional depth in all beams having the same elastic properties and percentage of steel reinforcement, it will not be necessary to again make these calculations.

The resistance of a beam 10 in. wide and 18 in. high above the steel, for instance, would be the value of R as found above, multiplied by the breadth and by the square of the depth; that is, twice by the depth, the first multiplication by the depth being to get the area and the second to get the lever arm. The reduction by multiplying by j has already been made.

The figures are then

$$R = 105 \times 10 \times 18 \times 18 = 340,200$$

or the resistance in inch-pounds.

In Fig. 2 of the diagram there is presented a comparison of a wood and a reinforced-concrete beam. It is seen that more of the wood than of the concrete is in compression, but that the lever arm of the latter is greater, giving them almost the same value. The difference in this example is less than 2 per cent., being as 64 is to 63 in favor of the wooden beam. With a concrete stress of 650 the approximation is still closer.

Where the reinforcement is three-fourths of 1 per cent., as here required, one-sixth the area of the beam multiplied by the concrete stress and by its depth is the resisting moment as near as can be found with certainty, and it appears that the formula for a wood beam with the proper substitution of working stress would be convenient for those accustomed to using it.

Lettering on Drawings

From R. H. Randolph, Architect, Portland, Ore.—I am sending in Fig. 1 a few styles of lettering of which any one, if properly and neatly made, will be found satisfactory for ordinary work. Any one of them can be made freehand and, with a little practice, very rapidly.

I am also sending for the benefit of the correspondent making the inquiry—"W. H. M.," Clebourne, Texas—a sample from my blue prints showing one of the styles which I use a great deal in my work. This is the line which reads "House for E. W. Reader." The old italic single-line letters, however, are in my judgment the most practical for ordinary work and are the easiest made.

From P. T. Lesher, Philadelphia, Pa.—In answer to the inquiry of "W. H. M.," Clebourne, Texas, in regard to letterings or drawings, I am sending in Fig. 2 a few styles that are most used on working drawings.

From Matt Riley, Sturgeon Bay, Wis.—I am enclosing a few styles of lettering for plans in answer to the inquiry of "W. H. M." in the January issue of the paper. The first alphabet shown in Fig. 3 is plain and simple of construction and suitable for titles. It may be used in connection with lower case directly under them for describing materials or making other notes on plans.

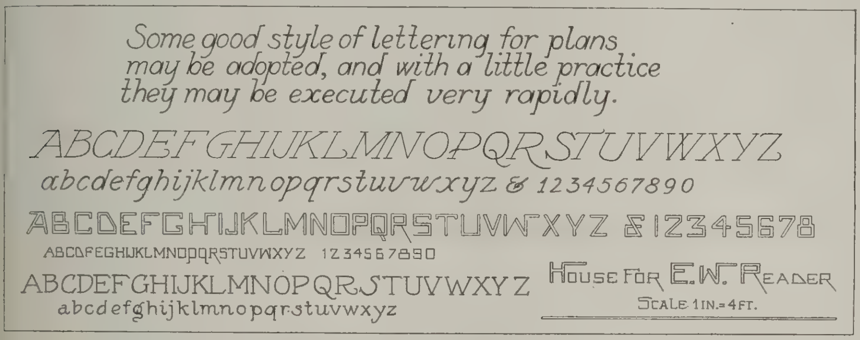


Fig. 1.—Samples Submitted by R. H. Randolph

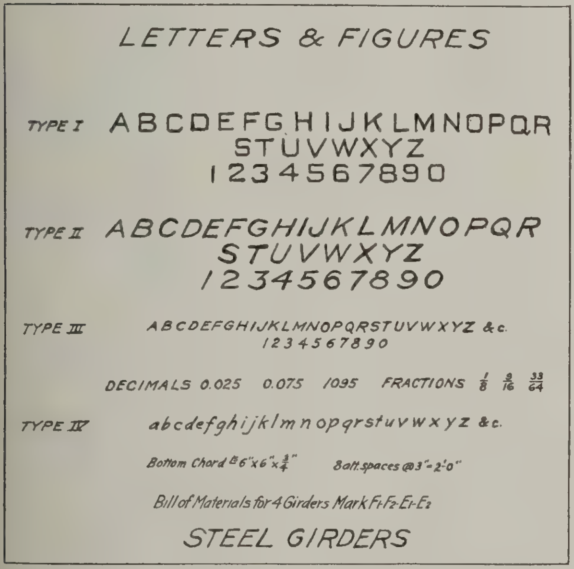


Fig. 2.—Specimens Contributed by P. T. Lesher

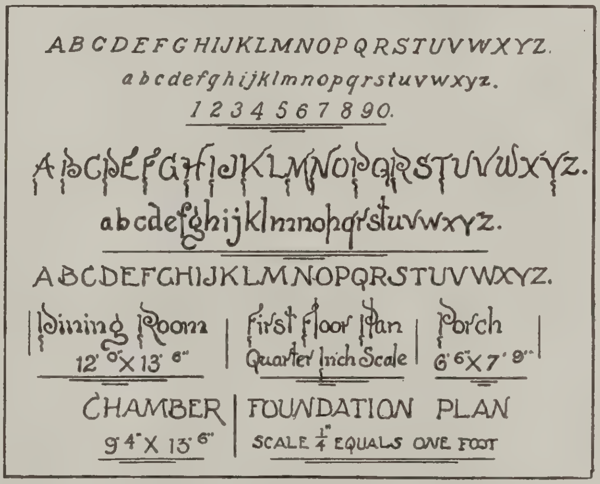


Fig. 3.—Styles of Lettering Furnished by Matt Riley

Lettering for Drawings—Specimens Contributed by Various Correspondents

The second alphabet is an individual style of my own and has never been used except on drawings of small cottages and summer-building plans, and then only as initial letters in connection with lower case alphabet directly below. Some samples of the combination are to be seen lower down on the sheet.

The third alphabet might be called a universal style and considered by most draftsmen as suitable for any kind of a drawing.

I have hurried the preparation of these examples to some extent and have not used any more care in regard to spacing or the making of the letters than I would use when lettering on plans. This I take it is about what the correspondent making the inquiry wanted.

Best Methods of Deadening Floors

From C. McG., Detroit, Mich.—I am a young contractor and a reader of your valuable magazine, and would like to have some of the older builders tell me through the Correspondence columns the best method of deadening floors. I have used several of the advertised deadening felts, but they do not give the desired results.

I am building a four-family flat which is to be steam heated, and the owner insists on the floors being as sound-proof as possible. Therefore I would like some of the practical readers of the paper to help me with my problem.

Note.—There are various methods of accomplishing what our correspondent desires, and we trust the readers will relate their experiences as to which plan gives the best results in practice.

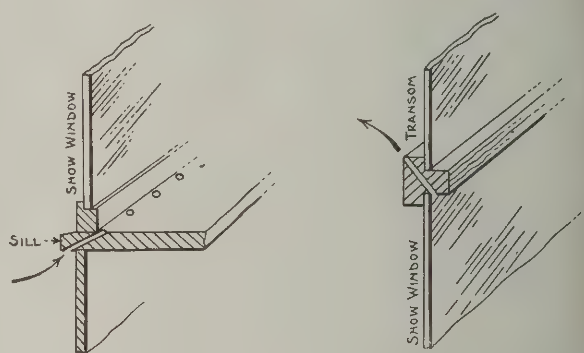
Why Do the Show Windows Sweat?

From G. M., Canton, Ohio.—I would like to know why the show windows indicated in the accompanying sketches collect moisture on the inside to such an extent as to be exceedingly annoying. The window seems to be ventilated, but I would state that there is no heater in the cellar of the building and the latter is naturally damp.

The window is not beaded with putty or any other preparation. The inside stop at the floor level of the show window is notched so as to allow the air to enter from the outside close up to the inside surface of the glass. Then to create a current we bored holes through the transom bar just inside the transom glass and we also ventilated the second transom the same as the first at the bottom.

My own opinion is that the trouble comes from a very damp and gravelly cellar which has no furnace to keep it dry. If any of the practical readers, however, can help me out in this matter I shall be very glad indeed to have them do so.

Fig.—Front Elevation of Show Windows



Details Showing Openings for Ventilation in Sill and Transom Bar

Why Do the Show Windows Sweat?

Details of Septic Tank Construction

From M. V. B., Townsend, Mont.—In the issue of the paper for January, 1911, there appeared an article entitled "Septic Tanks for Isolated Houses," which I clipped for future use. The time has now arrived when I wish to make a practical application of the construction there referred to, but I find several questions in my mind which the article has created. I will take it as a great favor if any of the readers who are posted on septic tank construction will help me out.

In the second paragraph of the article the statement is made that "the period of 8 days must be allowed for purification." Again, it is stated that the filter coke "should be intermittently wet and dry."

Now the question that arises is this: in family use the sewage going into a tank would be continuous from day to day; when or how can we secure these 8 days for purification or get time to allow the filter to dry?

Again, should the vent or inlet for air just come through the covering or extend a little distance above the covering?

Can anyone give me a detail or throw more light on the construction of the automatic trap in the vessel marked D?

I work in a town where it will be next to impossible to get a sewer system and as we have just completed a new water system in this place we will be called upon to install toilets with cesspools or septic tanks, so whatever light or help the readers of the *Building Age* can throw on this subject will be very much appreciated by me.

Criticism of Plank Frame Barn Construction

From Lumberman, Wisconsin.—I noticed in the issue of the paper for January, page 15, an article illustrating and describing Modern Barn Construction. This style of barn was very popular at one time in this section, but it has become quite a question with many whether a barn of this style of construction can be put up by the country carpenter.

Is it not a fact that in order to obtain the strength required the joints must be made as nearly perfect as possible? Again, the material in the trusses and in all of the frame for that matter should be perfectly dry.

If these few points are not observed is it not a fact that the joints will become loose by the shrinking of the green lumber or from poor construction and in this way become more or less lopsided and unable to withstand the wind pressure that they should?

I have also heard complaints about the ends of the barn being pushed out and in going over the illustrations representing the framing on page 17 showing the end I do not see that provision has been made for this pressure as the builder has simply two pieces of 2 x 8 in. stuff nailed together.

I am sure that others besides myself would be very glad to hear what the author of the article in question has to say on these points.

Building a Circular Brick Silo

From D. J. B., Redford, N. Y.—I have yet to hear of a brick silo. It would be expensive and bad, and I doubt very much if "W. J. W.," Hillsboro, N. H., whose inquiry appeared on page 85 of the paper, will have much success in building one.

Brick will let all the liquid filter through and absorb all the juice from the ensilage and in cold weather it will be covered with ice outside below the ensilage. I spent a winter at Exeter and it was pretty cold.

The correspondent had better use stone.

If the Editor wishes, I will give a good plan for cold climate silos that any carpenter can build and which will be cheap, practically frost-proof and durable.

A silo 15 ft. in diameter and 25 ft. high will feed 20 cattle once a day all winter and July and August.

Note.—The Editor will be very glad to have this correspondent furnish plans and description of a cold climate silo with a view to its publication in an early issue of the paper.

From E. A. N., Rockville, Conn.—In reply to "W. J. W.," Hillsboro, N. H., I would say that we built a brick silo last fall with an inside diameter of 16 ft. and a height of 27 ft. The walls for the first 12 ft. were 12 in., the balance being 8 in.

We did not think it needed any reinforcing, but we put in a full header every 7 courses and slushed in solid as we went up. Our mortar was a mixture of one barrel of Portland cement to a barrel of lime with sand to suit.

In the side toward the barn we put in an opening 3 ft. wide and the hight of the silo. Within 3 ft. of the top we put in a rowlock over the frame.

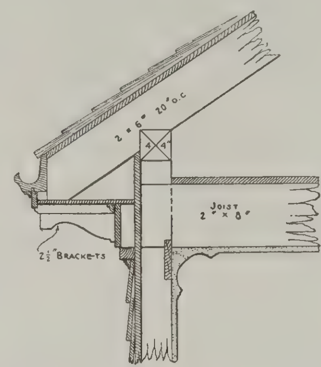
For the door frame we had a 2 x 6-in. spruce set flush with the outside of the wall, which left it so you could cut in 1-in. boards on the inside. The opposite side had 3 openings 14 x 24 in. at suitable hights for filling.

The silo holds 125 tons and the farmer keeps 25 cows. The silo has no roof, as the owner thinks the ensilage keeps better without.

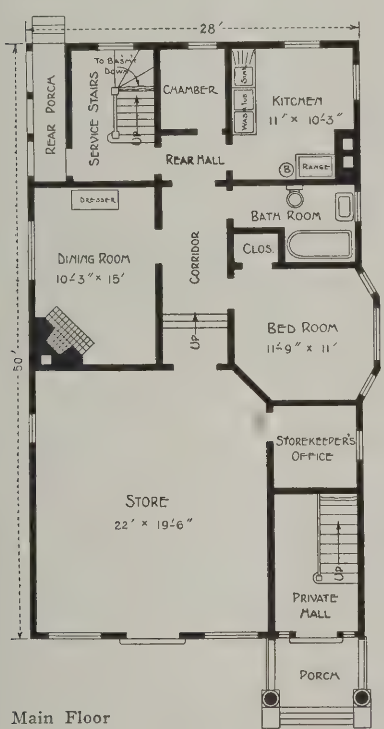
Design for Combination Store and Dwelling

From Arthur Peters, New York City.—In a recent issue of the paper there appeared an inquiry from "G. E. S.," Milwaukee, Wis., asking for a combination design of a store and dwelling, and in reply thereto I am submitting the accompanying drawings showing elevation, floor plans and a detail of the main cornice, which I trust will be of interest. The plans show the store on the main floor, beyond which are the living rooms of the proprietor. On the second floor is a doctor's office with waiting room, and beyond are the living rooms.

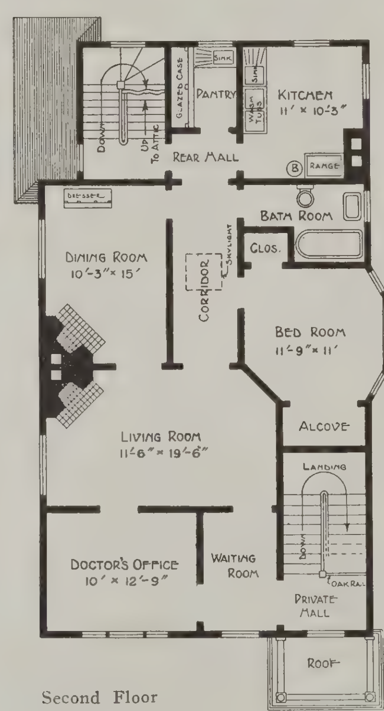
Front Elevation—Scale 1/16 in. to the Foot



Detail of Main Cornice—Scale ½ in. to the Foot



Main Floor



Second Floor

Design for Combination Store and Dwelling—Floor Plans, Scale 1/16 in. to the Foot

The foundations are intended to be of stone with underpinning of hard burnt brick. The walls are to be of frame construction, covered with sheathing boards and clapboards with good heavy building felt between. The roof is to be covered with shingles.

The architectural treatment is in the colonial style, the general scheme being clearly indicated on the front elevation.

Referring to the first-floor plan it will be noticed the floor level of the store is only about 6 in. above that of the sidewalk, thus adding 18 in. in the hight of ceiling in the store as compared with the hight of the other rooms on the ground floor. There are three steps up in the corridor connecting the store with the living quarters. This corridor is lighted by the transoms in the doors of the dining room and the bedroom, and more or less light comes from the rear hall.

In the attic there is space for three or four bedrooms lighted by dormer windows. The tenants of the second floor have private stairs in front and service stairs in the rear, which lead down to the first floor and basement and up to the attic.

In the basement is furnace room, coal bins, laundry and sufficient space for storage of goods for the storekeeper.

The entire cost of the building, including plumbing and hot-air heating, will not exceed $5,400, based on the prices of labor and materials in the neighborhood of New York City.

Obtaining Square Cuts of Rafters in Roof Framing

From J. W. W., Fallsington, Pa.—In the correspondence columns of the February issue of the paper John Parkhill, Rochester, Minn., gives a solution of the problem of "I. G. Norant," which appeared in a previous number, and comments on the answer thereto of "R. M. R." In the latter part of his comments Mr. Parkhill repeats the question of the original correspondent to this extent: "What figures on the steel square shall I use to cut the ends of the valley or hip rafter, and how do I get them?"

Mr. Parkhill gives a very elaborate answer, but still leaves us in the dark as to the figures to use in order to obtain the cut on the hip to agree with the end of the common rafter left square. Instead of figures he gives us a long rule which, to say the least, is very complicated. In the first place he marks the horizontal cut of the first hip and then the horizontal cut of the second hip across the first.

Now, by looking at his diagram we see that *E-D* is the horizontal cut of the hip *A-D* and it is also the horizontal cut of the complementary hip *F-D*. How does he make them cross each other?

Finally, after all this work he produces in Fig. 2 the end cut *D-A*, and has thus got back to where he started. Why all this trouble to get *D-A* when he has already laid it out by taking 17 on the blade and 4 on the tongue, marking along the blade, laying it out, of course, from the level line *E-D*.

What "I. G. Norant" wishes to know is how to get the cut *D-F*. If he will take one-half of 17 on the blade, and the rise—in this case 4—on the tongue, laying off from the same level line *E-D*, putting the 4 on the tongue at *D*, and mark along the tongue, he will produce the cut *F-D*. A second square laid along the line *E-D* is very handy from which to lay off, or a good straight edge will do.

Designing Footings for Piers and Walls

From G. E. S., South Orange, N. J.—In regard to Fig. 5 in the article by Mr. McCullough in the January issue, entitled "Designing Footings for Piers and Walls," and the formula

$$d = \sqrt{\frac{M}{102 \times b}}$$

which appears in the first column on page 40, I should like to ask if this has been derived from the well-known formula

$$M = .86 d.A.\ 16{,}000.$$

If so, .0075 ratio of area of steel to area of concrete was used and this would not check with formula $A = d.b. \times .0065$, which follows.

Is not the ratio .0065 rather low when as high as .01 is used in 1:2:4 concrete unless we take into consideration that each of the eight beams has a width b in reality only, when we consider that the compression area takes care not only of its own steel but components of the compression due to steel tension in the two adjacent beams?

Should not the formula $.7 \dfrac{V}{d} \times s$ for total stress in inclined stirrups be $.7 \dfrac{V}{Jd} \times s$, and is this formula based on the assumption that all horizontal stresses (shearing stresses) are transferred to the bottom tension bars or the same bars inclined through bond with the concrete?

Answer.—If the correspondent will refer to articles in the November and December issues of the *Building Age,* he will discover that with a low concrete stress, due to inferior or weak concrete, that a smaller area of steel is used than when a strong concrete is used. The formula $d = \sqrt{\dfrac{M}{102\, b}}$ is for a concrete stressed up to 613 lb. per square inch and a steel stress = 18,000 lb. per square inch, the ratio of deformation being 18. This is according to the Chicago building ordinance for the grade of concrete employed. A strong concrete furnishes so much strength in compression that it requires a large per cent. of steel to balance in the tension side of the slab or beam. For a 1:2:4 concrete the stress according to the Chicago ordinance will be 700 lb. per square inch, the ratio of deformation = 15, so that with a steel stress of 18,000 lb. (for deformed steel) the steel ratio = 0.0072.

To omit the moment arm (j) in the formula for stress in stirrups merely lowers that stress a trifle by making the divisor larger. All stirrups should be rigidly attached to the bottom reinforcement and also extend far enough up into the compressive side of the beam to be sufficiently anchored in the concrete. As a rough-and-ready practical rule see that the length of the stirrups, or the steel used for taking diagonal tension, be not less than 50 times the thickness or diameter of the bars, measured from the neutral axis to the upper end. This will generally require that the stirrups or diagonal tension reinforcement be carried up to within an inch of the top of the concrete and thence horizontally until the required anchorage is obtained. If this rule is not followed cracks may, and frequently do, appear above the ends of the stirrups. The bottom steel bent up serves for diagonal tension or shearing reinforcement. ERNEST MCCULLOUGH.

Short Cuts in Estimating

From J. F. C., Marion, Va.—I have been a reader of the *Building Age* only a short time, but I wish to say that I enjoy reading its pages very much, especially the Correspondence Department.

I have been following the business of contracting and building for some time and, as every one knows, a contractor has a great deal of figuring to do, so I come to the Correspondence columns to ask some of the builders for a little information. What I would like to know about are some "short cuts" on estimating labor and material for residences costing, say, from $500 to $3,000 each.

One is often called upon to figure a job in a hurry and has not time to make out bills of materials, etc., and get correct prices on them. I usually figure jobs like this by the square, counting labor and material at so much per square, and add all "extras" that are not counted by the square. I would be very glad to hear from some of the readers on this subject.

Building Concrete Steps

From Prof. John R. Bell, Huntingdon, Pa.—In reply to the inquiry of "H. L. M.," Pawling, N. Y., in the December issue of the paper relative to the best way to build seven concrete steps 40 ft. long with 6-in. risers and 15-in. treads, my advice would be that he secure the services of a competent cement finisher who has been trained in this particular work. In my opinion the cause of the great number of failures, collapses and accidents in concrete construction as well as in other classes of building work is due to the lack of training of those engaged in the work.

Regarding the question of the correspondent above I will not dwell on theory or the technical features of concrete construction, for in this class of work we cannot be governed by rules pertaining to reinforced monolithic construction work but will endeavor to discuss the matter in a way that the average workman will understand.

Steps placed on the ground in a solid mass are as a rule not reinforced, and I conclude that the specifica-

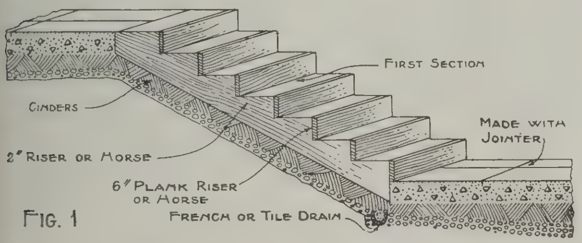


Fig. 1

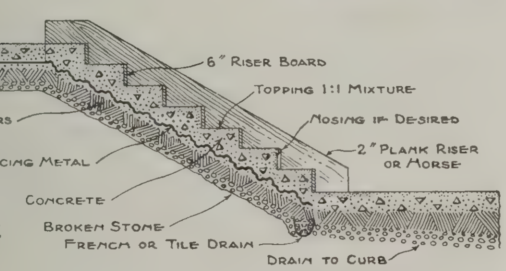


Fig. 2

Building Concrete Steps

tions do not call for it. Therefore, at least 18 in. to 2 ft. of earth should be excavated if the steps are placed against an embankment or terrace. If filled in it should be done to within the same distance from the finished steps. The next operation is to fill in about 4 in. of broken stone and then cinders be placed on top of the stone, the cinders to be well sprinkled and tamped to insure compactness.

Perpendicular expansion joints should be cut through the entire mass. In the writer's opinion there should be at least three of these joints dividing the steps in 10 ft. sections. This work can be accomplished in one of two ways. First by completing the first and third sections and removing the "forms" from the completed sections and then placing the "forms" for the second and fourth sections and completing them. Care must be taken to plaster the forms with top dressing as the concrete is placed in them.

This will be the easier way for the unskilled workman. The "forms" in this method can be placed in the usual way and a sufficient number of risers be used to complete the entire job at one time. These should be placed upside down, nailing the 6-in. riser plank to the riser "form," in some localities called horses, and plaster the top coat on the riser boards or plank as well as on the exposed portions of the finished work. The concrete can then be placed, the expansion joints can be cut through the entire mass and joints filled with sand and tamped. The top dressing should be jointed with a tool for the purpose, called a jointer.

This method requires more skill, as the entire mass must be finished at one time. In my opinion it is the quicker and cheaper method, therefore, the best, considering the keen competition in this class of work. In submitting this information to "H. L. M.," and to other readers of the *Building Age* to whom it may appeal, I do so in the interest of industrial education and building construction, as I am devoting my best efforts to teaching this as well as other building arts at the Pennsylvania Industrial Reformatory. I will conclude by stating that a French or tile drain should be provided so that the water will not accumulate at the bottom of the steps. This can be accomplished by filling a trench the entire length of the steps with broken stone and making two such drains at right angles, with the long drain running to the French drain under the curb. These drains will prevent the steps being affected by frost and are necessary if tile is used. The latter should be placed about 10 ft. from both ends, thus having two drains equally distributed.

Care should be exercised in setting the risers referred to so that the steps will slope sufficiently to allow the water to run off. If reinforcing is desired place 2 in. of concrete on the cinders and then on this place the wire mesh or reinforcing bars as the case may be, and then fill in the concrete.

I would suggest for this class of work a 1:3 :6 mixture for the concrete and a 1:1 mixture for the top dressing.

The accompanying sketches are suggestive of the remarks above presented.

Durability of Spruce and White Pine Clapboards

From E. S. C., Webster Grooves, Mo.—Referring to the communication of "C. D. A.," Ogdensburg, N. Y., in the December issue of the paper relative to the lasting qualities of white pine and spruce bevel siding or clapboards, it may be stated that taking the two woods, growth and grade alike, there is no appreciable difference. Both are of proved lasting worth and it is reasonably claimed that spruce is the nearest approach to white pine all around of any wood.

In this connection, however, it is well to refer to the fact that virgin growth white pine and the unexcelled grades of 50 or more years ago is no longer available and the present supplies of spruce are practically in the same relative position that white pine was a half century since. The growth of the Pacific Coast which is just being introduced in the Eastern markets is the finest in the world.

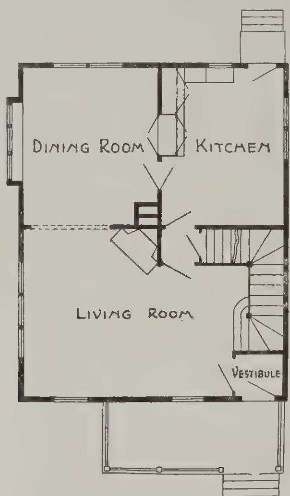
It is well-known that white pine lasts well and it is evident from the query of the correspondent that spruce is not so well assured. The writer has had several years acquaintance and experience with the lasting qualities of the coast spruce and feels no hesitancy in favorably placing the lasting qualities of it alongside of white pine or any other good wood. He has seen "shakes" of this spruce that have been on roofs in Washington for 30-odd years that were in as good condition on removal as could be expected—the wear being the only feature that affected them.

Before leaving the subject why not mention with white pine and spruce the certain and undeniable lasting qualities of the red cedar of the Pacific Coast which, too, is being introduced eastward as a most superior material for siding. Both cedar and spruce are to be obtained at considerably less price than white pine and either of them will prove eminently worthy and reliable. Cedar is so distinctly a lasting wood that it can scarcely be compared with any other in this respect.

"It never rots and only wears out" is the apt term expressing the worth.

Appropriate Mantel for Fireplace

From A. G., Duluth, Minn.—I am thinking of building a house for myself, but I have not yet decided what kind of a mantel would be best suited for the fireplace in the living room, and I therefore come to the Correspondence Department for assistance from its practical readers.



Appropriate Mantel for Fireplace

The plan which I enclose shows the arrangement of the rooms on the first floor. I want the fireplace located just about as shown and the width across the front of it is to be about 4 ft. 4 in. The dining room, living room and vestibule will be of craftsman oak finish.

I would be glad if some of the architectural readers of the *Building Age* would furnish suggestions and details for publication.

Trouble from Freezing in Basement

From D. P. B., Redford, N. Y.—I was in North Dakota in August and am free to say that there was no necessity of protection from cold then, but I should like to inform "W. T.," whose letter appeared on page 86 of the February number of the *Building Age*, that 15 degrees below zero *is* cold. He should test his walls to find where the cold comes from by throwing water on them. Rooms overhead with no fires may be the cause of all the trouble. His outside door should have a tight storm door. He should have inside storm doors on his windows, hinged at the top and made of inch lumber. A 12-in. hollow block wall with double windows is not sufficient to keep out frost in this freezing North unless a fire is in the room.

The correspondent has three remedies—banking; building a chimney to the bottom of the cellar with a door level with the floor for ventilation and set up a stove, or stud around the inside with 2 x 4's and then ceil or lath and plaster. Banking is much done in the section where I live. I have a stove in my cellar and it does no harm. Enough fire to keep the temperature at 30 degrees will not hurt anything.

From F. W. E., Temple, Okla.—For the benefit of "W. T.," Binford, N. D., I would say that the few courses of hollow concrete blocks is probably the cause of his cellar freezing. If he will box between the floor joists and fill in with concrete to the floor line or 2 in. above, and make what we call a "mouse-proof" floor, his trouble is likely to be obviated. The draft between the inside and outside walls will be more like a dead-air space.

Obtaining Bevels in Roof Framing

From J. C. I., Oconto, Neb.—The sketches which I am sending herewith are intended to explain the problem in roof framing presented by J. F. Johnson, Nokomis, Ill. Fig. 1 represents the method of obtaining the run of rafter, while Fig. 2 shows the methods of obtaining the bevel. As we have a run of 6 ft. 6 in. and a rise of 4 ft., the steel square laid on the stick, as indicated in the sketch, will give the required bevel-cut and the distance from 6½ in. across the steel square to 4 in. gives the length of the rafter—that is, using inches to represent feet.

This applies to all hip and valley rafters as when we have the length of the common rafter and the distance from the last common rafter to the corner of the roof then take the length of the common rafter on the blade and the distance to the corner of the roof on the tongue and a mark against the blade will give the required cut. The other cuts will be the same as the common rafter, and to get the length for them divide the length of the common rafter by the number of spaces from it to the corner. Thus the length of the common rafter is 10 ft. and the distance to the corner of the roof is 8 ft. Rafters spaced 2 ft. on centers would give us four spaces. Then $10 \div 4 =$ 2½ ft., so the first hip rafter would be 2½ ft. shorter than the common rafter and the next hip rafter 2½ ft. shorter than this one and so on until all are cut.

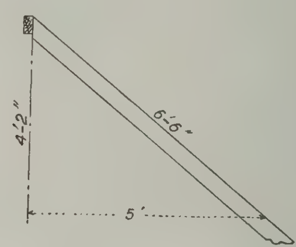


Fig. 1.—Method of Obtaining the Run of Rafter

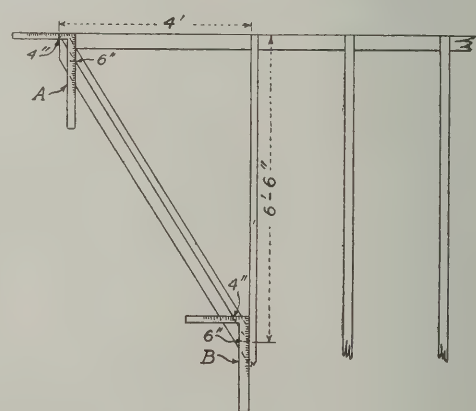


Fig. 2.—Method of Obtaining the Bevel

Obtaining Bevels in Roof

The practice of cutting rafters by the "stepping" process ought to be done away with entirely. Determine the hight it is desired to have the roof in the center and take this figure on the tongue of the square with the run on the blade which gives both cuts. The length of the rafters can be obtained by measuring across the steel square, as before stated. In this way rafters or braces of any unequal number of feet or inches, or fractions thereof, can be readily and accurately cut.

The Jobbing Carpenter and Some of His Work*—XXX

Various Shop "Kinks"—Tools for Marking and for Other Purposes—The Shellac Bottle—Concluding Comments

By Edward H. Crussell.

VERY little bench work is marked out with a pencil, for in nearly all cases a knife mark is used, and for this purpose many mechanics bring into play their pocket-knives, while others call into service the corner of a chisel. In Fig. 238 there is shown a marking knife used by the writer for a number of years. It is made from a piece of round steel about ¼ in. in diameter, with one end flattened and ground to a knife edge, while the other end is pointed as shown. The pointed end is used for locating the exact spot through which the line passes; the square is then shoved up to it, the knife reversed and the mark made.

Now just a word of experience by way of caution. The writer was for a long time in the habit of sticking the knife end-up in the top of the bench as soon as he finished using it. One day he stooped over to squint along the edge of a board which he had in the bench vise and the pointed end of the knife, which was sticking upward, ran into his face within ⅛ inch of his eye. Needless to remark he has never stuck the bench knife or any other double-ended instrument into a bench top since.

Marking Irregular Curves.—Straight lines can always be marked on the material with squares or straight edges, but irregular or freehand curves are altogether another matter. One way to get them is to mark out the curve full size on a sheet of paper; lay the paper on the material and then go over the curve with a tracing wheel. The tracing wheel pricks through the paper and reproduces the curve on the material in a series of dots. It is a dressmaker's tool and can be bought for a dime in almost any notion store.

The Copying Pencil.—Most of the readers are doubtless familiar with the copying pencil—a painter friend uses it in a rather novel manner. If he wishes to copy a fancy letter or any other item of decorative design, he first goes over the outline of the original with the copying pencil, then dampens a sheet of paper, lays it on the design and rubs or presses it to an even contact. This gives him a faint reverse of the original. Whenever he wishes to reproduce it he goes over the outline again with the pencil and transfers it to the article to be decorated by first dampening the article and then placing the paper—design side down—on to it. This "kink" cannot be used in all cases, but it is worthy of remembrance and so it is mentioned at this time.

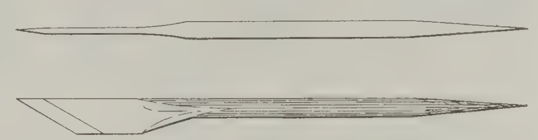


Fig. 238.—Side and Edge Views of Marking Knife

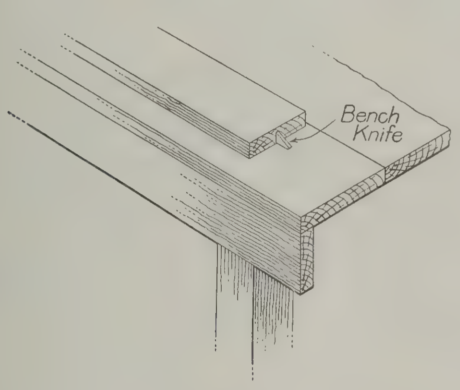


Fig. 239.—Application of Bench Knife

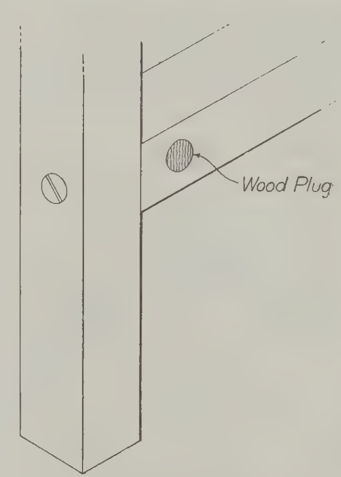


Fig. 240.—Method of Holding Wood Screw in End Grain

The Jobbing Carpenter and Some of His Work—XXX

Drawing Pins.—This is not a "kink," it is just a piece of plain, common sense that most of us are too busy to realize. Drawing pins or thumb tacks can be bought for less than 10 cents per dozen and can be made useful in more than a dozen different ways. Here is one of them and you can think out the others for yourself.

Blue prints or working drawings arrive in the shop or out on the job in a roll. The workman spreads them out flat, lays a chisel on one corner, his hammer on another, a block of wood on the third and a piece of brick on the fourth corner. Every time he moves he knocks one of these improvised paper weights out of place, and the patience he displays in putting them back again is really wonderful. A few thumb tacks pushed into a cork and carried in the tool box will avoid all this bother.

Bench Knife.—The bench knife is a tool of every day use in Europe, but is not so well known or used in America. It is nothing but a piece of the blade of an old dinner knife about 1¼ or 1½ in. long and is used

*The author of these articles will be glad to discuss any phase of work in the line of jobbing carpentry that the reader may suggest—Editor *The Building Age*.

in lieu of a nail for holding material on the bench. It is used at the opposite end to the bench stop, being driven partly into the bench and partly into the material, as shown in Fig. 239. For thinner stuff it is driven deeper into the bench. It is easy to apply, can be readily removed with a claw hammer and does not mar the bench or material so badly as other forms of fastening. It is a good idea to have two or three of these bench knives because it is so easy to mislay them in the shavings.

Fastening a Screw in End Grain.—Any one who has made the experiment knows that a wood screw does not hold so well parallel with the grain (shop parlance "in end wood") as it does across it. A good way to overcome the difficulty is to fit a plug of wood crossways of the grain in the piece into which the screw is to be driven. This is illustrated in Fig. 240, which shows a method of fastening one of the lower rungs to the leg of a chair. The screw is long enough to reach through the plug of wood and the combination acts somewhat in the manner of a bolt and nut. It is not necessary to bore all the way through the rung for the plug, although where appearance is of no moment it is easier to do so.

Screw Eyes.—Screw eyes can sometimes be used in place of wood screws to advantage, especially for temporary fixtures, because they can be inserted or withdrawn without the aid of a screwdriver. Fig. 241 shows a form of gauge for inside measurements in which a screw eye in conjunction with a small washer is used for holding the two pieces at the proper distance.

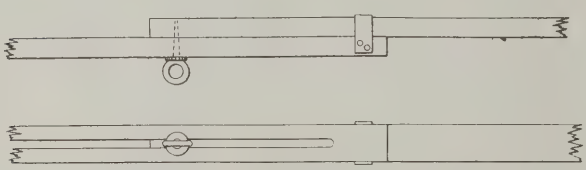


Fig. 241—Screw Eye Used as Gauge Fastener

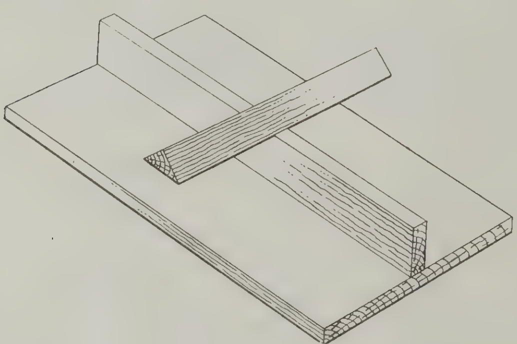


Fig. 242.—A Miter Marking Appliance

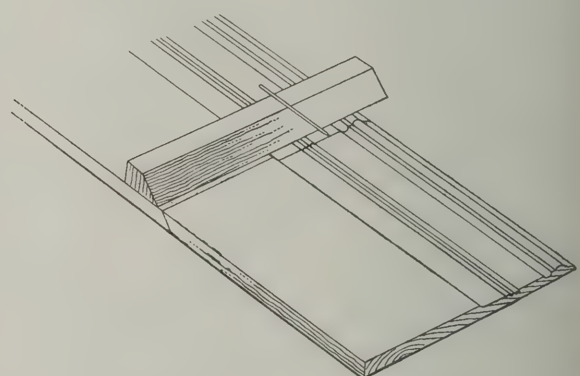


Fig. 243.—Applying the Principle of Fig. 242 in a Different Manner

The Jobbing Carpenter and Some of His Work—XXX

Marking Out a Glass Board.—One day we were called upon to make a new glass board for the shop; that is, a board on which to cut glass. Marking one of these boards into inches and fractions is a slow and tedious job and one in which mistakes are very liable to happen. To avoid this difficulty we procured two yard sticks—such as are given away by hardware stores for advertising purposes—and then plowing grooves of the correct size at the top and bottom of the board we glued the yard sticks into them. We sunk the yard sticks a little below the surface to avoid wear on the figures and gave the whole thing a coat of shellac.

Our Shellac Bottle.—A bottle of shellac and a brush is a handy combination to have around either in the shop or in the household. The brush must be left in the shellac and the shellac kept from the air if it is expected to remain in good condition. The writer's outfit is here described.

Select a pickle jar with a wide mouth, then get a good bristle brush that will easily enter the mouth of the jar. Cut a circle out of a piece of leather about 1 in. in diameter larger than the mouth of the jar; make a small hole in the center of this circle and force the handle of the brush through it. Fill the jar nearly full of shellac and drop the brush into it so that the leather circle or collar sits on the top of the jar. To make the point air tight run a brush-full of shellac around the mouth of the jar, drop the brush in again and hold the leather down on the jar for a few seconds until the shellac sets. The shellac will stick the leather to the jar, but it can be easily removed when required for use and can be as easily fixed in place once more after you are through with it.

A Sandpaper Kink.—Take a sheet of sandpaper or coarse emery cloth and glue it flat on a piece of ½ in. pine board. After the glue has set, rip the board into strips with a saw. These strips with the sandpaper attached can be used the same as a file or rasp for smoothing up the corners or crevices of woodwork. The sandpaper cuts faster than a file and if necessary the sticks can be whittled down at the end so as to permit them to enter places where a file cannot be used. It is best to wait until your saw needs filing before cutting up the board, because it certainly will need filing after using it for that purpose. The sandpaper does not hurt a dull saw to any extent, but it will surely play hob with a sharp one.

A Miter Marking Appliance.—In Fig. 242 is shown a substitute for the ordinary miter box. The construction of it is indicated quite clearly in the sketch, but some little explanation will be needed before either its construction or capabilities are thoroughly understood. As to the construction it consists of a bed piece or bottom with another piece fixed to it along the center of its width. The angles formed between these two pieces should be as square as possible. Across the upper edge of the center piece and at right angles with it is fixed a strip, the sides of which are beveled to an angle of 45 degrees. Made in this way the appliance will mark what is commonly called the "square miter." In use, the molding or whatever is to be marked is laid in the angle formed by the two lower pieces and a flat-sided pencil is laid on the beveled strip so that its point touches the molding; then while keeping the pencil flat on the strip, draw it along so that a mark is made by it right across the width of the molding. You now have the molding marked for either an external angle miter joint or an internal angle coped joint, depending upon which end of the molding you use.

It is only in special cases that the tool is of benefit in cutting the ordinary outside miter, but for coped joints its advantage is at once apparent, especially for material that is too wide or bulky for the ordinary miter box. If some angle other than that of 45 degrees is needed the beveled strip must be altered to suit, or if a square line is required across a large molding a square edged strip is used in place of the beveled one.

The appliance as shown in Fig. 242 is perhaps more helpful to the pattern maker than to the carpenter, especially in pipe and core box work, but the principle upon which it works can be made useful to the carpenter in a number of different ways. Once it is thoroughly understood miters of almost every conceivable size and angle can be marked by means of it.

The intelligent student will at once perceive that in many cases it is not necessary to make the lower portion of the device at all, the beveled strip being all that is required. Suppose you wish to mark a coped joint on a piece of 12 in. molded base, no matter whether it be for the square corner of a room or the octagon angle of a bay window. Take a strip of the correct bevel, which is the same as the miter of the angle, and lay it square across the piece of base. Run your pencil along the beveled side, keeping it flat on the strip and letting the point of it follow the outline of the molding as illustrated in Fig. 243 of the sketches. This is quicker than scribing with the compasses, and with a little practice will be found more accurate, especially for odd shaped angles. Using it in this way the strip can be turned around so that it is only necessary to bevel one side of it, or each side may be beveled to a different angle to suit different miters.

And now this long and rambling series is brought to a close. At the time the articles were started there was no thought of continuing them to this length, but the letters of commendation that the writer has received from his fellow workmen—the readers of the *Building Age*—and the forebearance and assistance of our worthy editor have been very important factors in making the writing of them possible.

The material contained in the articles has been written from month to month just as it was published, and a considerable quantity of the "midnight oil" has been burned in its production, but on account of the distance of the writer from the office of publication—the extreme width of the country separating the two—there has been no chance for me to correct proofs of it after being set in type. Under these conditions it is not strange that a few errors should have crept into the printed pages, but these were never considered serious enough to require correcting or explaining in subsequent issues.

This, in my opinion, is an eloquent testimonial to the editorial staff of the *Building Age*, and these few halting lines are tacked on here to indicate the appreciation of the author.

Legal Excuses for Contractors' Delay

When Strikes, Inclement Weather and Acts of Owner Are Available—Changes and Errors in Plans

By A. L. H. STREET

A PARTICULAR phase of building contracts, which is often drawn into controversy in the courts, relates to the facts which excuse a contractor's failure to complete a building within the time required by his agreement as affecting his liability for consequent damages sustained by the owner. On a careful research among the American appellate court decisions on this question the writer finds that they are substantially uniform in their holdings, so that the following stated principles may be fairly said to apply generally throughout the several States:

Excuses Available in General

Since a builder cannot justify a delay through negligence or other acts controllable by him, available excuse, as a general rule, must be found in conduct of the employing owner or his representatives or in other conditions not within the contractor's control. But it has been decided by the United States Supreme Court and by appellate courts of New York and several other States that where a builder contracts absolutely to complete work on or before a certain date unforeseen contingencies, regardless of their nature, are not available as an excuse. Hence, from his standpoint, it is a matter of great importance that his agreements specify as fully as possible the conditions upon which he is to be discharged from responsibility for postponed completion of his work, especially as to strikes, inclement weather, inability to procure material, delay in carriage of material, destruction of material by fire, latent conditions of the ground or other cause.

A delay is excusable only so far as it is commensurate with the cause thereof. In other words, if a contractor can perform his agreement within the time fixed, with allowance for delays for which he is not accountable, he is liable for damages for each day's delay beyond that time.

Responsibility of Owner

As to the owner's responsibility for delays, his failure to make payments promptly as required by his contract, has been held by the courts of Illinois to excuse tardiness of the builder in performing on his part. In Indiana a lawsuit was once necessary to procure a determination that a delay in completing work at the owner's request was not chargeable to the contractor. It is another obvious legal proposition that if a builder cannot do his work until certain work required of the owner is done the owner's delay excuses consequent delay by the builder. The owner's failure to furnish fixtures until the day fixed for completion of a building has been judicially determined not to have excused the builder's delay where the latter did not call for them until then; and the owner's failure to furnish screens as required by his agreement did not excuse delay in doing work not affected by the screens. The New York Court of Appeals exonerated a contractor for delays caused by the owner's failure to comply with requirements of the municipal building department, resulting in temporary injunction against prosecution of the work; by neglect of the architect to furnish sufficiently detailed plans; by the owner's request that the seventh floor be finished before the sixth; and by unusually wet weather.

Delays Chargeable to Builder

That a contractor notified the owner he would complete the building in a short time on receiving notice that the owner desired to rent or use the building, and the owner failed to give such notice, did not excuse a delay, according to the Texas Court of Civil Appeals. In the same State it has been held that an owner is not chargeable with delay caused by an architect refusing to permit the contractor to use inferior material. This holding accords with the general rule that delays caused by proper condemnation of material and rejection of faulty workmanship are chargeable to the builder. A builder is not responsible for tardy performance caused by architect's delay in passing on completed work which would be covered up by further work. Where there is a general custom to apply to the architect for specifications and he furnishes them promptly on request, his failure to furnish them without request does not excuse delay by the builder. The Federal Supreme Court refused to exonerate a contractor for delay caused by a latent defect in the soil, which necessitated building on an artificial foundation not originally contemplated. A Louisiana contract allowing the builder an extension of time for delays from causes beyond his control was construed by the Supreme Court of that State as entitling him to credit for delays caused by the owner or municipal authorities, but not by rain, holidays or defaults of his subcontractors. Delays of other and independent contractors for other parts of work on the building are uniformly held to excuse a builder for failing to do his work on time, so far as his delay is so caused. As between a contractor and his subcontractor, the former cannot hold the latter responsible for delay unless there is a fixed liability against the contractor and in favor of the owner on account thereof.

Changes and Errors in Plans

The courts of Missouri refuse to hold a builder accountable for a delay caused by an error in the plans. Agreement upon extra work which requires additional time entitles the builder to a reasonably proportionate extension of time for completing the work, except as controlled by agreement between the parties. It is essential, however, as pointed out in a New York decision, that a change in specifications be of such nature as to render further time necessary before the contractor can claim an extension of time.

Effect of Strikes

Strikes or boycotts, to be available as an excuse, must, as above indicated, be expressly provided for in the contract. Under a New York decision the common provision exempting the builder from delays caused by "strikes" protects him against any strike entailing a delay, though it does not occur among his own employees. Such a stipulation was held by the Nebraska Supreme Court not to extend to a strike of a builder's workmen on account of his failure to pay their wages. A strike clause does not protect the contractor against a voluntary lockout against employees on his part. A strike by the operatives of 25 out of 28 planing mills in operation in St. Louis was held to be a "general strike" within the meaning of a provision excusing a delay on account of such strikes. The Georgia Supreme Court has determined that, though a contract provided for an extension for delays arising from strikes, providential causes, etc., delays so caused are not excusable if the contract requires notice thereof to the owner and no notice is given.

Delay in Obtaining Material

As to the effect of the builder being unavoidably delayed in obtaining material, the United States Circuit Court for the district of Pennsylvania has decided that a Federal building contractor could not excuse a delay because, on account of a congested condition in steel mills, he was unable to procure necessary structural steel in time. Strike of employees at a brick plant does not excuse a delay resulting from inability to procure brick unless strikes are guarded against in the contract. Impossibility to procure a particular kind of stone required by the contract does not excuse delayed completion unless the impossibility existed at the time the contract was made.

Convention of North Dakota State Association of Builders' Exchanges

Representatives from affiliated bodies of the North Dakota State Association of Builders' Exchanges gathered in Minot on January 22 for the annual convention, which was a most interesting affair and brought out a number of important propositions. Legislation was discussed and there was more or less planning for the future.

Retiring President George Rusk, of Fargo, delivered a strong address in which he urged a number of important matters to the consideration of the members. He referred to the work which had been accomplished during the past year and called attention to the fact that he believed the association was making a mistake in deferring definite action on the question of trade schools. He recommended active steps in this direction, as trade schools are proving a great success in the East and he felt that they would be of great benefit to many of the state industries. One of these benefits, he said, would be the obtaining of educated mechanics, as at the present time a very large percentage of the mechanics, and some of the good ones, are lacking in this respect.

He referred to the association as a force which was an important industrial factor. Another feature of the association is the employment bureau, through which members can obtain help, and after a man has been sent to him a record is kept of his work. Whenever a man is discharged or quits a position a record is also kept of it and the reason for the action is recorded. When a man applies to a member of the association for work he is referred to the employment bureau before being engaged. In this way it is felt that members of the association are enabled to obtain a better knowledge of the class of help they are employing.

The use of arbitration as a means of settling business disputes was urged, and various phases of the subject were discussed at some length.

The following officers for the ensuing year were elected:

President, James A. Dinnie, of Grand Forks.
Vice-President, R. J. Piper, of Minot.
Second Vice-President, Edward Orbin, of Fargo.
Third Vice-President, J. D. Turner, of Grand Forks.
Secretary-Treasurer, Louis Campbell, of Grand Forks.

The Executive Committee chosen consists of George Rusk, J. H. Bowers, W. J. Price, of Fargo; John E. Nuss, of Grand Rapids, and D. A. Dinnie, of Minot.

The meeting closed with a banquet in the evening at the Leland Hotel.

Another of New York's old landmarks is rapidly disappearing to make room for a more modern structure. We refer to the Continental Hotel, which has been a famous hostelry for more than 40 years at the corner of Broadway and Twentieth street. As soon as the work of demolition is completed a 20-story commercial and office structure will rise upon the site at a cost of about $700,000. The architect of the new building is Robert T. Lyons, 31 Union Square West, New York.

An interesting mechanical feature of "The Century Theatre" in New York is the revolving stage designed by A. Falkenau. A similar stage designed to carry complete scene sets is to be incorporated in "The Little Theatre" which is being built by Winthrop Ames. The design for this stage is now being worked out by the Hooper-Falkenau Engineering Co., New York City.

Suggestions for Building a Modern Dwelling

The Second Floor and Attic Arrangement--Some of the Details of the Various Rooms

By William Arthur

THE position of the stair and chimney being already decided, the rooms must be arranged in the best way possible. The complete plan does not show how much trouble it sometimes is to get the stairs and chimney placed. "The house that is built is not as the house that is a-building."

The stairs lands practically in the center of the house, and thus saves hall room. The one leading up to the attic might be turned around to the wall where the case is shown, and this would give a better hall, but lose a good case unless that were set up against the side of the stair. It should be wide enough to use for linen, etc. Or the space could be enclosed by a partition set on flat.

In such a house there is usually a small bedroom—the one in this case on the front. It is helped by putting the first flight of attic stairs west of the main stair instead of east, for the hall can better spare the room than the chamber. By this change another gain is made, for above the slope of the main stair we can put in a little closet.

The bathroom was extended over the entry hall to get more space. Inside the main wall there was too little room for it and the bedroom closet, and by extending it over, three advantages were gained: A larger bathroom, a larger closet, and a shelter for the sun parlor from the northern storms.

The fixtures for the bathroom are not usually put in line as they are here, but what will you? A given space, too little room for theoretical arrangement, the advantage of reaching the window without striding into the tub—these things have to count.

The window is put in the end instead of the side because the west is better than the north in a zero climate, and also because no one can see through the west window, in this case, while that would not hold on the north.

The outside wall is not the best place for a medicine cabinet in a cold climate, but with building paper or mineral wool the cold can be easily kept out. An electric light should be put on both sides.

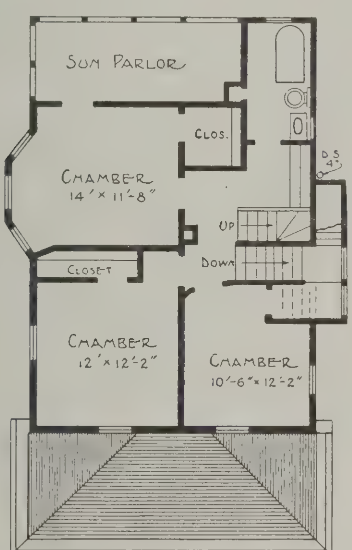
A north wall is not an ideal place for a bathroom, either, but was hard to avoid in this plan. The plumbing is directly below and it is on the rear, out of the way.

After several trials in different positions the place for the chute was chosen for the kitchen, and the opening for the bathroom had to be found. A corner of the sun parlor was selected with a shelf on top of the box, and about 3 ft. 6 in. from the floor. Thus it serves both bathroom and parlor.

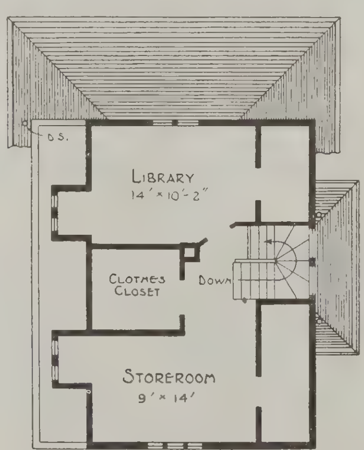
The pantry has to have a roof in any case, and why not use it? It is often surrounded with a small railing, and affords a good opportunity for airing clothes. Those who care to expend about $120 extra can turn it into an enclosed sun parlor. When regular hung sash are put in, it is safe in case of rain, and in summer screens are used with half the window open. The varnished floor may be carried out of the bedroom and a door used.

If sash are not put in, a tin roof must be put over the pantry and fly screens alone for enclosure. In this case it is safer to use a window reaching to within a foot or so of the floor, instead of a door, if one has to contend against a rainy, cold climate.

If there is no attic the space given to the stair can be used for a bathroom inside of the main walls, but consider what is lost, unless the family is so small as not to require the extra space. Even a rough floor gives valuable room for any purpose.



Second Floor Plan



Attic plan

Suggestions for Building a Modern Dwelling—Floor Plans, Scale 1/16 in. to the Foot

Here is room for a large clothes-closet. With hooks, shelves and a few drawers the family garments may be stored there according to season. If it can be all lined with cedar and the fittings made of the same wood so much the better.

A storeroom is provided with a large closet under the roof, on this, the fourth story of a modern house.

Why, you ask, was the library not put on the front of the house and the storeroom in the rear, where it should be? The reason for this gives one more illustration of the fact that a plan made for one location does not always fit another. Site, plan, arrangement of rooms with respect to the site and so forth, should all be considered together.

In this case, lying away for miles to the southwest of the lot is a valley without a name that I call the Valley of Bagdad, from the one that Joseph saw in his dream. It is a beautiful view that costs nothing Therefore, the ideal place for a library was where this valley would always be visible, spreading away to the horizon and pointing to the Santa Fe Trail, a thousand miles beyond.

On the front there would be only a paved street, a few milk wagons, or what a friend of mine used to call, an equipage d'epicier when smiling at the "style" some of the passersby affected, and what are these to compare with the long, hollow Valley of Bagdad, with oxen, sheep and camels grazing on the sides of it, and the Santa Fe Indians calling from beyond?

The inside of the dormer windows, it will be noticed, is made large enough to give standing room. One sees that famous Old Colonial house with single narrow windows, and is told that they look well. They do from the outside, but inside they are a failure; and the best kind of art is useful as well as beautiful. If the attic is only a garret it does not matter, but where rooms are to be made a double window is better, or a wall space that gives enough room inside.

(*To be continued*)

Convention of Inter-State Builders and Traders Association

The fifth annual convention of the Inter-State Builders and Traders Association of Maryland, District of Columbia and Virginia, was held in Richmond, Va., with headquarters at the Jefferson Hotel, on February 13 and 14, with a representative attendance. The meeting was characterized by great interest on the part of those present and after much routine business had received attention committees were appointed on Auditing, Nominations and the Press.

During the meeting the Association took occasion to denounce building contractors who jump from one city to another underbidding the local contractors and thus taking just so much money out of the cities which are doing the building. Resolutions to this effect were passed and ordered sent to the Boards of Trade of the cities represented by the Association.

The following Board of Governors was elected for the ensuing year:

Richmond—W. J. Gilman, James E. Philips.

Baltimore—F. S. Chavannes, S. Frank Bennett, John Trainor, William H. Monon, J. Herbert Scates.

Washington—John R. Galloway, S. J. Prescott, W. T. Galligher, W. D. Nolan, E. C. Graham.

Norfolk—W. T. Gregory, A. Christe, J. M. Bunting.

In the afternoon session of the second day officers were chosen as follows:

President....John R. Galloway of Washington.
1st Vice-Pres...F. S. Chavannes of Baltimore.
2d Vice-Pres......W. J. Gilman of Richmond.
Treasurer.........S. F. Bennett of Baltimore.
Secretary..........I. H. Scates of Baltimore.

In the afternoon the ladies accompanying the delegates to the convention were given an automobile ride by the Richmond Exchange.

In the evening occurred the annual banquet in the Palm Room of the Jefferson Hotel, covers being laid for 150 guests. The tables were beautifully decorated with flowers and a special musical program was rendered during the evening.

W. J. Gilman of the Richmond Builders' Exchange acted as toastmaster. John Trainor of Baltimore spoke on "Our Association"; F. S. Chavannes, president of the Baltimore Builders Exchange, made a short address, as did also W. T. Galligher, first vice-president of the Washington Builders Exchange; I. H. Scates, secretary of the Baltimore Builders Exchange; Secretary A. Christe of the Norfolk Builders Exchange, and S. Frank Bennett, treasurer of the Inter-State Association.

Building Operations in 1911

The statistics covering building operations in leading cities of the United States during 1911, which have recently been issued by "Bradstreets," show a decrease in 120 cities of 2.6 per cent. as compared with 1910 and of 7.3 per cent. as compared with the record year of 1909. The feature in connection with these figures is that they represent the amount of money actually expended in building operations rather than the estimated cost, as is the usual form of reporting statistics of building operations for which permits are issued by the Building Departments of the various cities except Boston, Mass., and here the actual amounts expended are reported.

Outside of the Eastern metropolis, Chicago is the only city of the country which furnishes a total building expenditure in excess of $100,000,000.

Reports to Bradstreets from 120 cities of the country for 1911 show an aggregate expenditure of $824,088,000 as against $846,712,000 in 1910 and $889,723,000 in 1909.

Cement Production in 1911

Complete statistics for the year 1911 were received by the United States Geological Survey during the month of January from about 70 per cent. of the Portland cement manufacturers in the United States. Based on these returns, an estimate has been made by Ernest F. Burchard, of the United States Geological Survey of the entire output for the year. It is believed that this estimate is within 2 per cent. of the exact quantity of Portland cement manufactured in 1911.

There was apparently a slight increase in the production of 1911 over that of 1910, amounting to about 1,300,000 barrels, approximately 77,877,236 barrels having been made in 1911, as compared with 76,549,951 barrels in 1910. This represents an increase of only 1.7 per cent. as compared with the increase of 17.7 per cent. that occurred in 1910 over the previous year.

The figures for 1910 and 1911 are so close that when complete returns are received possibly a slight decrease in production may be shown. The average factory price per barrel, not including packages, was 86.7 cents in 1911, as compared with 89.1 cents in 1910, a decrease of 2.4 cents per barrel, or 2.68 per cent.

In the Eastern Pennsylvania and New Jersey (Lehigh) district there were 23 active plants last year, compared with 24 in 1910; production was 25,924,516 barrels, and shipments were 25,634,671 barrels, against 26,315,359 barrels and 27,033,313 barrels, respectively, in 1910. This was a decrease of 1.5 per cent. in production and 5.2 per cent. in shipments.

Buildings of more than five stories in height are not allowed to be erected in Budapest, Hungary.

What Builders Are Doing

Bird's-Eye View of Building Situation in Leading Cities--- Permits Issued and Estimated Value of the Projected Developments

THE severe winter weather which prevailed over most parts of the country during the initial month of the year was forcibly reflected in the decreased permits issued for new construction work in the leading centers as contrasted with the plans filed in the corresponding month of the year before. Here and there increases over the year before are shown, due largely to special causes, but the majority of the cities reporting, however, show heavy losses, ranging from a little more than 70 per cent. in Memphis, Tenn., to 7 per cent. in Minneapolis, with Washington, Chicago, Cleveland, Atlanta, Detroit, Indianapolis, Milwaukee, Cincinnati, Nashville, New York City, Omaha, Pittsburgh, Philadelphia, Spokane, and New Haven coming in between. The cities showing important increases are Seattle, Wash.; New Orleans, Denver, Baltimore, Dallas and Buffalo.

Under such conditions as have prevailed it has been impossible for outside work to be carried on extensively, and therefore those mechanics who have been busy have been obliged to confine their operations to buildings already enclosed. Naturally, fewer permits are taken out when there is no immediate prospect of starting actual operations, but it is felt that as soon as the weather will allow, much work that is now held in abeyance will be rapidly pushed to completion.

Baltimore, Md.

New construction work was planned during the initial month of the year upon a fairly liberal scale, the figures of Building Inspector Stubbs showing the estimated cost of the improvements for which permits were issued to have been $621,660. Of this amount $493,200 was for new work.

The report shows that 194 two-story brick buildings were planned to cost $291,390, and 12 manufacturing buildings and warehouses to cost $96,650.

At a meeting of the Baltimore Chapter of the American Institute of Architects held on the evening of February 2 the following officers were elected: President, J. B. Noel Wyatt; vice-president, George Worthington; secretary, Thomas C. Kennedy, and treasurer, W. W. Emmart.

The Builders Exchange, of Baltimore, Md., is strongly urging the municipal authorities of that city to establish and equip a municipal testing laboratory. The Baltimore Building Code calls for tests of materials entering into building construction, and requires that tests be made in private laboratories. It is pointed out that in addition to the testing of building materials, the laboratory would also be able to do the work of testing and analyzing various other supplies purchased by the different municipal departments.

Buffalo, N. Y.

The number of building permits issued by the Bureau of Building during the month of January was 176, representing an estimated valuation of $427,000 as compared with 293 permits with a total estimated valuation of $1,394,000 for the month of December, 1911. Comparison of permits for December, 1911, and the corresponding month of 1910 shows a gain of 55 per cent. over 1910, when the permits totalled only $274,000.

The total number of permits issued for the year 1911 was 3402, with a valuation of $10,364,000, a gain of nearly 10 per cent. over 1910, for which year the valuation for permits issued was $9,222,000. The yearly totals given do not include municipal work, which in 1911 amounted to $425,000 for school, police and fire department buildings.

Among the more important of the structures covered by permits issued since the last report, that is, including December and January, or for which contracts have been let and plans filed the first few days of February, are the following: An 18-story bank and office building for the Marine Bank, from plans of Architects Green & Wicks, Buffalo, for which contract has been let to the Lanquist & Illsey Company, Chicago, cost $1,400,000 (permit not yet issued); wholesale grocery warehouse for L. Doelman & Co., $30,000; distributing warehouse for Libby, McNeil & Libby, of Chicago; 4-story warehouse 75 x 150 ft. for the W. L. Loeser Company, from plans of Architect H. Osgood Holland; store and loft building for C. B. Hill, Franklin and Mohawk Streets; addition to department store for Flint & Kent, $45,000; restaurant building for the "Waldorf Lunch," $30,000; 4-story warehouse and show room building for the Mobile Construction Company; 3-story garage and stable building for the Hoefler Ice Cream Co., from plans of Louis J. P. Eckel, $50,000; a 2- and 5-story factory building, 100 x 300 ft., and power house for the International Auto League Tire & Rubber Company, $135,000, from plans of Cyrus K. Porter & Sons.

A factory, laboratory and office building for the Foster-Milburn Company has been planned to cost $80,000. A clubhouse for the Jewish Federation of Buffalo on Jefferson Street, to cost $50,000; a synagogue for the Brith Israel Congregation, Hickory and William Streets, and a synagogue for the Ahavas Achim Congregation, from plans of Architect H. Osgood Holland; the Matthewson apartment buildings at Johnson Park, Elmwood Avenue and Tracy Street, $40,000 and $62,000, and the Devereux apartment building, Delaware Avenue and Johnson Park, $90,000.

Calgary, Alta.

The members of the Builders' Exchange of Calgary recently held their annual meeting, at which several new members were elected and reports of president and secretary were presented. The officers for the ensuing year were elected, with the following choice:

President	T. W. Aldridge
First Vice-President	C. Silvester
Second Vice-President	W. J. Richards
Third Vice-President	J. H. Garden
Sergeant-at-Arms	James Marr

There were also six directors elected and delegates appointed to attend the convention of the Canadian National Association of Builders.

Chicago, Ill.

At the annual meeting of the Builders and Traders' Exchange in January it was decided to arrange for a special excursion for the members to attend the opening of the Panama Canal whenever that event shall be held.

A committee of twenty-five members was appointed, with Daniel Freeman as chairman, to make arrangements for this trip, the committee being made up of the following sub-committees:

Information—John Sunderman, chairman; A. Y. Reed, E. B. Perkins, Charles Nicholson, James L. Ratcliffee.

Publicity—R. S. Adams, chairman; Charles W. Gindele, G. E. Warren, H. F. Bremer, Joseph Lindquist.

Printing and Sundries—John Rawle, chairman; Andrew Biemolt, L. L. Binyon, F. A. Heineman, W. J. Scown.

Transportation—John D. Corlett, chairman; James A. Hogan, Daniel Freeman, Sanger Steele, C. F. Wiehe.

Entertainment—A. E. Yanger, chairman; A. H. Sherlock, A. E. Jaeger, Frank Scaar, C. J. McKeown.

John Sunderman and A. Y. Reed, members of the information committee, left shortly after this meeting on a special trip to Panama and were armed with a camera and note books, and will talk about their trip at the next meeting of the Exchange on March 4. The purpose of the trip is to obtain information that will be of value in planning for the trip of the entire organization.

It is hoped that a sufficient number of the members can be induced to go so that a special train to New Orleans can be chartered, and a special steamer from New Orleans to the Canal.

Although the date for the opening of the Canal has not yet been announced by the U. S. Government, the Chicago builders are intent on making plans sufficiently far ahead so that there will be no danger of disappointment in any way.

At the same meeting at which these arrangements were made the annual election of officers took place, with the following result:

President........................J. D. Corlett
First Vice-President.............J. J. Walsh
Second Vice-President.........Thomas B. Roy
Treasurer.................Joseph E. Lindquist

Directors

Daniel Freeman — Christ Paschen
A. C. Preble — John Sunderman
George W. Warren

These officers and directors elected as secretary J. H. Hendricks, formerly with the Illinois Stone Company. Mr. Corlett, the new president, is a well known and successful builder, whose offices are in the Chamber of Commerce building.

Building fell off in January to a marked degree, there having been 422 permits issued for buildings costing $1,999,300, against 407 permits in January last year calling for an outlay of $3,143,200.

The greatest building activity in or near Chicago during the coming few months will be at Calumet-East Chicago, where the new plant of the Baldwin Locomotive Works is to be located. In addition to the plant of the Baldwin Locomotive Works, Calumet-East Chicago will have the benefit of the Buckeye Steel Castings Company, of Columbus, Ohio, and the McClintic-Marshall Construction Company. The former concern will erect a $1,500,000 plant, giving employment at first to 1,200 men, and 2,500 within two years. The latter company will erect a $500,000 mill and employ 1,000 to 1,500 skilled mechanics.

Cincinnati, Ohio

The month of January, just passed, made a very poor showing. Exclusive of elevator and plumbing inspections, only 197 permits were issued, having the estimated valuation for improvements placed at $195,075. The record for January, 1911, gives 272 permits, valued at $545,350, while the value of estimated improvements in December, 1911, was $694,380.

Attention should be directed to the fact that the extremely cold weather during the month of January, 1912, practically stopped all building operations in the Central West, and in a large measure was to blame for the tremendous shrinkage in new construction work.

Among plans made up in January for extensive manufacturing buildings is one for a large addition to the plant of the Alvey-Ferguson Company, at Oakley, a Cincinnati suburb, but a separate municipality. The Allyn Engineering Company, of Cincinnati, is the architect and engineer in charge of this work.

The majority of local architects and builders anticipate a very busy spring season, especially in the residence construction line.

Cleveland, Ohio

The extreme cold weather that prevailed during the whole of January is blamed for inactivity in building lines during the month. No new work was started and construction under way came almost to a standstill. During the month there were 185 permits issued for buildings to cost an estimated amount of $328,107.

The building outlook for the year continues quite satisfactory. During the month a contract was placed for a new 12-story office building to be built by W. G. Marshall and several other good sized building projects were announced.

Architects and engineers are figuring on considerable new work in the line of new manufacturing plants and additions to existing plants.

Jersey City, N. J.

According to the report of John Saul, Superintendent of Buildings, there were 617 permits issued during 1911 for the construction of new buildings calling for an estimated outlay of $4,799,144, while there were 727 permits issued for alteration work involving an outlay of $707,228.

The total cost of new building construction, alteration and repairs for the 12 months of 1910 was $6,932,570, which is a decrease of $1,426,178.

London, Ont.

The Builders' Exchange recently held its fourteenth annual meeting, which was a very interesting affair. Retiring President Jones referred to the work of the Exchange during the past year, and among other matters to the part which the Exchange had played in establishing technical night schools.

The election of officers for the ensuing year resulted as follows:

President..................William Nutkins
First Vice-President............E. R. Dennis
Second Vice-President.........L. H. Martyn
Secretary-Treasurer.........George S. Gould
Recording Secretary............A. C. Nobbs

Some of the important matters which will come up for consideration by the new board of management are the Mechanics' Lien Law, the formation of a Provincial Association and the Workmen's Compensation Act.

Los Angeles, Cal.

After three months of moderate activity, with new work limited almost entirely to buildings of the smaller types, the year has opened with a marked revival in the building trades. Home builders, always the most important factor in this market, are taking full advantage of the unusually dry winter, and the decrease which might be expected in small building at this season is not observed. At the same time permits have been taken out for several buildings of large size, plans for which were given out before the end of the year, and with a fair sprinkling of apartment houses and stores of moderate size the total is among the best on record for this time of year.

The buildings for which permits were issued last month were valued in all at $2,456,872, a gain of more than $1,000,000 over the December record, which was $1,421,875. The record for January last year was $2,104,875.

The principal building recently contracted was the Garland theater and office structure, 11 stories high, designed by Morgan, Walls & Morgan, the general contract for which was awarded to the National Fireproofing Company, at $350,000. Another important job is the 11-story reinforced concrete structure of the Black Fireproof Building Company at Fourth and Hill streets, Edelman & Barnet, architects, awarded to A. Barnman at $163,295. The F. O. Engstrum Company has taken a contract, at $102,146, for the construction of a 6-story reinforced concrete building on Avery street, of which W. J. Saunders is the architect. The Union Tool Company has placed with a Chicago firm the contract for its large factory buildings near this city, the total cost of which will be nearly $400,000. The lowest figures for all work on the municipal public service building amount to $289,172, but the award has not been announced.

The most important buildings projected include a 5-story brick apartment house at Witmer and Ingraham streets for B. G. Adams, to contain 177 rooms, and estimated to cost $100,000; a 6-story reinforced concrete department store for John Brockman, with a frontage of 600 ft. on Seventh street, extending from Grand to Hope streets, to cost about $500,000, Harrison Albright, architect; a 10-story reinforced concrete hotel of 250 rooms on Grand avenue near Ninth street, to cost $250,000, Noonan & Kyser, architects; and an 8-story concrete hotel at Spring and Franklin streets, to cost about $400,000, Dennis & Farwell, architects. Architect Myron Hunt, of this city, has plans complete for a $100,000 building for the First Congregational Church at Riverside, Cal.

Louisville, Ky.

The opening month of the year shows a trifle more activity in the building line than was the case in the corresponding month of the year before, the figures for the two periods being $188,563 and $133,817, respectively. This increase over a year ago is due to the permit taken out by the Norton Company for the erection of the five-story structure at the southwest corner of Fourth and Market Streets, calling for an expenditure of $60,000.

Milwaukee, Wis.

At the annual meeting of the Master Carpenters Association held on the evening of January 19, the following officers were elected for the ensuing year:

President.......................M. G. Winter
Vice-President................W. J. Buscher
Secretary..............William Van Rhienen
Financial Secretary...........O. H. Ulbricht
Treasurer..................Henry Flack, Jr.

There was one trustee elected to serve for a term of three years, and the treasurer's report was presented, showing the association to be in a flourishing condition.

Newark, N. J.

There was nothing of unusual interest in the building line to characterize the opening month of the year, although architects and contractors are looking forward hopefully to a good spring business. The report of Superintendent of Buildings W. P. O'Rourke shows that in January 132 permits for new buildings, alterations, etc., were issued, calling for an estimated outlay of $589,401. These figures contrast with 242 permits issued in January last year for building improvements involving an estimated outlay of $938,691. The new work projected last month was of a rather inexpensive character, as the average estimated cost of the buildings for which permits were issued was $4,465.

The month of February opened with very little doing in the way of new construction work, the totals being considerably under those of the corresponding week of the year before.

New York City

While the extreme cold weather which prevailed during the month of January may have had its influence upon the planning of new construction work, yet the heavy falling off in the estimated cost of building improvements for which permits were issued that month, as compared with the corresponding month a year ago, is largely due to the fact that in January, 1911, permits were issued for the New York Central Station estimated to cost $4,000,000, and for the McAlpin Hotel, costing about $4,500,000. According to the report of R. P. Miller, Superintendent of Buildings for the Borough of Manhattan, permits were issued last month for 72 new buildings, estimated to cost $6,252,175, while in January, 1911, permits were issued for 49 new buildings costing $13,080,600. To these figures must be added $695,075 and $590,177, respectively, for alterations, additions and repairs in the two periods.

The most interesting feature of the local situation is the showing made in January in the Borough of the Bronx. Here 95 new buildings were projected estimated to cost $3,337,000, as compared with 40 new buildings costing $580,000 in January, 1911.

In Brooklyn construction work is influenced more or less by the uncertainty regarding underground transportation facilities, but during the month under review 636 permits were issued for building operations costing $2,057,947, while in January of last year 628 permits were issued for construction work, estimated to cost $1,348,205.

In the Borough of Queens there has been a decline in building activity, but this is not surprising when it is considered that the borough has just passed through the biggest building year in its history, and the present reaction is a normal and wholesome development. This year there is an increased demand for detached houses in the purely residential centers, while a good portion of last year's activity was in Long Island City, where many factories were constructed and where numbers of tenements and inexpensive houses were provided for factory and railway employees.

Much interest attaches to the bill introduced at Albany creating a new city department of buildings under the jurisdiction of the Mayor, and abolishing the separate building bureaus of the five boroughs constituting Greater New York. The reason for the bill is said to be the desire for "uniform building regulations in all boroughs."

Oakland, Cal.

Anticipations of improvement for the opening of the year have been disappointed, though the record for January is by no means bad for the winter season, the official valuation of buildings for which permits were issued during the month being $326,712. A rather large item in this, as in other recent months, is that of alterations, and there are also a comparatively large number of small shop and stable buildings. Bungalow, cottage and residence work is as well maintained as could be expected at this season, and something of a boom is predicted in this line next summer, both here and in the northern suburb of Berkeley. This is due to the operation of the new Southern Pacific electric train service through to the eastern city limits, and into new territory north of the State University, both districts being now thinly settled. Tentative figures have recently been taken on several business structures of unusual importance, and at least one of them is pretty certain to be contracted within a month or two.

An award is expected in a few days on the State Manual Arts School at Berkeley, a steel-frame structure, on which bids were received Feb. 5. The plans were drawn by the State Engineering Department.

Preliminary figures have been taken on the Kahn Bros. department store, a 4-story building to be erected on San Pablo avenue opposite the new City Hall. It will have three frontages, and will cost about $500,000.

Other important plans to be figured shortly include the Crane Company's warehouse and office building, 5 stories, with steel frame, Reed & Mayer, architects; and a 3-story frame building for the Oakland Casket Company, to cost $40,000, T. D. Newsom & Son, architects.

John H. Spring, of this city, will start work in the spring on an Italian villa in the Thousand Oaks district of Berkeley. It will be of reinforced concrete, to cost about $100,000, the plans being drawn by John J. Thomas. An interesting feature will be a heating plant apart from the main building.

The City Council recently adopted a resolution favoring the appointment of a Bureau of Architecture, to be charged with responsibility for all municipal construction, including the new city hall. In addition to this, the city will let contracts this year for a $500,000 auditorium, and has plans under way for new school buildings to cost $2,500,000.

Philadelphia, Pa.

Extremely unfavorable weather conditions were a factor in the local building trade during January. Fourteen days in the month either rain or snow fell, low temperatures also prevailed, so that the amount of new work undertaken was small, while but limited progress was made on work under way. Statistics compiled by the Bureau of Building Inspection show the value of work for which permits were issued to have been the smallest for any January since 1908. A total of 448 permits, covering 593 operations, were taken out, the estimated cost of which was $1,265,020, as compared to an authorized expenditure of $2,597,460 for 785 operations in January, 1910. Dwelling house operations represented about one-third the total estimated cost, being $345,300 for 126 two-story, and $85,800 for 16 three-story dwellings. Manufacturing buildings on which work was begun showed the largest individual item, and these were small in number, five being started which will cost in the aggregate about $474,000. Of these two were important, one being for an additional building for the John B. Stetson Company, $170,000, and the other for A. H. Harting.

Notwithstanding the unfavorable start this year, builders look forward to a very good year. A large amount of building work in dwelling houses is being planned and will come out as soon as weather conditions are more favorable. Quite a few propositions are nearing completion in the way of large office buildings, hotels and clubs, and the usual amount of municipal construction work is expected.

The G. A. Fuller Company has the contract for the addition to the Bellevue-Stratford Hotel, to cost about $1,000,000, work on which, it is stated, will begin May 1.

The City of Philadelphia has received bids for the erection of a temporary convention hall, 407 x 265 feet, to be erected at Broad and Allegheny Avenue. This will be constructed largely of wood and will cost about $100,000.

The new Stock Exchange building, regarding which there has been more or less uncertainty for several months, will be built as planned. It will cost about $750,000 and the contract has been awarded George F. Payne & Company.

Plans for the new 12-story hotel to be erected for Charles H. Vendig, at Thirteenth and Filbert Streets, have been completed and estimates are to be asked for early in February. The building is to be 12 stories high and of fireproof construction.

Joshua M. Holmes will, it is stated, begin work as soon as weather permits, on an operation of 24 two-story dwellings in the vicinity of Judson and Cambria Streets. The operation will cost about $40,000.

The contract for the new Manufacturers' Club will no doubt be awarded to Irwin & Leighton, contractors, who were the low bidders, at a cost estimated to be $750,000. The building will be 100 x 100 feet, eleven stories high.

At a meeting of the board of directors of the Master Builders' Exchange Feb. 14, the following officers were elected for the ensuing year:

President..................Harry S. Andrus
First Vice-President........John R. Wiggins
Second Vice-President......Joseph M. Steele
Third Vice-President..William R. Dougherty
Treasurer..................Frank H. Reeves
Sec'y and Gen'l Supt....Charles Elmer Smith

Portland, Ore.

Owing to heavy rains, building operations in this city are necessarily limited during the midwinter season, and a material decrease is usually expected at this time. The January record, however, is not discouraging, the month's total being $901,272, compared with $990,616 for the same month last year, and $624,110 for January, 1910, while the record for December was $1,288,476. The nature of present activities is well illustrated by the fact that in January, 1911, three permits aggregated $450,000, while last month the largest permit issued called for an expenditure of only $50,000. The number of permits for the former month was 415, compared with 563 last month, and of these over 350 were for dwellings. Officials of the city building department predict that February will bring a material gain, as there are now in the building inspector's office a number of applications for fireproof buildings, one of which will cost about $500,000.

The principal building for which contracts have recently been let is the 12-story Oregon Hotel annex, Doyle, Patterson & Beach, architects.

Architect Ellis F. Lawrence will soon have working plans ready for a fine public library building, to be erected on Knott street near Union avenue. It will be of Spanish renaissance type, with tile roof.

Dieter & Wenzel, Wichita, Kan., have taken the contract for a public building at Walla Walla, Wash. The job was taken on a bid of $119,144, limestone being specified as the facing material.

The tallest building in Spokane, Wash., will be the new 10-story Volney Williamson building, J. T. LeVesque architect, to cost about $500,000.

The Advance Construction Company, this city, has taken the general contract for a high school at Pendleton, Ore., at $74,000.

Rochester, N. Y.

According to the annual report of the Bureau of Buildings of the city of Rochester, submitted to the Commissioner of Public Safety on Jan. 23, the total value of building construction for which permits were issued in 1911 was $9,389,775. The buildings erected during the year include 2184 frame structures, 112 brick buildings, 16 fireproof structures, 96 concrete block buildings, 32 of tile, 1 of stone, 17 of stone and frame, and 12 of concrete block and frame.

The total number of dwellings was 1864, estimated to cost $5,840,779. There were also 56 commercial buildings costing $497,246, and 15 factory buildings costing $603,500. The months of April, May and October show the greatest building activity, there having been issued in each of these months permits calling for an estimated expenditure of more than one million dollars.

Sacramento, Cal.

After a record month in December, building operations have fallen off to a marked degree, the total of permits for January being scarcely 10 per cent. of that of the preceding month. The figures for January are $94,577; for December, $982,691; and for January last year, $275,525. This can only be attributed to delay in the letting of important contracts, as figures have been taken on several large jobs and plans are complete for a number of others which will probably be let in a month or two.

The principal building in immediate prospect is a 5-story Class A office structure for the Pacific Gas & Electric Company, to cost $100,000, S. C. Hemmings, architect. The Southern Pacific Railroad is planning a passenger station in this city, to cost $350,000, but it is not known when the contracts will be let.

Building contractors from all parts of the Sacramento and San Joaquin valleys, and from many points in southern California, will assemble in Sacramento for three days, beginning Mar. 7, for the purpose of extending the operations of the Builders' and Contractors' Association to every part of the State. Two days will be devoted to discussion and organization, after which the local association plans to take its guests on an excursion to Folsom, Cal., ending with a banquet at a local hotel.

San Diego, Cal.

Local building operations continue extremely active, last month's record being about the best ever noted for January in this city. Permits were issued during the month for buildings valued at $528,252, compared with $424,770 for December, while the January records for the two preceding years were $177,858 for 1910 and $219,450 for 1911. The principal activity just now is on the Panama-California Exposition buildings, on which several hundred carpenters and other mechanics are employed, with the intention of completing the work by January 1, 1914.

The structures now under way are the Administration Building, the Memorial Arch over the main entrance, and the California State Building. Plans are nearly ready for the Agricultural and Horticultural Building. All architecture and ensembles of architecture and landscape are in the Spanish colonial or Mission style, white cement being the finish used throughout.

Santa Fe Railroad officials announce that contracts for the $100,000 reinforced concrete freight station will probably be let this month.

Plans have been filed with the Building Inspector for the $100,000 Y. M. C. A. building by Architects Bristow & Lyman, representing G. W. Kelham & Son, of San Francisco, the designers.

San Francisco, Cal.

The year 1912 has opened with the busiest January in several years. The hesitation in letting contracts which was long apparent among owners has practically disappeared, and only a few of the largest jobs are held up for refiguring. Contracts have been let during the month for several structures of an important nature, while the volume of miscellaneous work at medium values has materially increased. The number of new projects for which plans have been started during the month is unusually large for this time of year, and the majority of owners wish to have their buildings completed as soon as possible.

The total valuation of buildings for which permits were issued was $1,870,617, compared with $1,207,429 for December, while the January records for 1911 and 1910 are, respectively, $1,617,608 and $1,708,380. The total was the highest since last August, and is taken as a fair indication of unusual activity during the spring. An encouraging feature is the fact that, of the total, nearly $1,000,000 was for buildings of brick or other permanent materials, while only about 60 per cent. was for frame construction. The contracts let included one large office building and several of smaller size, but the principal feature has been the letting of work on numerous apartment houses of the finest class, in which the principal materials are brick and terra cotta over steel frame. Residence jobs have also been fairly numerous, including brick, plastered and shingled exterior types, at values ranging between $10,000 and $50,000.

There is every prospect of higher prices for lumber in the near future. Values are already a shade higher in primary markets, and coastwise lumber rates are the highest in many years, causing an appreciable advance in this market, while an extraordinary demand is expected in the spring. Jobbers are cutting prices on some steel products, and the local production of reinforcing bars has increased to such an extent that the price has been greatly reduced, though values for steel frame fabrication are firmly held. The cement market is rather quiet, and some reduction in prices has been made within the last few days, while prices for sand, gravel and crushed rock show little variation. Brick prices have not changed for several months, and while there is some surplus on hand there is no great pressure to sell.

Aided by the Architectural Commission of the Panama-Pacific Exposition, the municipal authorities have decided upon preliminary details for the construction of a permanent City Hall and civic center. The old site will be used, together with several surrounding blocks, and an advisory committee consisting of Architects John Galen Howard, John Reid, Jr., and Frederick H. Meyer has been appointed to assist in obtaining plans for the buildings. An election will be held March 28 to decide on a bond issue of $8,600,000 of 5 per cent. bonds to cover the cost of construction.

The architectural force of the Panama-Pacific Exposition has been augmented by the appointment of several prominent architects, both of San Francisco and eastern cities. These are: McKim, Mead & White, Henry Bacon, Thomas Hastings, L. C. Mullgardt and Geo. W. Kelham.

The principal work for contracts that has been let in the last month is a large office building for the Sharon estate, on New Montgomery street, and to cost $600,000. The C. P. Moore Building Company has taken the general contract for a 5-story $60,000 mill-construction warehouse for H. Levi & Co., on Fifteenth street, G. A. Lansburg, architect; Stockholm & Allyn have the general contract for a 7-story Class B hotel for Mrs. A. Kessing, on Grant avenue, for $72,000, L. B. Dutton & Co., architects; and Samuel Knight has let contracts amounting to about $100,000 for a 6-story brick hotel on O'Farrell street, near Mason. Contracts amounting to about $200,000 have been let on a 7-story Class A hotel for M. Fleishhacker, at Bust street and Grant avenue, F. H. Meyer, architect.

The Master Plumbers' Association of San Francisco has let contracts for a 3-story and basement building of brick and terra cotta, to be erected at Page and Gough streets, at a cost of $45,000, Ross & Burgren, architects.

Architects Frye & Schastey are taking figures on a 134-room reinforced concrete lodging house, to be erected at Sixth and Natoma streets. They also have plans under way for a 6-story concrete warehouse, faced with white cement, to be built at Second and Brennan streets at a cost of $75,000.

Architects MacDonald & Applegarth report plans under way for a number of costly structures, including a 26-story building projected for the financial district, estimated to cost $4,000,000; a $400,000 apartment house for California street hill; a 12-story hotel for Chas. Crocker, to cost about $100,000; and a 6-story wholesale building for the Moore-Watson Dry Goods Company.

Other important plans which will soon be up for figuring are the new Tivoli Opera House on Eddy street, O'Brien & Warner, architects; a 7-story steel and concrete apartment house at Hyde and Geary streets, to cost $125,000, O'Brien & Werner, architects; a 5-story Class "A" office building on Pine street, to cost $100,000, and a $35,000 brick veneer residence for Milton Getz, on Clay street, Julius Krafft & Sons, architects.

Seattle, Wash.

The filing of permits for several business buildings calling for an outlay of something over $200,000 is largely responsible for the increased cost of building improvements for January as compared with the initial month a year ago. The report of Superintendent R. H. Ober, of the Department of Buildings, shows that his office issued 762 permits last month for building improvements estimated to cost $774,810, while in January last year 790 permits were taken out for building construction estimated to cost $506,005.

Of these totals 5 permits were for warehouse and factory buildings costing $121,000, as against 9 for which permits were filed in January last year, costing $69,000. There were 10 permits for office and store buildings costing $216,100, as compared with 7 buildings of this class costing $49,000 in the initial month a year ago.

Coming now to private residences it is seen that 155 were planned last month costing $212,315, while in January last year 157 were planned costing $211,305.

An interesting feature of the situation is that fees for filing building permits were abolished on the first of January by Ordinance No. 27,704.

Patent for "Mushroom" Reinforcement for Concrete Construction

What is known as the "Mushroom" System of reinforcement for concrete columns and floor slabs has been the basis of a contest lasting for several years, but a short time ago a basic patent was granted to C. A. P. Turner, of Minneapolis, Minn., covering his well-known construction. The settlement of the case is a matter of more than ordinary importance as it had attracted a great deal of attention among builders and contractors interested in construction work. The patent which has been granted is very broad in its provisions and seems to cover all the essential features in this type of reinforced concrete construction.

Some Aids to Bricklayers

Brick manufacturers, as a rule, lend generous aid to trade schools in order to encourage young men to learn useful trades, and especially to learn the trade of bricklaying, so that indirectly it may help extend the use of brick and make it practical for those desiring brick work done to get someone qualified to do it, says the *Clay-Worker* in a recent issue. There is perhaps hope in the minds of some that the training of more men will, to a certain extent, ease the cost of bricklaying and in this way encourage a still larger use of brick. To this same end brick manufacturers might well give attention to the encouragement and development of ideas of a mechanical nature that will assist in bricklaying and contribute something to reducing the cost of putting brick in the wall.

It is not only the brick mason that costs money. Not only is he about the highest paid skilled laborer working on structural work, but there is a lot of incidental cost surrounding him. As a rule the hod carriers cost more money than carpenters, though hod carrying is not skilled work. So do those who mix mortar and prepare it for the building, cost money, and then there is the expense of scaffolding, which sometimes amounts to nearly as much as the expense of doing the actual work of bricklaying.

The question is, what can be done to reduce the burden of cost for some of these? Just what can be done remains to be seen, but it looks like there is a chance here to develop machinery and mechanical appliances just as the trade has developed them in the work of digging clay and making up and burning brick. It should be practical to develop machines for contractors for mortar mixing, and already there is some progress being made with the inexpensive hoisting machines to carry the brick and mortar up on buildings, and there should be more of these. The brick machinery people might well turn some attention to developing special machines to assist in this work. Machines that the contractor and builder can afford to build, and they will not only relieve the burden of cost, but will also be something of a safeguard against any scarcity of labor and difficulty in getting enough help to push building work forward.

There is room to not only develop mortar-making machinery and hoisting machinery, but also develop some special mechanism or appliance that will facilitate scaffolding and reduce both the time and expense required in rigging temporary scaffolds for masons to work on. It is not an easy thing, neither can it be done all at once. If it were so it would have been done long ago. However, the problem as a whole is no more difficult than many other problems the clay-worker has already solved, and if enough attention is concentrated on it some good progress can be made in the course of time that will reduce the cost of laying brick in the wall and thus encourage a more extensive use of clay products.

Automatic Sprinkler "Bulletin"

This quarterly publication, devoted to the interests of fire prevention from the standpoint of the automatic sprinkler, contains a great deal of detailed information regarding the actual operation of sprinklers in cases where fires call them into action. The January number is a particularly interesting one, carrying with it digests of the reports of the Chambers of Commerce of Rochester, N. Y., and Boston, Mass., both of which declare very strongly for the installation of automatic sprinklers, particularly in cases where fires would endanger large numbers of lives or would threaten to spread into a conflagration. One of the most interesting items in this *Bulletin* is a list of the 327 fires reported under Grinnell sprinklers since the last bulletin was issued. These show the date and location of the fire and various other details, including the number of sprinklers opened and the amount of loss sustained. In the latter it is interesting to note that only fifteen reached $1,000, and about as many more passed the $500 mark. This means that more than 91 per cent. of all these fires were confined to less than $500 loss, while, as a matter of fact, out of about 12,000 fires on which detailed reports are available, 62.6 per cent. were so insignificant, due to prompt action of the sprinkler, that no claim for damages was made.

The *Bulletin,* which is full of pithy items, partially culled from the reports above mentioned, is published by the General Fire Extinguished Company, Providence, R. I. It will well repay careful reading by any one whose interests are at any time liable to be threatened with destruction by fire, and will be sent regularly to any one who desires it.

Some idea of the magnitude of the heating installation in the new Municipal Building in course of construction in New York City may be gained from the statement that there will be 100,000 sq. ft. of heating surface in the radiators and steam pipes, supplying heat to 4,000,000 cu. ft. of space.

Cedar for Building Construction

Pacific Coast the Source of Abundant Supplies--Merits of the Wood for Various Purposes--Shingles an Important Product

By E. S. Crull.

THERE is an old, old story of the man who sat upon a limb and sawed it off behind him, thus destroying his support. This has served to illustrate the decidedly asinine methods of man, and the folly of misplacing foresight. When this world was new, and before the introduction of man, everything was provided that could be required for his welfare and comfort, ready at hand, awaiting man's development and reconstruction to meet all needs, and though the supply was regarded as inexhaustible, as, no doubt, it would have been under reasonable and discriminating usage, it could not maintain the heedless waste that has followed throughout civilization.

Use of Wood in Building Construction

So much has been written of the depletion of our forest resources that all readers are more or less familiar with the subject, and this shortage in the timber supply is of such concern to the carpentry industry that it is the purpose of this writing to show the analogous positions of the carpenter and lumberman as pertaining to lumber uses and supplies.

Carpentry—one of the oldest and most necessary trades—is wholly founded and continued upon the use of wood in building operations, and to eliminate the use of it means dispensing with the carpenter's handiwork. This is so obvious that it seems scarcely necessary to refer to it or that a carpenter can be led into using or recommending, as many are doing, the use of imitation articles or material that are substitutes for wood, and that are broadly advertised as being applicable without the need of the carpenter's skill. It would seem, further, that it would occur to the carpenter that he is sawing off the limb that is supporting him.

Selfish and interested motives have ever been ready to place the fault for profligate abuses of our timber productions to other selfishness, and to propose that corrections shall not interfere with our own convenience, overlooking the fact that the good of all can only come through the acts of individuals.

Timber Supplies Should be Conserved

Advancing values is an indisputable sequence to exhaustion or reduced production, and, while it is essential that timber supplies shall be more sensibly conserved, it by no means follows that the use of lumber shall be wholly displaced or that there is not ample supply for many generations, under just usage, nor that prices are prohibitive, if the available newer woods are introduced where the old and familiar woods have vanished from the markets.

The very wisdom of our timber supplies is apparent in the many varieties that are found; different trees of different strengths, textures and colorings, that every demand and requirement may be rightfully planned and met, and this rightful use is one means of conservation. Another is in better adaptation of sizes, lengths and grades.

Again, the belief in the depletion of all lumber and the higher prices that are continually discussed comes from the actual exhaustion of well-known species and grades, still in demand, in ignorance of or refusal to consider other supplies or woods of equal or better values. There exists a pronounced obstinacy in some of the older states, it is found, to believe that this can be true, yet there is a ready willingness to take up with materials that have absolutely no recommendation beyond the maker's assurance, reminding one of Mr. Barnum's now famous statement.

And while the eastern and middle states are finding a dearth of market supplies in siding, finish and roofing and are worrying over the advancing prices of the woods that are fixed in their memories, they have yet to learn that the Pacific Coast has an abundance of timber, and the mills of that country are heavily overstocked with the finest lumber ever produced at prices more nearly in line with those of old, and that it is certain to satisfy any user.

Cedar Used for Shingles

In that country there grows cedar, the wonderful wood, that has scarcely been touched, though it has supplied sixty or more per cent of the shingles used in the entire United States for many years, and is now about the only shingle timber that is to be depended upon for further supplies. Most readers of this journal are probably users of cedar shingles to some extent.

It is no longer impossible to get absolutely clear siding and finish, as well as shingles, if all prejudice of acquaintance is discarded, for it can be readily supplied in this splendid and worthy wood at very reasonable prices if it is demanded.

The cedar of Washington and Oregon grows to immense proportions that astonish the unfamiliar visitor almost beyond belief. It has been used for many years for just such purposes as it is now being marketed. This article would be too long if all that cedar deserves should be here written. All that is necessary herein is that cedar is undeniably superior to any other lumber for such uses as it is fitted, being too soft for hard usage and without the strength or stiffness that is required of some woods.

Durability of Cedar

Cedar is practically without decay. Logs of fallen trees have been often found with large trees growing over them that are perfectly good timber for domestic use. It works easily, stays perfect under any and all weather or climatic exposure, does not swell, shrink, check or change and paints, stains or finishes natural; with the siding reversed, the sawed side exposed, the stained effect is that velvety appearance so admirable with shingles.

Let us not get away from the long-time preference for the house of wood nor that wood houses and shingle roofs are yet the cheapest and best, where it is possible to make use of wood.

It is noted that travelers and visitors always connect the wooden home with the city beautiful, and that cities having a preponderance of such homes are always classed as a city of homes. Think of it yourself, you builder, and you will, too, still prefer the home that has an appearance of hospitality and cozy comfort, such as only wood affords.

New Publications

The Standard American Drawing and Lettering Book.—Drawn and arranged by Peter Idarius; 104 pages; 36 plates. Album shaped. Size, 10 by 14 in. Attractively bound in board covers, ornamentally designed. Published by Laird & Lee. Printed in colors on paper sides, $1.25; extra cloth design in gold and colors, $1.75.

This work constitutes a modern treatise on the art of sign writing, with full instructions for mixing colors, care of brushes, etc., etc. The examples of lettering appear upon right hand pages, while those facing are left blank. The full-page plates illustrate a wide range of lettering, embracing all the most useful styles of letters used by sign and card writers, as well as a great number and variety of monograms, specimens of wood letters, projecting signs, etc. All are arranged in such a way as to give practical aid to students and others who desire to know the character, shape and design of any letter of the different alphabets shown in the book.

An especially noteworthy feature of the work are the full instructions for beginners, such as shading of letters, aluminum leaves and gilding color harmony, cutting in, colors for sign work, diagram of spacing, designs of lettering, gilding of glass, laying out, etc., etc. The author is not only an expert letterer, but has spent more than 30 years in the business, thus enabling him to write instructively for others, and in the book under review he tells his readers in the plainest language the proper thing to do and how to do it.

The practical designer is frequently called upon to execute lettering or sign writing in style and harmony with some practical purpose, and for this reason the student is given a number of useful alphabets, together with different samples in lettering of designs, which will enable him to execute the outline of each letter properly and proportion it according to rules.

Hints for Painters, Decorators and Paperhangers.—By C. Godfrey; 122 pages. Size, 5 by 7½ in. Profusely illustrated. Published by Industrial Book Company. Price, bound in board covers, 50 cents; in paper covers, 25 cents.

This little work is designed to furnish the practical housepainter and the man who wants to paint and decorate his own home with information sufficient to enable him to intelligently understand his business. It contains instructions and suggestions for housepainting, stenciling, graining, gilding, paperhanging, etc., having especially in mind the wants of amateurs.

One of the objects of the book is to deal with the natural characteristics, qualities and defects of the materials employed by the class of artisans for whom it is written, and to a limited extent this has been done with as little theory as possible. The author has drawn from many sources, and to this information have been added many things discovered in his own actual experience. It is felt that the young painter may derive great benefit from a careful study of what is presented within the covers of this book, as the hints, rules and recipes are referred to as being reliable, practical and of every day use.

Practical Cement Work.—By W. B. Henry; 110 pages. Size 4¼ by 6¾ in. Bound in stiff cloth covers. Published by the Concrete Age Publishing Company. Price 50 cents.

This is an elementary treatise on cement construction and has been prepared by a man who spent much of his time during the past 25 years in a varied line of cement work which gave him the opportunity to learn many practical facts. The matter is embraced in two parts and is considered under such heads as "Natural Cement," "Sand," "Aggregate," "Mortar," "Plain and Reinforced Concrete," "Form Building," "Waterproofing," "Coloring," "Cost Data" and "Testing Cement."

The second part of the little work is devoted to foundations and walls, specifications, cement houses and how they are built, cement plaster and stucco houses, water and steam curing, sand-lime brick, sidewalks, floors for cellars, basements and stables.

Stopping the Fire Waste.

Much attention is being given at the present time to the consideration of means for putting a check upon the appalling fire waste in the United States, and prominent business men have expressed their views on the subject. One of Chicago's leading insurance men in speaking of the matter says:

"The first effort should be made in securing the united support of all municipalities to establish a standard building code which will foster genuine fireproof construction and which will put an end to the building of such flimsy structures as are now a menace to the congested districts of all our cities.

"When we stop to consider that the fire loss in European countries averages only about 30 cents per capita annually as against $2.50 per capita annually in this country, there can be no other conclusion than that there is something radically wrong with our methods of construction in the United States. Fully 25 per cent. of our new buildings simply replace those destroyed by fire. We build in this country about one billion dollars' worth of new buildings annually, and burn down buildings to the value of two hundred and fifty million dollars. On top of this we must add the cost of our fire insurance and the cost of maintaining our expensive fire departments, making a total fire waste of over five hundred million dollars. Our total fire waste annually amounts to more than our annual production of gold, silver, copper and petroleum.

"It is discouraging to note that while our population has increased 74 per cent. in 30 years, our fire loss has increased 134 per cent. in the same period.

"Within the last few years there has been developed a form of construction which can be called absolutely fireproof, and many of our modern business buildings, of this type, will stand for an indefinite time as monuments to the wisdom of their builders. Such splendid buildings offer the best kind of a fire wall and do much to prevent the spread of fire and serious conflagrations.

"Many people have an idea that fireproof construction is too expensive to be practical for all kinds of buildings, but this is a most erroneous belief, for today it is possible to build not only business buildings and factories of fireproof construction at reasonable cost, but also city and suburban residences. In fact, there is no excuse whatever for a building being erected of anything but fireproof construction at the present time. The slight additional first cost is more than made up by many savings in maintenance and repairs, and in the longer life of the building.

"One of the greatest menaces to the public welfare is the misrepresentation regarding the fireproof character of business buildings. Many so-called fireproof structures are nothing more than fire traps, and a fire well started in them will gut their interiors from cellar to roof. Merely the constructions of walls and partitions from fireproof materials does not make a fireproof building.

"Modern progress in fireproof construction will be fully demonstrated at the Clay Products Exposition, to be held at the Coliseum in Chicago, March 7 to 12. All kinds of fire-resisting and fire-protective ideas in building construction work will be shown in actual structures which will be erected on the floor of the Coliseum, including a full-size modern fireproof house.

"This fireproof feature of the exposition is so important that fire marshals from municipalities throughout the country will be sent to Chicago to attend the show and the movement has the endorsement of the National Fire Marshals' Association."

Wilbur S. Sample, vice-president of the Thompson-Starrett Co., builders of the new Insurance Exchange Building, when interviewed on the subject, remarked:

"We have heard much discourse concerning conservation of our natural resources, but what conservation is more important than that of the buildings which we are erecting all over the country to house our business and manufacturing interests, and in which we live? Nothing has been said of the millions of dollars which are going to waste annually through failure to construct our residences, factories and business buildings in a sane and economical manner.

"We build one hundred thousand buildings annually, to take the place of those which we carelessly burn down. We have been cheerfully paying our fire insurance taxes and adding to our municipal burdens without realizing that these wastes could be readily reduced through a revision of our building codes. The money which we waste annually on fire, if put into buildings of permanent construction, would add immensely to our real estate values and to the actual wealth of the country.

"I heartily commend the plan to show the country at large the merits of fireproof construction through an industrial exposition such as that to be held in the Chicago Coliseum, March 7 to 12."

Competition in Suburban Houses

One of the interesting features in connection with the coming Real Estate and Ideal Homes Show, to be held in the Grand Central Palace the week beginning March 30, will be a competition in suburban homes. The contest is open to every one having ideas as to the best design for a six or seven-room house with relation to the development of a plot 50 x 100 ft. Allowance is to be made for a small garage not exceeding 200 sq. ft. which should be located not nearer than 30 ft. of the house, unless it be of fireproof construction, when it may be placed nearer or even connected with the house. The cost, which will include heating, lighting and plumbing, is not to exceed $3,800, and the construction is not restricted to any kind of material. There is to be at least a living room, a dining-room, kitchen, entrance hall, three bedrooms with closets and bathroom disposed on one or two floors and the usual arrangements for laundry, heater space, storage and servant's toilet in the cellar.

The points which will be considered in judging the designs are, first, excellence of the general plan of the lot showing the combination and grouping of the various features and their relation to each other; second, excellence of the floor plans and the exterior of design as expressed in the perspective of the house, and, third, excellence in presentation of drawing. There are three prizes offered, the first being $200, the second $100 and the third $50 with various "Honorable Mentions." The designs will be judged by three well-known members of the architectural profession and Frank H. Holden, the well-known architect, will act as advisory counsel for the management. The rules of the American Institute of Architects will prevail.

Another novel feature of the show which is under the management of the Real Estate and Exposition Company, No. 1 Madison avenue, New York City, will be the exhibits of a number of well-known suburban communities within a radius of 30 miles of the city. These communities will be represented by their civic bodies or principals of trade and will present the advantages of their respective towns to New Yorkers who may be looking for a suburban home within commuting distance. It is expected that this section of the show will be very complete this year, as the number of inquiries received by the management has induced it to reserve several thousand feet of floor space to be devoted entirely to the exhibits of suburban communities.

Prominent among the improvements recently projected for Riverside Drive, New York City, is a 12-story apartment house at the corner of 114th Street, which is estimated to cost $1,000,000 and afford accommodations for 87 families. It will have a frontage of 184½ ft. on the street and 76 ft. on the Drive.

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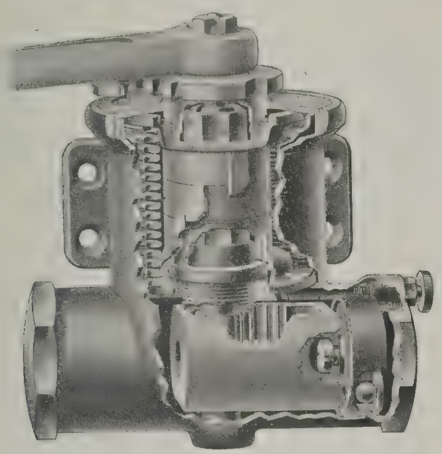
NOVELTIES

Corbin's 1911 Model Door Check and Spring

We take pleasure in bringing to the attention of our readers the 1911 Model of the Corbin Door Check and Spring, which is made with or without automatic hold-back attachment. It is adaptable for right-hand and left-hand doors without change and is offered in six sizes to swing all doors from the lightest screen type to the heaviest doors made.



Novelties—Fig. 1—Corbin's 1911 Model Door Check and Spring

It is being placed upon the market by P. & F. Corbin, New Britain, Conn. The spring used is long and resilient, reducing the crystallization to a minimum and giving a quick, live action which is highly desirable in a device of this nature. The spindle has a lower bearing which is said to absolutely prevent side pressure or friction while giving rigidity to the check. The parts are few and strong, are easily accessible and quickly replaced. The rack and pinion in the check give control to the door at all points from the wide-open to the closed position. The movement in closing is steady and is claimed to be without shock or jar at any point. The liquid used is one which has been carefully compounded with a view to securing immunity from changes due to difference of temperature. It is non-freezing and is not affected by extreme heat. The checking pressure is confined to the cylinder, there being no pressure at the spindle, so that the liquid is not forced upward and the check will not leak. The brackets used are the same as in connection with other models of the Corbin check. The broken view of the device which we present on Fig. 1 clearly indicates the internal mechanism.

The Success Garbage Receptacle

In these progressive days when more and more attention is being given to sanitation in connection with buildings of all kinds and especially dwelling houses, interest naturally attaches to the matter of garbage disposal and the means for accomplishing it. In this connection the garbage receptacle which is being introduced by the Success Mfg. Company, Gloucester, Mass., is of more than passing interest. The receptacle is made of concrete about 2 in. thick throughout and covered with heavy galvanized sheet steel, thus rendering it practically indestructible. The rim is of heavy cast iron firmly secured in place and fitting to it and lying flush when closed is the cast iron cover. The

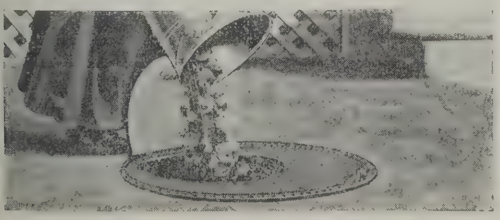


Fig. 2—Success Garbage Receptacle

receptacle is of such a nature that it may be placed in the sidewalk or in a lawn, thus requiring no space other than that occupied by the surface of the cover, which is flat, and therefore does not interfere with the use of the walk or lawn. The can is made of heavy galvanized sheet steel and provided with a handle which is always out of the way, being protected by the chute on the inside cover. In use only the small cover is raised for depositing garbage in the can, while the large cover with the chute is lifted when the can is to be bodily removed at the time the garbage is to be taken away. The small cover is raised by a slight pressure of the foot, the general method of using the receptacle being clearly indicated in Fig. 2 of the engravings. The receptacle can also be used in garages and manufacturing plants for the deposit of oily waste and sweepings and can be used by cities and towns for the temporary disposal of refuse which can later be removed in wagons. By reason of the practically air tight construction of the cover the receptacle may be placed close to a building or dwelling without any chance of odors or other injurious effects.

Hardwood Floors for Small Houses

The Interior Hardwood Company, Indianapolis, Ind., has just been sending out as being of special interest to small builders a very attractive pamphlet bearing upon the front cover the inscription "Small Houses Tend to Solve the Servant Problem and Make Life Worth Living." The matter is made up of pictures and floor plans of some very attractive homes of moderate cost and embracing a style of treatment which is likely to appeal to persons desiring to build a home somewhat different from the usual five or ten-room houses. The interiors are carefully worked out and the plans are published in colors showing the style of hardwood floor adapted to each of the principal rooms. In fact, the mission of the company in distributing the pamphlet is to display its specialty—fine hardwood floors—in proper setting, and the point is made that the company will be pleased to give the same attention to prospective clients if they will submit their floor plans for consideration.

Lignine (Wood) Carvings

A line of ornamental carvings which cannot fail to prove of special interest to a large class of our readers, more especially the architects and builders, is found in the goods

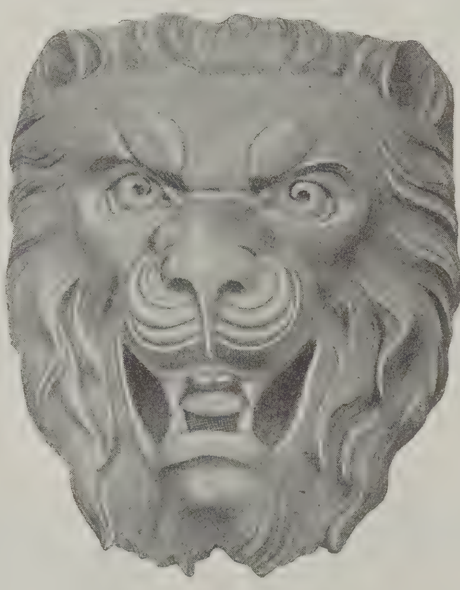


Fig. 3—Lignine (Wood) Carvings

now being introduced by the Ornamental Products Company, Detroit, Mich. These products consist of what is known as Lignine (Wood) Carvings which are of such a nature as to be practically unbreakable and which, it is pointed out, do not chip, check, crack or shrink. The carvings are excellent reproductions of hand-carved oak, mahogany and walnut models with full depth of grain and color, and the carvings can be nailed, screwed, braded or glued in place according to requirements. The carvings finished the same as wood with filler or stain, are said to stand the roughest usage and will not deteriorate with age. They are specially adapted for use in connection with interior finish, furniture, mantels, etc., and in finishing carvings in mahognay or walnut the company points out that the best results are obtained by the use of spirit stain. An excellent idea of the work may be gained from the lion's head shown in Fig. 3 of the illustrations.

In a catalogue just issued from the press a very extensive line of stock designs of Lignine Carvings are shown to excellent advantage, the detail being brought out strong and clear so as to afford the architect and builder an excellent idea of the appearance of the ornamental work turned out by this concern. The company will be glad to send a copy of the catalogue to any reader who may make application, also a free sample of Lignine Carving.

Woodworkers' Catalogue No. 32

We have just received from Huther Brothers Saw Mfg. Company, 2500 University avenue, Rochester, N. Y., a copy of the new edition of Woodworkers' Catalogue No. 32, which it has issued for distribution among the trade. Any reader of the *Building Age* who desires a copy of this interesting little work can secure it on application to the company. The catalogue is made up of 68 pages attractively printed and bound in colored paper covers. It is profusely illustrated with pictures of leading specialties in the way of Huther saws, and in Fig. 4 of the engravings is shown the regular teeth used in the company's hollow ground miter saws. With this class of saw very smooth work can be executed, and the manufacturer makes reference to it as something likely to prove of special interest to carpenter-contractors and others operating woodworking establishments.

Novelties—Fig. 4—Showing Regular Teeth Used in Huther Miter Saws

In the new edition of the woodworkers' catalogue much interesting information is given concerning the various lines of saws made by the company and accompanying the illustrations are sizes, number of teeth revolutions, prices, etc., all presented in a way to be of the greatest value to the woodworker. In addition to saws reference is made to planer, molding and special knives, band saw filing machines, band saw setting machines, saw swages, saw vises, saw mandrels, jointers for circular saws, wood saw frames, files, scraper blades, etc.

Pivot Check for Double Acting Doors

The pivot check for double-acting doors which we illustrate in Fig. 5 of the accompanying engravings has just been added to its already extensive line of specialties by the Standard Mfg. Company, Shelby, Ohio. The illustration shows the combined pivot and check as applied at the top of the door to be used in connection with a regular double-acting spring floor hinge. The claim is made that with the use of this pivot check at the top of a door and a regular double-acting spring floor hinge at the bottom of the door the result of a double-acting checking hinge is obtained. The pivot check here shown is designed for use on doors where the regular double-acting floor hinges are already applied and it is desired to use a check to control the swing of the door. One distinctive feature claimed is that the "Standard" Pivot Check can be set in position to bring the pivote in line with the hinge post at the bottom of the door. This is referred to as a particularly important feature since the distance from the edge of the door to the center of the hinge post is not the same on different makes of floor hinges, and it is absolutely necessary that the pivot at the top of the door be in line with the hinge post at the bottom of the door. The checking principle is liquid, carefully compounded and is said to be affected by neither extreme heat or cold. The pressure in the check is confined to the cylinder inside of the liquid reservoir so that there is no pressure against the joint, thus preventing danger of leakage.

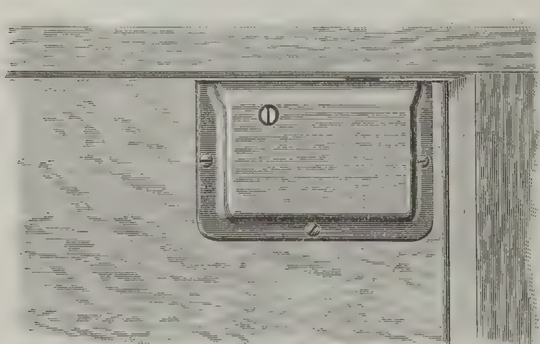


Fig. 5—Pivot Check for Double Acting Doors

Standard Combination Woodworker

The Atlantic Engine Company, Meadville, Pa., has issued a very attractive catalogue illustrating and describing in great detail the "Standard" Portable Combination Woodworker which it manufactures and which comprises nine distinct woodworking machines in one. The motive power is the company's new model engine, ranging in size from 5 to 6 hp., and which may be equipped for using either gasoline or natural or artificial gas, according to requirements. The machine is illustrated by means of halftone engravings, one view showing it with jig saw and disk sander attachment, another with dado head and boring attachment, and another with jointer and emery wheels. The catalogue is bound in paper covers and a copy of it will be sent to any reader who may make application for it.

The Niagara Sash Pulley

The Niagara Falls Metal Stamping Works, Niagara Falls, N. Y., point out that unlike most steel pulleys the Niagara, which they are bringing to the attention of the trade, is well bushed, is solid, safe, easy to put in place and is guaranteed for 10 years. The bushing serves as a powerful clamp and the pulley is said to be sufficiently strong to carry the weight of 1000 lb. should it be necessary to do so. The pulley runs freely and is well adapted to serve the purpose for which it is intended. A general view of the pulley with a section of the Premax sash chain is shown in Fig. 6 of the engravings. We understand that the makers will be glad to mail a sample to any architect, builder, contractor or houseowner who may be interested.

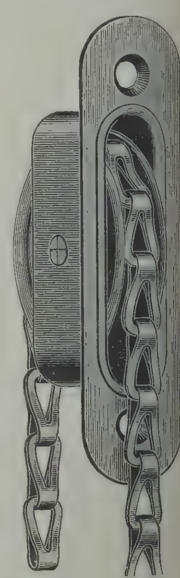


Fig. 6—The Niagara Sash Pulley

Built-Up Veneer Panels

The extent to which veneered work is being used at the present day lends added interest to the built-up veneer panels which are made by the American Veneer Company, 711 Market street, Kenilworth, N. J. The company is especially equipped for turning out large-sized panels for interior finish as well as wainscoting, door, ceiling and partition panels for planing mills, cabinet makers, bank and office fixture manufacturers. The plant of the company is located near Cranford and occupies a 3-story structure, 200 x 60 ft. in plan, equipped with the most approved machinery and appliances known to the industry. Some idea of the character of the work turned out by this concern may be gained from the statement that a goodly percentage of the veneer work in Rector's Hotel, the stores of Rogers-Peet & Co. and the Gimbel department store in New York City; the National Museum at Washington and other handsome structures, has been furnished by the American Veneer Company. We understand that the concern imports a great deal of its veneer direct, and that something over 35 different varieties are in use.

New Selling Agents for I. P. Frink Reflectors

The H. W. Johns-Manville Company has acquired the sole selling agency for the entire products of I. P. Frink, whose reflectors and fixtures need no introduction to the lighting trade and to consumers throughout the country. The standing of the two companies in question places the stamp of merit on this combination, and undoubtedly all interested in artificial illumination will be benefited by the uniting of these forces, as the Frink Company has been following this particular line of work for the past 50 years. An engineering department which will be maintained along very extensive lines will have a corps of engineers throughout the United States and Canada, and be equipped to place data and recommendations in the hands of all interested in any subject pertaining to illumination.

Ketchum Spirit Level Attachment

In connection with the work which he is called upon to do from time to time the building mechanic has frequent occasion to use a plumb and level, and with a view to meeting the requirements of the case the device here shown has been put upon the market, which takes the place of the plumb bob and staff and makes a level of any straight edge to which it may be applied. The device is called the Ketchum Adjustable Spirit Level Attachment and is made by the Vrooman Mfg. Company, Cleveland, Ohio, who states that it is attached to the plumb staff or straight edge by boring a 2-in. hole through the staff. Simply removing

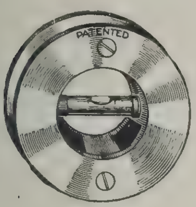


Fig. 7—Front View

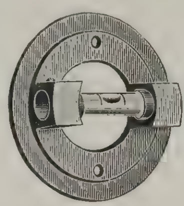


Fig. 8—Disk with Level

Novelties—Ketchum Spirit Level Attachment

two screws which are clearly shown in Fig. 7, which represents a front view, the two disks are separated. One disk is placed on either side of the hole in such a way as to allow the lugs of each disk to enter while the flanges bear on either side. The screws are then inserted and the device is held rigid with the staff. Fig. 8 shows the disk to which the spirit level is attached. The point is made that the device can be mounted in a straight edge of any length to suit any conditions for leveling or plumbing work and can be turned at any angle in the plumb-staff which admits of its being used as an inclometer. The form of the attachment is such that it protects the glass from direct injury and the spring brass clips that cary the glass absorb to a sufficient degree the effect of a fall.

Catalogue of Metal Ceiling Decorations

The Kanneberg Roofing & Ceiling Company, Canton, Ohio, has just issued from the press its special Ceiling Catalogue "B," which will be found of unusual interest to architects and builders generally. The introductory matter presents a very comprehensive account of the manufacture of stamped steel ceilings and reference is made

Fig. 9—Design of Centerpiece for Metal Ceiling

to the great variety of designs produced, thus permitting of a selection that will be appropriate for any style of architecture. The advantages of metal ceilings are noted and other points are presented which tend to emphasize the claims made for the ceilings turned out by this concern. The illustrations are halftone engravings of the finished goods, thus affording the reader an excellent idea of the general effects which may be produced with them. In Fig. 9 of the accompanying illustrations we show the design of one of the company's centerpieces which measures 48 x 48 in. in size. It is composed of four inside border miters and the general effect produced is clearly indicated in the engraving. The catalogue carries illustrations of borders, moldings, ceilings, friezes, fillers and centerpieces, side wall designs and combination designs in profusion. In connection with each illustration is the number by which the design is known, its size and price. The designs are stamped in sheet steel of 29 gauge to such a depth that paint brings out rather than hides the pattern. The company has also issued a catalogue entitled "General Instruction on Applying Metal Ceilings," a copy of which can be secured by any one writing for it.

Handbook on Concrete Block and Brick Making

The principles of successful brick and block manufacture are explained in simple language in an attrative handbook sent out by the Queen City Brick Machine Company, 43 Bank Building, Traverse City, Mich. It is the second edition of the little work and is copyrighted by C. J. Helm, patentee of the Helm Brick and Block Presses made by the company in question. The handbook describes three ways of making cement products and calls attention to many features of the Helm System. There are also suggestions on making and selling dry wall blocks and pressed brick; hints on estimating; rules for using concrete; the advantages of laying two-piece dry wall blocks; comparative tests of blocks; weights of building materials, etc., etc. The company in question has also issued a 44-page catalogue presenting much interesting matter relating to the Helm Presses and Dry Wall Building Systems, a copy of which will be sent to any reader who may apply. The brick and block machines in question are illustrated and described in a way to strongly appeal to the builder, and there are numerous halftone engravings of buildings in connection with which the company's product has been issued.

There are also illustrations showing the special features of the blocks themselves and also the appearance of combination brick and block construction. There are also shown various forms for bay window construction, chimney and pier construction with details of how the work should be done. The entire make-up is neat and attractive and the information of an instructive nature.

Ideal Wall Board

Among the candidates for popular favor in the way of a wall board for use as a substitute for lath and plaster is the "Ideal" which is made by the Roberds Mfg. Company, Marion, Ind. The wall board is made of selected wood fiber stock under great pressure; is thoroughly water proofed on both sides; is of uniform thickness, and is cut into panels of convenient width and length for effective use. The point is made that the waterproofing of both sides not only insures effective protection against dampness and climatic changes but makes it possible to use either side for decoration. The waterproofed surface required no sizing, hence may be economically and quickly decorated. The wall board is nailed directly to the studding, is easily put on and is claimed to have fire-retarding properties that "render it much safer than ordinary lath and plaster." It is said to be as useful in repair work as in new construction, and there is hardly any limit, the company states, to the ways in which Ideal wall board can be utilized, either in the building of a new house or in the repairing of an old.

The Holland Furnace

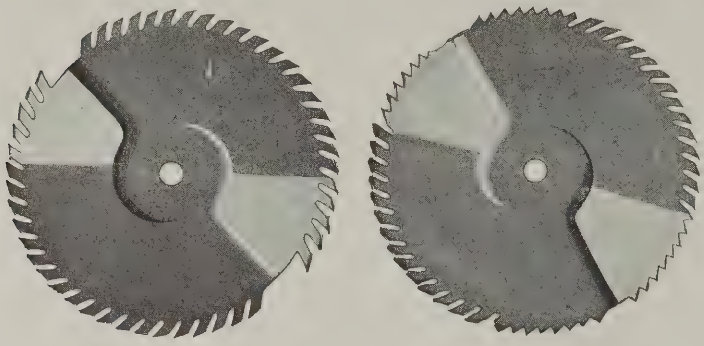
The season is close at hand when builders will be actively engaged in the erection of buildings of all kinds and of dwellings more especially, and the question will naturally arise as to the heating system to be installed. A method of doing business as applied to heating furnaces and one which cannot fail to interest not only the builder but the house owner as well is that adopted by the Holland Furnace Company, Holland, Mich. With each "outfit" the company furnishes full instructions for installing the complete system, and in their fitting department they cut in the collars, put in the dampers, supply adjustable pipe so that the desired length can be had without trouble, while heating plans and detailed specifications show just what each part costs delivered. This method is and has been proving very popular with contractors and builders by reason of the ease with which the Holland Furnace complete can be installed.

In a catalogue which the company has just issued the merits of the Holland Warm Air Furnace are set forth in a way to command attention, and illustrations are given of the Holland and the Ottawa furnaces, also of the lead-
the demand for the Holland furnace has made it necessary
ing parts of which they are built. The company states that

for it to erect in the past three years three large additions to its factory, so that its plant now covers over 54,000 sq. ft. of ground.

Lamson's Combination Grooving and Dado Heads

Those contractors, carpenters and others among our readers who are operating woodworking establishments are likely to be interested in the grooving and dado heads which are illustrated in Fig. 10 of the accompanying engravings and which are being introduced by the Lamson Cutter Head Company, 34 North Jefferson street, Chicago, Ill. The cutter head is made by forming a single piece of steel in such a way as to produce different widths of cuts. Another feature is that the offsets tend to make it perfectly rigid, while cutting the required width at all times. It is light on the arbor, well balanced, and will, it is said, run at the highest rate of speed without danger of breakage and flying parts. The single heads for individual cuts are made from 3/16 to ⅞ in. and from 7 in. to 10 in. diameter, inclusive. The company states that it also manufactures the single heads in special sizes 12 in. and 14 in. in diameter for the separate cuts and from 5/16 to 1 in., inclusive. The adjustable head made by the company is composed of two single heads, each head having collar attached, and a threaded screw fastens them together. This can be readily adjustable to the width of cut required. In addition to its general use on saw tables the head can be used on a shaper to make tenons by using two heads with collar between, and it can also largely be used on Universal woodworkers for doing any kind of grooving or dadoing. In the illustration the left-hand picture shows a solid grooving head, while the right-hand one represents dado and groover.



Solid Grooving Head   Dado and Groover

Novelties—Fig. 10—Lamson's Combination Grooving and Dado Heads

Rib Lath and Rib Studs for Plaster and Stucco

The Trussed Concrete Steel Company, Detroit, Mich., has just brought out the fourth addition of its valuable and instructive booklet relating to Rib Lath and Rib Studs for plaster and stucco in sidings, partitions and ceilings, furring hollow walls and hollow partitions. The introductory matter consists of comments intended especially for the attention of builders, and following these are descriptive particulars relating to the forms of construction above referred to. There are specifications for cement stucco and for metal lath, with detail sketches showing Hy-Rib on the outside and Rib Lath on the inside walls of residences. There is also considerable about "overcoated" houses, a subject that is of timely interest in these progressive days. The bulk of the illustrations are half-tone engravings showing buildings in connection with which the company's product has been used. Among the pictures is a view of an old wooden house before and after it has been overcoated with rib lath and stucco.

A New Year's Calendar

The Eastern Granite Roofing Company, 16 Battery Place, New York City, has been distributing among its friends in the trade a very attractive poster calendar for the new year. A large panel occupies the upper portion of the poster and consists of a photographic view looking out across a portion of Battery Park and toward the Jersey shore. It shows prominently in the foreground the Whitehall Building and in the Hudson River beyond is the Olympic, one of the largest ocean steamers afloat. There are also shown two piers of the Lehigh Valley Railroad which were covered with granite roofing eight years ago and are said to be as good now as when the roofing was applied. Below this picture is the name and address of the company with the statement that it was the originator of stone-surfaced roofings and the maker of "Safeguard Granite Roofing." Attached to the lower portion of the poster are the leaves forming the calendar proper. These are printed in colors and there are also indicated the various phases of the moon.

Lin-O-Wall for Interior Decoration

We have received from the Henry Bosch Company, 525 South Wabash avenue, Chicago, Ill., and with New York office at 890 Broadway, a copy of its 1912 catalogue of Lin-O-Wall for interior decoration. The product is an indestructible wall covering in solid high relief or decorated so that no finishing process is required. Being colored throughout it does not show surface scratches or dents, and the claim is made that it cannot fade because the colors are oil. The material is said to make a perfectly sanitary wall covering as it can be cleansed with soap and water, and that it is as easy to hang as any ordinary paper on account of its pliability. The designs presented in the catalogue are admirably reproduced and embrace Pompeian, Art Nouveau, Modern Art, Oak Grain, Ivy, Brocatelle, Leather, Brick-Tile, Lorington, Louis XV, Renaissance, Romanesque, Gothic, Cathedral, Heraldic, etc., etc. There are also excellent examples of carved wood panels, upper and lower finish for wainscoting, Lin-O-Wall borders, special room moldings in the way of plate rails, chair rails, beadings, corners, coves, etc.

A goodly portion of the catalogue is taken up with illustrations of brushes for paper hangers' use, trimming machines, straight edges, paste tables, knives of various kinds, rollers, shears, wire brushes, flexible grainers, roof brackets for house painters' use, etc., etc.

Cement Over-Coated Buildings

The building constructed with an over-coating of cement or concrete seems particularly adapted to withstand the high winds and severe weather conditions of the prairie countries. The illustration of the Kimball House at Kimball, South Dakota, shown in Fig. 11, an excellent example of the type of building that withstands the elements, is practically fireproof, and considerably warmer than almost any other construction. This hotel is covered on the outside with Berger's Diamond Mesh Expanded Metal Lath, made by the Berger Mfg. Company, Canton, Ohio. After the metal lath was applied the whole building was given an over-coating of cement stucco. Even in the smaller towns and villages throughout the great Northwest this over-coated or stucco construction is becoming quite popular for residences, schools, store buildings, hotels and buildings of practically every class. This construction has many advantages over both wood siding and cement blocks and makes a most substantial and permanent building. Best of all it has those fire-resisting qualities which are so essential in every locality. Old frame buildings can be renovated and greatly improved at small expense by covering the exterior with expanded metal lath and then applying the stucco cement. The improvement and change in the appearance of many of these buildings which have been refinished in this way is very striking and has well repaid the owners by the improvement in appearance alone, without the additional fire protection.

Fig. 11—Example of a Cement Over-Coated Building

(For Trade Notes see second page following)

TRADE NOTES

Henry Disston & Sons, Philadelphia, Pa., commenced its 1912 campaign with some striking announcements relative to the merits of Disston saws, tools and files. Reference is made to "The Story of a Stone Wall" which appeared in the Saturday Evening Post for January 20 and to another entitled "Over 50 Years with Disston," which will appear in the issue for February 17. It is felt that these and other prominent announcements will give the consuming public a wider and more intimate knowledge of Disston goods than they ever had before and that this knowledge will inevitably lead to greater business. The manufacturers also state that they have prepared an attractive illustrated book describing tools especially needed by the farmer.

Concrete finishes and damp-proofing products are some of the specialties which are being brought to the attention of architects, builders and contractors by the Glidden Varnish Company, Cleveland, Ohio. A booklet which the company has issued gives complete specifications for various finishes, also color cards of concrete floor dressing, liquid cement and waterproof flat finish. A copy of this booklet can be obtained by application to the company.

The Monarch Mfg. Company, 673 Shepard Building, Grand Rapids, Mich., calls attention to its leading specialties which embrace the Monarch Continuous Concrete Mixer, which is said to have a capacity ranging from 40 to 50 yards in 10 hours with two men to do the work; the Rapid Floor Scraper, which is of easy motion and economical operation, and the Monarch Metal Wall Plug, which is of such a nature as to give a positive grip on the rail and afford a definite key in the mortar. A sample of the wall plug will be sent free to any address on application. The company has also issued a catalogue of its goods, which it will also send to those who may apply for it.

As the building season opens contractors and builders will be considering among other things the roof coverings of buildings, and they are therefore likely to be interested in the Reynolds Flexible Asphalt Slate Shingles which are being supplied by the H. M. Reynolds Asphalt Shingle Company, 184 Oakland Avenue, Grand Rapids, Mich. These asphalt shingles are 8 x 12¾ in. in size and are laid 4 in. to the weather. The claim is made that they are fire-resisting and weather-proof, will not split, warp or rot. The shingles are mineral surfaced and very durable.

The Braunsdorf-Mueller Company, Elizabeth, N. J., has issued catalogue No. 5, illustrating and describing "tools that last." It contains 77 pages, and among the goods shown are trimmers, chisel sets, butt and notching chisels, both tanged and socket tanged and socket firmer chisels and gouges, paring and turning chisels and gouges, plane irons, screw drivers, scrapers, clamps, gauges, pin vises, hand vises, knurls, miter boxes, bevels, speed indicators, punches, stone cutters' tools, trowels, etc.

The Chicago Portland Cement Company, Chicago, Ill., is distributing a post card announcement relative to its "Chicago A-A" Portland cement, the manufacture of which is set forth in a 72-page booklet which any reader of the *Building Age* can secure free of charge upon application to "Department 61" of the company. The booklet is entitled "From the Raw to the Finished Product" and is illustrated by means of 66 halftone engravings. It tells how the raw materials are taken from the quarries, how they are weighed, proportioned, crushed and conveyed to the mills. It describes the process of drying, grinding and then burning the raw mixture to a clinker, also the method of cooling the clinker and grinding and regrinding it, thus producing "Chicago A-A" Portland cement.

The Blystone Machinery Company, Venango Street, Cambridge Springs, Pa., has brought out a new style of Blystone Concrete Mixer which is said to eliminate all loading and discharging devices. It is equipped with a 2-hp. gasoline engine; Bickerstaff positive and friction clutch and cut gears and has staggered spoke steel truck wheels.

The Concrete Supply Company has been organized in Arrowsmith, Ill., for the purpose of manufacturing a complete line of concrete workers' and masons' tools and supplies, as well as a line of concrete mixers, block and brick machines, metal sidewalk forms, etc. It has placed upon the market a new line of long-handled finishing tools, among which is an edger having as an important feature the method of attaching the handle to the tool proper. The arrangement is such that the handle is easily and quickly connected and disconnected.

The Miles Mfg. Company, 313 East Franklin Street, Jackson, Mich., has made some important improvements in the "Simplex" Continuous Concrete Mixer which tend to render it more satisfactory than ever before. A new proportioning device has been added which is claimed to be absolutely positive and accurate in operation. The sand, cement and aggregates are made to feed continuously from their respective hoppers, the aim being to give the materials a preliminary dry mix before they reach the mixing trough. The feeding device is controlled by a clutch within easy reach of the operator.

E. W. Campagna, Randolph, Mass., is bringing to the attention of carpenters and building mechanics a combined saw jointer and pencil gauge which is likely to prove of more than pasing interest. The claim is made that the jointer holds and guides a three-cornered file is such a way that by means of it an inexperienced person can quickly and accurately true up the teeth of a saw. The file can be easily inserted or withdrawn. When the jointer is not in use it can be conveniently carried in the vest pocket. By inserting a pencil through the loop at the top it can also be used as a gauge, enabling a person to draw a line at any desired distance from the edge of a board.

At the annual meeting on January 29 of the stockholders of the Federal Terra Cotta Company, 111 Broadway, New York City, and with works at Woodbridge, N. J., 11 directors were chosen for the ensuing year. At a subsequent meeting the directors organized by electing the following officers: President, DeForest Grant; first vice-president, Edwin Thorne; second vice-president, William Manice; treasurer, William B. Dinsmore, and secretary and assistant treasurer, Dwight W. Taylor.

Mack & Company, 18 Brown's Race, Rochester, N. Y., has issued a second edition of that interesting little pamphlet entitled "True Stories" of various authors. The stories consist of testimonial letters from some of the many who have used the company's tools, such as chisels, gouges, drawing knives, turning and carving tools, plane irons, broad axes, etc., etc. A short chapter on the "Care of Tools" is not the least interesting feature of the booklet.

The H. D. Smith & Co., Plantville, Conn., show in their 1912 catalogue a varied line of drop forged tools, some of which are of special interest to building mechanics. These include nail sets, chisels, carpenters' pincers with wire cutter and hammer head, drawing knives, srew drivers, shingling hatchets, etc. The bulk of the catalogue is devoted to vehicle drop forgings and to those of a special nature.

Announcement is made that E. H. Fuhrman has disposed of his interest in the Elite Mfg. Company, Ashland, Ohio, to the other members of the firm, who will continue the business under the old style and title.

One of the late issues of "Edwards Metal Sheet," published by the Edwards Mfg. Company, Cincinnati, Ohio, is replete with interesting information relative to the products of this well-known concern. An important feature is the conclusion of an article on "Casting the Dies for Metal Ceilings" and illustrated by a center plate in the Italian renaissance style. Other interesting features include an interior finished with Edwards Gothic Metal Ceiling Design No. 1994, also a Cincinnati residence covered with Edwards metal Spanish tile. More or less matter of a humorous nature tends to hold the attention of the reader, even though he may not be interested in sheet metal goods.

Richards-Wilcox Mfg. Company, Aurora, Ill., is sending out among its friends in the trade an illustrated folder bearing the suggestive title "Take Advantage of the Fireproof Clause." The point is made that there are door requirements in every factory, warehouse and public building, as well as window requirements in many buildings that demand fire protection. Architects are specifying automatic self-closing fire doors; owners are demanding such protection and underwriters are insisting on definite safeguards. In this connection attention is directed to the extensive line of fire door equipment, hangers and sliding door hardware, which the company manufactures and the merits of which are set forth in its catalogues. Any reader who is interested in goods of this character can secure a copy of the folder in question, as well as of the catalogues, by applying to the company at the address above given.

The Building Age

New York, April, 1912

A Brick Library Building in a Cincinnati Suburb

Its Construction and Arrangement--Lecture Hall a Feature--Hot Water System of Heating

A PROMINENT feature of the educational facilities of every country is found in the multiplicity of its library buildings ranging as they do all the way from the miniature affair in the country village to the elaborate and pretentious structure of the metropolis, involving in its construction millions upon millions of dollars. Between these extremes the buildings are graded according to the specific requirements of the localities in which they are located. Even in those of comparatively moderate cost the equipment involves all the modern conveniences for the comfort of their patrons and for the rapid performance of their functions as circulating and reference libraries. A most interesting example of domestic architecture in this line and one which is of a nature to appeal to many readers of this journal is the Price Hill Branch Library illustrated upon this and the pages which follow.

The halftone engravings clearly indicate the architectural treatment both interiorly and exteriorly of the building, while the plans, elevations and details afford an excellent idea of the construction and general arrangement.

The main walls of the building are of brick, the underpinning of ashlar, the trimmings of cut stone and brick, while the roof is of slate. A noticeable feature is the main entrance with its ornamental standards for illumination at right and left, a detail of which is found in connection with one of the halftone engravings upon another page.

Photographic View Showing Front Approach to the Main Entrance Flanked on Either Side with Ornamental Lights

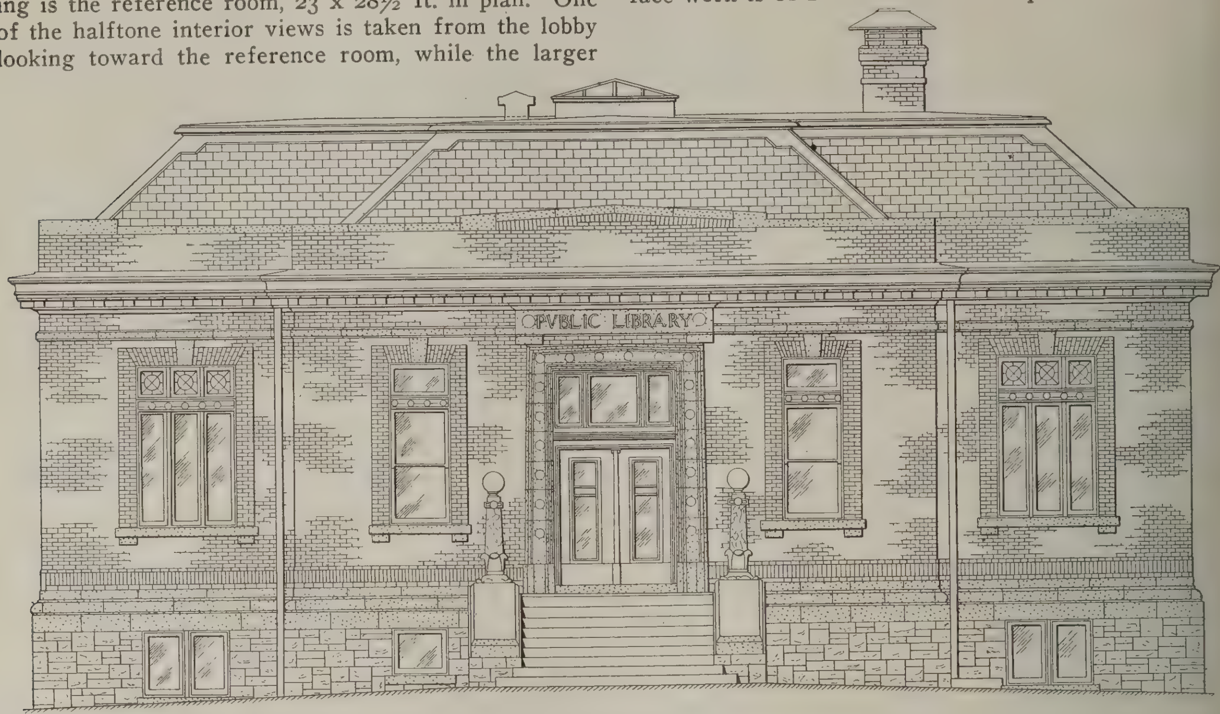
A Brick Library Building in a Cincinnati Suburb—Garber & Woodward, Architects

An examination of the floor plans shows the basement story to be devoted largely to a lecture hall measuring 28 x 52½ ft. in area. At the left of this are waiting rooms and toward the front of the building are the lavatories. Beyond the lecture room is the boiler and work room, the position of the fixtures being clearly indicated. On the main or library floor the broad stairs to the lecture hall are found at the right of the vestibule. Beyond the latter and in the center is a large lobby lighted by a skylight and with circulation room to the right and children's room to the left.

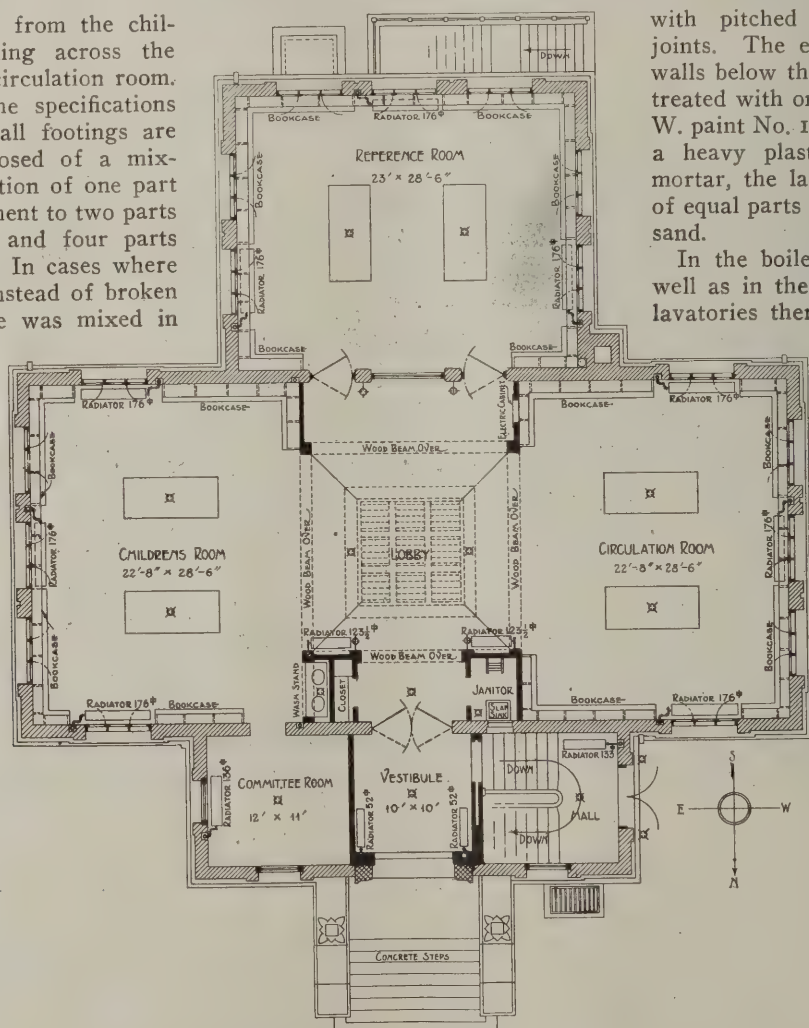
In what may be termed the rear extension of the building is the reference room, 23 x 28½ ft. in plan. One of the halftone interior views is taken from the lobby looking toward the reference room, while the larger interior is a view from the children's room looking across the lobby toward the circulation room.

According to the specifications of the architects all footings are of concrete composed of a mixture in the proportion of one part Atlas Portland cement to two parts clean sharp sand and four parts broken limestone. In cases where gravel was used instead of broken stone the concrete was mixed in the proportions of one part cement to six of sand and gravel. The walls are of rubble course work bonded with a header every 3 ft. of wall surface. All exposed face work is of Indiana stone laid up as broken ashlar with pitched face and squared joints. The exterior of all stone walls below the finished grade was treated with one good coat of R. I. W. paint No. 110 after it was given a heavy plaster coat of cement mortar, the latter being composed of equal parts Portland cement and sand.

In the boiler and coal room as well as in the men's and women's lavatories there are cement floors laid on a concrete foundation 4 in. thick composed of one part Atlas Portland cement and four parts clean



Front Elevation of Building—Scale, 3/32 In. to the Foot



Main Floor Plan—Scale, 1/16 In. to the Foot

A Brick Library Building in a Cincinnati Suburb

A Brick Library Building in a Cincinnati Suburb—A Detail of the Main Entrance

The deck of the main roof is covered with a layer of Sackett's building paper and over this in turn is a standing seam tin roof of Lawson's "Old Process" plate.

Over the center of the lobby where shown on the plan is a galvanized iron Hayes patent skylight 7 ft. square made by the George Hayes Company, 71 Eighth Avenue, New York City, and glazed with ¼-in. wire glass. On the roof there is also an 8-in. Globe ventilator made by the Globe Ventilator Company, 203 River Street, Troy, N. Y., which provides proper ventilation for the roof space. A galvanized iron duct 16 x 18 in. in cross section extends from the ceiling of the lecture room up through the closet on the first floor and through the roof where it connects with the 16-in. Globe ventilator.

All posts and beams are of yellow pine and of the dimensions indicated on the horizontal vertical section and on the details. Steel beams 2¼ in. and 2½ x 16 in. are used for the joists. The first floor ceiling joists are 2 x 12 in. and the basement platform joists 2 x 8 in. placed 16 in. on centers. All joists have one row of 1 x 3-in. cross bridging for every 6 ft. of span. The studs are 2 x 4 in. placed 16 in. on centers and doubled around all openings over 2 ft. wide and trebled at all corners. Openings more than 3 ft. wide are trussed overhead. All headers over 6 ft. in length are framed to trimmers by means of hangers. All headers more than 2 ft. long are doubled and all partitions running parallel with joists are carried on triple joists except where the partitions are less than one-half the length of the joists, in which case the joists are doubled.

The floors of the building are doubled, the under one

coarse sharp gravel. On this in turn is a finishing coat 1 in. thick composed of one part Portland cement and one part sand marked off in blocks, the cuts extending through the concrete. In the remaining portion of the basement the floor is composed of 4 in. of concrete on 4 in. of cinders and having 3 x 6-in. cypress sleepers laid on top, spaced 18 in. on centers and filled in between to receive the wooden floor.

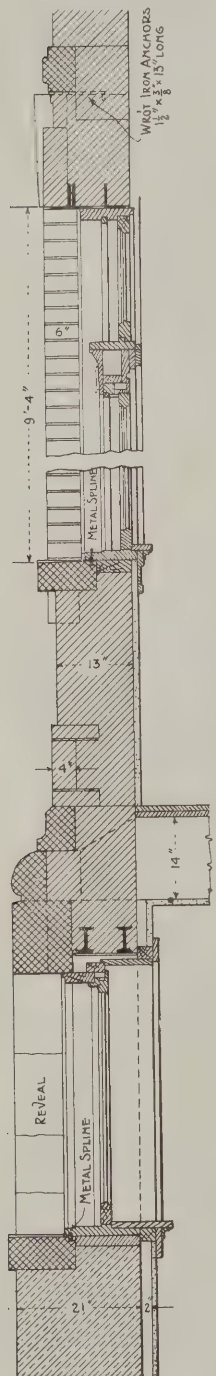
The steps and landing at the main entrance are constructed of concrete composed of one part Portland cement, two parts sand and four parts broken limestone 1 in. in diameter reinforced with ⅜-in. square twisted rods placed 5 in. on centers and running up and down the slope of the steps and on 12-in. centers across the steps. There is also a ⅜-in. square twisted rod in the upper angle of each step.

The exterior face of the main walls of the library building are of pressed brick of dark red shade laid up in Flemish bond. All horizontal joints are "struck" and ½ in. in thickness, while the vertical joints are flush. The trimmings are of buff Bedford cut stone. The sills are cut with a "wash" on the upper surface and a "drip" on the under side. All cut stone are laid in mortar composed of one part Portland cement and two parts sharp sand.

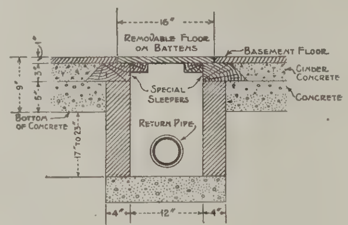
The roof is framed with 2 x 6-in. and 2 x 8-in. rafters placed 16 in. on centers and covered with ⅞-in. yellow pine sheathing boards which in turn are covered with Matthews Consolidated Slate Company's 10 x 20-in. green slate laid with 3-in. lap, each slate being secured with two galvanized iron nails

View in Lobby Looking Toward the Reference Room

being composed of ⅞ x 6-in. tongued and grooved yellow pine boards laid diagonally, while the finish floor of the principal rooms is of ⅞ x ¾-in. yellow pine. The floors are covered with cork carpet. The basement hall, ante room, rest room, corridor and lecture hall have floors of ⅞ x 3¼-in. rift sawed yellow pine. The entrance and vestibule doors are 2¼ in. thick and have glass panels. These doors as well as those between the basement hall and lecture hall, the sliding door in the main entrance vestibule; the doors between the reference room and the lobby are veneered, the cores



Section Through Triple Window and Basement of Front Elevation—Scale ⅜-In. to the Foot



Section Through Trench for Heating Returns—Scale ⅜ In. to the Foot

pine and treated to a coat of varnish.

The bookcases are of No. 1 birch with ⅞-in. poplar shelves. The backs of the cases are of ⅞-in. beaded poplar varnished.

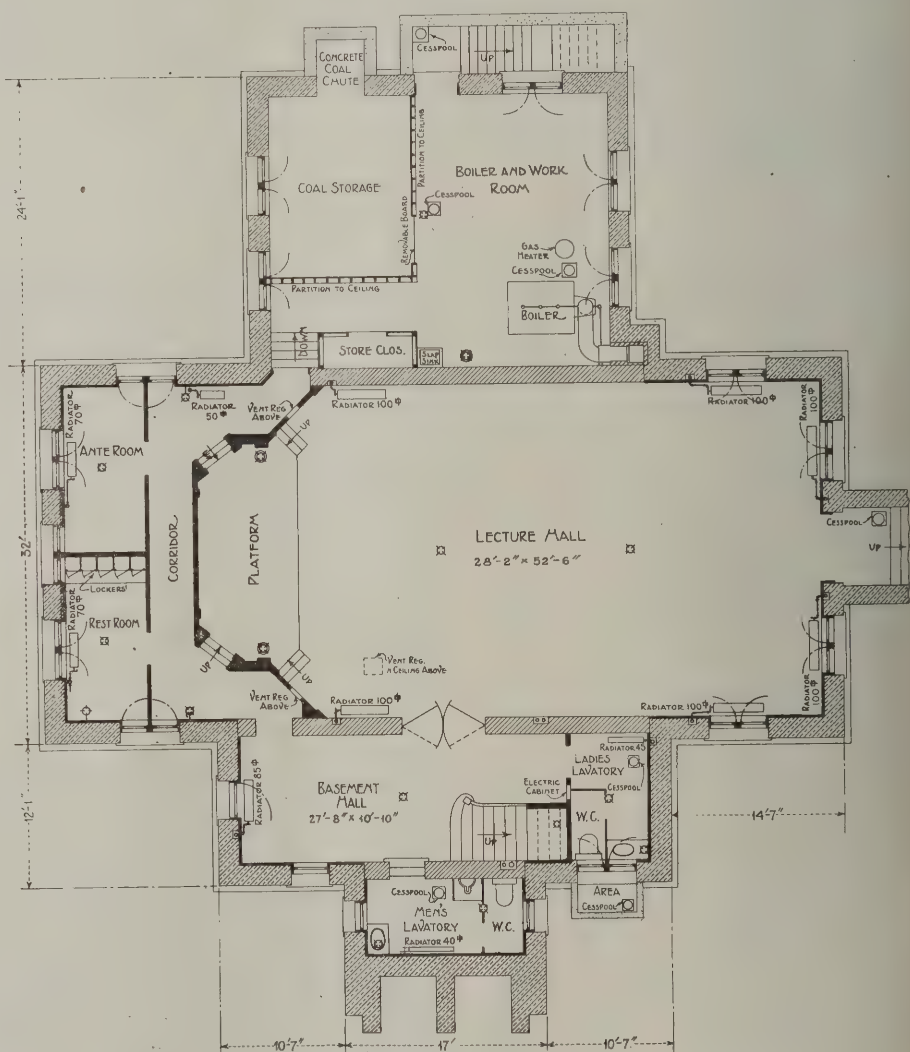
The main stairs have ⅞-in. poplar risers, 1⅛-in. squared oak treads and 4 x 4-in. molded oak hand rail. The balusters are of poplar. The newel posts are 6 x 6 in.

The entire interior of the building, including the basement walls and ceiling, light shaft, etc., is lathed and plastered with three-coat work, the finish coat being composed of lime putty, fine washed white sand and plaster of Paris. All brick work has two-coat work.

The men's and women's lavatories are wainscoted 3 ft. 6 in. high with Kenne's cement on metal lath ruled off in imitation of 3 x 6-in. tile and painted with white enamel.

All exterior woodwork is painted three coats and the exterior metal work has two coats. The outside oak face of all exterior doors is treated with three coats of Spar varnish and rubbed to a dead oil finish.

All woodwork of the first story, together with the lecture hall, lavatories and stair hall in the basement,



Basement Plan Showing Lecture Hall, Etc.—Scale 1/16 In. to the Foot

A Brick Library Building in a Cincinnati Suburb

being built up of ⅞-in. white pine pieces glued together and the veneering ¼ in. thick. The panels are solid.

The entire first floor is finished in poplar painted white and has a ⅞ x 6-in. architrave miter, glued and halved at the head. In the basement hall, lecture hall and lavatories the finish is the same as on the first floor, but the remainder of the basement is finished in yellow

is finished in white enamel. All interior yellow pine woodwork in the basement has a coat of oil stain, and three coats of varnish rubbed to a dead finish.

The vestibule has a tile floor laid on a base of concrete composed of one part Portland cement, three parts sand and six parts cinders. The tile floor has a border 15 in. wide with a neat Greek fret design worked in colored tile. The field is white with dark colored tiles laid in at regular intervals.

In the boiler room is a No. 4 Ruud hot water heater from which pipes run to all wash stands and slop sink in the basement and on the first floor. In each of the men's and women's lavatories is a 13 x 17-in. porcelain bowl with marble slab and having hot and cold water supply with Thatcher self-closing faucets, also a Standard porcelain enameled "Delecto" siphon jet water closet with nickel-plated fixtures. In the men's toilet is a Standard porcelain enameled flat back lipped urinal enclosed 5 ft. high on three sides with marble slabs. In the children's room are two 13 x 17-in. porcelain bowls with marble slab and with 12-in. marble splash at back and ends, also a 6-in. marble apron in front. In the janitor's closet and in the boiler room is a porcelain enameled flat rim slop sink with hot and cold water supply.

The plumbing fixtures were installed by the Richard Murphy Plumbing Company, Cincinnati, Ohio.

The shafts of the two ornamental lamps on the buttresses at the front entrance steps are of Sienna marble, light vein, and rest on cost iron bases and collars. The bases are securely fastened to the stone coping by means of expansion bolts.

The library building is piped for artificial gas and is also wired for electric lighting in accordance with the National Electric Code and as approved by the Underwriters' Association of Cincinnati.

The heating is by hot water with direct radiation, The flow mains are taken from the boiler and carried up to the attic where they supply the various risers. The returns are in trenches beneath the floors of the building, all as indicated on the sectional elevation presented herewith. The floor plans show the position of the principal radiators which are of Rococo pattern, also their radiating surface.

An ideal sectional cast iron hot water boiler of the American Radiator Company's make is used, this having a capacity for handling not less than 5200 sq. ft. of direct radiation at a maximum temperature of 180 degrees at the boiler and having 15 sq. ft. of grate surface. The expansion tank in the attic is of galvanized iron of the closed type and measures 20 x 60 in. A 1-in. diameter expansion line taken from the top of the main riser connects through a Honeywell Heat Generator No. 3.

The heater, main riser and flow mains in the attic with return mains under the floors are incased in 4-ply asbestos air cell covering held by canvas. The boiler and smoke connection are covered with 85 per cent. magnesia plastic covering 1½-in. thick all of Keasbey & Mattison make. The contract for the heating installation was executed by the M. H. Crane Estate of Cincinnati, Ohio.

The Price Hill Branch Library here illustrated and described is located at the corner of Warsaw and Purcell Avenues, Price Hill, one of the beautiful suburbs of which the city of Cincinnati can boast.

It was completed in accordance with drawings prepared by Architects Garber & Woodward, 905 to 907 Andrews Building, Cincinnati, Ohio.

View in Children's Room Looking Through the Lobby Toward the Circulation Room

A Brick Library Building in a Cincinnati Suburb

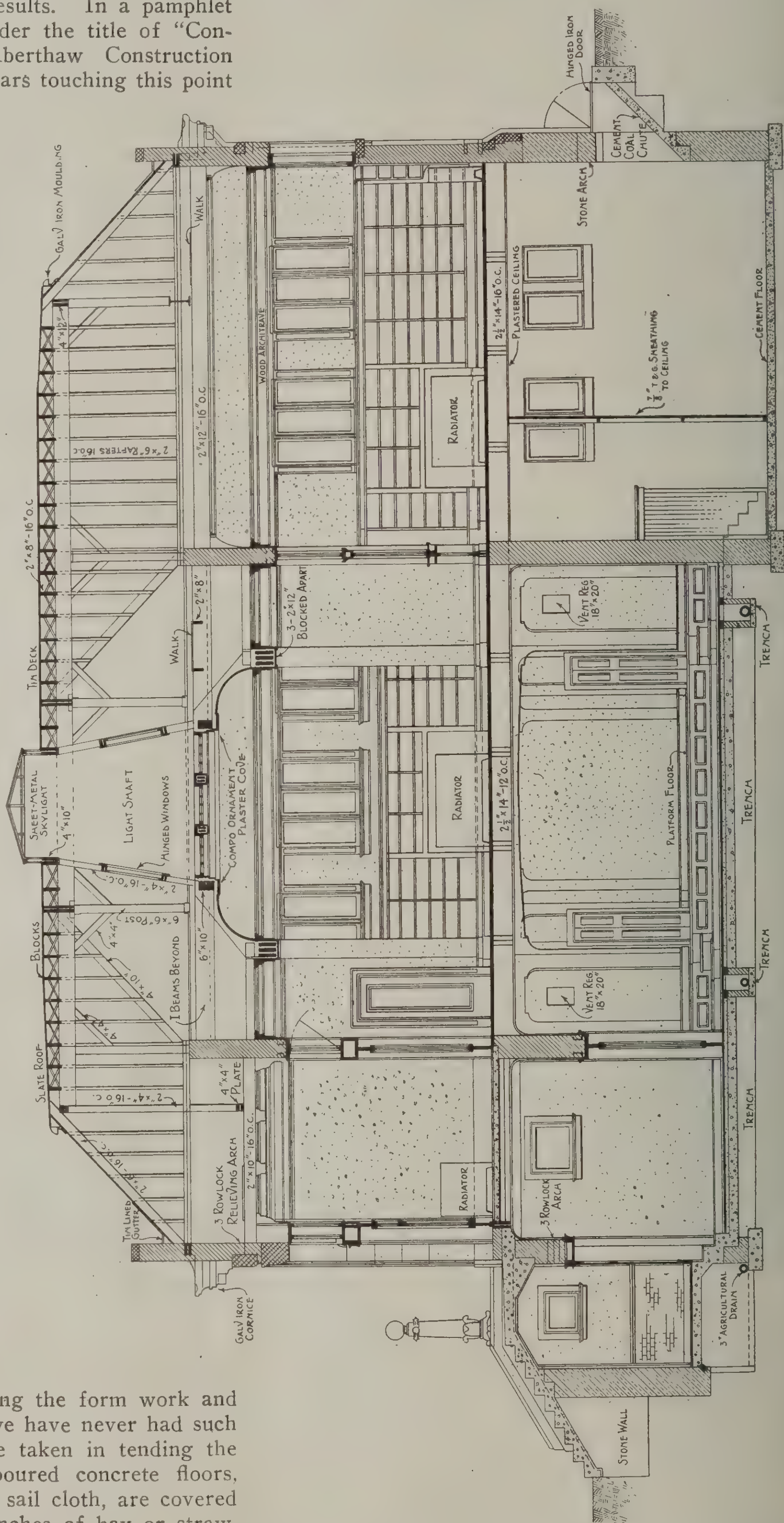
Reinforced Concrete Construction in Winter

Much discussion has appeared in the past relative to the construction of reinforced concrete buildings or the execution of other work in winter when the temperature is below the freezing point. Experience has shown that concrete work can be carried on under such conditions if the proper care is exercised and it is done by those who are experienced in this line. There are, however, certain precautions which it is necessary to take in doing concrete work in winter and in order to insure absolutely satisfactory results. In a pamphlet which has just been issued under the title of "Concreting in Winter" by the Aberthaw Construction Company, the following particulars touching this point cannot fail to interest a large class of our readers. The authority in question says:

From the boiler a steam pipe is taken to the sand pile and another one to the stone pile. On jobs where sand and stone are received on railroad cars a steam pipe is laid parallel with the tracks, with tees at frequent intervals, from which steam hose is taken directly into the car itself. This insures that all sand and stone are warm when placed in the mixer. In a similar way steam is turned into the water barrel to heat the water used in mixing. The cement is not heated, as its setting is thereby accelerated to too great a degree. Salt is mixed with the concrete in the proportion of two pounds of salt to each bag of cement. This lowers the freezing point of the water in the concrete, and, though it slightly retards the set of the cement, it is a necessary precaution against sudden unexpected falls in temperature, and, provided that too great a quantity is not used, the strength of the concrete is not decreased.

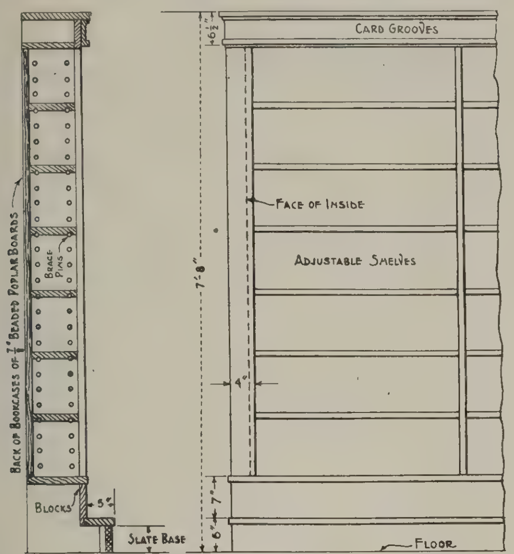
Before concrete is poured all forms are swept clean of snow, and any ice is removed with a steam jet. The whole building as it goes up is enclosed with canvas, floor by floor, until the concrete has set, and salamanders burning coke are placed underneath all freshly poured concrete and kept burning night and day until the concrete has thoroughly set. In this way the interior of the building is kept about thirty degrees above that of the air outside. Although with the use of salamanders there is a considerable risk of fire catching the form work and causing the work to collapse, we have never had such an accident, owing to the care taken in tending the fires. The tops of freshly poured concrete floors, which cannot be enclosed with sail cloth, are covered with paper and about twelve inches of hay or straw, which are sometimes sprinkled with salt.

It will be urged that the cost of winter concrete work, done in the way described above, must necessarily be more than work done under summer conditions. This is true, and we have found that the cost o winter concrete work will average from 6 to 10 per cent. more than the cost of work done in warm weather, and mill construction will cost about 4 to 8 per cent. more. A part of the extra expense is incurred by the heating operations, a part in the decreased efficiency of the workmen when numbed by the cold, and finally owing to the comparatively slow progress of the work due to allowing longer time for the concrete to set. In spite of this, we have found several owners every year who have found it worth their while to pay this extra cost for the certainty of early delivery of completed buildings in the new year.

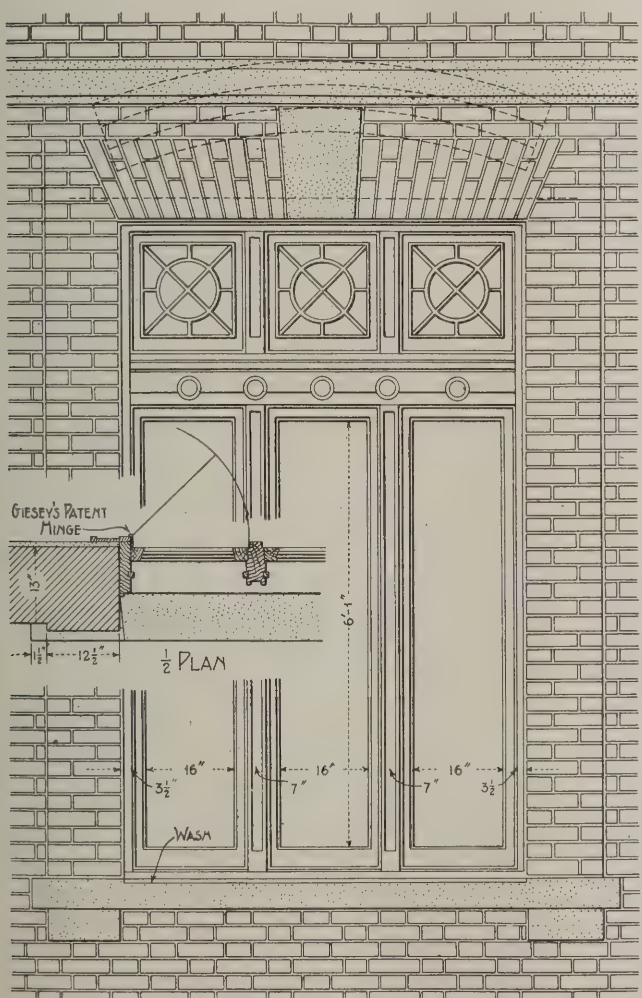


A Brick Library Building in a Cincinnati Suburb—Longitudinal Vertical Section of Building—Scale 3/32 in. to the foot

According to the Connecticut Supreme Court of Errors, where the general manager of a corporation orally ordered extra work to be performed by a contractor, there was a waiver of the requirement of the contract that such work should be undertaken only on written orders from the architects. Labor and material necessary to put in a new sewerage system



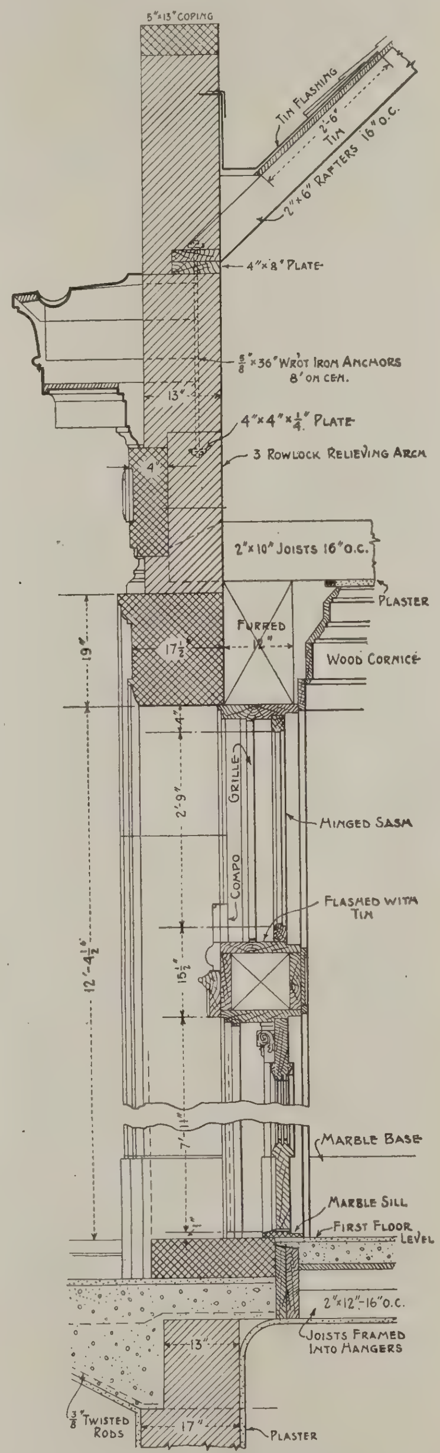
Section and Partial Elevation of Book Cases in Reference and Circulation Rooms—Scale ⅜-In. to the Foot



Detail of Triple Windows Shown in Front Elevation—Scale ⅜-In. to the Foot

Department of Industrial Research

The Department of Industrial Research of the University of Pittsburgh has entered upon a careful study of the smoke problem in the broadest possible manner. The chief lines of investigation are the effect of smoke on health, plant life and buildings. The Department is also considering the increased cost of living due to damage and dirt caused by smoke and the legal as well as the engineering side of the question. It is hoped that by co-ordinating these various researches it will be



Section Through Front Wall Showing Main Cornice—Scale ⅜-In. to the Foot

Miscellaneous Constructive Details of a Brick Library Building in a Cincinnati Suburb

in a remodeled building were not "alterations," within a provision of the contract declaring that no alterations should be made in the work done or described by the drawings and specifications except on the written order of the architects.

possible to obtain some valuable technical as well as scientific data. It is expected to establish at least the status of the probem as a whole on a scientific basis. Each of the investigations will be carried out by one or more men, each a specialist in his line.

Right to Rescind or Abandon Building Contract

Defective Performance by Builder--Owner's Non-Payment of Installments--Other Grounds for Rescission

By A. L. H. Street.

SINCE questions touching the right to rescind or abandon building contracts often present themselves in litigation, the following statements of law based on appellate court decisions in the several states are offered with a hope that their perusal will prove useful to readers who may be involved in kindred controversies.

The right of the parties to an agreement to rescind it by mutual understanding if, of course, undoubted. We are to deal with cases where the builder or the owner withdraws without the other's consent.

Fraud in inducing the other party to contract is good ground for rescission. Thus, a subcontractor has been upheld in an abandonment of his agreement on the contractor's failure to keep a promise, fraudulently made, that he would give the subcontractor other work at reasonable figures if the latter would take the subcontract at an inadequate price.

It is a general rule that one party cannot treat the contract as abandoned, where his own non-performance prevents the other party from complying.

When Builder May Withdraw

A general rule, deducible from all the reported cases, is that a builder is entitled to rescind if the owner prevents performance, or fails to make payments provided for by the contract, unless the builder is, also, in default. A Pennsylvania court exonerated a contractor in quitting work when the owner refused to make stipulated payments, and ordered him to quit, stating that she would have the building completed by another. That a builder, who has given a bond to perform his contract, is justified in abandoning the agreement, if the owner withholds payment due, has been decided by the Illinois Supreme Court, though the owner intends to pay the money to subcontractors or the builder's workmen. If the contract fixes a method for ascertaining the price to be paid for extra work, the builder is not entitled to quit work because dissatisfied with the valuation so fixed. A contractor, who is prevented from completing his work by acts of the owner may abandon it, and recover for all work and material furnished up to the time of the abandonment, plus profits lost through the owner's breach. Difference of opinion as to the meaning of terms in the agreement does not entitle the contractor to quit; nor do errors in the plans, making construction impossible, if the contract requires errors to be referred to the architect for correction. Provision for a fixed penalty for each day's delay in completing the work does not apply where the builder has wholly abandoned his contract.

When Owner May Rescind

The owner may terminate the contract for the contractor's failure to comply with it in a material respect, e. g., where the builder furnishes defective material, unless the owner knew of the defects when the contract was made; or where the builder fails to finish the work on time or within a reasonable time. Of course, the owner on terminating the agreement must pay the reasonable value of work and material furnished under the contract, as a general rule. But a minor breach by the builder will not justify a cancellation. Continued delay of the contractor beyond a fixed day to complete the work is a continuous breach of which the owner may avail himself at any time as ground for recission, under a decision of the New York courts. According to a Texas Supreme Court decision, the fact that the builder's sureties have become insolvent does not entitle the owner to rescind, unless the builder is first given opportunity to substitute good sureties. A statute of Louisiana has been held to entitle the owner to rescind at his option, leaving him liable to the contractor for the latter's outlay for labor and material furnished, plus the profits he would have earned had the agreement been carried out. This statute merely declares a general rule, which has probably been upheld by the courts in every state, for one's right to abandon any contract without incurring liability beyond the amount of damage resulting to the other party cannot be denied. The owner cannot cancel the contract for non-performance by the builder, if he himself has broken the agreement by failing to make payments due. The fact that the contractor made misrepresentations as to his solvency does not entitle the owner to rescind, where the contractor has given good bond to secure performance of his work as agreed.

Mode of Rescission

Before rescission can become effective, it must be clearly and unqualifiedly declared to the other party, and within a reasonable time after the ground therefor arises, and before the other party has incurred expense in reliance upon the other's apparent intent not to claim a revocation. Appellate courts of Indiana and other states have declared that if a contract provides for a certificate of the architect that a termination by the owner is warranted by the builder's failure to properly comply with his agreement, that provision must be strictly complied with before a rescission by the owner can become operative.

Dissipation of Heat

That heat is dissipated slowly from a manufacturing building is indicated in some figures obtained by a committee appointed by the Home Secretary of State of England to investigate the conditions in cotton mills of that country. On non-working days a shed was found to remain 8 to 10 deg. above the outside temperature. In all the weaving sheds the rise of temperature is rapid when the work commences in the morning, the average rate being 3 to 4 deg. per hour between 6 and 8 a. m.; 1.8 deg. per hour between 8:30 a. m. and 12:30 p. m. and 1.2 deg. per hour between 1:30 and 5:30 p. m. The maximum temperature, of course, occurs at the end of the working day. In the case of satisfactory construction the average increase is 15 to 20 deg., but 25 or 30 deg. have been recorded in some tests.

Some novel features are provided for in a new theater in Chicago which is going up on Milwaukee avenue, near Logan Square boulevard. There will be a ladies' parlor and nursery and a gentlemen's smoking room, while inclosed inside stairways, coupled with emergency fire escapes, have been designed with a view to emptying the theater in from two or three minutes.

National Building Trades & Employers Association of the United States

National Association of Builders' Exchanges Under a New Name--Declaration of Principles--New Officers

THE launching of a National association of Builders' Exchanges, under a declaration of principles which it is firmly believed will insure its success as a National body, was the outcome of the Fifth Annual Convention of the National Association of Builders' Exchanges, held in Washington, D. C., February 27 and 28. The declaration of principles, while permitting of a fixed policy of government as far as the National organization is concerned, retains a certain flexibility which enables Local, State and Interstate bodies, as well as interests correlative thereto, to affiliate with the National body and still retain control of local affairs, in connection with which, owing to natural surrounding conditions, they are best fitted to act.

Official Button, Actual Size.

The convention was held at the Continental Hotel, which was the designated association headquarters. The opening session was held on Tuesday afternoon and was attended by delegates from Exchanges in New Jersey, Pennsylvania, Maryland, Ohio, Iowa, Virginia and the District of Columbia. President Franklin M. Harris, Jr. Philadelphia, Pa., called the meeting to order, making a brief address of welcome to those assembled. The reading of the minutes of the last annual meeting and routine business followed. The report of the secretary was retrospective in character. He referred to the early days of the organization and its various periods of activity and inactivity, and expressed the hope that the present convention would do much for the betterment of the organization.

Report of Reorganization Committee

The report of the Reorganization Committee, appointed at the Philadelphia Convention a year ago, was then presented. It was signed by the entire committee, consisting of I. H. Scates, chairman, Baltimore, Md.; Hugh D. King, Bloomfield, N. J.; H. S. Andrus, Philadelphia, Pa.; W. H. Dennis, Bradford, Pa., and John R. Galloway, Washington, D. C. The plan of reorganization as presented below was adopted seriatim and as a whole, and the association immediately became operative under its declaration of principles.

This Association shall be known as the National Building Trades and Employers' Association of the

Bird's-eye view of the City of Washington Where the Convention Was Held, Looking East from the Washington Monument

Convention of National Building Trades and Employers' Association of the United States

United States of America and shall consist of City, State and Interstate Associations connected with the Building Trades and interests co-relative thereto.

OBJECTS OF ASSOCIATION

The objects of this Association are declared to be the promotion and protection of the general interests of the Building Trades of the United States. It is its purpose to secure and maintain the highest standards of efficiency, a more uniform system and harmonious relation with those connected with the Building Trades; whether they be engaged in the manufacture or sale of appliances, supplies, materials, or in the installation of appliances, the use of materials, or the erection of buildings, and secure a more equitable system of dealings between the architect, owner and member, to the end that the interests of all parties concerned may be fully protected and the trade in consequence thereof elevated to a higher standard of proficiency and usefulness, and in order to fully accentuate this declaration, to guarantee to the organizations affiliated with this National Association the absolute right of *Home Rule* in the adjustment of all matters pertaining to labor or questions of a local nature which may arise or exist in their respective localities; this National Association to hold itself in readiness at all times to assist in every way possible in times of trouble when called upon through the proper officer.


The Washington Monument, 555⅓ Ft. High

PRINCIPLES

First—Constant attention to legislation, Municipal, State and National, that will in its character correct abuses and protect public interests.

Second — Co-operation with the various associations of Architects, Engineers and kindred organizations.

Third—The establishment and fostering of Trade Schools.

Fourth—The development of a system of local employment bureaus.

Fifth—Uniformity of Building Laws as far as practicable.

Sixth — To encourage the merit system, and upon the basis of this system the settlement of all industrial disputes by mutual and amicable arbitration.

Seventh — To encourage a friendly relation between employer and employee as necessary for the permanent success of both.

OFFICERS

The officers of this National Association shall consist of a President, a Vice-President, a Secretary and a Treasurer. These four officers elected at the annual convention of this Association, with the retiring President, shall constitute the Executive Body of this Association, and also shall constitute the Board of Control and Jurisdiction, to whom shall be referred all questions as to territorial affiliation and all administrative matters, and their decision upon any question shall be accepted as final, subject only to review at the next succeeding annual convention.

STATE COMMISSIONER

There shall be a National State Commissioner for the District of Columbia and for each State represented in this Association, who may be nominated by the delegates or members from each State and elected to the convention. The President of this National Association shall, with the Executive Board, if no nominations are made at the convention, appoint a National State Commissioner for any State where there may be a vacancy by reason of no nominations and election at the convention of the National Association.

National State Commissioners shall have power to organize local associations in their respective States and look after State and local affairs; they shall be the representative of the National Body in their respective States, under the direction of the Executive Board or Board of Control and Jurisdiction.

NATIONAL CONVENTIONS

The National Convention shall consist of the five National Executive Officers hereinbefore provided and the Commissioners from each State, and one delegate-at-large for every fifty (50) members or majority fraction thereof, of each association, as hereinbefore mentioned.

PER CAPITA TAX

Ten cents (10c.) per members shall be the per capita tax payable by affiliated associations to this National Association. One year's per capita tax in advance to accompany the application for membership.

The committee begs to suggest in connection with the plan presented that this convention consider the adoption of a law or rule whereby no Exchange be allowed to entertain a National Convention of this Association, and that the only expense that can be incurred by an Exchange in a city where a convention is held will be the use of a hall for the holding of the said conventions. This recommendation is made with a desire to eliminate every unnecessary expense.

The Quarters of the Builders and Manufacturers' Exchange on Masonic Temple Plaza

Convention of National Building Trades and Employers Association

BUILDERS' EXCHANGES

As a final suggestion: Associations known as Builders' Exchanges (or whatever name they bear) organized for the purpose of bringing the varied interests of the Building Trades into an association of co-operation, should not overlook the practice of reciprocity as an element to their successful operation. As a National Association we must depend upon the success of the locals, which in turn produce the State Associations, for the highest efficiency. Organizations such as are represented in this convention, inasmuch as they are a constituted clearing house for the trade and through their efficiency in securing and distributing information to their members are in effect a Bureau of Information, make it possible to simplify the work and correspondingly diminish the expense of securing business and information relative thereto, which, when intelligently taken advantage of, will enable the contractor or subcontractor, who are by their membership entitled to these benefits, to prepare his estimate and figure at the lowest possible cost. In face of such facts as these there is no reason why this National Association should not, through the membership of its affiliated organizations, undertake the adoption of some positive plan leading to the actual work of reciprocity in awarding contracts, the purchase of materials, supplies, etc. This could be best accomplished (every condition being equal) by dealing with members affiliated with this organization, and in addition to the benefits already defined, extending a special discount for cash payment on all transactions, this plan to be effective and operative only between members of this and its affiliated organizations who contribute to the possibility of its success.

Appointment of Committees

Following the adoption of the report, which embodied many changes in the organization, President Harris appointed the following committees:

Nomination of Officers—E. A. Roberts, Ohio, chairman; A. H. West, Maryland; W. H. Brereton, Iowa; Joseph T. Eilbacher, New Jersey; A. J. Fowler, Pennsylvania; A. Christe, Virginia; B. T. Pillow, Washington, D. C., and S. Hutzler, Richmond, Va.

Resolutions—John Trainor, Baltimore; John Atkinson, Philadelphia, and John R. Galloway, Washington, D. C.

By-Laws—I. H. Scates, Baltimore, Md.; John Trainor, Baltimore, and John R. Galloway, Washington, D. C.

The meeting then adjourned until Wednesday morning at 10 A. M.

WEDNESDAY MORNING SESSION

After calling the meeting to order, B. T. Pillow and A. F. West were appointed Sergeants-at-Arms, and reading of communications followed from the Pittston Builders' Exchange, Pittston, Pa.; Memphis Builders' Exchange, Memphis, Tenn.; San Francisco Builders' Exchange, San Francisco, Cal.; Wilkes-Barre Builders' Exchange, Wilkes-Barre, Pa., regretting their inability to send official delegates, but expressing their best wishes for the success of the convention. Business of an executive nature followed.

Election of Officers

The Nominating Committee presented the following candidates for election for the ensuing year:

President—John Atkinson, Philadelphia;
Vice-president—John R. Galloway, Washington, D. C.
Secretary—I. H. Scates, Baltimore, Md.
Treasurer—Alex E. Pearson, West Orange, N. J.

These officers were unanimously elected, after which a recess was taken until 3 P. M., when the newly elected officers would take formal charge of the convention.

We take pleasure in presenting in this connection the portraits of some of the newly elected officers.

Vice-President John R. Galloway is also President of the Inter-State Builders' and Traders' Association of Maryland, District of Columbia and Virginia; is treasurer of the Builders' and Manufacturers' Exchange of the District of Columbia, and is treasurer of the Na-

Group Picture of Delegates in Front of the Continental Hotel in Washington, the Headquarters of the Convention

Convention of National Building Trades and Employers' Association of the United States tional Electrical Contractors' Association of the United States.

Mr. Scates is secretary of the Builders' Exchange of Baltimore, which office he has most acceptably filled for the past six years, and for the past five years he has been secretary of the Inter-State Builders' and Traders' Association of Maryland, District of Columbia and Virginia.

Treasurer Alexander E. Pearson has been in business as a builder and contractor since 1900. He was elected secretary of the Master Carpenters' Association

Vice President, J. R. Galloway Secretary I. H. Scates

National Building Trades and Employers Association

of the Oranges, January, 1902, and re-elected each succeeding year. He was elected secretary of the Master Builders' Association of the Oranges (N. J.), comprising master carpenters, masons, painters and plumbers, in February, 1903, and re-elected each succeeding year. He was elected secretary of the Master Builders' Association of New Jersey in May, 1903, and re-elected each succeeding year, but resigned in January, 1911, for lack of sufficient time to give to the Association. He was elected secretary of the National Association of Builders' Exchanges at its convention in Scranton, Pa., January 15, 1907, re-elected at the convention held in Washington, D. C., in 1908, re-elected at the convention held in New York City in 1909; held over in 1910 and re-elected at the convention held in Philadelphia in 1911. He was elected vice-president of the Master Builders' Association of New Jersey in January, 1912.

Franklin M. Harris, Jr., of F. M. Harris & Company, contractors and builders, Philadelphia, is a past president and now a director of the Philadelphia Builders' Exchange. He is a past president and now a member of the Executive Board of the National Building Trades' and Employers' Association of the United States.

WEDNESDAY AFTERNOON

President Harris formally called the afternoon session to order and thanked the members for the assistance given him during the past year and during the various session of the convention, and concluded by introducing John Atkinson, the president-elect, who made a brief address, saying in part that his election came as an entire surprise to him and he thanked the delegates for the honor conferred upon him. He asked for the hearty co-operation of the members of the association. "Don't feel," he said, "that now that the convention is over the work is done. The officers want the best thoughts and effort of the members to help them in their work. A good beginning has been made toward making this National Building Trades organization the most important organization of its kind. The work must be kept up as there is a glorious future ahead."

Vice-president-elect John R. Galloway was then presented and expressed his thanks for the honor bestowed upon him. He stated that the president had fully expressed his views and he looked forward to a most successful organization.

Secretary I. H. Scates was formally introduced and made a brief speech of acceptance of the office of secretary to which he had been elected. He thanked the Association for its confidence in him and pledged his best efforts for its success.

Treasurer-elect Alex E. Pearson, in accepting the office of treasurer, said that the work of the Association was near and dear to him and that he would do all in his power towards its success.

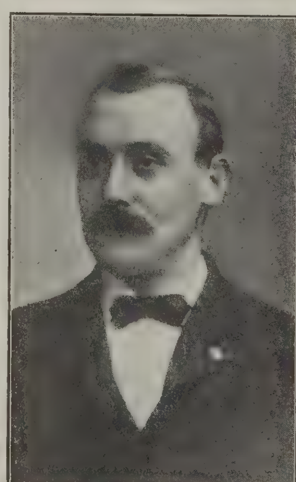
The past president, Franklin M. Harris, Jr., who automatically, under the new organization plans of the Association, becomes a member of its Executive Board, was then given a unanimous vote of thanks for the services he had given the association as its presiding officer during the past year.

Commissioners

A recess of thirty minutes followed, after which the Executive Committee of the Association announced the appointment of C. A. Shuster, Cleveland, Ohio, as Commissioner from that State. Commissioners representing Iowa, Maryland, Virginia, Pennsylvania and the District of Columbia will be appointed after names are suggested by Exchanges in those States.

Resolutions

Resolutions thanking the Reorganization Committee for the work done by it during the past year were unanimously adopted, as were also resolutions empowering the Executive Board to receive funds, applications for membership and dues during the ensuing year, elect members and transact business under the plan of the Reorganization Committee as adopted, pending the



Treas. Alex E. Pearson Director F. M. Harris, Jr.

National Building Trades and Employers Association

preparation of the new by-laws of the Association. The Executive Board was also empowered to select a time and place for the holding of the next annual convention. After a general discussion of matters of interest to the Association, adjournment to meet at the call of the Executive Board was taken.

Delegates in Attendance

The delegates attending the convention included:

Joseph F. Eilbacher,	Elizabeth, N. J.
W. H. Dennis,	Bradford, Pa.
F. J. Barriscale,	Scranton, Pa.
A. J. Fowler,	Scranton, Pa.
Charles Elmer Smith,	Philadelphia, Pa.

Henry Franklin,	Baltimore, Md.
W. E. Peck,	Baltimore, Md.
Edw. F. Lamb,	Norfolk, Va.
E. L. Myers,	Norfolk, Va.
Wm. H. Van Sickel,	New Brunswick, N. J.
A. Christe,	Norfolk, Va.
C. J. Bergen,	New Brunswick, N. J.
Wm. E. Leary,	New Brunswick, N. J.
John R. Galloway,	Washington, D. C.
S. Hutzler,	Richmond, Va.

Convention of National Building Trades and Employers Association—View of the Library of Congress as Seen from the Capitol—One of the Points of Interest to the Delegates

H. W. Stamper, Jr.,	Richmond, Va.
John Atkinson,	Philadelphia, Pa.
F. M. Harris, Jr.,	Philadelphia, Pa.
Alex E. Pearson,	West Orange, N. J.
H. H. MacClellan,	Baltimore, Md.
S. F. Bennett,	Baltimore, Md.
Arthur F. West,	Baltimore, Md.
P. J. Cushen,	Baltimore, Md.
F. C. Bayne,	Baltimore, Md.
W. J. Welliner,	Baltimore, Md.
Chas. W. Grant,	Baltimore, Md.
E. A. Roberts,	Cleveland, Ohio.
J. C. Drever,	Richmond, Va.
John J. Kelly,	Baltimore, Md.
J. J. Dodge,	Baltimore, Md.
J. Henry Smith,	Baltimore, Md.
J. Albert Link,	Baltimore, Md.
I. H. Scates,	Baltimore, Md.
W. H. Brereton,	Des Moines, Ia.
Hugh D. King,	Bloomfield, N. J.
B. S. Pillow,	Washington, D. C.

ENTERTAINMENT

The attending delegates were extended an invitation by the Builders' and Manufacturers' Exchange of Washington, D. C., to attend the annual smoker and entertainment of the Association, which was held in the Builders' Exchange Rooms, Masonic Temple Plaza, on Tuesday evening, February 27. George E. Potter, chairman of the committee, introduced John R. Galloway, president of the Interstate Builders' and Traders' Association of Maryland, District of Columbia and Virginia, who made a brief address of welcome and extended the keys to everything belonging to the Association to the visiting delegates. E. C. Graham, vice-president of the Builders' and Manufacturers' Exchange, then made a brief address, after which an elaborate vaudeville program was given, followed by a luncheon. The latter was somewhat interrupted by a feature not on the program, fire breaking out in a garage located on the first floor of the Exchange, which, while it might have been serious, was extinguished without great damage, but interrupted the luncheon.

At the same time the ladies attending the convention were entertained by the Washington Exchange at a luncheon and vaudeville entertainment in the Fredonia Hotel, adjoining the Exchange, which was to have been followed by a dance, but this was also interrupted by the fire referred to.

The committee of the Washington Exchange in charge of the arrangements for the entertainment was composed of George E. Potter, chairman; Ernest Gichner, L. J. Bombardier, W. J. McCarthy, B. K. McCloskey, James Darnell and B. T. Pillow.

On Wednesday afternoon the ladies participated in a sight-seeing automobile trip, visiting the various points of interest about Washington.

The Annual Banquet

The annual subscription banquet of the Association was held in the Continental Hotel on Wednesday evening. Covers were laid for fifty, and the ladies in attendance made up nearly one-half of the total number. John Trainor, Baltimore, Md., acted as toastmaster and made a brief address of welcome, in which he took occasion to congratulate the members on the large representation of ladies present. Brief addresses were made by Walter D. Nolan, who referred particularly to the benefits obtained by Association work. James A. Emery responded eloquently to a toast to the ladies. John R. Galloway, vice-president of the Association, made a brief but interesting address. The toastmaster then introduced I. H. Scates, secretary of the National Association, paying a high tribute to his successful efforts for the welfare of the Association, not only during the convention but also during the past year. Mr. Scates in response asked that credit be not given him alone, but also other members of the Association who have had its welfare at heart and have given time and effort to the interest of the association, which has been so generally approved by the delegates in convention. He referred at length to the attendance of the many ladies at the banquet, and expressed a wish that they would again grace the occasion of the next annual convention with their presence.

The Capitol at Washington—Another of the Points of Interest Visited by the Delegates

The Builders' Exchange of Worcester, Mass., held its annual banquet February 22, with 200 in attendance.

Forms for Reinforced Concrete*--III.

Notes on Construction--Removal of the Forms--Re-Making Forms--Effect of Design of Forms on the Labor Cost

By Frederick W. Taylor and Sanford E. Thompson

HOWEVER carefully the forms are designed, the chief points in economy lie with the constructor in the field, the organization of his men, and the methods he employs in making up, erecting and removing the forms. A thoroughly organized job requires a planning department and, in advance, an exact layout of the work.

Marking Sections of Forms.—Whether made up at the saw mill where the lumber is purchased, the saw mill on the job, or by hand labor, the sections should be marked distinctly to designate their position in the building.

A system of marking by combination of letters and figures is convenient to save the labor of writing words.

Form Sections.—The construction of forms is simplified by the necessity of dividing them into units or sections. For example, the side of a column is a column unit and this differs in construction from the beam unit or the slab unit. The work on each of these units is necessarily divided into making, handling, erecting and removing, so that the work naturally divides itself into definite operations.

With a systematic layout the next step in the future will be to establish a time for performing each operation so that the men may be paid in accordance with the task which they accomplish. This will eventually result in an immense saving in cost of construction, and at the same time give higher wages to the carpenters and laborers.

Organization of Men.—The difference between a fair profit and an actual loss may easily lie between a good superintendent and a poor one. Whatever the ability of the superintendent, however, the speed and quality of the work are improved by insisting upon a definite organization, systematized so that each carpenter and each gang of laborers has definite work to do and with jobs following one another in definite order.

With this in view the carpenters should be divided into small gangs, usually consisting of one or two men each.

Each gang should repeat the same work over and over. They may: lay out the work; make one kind of form unit repeatedly; set columns; brace columns; set posts; set girders; attach end of girders to columns; set beams; attach end of beams; and so on.

Different designs require different arrangements, but the different operations should be arranged in sequence so that one gang will follow directly upon another and yet not interfere with it. The time required by the different gangs should be as nearly alike as possible. Some parts of the work may require a gang of two men, other parts two gangs of two men each, while some operations can be performed most economically by a single carpenter. In some cases if one gang has harder work to do it may be started considerably ahead of the gang doing the next operation, so as not to interfere with it.

The principle is to get each man accustomed to and expert in his work, to give each man a definite thing to do, and finally to let each man feel that he must work steadily in order to keep up to the gang ahead of him or out of the way of the gang behind. In order to carry this out to the best advantage, Mr. Thompson has adopted in construction work a system similar to that used so successfully in scientific management in shop work. The work of each man is planned in advance and the lumber and materials are routed to him so that no time need be wasted. This in itself has been found to effect a great saving in labor cost.

Laborers' Work.—Laborers should not make forms nor set them up. They should carry and hoist all the materials, bring the sections per unit to the carpenters, provide the carpenters with bracing lumber, blocks and wedges, and do most of the work of form removal.

To do this, the laborers, like the carpenters, must be organized and under the supervision of one or more first-class bosses. On a small job much of such labor work falls to the concrete gang. These men unless watched every minute or given a definite task, will be apt to work simply to kill time, and will take three or four times longer than necessary on miscellaneous jobs like carrying form lumber. It has been found practicable to plan the work of the labor gang moving material in a manner similar to that employed with the carpenters.

Under ordinary management from 5 per cent. to 10 per cent. can be saved in labor cost of form construction by giving laborers the work outlined above. With scientific management the saving is still greater.

Mill Saw.—If the total cost of the concrete on the job (labor and material) is over $20,000, a circular swing arm saw and a table saw on the job will be economical. For a large job a planer and a boring machine should be added. On small jobs the men who run the saw can work on other jobs when not busy. To properly operate a saw mill means the layout of the work in advance according to definite plans and the careful marking and piling of the pieces sawed.

Raising Saw from Story to Story.—If the saw is run by a motor it can be raised from story to story so as to permit the remaking of the forms on each floor or every other floor as the case may be. This avoids the cost of lowering the forms to the ground and hoisting them again.

Staging.—Men will do more work and do it easily with planty of staging.

Sometimes it is economical to build a wide staging on the level of each floor to avoid extra travel and interference with the work.

Stairs should be built at an angle not steeper than 45 deg. Staging and runs should be built with enough headroom to allow men to walk without stooping.

Ladders should have a slope of about 2 ft. horizontal to 4 ft. vertical. A good design of a ladder for construction work is shown in Fig. 1 of the sketches.

Making Up Forms.—Plans if provided, should be followed exactly or else altered with the approval of the builder before work on them is begun.

Sections to be used over and over must be securely nailed. On the other hand, all joints that are to be taken apart should have as few nails as possible. The sheathing of wall forms, for instance, if to be removed board by board, requires only enough nails to take out

*This article is adapted by the authors for the *Building Age* from a chapter in their forthcoming book, "Concrete Costs."—

the wind of the boards and hold their own weight till the concrete is placed.

Accurate Measurements.—One of the difficulties in form construction is in setting the forms true enough to line and level to avoid a lot of subsequent labor straightening and adjusting. This trouble is largely due to inaccuracies in making up the forms. If the widths of the column forms are exact and the beam forms are cut to exact length, the wall columns must come plumb and true. Accuracy in level is somewhat

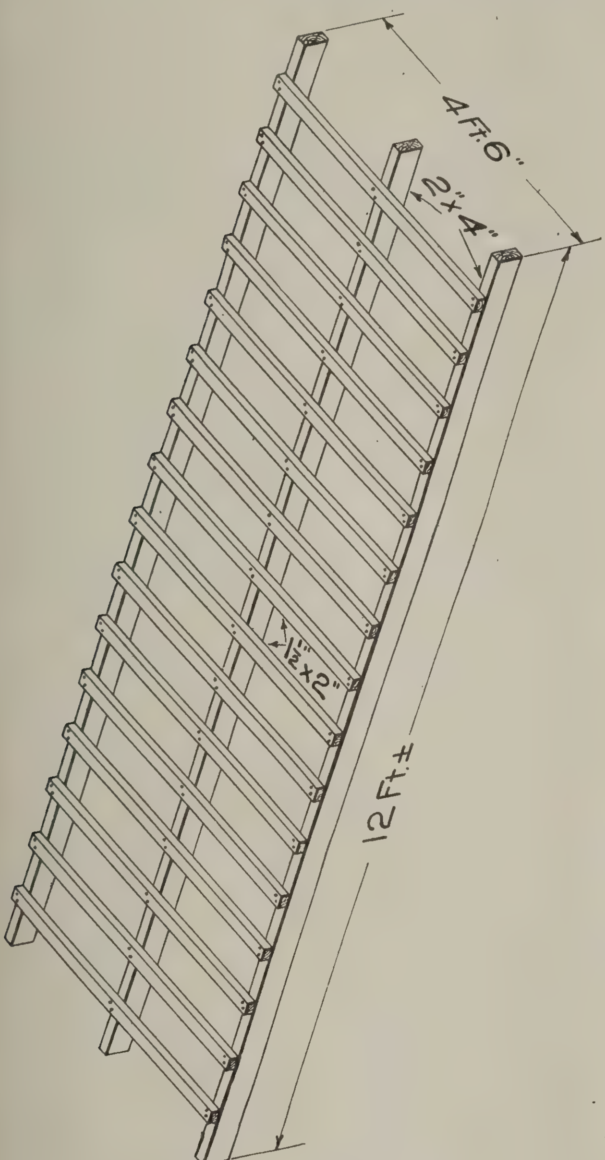


Fig. 1.—General View of a Construction Ladder

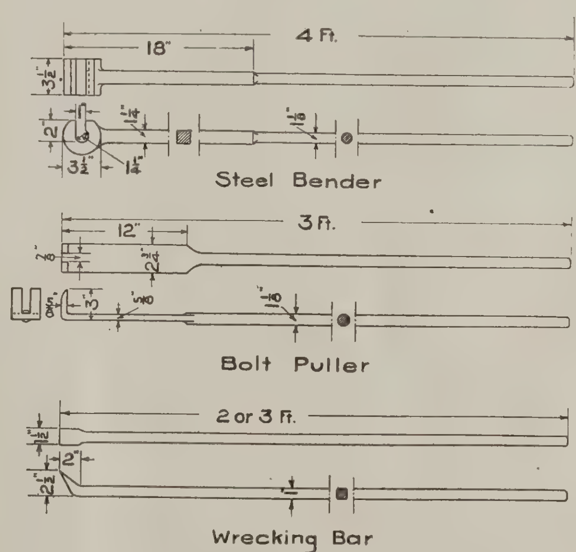


Fig. 2—Tools for Removing Forms and for Bending Steel

Forms for Reinforced Concrete

more difficult to obtain if the forms are set upon concrete which is not absolutely smooth, and, in such cases, they must be brought up to line and level by wedges.

Good vs. Poor Carpenters.—In accuracy of workmanship the difference between the good and the poor carpenter is manifest. Cheap skilled labor is always expensive, and because form construction is necessarily somewhat rough and temporary, there is a tendency to think that any carpenter is good enough. Just the reverse of this is true, because the poor man will take more time and material to construct the forms and then his work will require more labor after it is set. Of course it is possible to go too far to the other extreme, for example, a carpenter who is simply skilled in cabinet work will spend too much labor on parts that can be simply done with a saw and hatchet. Nicely planed joints are an absurdity on form construction.

Alignment of Forms.—The exact locations of the columns are first marked on the floor. The forms must be set true and plumbed vertical, the beams must be without winds and level or with the required camber and the slabs must be level and true. In some cases, especially in a large building, labor is saved by leveling up the forms with an engineers' leveling instrument.

If much time elapses after erection of the forms before concreting, the lines and levels should be checked to see that the forms have kept their shape.

The details of construction should receive careful attention. See that nuts are tight on the bolts; wedges securely driven and tacked with a nail if necessary; wire ties taut; bolts greased; and spacers between wall forms removed before concreting. Tie bolts should not be run through walls near corners or the concrete is in danger of being cracked when they are drawn; joints in forms should be tight enough to prevent leakage of cement, as any leakage will tend inevitably to form pockets of stone or coarse sand on the surface of the concrete.

Camber.—When a load is placed upon any structural material like a beam, the stresses cause it to bend or deflect a little. In forms there is a slight movement, due to the adjustment of the wedges under load and the compressing of the lumber, so that it is advisable to raise the beam forms slightly higher in the center than at the ends. A rough rule for this is to assume a deflection of the forms and of the finished concrete equal to ¼ in. in every 10 ft. of length.

Bevel or V-strips.—The bevel strips or triangular pieces, whenever possible, should be fastened to the forms when making, instead of leaving it to the erection gang.

Wedges.—Always drive wedges in pairs to give an even bearing.

Forms Strong but Not Too Strong.—A foreman will frequently say that to be on the safe side he will put in an extra set of posts or braces. This is proper if there is any doubt, but such things are really a matter of design, and the number of posts can be determined by figuring.

Forms should be well braced, but the braces should be designed to resist all tendency to slide and may be useless if put in without thought.

Nailing.—Where the pressure of the concrete tends to tighten the joints or where the tightness is assured by clamps, nails may be only partly driven, which leaves the heads projecting so that they can be easily drawn.

A special form of double headed nail designed for easy drawing is now on the market.

Anchoring for Upward Pressure.—Liquid or semi-liquid concrete will produce an upward pressure when pouring under horizontal or incline forms. An example of this is in a flaring column footing. Such inclined forms must be fastened to prevent their lifting.

Straightening Forms When Pouring Concrete.—Many builders detail one or two carpenters to see that forms are not thrown out of true as the concrete is being poured. This is good practice, but at the same time it must be impressed upon the carpenters that it is absolutely wrong to straighten forms after the concrete has begun to dry out or stiffen . Common sense should teach this and yet the authors have known good house carpenters to line up wall forms the day after the concrete was poured. Of course the concrete cracked so that it had to be removed.

Time Lost in Holding Forms.—Much time is wasted unnecessarily in form construction by one carpenter holding a form while another nails or saws. On one job, for example, a job fairly well organized, 40 per cent. of the total time of carpenters erecting a column form was occupied in holding the sections in position.

Oiling.—Forms should usually be oiled before the forms are set in place, by laborers and not by carpenters. By using not a grease but an oil, like crude oil, which is a petroleum product, it will soak into the wood and the forms will not be too greasy to handle.

If the surface of the concrete is to be plastered, the forms must not be oiled but instead must be thoroughly soaked with water. Sometimes even oiled forms require wetting on hot days to prevent shrinkage. In freezing weather forms should not be wet.

Cleaning Forms Before Concreting.—To remove shavings and dirt, clean-out holes must be left at the bottom of wall forms and column forms. For cleaning beam and slab forms a steam hose or a fire hose may be economically used. This should be done by the concrete gang and not by carpenters.

Be sure to close these holes before concreting.

REMOVAL OF FORMS

The best gang for removal of forms consists of a gang of laborers under the control of a labor boss and large enough to just keep the carpenters busy.

The forms should be set in the first place so that they can be taken down without the use of a sledge or heavy bars, which are liable to break the forms and injure the concrete. Notes have been given already on methods of making which will facilitate the removal.

Tools for Removing Forms.—Special tools should be made up for removing forms, so as to perform the work quickly and with as little injury as possible. A bolt puller and a wrecking bar are illustrated in Fig. 2.

Cleaning Forms After Removal.—Forms must be cleaned before rebuilding. Concrete which sticks to them can be removed most easily immediately after they are taken down.

If a section of forms has been badly oiled so that the concrete sticks once, a rough surface is left on the lumber and it is difficult to prevent sticking when the forms are used again.

Remaking is one of the largest items of cost, and there is in it the greatest opportunity for waste of labor and material. The ease of remaking depends to a large extent upon the original design and upon the care in the first erection.

Economy in form construction depends in large degree upon the design, and the labor of construction upon the type selected. In order to present times and costs of form construction that can be used without question, therefore, it is necessary to show very clearly the methods and details of design on which they are based. By our methods of unit time study it is possible to indicate, in many cases, which is the most economical type; or to show that the difference between different types is so slight that a man may select that which best fits the job under consideration.

Obligations Under Building Contracts

It has been decided by the Kentucky Court of Appeals that where a building contract was silent as to the quality of material and workmanship, an obligation on the part of the builder to use reasonably good and suitable material and reasonably skillful workmanship in constructing the building would be required by law. In an action for breach of a building contract for alleged improper construction, the owner's measure of damages is the difference between the value of the building when constructed and what its value would have been if constructed according to contract, and with reasonably sound material and reasonably skillful workmanshiu.

In an action for breach of a contract for the construction of a warehouse, the builder was not liable for the breaking down of the structure if caused by the owner's unreasonable overloading thereof. Where the owner of a warehouse accepted it as a sufficient compliance with the terms of the contract after full examination, with knowledge of the kind of material used and the workmanship exercised in its erection, he could not recover as for a breach of the builder's contract on its subsequent breaking down. Taking possession of the building by the owner does not constitute a final acceptance thereof as between the owner and the contractor, unless intended as such.

Bungalows in Cold Climates

A Pacific Coast architect of wide experience, in discussing the growing popularity of the cozy-cottage type of building commonly designated as the "Bungalow," sees no reason why the California bungalow is not perfectly adapted to all the needs of the people in colder climates. It is true, he points out, that bungalows as built in California would never keep out the cold when the mercury is at zero, but the idea to be emphasized is that California bungalows with certain minor modifications can be and have been made to fill every requirement of the coldest parts of the country.

In order to accomplish this the floors should be made double with a good thick layer of paper between; the walls should be sheathed solid and covered with building paper, and in some cases they could be back plastered or in some other way dead-air spaces be produced, thus adding to the security of the insulation. All joints should be made close and window frames should be tightly fitted.

An original and comprehensive treatment of the subject of silage and silo building, with special emphasis upon the advantages of economy of building silos of concrete, is embraced within the covers of a booklet entitled "Concrete Silos" which is being distributed by the Universal Portland Cement Company, Chicago, Ill. In addition to much general information on the subject, the booklet gives detailed instructions for making forms and for laying out and erecting concrete silos, the increasing use of which is apparent to even the casual observer traveling through the Western country.

Moving and Remodeling a Railroad Station

A Very Unique Operation--The Preparatory Work--The Blocking and Runways--Power Used for the Moving--Various Stages of the Work Attractively Pictured

By Hee H. See.

THE house movers business is for the average citizen losing its novelty, due no doubt to the fact that the moving of a building, whether it be large or small, is nowadays of common occurrence; but the work about to be described in this article should have interest, if for nothing else than an illustration of the liberties the present generation will take in the remodeling of a building. In Fig. 1 of the engravings is shown the ground plan of a railroad passenger station with the shape of the roof indicated by the dotted lines. Fig. 2 is a cross-section taken on the line A-B of the plan, but not showing the counter. This drawing also represents a cross-section of the roof dormers, the position of which was omitted from Fig. 1 in order to avoid a complication of lines.

This building was to be moved endwise a distance of 800 ft., taken sideways across four railroad tracks and then turned at an angle so as to fit equally in the corner of the "wye." After that it was to be cut in two parts, a portion 20 ft. long was to be added to the center and the arcade continued around all four sides. Numerous other changes were also to be made, and an examination of Fig. 6, which represents a ground plan of the remodeled building, will indicate what some of these changes were. Such changes as were made in connection with doors and windows are not shown, although some of them may be readily discernible in the pictures which accompany this article.

Much larger and heavier buildings than this have been moved, but one of a more inconvenient shape for moving it would be difficult to find. Notice, fellow workmen, the intelligent (?) roof bracing indicated in Fig. 2. The ceiling joists do not run through, but are joined on the front wall. The arcade, or porch, as some would call it, is 14 ft. wide, and it can easily be seen that if in moving the building the two walls and the outside of the arcade where the columns are located are not kept level the roof will break apart at the ridge.

The columns of the arcade were of wrought iron pipe 10 in. in diameter. Portions of the bottom ends of these pipes had been split and turned at right angles, forming lugs to hold the pipes or columns, as we will now call them, in the concrete piers. The columns were imbedded in the piers for a depth of 6 in. and were filled with concrete to a hight of 6 ft.

The bases of the columns were for ornament only; they were of cast iron in two pieces and had been bolted around the columns after the latter were in place, the bolts passing through lugs on the interior of the castings. The caps of the columns were fixed in the same manner.

The removal of these caps and bases was the first work done, after which temporary struts were placed to take the weight of the roof and the columns were taken down, the tops of the concrete piers being broken away with sledges and heavy chisels. Five timbers, each 12 x 12 in. in cross section and 40 ft. in length, were then placed beneath the building in trenches that had been dug for their reception. It was impossible to so space these timbers that they would carry the ends of the floor joists and the ends of the beams of the arcade, so they were placed to suit the floor joists, 6 x 10-in. timbers being placed on top of them at their outer ends and a number of 3 x 8-in. studs or struts cut in between the 6 x 10-in. timbers and the beams of the arcade. The ends of the arcade that projected beyond the length of the main building were carried on

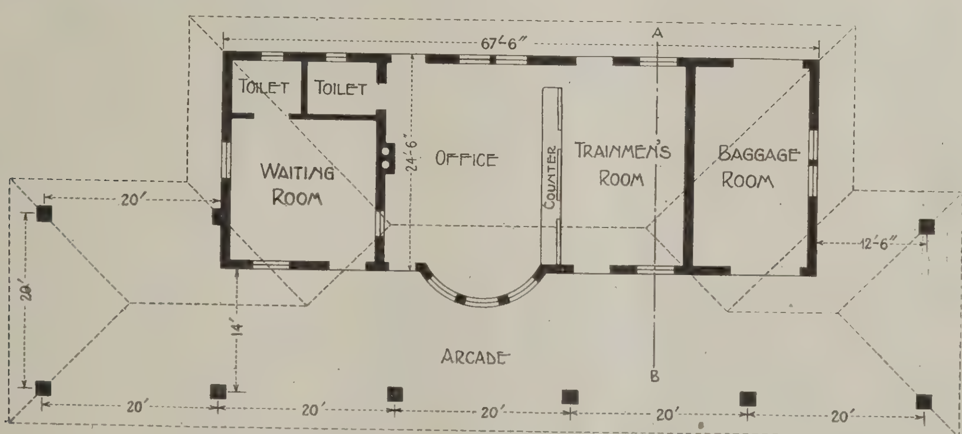


Fig. 1—Ground Plan Before Removal—Scale 3/64 in. to the foot

Moving and Remodeling a Railroad Station timbers placed cantilever fashion on top of the 12 x 12-in. cross timbers. The struts at the ends of these cantilever timbers were set in with screw jacks, which sprung the ends of the timbers down until the roof lifted a little, thus avoiding the possibility of the timbers sagging when the weight of the roof came on them. Braces were also used at this point to assist in carrying the weight. The entire arrangement is well illustrated in Fig. 3 of the pictures.

Most of this preparatory work was done while the building was still in service. A temporary station was then constructed of 1 x 10-in. rough boards, and while the office force was moving into it—which on account of the telegraph wiring, station records, etc., occupied the space of two days—the concrete foundation was put in at the new location. Holes for the 12 x 12-in. under the 12 x 12's on which the rollers were to run. These upper 6 x 10's had to be blocked from the building every few feet to make them stiff enough to carry the weight. All of the material was stock sizes, nothing being especially ordered. The power used for the moving was at first a four-fold block and tackle and a capstan, such as is used on sailing craft for hoisting the anchor. The continuous marching round and round this capstan is by no means a pleasant sort of work, and after the first day the capstan was replaced by a single cylinder hoisting engine, which is known locally as a "donkey" engine. This was a vast improvement, for it not only left several more men free to tend to the rollers, but the engine had always a surplus of power that would move the rollers over any uneven places in the runways. One of the men who had not

Fig. 3—View of the Building After It Had Been Moved a Little More Than its Own Length

Fig. 4—An Incident of the Second Day's Moving Operations

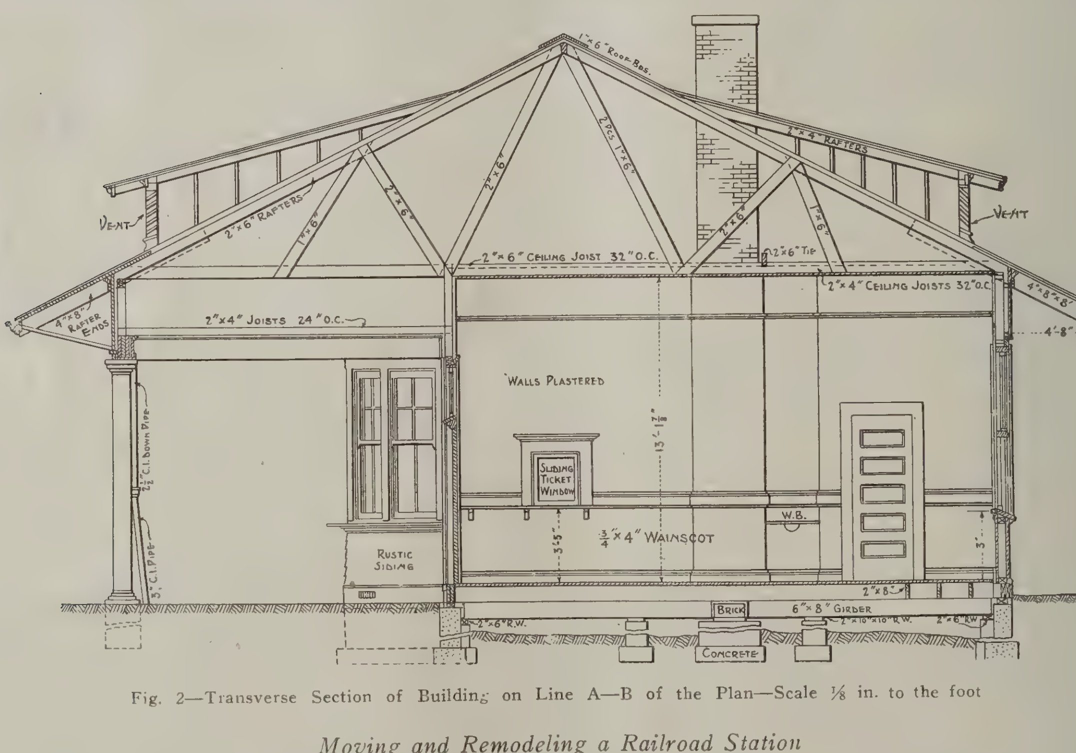


Fig. 2—Transverse Section of Building on Line A—B of the Plan—Scale ⅛ in. to the foot

Moving and Remodeling a Railroad Station

cross timbers were left in the concrete walls so that the building might be lowered into place without shifting the timbers, both while the building was in one piece and after it had been cut in two and spread apart. These holes can be seen in some of the pictures here presented.

After the office force had left the building the chimney was torn down and the building raised with screw jacks high enough to get the rollers and runways under it. Three runways were used, each formed of double rows of 6 x 10-in. timbers laid on the ground with other 6 x 10-in. timbers lengthwise of the building had his turn at the capstan remarked that the donkey engine had the "capstan donkeys beaten to a frazzle." The picture shown in Fig. 3 was taken at the end of the first day's work after the building had been moved a little more than its own length.

In Fig. 4 is pictured an incident of the second day's moving. There was a large palm tree directly in the path of the building, being also shown at the farther end of the station in Fig. 3, and while we could have taken the building around it, the idea had been conceived of moving the palm to the new site along with the building. The picture shows the wrecking crane in the act of picking up the palm which it may be stated is over 3 ft. in diameter and about 30 ft. high. A trench had been dug around it so that a wad of earth 10 ft. in diameter came up with it, and the pull on the crane before the roots finally gave way was considerable. The pieces of timber that can be seen on the trunk of the palm were, of course, used to prevent the cable cutting it. Enough time has elapsed since the palm was

Fig. 5—Appearance of Building When Crossing the Railroad Tracks

6 x 10-in. lengthwise timbers were taken out and the rollers placed directly under the 12 x 12-in. cross timbers. The building was wide enough to block up four railroad tracks and had to be moved a little more than twice its width from the time we came foul of the first track until we were clear of the last one. We had the tracks blocked a little over 30 minutes, and thought we had done pretty well. Of course we had the five runways to lay down and pick up again in that time. In Fig. 5 the building is shown as it appeared when crossing the tracks.

In Fig. 8 the building is shown as it appeared on its new foundations. In this picture the building has been cut in two and the extra cross piece placed ready for spreading the two pieces apart. An incident occurred in the cutting of the building that is perhaps worthy of mention. There are few carpenters who are pleased to hear or feel the teeth of their hand saws rasping on a nail, and when the workmen first began cutting there was a good deal of tentative fiddling with the point of the saw and

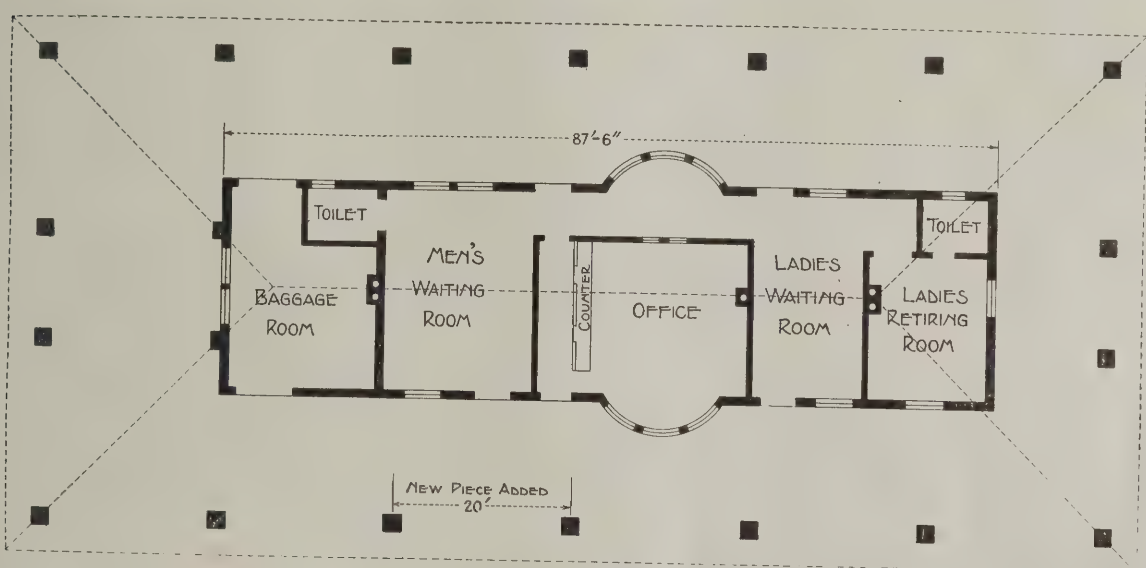


Fig. 6—Ground Plan of Railroad Station After It Had Eeen Remodeled—Scale 3/64 in. to the foot

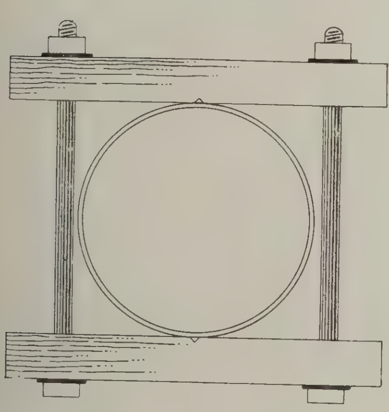


Fig. 7—Clamp on Column to Which Braces Were Nailed—Scale 1½ in. to the foot

Fig. 8—Appearance of Building on Its New Foundations

Moving and Remodeling a Railroad Station

moved to prove that the transplanting was in every way a success, the palm at the present time being, if anything, in a more flourishing condition than ever.

With the palm out of the way the work progressed rapidly and we were soon up even with the new location. As the building was now to go sideways, the

subsequent cutting with wood chisels. Becoming tired of this the foreman took a hand saw from his own kit, and passing it up to one of the men, said emphatically, "I want you to take that saw and cut right down that line; stop for nothing; if there is a nail in the way, saw through it."

"If I don't," said the man, "I hope I may die."

"That's all right," was the reply. "Go to it."

The workman was as good as his word, and not only cut through the nails and plastering but also through four porcelain tubes and copper wires that had been part of the lighting equipment. It developed that although the first nail struck spoiled the saw for wood cutting purposes, it was still fit to cut a combination of wood and hardware and was apparently no worse at the completion of the work than it was after it had struck the first nail.

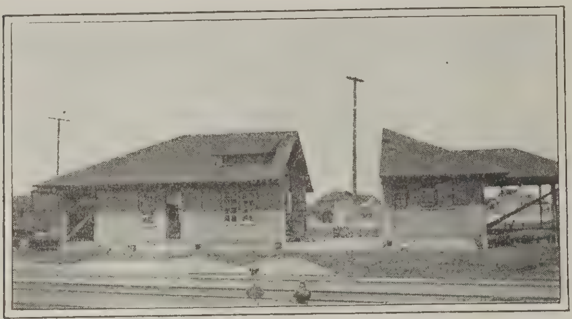


Fig. 9—Building Spread Apart and Lowered to Its Foundations

of that length and the attic of the building was not to be used for any purpose, we set up a plate above the walls of the building, making it the correct hight, and put up the rafters in two pieces. A portion of the plate already set up can be seen in the picture.

The dormer ventilator shown on this side of the roof we ripped loose in one piece and slipped it up and over to the other side before all of the short rafters were put in position. There it stayed until this side of the roof was ready for shingling, when we moved it back again and fastened it in position. This scheme saved us the building of a new dormer.

For our columns we made use of pipe, as the previous builders had done, and as all that held these pipes upright was the short distance they were embedded in the concrete piers, and as we could not wait until these piers were thoroughly set, it was necessary to brace the columns very firmly to prevent them from being knocked out of place and cracking the piers while we were placing the trusses and roof rafters on top of them. To provide a place on the columns for fastening the braces we clamped two pieces of 2 x 4-in. stuff about 16 in. long to the columns, as shown in the plan, Fig. 7, using two ¾-in. bolts to hold them in place.

The picture shown in Fig. 9 was taken from the same side of the building as Fig. 8, but from the other end. This picture shows the building spread apart and lowered on to its foundations.

The remaining pictures, Fig. 10 and Fig. 11, were taken from the same viewpoint as Fig. 8, and a comparison of these different pictures will show better than my pen can describe the several stages of the work and the appearance "before and after."

In the picture, Fig. 10, there is shown a number of points in the reconstruction, some of which will need explaining before they are quite clear to the reader. In the first place the old roof, being perfectly good, was utilized wherever possible as a portion of the new one. On the side of the building opposite to that from which the picture was taken short rafters were run from the top of the old roof to the ridge of the new one, the new ridge being set up on posts in its proper position. The common rafter of the new roof was approximately 32 ft. long, and as we had no material

Fig. 10—Showing Some of the Details of the Remodeling

Fig. 11—Appearance of the Finished Building

Moving and Remodeling a Railroad Station

The bolts were stock sizes and did not have to be especially ordered, so that this method was no more costly than nailing four pieces of board around the columns in the form of a box, which is a method more usually employed though not nearly so good.

The trusses were formed of 2-in. plank and were put together on the ground. The picture, Fig. 10, shows the method of raising them into place.

There is shown in Fig. 11 of the illustrations a picture of the finished building as it now appears, and I am quite sure the interested reader will agree with me that it is not a bad-looking job.

The plan views, Figs. 1 and 6, are both drawn from the side opposite to that from which the picture, Fig. 11, was taken. In Fig. 3 the chimney in the ladies' retiring room will apparently run up through the intersection of the hips with the ridge. To avoid that the chimney was given a slant in the attic space so that it came through between the hips, as can be plainly seen at this end of the building when looking at the picture shown in Fig. 11 of the group.

A movement is on foot looking to the organization of a Builders' Exchange at La Crosse, Wis.

Concrete Church of Novel Construction

Walls of Concrete "Poured" Lying Flat and Then Raised to a Vertical Position--A System Involving Unique Features

THE building which constitutes the basis of the present article is of "poured" concrete construction and embodies many unique features whether they be viewed from the standpoint of the architect, the builder or the concrete contractor. The finished appearance of the work is shown in the first of the half-tone engravings appearing upon this page, while an excellent idea is also afforded of the architectural treatment possible by means of the system employed in the erection of the edifice. The second half-tone view represents the interior of the church looking toward the end of the building shown in the first picture, the camera being placed at the chancel.

General Appearance of the Finished Building

On the following page the floor plans show the basement to be utilized as a large assembly room, beyond which is a kitchen and serving room, and beyond these in turn are the furnace room with the stairs leading up to the chancel. Extending along each side of the foundation walls is an area which affords ample light to the rooms on that level. The plan of the auditorium shows the arrangement of the pews and location of the warm air registers in the floor. It also shows the pastor's study, which has an outside entrance, the location of the choir, the pastor's reading desk, communion rail, etc.

The auditorium measures 38 x 71½ ft. inside the finished walls and has a double floor, the upper one being of straight grain ⅞ in. oak. The pews are of straight grain oak and "mission" finish. There are 60 pews in the auditorium with a seating capacity of 350. The chancel measures 15½ x 22 ft. and is finished in antique oak.

The assembly room measures 37 ft. 6 in. by 56 ft. 8 in. and has a 4 in. concrete floor overlaid with ⅞ in. pine flooring. The serving room has a floor of the same construction.

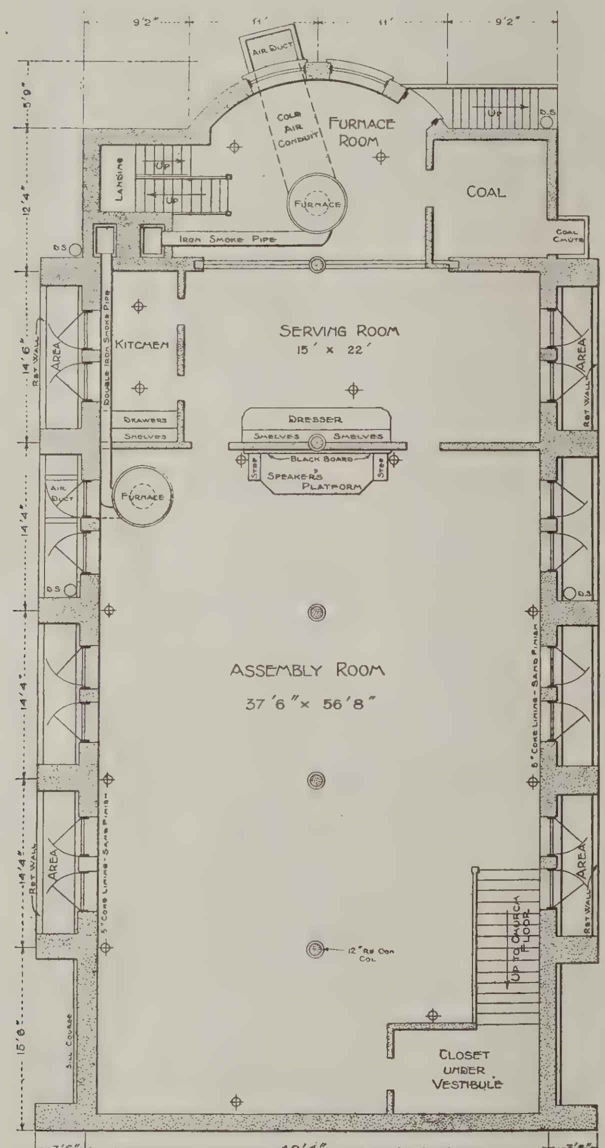
The unique feature in connection with the construction of this building, which is known as the Memorial Methodist Episcopal Church at Zion City, Ill., is the manner in which the walls were built. The work was done by what is known as the Aiken Flat Wall System, by means of which the walls were built in a horizontal position and then raised vertically into place. Previous construction systems have in almost all cases required that the walls be cast in their final position, and this has brought about many difficulties which while in the end being solved have in many cases been accomplished at an added cost that might have been avoided if it were possible to cast all parts of a building and add the surface finish while in a hori-

View in Auditorium Looking from the Chancel Toward the Ornamental Window in the Entrance Gable

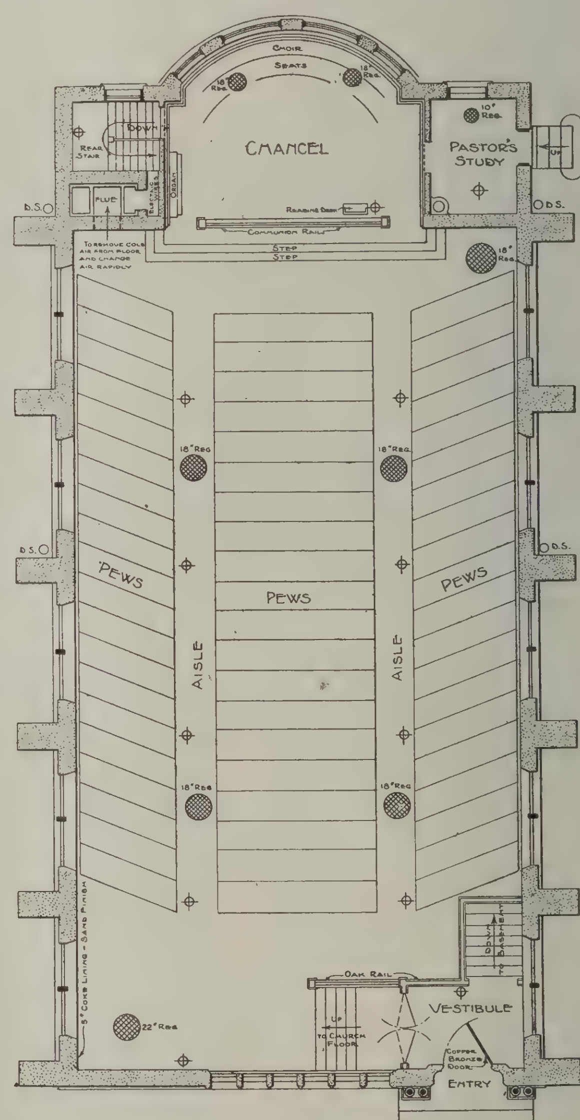
Concrete Church of Novel Construction—J. D. York, Architect zontal position. In the case of the Memorial Church at Zion City the foundations were first built as for any ordinary structure and on these or on piles inside of the building lot a series of jack screws were placed consisting of a supporting carriage, a pivoted steel walking beam or truss and a collapsible screw inside the jack and driven through a worm and gear. A platform of timbers was then laid on the walking beams, all as shown in the half-tone illustration upon another page, which shows the rear wall of the church being erected after it had been "poured."

All doors and window frames were then set in their proper relative position on the platform and the concrete "poured" around the frames covering the entire area of the wall to a thicknes of several inches. The than if it were on a vertical surface and requires the minimum of scaffolding to reach all parts. After setting 48 hours the wall is raised as a unit into its final position. This is accomplished by means of a small gasoline engine or electric motor belted to a shaft which engages a worm at each jack, thus insuring the raising of the wall without jar or strains due to unequal or irregular movements.

After all the walls of the building have been raised into position the joint between the wall and the foundation is pointed up and the corners where the reinforcement from both walls project are enclosed in forms. Concrete is then poured so as to lock the walls into a monolithic whole. Following the construction of the walls, the floors and roofs of concrete or any desired construction may then be placed in the same



Plan Showing Arrangement on Basement Floor



Plan of Auditorium Floor Showing Chancel, Pastor's Study, Choir, Etc.

Concrete Church of Novel Construction—Floor Plans

reinforcement was then placed and the remainder of the concrete "poured."

If an air space is required for heat insulation, for example, a thin reinforced inner concrete shell is cast, a 3 in. layer of sand laid on top and upon this the outer concrete shell, properly reinforced, is cast. The two shells are then securely bonded together by metallic hooks placed at short intervals. Upon raising the wall the sand is rodded out, leaving a clear air space.

When the entire wall is "poured," which may require a day for an ordinary wall, the finish is then applied. Being in a horizontal position it is more readily finished way as for other buildings. From the method of construction it will be seen that there are great possibilities in architectural decoration. For example, a close inspection of the last half-tone picture which shows the four walls of the church erected and the corners "poured" reveals some intricate decorative work that was cast separately in gelatine molds. After hardening it was placed in position on the partially poured wall and locked into place by the surface coat.

The advantages claimed for the system of construction used in this church are that the "forms," consisting of a simple platform and a series of jacks, are applicable to any number of successive uses; that an air space may be provided with little additional cost; that it is as easy to "float finish," trowel or "pebble dash" a wall as to finish a sidewalk, and that walls poured in this way have not the horizontal marks showing the joining of successive batches "poured" in the same or succeeding days.

The system of concrete construction used in the building of this church was that of the Aiken Cement

Erecting the Rear Wall of Church After the Concrete Has Been "Poured"

House Company, Peoples Gas Building, Chicago, Ill.

The contractors and builders were the Monolithic Concrete Construction Company, Chicago, Ill., and the architect was J. D. York, 1323 North Clark street, Chicago, Ill. For three of the half-tone engravings accompanying this article we are indebted to the *Bulletin* of the Universal Portland Cement Company, whose cement was used in the construction of the church.

View of Building After the Four Walls Had Been Erected and the Corners "Poured"

Concrete Church of Novel Construction

Instruction in Erecting Metal Ceilings

The erection of sheet metal ceilings is simplified for the man who is to undertake such work for the first time by the information presented on the cover which the Wheeling Corrugated Co. is using for a number of half-tone engravings 7 x 10 in. in size showing the different patterns of ceiling panels it can furnish with the borders, corners and filler that is used in connection with them. The cover mentioned gives full instruction for applying a metal ceiling from laying out the space to nailing up the furring strips for shallow and deep panels. Any competent sheet metal worker should find no difficulty in erecting a ceiling if he carefully reads and studies the drawings and the instructions which are given in this cover. They seem to cover every possible condition from the square room to the irregular shaped room or for covering a ceiling around the plate glass windows which as a rule run into the store on an angle. A series of questions are also presented which have a bearing on the work to be done and which must receive consideration. The information on the cover has been prepared with the idea of enabling a man to meet all ordinary requirements, but the company further states that it will be glad to give additional information where it may be needed.

Theatres Concentrated in Small Area

The places of amusement in the vicinity of Long Acre Square, New York City, continue to multiply and within an area of six city blocks there have been built or planned within the period of a year eleven theaters, the last being a $500,000 structure intended for erection on West 48th Street, about half the sum named representing the cost of the site, which is just west of Broadway, and now covered by five old-fashioned dwellings.

Prominent among the theaters which have been built or planned between 43rd and 48th Streets, Sixth and Eighth Avenues, are the Folies Bergère, Gaiety, Globe and Edward Rush Theaters in 46th Street, the Cohan in 43d Street, the Shubert and New Theaters in 44th Street, the Columbia at Seventh Avenue and 47th Street, the Playhouse in 48th Street and the Winter Garden, which replaced the old American Horse Exchange at 50th Street, Broadway and Seventh Avenue.

Convention of Canadian National Association of Builders' Exchanges

Sixth Annual Meeting Held in Toronto--Importance of Business Transacted--New Officers

REPRESENTATIVES of the leading Builders' Exchanges of the Dominion of Canada gathered in Toronto the third week in February for the purpose of attending the sixth annual meeting of the Canadian Association of Builders' Exchanges held in the city named. The convention developed the fact that an unusually keen interest is being manifested by builders, contractors and others in matters bearing upon the industries with which they are associated and the general run of the business transacted at the meeting was of a most important nature.

A feature of the first day of the meeting was a civic reception by Mayor Geary in the Council Chamber of the City Hall. The Mayor extended a cordial welcome to the visiting delegates and reply was made by President E. T. Nesbitt of the Association.

The President's Address

After the reception the delegates assembled in convention headquarters at the Builders' Exchange on Berti street, when President Nesbitt delivered his annual address. He reviewed at some length the work of the Association, emphasized the benefits to be derived from the gathering together of the membership, affording as it did an opportunity to discuss trade topics and exchange ideas touching various phases of the business.

The president was followed by George Gander, second vice-president of Ontario's new Provincial Association of Builders, which is a subsidiary to the parent body, and the purpose of which is largely the safeguarding of the master builders' interests in the enactment of all new legislation. Mr. Gander discussed at some length the subject of legislation in Ontario, all of which was closely followed by the members present.

An important feature of the meeting was the reports from various sections of the dominion showing the conditions existing in the building industry in those places.

Secretary Lauer's Report

Secretary-treasurer J. H. Lauer of Montreal in his report presented some very interesting details concerning the work of the Association and showed the progress that had been made since the Association was organized six years ago. He also referred to the relations existing between the builders and the architects and pointed out the need for uniformity in contract. This is a subject which is attracting widespread attention on both sides of the border and the feeling is growing stronger and stronger that more uniformity should exist in connection with contracts so as to avoid many of the annoyances which are constantly coming to the surface.

Technical Training

Dr. A. C. McKay, principal of the Technical School of Toronto, gave a talk on technical training in which he outlined the scope and aims of the two great branches of education—general or cultural and technical or vocational—pointing out that a generation ago the chief emphasis was laid on the former, while today the popular idea of education centered in the latter.

Election of Officers

The officers elected for the ensuing year resulted in the following choice:

President.........J. W. Morley of Winnipeg.
Vice-Pres.........George Gander of Toronto.
Secy.-Treas.......J. H. Lauer of Montreal.

Provincial Vice-Presidents

Alberta...........C. R. Frost of Edmonton.
Saskatchewan.....R. J. Lecky of Regina.
Manitoba.........W. J. Davidson of Winnipeg.
Ontario...........G. S. Gould of London.
Quebec...........John Quinlan of Montreal.

Calgary was selected as the place for the convention to be held next year.

Expressions of Appreciation

Retiring President Nesbitt was presented on behalf of the Association with a magnificent solid silver tea set as a token of regard and gratitude of the members. A further mark of esteem was in conferring upon Mr. Nesbitt the life rank of honorary president of the Canadian National Association of Builders' Exchanges.

The visiting delegates remembered the effective work of George Gander of Toronto in arranging for their reception by presenting him with a handsome oak banqueting chair.

The Banquet

The annual banquet of the Association was held Thursday evening, February 22, when something like 250 members and their friends were present. Fred Armstrong of Toronto was toastmaster and interesting remarks were made by a number of those associated one way and another with the building and allied industry.

Another Theatre for New York

The new theatre which is being erected in Forty-eighth street, just west of Broadway, New York City, has a frontage of 100 ft. and will have a seating capacity of about 1000 persons. According to Architect Henry B. Herts, 35 West Thirty-first street, the exterior will be of light terra cotta, and extreme simplicity both in design and color will be the basic motive of the artistic conception. The theatre will be more on the type of the intimate court theatres of the eighteenth century. The dominating color of the interior will be a simple tone of cream for the relief work, while the flat wall surfaces will be a very delicate electric blue. It will be known as the "Long Acre Theatre" and is expected to be ready for occupancy late in the fall. Above the theatre will be a story of offices and studios.

Nipa roofing in Manila's city limits must go, according to a resolution passed by the municipal board, which provides that in the districts of light materials only incombustible roofing material may be used. This step should provide a further opening for the sale of American roofing in the Philippines.

Raising a Large Brick Building

Brick Building with 21-Inch Walls Raised to Accommodate Stores on the Ground Floor

BY JAMES F. HOBART

THE description here presented relates to the raising some time since of a large brick building or block in an Eastern city, and while the methods used did not involve anything particularly unusual, the operation is of interest to all contractors who are called upon to do similar work. In the operations described the whole structure was raised from its foundations and a higher story built underneath it without developing a single crack or break in the entire building. It was known as the Central Block in Pittsfield, Mass., had 21-in. walls for the first or ground story and these were the walls which were removed and the remainder of the structure raised. Strictly speaking, the building cannot be said to have been raised from the ground, for it was not made appreciably higher. Really what was done consisted of removing the entire outer walls of the lower story and replacing the solid brickwork with a series of store fronts, supported upon brick pillars with trussed iron beams between the pillars to sustain the upper walls of the building.

The first step was, as shown by Fig. 1, the needling of the outer walls with 10 x 10-in. yellow pine timbers, although some 10 x 12-in. timbers were used, and placed, as shown, from 24 in. to 26 in. apart, center to center. The holes in the walls were cut with great care just large enough for the timbers to pass through, so as not to cut away more of the wall than was necessary.

The next step was the building of a substantial crib-work inside the building close to the wall and placing the needle timbers of 10 x 10-in. yellow pine timbers the entire length of the walls. These timbers were placed directly underneath the needles and close against the outer walls of the building. Fig. 2 shows the method of blocking, a solid cribwork of railway

Fig. 1.—"Needling" the Walls of the Building

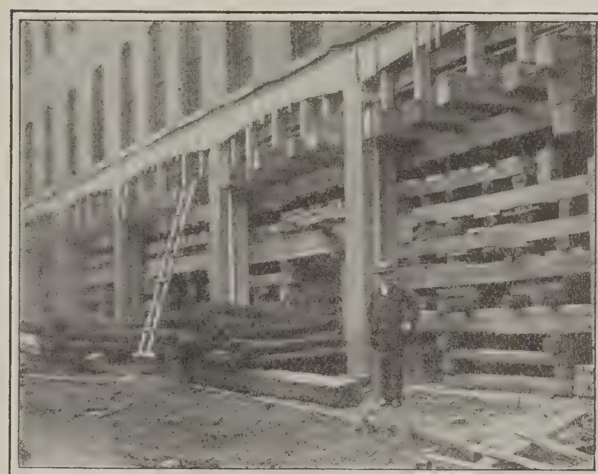


Fig. 2.—Showing Method of Blocking

Fig. 4.—A Detail Showing the Manner of Removing the Beams used as "Needles"

Fig. 3.—Arrangement of the Jack Screws

Raising a Large Brick Building

ties being placed lengthwise of the needles and long 8 x 8-in. timbers placed between the courses of railway ties. Thus the blocking was bound together at every layer with heavy lengthwise timbers, which served admirably to equalize and bind together the heavy blocking.

Directly underneath the 10 x 10-in. timbers under the needles the screws were placed. These were of the usual type employed by "house-jugglers"—a thick cast iron screw passing through a hole in a plank, the cast iron nut being bolted to the plank, which, when placed over two timbers, permitted the screw to pass down between the timbers into the cob-house blocking below.

The screws, as shown by Figs. 2 and 3, particularly by the latter, were placed about 2 ft. apart the entire length of the walls and these screws were all tightened until the walls of the building were carried upon the overhang of the needles. Screws were tightened until the walls were broken across between the needles and until a crack of uniform width showed between them.

The walls having been freed from the upper portion, all the brickwork below and between the needle beams was removed, leaving the building hanging upon the needles and upon the interior walls. Next the metal arches were prepared. These were to sustain the upper walls between the 21-in. columns shown by Figs. 2 and 3.

The metal arches are visible in Figs. 2, 3 and 4 and the manner in which the arches were constructed may be studied in each of the three engravings mentioned. It will be seen that the arch is made up of a cast iron compression member in the form of a flat arch, and to sustain the thrust of the arch, which must be considerable on account of the extreme flatness thereof, a steel tension member has been placed across the lower side of each arch, thereby greatly increasing the strength and making each and every arch self-contained and independent of heavy masonry to withstand the lateral thrust.

The building up of supporting arches in this manner is a pretty good idea. It permits a given load to be carried with much less weight of metal than is possible with all cast iron construction. By making use of a properly made design the steel member may be cast into the arch, thereby obviating the necessity of any machine work whatever, even the cutting of threads upon the rod so plainly shown in the several engravings, which form the tension members of the several arches.

Figs. 2 and 3 also give a clue to the manner in which the metal arches were put in place. The inside portion of the wall was first taken out, leaving the outer 8 in. intact. The arches were then placed in the wall and jacked up into position with considerable exactness. The floor joists were to be supported directly by the arches, and great care was taken to wedge firmly under each joist while the inside wall was being replaced on top of the arches, the outer wall being still supported by 8 in. of solid brickwork which had not been touched.

After the inside wall had become well set the outside courses of brick were removed, board forms covered with slats were placed fair with the front edge of each metal arch and the brick arches were laid in as shown by Figs. 2 and 3.

Fig. 4 shows the very simple manner in which the needle-beams were removed after the walls had set and the load had been again transferred to them. A chain was passed around each needle-beam and around the steel tension member just above each beam, then the entire blocking in a section between posts was removed and the beams were lowered one at a time by means of a small tackle, an intermediate blocking being left as shown to serve as a staging for the convenient handling of the heavy needle timbers.

It will be noted the engraving also shows that there was another cribwork of blocking under the inner end of each timber. In this engraving, as well as in Figs. 2 and 3, note the careful manner in which each and every stick of blocking was placed. There is not a single piece of all the hundreds of blocks, timbers and ties which is not placed exactly in vertical line with the timbers above or below. It is upon the careful piling of the blocking that the safety of the structure depends. Also the surety against cracking can only be guaranteed by a careful placing of the blocking.

In Figs. 2 and 3 there may be seen a lot of short posts or struts. In fact, there is one of these short timbers above each needle timber. The struts thus cut in above the needle timbers supported the very flat arch while it was green, and this was a bit of good engineering while the mortar was green in the flat arches in question. These arches have little more than their own weight to support, but the contractors declined to take any risk whatever as regards possible settling of these flat arches through squashing out of the mortar before that substance had time to become well set—hence the short struts which were so freely used above the needle timbers.

Building Materials in Japan

In the general mode of construction of a Japanese house the sills and heavy timbers are connected with a network of split bamboos, which is filled in with a cheap muddy cement. When dry, the outside walls are covered with clapboards, the inside walls being either smoothly plastered or finished with a well-grained wood. Another method is to board up the sides of the building, tack fireproof flat tiles about 8 in. square upon this and cover the whole with a good grade of cement or plaster. The roofs in cities are, with few exceptions, of fireproof tiles laid in cement over light shingles that have previously been covered with a cheap claylike cement, repairs being necessary after one or two years. Country houses are, as a rule, thatched, and with the "shoji," or paper-covered sliding doors, the cost is very little for material and construction. The better class of foreign-built buildings are now of artificial stone blocks or stone and brick. The Japanese are now building foreign-style office buildings almost without exception.

If a good fireproof wood were easily available and cheap enough to meet the demands of the Japanese, it might largely take the place of the present mode of bamboo-clay or plaster construction. It has, however, become an axiom with the Japanese that they build twice rather than put costly materials into their buildings, exceptions being the modern government buildings, both national and prefectural, and banks. The large majority of Japanese houses will continue to be made of the cheapest wood available, and, as often happens, a large part of a town may be suddenly burned out and be rebuilt within a few days. Plants for treatment of timber would have to be numerous and easily accessible, the cost of treatment to the builder very cheap, and large demands would have to be anticipated at any time.

Robert Harkness, for 19 years with the architectural firm of Samuel Hannaford & Sons, Cincinnati, Ohio, has resigned his position as secretary in order to become the treasurer and secretary of the Cincinnati Clay Products and Supply Company, with offices in the Johnston Building. Mr. Harkness, who is well known in building circles, has bought an interest in the company, and a meeting of the stockholders will take place in a few days in order to bring about a reorganization. He will be succeeded by H. P. Van Arsdall.

A Reinforced Concrete Factory Building

Flat-Slab System of Construction Adopted in Place of Beam and Girder Type on Account of Restricted Area

A TRIANGULAR shaped reinforced concrete building so treated as to possess an attractive exterior, architecturally considered, although the building is used as a factory, has recently been completed in Cambridge, Mass., and an excellent idea of its appearance may be gained from the accompanying half-tone engraving. The two upper floors are occupied by manufacturers of cigars, while the lower or ground floor is devoted to stores. On account of the restricted area a flat slab system of concrete construction was adopted in place of a beam and girder type. The flat slab system also was as cheap as a beam and girder, besides offering additional advantages such as simpler "form" work, lower cost of automatic sprinkler installation, better overhead shafting facilities etc. From the shape of the building it will be noted that a beam and girder system would have been very complicated.

The factory, as shown in the half-tone engraving, is three stories and basement in height with all floors and the frame of reinforced concrete, while the exterior between the pilasters is veneered with 4-in. red sand-struck brick. The longer side of the building is about 151 ft., while the shorter sides are 87 ft. and 132 ft. The lower floor is devoted to stores with entrance on Massachusetts Avenue. The entrance to the upper floors is by a stairway and an elevator in the right-angled corner of the building.

The general impression that reinforced concrete structures have a displeasing effect is being diminished by such structures as this factory building. The lines of the building are exceptionally well kept, the height seeming more than it really is, due to the continuation of the pilaster lines to the top. This is effected by means of corbels and small marble panels at the top. The entire width between the pilasters is taken up by the large window area beneath which is 4-in. brick veneering with concrete panels in the center and below each of the four respective windows. The entire cornice is of concrete, while a concrete coping rests on the 8-in. thick brick wall running around the top of the building. The artistic effect is excellent and the building is a very creditable addition to the community and would hardly be recognized as a factory.

A Reinforced Concrete Factory Building—Monks & Johnson, Architects, 7 Water Street, Boston, Mass.

The interior arrangement of the building has been planned for maximum efficiency. All of the floors are of 7-in. concrete, the first floor having a terrazzo finish. There are three rows of columns on each floor running parallel to the long side of the building with 18-ft. bays each way. The window area is about 75 per cent of the wall area, this being secured with windows 7 ft. 6 ins. high running up to the floor slab. The windows have wooden frames and sashes and are pivoted at the top, while the low portions are double hung. The general width of the window is 15 ft. 10 ins. An automatic sprinkler system is installed throughout the building. The columns, rectangular in cross section, vary from 20 ins. to 30 ins. in the basement and first floor to 16 ins. by 30 ins. on the second and third floors. The basement columns are reinforced by 12 1-in. diameter rods with ¼-in. hoops placed 12 ins. on centers. The reinforcement of the first, second and third floor columns consists of ¾-in. rods, 8 being in the first floor columns and this number decreasing by two for each successive floor. Hoops ¼-in. diameter are also used spaced similarly to the basement columns.

The reinforcement of the floor slab consists of a layer of rectangular rods at the top and a layer of diagonal rods at the bottom, the latter having a slight lap. The rectangular rods lap over column heads with laps ranging from 5 ft. 4 ins. to 8 ft. 4 ins. This method is slightly different from the ordinary and avoids four layers common in most flat slab systems. The floor load was calculated at 125 lbs. per square ft. and the mixture of concrete used at the column heads was quite rich, being 1:1½:2. It is stated that a saving in steel was made by this method.

The entire building, which was designed with the future intention of putting on another story, rests on concrete footings placed on hard pan. These footings

Interior view on one of the floors of the factory building

A Reinforced Concrete Factory Building

are generally 9 ft. 6 ins. by 8 ins. The elevator well is of terra cotta, while the chimney is of brick, and at present there is a temporary roof of wood with plastic slate.

Although this building might properly be stated to be "absolutely fireproof" a serious loss might occur by the burning of the combustible contents. To prevent such an occurrence about 340 Grinnell automatic sprinklers have been installed on a wet system put in in accordance with specifications of the General Fire Extinguisher Company of Massachusetts. The interior view shows clearly the method of suspending the sprinkler pipes and the advantage gained in this connection from using a flat slab system.

The entire building was erected by the Concrete Engineering Company, Boston, in accordance with plans and specifications of Monks & Johnson, architects and engineers, 7 Water street, Boston, Mass. The concrete was mixed on the ground in a 1-yd. Ransome mixer that discharged directly into Ransome dump buckets which were hoisted to the top of the wooden tower, where the concrete was chuted directly to the forms. The cement used was "Giant" Portland. The architects have designed quite a number of buildings of late that are good examples of what can be done in the way of artistically treating the exterior of concrete structures.

Monks & Johnson state that the unit cost of the building was $1.63 per square foot of floor area. This figure was obtained from the total cost of the building and includes plumbing, lighting, heating, sprinklers, elevators, office partitions, finish for stores, etc., etc. It should also be noted in this connection that provision was made in the design for the future addition of two extra stories, which added materially to the footings and columns and this made the unit cost considerably higher than would have been the case if such provision had not been made.

Marble in Roman Houses

It was not till the latter times of the Republic, when wealth had been acquired by conquests in the East, that houses of any splendor began to be built in Rome, but it then became the fashion not only to build houses of an immense size, but also to adorn them with columns, paintings, statues and costly works of art. M. Lepidus, who was Consul B.C. 78, says a writer in an English journal, was the first who introduced Numidian marble into Rome for the purpose of paving the threshold of his house, and the fashion of building magnificent houses increased rapidly. Lucullus especially surpassed all his contemporaries in the magnificence of his houses and the splendor of their decorations.

Marble columns were first introduced into private houses by the orator L. Crassus, but they did not exceed 12 ft. in hight, and were only six in number. He was, however, soon surpassed by M. Scaurus, who placed in his atrium columns of black marble called Lucullean, 38 ft. high, and of such immense weight that the contractor of the sewers took security for any injury that might be done to the sewers in consequence of the columns being carried along the streets. The Romans were exceedingly partial to marble for the decoration of their houses. Mamurra, who was Cæsar's praefectus fabrum in Gaul, set the example of lining his room with slabs of marble.

Some idea may be formed of the size and magnificence of the houses of the Roman nobles during the later times of the Republic by the price which they fetched. The Consul Messalla bought the house of Autronius for 3,700 sestertia (nearly £33,000, and Cicero, the house of Crassus, on the Palatine, for 3,500 sestertia (nearly £31,000). The house of Publius Clodius, whom Milo killed, cost 14,800 sestertia (about £131,000); and the Tusculan villa of Scaurus was fitted up with such magnificence that when it was burned by his slaves he lost 100,000 sestertia, upward of £885,000.

The house rent which persons in poor circumstances usually paid at Rome was about 2,000 sestertia (between £17 and £18). It was brought as a charge of extravagance against Cælius that he paid 30 sestertia (about £266) for the rent of his house.

Operations are well under way looking to the erection of an eleven-story office building at the corner of Fifth Avenue and 53rd Street, New York City, the architect being C. P. H. Gilbert. The new structure will have a frontage of 85 ft. on the avenue and 125 ft. on the street and will cost about $600,000 to build, which, with the site, will represent a total investment of about $2,000,000. The façade will be in buff limestone and the main entrance will be in the avenue frontage. This is another invasion of what was once the most fashionable residential section in the city. Not only here but elsewhere in the Metropolis big commercial lofts are going up on blocks long restricted to private homes.

The Camera as an Adjunct of the Builder's Equipment

Its Value to the Builder--Some Examples of Its Work--Selection of a Camera

By E. H. Chandler

IT is quite possible that some of the readers may consider the above a rather queer title for an article appearing in the columns of the *Building Age,* but the only reason I can give for using it is that I cannot at the moment think of a better one. In what is to follow I hope to explain to the satisfaction of the reader how I have used a camera for recording items and incidents of my daily work, and taken in connection with the accompanying pictures it may perhaps start a few ideas on a subject that is certainly outside the builder's line.

Photography with me is not a hobby, nor do I call myself either an amateur or professional photographer. My camera, so far as I am concerned, is simply a means to an end, and I use it as I would a Stillson wrench, a card index or any special equipment that I think would increase my capabilities or render my work easier. I know of other mechanics here and there in different trades who use a camera for the same purpose, but so far I have never seen anything bearing upon this subject in the columns of our technical press.

Of course there are plenty of photographic journals with their pages full of information on photographic subjects, but the average mechanic does not commence reading these journals until he has become the possessor of a camera, or at least until he has become a prospective possessor. This article, therefore, is for the purpose of turning his thoughts in that direction.

I will at first indicate a few of the items that might prove subjects for a builder's camera and afterward indulge in a short discussion of its selection and manipulation. As already mentioned, it is of the greatest importance for obtaining records. In this connection it is the quickest and easiest shorthand ever invented. Items of detail that would take hours, days or even months to copy with pen or pencil can be caught by the camera in the winking of an eye and at an expense of but a few cents. Quite recently I read of a contractor who hired a photographer to take pictures of the progress of the work on a building in order that he might use the pictures in court to prove that it was not his fault that his contract was not finished on time. A better idea is for the contractor to have a camera of his own and either take the pictures himself or have his timekeeper or some other of his subordinates take them for him, not only in special cases but in all cases. How are we to be certain until the job in hand is finished that it is not going to be a special case?

Very often it is necessary for the builder to invent some temporary or emergency equipment. At the time of using it he is sure that it will never be forgotten, but in all probability if it should be three or four years before the emergency occurs again, he will have forgotten all about it, and after racking his brains may perhaps evolve the same thing he had before or something entirely different. In nine cases out of ten if he had a photograph of the previous work—even though it did not show the emergency equipment—he would be able to recall what it looked like and how it worked by merely examining the picture of the work on which it was used. The picture works upon the same principle as the piece of string that some people tie around their fingers to aid their memories, though of course there is no reason why a photograph could not be made of the special equipment, if it were necessary so to do.

To illustrate the foregoing take a look at Fig. 1. This picture to the reader does not perhaps mean much of anything. He may even be wondering what it

Fig. 1—Watchman's Cabin in Center of Long Railroad Trestle

Fig. 2—Method of Cribbing on Top of the Original Bents of the Trestle

The Camera As An Adjunct of the Builder's Equipment is, so I hasten to explain that it shows a watchman's cabin at the center of a long railroad trestle. This cabin was raised 7 feet above its old position, which was already 16 feet from the ground, and although

The Camera as an Adjunct of the Builder's Equipment—Fig. 3—A Good Example of the Use of Cobble Stones

the picture shows nothing but the completed work—and it is three years since it was taken—yet by examining it for a few moments I can recall practically everything in connection with it even to the humming of the ferocious man-eating mosquitoes.

The cabin had to be raised to bring it level with the top of the trestle, which had already been elevated the necessary 7 feet. Fig. 2 shows the method of cribbing on top of the original bents of the trestle. This cribbing was only false work to be afterward taken out and replaced with "pony bents" framed and set on top of the original ones. There does not appear to be very much in this photo, yet, like the previous one, it vividly recalls every move made from the commencement to the completion of this work.

Fig. 4—Another Example of Cobble Stone Work

I could easily fill an entire issue of the *Building Age* with examples like the foregoing from my own collection, but realizing that they could not possibly be of the same interest to the reader as they are to myself I have taken a few special pictures to illustrate this article, with the idea of supplying a few items of detail that would be of more general interest.

Out in this vicinity we have some pretty good examples of cobblestone work, and seeing that this is at present rather popular with the bungalow builder, I "snapped" the pictures shown in Figs. 3, 4 and 5 to serve as examples. The pictures show the arrangement of the cobblestones better than they can be shown by line drawings, though it is, of course, impossible to show the coloring.

In Fig. 6 there is shown a combination of cobblestones, clinker brick and shingles. Old Sol was too far on his journey to make it possible for me to get a good picture of the cobblestone porch that runs across the front end of the building, but the general appearance of the structure is such as to make it worthy of insertion in this article.

In Fig. 7 is presented a combination of clinker brick and shingles. On account of the dark-brown color of both the brick and shingles this was a difficult subject to photograph, and I am free to admit that the photo does not do the original justice. There are many charming details that may be picked out in this picture, and it is well worthy of close examination. For myself I am particularly pleased with the tapering brick columns and the elliptical arches; the hood over the front door and the bay or oriel windows with their quaint tower roofs. It is a pity that the picture is too small to show the random effect of the clinker brick.

There is shown in Fig. 8 a rather odd detail of a clinker brick chimney which pierces the deep overhang of the roof on the gable end of the building.

Fig. 9 is a fine example of pressed brick with raked joints. This detail shows up well in a picture, but the beauty of the coloring is all lost, and it is easier to imagine than describe the effect of the dull red brick, the white trimmings and the dark brown of the weathered redwood shingles.

In Fig. 10 we have a double house with shingled exterior and white trim. One entrance is at the front of the house—the other at the side. The picture was taken because of the general effect, which is surely out of the ordinary.

In Fig. 11 there is illustrated a method in use by the Ransome people for distributing and placing concrete in the forms on a building. The concrete ascends the elevator in the usual way, is dumped into the hopper, and runs by gravity down the chute and thence down the spout at the end of the boom to any point desired. The boom is of wood, not steel, as might be supposed from its appearance. It is attached to the tower or elevator in much the same manner as the boom of a tower derrick and can be swung in exactly the same way.

The initial illustration at the head of this article shows an artistic treatment of windmill, water tank and tower for a suburban home. The windmill with its accompanying galvanized iron tank is sometimes a necessity but always an eyesore. The original of this picture is tastefully painted and is one of the best solutions of the the problem I have ever seen.

And now if the reader thinks it worth while going further we will go into a short discussion on the selection and manipulation of a camera—taking the last item first, because many people want to be sure they can use an instrument before spending their good money for one. At the present time there are places in almost every town in the country where photographic developing and printing are done, so that a

Fig. 5—A Case Where the Chimney is Built of Cobble Stones

person may possess a camera and secure pictures of his own by simply pressing the button and turning the work over to the professional worker for developing and printing. Many people profess to get their greatest pleasure out of photography by doing their own developing and printing; personally I am free to confess that I never do any part of the work if I can avoid it. I like to hunt around and secure suitable subjects for printing and I like to look at them when finished, but the work that comes in between is too much like washing dishes to suit my taste and consumes too much valuable time that I can employ to better advantage in other ways.

This being so I seldom do my own printing unless the negative happens to be poor and I think I can get a better print from it than can the professional, merely because—not having to make a living at it—I can afford to spend more time on that particular negative. For those who might wish to do all of the work themselves it may be stated that all manufacturers enclose directions with their goods, and there is nothing in any part of this work that the "average intelligence" cannot master. It is like the story of the old fellow who was asked if he could play a fiddle. He said he guessed he could; he never had tried it, but he thought he could make a pretty good job of it. One of the biggest fools he had ever known could play a fiddle fine, so there couldn't possibly be any doubt about *his* ability to play it.

The foregoing is not so foolish as it seems. In all probability if the old fellow had put in as much time practising a fiddle as the fool had, he *would* have been able to play as well, and although with the present-day appliances it is quite possible for the novice to make a success with his first pictures, a certain amount of continuous practice is necessary before he can feel absolutely sure of himself. As to the selection of a camera, do not expect me to decide this point for you. I cannot decide it for myself. Every time I get a good picture I think my present camera is all right; most times when I get a poor one I tell myself that if I had a better camera I could do better work. I never say this out loud because of the old proverb, "A poor workman grumbles at his tools."

Prices of cameras range from $1.00 to several hundred dollars. Under certain conditions the $1.00 camera will produce as good pictures as the hundred-dollar one; indeed, under some condition it will produce better. Many a novice has changed his first camera for a more expensive one only to find that at first his expensive camera does not produce as good pictures as did the old one, merely because he does not understand it as well.

The best course for the intending purchaser is to go to some reliable merchant and have him explain the merits of the various styles. Make your visit during the slack portion of the day and he will be glad to explain and demonstrate to you by the hour. If possible go to a merchant who does developing and printing; he will have more things to show you and more information to give you.

There are two general kinds of cameras—one uses plates, the other films. For myself I swear by the film camera, but you will find plenty of people who swear by the plate and still others who use them both. The manufacturers of the different kinds put out tons of literature extolling the merits of their own particular goods. This literature can be had for the asking and explains the different points much more fully than I can.

Fig. 6—A Dwelling House in Which the Combination of Cobble Stones, Clinker Brick and Shingles is Very Cleverly Managed, with Pleasing Contrasts

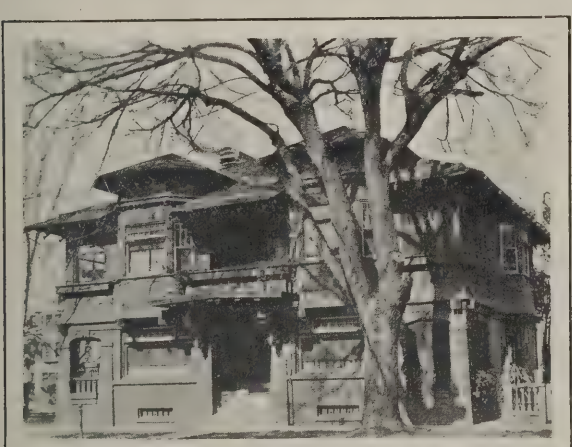


Fig. 7—A Combination of Clinker Brick and Shingles

Fig. 8—Detail of a Clinker Brick Chimney

The Camera As An Adjunct of the Builder's Equipment

I have a friend who uses a plate camera and can see no merit in any other. I once had him take a special picture for me at a time when my own camera was not available. I am sure the fear of breaking this

The Camera as an Adjunct of the Builder's Equipment—Fig. 9—An Excellent Example of Pressed Brick with Raked Joints

plate caused me more trouble than all the film negatives I ever had. I finally put it away so carefully that a month or so ago, when I had use for it, I turned the house upside down hunting for it but without success. It is still hidden away and I hope it remains so.

History of Shingle Making

The number of shingles made from white pine in the United States has been enormous, the three states, Michigan, Wisconsin and Minnesota, alone having produced 85 billion in 24 years. Shingles have been made of this wood since the earliest settlements of New England. For two centuries they were made by the slow process of hand work. The logs were cut into bolts by hand, rived with a frow, and the shingles were shaved with a drawing knife, the only other machine being a "shaving horse," a contrivance for holding the shingle while the manufacture went on. It was a slow

Fig. 10—Rather Unique Design of a Double House With Shingled Exterior

process, and the man who could rive and shave 500 shingles in a day was fully up to the average of his craft. That many shingles sold for a dollar or two, depending upon time and place. The rustic shingle maker was an expert in his line, and was supposed to be able to tell from a pine tree's general appearance whether it would "rive." He was at liberty, however, to test any trees he pleased by "blocking" them—cutting a large block out of the side of a standing tree to sample its splitting properties. If it did not suit he passed on, leaving the blocked tree a prey to the next forest fire that would ignite the resin which accumulated in and about the wound.

The pioneer custom in Kentucky of killing buffaloes for their tongues was little more wasteful than the primitive white pine shingle maker's procedure, says a writer in an exchange. He used only a small portion of the choicest part of pine trees. The sap-wood, the knots, much of the heart and practically the whole trunk above the first 20 feet were left in the woods to rot. It was not unusual to sacrifice a 3,000-ft. tree to get 1,000 shingles—throwing away fourteen-fifteenths and using one-fifteenth. The introduction of shingle-making machinery put a stop to that enormous waste, for the saws could make shingles of knots, slabs, tops, cross grains and all

Fig. 11—A Convenient Method of Distributing and Placing Concrete in the "Forms" on a Building in Progress of Erection

else, from stump to crown. The old-style method of shingle making died hard, for the shavers opposed the introduction of machines, and declared the ruination of the country would follow so radical a revolution in a widespread industry.

It was sometimes found necessary to regulate by law the making of shingles by the old process. Thus, in 1873, an act passed by the Massachusetts legislature provided that if a bunch of shingles fell two per cent. short of the regulation length the shingles should be seized and sold for the benefit of the poor. Under the old method every individual piece was counted as a shingle, and it must be approximately of the right length and width; when sawed shingles came in they might be any width, but every four inches made a shingle, and a piece a foot wide counted three shingles. They were packed in bunches, usually containing 250 shingles. When made by hand two kinds were produced, known as "joint" and "lap." The latter were longer, with one edge thick, the other thin, and when nailed on the roof the edge of one lapped over the edge of another, like weather-boarding. The joint shingles were short, and were nailed edge to edge, like sawed shingles.

National Association of Sheet Metal Contractors will hold its convention in St. Louis, June 12 to 14.

Uniformity in Architects' Plans and Specifications

Some Headings Suggested as "Reminders" in the Preparation of Architects' Specifications

AT the annual meeting of the Minnesota State Association of Builders' Exchanges, held in St. Paul in December, one of the reports presented was that of the committee to whom was referred the question of uniformity in plans and specifications. The tendency at the present time seems to be more and more toward uniformity in the wording of contracts and specifications, the idea being not only to reduce to a minimum the liability of omission of any important parts but also to make use of such terms that all will understand just exactly what is meant and thus do away with much of the annoyance now resulting from different interpretation of specifications by the building contractor and the architect.

The committee on uniformity in plans and specifications at the meeting referred to suggested the following "reminders," which have been issued in the form of a convenient folder by the Minnesota State Association of Builders' Exchanges:

General Description of Building

General Conditions	Water
General description of building	Guards, Lights
Character of work and materials	Watchman
Separate contracts	Tests. Examination
Drawings	Photographs
Laws	Defective work
Bonds	Damage
Permits	Guarantee
Patents	Commencement of work
Insurance	Delays
Survey	Progress of work
Staking out	Time of completion
Tests of ground	Temporary Heat
	Payments on account
	Cleaning out building

Excavation

Digging	Filling
Blasting	Grading
Dispose of dirt	

Foundation

Footings	Area walls
Foundation	Porch footings
Kind below grade	Chimney foundation
Kind above grade	Cement coating
Backing	Water proofing
Beam filling	Pointing
Opening for pipe, etc.	Whitewashing
Drainage (who supplies)	Coal chutes (who supplies)
Dwarf walls	Specify mortar

Stone

General description	Columns
Natural stone	Belt courses
Kind, color, quality	Base
Artificial stone	Cornice
Kind, color, quality	Steps
Backing	Brackets
Reinforcement	Carving
Bonding	Stone Setting (who sets)
Cutting before delivery	Pointing
Cutting after delivery	Specify mortar
Sills	Color, quantity, etc.
Lintels	Protection
Copings	Cleaning
Caps	

Face Brick

General description	Reinforcing
Kind, color, quality	Metal bonds (who supplies)
How laid	Kind of backing
Color and kind of mortar	Thickness of walls
Depth of reveal	

Common Brick

Arches	Hollow brick lining
Chimneys	Water proofing
Flue linings (who supplies)	Anchors, tie rods, etc. (who supplies)
Relieving arches	Mortar
Thimbles (who supplies)	Cleaning
Ashpit and door (who supplies)	Caulking
Porch piers	

Terra Cotta

General description	Bonding
Kind, color, quality	Setting

Reinforced Concrete

Scope of work	Proportions
Material	Mixing
Sand	Forms
Stone	Openings
Cement	Dispositions
Water	Fireproofing
Reinforcing steel	Load test
Test of cement	Protection

Concrete and Cement

Where used	Rough grouting
Kind, quality	Cement floor
Preparation for tile, etc.	Steps
Preparations	

Lathing

General description	Metal lath
Wood lath	Preparation for cornice, etc.

Plaster

General description	Finish
Exterior plaster and cement	On brick, concrete, or lath
Kind, quality, number of coats	Wainscoting
On brick, concrete, or lath	Cornice
Smooth or rough cast	Beams
Interior plaster	Centers
Back plaster	Ornamental
Basement (which rooms)	Stucco
First floor	Corner beads (who supplies)
Second floor	Plaster jambs
Attic	Plaster blackboards
Kind, number of coats	Round corners

Marble, Slate, Mosaic and Tile Work

Extent of work	Scagliola
Kinds of marble	Columns
Kinds of tiling	Pilasters
Finish and setting	Cornices
Concrete fill	Ceiling work
Floors	Stair soffits.
Thresholds	Arches
Wainscoting	Stair balusters
Trim	Stair well facia and balustrade
Toilet partitions	Light well facia and balustrade
Toilet hardware	Caps
Stair treads and platforms	
Slate blackboards	

Composition

General description	Interior
Exterior	Blackboards

Tile and Floors

Foundation for tile	Fireplace
Floors	Terrazzo floor
Wainscoting	Mosaic
Hearths	

Building Papers

Tar paper
Sheathing paper
Deafening felt
Sheathing quilt

Carpentry

General description
Dimension of materials
Sills
Plates
Partition
Bridging
Headers and trimmers.
Sheathing
Roof boarding
Rough flooring
Furring
Sleepers
Sliding door openings
Grounds
Base
Corner boards
Cornice
Belt courses
Steps
Porchwork
Columns
Rails
Balusters
Lattice
Mouldings
Brackets
Scuttle
Cresting
Finials
Flag pole
Siding
Vertical shingles
Shingle roof
Saddles
Cellar ways
Basement sash frames
Outside door frames
Ice box door and frames
Window frames
Pulleys (who supplies)
Priming frames
Temporary enclosure
Skylight
Windows
Storm sash ventilator
Storm doors
Window screens
Door screens
Screened porches
Blinds
Store front
Vegetable bins
Coal bunker
Preparation for tile floors
Preparation for tile roof
Preparation for slate root

Interior Finish

General description
Kind of wood
Flooring
Doors
Double acting doors
Sliding doors
Flexifold doors
Partition sash
Ceiling sash
Transoms
Scuttle
Frames
Casings
Plinths
Jamb linings
Stools
Aprons
Toilet partitions
Panel work
Wainscoting
Corner beads
Bulletin boards
Base
Plate rail
Chair rail
Chalk rail
Wainscot cap
Picture molding
Ceiling cornice
Ceiling beams
Hook strips
Closet shelves
Drawer, hat and rubber cases
Arches
Columns
Pedestals
Pilasters
Mantels
Book cases
Side boards
China closets
Pantry fixtures
Kitchen fixtures
Linen cases
Medicine cabinet
Seats
Clothes chute
Drip boards
Refrigerator
Basement stairs
Main front stairs
Rear stairs
Attic stairs
Stair rail for metal or marble stairs
Carving

Weather Strips

Metal Screens

Glass and Glazing

General description
Front door glass
Vestibule door glass
Other door glass
Plate glass
Window glass
Basement glass
Attic glass
Storm sash glass
Leaded glass in transoms
Leaded glass in stairway
Glass of sideboards
Glass of bookcase
Glass of fixtures
Store front glass
Marquise glass
Transom glass
Bulkhead glass
Fireproof glass
Prism glass
Mirror glass

Painting

General description
Priming frames
Kind of paint
Exterior walls
Roofs
Metal work
Gutters
Valleys
Shingle stain
Oiling ceiling
Porch floors
Outside doors
Windows storm sash
Screens
Blinds
Store front
Ornamental iron
Structural iron
Steel ceiling
Interior painting
Hardware treatment
Enamel
Plaster treatment
Bath tub
Sink
Floors, painted, oiled
Floors, waxed and varnished

Fire Proof and Metal Clad Doors

Exterior
Interior
Kind of covering
Doors
Sidelights
Transoms
Frames
Trim
Hardware (who supplies)
Glass (who supplies)

Hardware

Hinges
Locks
Bolts
Knobs
Pulleys
Escutcheons
Double acting butts
Door checks
Kick plates
Push plates
Mailing plates
Base knobs
Sash pulleys
" cord, chain, tape
" weights
" locks
" lifts
" sockets
" stop screws
" pull down hook
" pull down pole
Storm sash hinges
Storm sash openers
Storm sash number tags
Sliding door tracks
Sliding door hangers
Transom lifts
Stair rail brackets
Cupboard hinges
" catches
" locks
" elbow catches
" shelf brackets
" sheaves
" tracks
Drawerpulls
Electric buttons (see electric)
Coat hooks
Chalk screen
Clean-out door
Building paper
Coal chutes

Metal Store Fronts

General description
Make of fixture
Kind of metal
Zinc, copper, bronze, cast-iron, wrought iron, steel

Sheet Metal

General description
Tin, copper, zinc, lead
Galvanized iron
Valleys
Gutters
Leaders
Conductors
Cornice
Cresting
Finials, vanes
Main roof
Deck
Porch roof
Flashing
Chimneys
Skylights
Skylights glass (who supplies?)
Lining refrigerators
Lining warming case
Metal ceiling
Metal ceiling cornice
Fire proof windows
Fire proof frames and trim
Tin and iron clad doors
Tin and iron clad frames and trim

Structural Steel and Iron

Beams, size & weights
Lintels, size & lengths
Trusses, size of members
Tie rods
Separators and their bolts
Columns, cast or steel
Girders
Bearing plates
Anchors and bracing

Miscellaneous Structural

Joist anchors and straps
Girders, anchors and straps
Stirrups and joist hangers
Caps and bases for wood posts
Bolts and washers
Wall plates, bolts
Rods and castings for combination trusses
Cleanout doors and frames
Coal hole covers
Area gratings
Area railings
C. I. entrance plates
Metal thresholds
Safety treads
C. I. Chimney caps
Chimney anchors (who supplies)
Steel doors and frames
Shutter eyes
Corner wheel guards
Cast or steel sill plates
Sidewalk doors
Ash pit doors
Coal chutes
Sidewalk lights
Skylight guards
Cast iron windows and frames
Cast iron spandrels
Flag poles

Ornamental Metal Works

Cast store front
Lamp standards
Lamp brackets
Folding gates
Ticket windows
Grilles
Vestibule plates
Screens
Window guards
Kick and push plates
Corner beads

Fire Escapes

Stand pipes
Valves
Sizes of pipes
Straight ladders
Stairs
Railings
Brackets
Gratings
Treads

Metal Stairs

Steel
Cast iron
Posts
Risers
Treads
Railings, metal or wood
Brackets
Wall rails, wood, iron, brass
Plating

Canopies, Marquises

Lion heads	Cast iron cornice
Sills	Sheet, metal, copper, galvanized iron
Chains	False ceiling
Framing	Down spouts
Roof glass (who supplies)	Electric wiring (who supplies)
Pendants (who supplies)	
Sheet metal cornice	

Elevator Enclosures

Cast iron grills	Thresholds
Wrought iron grills	Steel headers
Wire glass (who supplies)	Over head to ceilings
Locks	Aprons over doors
Operating device	Wire fenders over hatch.
Angle iron frame	Plating.
Double sides to enclosure	Painting

Balconies and Railings

Railings	Posts
Floors	Flanges
Brackets	Fastenings

Asbestos Roofing

General description	Metal
American method	Cement
French method	Hips fasteners
Vertical walls	Crestings
Roof	Flashing
Felt	

Slate Roofing

General description	Felt or paper
Vertical slate	Nails
Pattern and color	Flashing
Roof slate	Cement
Hips, valleys, cresting	Blackboards (see marble)

Tile Roofing

General description	Cement
Kind, color	Hips
Preparation for tile	Cresting
Felt	Flashing
Metal fastener	

Gravel and Slag Roofing

Use 1909 specifications	Slag
Unsaturated felt	Nails
Tarred felt	Flashing
Coal tar pitch	Inspection
Gravel	Guarantee

Electric Work

General description	Centers of distribution
Bids	Meter loops
General	Metering panels
Drawings	Elevator lights
System	Drop cords
Wire shafts	Lamps
Service connection	Loss of potential
Service switchboard	Annunciators and bells
Mains and feeders	Push buttons
Motor circuits	Watchman system
Wiring	Interior telephones
Fans	Telegraph outlets
Window lighting	Burglar alarms
Distribution	Electrical clock
Fixtures	Program clock
Specific lighting	Pole lines and poles
Conduits	Test of wiring and installation
Installation of conduits	Quality of work
Wire	Ordinances
Switches	Guarantee and bond
Controlling lights	Standard symbols
Outlet boxes	Schedule
Floor outlets	Certificate of payment
Wall outlets	Retaining payment
Cut out cabinets and panel boards	Final payment

Gas Piping

General description	Joints
Connection with city main	Shut-offs
Sizes of pipes	Cocks
Location of meter	Capping
Meter shelf	Tests

Plumbing

General description	Laundry tubs
Water supply	Wash basins
Connection with city main	Bath tubs
Meter	Foot and seat baths
Kind of pipes	Urinals
Size of pipes	Lead pans

Plumbing—Continued

Joints	Slop hopper
Pump	Vents
Tank	Traps
Over-flow	Grease trap
Drains	Bibbs
Soil pipes	Cocks
Range	Refrigerator
Boiler	Cesspool & Sewer work
Hot water heater	

Heating—(Hot Water)

Hot water system	Decoration
Boiler	Pipe and boiler covering
Boiler trimmings	Expansion tank
Breeching	Carpenter and mason work
Foundation	Temporary heat
Radiation	Thermostat
Pipe and fittings	Workmanship
Ceiling and floor plates	Guarantee
Radiator and air valves	

Gravity System—(Steam)

Boiler fronts and castings	Radiator valves
Boiler trimmings	Air valves
Foundation and brickwork	Pipe (hangers, etc.)
Breeching	Fittings
Steam supply	Painting (who supplies)
Return valves	Pipe covering
Blow-off	Thermostat
Catch basin	Workmanship
Water supply	Guarantee
Radiation	

High Pressure—(Reducing System)

Boilers	Grease extractor
Boiler fronts and castings	Radiation
Boiler trimmings	Radiator valves
Foundation	Air valves
Brickwork	Pipe (hangers, etc.)
Breeching	Fittings
Boiler valves	Valves on supply and return
Steam header	Painting (who supplies)
Blow-off	Pipe covering
Catch basin	Thermostat
Water supply	Workmanship
Boiler feed pump	Guarantee
Pressure reducing valve	Receiving tank
Back pressure valves	Vacuum pump

Vacuum System

Vacuum pump	Gauges and gauge board
Vacuum piping	License
Valves	

Ventilation

System	Register faces
Piping	Regulator
Flues	

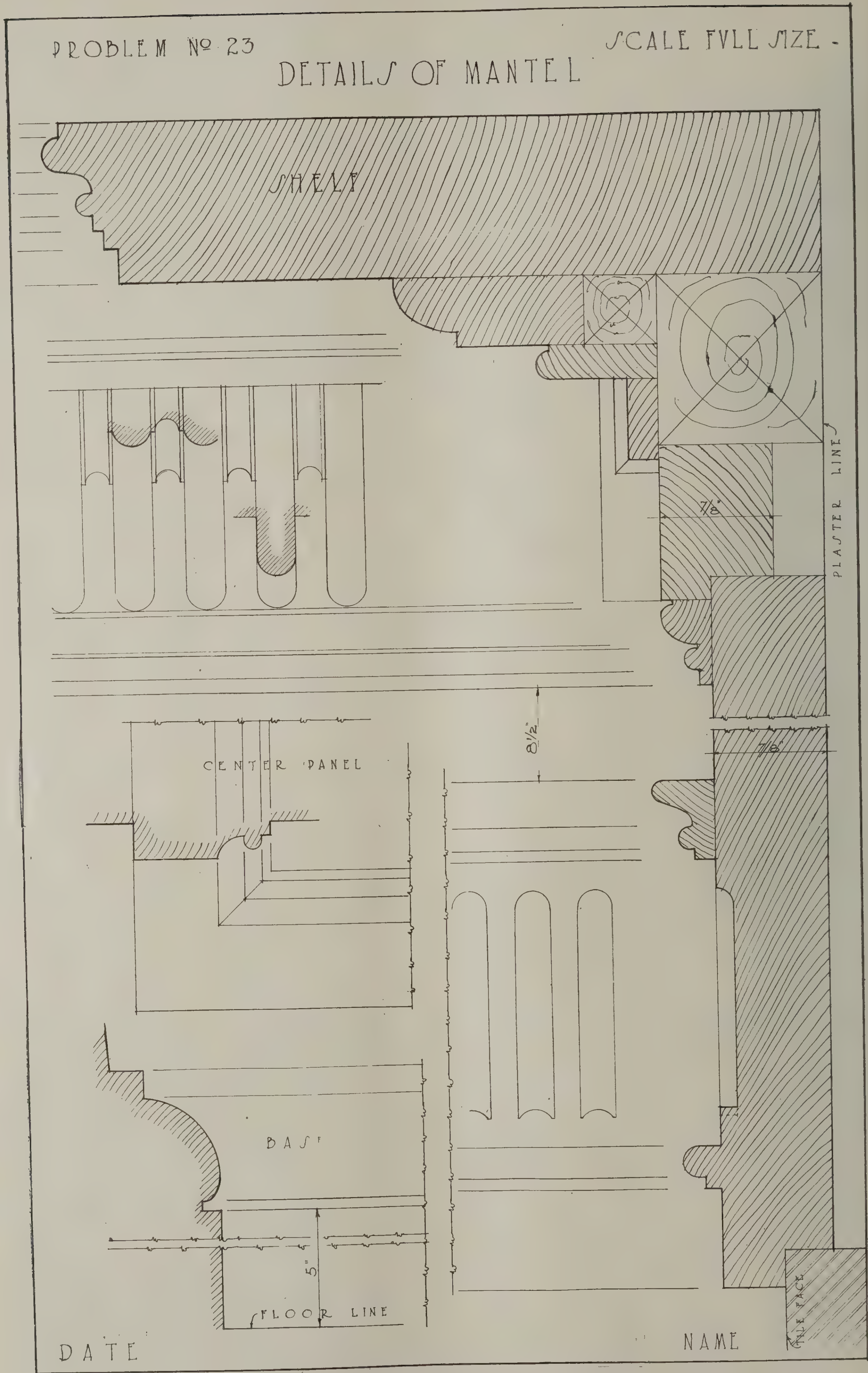
Specialties

Revolving doors	Vault doors
Dumb waiters	Vault fixtures
Metal lockers	Refrigerator
Rolling partition	Speaking tubes
Rolling doors and shutters	

Building Contracts in Scotland

While the system of divided contracts is general in the building trades in Scotland there has latterly been a movement in the direction of the English system of single contracts. The Scottish master builders, however, are for the most part opposed to the change, and at the annual general meeting of the Scottish Building Trades Federation recently held at Aberdeen it was decided that representations should be made by the Federation protesting against the system of single contracts. It was further decided that an effort should be made to strengthen the associations of the different trades in these cities so that they might be in a position to return such schedules without estimating, if desired.

The oldest frame house in the United States located at Southampton, N. Y., has just been torn down by order of the authorities, who declared it was no longer safe for occupancy. The house was built in 1618 by Thomas Sayre, an Englishman, who came to this country in Cromwell's time.



Lessons in Architectural Drawing for Beginners—Scale of Sheet One-half Original Size

Lessons in Architectural Drawing for Beginners

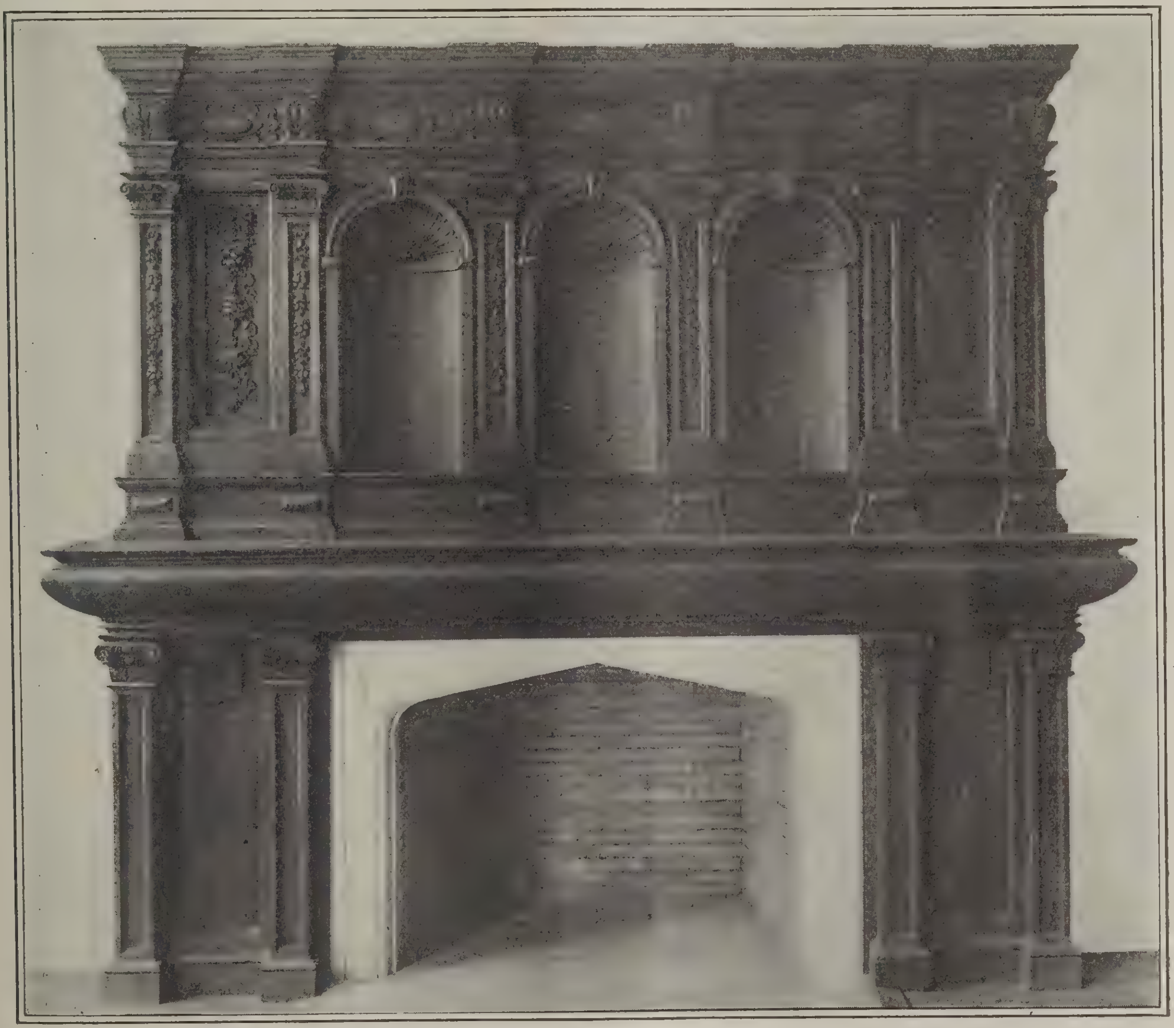
Details of a Colonial Mantel--An Attractive Example--Suggestions for the Student

By Alfred Auslander.

We have taken for the subject of the twenty-third lesson the drawing of a Colonial mantel. The student should observe the following general rule in designing and drawing a suitable mantel for the average bedroom of the unpretentious contry house: Have a plain wooden frame of hard wood, well seasoned, so as to prevent cracking, shrinking or warping. After being well filled it should, if the remainder of the room is painted, receive four or, even better, five coats of paint. On top of the frame place a shelf supported and connected by a proper bed molding to the moldings below. Project the shelf from 6 to 10 in. from the wall. Make facing of fireplace in harmony with the design of the mantel of either stone, face brick, marble or tile, the dimensions on the top to be the same as at the sides if possible.

The word "Colonial" relates to the style of design of mantel, which was done at a certain period. Owing to the lack of room we will not try to explain the various styles of design, but refer the student to some histories of architecture which may be secured at a reasonable price through the publishers of the *Building Age.*

Where there is an uncertainty as to the style of the mantel to be drawn, especially for a room of a decided architectural period, the designer can do no better than to carry out the mantel in the same style of the room. The half-tone engraving reproduced from a photograph of a mantel, is a good copy of an old English type, and is in perfect harmony with the room for which it was designed. Naturally a Colonial or other mantel for the same room would not have been as charming or harmonious. This was designed by Architect W. G. Lawrence for the Heller residence at Newark, N. J.



Front Elevation of Mantel of the Old English Type, Designed to Harmonize with the Trim of the Room

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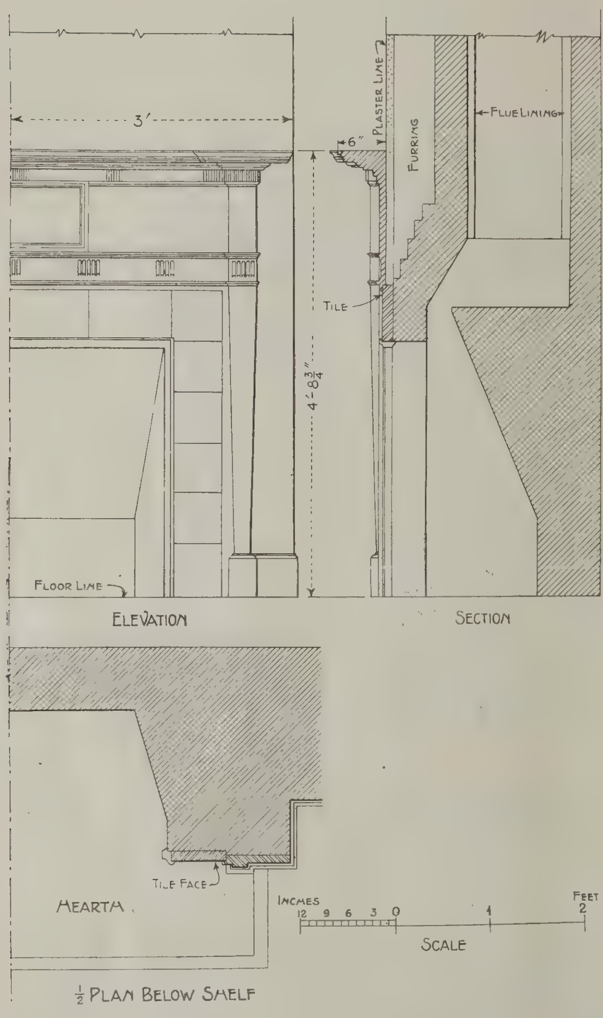
From the previous lessons the student will know by this time that an entablature generally consists of three distinct divisions; namely, architrave, frieze and cornice; observe now the front elevation of the mantel illustrated herewith, you will notice that the frame of the mantel (referred to in the general description above) will resemble the architrave, the plain space between the under side of the shelf and the top of frame will form the frieze and finally the shelf with its molding below, will be the cornice, and all three resting upon pilasters similar to the regular order architecture. The peculiarity of the moldings is the one which tells us to what style a certain mantel belongs. In designing a mantel, therefore, see that the general mass and outlines have architrave frieze, cornice and columns or pilaster, etc., one or all of which may be more or less ornamented with carvings or plain moldings. In some cases the



Details of Mantel Here Described

Lessons in Architectural Drawing for Beginners

returning architrave at the two sides will take the place of the columns.

Referring to the full-page drawing, we find first a vertical section through the shelf, showing its projection from the wall, the outline of the moldings and the relations to each other, etc. Under the shelf we find a space, the decoration of which is quite similiar to dentiles, and the shape of these are shown by (horizontal) section through the plan. In the center of the frieze of the mantel (see drawing below) we find a panel 20 in. long formed by a raised molding, as shown by the full-size detail on the full-page drawing. The architrave is also decorated by carvings (grooves) and the moldings of the architrave also form the cap of the pilasters at the two sides of the mantel. The section through the base of the pilasters is shown on the left-hand corner. We also show one-half plan through the fireplace and one-half plan above the shelf to the same scale as the elevation; also the vertical section through the center of the mantel. The student should read up one of our previous lessons explaining the details of the fireplace and with the explanation of the mantel above will be able to copy the drawing given below. We would suggest that the student take a large sheet of brown, so-called, detail paper and copy the full-size moldings as shown on the opposite page, but using the general dimensions of scale drawing, and so get a drawing of the entire mantel in actual size. After drawing the full-size elevation draw plan and section of every molding, ornament, projection, etc., and then reduce this on another sheet to a scale of 3 in. to the foot, and from this to smaller scale, say 1 in. equals 1 ft. Use for facing face brick instead of the tile shown in the sketch.

The example which we have taken was measured from a mantel built about 1750 for the library in the house No. 116 Clinton avenue, Newark, N. J. The student may also try to measure one and make a scale detail and full-size section similar to the full-page drawing.

Method of Razing High Chimneys

The originator of an interesting method of razing lofty chimneys in England is credited with having felled, without accident, more than one hundred chimneys which for one reason or another had become useless. Some of these were from 200 to 250 feet in hight.

The method consists in removing the stones or brick near the foot of the chimney and substituting an underpinning of wood, which is afterwards set on fire. About two-thirds of the area of the base is removed up to a hight of 5 or 6 ft., so that most of the weight rests upon the underpinning. Experience has shown that when the work is properly done the chimney leans slightly toward the side where the underpinning is inserted, and when a slight crack appears in the masonry on the opposite side the time has come for the fire to be applied. As the chimney falls it partially telescopes in consequence of the shock produced by dropping into the void left by the burned timbers.

Waiting for Opportunity

The man who waits for opportunity to come knocking at his door will wake up some morning to discover that he has made nothing of himself and that he has outlived his usefulness and grown grey doing it, says a writer in *Contract Record*.

The man who wants success in any line today is the one who rolls up his sleeves, starts out with a club, a gun, a steel trap, or what is most likely to catch the game, and himself lays in wait for opportunity. He will be following opportunity every minute he has. He will be striving and working, pushing and hustling. Sometimes he may lose sight of the game, but he will keep on and on.

When a man goes hunting in the woods he tramps where game ought to be until he finds tracks. Then he follows the tracks. Maybe he gets a glimpse at the game occasionally, but he keeps on and on. Probably not more than once or twice in a while will he see what he seeks, but finally he comes upon it in the open, and it is his. Just so with opportunity. Search for it!

Winding Stair Rails

How They May Be Developed by the Methods of Descriptive Geometry--Generation of Solids--Application of the Principle--Outlining the Plank

By Triangulus

In all the history of carpentry the construction of a handrailing to follow the course of a winding stair has ever been, and is today, one of the most difficult problems with which the practical carpenter is confronted; difficult as a matter of geometrical calculation and often difficult in regard to artistic results. The radiating lines of the steps can be easily shown upon a plan, an arch occurring in a straight wall or the gables of a roof can easily be delineated, but a twisting rail apparently presents no surface which continues far enough in one plane to permit its being so drawn that its various dimensions can be taken. An idea seems to prevail that a wreath piece is something whose shape can only be approximated by outlines, and is, therefore, never definitely known until the piece itself is completed.

So far as the scientific phase of the problem is concerned it is the purpose of these articles to show that after the plan of a staircase has been fully completed the shape of the blank or even that of the finished rail itself is of a purely geometrical nature; and, further, that every detail of its appearance as seen from any side can be shown upon paper by the methods familiar to all mechanical draftsmen (academically termed descriptive geometry), in such a manner that the exact dimensions and curves of the necessary blank can be transferred to the plank from which it is to be cut.

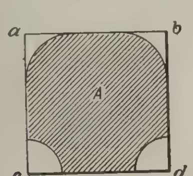


Fig. 1—Profile of Hand Rail

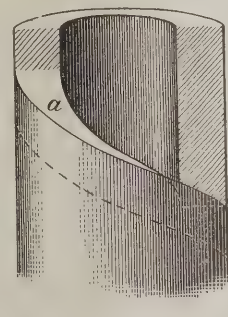


Fig. 2—Warped Surface Cut from the side of a Hollow Cylinder

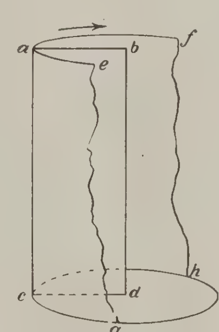


Fig. 3—How a Cylinder Is Generated

Winding Stair Rails—By "Triangulus"

But the subject has also an artistic phase. Let it be supposed, by way of illustration first, that the railing for a winding stair has been completely finished and that every part is in position, and, secondly, that one of the pieces or segments of this rail has been destroyed or removed and that in its stead a block of timber, unshapen but of sufficient size to contain or include a duplicate of the missing piece, has been fitted into the breach and fastened firmly into position. There is little doubt but that under these conditions an experienced workman, without lines and with very little measurements, could hew and carve the block into a duplicate of the missing segment. All of this goes to show that, while science is a necessary factor, an eye for artistic lines is a valuable assistant to the accomplishment of this work.

In order first that the reader may understand exactly what is comprehended by the term "descriptive geometry," it will be necessary to enter into a brief review of its principles. It signifies the representation of any object upon certain planes, usually parallel to the sides to be shown, and involves the methods employed by mechanical draftsmen generally in the construction of plans, elevations and sections. According to abstract science, extension or space has three dimensions, length, breadth and thickness, the latter dimension being also termed hight or depth. A plane has only two dimensions, length and breadth or hight. A view of any object in any plane, therefore, shows only two of its dimensions. A view in a horizontal plane shows length and breadth. A view in a vertical plane placed parallel to the longer side shows length and hight. On this line of reasoning two views of an object are sufficient to show the relative location of every point in it as well as measurement in all three directions. Modern practice, however, has added another view, one projected in a vertical plane which is at right angles to the other vertical plane and also to the horizontal, that is parallel to an end of the object. The three planes of projection, therefore, are all at right angles to each other, all of which may be represented in a familiar way by the three surfaces that meet at the corner of a box. The three views or projections, as they are termed, may be designated as plan, front elevation and side elevation. In the complete set of views, then, each dimension is thus shown twice; thus the plan shows length and breadth, the front elevation shows length and hight and the side elevation, breadth and hight.

By the operations of descriptive geometry it is also possible to obtain projection of an object at any angle or upon any plane. This renders it possible to obtain a normal view of any side or proposed surface upon the plank or blank from which a wreath piece is to be cut. If, then, all of the points necessary for the laying out of a blank for a wreath piece can be shown upon a plan and elevation, there is no reason why views normal to the several faces of the plank from which such piece is to be taken cannot be made which shall show with absolute accuracy every point. Briefly stated, the principal operation or function of descriptive geometry is that of locating or determining the position of a point in space by means of its distance from two, or better, three planes at right angles to each other. In applying this to the handrail the sides and ends of the plank are the planes. A correctly drawn plan and elevation must show first, exactly how large a piece of plank is necessary when its outlines can be drawn, and second, exactly how far within the plank any given point upon the finished rail or its blank is from any side or end of the plank as outlined.

Determining the Curves

According to the prevailing methods employed in getting out the blanks for wreath pieces, the curves (usually arcs of ellipses) are determined by a system of tangents from which the major and minor axes of the ellipse are found. These operations together with those of finding the angle for the twist of profile at the opposite ends of the blank, form a set of rules more or less arbitrary, and only approximate, to retain which requires an active memory and involves chances of error. According to the methods of the mechanical draftsman, the results are arrived at by what may be termed deductive means, the drawing of conclusions from given premises, in which the greatest accuracy can be maintained. This work must be done first on a drawing board, after which the various points and curves can be transferred to the plank.

The blank for a wreath piece is usually first cut square or rectangular in section, and to the required twist or wind, after which its corners are rounded and such portions cut away as are necessary to reduce it to the required profile. If, for instance, the shaded portion, A, of Fig. 1 be the desired profile for a winding rail, then the circumscribed rectangle *a, b, d, c,* will be the profile or cross section of what, for convenience, may be termed the blank. In considering the four surfaces of this blank, the upper and lower surfaces, *a b* and *c d,* represent what may be described as winding or warped surfaces, while the sides *a c* and *b d* will be cylindrical, as though cut obliquely from the side of a hollow cylinder as represented in Fig. 2, one side being concave and the other convex to a given radius.

Generating a Cylindrical Surface

A cylindrical surface in the abstract, according to solid geometry, is said to be generated by the revolution of a rectangle about one of its sides, the fixed side constituting the axis of the cylinder. In Fig. 3 the rectangle *a b d c* is revolved about the fixed side *b d,* the side *a c* thus generating the cylindrical surface *g c h f a e,* and the side *a c* in any position is termed an element of the cylindrical surface.

The winding surface of the top or bottom of the blank for a wreath piece may be said to be generated by the movement at a uniform rate of speed of a line, always horizontal, moving like a radius, one end of which, being kept in contact with a vertical axial line, while at the same time it rises or falls along the axis, also at a uniform rate of speed; the amount of surface generated being confined to the space between the two wall surfaces of a hollow cylinder, such as that shown in Fig. 2, in which *a* represents a portion of a surface so generated. Such a surface is, therefore, like the upper and lower surfaces of the square thread of a jackscrew or that of a piano stool. The generating line at any position along the surface generated constitutes, as in the previous case, an element of that surface by which it will be seen that any horizontal line drawn across the surface of a finished blank is an element of its surface, and will, if produced, reach the axis of the cylinder or well of the stair, all of which will be more fully illustrated in subsequent drawings. A finished rail (*i. e.,* the blank cut to profile) is therefore a generated solid.

Model of Form of Finished Rail

Following out this idea then, if the profile of the required rail were cut out of a piece of thin metal (leaving the opening the shape of the profile) and the same were fixed at the end of a rod or bar whose movements were so controlled as to mechanically produce at the same time the two movements described above, the templet would then form in clay or any plastic material, which may be supposed to be held in place, an exact model of the form which the finished rail is supposed to have or take on.

In a further consideration of the geometrical character of the blank for a wreath piece, it will be seen that the relative speed of the generating movements above described, to each other, results in the pitch of the rail. That is, a rapid movement of the vertical line (*a c* of Fig. 3) which generates its sides, combined with a slower downward or upward movement of the radial line which generates its upper and lower faces, will result in a low pitch or inclination such as might be used for the railing on the side of a stair farthest from the well, while movements of the generating lines the reverse of those above described, would result in a rail of high pitch such as might be used on the side of a stair next the well. These statements are introduced first to enable the reader to more completely grasp the geometrical nature of the solid with which he is to deal, since an accurate method of development cannot be made clear until the nature of the subject is thoroughly in mind; and second, to show that a piece containing an easement or ramp is geometrically formed or generated by a gradual change in the relative speed of these motions.

Developing a Helix

The curve developed by the uniform sweep of the generating line or radius over the circle of the plan combined with the regular rise of the same, is termed a helix; but in applying this to the development of a winding rail, it will be understood that the regular rise of the generating line may lessen as the top is approached and finally cease, while the circular movement continues, when a level, circular rail only will be generated instead of helical rail. Such a movement describes the geometrical character of an easement or of a ramped piece.

In making an application of the principles as herein set forth some representative or typical parts of handrailing have been selected for illustration so that the methods explained can easily be applied to similar cases.

In Fig. 4 a stair having a perfectly circular well is shown, the handrail thus forming a continuous wreath of uniform pitch from the curve or ramp at the newel to the easement, which brings it into the level rail at the top, including, with the ramps, three-quarters of a circle in plan. It is needless to say that accuracy in results depends upon accuracy and care in all the operations indicated.

In conducting this work it will first be necessary to produce an accurately drawn elevation of the part to be constructed, which, of course, to be available, must be drawn full size. Therefore draw first the plan of the rail as shown in the lower part of Fig. 4, to the specified radius of the well, showing the exact width of the rail. Next divide the plan of the rail into segments of suitable length for convenient construction, so placing them on the plan or so turning the plan that one piece or segment shall appear in the center of the elevation, that is, crossing the axial line of the well. The plan shows the rail so divided as to comprise two wreath pieces, A B and B C, both alike and each covering a quarter circle of the plan, and two pieces each covering one-eighth of a circle in plan; one at the bottom, which should show such a curve in elevation as will bring it into the newel post at right angles, and the other a curve at the top which shall be so formed as to connect with the level rail, continued straight in the plan from the last riser. The plan is so drawn that the segment B C comes in the center. This is done so that the elevation projected therefrom will be normal to the sides of a plank, as shown by the plan, from which the segment of rail is to be cut.

As a means of obtaining a correct elevation of the blank as it will appear after being sawed out, draw across the plan as many of the elements of the upper surface as may be deemed necessary, having them equally spaced and radiating, as they necessarily must, from the center D. If the spaces assumed between the elements be equal to the width of the treads, that is, drawn in this case in continuation of the risers, the hight of each element above the next in the elevation will be equal to the hight of the risers. This will give the pitch of the rail. If greater accuracy is desired, twice the number of elements can be assumed, alter-

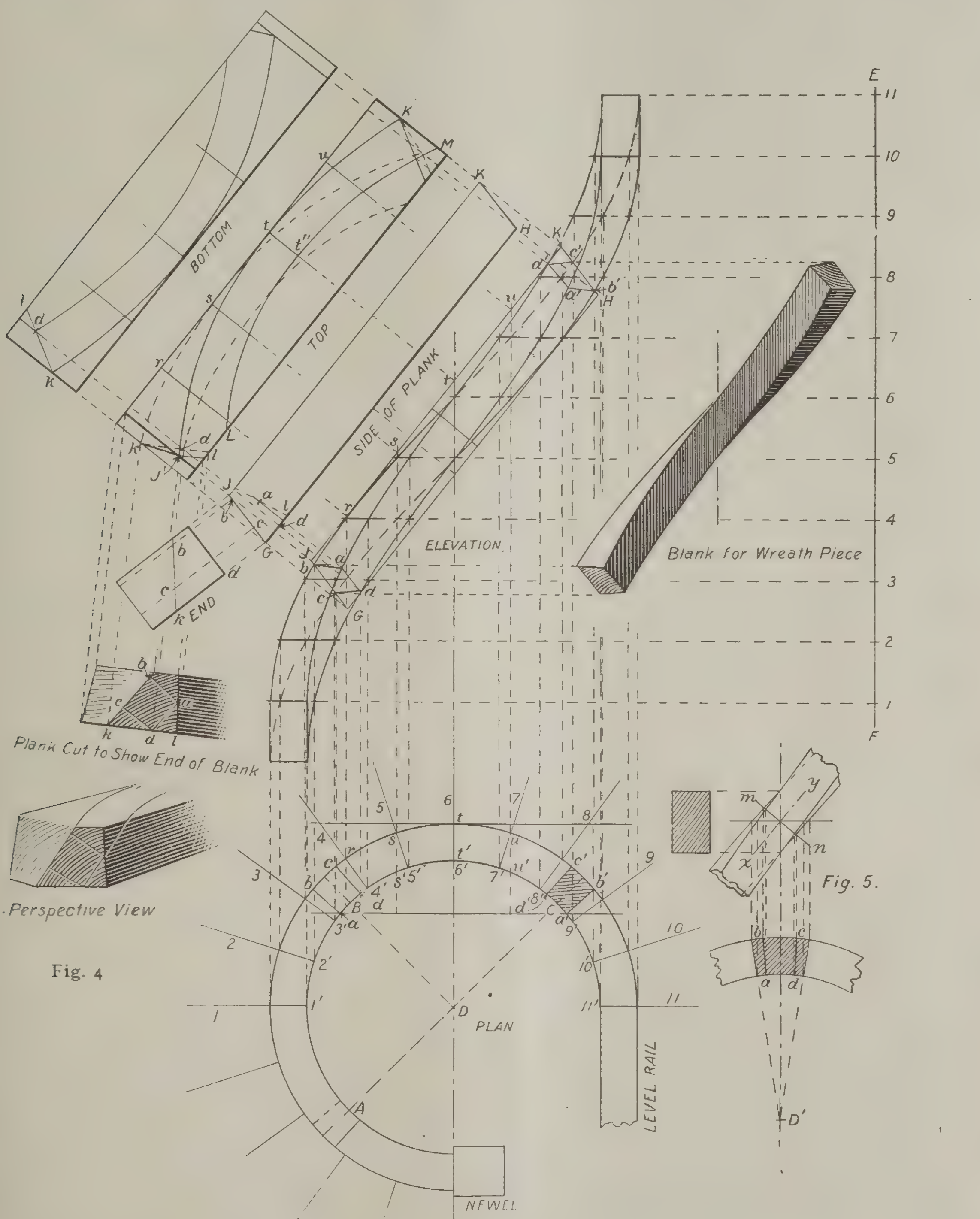


Fig. 4—Plan and Elevation of Stair Rail, Showing Blank for One Section in Several Positions
Fig. 5—A Vertical and a Horizontal Section Through the Blank

Winding Stair Rails—By "Triangulus"

nate ones only coming over the risers. To begin the elevation first draw any vertical line to one side, as E F, divide it into a number of equal spaces, the spaces being equal to the hight of the risers (or to half that distance if twice the number of points have been assumed) and see that all the points thus located on the plan and on the line E F are numbered correspondingly as shown by the small figures, 1 to 11 inclusive.

The intersections of lines projected horizontally from the points on E F with those erected from corresponding numbers on both the outer and inner curve the plan of the rail will give a true elevation of the blank. This operation is fully shown in the drawing which shows the blank covering a full half circle of the plan. The outlines at the bottom of the wreath piece are, of course, duplicates of those just drawn, but are dropped down sufficiently to give the required thickness of the blank. In this operation it is best to obtain an elevation of more than the exact length wanted in one piece, so that the curves at or near the ends may be as nearly correct as possible. That part of the elevation showing what it is designed to make in one piece has been transferred to a position just to the right of the elevation and fully shaded so as to give a pictorial view of the finished blank.

Before the outlines of the plank from which this blank is to be cut can be drawn, the ends or joint lines of the piece must be shown upon the elevation. Some peculiarities are sure to be encountered in doing this by the person who undertakes to work out this problem with thought and accuracy, which, while they are relatively of small importance, may yet be confusing or puzzling if not explained. The most important of these is the fact that a right section of the blank, though its width is equal to its thickness, is yet not square nor even rectangular, as will be seen by an inspection of Fig. 5. This figure shows a view looking from the center D of the plan Fig. 4, toward one of the joints as B, or in other words is a projection upon the plane parallel to A C. It is understood, of course, that all parts of the rail between the two ramps above referred to, will appear the same when viewed from the center of the well. Without the joint line *m n*, Fig. 5 may, therefore, be a view at any point along its course, but in this case shows a view of the joint for the purpose of obtaining a true section of the blank on a plane (*m n*) which cuts it at right angles to its axial line *x y*. The most obvious explanation of the peculiarity just mentioned lies in the fact that a vertical section on the center line is a perfect rectangle, somewhat elongated, as shown at the left, while a horizontal section will have curved lines at two opposite sides and tapering lines on the other two, as shown below in Fig. 5. A section therefore which is neither vertical nor horizontal, but is at an angle between the two, as *m n*, will partake, so far as possible, of the shapes of both these sections. This section is obtained by drawing the line *m n* at right angles to the axis *x y* of the rail or blank and then projecting its intersections with the four helical lines, forming the corners of the blank, into the plan as shown, when the figure *a b c d* thus produced, may be transferred to its positions as shown at B and C in the plan, Fig. 4. This having been done, projections may now be made from the points *a*, *b*, *c* and *d* in both joints into the corresponding helical lines of the elevation, and the points connected as shown and as designated by the same letters in the elevation, when the plan and elevation of one piece of the blank may be said to be completed or perfected so far as its shape and dimensions are concerned. The points at the upper end of the piece have been designated by letters which, it will be seen, are correspondingly placed when it is understood that both ends are alike when reversed, as will be subsequently explained.

(*To be continued.*)

Slate Roofs for Concrete Buildings

Why Slate Is a Desirable Material for the Purpose -- Its Cost and Its Durability

IN a discussion of the service and value of slate for covering the roofs of concrete buildings, some pertinent suggestions are offered by R. J. Kichline, who is identified with slating interests at Slatington, Pa. He states that the reason slate is the ideal material with which to cover the roof of a concrete building is because it is practically indestructible, will not rust, rot or burn, is not affected by climatic changes, acids, gases or other substances, and furthermore will neither expand nor contract under influences of heat or cold.

Roofing slate of uniform shade, he points out, contributes to the beauty of the building, as no deposit can obscure its original color, for with each passing shower any particles of dust or dirt are washed from its plain, smooth surface. A slate roof when once in position needs few if any repairs and requires no painting or other preservative care. It is absolutely clean and the water from its surface is instantly available for household use.

The superiority of a roof material he states is determined by its first cost, durability, resistance to fire, cost of maintenance, repairs and insurance.

Slate is sold by the square; that is, enough slate to cover a space of 10 feet square or 100 square feet. The part of the slate exposed to the weather is the part sold or figured to make up the number of pieces of the various sizes to make a square. A square of slate is almost as cheap as 100 square feet of tin in original cost, and costs but little more than a thousand shingles.

It is claimed with confidence that a roof made of good slate will last 75 years without appreciable deterioration either in appearance or serviceable quality. Consequently a good cement building covered with a good slate roof should last several generations.

The original cost and durability should be considered together, for the cost of a roof having a life of only five years should not be more than half as much as the cost of one having a life of 10 years, and if a shingle roof will last 10 years and a slate roof 50 years, then slate would be as cheap as shingles though the cost were five times as great.

Upon this fair principle, taking the life of the best slate at 75 years—although there are some slate roofs in America in use more than 100 years—we find the cost of a slate roof in the vicinity of Chicago is about 12 cents per square per year.

Therefore a concrete building roofed with a good grade of slate will last more than a lifetime, is fireproof, is sanitary, is beautiful, is the cheapest in cost, maintenance and insurance.

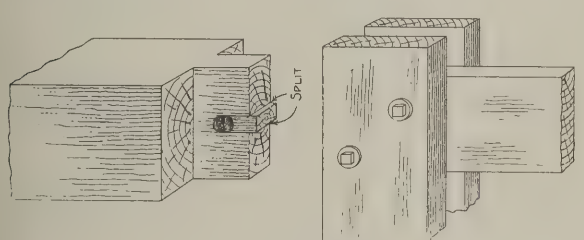
A slate roof, therefore, in his opinion is the cheapest to put on any building, and especially on concrete buildings.

CORRESPONDENCE

A Department Where Those Interested Can Discuss Practical Trade Topics -- All Are Invited to Participate

Reply to Criticism on Plank Frame Barn Construction

From L. H. Hand, Bloomfield, Ind.—I note the criticism by "Lumberman" in the March issue of the paper, on "Modern Barn Construction," and would say it is a question well worth thorough investigation in view of the present timber supply in many parts of the country. If it was a question of procuring long, straight, square timbers for farm buildings or do without buildings, the farmer would have to do without; hence, if a method can be devised whereby medium-sized planks can be so laminated and spiked or bolted together as to make a substantial structure it behooves those of us that make it our business to design and build such structures to study very carefully the material which the country still yields, in order to produce the very best construction possible. All over the country where I have operated for many years there are many groves of common to medium timber which will cut fairly good dimension stuff up to 2 x 10 in. by 16 ft. in length, yet it would be an impossibility to go into these forests and get an old-fashioned barn pattern for a structure, say 40 x 60 ft., to say nothing of the extravagant waste of good material which formerly went into chips and juggles. The writer once cut a clear poplar tree which would today bring $100 on the stump. This tree was scored and hewed to a thickness of 12 in. and then split in halves to make two barn sills 11 x 12 in. in cross-section and 65 ft. long.



Sketches Accompanying Letter of Mr. Hand

I have in mind a large frame barn erected about 80 years ago in Union County, Ind., which required the combined effort of 60 men, six yoke of cattle and such hoisting tackle as they may have had, for three days to raise the timbers, and no ten farms in the county today could provide the timbers that went into it; hence it is easy to see that we have to come to the plank frame, and we ought to do it with the best grace possible.

The first question raised by "Lumberman" is "Can the plank frame barn be put up by a country carpenter?" My experience with carpenters is as wide as almost any man of my age (57 years), having worked both in the large cities and in farming districts; on railroad work, such as machine shops, roundhouses, bridges; on factory buildings of many kinds, and such experience shows that the intelligent country carpenter in a prosperous farming community is a man who comes on the job prepared to take his own levels; establish his corners; make his own centers for masons; lay out his drainage; if occasion demands, make his door and window frames; make and erect his building and finish up the inside in a neat and workmanlike manner. The city carpenter, on the contrary, is a "specialist." He may be a lock fitter, and in eight working hours can put on 32 mortise locks, but would be as much at sea on a farm barn as a schoolboy. The country carpenter is a grandson of the man who could take a rifle, an axe and a 2-in. auger and go out into the wilderness and cut out a farm and a comfortable home.

Again, there is no comparison whatever between the mechanical skill required to square up a stick of timber from a long round log, take it out of wind, counter-hew it on two or three sides, mortise box, bore and tenon and make it fit for use in the old square timbered barn of our fathers and the skill required to saw, bore and box a plank, using an accurately made piece for a template. In fact, in the old days every man had to be a mechanic, and it was a custom among most of the foremen of my acquaintance, both on barns and bridges, to give every journeyman a private mark to put on the sticks he framed so that any imperfect work could be traced to its proper source. With the plank frame any man with sufficient knowledge of a steel square to make a drawing of half a bent and then work from the drawing correctly, can get out the templates from which the entire structure can be framed.

"Lumberman" next raises the question, "Is it not a fact that to obtain the strength required the joints must be made as nearly perfect as possible?"

This of course cannot be considered a criticism on carpenter work, and needs no reply. Joints that do not fit are not carpenter work, and would not pass on ship building, house building, pianos or any class of woodwork. Then why suppose bad joints on barns? Besides, if "Lumberman" had ever tried to get the pins into an old-fashioned barn frame where the joints did not fit, would he raise the point at all?

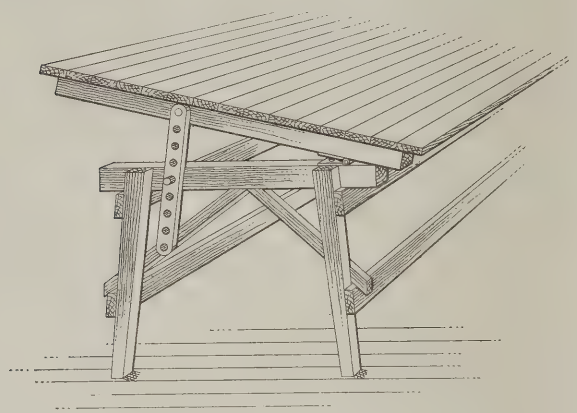
His third objection as to dry timbers also falls to the ground without an argument. We concede his point that dry timber is best for any kind of woodwork. But suppose, as everyone knows, all wood structures are framed of green timbers; which is best, that we mortise and tenon two pieces of timber together so that the shrinkage of the mortised stick has either to draw all the "pull" out of the pin in the tenon, leaving a loose joint with the end wood of the tenon split and drawn out whatever the mortised timber shrunk; as one will find in tearing down almost any old frame structure; or might it not be easier to remedy if the structure was constructed of plank laminated together and bolted, so that by a turn of the wrench on a rainy day everything could be made as solid as it was the day it was raised and bolted up.

The last point raised by "Lumberman" is that the ends of the barn will be bulged out by pressure from within. If he will kindly refer to my article and examine the sketch on page 17, "Elevation of Side Framing," he will see that the beams are securely braced to both bearers of the mow floor, which makes the gable immovable; whereas with the old construction we should simply have an 8 x 8 beam 30 ft. long. If the beam seasoned crooked we would have had a crooked gable.

In conclusion I must say that I have never had anyone look at my plank frame barns who has not unreservedly pronounced them strong enough for any emergency, and every possible strain or pressure met and controlled.

Something About Drawing Boards

From O. B. M., New York City.—In reply to the correspondent writing recently from Charlottstown, P. E. Island, as to the forms of large drawing boards in use by architects in New York City, I would state that they are many and various. Some prefer those made of boards of different width placed on two or three movable horses or trestles, with sloping tops made to the angle with the floor desired, while others prefer flat tables with drawers fitted with legs for storing drawing materials and having shelves underneath for preserving plans, sketches and details in a flat position. On these small or large boards are



Something About Drawing Boards

placed, according to the size of the paper, tracing cloth, etc., to be worked upon.

These tables are about 2 ft. 6 in. or 2 ft. 8 in. in hight, 3 ft. in width and 4 ft. or 5 ft. in length, with 3 x 3-in. legs, well built of seasoned pine wood and placed in the best—generally the northern—window light.

An excellent form of table is that shown in the accompanying sketch, which represents a partial perspective view. This table is portable and adaptable to any slope, at the same time it can be used as an easel or board. For very wide drawings two tables can be used back to back, and if the drawings be very long, as in the case of a very many storied loft or office building, they also are made long to suit, and the T-squares are applied across the surface, working from left to right and right to left, moving the horses and boards around so as to keep the light, be it artificial or daylight, constantly over the working edges of the triangles and T squares.

The construction of the boards themselves must be done most thoroughly and systematically so as to prevent possible shrinking and warping. The strips, always of white pine, are narrow, being not more than 3 in. wide and 1⅛ or 1⅜ in. thick. They must be very carefully selected, all hard or pith heart wood, or curly cross grains being avoided. The running direction of the grain must be constantly reversed and the pieces turned over. The edges must be straightened and doweled or tongued and grooved, then heated in a hot box and glued in iron screw clamps. Afterward the board must be battened on the bottom side before being released from the iron clamps. After all this has been done it is carefully planed off with jointer and fore-planes, smoothed to a straight surface and sandpapered to a glass-like surface so that all indentations and lumps shall have been removed.

It is desirable that this carpenters or joiner's work should be done in the office or room in which the board is to be used, as exposing it to the outside atmosphere and then bringing it into a heated or cool room will be very likely to change its shape or condition. If so desired, however, the stuff may be prepared and left at least a week in its permanent home before being put together for final usage.

Pivotal, tilting or swivel tops are too liable to move while working upon them to render them desirable types of drawing boards to use in an architect's office. In connection with large drawing boards, however, it may be suggested that the use of stools with revolving screw tops greatly aid in reaching the work on the boards, while at the same time resting the draftsman.

Finally large drawing boards should be far enough away from windows and walls so that the draftsman can work from every side.

The adjustable drawing board shown in the sketch is hinged at one side and its angle with the floor is regulated by means of the vertical bar and the wooden pin which is inserted in the different holes according to the angle required.

Information Wanted on Setting Tile

From W. H. D., Latrobe, Pa.—Can any of the practical readers of the Correspondence columns tell me how to set tile such as would be used in bath rooms or offices for floors and side walls, also mention the different kinds best adapted for the purpose and tell how to mix the mortar. In tiling a room, at what point should the work be commenced or is this immaterial?

How much work of this kind ought a man to be able to do in a day? What tools are needed and how much ought the workman to receive per foot for setting tile? This appears to be a subject on which comparatively little has been written, and I have thus far been unable to find anything which would throw light upon it, or give me the information that I desired.

Note.—If our correspondent has files of the *Building Age* as far back as 1907, at which time the paper was known as *Carpentry and Building,* he will find in the issue for April a very interesting article which illustrates and describes the method of setting tile under various conditions.

In the issue for June, 1907, is an article illustrating and describing the proper method of measuring floors and walls for tiling, and in the issue for March, 1908, is a short article giving specifications for setting tile. These articles contain much that is of value in regard to the setting of tile and cannot fail to prove of assistance to the correspondent presenting the inquiry above.

Lettering on Drawings

From C. H. Meeker, New York City.—I am sending a few samples of lettering for architectural draw-

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1234567890 *1234567890*

I II III IV V VI VII VIII IX X XI XII

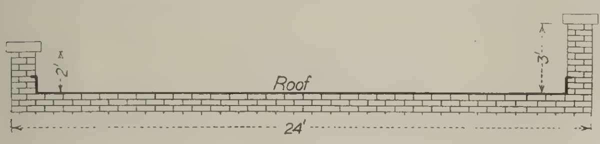
Lettering on Drawings

ings which may be of interest to the correspondent who recently inquired for specimens of this nature.

From A. W. A. E., East Orange, N. J.—Referring to the request of "W. H. M.," Clebourne, Texas, in regard to lettering on drawings, I would say that in many years' experience I have found very helpful what I learned in Reinhardt's book. One great advantage of this book is that it not only tells "how to do," but "how not to do." The "single stroke" letter is now used for a great many working drawings on account of the ease with which it can be made and read.

Why Does the Roof Leak

From G. M., Canton, Ohio.—I am an interested reader of the columns of the *Building Age* and come to the Correspondence Department for information: I have a brick building with store-room below and flats above and the building leaks on one side although the roof appears to be perfect. The roof of Rubberroid is 22 x 70 ft. in area and is flashed with the same material well bedded in the joint above the



Why Does the Roof Leak

third brick with Portland cement and united to the roof with a good supply of roof coat cement to make a good job. I also gave it a good coat of this compound, especially the seam of Portland cement and the first brick above the flashing.

If I had my way I should have placed a turning board in the corner of the roof and the fire wall, but this would be of no benefit further than to slide a deep wet snow at the time of a thaw away from the fire wall. I did not have my way, however, and the superintendent told the owner the board was not needed and was a waste of some 160 lineal feet of 8-in. board. I should say so, too if we did not get any deep drifting snows, but we do get them and they melt, and if it leans against a brick it drinks the water and should there be a hard freeze the following night some of the mortar joint is pushed off.

The brick contractor placed two experienced bricklayers on the job, the building being on a corner and the front and right-hand sides face the streets—and he wanted these to look the best the men knew how to make them. So far as known they did not get any mortar in the air vent while they were doing the work. Should the cap leak the water might run down this vent for many courses or until spent.

The other side was laid by two amateurs who, as I could notice, dammed the vent or made it almost solid. Now when the water hits this it apparently scatters as easily as to go on. The cap stones average on the fire wall 29 in. and on the higher one 48 in.

The sketch which I send represents a front elevation of the upper part of the building showing roof flashings and fire walls. Could the leakage be the fault of the fire wall, which is much lower on the side where the leak occurs than it is on the opposite side?

Laying Floors by the Carpenter

From J. H., Chicago, Ill.—It is rather amusing to read the article which appeared on page 650 of the December issue of the *Building Age* and bearing the above title. It certainly shows that the person who wrote it does not fully appreciate under what conditions the carpenter has to work now-a-days; at least in the big cities. Among a hundred carpenters there are certainly more than 80 skilled workmen who know how to make a good job and like to do it, too, but are prevented from so doing. All that is required of them is to bring a lot of good work into sight. The carpenters in the big cities working on apartment buildings and flats are virtually driven like slaves; no time is allowed in which to make a fancy job—not even a good job, no matter what the work may be.

I had some experience of this nature to-day that reminded me of the article in the *Building Age*. I started to lay a floor in a 20-flat building when the foreman told me that a lot of floor was to be laid, and said: "Don't nail every strip—just lay a lot of floor; that is all we care for." Then they place a carpenter in the other room and you have to try to beat the other fellow or out you go. There is no question as to going on your knees and driving the nails home with your nail set.

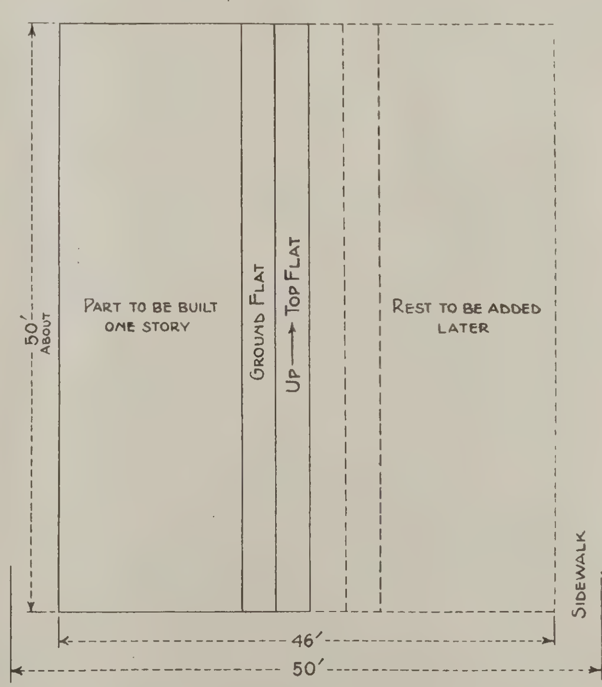
Then, again, from the contractor's point of view he has to take the job at a low figure, otherwise he don't get it; so that he is actually obliged to drive his men and skimp the work wherever possible in order to come out ahead and be able to buy an automobile.

Lining the Chimney Flues

From U. P. G., Lewisburg, Pa.—Will some of the practical readers of the paper advise me in regard to flue tiling for chimneys? I am told that tiling will crack, but I wish to run a flue lined with tiling up through my rooms to connect with a furnace, but am advised not to use tiling, as it will crack from the heat and sulphur. Will some one tell me whether to use tiling or brick. I want something I can use at once.

House Plans and Elevations Wanted

From Canadian, Toronto.—I have been a subscriber to the *Building Age* for three years and have found it of great benefit to me. I am 23 years old and I want to build a house. I have 50 ft. of land and I want to



House Plans and Elevations Wanted—Diagram Submitted by "Canadian"

build a house upon it so that later on I can make a four-suite apartment house by adding to it.

Will some of the architectural readers help me with plans and elevations for such a building? The idea I have in mind is indicated by the diagram enclosed.

Increase in Safe Load on a Reinforced Concrete Floor

From G. E. S., South Orange, N. J.—Referring to that installment of the article "Work and Methods of the Concrete Contractor" which appeared in the January issue of the paper, it is stated in the closing portion, as I understand it, that by designing with a safe steel stress of 15,000 lb. at the end of one year the construction is good for double the live load for which it was originally planned. I am unable to see this when the formula

$$M = .87 \times 15{,}000 \times d \times A$$

is taken into consideration. Two factors in this formula would change the 15,000 to 18,000 and a slight increase in factor .87 making therefore an increase of slightly over 20 per cent. in the original total moment or load.

Since in floor loads the live load is usually much more than half the total load I am unable to see how the strength is doubled as to live load. Will Mr. McCullough kindly throw additional light on this point?

Answer.—The communication of our correspondent was referred to Mr. McCullough, who comments upon the questions raised as follows:

I thank "G. E. S." for his inquiry relative to the increase in safe load on a reinforced concrete floor. The present tendency in building ordinances, due to competition among companies selling steel, is to permit very high steel stresses, sometimes as high as 20,000 lbs. per sq. in., and also high concrete stresses. Buildings are thus designed with very small amounts of steel and the strength is permanently fixed by the steel. I recently gave an example showing how the steel stress is lessened only about 2 per cent. due to an increase of 50 per cent. in the concrete stress.

My contention, and in this I have the support of the majority of engineers who have studied the subject closely, is that owing to the fact that concrete does increase in strength with age we should take advantage of this in designing so that a low steel stress will be used and when the concrete through age becomes stronger there may be permitted an increase in the steel stress. In the example chosen the assumed concrete stress was 650 lbs., the steel stress 15,000 lbs. and the ratio of deformation = 15. Referring to the table given on page 577, November, 1911, issue of *Building Age* and using the slide rule to make the calculations, the steel ratio was found to be 0.00853 and the moment arm = 0.872 d. By assuming a ratio of deformation = 8 by the time the concrete has increased 50 per cent. in strength the moment arm =0.90 and the steel stress = 17,900 lbs. The actual increase is a trifle over 20 per cent., as stated by "G. E. S."

At this point for such a high stress in the concrete I made use of the parabolic formula, instead of the straight line formula, and found the increase in actual strength to be somewhat greater. This, however, was pretty well taken care of in the smaller ratio of deformation. The day the article was written the work of rechecking a design of a building made by another engineer for an architect had been completed by me. This building was typical of 75 per cent. of the buildings the average contractor will encounter, the lower floor being designed for a live load of 100 lbs. per sq. ft., the second floor for 75 lbs. and the upper floors for 50 lbs. There is at present a marked tendency towards long span construction and in the building mentioned the total dead load, which included floor, flooring, partitions, etc., was 75 lbs. per sq. ft., with a live load of 50 lbs. This gave a total load of 125 lbs. and a 20 per cent. increase made it 150 lbs. Deducting the dead load left a total of 75 lbs. per sq. ft. live load, an actual increase of 50 per cent.

The owner of this particular building thought that later on, in three or four years, he might wish to use it for light manufacturing, etc., with a live load of practically 100 lbs., or double the original loading. The columns were designed with this in view, the increasing strength of the concrete being taken into consideration. It was considered by all concerned that if the steel stress was permitted to reach 20,000 lbs. the concrete stress would be 1150 lbs. and the increase would make a total load of 161 lbs. allowable. The assumed allowance for partitions was 10 lbs. per sq. ft., so this was deducted to permit large spaces for the work to be done in the space designed originally to be used for small offices. Deducting therefore from the total load 75 lbs. and adding thereto the 10 lbs. for partitions, the total live load was brought up to 96 lbs. per sq. ft., so close to double the original live load that it might be said to be doubled. There were some things I might have changed if I had been the original designer, but in this particular instance I was merely employed to check the design of another man and give an opinion to verify or dispute one he had already expressed. I gave it as my opinion that in a year after completion the owner might use it for double the assumed live load used in the design, knowing that as concrete is twice as strong in 5 years as it is after 30 days, the steel stress may be kept well below 20,000 lbs. at all times, whereas if the steel stress in the design had been between 18,000 and 20,000 lbs. the owner could never have taken advantage of the great increase in the strength of the concrete.

In expressing myself as I did in writing the article referred to, this building, which had been occupying my mind for a week, was uppermost in my thoughts and the remark as to the increase in possible loading was made without going into full particulars. I wanted to bring out the fact that extreme economy in the use of steel is not really honest policy, so far as the owner is concerned. The men who pay for concrete buildings are aware of the fact that concrete strengthens as it ages and should be fully informed as to the limitations they impose upon themselves by permitting high stresses in steel with a view to saving on steel. Concrete is more expensive than steel and undue economy in steel increases the total cost of a building. That is, it increases the first cost by using more concrete and limits the loads that may be carried, so we see that an owner given a small amount of steel in the beginning, with false ideas of economy in his mind, pays for this ignorance every year the building is used by being limited in his ability to use it. The best definition of engineering is that by Wellington, which reads, "Engineering is the art of doing that well with one dollar which any bungler can do with two after a fashion." My remarks were a protest against the present fashion of permitting the steel salesmen, acting as designers for reinforcing companies, to fix stresses in building ordinances and practically control the design of buildings in this material which is to-day creating such interest in building circles. It is practically the only material known which does not deteriorate, but which improves with age.

I know that some of the readers by this time may say I am explaining and taking back water, because I could soberly tell an owner that his building could carry twice the assumed live load at the end of a year, thus apparently putting myself up as an advocate of high stresses. There is an apparent inconsistency, but the difference is really great. According to the building ordinances of several cities a designer can use a fiber stress of 800 lbs. per sq. in. in the concrete and a fiber stress of 20,000 lbs. per sq. in. in the steel. The steel is therefore stressed as high as it ever should be stressed, right from the start, and the concrete is stressed very high, much higher than green concrete should be stressed. Assuming however that the concrete suffers no injury it increases in strength so that at the end of a year it is considerably stronger, but the steel cannot safely be stressed any higher. Moreover, as the steel is stressed extremely high we can hardly be said to have an increased factor of safety by reason of the increased concrete strength. By my method, and it is followed by conservative designers, the building is originally designed with a reasonable concrete stress and a low steel stress. The relations are such that neither material is unduly stressed by any load that might be imposed, if not in excess of the prescribed loading, but when the concrete is aged the loads may be increased. Under the ordinance the designer tells an owner a certain floor can carry a live load of 100 lbs. per sq. ft. from the start and it should never carry any more. Under my method the owner is informed that if he wishes a floor to carry 100 lbs. per sq. ft. he will get it, but that neither material will be unduly stressed and that at the end of a year or so he can carry 200 lbs. per sq. ft. If 100 lbs. per sq. ft. is all he figures he will ever want then the floor can be designed for a somewhat lighter load, if economy is sought, and the loading increased as the building ages. Under this latter plan there is essentially no difference from the plan pursued by the man using high stresses *in case the owner loads his floor to the limit soon after construction.* It has been my experience, and also that of many men who have been engaged in building work many years, that old buildings generally fall into the warehouse class. Usually the building is first used for office purposes, then as the character of the neighborhood changes it is partly given up to light manufacturing and manufacturers agencies carrying stocks of samples. Finally the building becomes a warehouse and it is not uncommon to read of overloaded floors giving way.

In reinforced concrete we have a material that is admirably adapted to the changing character in the uses of buildings, because as the building gets older the floor loadings are apt to increase, which is bad when wood or steel, which grow weaker with age, are used for structural purposes. The reinforced concrete designer should therefore stick to low steel stresses and use only open hearth medium steel, deformed in some way, knowing that he is thus giving the owner every possible benefit that he is entitled to when he is persuaded to use reinforced concrete as the structural basis of his building. Two way reinforcement should also be used when possible for the concrete stressed in two directions becomes then restrained and prevented from breaking sideways. We can thus practically double the concrete stress by having the same stress acting at right angles. This was seen in the recent article on concrete footings where the footing was designed as if 8 beams crossed under the column, the extra compression from all sides contributing to the strength and density of the concrete.

Automatic Farm Gates

From J. L., Fort Reno, Okla.—I have been a reader of the *Building Age* for the last 12 years and now come to my brother carpenters for some help. I am to erect several automatic farm gates that may be opened and closed in some manner without the driver leaving his seat on a wagon. As I have never seen any such gates I am puzzled as to how to construct them. Any suggestions which my brother chips may offer on the subject will be greatly appreciated.

Note.—We shall be glad to have those of our readers who have built gates of this character send us pictures of them to be published, in connection with detail sketches showing how the gates are constructed.

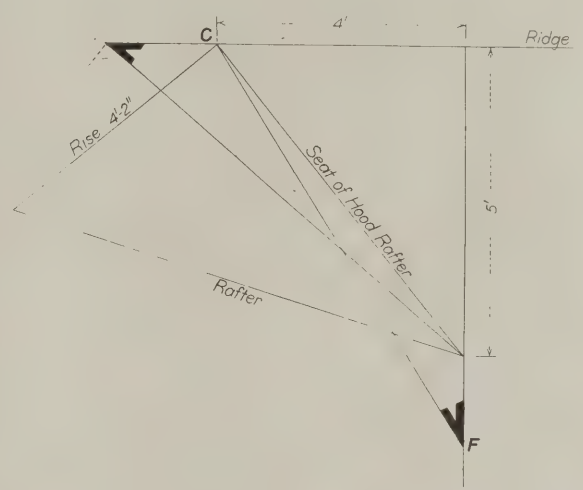
Repairing Shingle Roofs

From Carpenter, Montreal, Canada.—I would be very glad indeed to see published in the Correspondence columns a few letters from some of the practical readers of the paper illustrating what they consider to be the best way of repairing shingle roofs or gables where the shingles have been torn off or broken away.

Obtaining Bevels in Roof Framing

From J. MacV., Providence, R. I.—In the diagram submitted by "J. C. I.," of Oconto, Neb., as a solution of the problem which was presented by J. F. Johnson in the November issue of the paper, there are inaccuracies to which I feel attention should be called. In Fig. 1 of his diagrams for finding the length of the run of the hood rafter he used the rise 4 ft. 2 in. instead of 4 ft.—the distance out from the building.

His figures for finding the bevels are not correct. For the top bevel on the lower end of the rafter the figures should be 6 7/16 in. on the blade and 4 in. on the tongue. For the bevel against the ridge they should be 5 11/16 in. on the tongue and 5 in. on the blade.



Obtaining Bevels in Roof Framing—Diagram Submitted by J. MacV.

My advice to Mr. Johnson is not to rely altogether on the steel square as a means for finding the various cuts and bevels, but also to practice them by the use of diagrams. Once this branch of the science of framing is understood it becomes an easy matter to find any and all cuts and bevels used in building construction.

I herewith send a diagram which I hope may prove helpful to Mr. Johnson. I think no explanation of it is necessary further than to say that the point F is found by laying off the length of the rafter from the point C.

Holding Power of Nails

From C. J. H., St. Louis, Mo.—Will some one please tell me through the Correspondence columns of the *Building Age* the formula, if there is one, showing the power to draw out nails from timber; that is, for different sizes of nails and various kinds of lumber? I want to know, in fact, what is the holding power of nails in timber.

Note—It is possible that our correspondent will find a partial answer at least to his question by referring to his file for August, 1895, when the paper was known as *Carpentry and Building,* in which appeared an article on the "Driving and Pulling of Cut and Wire Nails." The matter consists of extracts from a paper read by Prof. R. C. Carpenter before the American Society of Mechanical Engineers, and described a series of experiments in driving and pulling nails in Southern pine wood. The cut and wire nails used in the series of experiments ranged from 20 d. to 6 d. The depth the nails were driven into the timber was given, also the work in inch-pounds required in driving and pulling them.

Another article bearing on the holding power of cut and wire nails appeared in the issue of *Carpentry and Building* for July, 1898, and consisted of extracts from a paper read by Professor Soule of the University of California before the Technical Society of the Pacific Coast. The nails were driven in Douglas spruce, otherwise known as Oregon pine, and in redwood. The points which it was particularly desired to clear up by the test were the relative merits of cut and of wire nails; the merits of different surfaces on the nails; the best shape of nails; also of points; the relative holding power in the woods mentioned; the best relation between the length of nail and the thickness of board nailed by it, and the effect of time upon the holding power of nails in the cases of the kinds of timbers mentioned.

We shall be very glad, however, to have our practical readers tell of any experience which they may have had in determining the holding power of nails.

Trouble with Graining Machine for Imitating Quartered Oak

From W. T. D., Waynesboro, Va.—I have been a reader of the paper for a number of years and have noticed in the Correspondence columns that questions are presented for answer and as I am in need of information I come to the practical readers for such help as they may be able to give me.

My trouble is this: I have a graining machine for making imitation quartered oak. To make the transfers I use a composition roll such as are to be found in connection with large printing presses and I am having trouble with my composition. I clean this composition, which is 7 in. in diameter, with a steel scraper and with the constant use the roll becomes faced or smooth and will not pick up the ink or make a perfect point.

The roll I am using is composed of a good grade of glue, glycerine and sugar. The life of the roll is so short that the high price we pay for glycerine makes the roll very expensive, and I therefore ask if any one can suggest a material of which to make a roll that will give good results and yet will not be so expensive.

I mold the roll in a brass tube with a wooden core and I am bothered with blisters or air bubbles in the composition, which often renders the roll worthless. I have tried various ways but with poor success. I warm the mold and pour it from the bottom, but the air bubbles remain.

Any information in regard to a cheaper material and the handling of it will be greatly appreciated.

What Readers Say of the *Building Age*

From F. H. T., Topeka, Kan.—In renewing by subscription to *The Building Age* I desire to mention that up to June, 1903, I had the twenty-five volumes of *Carpentry and Building* uniformly bound and I consider them the most practical and useful architectural works in my library, which up to that time had cost me nearly $1,000. I have renewed my subscription up to the present time when my days of usefulness are past, having lost all my property both real and personal in the flood of the Kansas River in May-June, 1903. I not only lost all of my property but my business as well and came out of the flood in such physical condition that I have been unable to do any manual labor; yet at my present age—77 years—I would feel entirely lost if I did not receive every number of the paper regularly. Of course, I cannot put to practical use any of the methods and suggestions which each number contains, but I am just as much interested in them as ever, and I hope the work will continue in usefulness as heretofore.

From W. C. C., Albany, N. Y.—I greatly appreciate the efforts of the editorial management in furnishing such a valuable magazine for building mechanics at so low a price. The quality of paper and print, together with the illustrations and diagrams, are certainly very neat and clean-cut.

Mr. Crussell's articles on the "Jobbing Carpenter and Some of His Work" are interesting, good and very instructive, but in saying this I do not wish to neglect any of the different authors, for they are all good, and I think a great deal of thanks is due to the contributors of the correspondence columns for the time and trouble they take in furnishing replies and diagrams to the many anxious inquiries for instruction. I would like to say to the different correspondents of this department that if any of them make a mistake now and then in the conclusions which they draw, that we judge them kindly rather than harshly, remembering that they have done their best for our benefit.

From J. W. W., Fallsington, Pa.—I would like to say for the benefit of others that I am very much pleased with the articles which have been running in current issues from the pen of Edward H. Crussell, and I hope he will keep up the good work. I wish to say, however, that the entire magazine is remarkably good.

A Fireplace for Heating Purposes

From Z. C. M., San Francisco, Cal.—Will some of the readers describe in the Correspondence columns the proper way to construct a large fireplace—one that is meant for heating purposes and not ornament. I would be glad to have the correspondent replying describe how the heat can be thrown out into the room instead of going out through the chimney; also how the fireplace can be kept from smoking in case of wind blowing down the chimney.

I wish to say that I have yet to see a fireplace that is good for anything except its cheerful aspect.

Answer.—We referred the query of our correspondent to Lawrence S. Keir, the author of the articles on Fireplace Construction which appeared in these columns not long since, and he submits the following comments

In the first place let it be understood that an open fireplace can never be expected to give the heat that a stove would, and it can, therefore, be relied upon only for heating purposes in moderately cold weather, and seldom if ever satisfactory when the temperature is much below freezing. Nevertheless, fireplaces have their uses and no home is really complete without one or more of them; but as the correspondent truly says, properly constructed ones are the exception rather than the rule. Contrary to the average mason, and I am afraid we will also have to include a large number of architects and builders as well, a fireplace is not merely a hole in the chimney with a more or less elaborate mantel built around it.

In order to secure the best results from a fireplace the following rules should be observed:

The depth of the fire opening should be at least 16 in. and unless the opening is more than 3 ft. wide the hight of the opening should be but very little if any more than 2 ft. 6 in. at the highest point, unless the opening is made 20 in. or more in depth.

The bottom of the arch should not be more than 4 in. wide.

If the face of the mantel is to be thicker than 4 in. a second arch can be turned back of the face arch and a few inches higher up, as shown in Fig. 1 of the sketches. The throat or damper must extend clear across the opening and should be about 3 in. wide. There should be a wind-break back of the throat and at least 6 in. above the arch. This is clearly indicated in the sectional view, Fig. 2. There should also be a smoke chamber to allow for expansion of the heated gases, care being taken not to make it too small and also not to draw in the sides at too sharp an angle. The flue should be at least one-twelfth the area of the fireplace opening, although one-tenth is better. The back should be brought forward gradually and it is better, though not essential, that the sides of the opening be splayed.

The flue should start directly over the center of the fireplace, or nearly so, and should have no sharp turnings, all angles or offsets being made gradually. Keep the flue as nearly square in section as the size of the brick or tile will allow. A round flue is even better, but round chimney tile are difficult to obtain in some places.

It might be well to state that an 8½ to 12½-in. brick flue will draw equally well with a tile lining, even though the flue is an inch smaller each way when chimney tile is used, because the flue is smooth and more uniform.

The correspondent in California does not say how large a room he wishes to heat, but the fireplace shown in Fig. 3 and in plan in Fig. 4 is the same size as one recently built by me, and which heats a room 14 x 18 ft. very satisfactorily. The drawings shown may be regarded with confidence. I have been following the rules laid down for some time, and although I do my fireplace work on the "not-satisfactory-no-pay" plan, I have never yet lost my pay.

In connection with the fireplace we should never forget that the chimney construction is equally important if we expect good results, and the correspondent touches on one of the most important points when he asks how the wind may be kept from blowing smoke into the room.

The first requirement is that the chimney extend at least 2 ft. above the highest ridge of the house, and the next requirement that a wind-break be built in the fireplace, as shown in the sectional view, Fig. 2. When there are high trees around the house it is well to have a stone or cement cap over the chimney and about 8 in. above the top of the chimney opening.

The fireplace is often fitted with an iron damper which may be closed when there is no fire, and thus keep the soot from falling down.

For the benefit of any one who may wish to change the size of the fireplace, it may be stated that the one shown may be made with an opening 4 in., or even 8 in., wider without changing the other proportions in the least, but always remembering that the flue would have to be made larger to keep within the one-twelfth of the fireplace opening—always try to have the flue one-tenth—this is the smallest that should be allowed.

The fireplace here illustrated will stand an additional 2 in. in hight in the arch if really necessary, but should the opening be made any higher than this an additional 4 in. in depth will be required, and if the arch were higher than 3 ft. the opening would require still another 4 in. in depth.

When the fireplace is made wider a larger flue is necessary; when the fireplace is made higher the flue is made larger and the fireplace deeper. The flue is not changed for additional depth of fireplace. The throat remains 3 in. wide no matter what the other dimensions may be, and the wind-break should always be at least 8 in. wide.

If any reader desires additional information on the

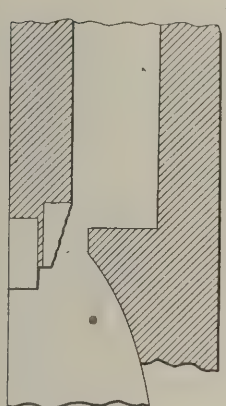


Fig. 1—Section Showing Construction when Face of Mantel is More than 4 in.

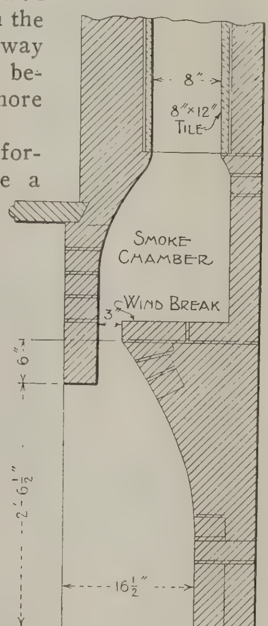


Fig. 2—Vertical Cross-section Showing "Wind Break" and Smoke Chamber

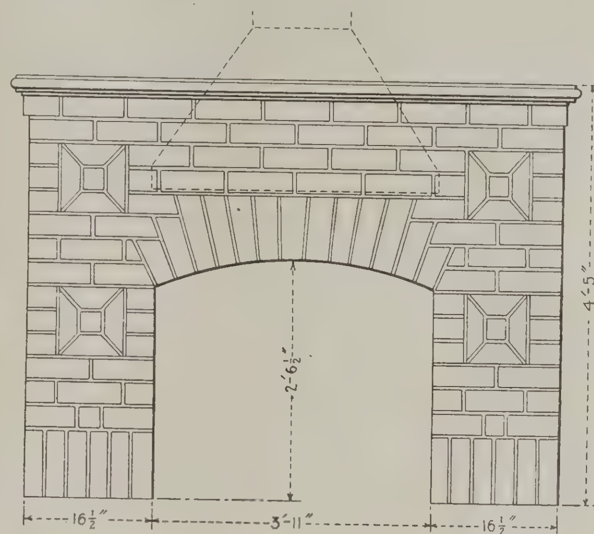


Fig. 3—Front Elevation of an Open Fireplace

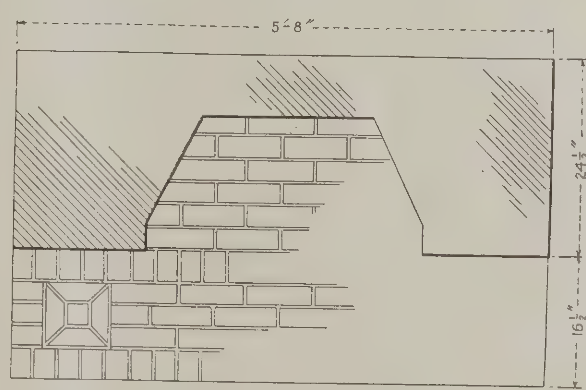


Fig. 4—Plan View of Fireplace Shown in Previous Figure

A Fire Place for Heating Purposes—Suggestions by Lawrence S. Keir—Scale, ½ in. to the Foot subject of fireplace construction I shall be very glad to answer through the Correspondence columns of the paper any questions that may be asked.

Piling Lumber in Confined Space

From J. Crow Taylor, Louisville, Ky.—Lumber piling is really a more important matter than the average builder gives it credit. Proper piling is essential to keep lumber straight and in shape to work, and careful piling will serve to straighten many of the crooks out of lumber that is warped. Therefore, it was interesting and proper to have an article on lumber piling for the builder such as appeared in *The Building Age* for December, but one offering an idea of this kind should be careful about what he offers. The fact of the matter is that there is room to criticise the illustrations shown, and the fact that they were in error emphasizes the importance of some specific knowledge on the subject of lumber piling for the benefit of builders.

Take the method of piling finished lumber as illustrated in Fig. 3, page 656, in *The Building Age* for December and the error in the illustration is so palpable that it is a wonder that any man undertaking to instruct people about piling lumber would make it.

There are shown four series of cross piling strips and only three foundation timbers. The center foundation timber instead of being under one of the tiers of piling strips is midway between them, which means that the lower board of the pile will bag over that middle foundation timber.

The correct way for laying out a pile of this kind with four tiers of cross strips is to have four foundation timbers, one under each tier of cross strips and, of course, have them carefully leveled so that the pile foundation will start off straight.

The other error in the illustration is the failure to put the front tier of cross strips out to the end of the boards. This is one of the first rules of lumber piling among the mills—to put the piling strips out flush with the ends of the lumber. This is the means used to prevent excessive checking of the ends of the boards. Moreover, if it were practical the piling strips of both ends would be put out flush, but generally there is some variation in the length of the lumber. Consequently, one end, what is called the front end, is made straight and the piling strips are brought out flush or even extended a little beyond the boards as a protection to the ends.

Then, always when there are tiers of cross strips in the pile, these are put directly over the foundation timber.

Another point that is not touched upon in the former article, and is perhaps of not as much importance to the builder as the mill man who cuts green lumber and dries it, is the giving of a slant or pitch to the lumber pile.

Where proper regard is had for piling the foundations are not level, but are slanted or pitched backward, the front end being from 6 to 18 inches higher than the back end, depending on the length of the pile and the habits of the people in the matter of giving pitch to a pile.

The first object in this is so that in covering over a pile it will make a roof-like water-shed so that it will keep the rain water from sifting through the pile, although this is a minor consideration. The main object of giving pitch or slant to lumber in a pile is to facilitate drying.

Most of the moisture from lumber escapes out the end and it always will run out the end easier than it will work out through the side faces. That is why some lumber is stood on end for drying, and this point was touched upon in the article referred to, where was illustrated a piling rack where lumber was stood on end for rapid drying.

To give slant or pitch to a lumber pile is not as good as to stand it on end in the matter of facilitating the escape of moisture, but it does assist materially the drying process by giving a slant that will encourage the escape of the moisture, and this is the main object of giving pitch or slant to the lumber pile.

After lumber has been dried and is simply to be piled for safe keeping and future needs it is not so important to pile it with a pitch. Indeed, if it is thoroughly dry it is not important to use cross strips if it is piled inside of a shed, except it be such lumber as absorbs moisture freely from the atmosphere.

Ordinary dry pine lumber may be bulked down in a shed where it is dry on a flat solid foundation, and it will keep very nicely and keep cleaner than if there were cross strips between it.

When it comes to cypress, however, it seems to take up moisture out of the air during rainy weather and sometimes a pile of cypress weather boarding, for example, tied up in bundles and piled down in a compact pile will show moist and damp after it has been piled for six months or more.

So, if you have cypress weather boarding to pile up, either in the shed or out of doors, take heavy cross strips, pieces of bridging or something, and treat each bundle as if it were a board. In other words, put cross strips between each layer or series of bundles and thus get air in among the piles that it may dry out thoroughly.

Poplar or pine weather boarding that is thoroughly dry may be packed down in the shed tight and it will keep all right, but cypress shows such an inclination to take up moisture out of the air that the safest thing to do with it is to get cross strips between it, even if it is dry and is being piled inside of the shed.

Cobblestones for Foundation Walls

From Mason, Redford, N. Y.—I have been in Oakland, Cal., and am sure frost will not do any harm in Alameda. In the section of the country where I live we use cobblestones a great deal. The best way for "Young Mason" whose letter appeared in the February issue to make use of them for piers is to place a board, say, 12 in. wide, 2 in. inside the "form" all around and have the concrete and cobblestones ready. Fill this 2-in. space with 1:1 mixture while the batch is mixing. Make the concrete quite soft and shovel in. Wash the cobblestones, or at least have them clean, and then dump them in, the largest first, and ram them home all over it; no matter if some do bob up, for you will cover them next time. If you put the stone first you will never get the concrete around the bottom if you use crushed stone. When the stones are well rammed next to the boards take them out and ram some more. For piers I use a 1:3 mixture and for foundations I vary it according to their uses. Thin walls require to be very strong.

Adapting a Substructure to a Larger Wooden Tank

From J. L. K., Holyoke, Colo.—I have read the *Building Age* for many years, and would have profited more had I studied its columns closer. Am sending sketches of a tank tower 8 ft. high, 8 ft. square at bottom, and 7 ft. square at top. The sides are weather-boarded. The tank on it is 8 ft. in diameter and 6 ft. high. I would like to know if the same support will serve for a tank 8 ft. in diameter and 10 ft. high; if not, what changes should be made?

Answer.—A practical reader furnishes the following comments on the question raised by the correspondent above: Figs. 1 and 2 represent the correspondent's original sketches, Fig. 1 having been altered somewhat by removing three 4 x 6 pieces now indicated by dotted lines; substituting the 2 x 10 joists, and removing one 2 x 4 piece in the center of the side and replacing it with a 4 x 6 in. taken off the top. The opposite side would show the same. The center truss (2 x 4 flanked with a 2 x 8 piece at each side) supported at the ends, indicated in Fig. 1, is shown more plainly in Fig. 2.

There is no doubt that the old structure, in good order, would support the larger tank mentioned, so far as the vertical members are concerned, but tank bottoms are none too thick and need well-distributed supporting bearings; then, too, a structure already old may need looking into, and if in good order now, might deteriorate in a way to give very unequal support long before the new tank showed serious decay. For this reason the writer would strengthen the structure in a simple way, regardless of present needs, and without going into any extensive figuring of the strains, because the way is easy, cheap and certain.

The top members of the structure, with an 8 x 10-ft. tank filled, would weigh in the neighborhood of 37,000 lb. The weight on the vertical members of any side, including shifting load from wind pressure, would never reach the load due, a total weight on structure of 40,000 lb. There appears to be four 4 x 6 and twelve 2 x 4 pieces in the old tower, a total section area of 192 sq. in. Taking 850 lb. as the safe load under a factor of safety of 4, this would put a load of something over 200 lb. per square inch on the uprights, about one-fourth of what good timber will carry under compression. The vertical members are therefore safe, but the tie-stringer upon which the ends of the old 4 x 6 joists rested (now replaced with 2 x 10 joists) should be strengthened by putting under the center one of the 4 x 6 pieces from the top. Also, as the ends of the 2 x 10 joists hanging on a single 2-in. piece at each end gives only about as much bearing surface under side compression as would be needed for end compression, and as side compression takes place with much less weight than end compression, it is best to add another stringer at each end of the joists, supported by gaining into the large members; this is shown in Fig. 3.

There is no need to remove the center truss. It can be blocked to a bearing under the new joists, and an extra stud placed under each end of the 2 x 8 pieces flanking the truss. This is also indicated in Fig 3, which illustrates the side of the tower at the left of that shown in Fig. 1.

Fig. 4 is a half plan view showing staves and tank bottom, broken to expose the damage under tank bottom and the joists on which it rests. Solid blocking should be placed between the joists, as indicated in one space in the sketches, to prevent any chance of side deflection of the joists. It is better not to floor over under the tank,—leaving the spaces open permits a free circulation of air, keeps the timbers dry and allows leakage, and snow that blows under, to fall through. If the space under tank must be kept dry, arrange a safe pan overhead, with pipe drain, and then do not box in the ends of the grillage. The projecting corners can be boarded over to make a better foot-hold, and may be covered with sheet metal back to the ends of dunnage to catch and shed the chime leakage outward if desired.

The sketches are not precise, but they plainly suggest that which a practical man can easily put into service with good effect,—a means of permanently keeping the tank bottom in the plane on which it is erected, and should remain.

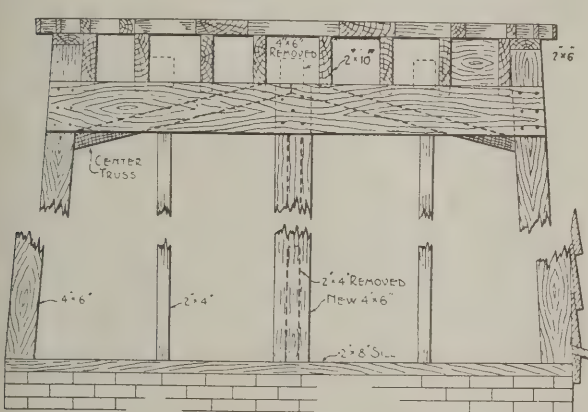


Fig. 1—Broken Elevation of Tank Support, Showing Substituted Joists and Posts

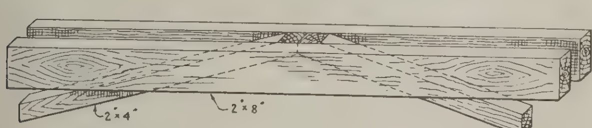


Fig. 2—Truss Now Under Center of Timbers

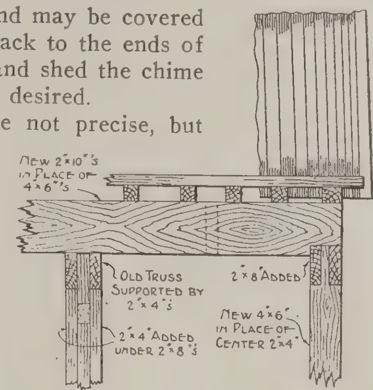


Fig. 3—Side View of Tank and Support with New Joists in Place as Viewed at Right Angles to the Elevation in Fig. 1

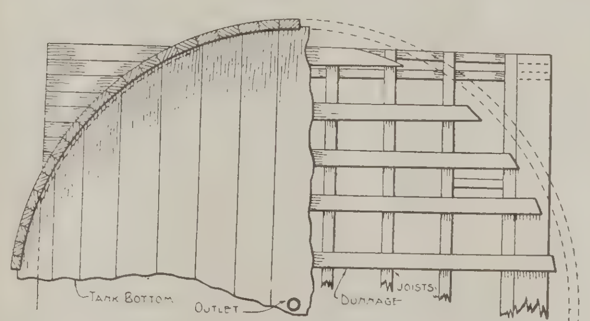


Fig. 4—Half Plan of Platform with Floor at Corners and Bottom Broken Away to Show Supporting Timbers

Adapting a Substructure to a Larger Wooden Tank

Methods of Making Compo or Plaster Board

From J. G., Wanganui, New Zealand.—Can any of the readers of the *Building Age* tell me of a method of making compo or plaster board without the use of expensive machinery or where I can get a book treating on this matter.

Black Ants as Wood Destroyers

From T. M., Colonial Beach, Va.—While repairing a frame house recently I found that the sills and corner posts were being destroyed by winged black ants, and they appeared to be making such progress that if not checked the whole house will be rendered unstable. I would like to ask the readers if they know of any way to destroy ants or treat the wood in such a way that they will not attack it.

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Formerly Carpentry and Building

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Index to reading matter, page 232.

APRIL, 1912

Opening of the Building Season.

By the time this issue of the paper reaches our readers the season for the building trades can be said to have officially opened. Naturally first thoughts are concerned with the prospects for the immediate future as it is a generally recognized fact that more branches of trade are dependent in large measure for their business upon the volume of building operations which take place throughout the country than is the case with almost any other single industry. Greater building activity means greater activity not only in the lumber business and in that of dealers in building materials of all kinds, but it immeasurably influences the volume of trade in the plumbing, the heating, the sheet metal, the roofing, the hardware, the painting, the decorating and the sash, door and blind trades, and so on through the whole category of things entering into the construction and finishing of a building. That this is likely to be a good year for building seems to be the opinion of many architects and contractors. According to the views of the former two changes in conditions were brought about by the general depression which existed the greater part of the year just closed. While the price for labor is about the same, mechanics are doing more and better work in a given time, and while the cost of material does not vary widely from the prices prevailing in 1911 contractors are charging less profit. Competition, however, is keen, good jobs are scarce and these conditions tend to bring about lower prices. Some architects express doubt that there will be conditions more favorable than those at present existing, for, notwithstanding present prices, building is as economical now as it was 10 years ago by reason of the fact that the work is more scientifically planned and there is less waste. In the view of some of the builders and contractors the competition existing in this important industry tends to the advantage of the prospective house builder while the plentiful supply of labor acts as a stimulus to the workmen, spurring them on to do their best in order to hold their positions. The greater the number of efficient workmen on a job the more the owner of the new house gets for his money. It is for these among other reasons that interest is now being so largely centered upon this important industry with a view to obtaining some sort of an idea of what may be required in the way of materials in the various lines indicated. Architects, builders and contractors generally are preparing for the activity that seems to loom directly ahead and they are naturally concerned in everything in the way of tools, appliances and equipment which are being placed upon the market calculated to facilitate the work of construction. In this connection the attractive array of varied and interesting articles appearing in this issue of the *Building Age* cannot fail to meet with more than ordinary attention. The designs which are given, the novel building operations which are described, the practical hints and suggestions to be found in the Correspondence columns, the birdseye view of building operations in leading centers of the country, coupled with the varied assortment of building tools, appliances and equipment illustrated and described constitute a contribution to the literature of the building business which we trust our readers will find both profitable and instructive.

Apartment House Heating

Health as well as comfort in the winter season is so dependent on the maintenance of a warm temperature in the home that there should be no class of building in which the heating installation should be made inadequate through a desire to cut down the cost to such an extent as to amount to a reprehensible greed. Sympathy will therefore be extended to the tenant in an apartment house in New York City, who recently moved from the building leaving unpaid rent amounting to $700 because he claimed the apartment had not been kept comfortable, and was not therefore habitable, thus automaticaly breaking his lease. When, however, the case was taken to court a judgment was rendered to the effect that he must pay the rent due. He appealed the case, and now the higher court has set aside the decision and sent the case back for re-trial to determine the fact whether or not the apartment was untenable by reason of insufficient warmth. Without doubt there are many unreasonable tenants in the world, but the majority of people residing in apartment houses in New York City know that it is quite frequently the case, the tenant is anything but comfortable during severe winter months through lack of steam furnished by the janitor of the building. It may possibly be that the equipment for maintaining a comfortable temperature is inadequate, but in the majority of cases it is probably due to lack of proper attention on the part of the janitor or engineer having the steam heating system in charge. The final outcome of the case in question will be watched with a great deal of interest, and it is to be hoped that the court will free the tenant from obligation.

Compulsory Installation of Country Plumbing

In certain sections of the West a movement is on foot looking to the compulsory installation of country plumbing, and at the annual meeting of the Illinois State Association of Master Plumbers, recently held at Decatur, the subject of the establishment of a State Bureau of Plumbing was considered at great length. In a paper on the subject read by a Chicago member the author referred to the unsanitary conditions so prevalent on the farm and in rural districts and emphasized the necessity of better methods of waste disposal from the country house and better methods of ventilation. His idea was that a State Bureau should be established which should have control of the sanitary construction of plumbing and drainage in houses and buildings in the State so that the farm house as well as the dwelling in towns and villages belonging to the poorer classes may be surrounded with as sanitary conditions as those of the wealthier classes in the cities. At the meeting in question a bill was drafted to be brought before the State Legislature at its next session which provides for the compulsory installation of sanitary plumbing in every building in the State.

Contractors' and Dealers' Association of California

About one hundred delegates from the principal towns and counties of California assembled at Sacramento, Cal., on Thursday, March 7, to attend the first State convention of contractors and building material dealers, with the object of forming a central state organization. The convention lasted three days, closing Saturday evening, March 9, the meetings being held at Pythian Castle, Ninth and I streets.

The organization was successfully formed, under the name of the "Contractors' and Dealers' Association of California." The principal purpose stated was to maintain industrial peace by agreements with labor unions and to prevent sub-contractors, dealers, laborers and owners from being defrauded on contracts.

The officers elected for the ensuing year are as follows:

President.......... W. S. Simmons, Sacramento.
First Vice-Pres..... J. E. Steere, San Francisco.
Secretary .... Frank Smith, Sacramento.
Treasurer.......... T. M. McShane, Sacramento.

The first session took place at 2.30 p. m., March 7, with Fred G. Parker, of Sacramento, in the chair. Addresses were delivered by W. S. Simmons, H. C. Muddox, W. D. Scovil, A. Anderson, Frank Smith, T. McShane, and others, and committees were named to complete the details of organization. The delegates were entertained at a smoker in the evening.

The principal business of the convention was accomplished at the morning and afternoon sessions Friday, March 8, which were held behind closed doors.

The morning session was largely devoted to the discussion of the Constitution and By-laws drawn up by the committees previously appointed, and the discussion was continued into the afternoon. A spirited debate took place between the Sacramento delegation and the delegates from the San Francisco Bay district, on the question of including general contractors with subcontractors and dealers in the membership, the associations around the Bay having formerly included the general contractors. The Sacramento people had the better of the discussion, and general contractors were excluded.

Another feature of the Constitution, which was adopted during the afternoon, is the endorsement of the closed shop.

With the final election of officers the session adjourned, and a banquet was tendered to the visiting delegates by the Sacramento Association in the evening. The actual work of the convention was completed on Friday, and Saturday was spent in an automobile trip to Folsom, Cal.

Change of Date of Real Estate and Ideal Homes Exhibition

Announcement was made on March 10 by the management of the Real Estate and Ideal Homes Show that the exhibition to be held in the Grand Central Palace, New York City, has been changed to the week beginning April 27 instead of March 30, as originally intended. This change in date was made after the management had consulted with exhibitors and found that the prevailing opinion was to the effect that the spring season is likely to be late and that April will prove a much more appropriate month for the Show than the earlier date mentioned. For the last three years the Show has practically opened the suburban real estate season by giving the people of the city an idea of the many advantages and conveniences offered by suburban developments. Exhibits of the representative suburban realty companies and builders have been seen and visitors have had opportunity to make comparisons and prospective buyers have had a chance to examine and learn all about the latest building methods.

One of the latest developments in connection with skyscraper construction is apartments for a doctor on the top floor of a 16-story store and loft building just completed at the corner of Madison Avenue and Twenty-ninth street, New York City. The building covers a ground area of 100 x 100 ft. and the entire top floor as well as the roof will be occupied as the doctor's future home. The roof section is to be utilized for miniature gardens, trees, terraces and other landscapes, amid which will be a glass-covered balcony or solarium from which unobstructed views of the city will be available.

A division of the Society of Carpenters and Joiners—Masters and Craftsmen, was established in Worcester, Mass., in February and on the 5th of March an enthusiastic meeting was held when the wage scale, working hours and other rules for the year were settled in an entirely satisfactory manner.

Safe Loads for Wooden Beams

Two Causes of Failure--Tearing and Crushing of Fibres--Horizontal Shear--Explanation of Tables

By Frank N. Kneas, C. E.

If we apply a load to a wooden beam or joist, it may fail in one of two ways. In the first the bottom fibers may tear and the top fibers crush near the central portion of the beam. This is the more usual cause of failure and one with which everybody is familiar.

The second way in which it may fail is by "horizontal shear," and the likelihood of such failure is frequently overlooked or not carefully investigated in figuring the strength of the beam.

Horizontal Shear.—If a number of boards are piled loosely on top of each other, that is, on horizontal layers and supported near the ends, they will deflect and the ends of each board will project slightly beyond the ends of the one below it, each layer of boards sliding on the layer below it.

When we consider that a solid beam is simply composed of layers of fibers, one on top of the other, we see at once that each layer tends to slide on the layer below it.

The resistance of wood against any tendency of one portion to slide on another is comparatively small in the direction of the grain. In the case of a wooden floor beam the grain, of course, runs horizontally, so that the resistance of each layer against sliding on the one below it is small, or in other words, the resistance to horizontal shear is small.

Check Cracks.—The resistance to horizontal shear will be reduced by any check cracks that may have been developed in seasoning the wood, and especially in short beams check cracks may seriously reduce the strength of a beam. The tables are figured for good commercial timber without serious check cracks.

Knots on the under side of a wooden beam or joist will reduce the strength of the beam about as much as a saw cut of the same depth.

Moisture.—According to statements in Bulletins No. 8 and No. 12, U. S. Department of Agriculture, Division of Forestry, timber freely exposed to the weather, such as railway trestles, etc., will contain about twice as much moisture as timber used in buildings at all times protected from the outside air and heated in winter, such as roof trusses in houses, etc. And the timber used in the outside structures will be only *two-thirds or three-quarters as strong* as timber used indoors, inasmuch as wet timber is not nearly as strong as dry timber.

The tables of allowable loads given herewith are for dry timber, and the allowable loads should be reduced about one-third for structures that are exposed to the weather, if the same factor of safety is desired, though the loads given can be used even for outside structures.

Deflection.—While a beam may be strong enough to carry the required load, it may bend under the load so much as to make it altogether impracticable to use. The ordinary requirements are that a beam not having a plastered ceiling on the under side shall not deflect more than one-twenty-fifth of an inch for each foot of span; while a beam having a plastered ceiling on the under side may not deflect more than one-thirtieth of an inch for each foot of span.

TABLE NO. 1

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR LONG LEAF YELLOW PINE BEAMS 1" WIDE
With no limit to deflection

Span L. Ft.	Def. In.	Depth 3 In.	Def. In.	Depth 4 In.	Def. In.	Depth 6 In.	Def. In.	Depth 8 In.	Def. In.	Depth 10 In.	Def. In.	Depth 12 In.	Def. In.	Depth 14 In.	Def. In.	Depth 16 In.	Def. In.	Depth 18 In.	Def. In.	Depth 20 In.
2	1/32	400	1/32	540	.....	800	.....	1070	.....	1340	.....	1600	.....	1880	.....	2140	.....	2400	.....	2680
3	1/16	**400**	1/16	540	.....	800	.....	1070	.....	1340	.....	1600	.....	1880	.....	2140	.....	2400	.....	2680
4	3/16	400	3/32	540	1/16	800	.....	1070	.....	1340	.....	1600	.....	1880	.....	2140	.....	2400	.....	2680
5	1/4	320	3/16	**540**	3/32	800	1/16	1070	1/32	1340	.....	1600	.....	1880	.....	2140	.....	2400	.....	2680
6	3/8	267	1/4	475	1/8	800	3/32	1070	1/16	1340	1/32	1600	.....	1880	.....	2140	.....	2400	.....	2680
7	1/2	229	3/8	407	1/4	**800**	1/8	1070	1/16	1340	1/16	**1600**	1/16	1880	1/32	2140	.....	2400	.....	2680
8	11/16	200	1/2	355	5/16	800	3/16	1070	1/8	1340	3/32	1600	1/16	1880	1/32	2140	1/32	2400	.....	2680
9	.....	.....	5/8	317	7/16	715	9/32	**1070**	3/16	1340	1/8	1600	3/32	1880	1/16	2140	1/32	2400	1/32	2680
10	.....	.....	13/16	285	9/16	640	7/16	1070	1/4	1340	3/16	1600	1/8	1880	3/32	2140	1/16	2400	1/16	2680
11	.....	.....	15/16	257	5/8	581	1/2	1030	5/16	**1340**	1/4	1600	5/32	1880	1/8	2140	3/32	2400	1/16	2680
12	.....	.....	1 1/8	237	3/4	533	9/16	950	7/16	1340	9/32	1600	7/32	1880	5/32	2140	1/8	2400	3/32	2680
13	.....	.....	1 3/8	218	15/16	491	11/16	870	9/16	1340	3/8	1600	1/4	1880	3/16	2140	5/32	2400	1/8	2680
14	.....	.....	1 9/16	205	1 1/16	457	13/16	812	5/8	1265	13/32	**1600**	11/32	1880	1/4	2140	3/16	2400	5/32	2680
15	.....	.....	1 13/16	189	1 3/16	426	7/8	755	11/16	1180	9/16	1600	13/32	1880	5/16	2140	1/4	2400	3/16	2680
16	.....	.....	2 1/16	178	1 3/8	400	1 1/16	715	13/16	1110	11/16	1600	1/2	**1880**	3/8	2140	11/32	2400	1/4	2680
17	.....	.....	.....	.....	1 9/16	376	1 1/8	670	15/16	1040	3/4	1505	9/16	1880	13/32	2140	11/32	2400	1/4	2680
18	.....	.....	.....	.....	1 3/4	355	1 1/4	630	1 1/16	985	7/8	1420	3/4	1880	17/32	2140	7/16	2400	11/32	2680
19	.....	.....	.....	.....	1 15/16	337	1 7/16	600	1 1/8	933	15/16	1325	13/16	1830	9/16	**2140**	7/16	2400	3/8	2680
20	.....	.....	.....	.....	2 1/8	320	1 9/16	570	1 1/4	890	1 1/16	1280	7/8	1740	3/4	2140	11/16	2400	3/8	2680
21	.....	.....	.....	.....	2 3/8	310	1 3/4	540	1 3/8	845	1 3/16	1220	1 1/16	1660	7/8	2140	11/16	**2400**	9/16	2680
22	.....	.....	.....	.....	2 9/16	292	1 15/16	518	1 9/16	810	1 5/16	1165	1 1/8	1585	15/16	2060	23/32	2400	5/8	2680
23	.....	.....	.....	.....	2 13/16	278	2 1/8	495	1 11/16	771	1 3/8	1110	1 3/16	1515	1 1/16	1980	29/32	2400	3/4	**2680**
24	.....	.....	.....	.....	3 1/16	266	2 5/16	475	1 13/16	740	1 1/2	1065	1 5/16	1448	1 1/8	1900	1 1/16	2400	13/16	2680
25	.....	.....	.....	.....	.....	.....	2 1/2	455	2	711	1 5/8	1022	1 9/16	1390	1 1/4	1820	1 1/8	2300	15/16	2680
26	.....	.....	.....	.....	.....	.....	2 11/16	437	2 1/8	684	1 13/16	982	1 5/8	1340	1 5/16	1740	1 3/16	2225	1 1/16	2680
27	Load = 134 times depth for hor. shear						2 7/8	422	2 5/16	659	1 15/16	950	1 3/4	1290	1 7/16	1680	1 1/4	2140	1 3/16	2625
28	Load = 178 $\frac{d^2}{L}$ for fibre stress						3 1/8	406	2 1/2	635	2 1/16	915	1 13/16	1242	1 9/16	1621	1 3/8	2060	1 1/4	2534
29	of 1600 lbs. per sq. in.						3 3/8	392	2 11/16	615	2 1/4	885	2 1/16	1201	1 11/16	1565	1 1/2	1990	1 3/8	2450
30	.....	.....	.....	.....	.....	.....	3 9/16	378	2 7/8	590	2 3/8	852	2 3/16	1159	1 13/16	1514	1 9/16	1920	1 7/16	2360
31	.....	.....	.....	.....	.....	.....	3 13/16	366	3 1/8	572	2 9/16	825	2 3/8	1121	1 15/16	1464	1 11/16	1854	1 9/16	2285
32	.....	.....	.....	.....	.....	.....	4 1/16	355	3 1/4	556	2 11/16	800	2 1/2	1187	2 1/16	1412	1 13/16	1795	1 5/8	2219
33	.....	.....	.....	.....	.....	.....	.....	.....	3 1/2	538	2 7/8	778	2 5/8	1054	2 3/16	1375	1 15/16	1741	1 3/4	2149
34	.....	.....	.....	.....	.....	.....	.....	.....	3 11/16	522	3 1/16	753	2 13/16	1023	2 5/16	1340	2 1/16	1690	1 7/8	2090
35	.....	.....	.....	.....	.....	.....	.....	.....	3 7/8	508	3 1/4	732	3	995	2 7/16	1300	2 3/16	1640	1 15/16	2030
36	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 9/16	1262	2 15/16	1595	2 1/16	1975

For safe loads below heavy type the deflections exceed one thirtieth of an inch for each foot of span.

Hemlock Beams are about half as strong as L. L. Yellow Pine, multiply the loads given in the table by 9 and divide by 16. Spruce Beams are nearly three-quarters as strong as L. L. Yellow Pine, multiply the loads given in the tables by 11 and divide by 16.

Explanation of Tables.—To properly investigate a wooden beam for its strength in cross-bending, for its strength in horizontal shear and for the amount of its deflection means considerable labor. We have therefore prepared several tables of allowable load taking all these factors into account. They are all for long leaf yellow pine timber, good commercial stock free from injurious check cracks, from knots and other defects, and for construction protected from the weather. The tables can be applied to hemlock by considering hemlock to be nine-sixteenths as strong as yellow pine in every way. In other words the allowable loads as given by the tables are to be multiplied by nine-sixteenths or a little over half when applied to hemlock beams.

The tables can be applied to spruce by considering

TABLE NO. 2

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR LONG LEAF YELLOW PINE BEAMS 1″ WIDE

Deflection limited to one twenty-fifth of an inch for each foot of span, as for factory buildings

Span L. Ft.	Def. In.	Depth 3 In.	Def. In.	Depth 4 In.	Def. In.	Depth 6 In.	Def. In.	Depth 8 In.	Def. In.	Depth 10 In.	Def. In.	Depth 12 In.	Def. In.	Depth 14 In.	Def. In.	Depth 16 In.	Def. In.	Depth 18 In.	Def. In.	Depth 20 In.
2	1/32	400	1/32	540	.....	800	.....	1070	.....	1340	.....	1600	.....	1880	.....	2140	.....	2400	.....	2680
3	1/16	400	1/16	540	.....	800	.....	1070	.....	1340	.....	1600	.....	1880	.....	2140	.....	2400	.....	2680
4	5/32	370	3/32	540	1/16	800	.....	1070	.....	1340	.....	1600	.....	1880	.....	2140	.....	2400	.....	2680
5	3/16	240	5/32	540	3/32	800	1/16	1070	1/32	1340	.....	1600	.....	1880	.....	2140	.....	2400	.....	2680
6	1/4	170	1/4	390	1/8	800	3/32	1070	1/16	1340	1/32	1600	.....	1880	.....	2140	.....	2400	.....	2680
7	9/32	130	9/32	290	1/4	800	1/8	1070	1/16	1340	1/16	1600	1/16	1880	1/32	2140	.....	2400	.....	2680
8	5/16	95	5/16	220	5/16	745	3/16	1070	1/8	1340	3/32	1600	1/16	1880	1/32	2140	1/32	2400	.....	2680
9	.....	.....	11/32	175	11/32	595	9/32	1070	3/16	1340	1/8	1600	3/32	1880	1/16	2140	1/32	2400	1/32	2680
10	.....	.....	13/32	145	13/32	480	11/32	1070	1/4	1340	3/16	1600	1/8	1880	3/32	2140	1/16	2400	1/16	2680
11	.....	.....	7/16	120	7/16	395	7/16	945	5/16	1340	1/4	1600	5/32	1880	1/8	2140	3/32	2400	1/16	2680
12	.....	.....	1/2	100	1/2	335	1/2	785	13/32	1340	9/32	1600	7/32	1880	5/32	2140	1/8	2400	3/32	2680
13	.....	.....	17/32	85	17/32	290	17/32	665	17/32	1315	3/8	1600	1/4	1880	3/16	2140	5/32	2400	1/8	2680
14	.....	.....	9/16	75	9/16	240	9/16	575	9/16	1120	13/32	1600	11/32	1880	1/4	2140	3/16	2400	5/32	2680
15	.....	.....	5/8	65	5/8	215	5/8	500	5/8	975	1/2	1600	13/32	1880	5/16	2140	1/4	2400	3/16	2680
16	.....	.....	21/32	55	21/32	185	21/32	450	21/32	860	21/32	1490	1/2	1880	3/8	2140	11/32	2400	1/4	2680
17	.....	.....	.....	.....	11/16	170	11/16	395	11/16	760	11/16	1320	9/16	1880	13/32	2140	11/32	2400	1/4	2680
18	.....	.....	.....	.....	23/32	150	23/32	350	23/32	685	23/32	1175	19/32	1880	17/32	2140	7/16	2400	11/32	2680
19	.....	.....	.....	.....	3/4	130	3/4	315	3/4	620	3/4	1050	3/4	1690	5/8	2140	7/16	2400	3/8	2680
20	.....	.....	.....	.....	13/16	120	13/16	285	13/16	560	13/16	955	13/16	1525	21/32	2140	11/16	2400	3/8	2680
21	.....	.....	.....	.....	27/32	110′	27/32	260	27/32	505	27/32	865	27/32	1375	27/32	2060	11/16	2400	9/16	2680
22	.....	.....	.....	.....	7/8	100	7/8	235	7/8	455	7/8	800	7/8	1255	7/8	1880	23/32	2400	5/8	2680
23	.....	.....	.....	.....	15/16	90	15/16	215	15/16	415	15/16	720	15/16	1145	15/16	1710	3/4	2400	3/4	2680
24	.....	.....	.....	.....	31/32	85	31/32	195	31/32	385	31/32	665	31/32	1060	31/32	1570	31/32	2240	13/16	2680
25	.....	.....	.....	.....	.....	.....	1	185	1	360	1	610	1	965	1	1465	1	2070	27/32	2680
26	.....	.....	.....	.....	.....	.....	1 1/32	170	1 1/32	330	1 1/32	565	1 1/32	900	1 1/32	1340	1 1/32	1920	1 1/32	2630
27	Load = 134 times depth for hor. shear.						1 1/16	155	1 1/16	300	1 1/16	530	1 1/16	835	1 1/16	1250	1 1/16	1770	1 1/16	2425
28	Load = 222 $\frac{d^3}{L^2}$ for deflection						1 1/8	145	1 1/8	280	1 1/8	485	1 1/8	775	1 1/8	1145	1 1/8	1655	1 1/8	2250
29	Deflection in inches = $\frac{\text{span in feet}}{25}$						1 5/32	135	1 5/32	265	1 5/32	455	1 5/32	720	1 5/32	1070	1 5/32	1555	1 5/32	2120
30	except for loads for hor. shear						1 3/16	125	1 3/16	245	1 3/16	430	1 3/16	670	1 3/16	1000	1 3/16	1430	1 3/16	1955
31	.....	.....	.....	.....	.....	.....	1 1/4	120	1 1/4	230	1 1/4	395	1 1/4	635	1 1/4	950	1 1/4	1340	1 1/4	1810
32	.....	.....	.....	.....	.....	.....	1 9/32	110	1 9/32	215	1 9/32	370	1 9/32	600	1 9/32	880	1 9/32	1260	1 9/32	1730
33	.....	.....	.....	.....	.....	.....	.....	.....	1 5/16	205	1 5/16	355	1 5/16	560	1 5/16	825	1 5/16	1190	1 5/16	1625
34	.....	.....	.....	.....	.....	.....	.....	.....	1 3/8	190	1 3/8	335	1 3/8	530	1 3/8	785	1 3/8	1115	1 3/8	1530
35	.....	.....	.....	.....	.....	.....	.....	.....	1 13/32	180	1 13/32	320	1 13/32	505	1 13/32	745	1 13/32	1050	1 13/32	1440
36	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 7/16	695	1 7/16	1000	1 7/16	1375

Hemlock Beams are about half as strong as L. L. Yellow Pine, multiply the loads given in the table by 9 and divide by 16, Spruce Beams are nearly three-quarters as strong as L. L. Yellow Pine, multiply the loads given in the tables by 11 and divide by 16.

TABLE NO. 3

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR LONG LEAF YELLOW PINE BEAMS 1″ WIDE

Deflection limited to one-thirtieth of an inch for each foot of span, as for plastered ceilings

Span L. Ft.	Def. In.	Depth 3 In.	Def. In.	Depth 4 In.	Def. In.	Depth 6 In.	Def. In.	Depth 8 In.	Def. In.	Depth 10 In.	Def. In.	Depth 12 In.	Def. In.	Depth 14 In.	Def. In.	Depth 16 In.	Def. In.	Depth 18 In.	Def. In.	Depth 20 In.
2	1/32	400	1/32	540	.....	800	.....	1070	.....	1340	.....	1600	.....	1880	.....	2140	.....	2400	.....	2680
3	1/16	400	1/16	540	.....	800	.....	1070	.....	1340	.....	1600	.....	1880	.....	2140	.....	2400	.....	2680
4	1/8	310	3/32	540	1/16	800	.....	1070	.....	1340	.....	1600	.....	1880	.....	2140	.....	2400	.....	2680
5	5/32	200	5/32	475	3/32	800	1/16	1070	1/32	1340	.....	1600	.....	1880	.....	2140	.....	2400	.....	2680
6	3/16	140	3/16	325	1/8	800	3/32	1070	1/16	1340	1/32	1600	.....	1880	.....	2140	.....	2400	.....	2680
7	7/32	110	7/32	240	1/4	800	1/8	1070	1/16	1340	1/16	1600	1/16	1880	1/32	2140	.....	2400	.....	2680
8	1/4	78	1/4	185	1/4	620	3/16	1070	1/8	1340	3/32	1600	1/16	1880	1/32	2140	1/32	2400	.....	2680
9	5/16	.....	5/16	145	5/16	495	9/32	1070	3/16	1340	1/8	1600	3/32	1880	1/16	2140	1/32	2400	1/32	2680
10	11/32	.....	11/32	120	11/32	400	11/32	945	1/4	1340	3/16	1600	1/8	1880	3/32	2140	1/16	2400	1/16	2680
11	3/8	.....	3/8	100	3/8	330	3/8	780	5/16	1340	1/4	1600	5/32	1880	1/8	2140	3/32	2400	1/16	2680
12	13/32	.....	13/32	85	13/32	280	13/32	655	13/32	1285	9/32	1600	7/32	1880	5/32	2140	1/8	2400	3/32	2680
13	7/16	.....	7/16	70	7/16	240	7/16	555	7/16	1095	3/8	1600	1/4	1880	3/16	2140	5/32	2400	1/8	2680
14	15/32	.....	15/32	60	15/32	205	15/32	480	15/32	935	13/32	1600	11/32	1880	1/4	2140	3/16	2400	5/32	2680
15	1/2	.....	1/2	55	1/2	180	1/2	415	1/2	814	1/2	1415	13/32	1880	5/16	2140	1/4	2400	3/16	2680
16	17/32	.....	17/32	45	17/32	155	17/32	370	17/32	715	17/32	1240	1/2	1880	3/8	2140	11/32	2400	1/4	2680
17	9/16	.....	.....	.....	9/16	140	9/16	330	9/16	635	9/16	1100	9/16	1760	13/32	2140	11/32	2400	1/4	2680
18	19/32	.....	.....	.....	19/32	125	19/32	290	19/32	570	19/32	980	19/32	1570	17/32	2140	7/16	2400	11/32	2680
19	5/8	.....	.....	.....	5/8	110	5/8	265	5/8	515	5/8	875	5/8	1410	5/8	2095	7/16	2400	3/8	2680
20	21/32	.....	.....	.....	21/32	100	21/32	240	21/32	465	21/32	795	21/32	1270	21/32	1890	11/16	2400	3/8	2680
21	11/16	.....	.....	.....	11/16	93	11/16	215	11/16	420	11/16	720	11/16	1145	11/16	1715	11/16	2400	9/16	2680
22	23/32	.....	.....	.....	23/32	84	23/32	195	23/32	380	23/32	665	23/32	1045	23/32	1565	23/32	2220	5/8	2680
23	3/4	.....	.....	.....	3/4	75	3/4	180	3/4	345	3/4	600	3/4	955	3/4	1425	3/4	2030	3/4	2680
24	13/16	.....	.....	.....	13/16	69	13/16	165	13/16	320	13/16	555	13/16	885	13/16	1310	13/16	1865	13/16	2570
25	27/32	.....	.....	.....	.....	.....	27/32	150	27/32	300	27/32	510	27/32	805	27/32	1220	27/32	1725	27/32	2370
26	7/8	.....	.....	.....	.....	.....	7/8	140	7/8	275	7/8	470	7/8	750	7/8	1115	7/8	1600	7/8	2190
27	29/32	Load = 134 times depth for hor. sh.					29/32	130	29/32	250	29/32	440	29/32	695	29/32	1040	29/32	1475	29/32	2020
28	15/16	Load = 185 $\frac{d^3}{L^2}$ for deflection					15/16	120	15/16	235	15/16	405	15/16	645	15/16	955	15/16	1380	15/16	1875
29	31/32	Deflection in inches = $\frac{\text{span in ft.}}{30}$					31/32	115	31/32	220	31/32	380	31/32	600	31/32	890	31/32	1295	31/32	1765
30	1	except for loads for hor. shear					1	105	1	205	1	360	1	560	1	835	1	1190	1	1630
31	1 1/32	.....	.....	.....	.....	.....	1 1/32	98	1 1/32	190	1 1/32	330	1 1/32	530	1 1/32	790	1 1/32	1115	1 1/32	1510
32	1 1/16	.....	.....	.....	.....	.....	1 1/16	92	1 1/16	180	1 1/16	310	1 1/16	500	1 1/16	735	1 1/16	1050	1 1/16	1440
33	1 3/32	.....	.....	.....	.....	.....	.....	.....	1 3/32	170	1 3/32	295	1 3/32	465	1 3/32	688	1 3/32	990	1 3/32	1355
34	1 1/8	.....	.....	.....	.....	.....	.....	.....	1 1/8	160	1 1/8	280	1 1/8	440	1 1/8	655	1 1/8	930	1 1/8	1275
35	1 5/32	.....	.....	.....	.....	.....	.....	.....	1 5/32	150	1 5/32	265	1 5/32	420	1 5/32	620	1 5/32	875	1 5/32	1200
36	1 3/16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 3/16	580	1 3/16	830	1 3/16	1145

Hemlock Beams are about half as strong as L. L. Yellow Pine, multiply the loads given in the table by 9 and divide by 16. Spruce Beams are nearly three-quarters as strong as L. L. Yellow Pine, multiply the loads given in the tables by 11 and divide by 16.

spruce to be eleven-sixteenths as strong as yellow pine in every way. That is the allowable loads as given by the tables are to be multiplied by eleven-sixteenths or nearly three-quarters when applied to spruce beams.

These tables are figured according to the fiber stresses required by the Act of Assembly of Pennsylvania for Cities of the First Class, and in accordance with the practice of the Bureau of Building Inspection of the city of Philadelphia.

The tables are all figured for beams one inch wide. To get the allowable load for any width beam (of L. L. yellow pine), simply multiply the values given in the tables by the thickness of the beam in inches. The deflection of the beam for each load and span is given just to the left of the load in all three tables.

Table 1.—This shows the greatest safe load for each depth of beam when there is no limit set for deflection, and it also shows how much the deflection amounts to, but in many cases, especially for the longer spans, the deflection is greater than that usually allowed.

Table 2.—This shows the greatest safe load when it is not allowed that the beam deflect more than one-twenty-fifth of an inch for each foot span; as in a factory building where there are no plastered ceilings.

Table 3.—This shows the greatest safe load when it is not allowed that the beams deflect more than one-thirtieth of an inch for each foot of span; as in a dwelling or apartment house where plastered ceilings attach to the under side of the beams or joists.

Example.—Suppose we desire to find the load that a 4 x 10 beam will carry on a span of 15 ft., long leaf yellow pine, good quality.

By table 1 we find that for a beam 1 in. wide, 10 in. deep, span 15 ft., the allowable load is 1180 lb., which multiplied by 4 gives an allowable load of 4720 lb. Looking to the left we find the deflection to be eleven-sixteenths of an inch, which is more than one-thirtieth of an inch per foot span, even slightly more than one-twenty-fifth.

If we wanted to keep within one-twenty-fifth of an inch deflection for each foot of span we look at Table 2 and find the allowable load for a 1 x 10 on 15-ft. span to be 975 lb., which multiplied by four gives 3900 lb. for a 4 x 10.

If we wanted to keep within one-thirtieth of an inch for each foot of span we go to Table 3 and find the allowable load for 1 x 10 to be 814 lb. for a 15-ft. span, which multiplied by 4 gives 3256 lb. for a 4 x 10, with a deflection of ½ in.

Undersized Beams.—If the beams are dressed down to smaller sizes than the full inches it will be necessary to make the proper allowances by taking the average between the nominal size and the size below, in other words by making the proper interpolation.

Building Materials in Argentine Republic

Only Well-To-Do Live in Properly Constructed Houses

According to a recent report of the Bureau of Manufactures by Commercial Agent J. D. Whelpley, the lack of timber in the central zone of Argentina is a serious handicap, and the difficulty of building is further complicated by the fact that the Province of Buenos Aires, the most populous in the Republic, is deficient also in sand and in stone. Cement is imported from Europe. Building in this section of the country is an exceedingly expensive operation, and it is said to be partly on this account that rentals are so extremely high in the city of Buenos Aires, averaging twice as much as for similar accommodations even in New York City.

In the country districts of the Province of Buenos Aires, and more or less throughout the Republic, it is only the comparatively well-to-do who live in adequately constructed houses. The houses of the poor are constructed of a vast variety of odds and ends, and frequently exhibit much ingenuity in the making. They are rambling one-story buildings, with a framework of odd bits of timber, the rest made up of scraps of sheet iron, mud, straw, old kerosene tins, and whatnot. To a considerable extent the adobe house is in use—that is, one built of straw with a timber framework. For a better grade of house sheet iron is largely employed, and in brick and masonry houses sheet-iron roofs appear to be supplanting tiling.

In the city of Buenos Aires the character of the building is in general exceedingly good and correspondingly expensive. In former days wood was more or less employed for exterior as well as interior construction. The present fire regulations prevent the construction of wooden buildings in the central district, but there are still a few old ones standing and newer structures in the outlying sections. At the same time wood for exterior construction is an insignificant element in the total. On September 18, 1904, there were in Buenos Aires 4,326 houses built of wood, 76,766 of stone and brick, and 1,448 of sundry materials, a total of 82,540. Of this number 72,092 consisted of one story only, 8,496 of two stories, 262 of three stories, and 736 of more than three stories. In spite of the high cost of timber, it is used extensively for interior finishing, more so, it would seem, than is necessary or wise, as fire losses in Buenos Aires have been unusually high for a city which is supposed to be built mainly of uninflammable materials.

The expense attached to building brick or masonry houses in Argentina, together with the more or less temporary occupation in view, suggests the field there for portable houses of wood or other material. Something better than the present huts now seen in many places, and yet less expensive than permanent brick and masonry construction, would undoubtedly be received with favor.

The Buenos Aires representatives of a foreign firm making bungalows have recently begun an effort to introduce that type of dwelling into the country, and it is probable that United States manufacturers of similar goods would find it to their advantage to investigate the field. A light, portable bungalow of wood or other material would appear to meet Argentine needs, and the amount to be realized in such construction would doubtless cover the cost of transportation by water to Buenos Aires and thence inland by rail and other means.

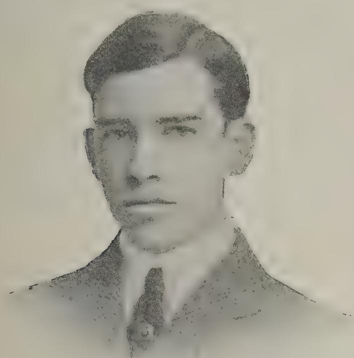
It would also be essential to bear in mind that a distinctly different type of house would be required in Argentina from that to which bungalow construction is mainly devoted in the United States. Here the demand for bungalows is chiefly from fairly well-to-do persons for summer homes. In Argentina, in order to be successful, bungalows would have to be sold mainly as houses for the working classes, especially agricultural laborers. The houses would therefore need to be plain and simple and constructed with due regard to the racial habits of the tenants, a large proportion of whom would be Italian or Spanish.

Merits of Hardwood Floors

Their Growing Popularity--Method of Laying Them--Susceptibility to Changes in Temperature and Humidity--Troubles Which Often Result

By G. D. Crain, Jr.

THE increasing popularity of hardwood floors in residences has been one of the interesting developments of the past decade. Until a few years ago it was considered sufficient for the reception hall and parlor to be floored with hardwood, but the residence-owner of today usually demands that his entire house be treated in this manner.



The great beauty of hardwood flooring is one of the reasons for the favor accorded it, but the fact that it is more permanent, having little depreciation; that it enables the floors to be easily cleaned and thus are more sanitary, and finally, because a house with hardwood floors is more readily salable than any other, the owner finds it advantageous to have them if they can possibly be afforded.

The fact that hardwood floors are an asset in favor of the sale of a house has caused many builders who make residences for immediate sale to put in hardwood floors, even if a sacrifice has to be made in some other part of the house. The real estate dealer who has homes for sale makes the fact that hardwood floors are to be found throughout prominent in his advertising.

There are, of course, hardwood floors and hardwood floors. The great demand for work of this kind has resulted in some rather hasty attempts to put jobs through, and now and then dissatisfaction has been the result. The work of putting down a hardwood floor is a task calling for competent labor, and even in the case of ordinary tongue-and-groove stock, which does not require the same expertness as that demanded of parquetry, the actual laying should not be relegated to the inexperienced workman.

Beginning at the beginning—the mill—hardwood flooring is made of white oak, red oak, maple and some other woods, though these are the leaders. Quartered oak, in view of its splendid figure, offers the greatest possibilities, and is consequently more popular than any other kind of flooring. Quartered red oak has a color that many people prize above that of white oak, and consequently much of it is put down. Maple has a fine, even grain light color and is well adapted to flooring.

Inasmuch as flooring is comparatively thin, ranging from 5-16 to 13-16 in. in thickness, it is particularly susceptible to changes in the temperature and humidity. From the time that it is turned out of the mill until it is laid down, therefore, it should be carefully handled and exposed to as little variation in these connections as possible. In fine work, such as parquetry jobs, many manufacturers of flooring make and ship the material just before it is to be used, in order not to allow the squares to have an opportunity to absorb moisture or otherwise deteriorate.

If the builder or hardwood flooring contractor carries much stock on hand, it should be kept in a compartment which is well closed and which, preferably, should be heated. In this way there will be no chance for flooring which has been purchased at a stiff price to come out of the warerooms anything but fit for service. In the case of special designs, which have to be manufactured to specification, there is of course no occasion for the use of heated storage-rooms, since this work is put into the job as soon as it is received from the mill.

If the flooring is laid over a base of inferior wood, as is usually the case, it is absolutely essential that this be thoroughly dry. In order to insure the absence of moisture, it is desirable that the stock be kiln-dried, and before the flooring is laid down the contractor, if he has not had charge of putting in the sub-floor, should make sure of his ground in this respect. If this is not done, the chances are that the floor will prove defective, and in that case a lot of explanations which will not explain as far as the house owner is concerned, will be in order.

Some time ago a flooring expert was called upon to

An Interior of Reception Hall in House with Hardwood Floors

lay down a large hardwood floor in what was to be the ballroom of a handsome residence in New York City. He made an examination of the sub-floor, and found that it contained excessive moisture, not having been thoroughly dried. He explained this to the owners of the property, and pointed out that in order to secure good results it would be necessary to heat the room and allow the floor to dry for several weeks. The owners did not believe this to be practicable, and therefore ordered the work to be done immediately. It was laid with the understanding that the contractor did not assume responsibility for its permanent stability.

The ill-effects of the moist underpinning were not evident immediately, but about six months after that they were easily apparent. The floor cracked in many places, and in some places sagged and in others buckled, reproducing the effect of the green flooring beneath. The surface, instead of being the beautiful, uniform expanse of brilliant hardwood that it was originally, was decidedly unattractive. The owner of the residence lost no time in informing the contractor that his prediction had come true, and authorized him to tear out the entire floor, sub-structure and all, and put in material that he could guarantee to do the work.

Similar trouble results when flooring is laid over concrete without proper protection. In a good many business buildings, even those which are comparatively small, it is getting to be customary to have the floors laid of some fireproof material, and this is frequently of cement construction. The concrete is of course put down wet, and while it sets after the crystallization process takes effect, it does not lose all of its moisture immediately, by any means. It is therefore evident that to put down a piece of thin hardwood flooring over this mass of moist stone, which is what the concrete really is, is to expose it to the most unfavorable conditions imaginable.

Getting Quick Results

Sometimes an effort is made to get quick results by laying strips, upon which the hardwood floor is to rest, in the concrete at the time it sets. This is unsatisfactory, since the strips themselves will feel the effect of the moisture, and the flooring that is nailed down over them will ultimately get the benefit of it as well. It is the best, and in fact the only safe, plan, when concrete is used, to permit it to dry for several months before the flooring is laid. If this is impossible the concrete should be waterproofed, and several strips of waterproof paper laid between the concrete and the wood above. A substructure of pine or other less expensive material should always be laid, so as to enable the surface structure to have a dry, firm foundation.

Occasionally where a hurry-up job is being put through, the hardwood flooring men are told to get busy when the building is not completely enclosed. This is a most hazardous undertaking, and to lay flooring in cold weather with doors and windows still open is running a risk that a careful workman doesn't like to take. Most flooring contractors find it advantageous to have charcoal heaters put in and to warm the rooms in which flooring is to be put down with the idea of making assurance doubly sure. They arrange so that they are the last contractors in the building, and so that the structure can be closed as tight as the proverbial drum. In this way they eliminate practically every chance of faulty work, and insure satisfaction to the owner, to themselves and to the flooring manufacturer who turned out the material.

Make Use of a Sub-Floor

Even when 13-16-in. stock is used in a residence where there is no concrete work, it is good policy to put the hardwood down over a sub-floor. It has gotten to be a common occurrence to see flooring of this type nailed down directly on the joists, without any supporting foundation. While this is not fatal in that it will cause the work to turn out badly, it is objectionable from other standpoints, and is not recommended. Greater permanence is assured by having a foundation structure, and as the cost of the latter is not great, this can usually be arranged for without increasing the expense of the floor to any considerable extent.

Finishing a hardwood floor, especially where there is a great deal of parquetry, is one of the hardest parts of the job. One reason for this is that practically all other interior trim comes to the carpenter finished and sandpapered and ready to be fixed in its place. Formerly nearly all of the cabinet work required scraping and finishing by the carpenter, but with the improvement in the methods of the manufacturers, all of this, with the exception of flooring, is now done at the mill. Owing to the fact that it is impossible to anticipate conditions under which the work is to be laid, it is best to have the flooring scraped after it is put down.

This puts it up to the carpenter to attend to that job, although, as one flooring expert said, there are a large number of otherwise excellent workmen who not only don't know how to scrape a hardwood floor, but don't know how to sharpen a scraper. Without attempting to go into details regarding this feature of the work, it may be stated that the floor should be scraped with the grain, and that uniformity in the finish is the attribute which must be secured.

While the work of the hardwood flooring man is complete, as far as his immediate responsibilities are concerned, after he has laid down the floor and scraped it until the proper finish has been secured, it is good policy to carry the work a bit further, so as to include instructions to the owner of the property, if he is to occupy it as a residence, or the tenant who comes after.

The care of hardwood floors is an art which many people know little about, but fortunately there is getting to be a rather extensive literature on the subject. The proper use of wax and varnish, and the treatment of the floors after the first coat has been applied, are all topics which can be legitimately dealt with by the flooring man, for by explaining to the "ultimate consumer" the various problems to be met with in the use of hardwood floors, better appreciation of the work done and greater insurance of permanent satisfaction are attained.

Masonry Bridge of Ancient Construction

We have received from a valued correspondent a photograph of the Chinese bridge from which the accompanying engraving was prepared. It is given here as a curious example of masonry construction in that while built in the form of an arch it is not a true masonry arch, for bond of masonry plays no part in the

Masonry Bridge of Ancient Construction

construction. A close examination of the picture will show there is no stone voussoir ring with the accompanying keystone.

Heavy timbers were placed in arch form as shown in the picture and a heavy timber framework was built, some of the timbers showing in the sides of the structure. The masonry was built up in courses as for a building, but evidently very little attention was paid to the matter of bond as is common in Chinese masonry.

The picture represents what is known as the Nietu Bridge over the Grand Canal at Soochow, China. The bridge was built many years ago—several centuries perhaps, if one can be sure of Chinese chronology.

An agreement has recently been reached by representatives of the Board of Education of New York City and of the Pattern Makers' Association by which all apprenticed pattern makers will attend public evening school where a course will be given them under the joint supervision of the school authorities and a committee of the union.

Specifications for Stucco on Metal Lath

A Composite of the Best Ideas in the United States on Stucco Construction

A SUITABLE specification for stucco has been a much-mooted subject, and when the Metal Lath Manufacturers of the United States associated themselves together for the purpose of working out the problems of the metal lath industry, stucco construction was one of the first things which received attention. After more than six months of consulting with authorities and conferring with architects, contractors and manufacturers, a typical specification to offer architects was finally decided upon and it is now being distributed among the architects of the country as a composite of the best ideas in the United States on stucco construction. As of wide interest at the present day when stucco is being so largely used in building construction we present the specifications as furnished by H. B. McMaster, Publicity Commissioner for the Associated Metal Lath Manufacturers.

The merits of the stucco house are now so well recognized that arguments in its favor seem to be trite. It is assumed that the prospective builder and his architect want a stucco exterior, and realizing that when built the house will look as substantial as stone, brick or solid concrete, they want a structure that will age slowly and gracefully through decades—not fail perceptibly from year to year.

Specifications for Stucco on Metal Lath—An Example of Domestic Architecture

Metal lath is recommended because wood lath absorbs moisture required by the mortar. Wood lath dries out and shrinks away from the plaster, following which the alternate shrinkage and swelling resulting from moisture causes unsightly cracks and finally failure. Wood lath, also, increases the fire risk and will harbor vermin.

Framing and General Construction

Flimsy construction in framing is false economy. The best will prove cheapest. The studs, spaced at 12 in. between centers wherever possible, should be run entirely from foundation to the rafters without any intervening horizontal grain in the wood. These studs shall be tied together just below the second-story joists by a 6-in. board, which shall be let into the joists on their inner side, so as to be flush and securely nailed to them. This board will also act as a sill for the second-story joists, which in addition will be securely spiked to the sides of the studs. At two points between the foundation and the eaves, brace between the studding with 2 x 3-in. bridging placed horizontally but with the faces of the bridging inclined in alternate directions in adjacent spaces.

All roof gutters should be fixed and down-spouts put up before the plastering is done; the down-spouts should be temporarily placed about a foot from the wall so there will be no break in the plastering where they are to be finally fixed.

One Style of Treatment for the Garage

Wood copings or rails for tops of parapets, balustrades, etc., are not so good as cement, for they may curl up, warp, check, crack and in various ways fail to do what they should—keep water from getting behind the plaster. This also applies to brick chimneys, which, when plastered, should have wide and tight caps of concrete or stone to prevent water running behind the plaster.

If only wood sills are used, they should project well from the face of the plaster and should have a good drip; either by being placed with a downward slant or by a groove rebated in the under side of the sill near enough to its edge that it will not be covered by plaster. The drip is an essential of good stucco construction that can not be slighted. It must be used to prevent water getting behind the plaster.

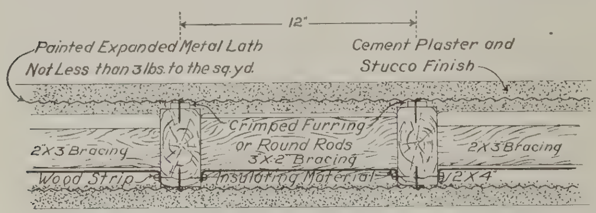
A Simple Application of Stucco

Lath and plaster should not be carried all the way down to the ground; this same restriction applies to brick or stone.

Care should be taken that all trim be placed the proper distance from the studding or furring to show its right projection after the plaster is on. It is a common mistake to allow too little for the lath and plaster, with the result that mouldings which should project from the face of the wall are back from it or partly buried under the plaster, thus missing the effect desired. About 1½ in. should be allowed for the lath and plaster, making sure that the projection of the moulding to show when finished is not measured in as part of this thickness.

Furring

Use painted or galvanized steel rods or painted or galvanized crimped furring. One-quarter inch is best



Specifications for Stucco on Metal Lath—Detail Showing Section of Exterior Wall

and it should not be over ½ inch at the most. This furring is to be applied along the face of the studding with galvanized staples.

Insulation

After the lath on the outside has been back-plastered, the air space may be divided by applying heavy building paper, quilting, felt or some suitable insulating material between the studs, fastening it by nailing wood strips over folded ends of the material. This insulation should be so fastened as to clear the 2-in. bridging, leaving the preponderance of the air space on the outside. Care must be taken to keep the insulating material clear of the outside plaster and to make tight joints against the wood framing at the top and bottom of the spaces, and against the bridging where the 3-in. face intercepts.

Corner Bead

If corner bead is not used, there should be 6-in. strips of metal lath bent around the corners and stapled

An Exterior Coating of Stucco Renders the Dwelling More Fire-Resisting.

over the lathing unless the sheets of metal lath as applied are folded around the corners.

Even though corner bead is used, it is a good precaution to bind the corners in this way and apply the corner bead over the strips of lath.

Lathing

The lath shall be painted to protect it until it can be applied and covered with Portland cement plaster. Care should be taken not to expose the lath to the weather while it is lying about the building.

Use metal lath weighing not less than 3 lb per square yard, spaced at 12-in. centers and fastened horizontally over the furring strips with galvanized staples 1¼ by No. 14 gauge. The sheets between furring are to be tied with No. 18 gauge galvanized wire.

Plastering

Portland cement will protect metal from corrosion absolutely by reason of its moisture-resisting qualities. Calcined gypsum should not be used in combination with Portland cement; the gypsum will destroy the protective quality in the cement, and neither should it be used as a substitute for Portland cement. A gypsum plaster may repel moisture for a time, but Portland cement actually thrives on it.

It is not theory only that Portland cement will preserve iron or steel indefinitely; it has been well demonstrated that Portland cement stucco will endure in any habitable climate. The first and second coats should be of good thickness and the finishing coat should have with it a mixture of waterproofing. A total thickness of plaster of about 1½ in. is good practice.

It is aimed for the first and second coats to get a Portland cement mortar with as little lime in it as will make it work properly. Clean, long winter cattle hair should be used.

For first and second coats and back-plastering mix in the following proportions:

Lime Mortar:

Two barrels of hydrated lime.
One yard of clean, sharp sand, free from loam.
Four bushels cattle hair.

Make up at least three days before using.

Cement Mortar:

Two parts of clean, sharp sand, free from loam.
One part Portland cement.

Mix fresh in small batches as used.

The lime mortar and cement mortar should be mixed and tempered separately, measured carefully, equal parts of each, and mixed well together.

In plastering over the face of the stud the plaster should be forced well through the lath in order to fill entirely the space between the lath and the stud.

The back-plastering should be a heavy coat, well troweled so that the lath is entirely enveloped. The finish coat may be done in a way to get any one of the many surfaces which give stucco its charm; this coat should contain no lime, as it makes the wall more porous, and if a lighter color is wanted than can be gotten with ordinary cement, a white Portland cement should be used.

The waterproofing acceptable to the architect should be mixed with the last coat of the exterior according to directions given by the wateruroofing manufacturer. The lathing and plastering on the inner side of the wall need not differ from ordinary practice.

The exterior plaster must not be allowed to set rapidly; if necessary, hang a curtain in front of the wall of burlap or other material that can be kept moist for a couple of days. Stucco should never be applied when the temperature is below freezing.

Stucco on Brick

In applying stucco over brick chimneys a 1½-in. painted or galvanized steel furring strip not lighter than 22 gauge should be fastened to the brick at 12-in. centers with galvanized staples 2 in. by No. 9 gauge driven into the mortar joints. The lath is fastened to the furring with No. 18 gauge galvanized wire, run through under the furring, and the same material used for lacing the ends of the sheets together between furring strips.

The same mixture for plaster is recommended for this work as on the metal lath on studding. Before plastering, the brick should be well wetted to prevent its absorbing the moisture from the plaster, and the first coat should be forced through thoroughly so that the entire space back of the lath is filled with the Portland cement plaster and the lath enveloped.

The Planning of Cottage Hospitals

The Site--Tendency Toward Certain Recognized Types--Arrangement of Rooms--Heating and Ventilation--Drainage and Water Supply--The Construction and Finish

By A. Redfern Cornwell

SOME attention is now being paid to the subject of hospitals, both large general and cottage types. Civilization, town and city developments bring with them in their train inevitable disease and death, and for the poorer classes who have not sufficient means to engage a doctor free hospitals are provided. A cottage hospital is usually affiliated with some large city general hospital and is erected in country districts of poor inhabitants who cannot afford to come into the city or who are in many cases too ill to travel. The necessity for these smaller hospitals admits of no doubt, for towns are rapidly developing and so fast that the necessity is not the subject of private or municipal consideration until long after the want has established itself.

The Site

The site chosen should be dry with a deep bed of sand or gravel if possible, and well drained. The near proximity of trees, although adding to the picturesque effect, are not to be desired from a hygienic point of view, for they interfere with the free movement of air. Neither should the hospital be too near large buildings.

The aspect should be south or southwest and protected if possible from the north and east. The ground level should not be low or marshy, but should be sloping. All excavations and filling in with debris must be avoided, and if done, the surface should be covered with a layer of cement concrete finished with a surface of asphalt or cement and sand.

The best position for a hospital is in the center of a district from which its patients will be drawn, and should, if possible, be near the medical residence. Proper and adequate provision must be made in the grounds for exercise for the convalescents. The grounds should be laid out in an attractive and artistic manner.

Requirements of Various Districts

Various types of districts require various conditions in the planning of a hospital. In mining districts there is necessarily a lot of accidents, and the provision of a certain number of beds per thousand population is higher than that of an agricultural district. For a mining district three to four beds for each thousand workmen should be allowed; then for their wives and other various workers at the rate of one bed per thousand. Agricultural districts only require one bed per thousand.

Hospital planning, like school planning, has tended of late years toward certain recognized types and standards which are more and more rarely departed from. The main principles to be considered are ventilation and disconnection of various departments, sanitary arrangements and proper amount of cubic air space per patient.

Arrangement of Rooms

Wherever possible the wards are laid to run north and south, so that the sunlight may enter the maximum amount during the day.

It is essential to have the operating room on the ground floor, and it should be placed on the north side and perfectly lighted by a top ceiling light. Care should be taken to make the corridor to the operating room wide enough to allow the couch to be easily wheeled from the ward to the room.

The day or recreation room should be designed in a pleasing manner and apart from the matrons' rooms. This is the only room where any pretense at decoration can be allowed.

The entrance should be placed in the center of the front, leading through a vestibule or short corridor into the staircase and main hall.

The Wards

Two departments must be provided—one for males and the other for females—and each must be kept separate from the other.

The ward should be designed to have only one story and well ventilated under floors. It has been found by experience that the best form of hospital is designed on the pavilion type, which gives the most satisfactory results.

Each ward containing ten beds requires the services and attention of one day nurse, who would also have charge of the single-bedded ward next to the main or large ward, while night duty could be undertaken by one night nurse. It is usual to have between the single bed and big ward an observation window or screen by which the nurse can see from one ward into the other.

Proper and adequate disconnection should be provided between the ward and sanitary spur containing the bath, water closet, sinks, etc., and having a short passage with cross ventilation and disconnecting swing doors. The ward is a long room planned in accordance with established ideas. The beds are arranged along either side between windows, which have high sills and are carried up to the ceiling level, and the windows must be opposite to one another so as to obtain a through and cross current of air at all times. Simple and natural ventilation for summer is the best, but during the winter arrangements must be made by which the air will be warmed before entering the wards.

Air ducts should be placed under the window sills with the inlet on the window board so that there is no possibility of a direct draught of air on the patient. It is usual to have the top of the window constructed as a hopper opening inwards and shielded at the sides, while the lower part is divided into double hung sashes.

The ward should not be less than 12 ft. in height and about 25 ft. wide, with 1200 cu. ft. of air allowed for each patient and 100 sq. ft. of floor space per patient.

In case of infectious disease the cubic capacity must be increased to 2000 cu. ft.

Heating the Wards

The best method of heating the wards is by a central heating special hospital stove, this being low stoves with table tops which stand in the middle of the ward and have open fires at both ends. Air is admitted to them from ducts which pass under the floor and outside the casing of the fireplace, thus permitting it to enter the wards in a heated state. Smoke and other various products of combustion are likewise carried down to horizontal flues beneath the floor to chimney flues in the outer wall.

At the end of the ward is placed the sanitary spur disconnected from the ward and corridor by the cross current of air and passage swing doors. The bath must stand in the room so that the nurse can readily get around it. Baths, sinks, etc., for hospitals are made of the best glazed stoneware.

No Sharp Angles

One great essential in the hospital is that there shall be no sharp angles. All corners and angles must be coved; no moldings where dust may lie and everything must be easily accessible to the duster. At about 4 ft. high in the ward a plain oak string is placed, the top portion of the wall surface being finished in some suitable fine cement. The lower half may be plastered and tinted a dark shade of green. At the finishing of the plaster at the floor level is placed a 3-in. wood cove or hollow molding to prevent the otherwise sharp angle, which would not so easily be cleaned.

All kitchen and stove quarters should be in the rear and quite disconnected from the main hospital because the smell of cooked food is most disagreeable to patients. The upper part of the central portion is to accommodate the servants' and nurses' bedrooms.

The laundry for a small hospital need not be of such an elaborate scale as for larger hospitals and chiefly consists of the ordinary laundry appliances and a disinfecting tank for linen.

The mortuary must be placed away from the building and quite out of sight from any of the windows to rooms occupied by patients.

System of Drainage

One generally discovers that the sewage disposal of old towns and villages leaves much room for improvement and is the cause of much infectious disease. In districts where the water supply is scarce the best method to adopt for sewage is by sub-surface irrigation.

The whole system of drainage must be as well ventilated as possible from end to end.

The passage of air from the sewer or cesspool into the drains of the hospital must be prevented by the interposition of a water seal or syphon trap, at or near the point where the drains join the sewer or cesspool. The drains must be laid in straight lines from point to point, and every change of direction or where junctions occur manholes should run in open channels. Under no circumstances should drains be laid under any part of the building near the wards, or even anywhere else where it can be avoided. Should it be unavoidable the drains running under the building must be of iron and entirely surrounded by a layer of concrete. Sometimes sub-soil drains pass under the building, but should if possible discharge into an open water course, or if that is impracticable they must be disconnected from the sewage drains by means of an open seal trap.

Soil pipes should be connected at their feet directly to the drain, without any trap, and should be carried up full bore of pipe as a ventilation shaft above all windows and eaves. Waste pipes also must be carried up as ventilation shafts, but at their feet they must discharge over trapped gulleys. All soil pipes must be fixed clear of the wall surface, and in no case must they be concealed in plaster or behind casings.

Water Supply

The water supply is also of great importance. Upland surface water, if there is any, should be caught and stored, for its use is invaluable in the hospital. The best kinds of water are:

1.—Spring water.
2.—Deep-well water.
3.—Upland surface supply.

Shallow well water is bad, as is also that from cultivated ground and rain water. Wells have to be sunk if water is scarce or of poor quality. In two days a well 60 ft. deep can be sunk and will in the great majority of cases give an abundant supply of clean water shortly after completion. Any existing well should be reported upon by a competent and reliable analyst.

The source of the water supply should by no means be near any drains, cesspools or filth, as the water is very likely to become contaminated. The mouth of any well must be protected from the entrance of surface water or any foreign substance.

Construction and Finish

As to the materials used in the construction of the hospital, they should be the best of their respective kinds. The walls may be either of brick or stone, but should be non-absorbent. The walls should be hollow to prevent any damp penetrating right through; cement or some good plaster is all that is required for the interior.

The whole site should be stripped and a 6-in. layer of broken brick with a top layer of 4½ or 6-in. concrete should be laid.

The interior wall surface may be painted with some sanitary patent wash or paint, and afterwards can have two coats of the best copal varnish, which has been known to last as long as fifteen years. The ceilings can be lime washed and require to be renewed at least once a year.

It is advisable to finish the floors in oak with perfectly tongued and grooved joints and should be "secret" nailed; then treat the surface with wax polish, which gives an impervious and antiseptic surface. It is easily cleaned by dry rubbing.

Demolition of New York's Assay Office

Within a very short time the old Assay Office building on Wall street, which was built in 1823, will be torn down in order to make room for the extension of the new building at the rear which will cover its site. The destruction of the old Assay Office will eliminate one of the last of the ancient landmarks in that section of the city. Originally the building was the New York Branch of the United States Bank, and after the closing of that institution it passed into hands of private bankers, but was subsequently repurchased by th Government and occupied as the Sub-Treasury, when the present Sub-Treasury was the Custom House. The building has been occupied as the Assay Office since 1854.

New Municipal Buildings for New Zealand

The committee appointed by the New Zealand government to award the prizes in the competition for designs for the new Parliament Building at Wellington awarded the first prize of $5,000 to Campbell & Paton, architects of Wellington, the senior member being the government architect. Out of 40 designs submitted many bore an interesting resemblance to the United States capitol at Washington.

The design securing the first prize is for a building in the English Renaissance style estimated to cost approximately $1,000,000. The principal feature of the front elevation is a stone stairway 40 ft. wide flanked by two groups of statuary, leading up to the main floor of the building which is to be 14 ft. above the ground. The stairway will extend beyond the main frontage and will be flanked on either side by long colonnades of Ionic capped pillars 10 ft. wide.

Suggestions for Building a Modern Dwelling

Outside Details--Question of Cost--Some General Remarks

By William Arthur

FOR the outside of the house a few remarks will suffice. As the apparel oft proclaims the man, so does the exterior of a house give a fair idea of what the inside is like. The bay window extends just far enough out from the house to be covered by the cornice, and the gutter is carried clear across. The dormer is kept in line with the bay below. Half windows only are used in the center of the bay.

Not long ago I saw a rule for the cornices of bungalows. It was to the effect that they should never be less than 2 ft. 6 in. wide, and never more than 5 ft. Five feet would seem to be a trifle too much of an extension—but you can never tell what a bungalow builder will do.

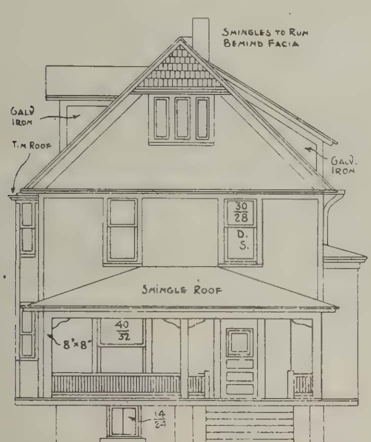
The cornice in this house stands out only 2 ft., and that is too narrow according to present standards, but the further out you go the more expensive does the house become, for more shingles are required, more roof boards, and cornice material and labor in general. Many houses are finished at 2 ft. A distance of 2 ft. 6 in. is better, but there is no use going any further out. Many houses of the old style are seen with only a heavy moulding for a cornice; tens of thousands have only about a foot of extension; and when the fad for five-foot cornices has run to ground, one that is 2 ft. or 2 ft. 6 in. wide may be just about right. By that time carpenters will be sawing the wide ones off; and those who build reasonable ones now will save the expense of the change. The gambrel, Dutch, horse's hind-leg style of roof is not so popular as it was, and the narrow cornices are also out of date. Where so many things change, cautious people will try to be moderate, and not so far from the fashion at any time.

Panels.—Galvanized iron panels are used on the sides of the dormers because it is hard to keep out the water on a stormy day. The arrangement that has often to be afterwards made might just about as well be accepted at the beginning and trouble saved. It is not such an artistic finish as the spider webs and fancy shingles, but high art sometimes has to give way to practical considerations.

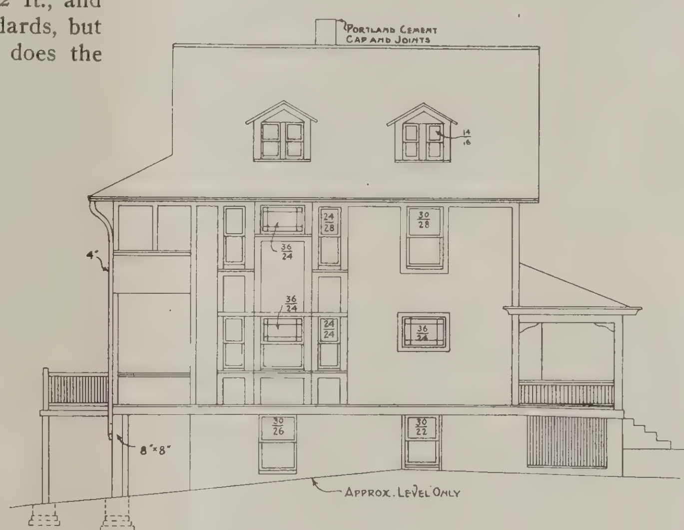
Chimney.—The chimney does not come out the center of the roof, because it is better when built straight. For the sake of schoolboy mathematical exactness it is sometimes swung over clear off its base. I have seen one laid over so far that it had to be supported on wood; but it came out straight at the ridge, and that is considered a wonderful achievement by some.

A saddle or watershed is put in behind when the chimney is down on the slope of the roof.

Downspouts.—One is placed west of the stair extension where it is scarcely seen and then led by underground tile back to the cistern— the second runs down west of the bay window, and there is a center one in the rear, all of 4 in. diameter.



Front Elevation



Side (Left) Elevation

Suggestions for Building a Modern Dwelling—Elevations—Scale 1/16 in. to the Foot

We go into a store and examine an article that appeals to us in many ways, and then we ask the old familiar question, "How much does it cost?" Or, "What do you charge for it?" And when we hear, as likely as not we say, "That is too much—by far too much." "It is naught, it is naught, saith the buyer," is as old as the days of King Solomon.

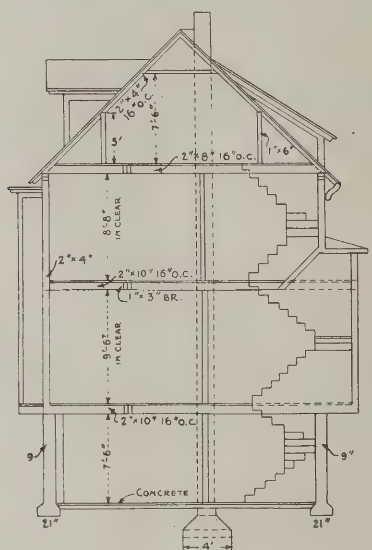
The cost of a house depends upon the part of the country where it is to be built, and also upon many other little items that we have noted as we have passed along from foundation to roof. A furnace for this house may be installed for $175; but a hot-water plant, according to one bid, $375. It all depends.

The contractor ought to have more out of such a house, but of course the plumbing, outside walks and other items are often not included in the main contract. By the time he pays fire and liability insurance the amount is too small. If he has only one house and works himself, he gets his wages in addition to the profit.

ESTIMATE OF COST

Excavation	$25
Masonry (without vault and bin)	225
Cement basement floor	75
Lumber	759
Millwork (Q. S. white oak)	615
Hardware	75
Galvanized iron	73
Plaster (none in attic or basement)	240
Furnace	175
Hardwood floors on first story (material)	80
Carpenter labor complete	550
Electric work (no piping)	60
Electric fixtures	60
Tiling in bath room and vestibule	60
Plumbing (no tubs or W. C. in basement)	275
Paint	120
Outside cement walks and steps	70
Cistern	50
Building permit	3
Fire insurance for five years	40
Contractor's profit	200
Total	3,830

This runs the total up to over $4.50 per square foot, taken by outside measurement. Now, if the house is not large enough the way is open for adding as many square feet as is desired, remembering always to add the price.



Sectional Elevation—Scale 1/16-In. to the Foot

Suggestions for Building a Modern Dwelling

A fair idea of cost may be had by the square foot plan, although it does not always work exactly. In enlarging such a house the millwork, for example, does not increase in exact proportion, for the same stairs, windows, porch material and inside doors are used.

Taking out the items, or parts of items, that remain unchanged, we have the following deductions:

Millwork	$615
Plumbing fixtures, etc.	110
Gas and electric	60
Inside hardware	50
Walks and cistern	120
Proportion of profit	52
Total	$1,007

Let us allow for unchanged items the sum of $950. Deducting this from $3,830 leaves $2,880, or about $3.45 per square foot. A reasonable increase in size would, therefore, be estimated at, say, $3.50 per square foot. Thus a house 26 x 37 would have 122 sq. ft. extra, and would run to $3,830 plus $427, or a total of $4,257.

REMARKS

The common impression is that the amount is too much for the size of the house, and it really seems so, but we carry old ideas with us even to the grave. The American ingrained idea of the cost of a house is based on lumber at $14 to $16 per M. Now it is 50 per cent. higher, and this for poorer material.

Near the forests of Oregon the lumber price might be cut to half, but from Oregon to Omaha the freight is $16 per M.

Then, wages might be lower by far than have to be paid in cities. Bricklayers get 65 to 75 cents; carpenters, 35 to 45; plasterers, 62½; plumbers, 55; painters, 45; all per hour. In former times the labor on such a house would have been done for 30 per cent. less. It is therefore useless to compare the price of a house built in the year 1 with those we build now. But much also depends upon the quality of the work done in this year.

This high cost explains the small size of rooms. "Art" is of much value, but we should always remember that in Greater New York, where its votaries sigh over the little vestibules and halls, the people around them, in the proportion of more than 90 per cent., live in rented houses or tenements.

And what about the architect's commission on such a house? Five per cent. for plans and superintendence is the smallest charge of the architects. Do you understand why ready-made plans are so popular? But the estimates given by the ready-made books are sadly below what they should be. Human nature is weak.

Deductions.—The cutting down of the cost usually has to be faced. There are quite a few ways in which it may be done and still leave the over-all size unchanged.

With the exception of the furnace duct, the basement floor may be left for a future time; the coal-bin may be built at any time; the space might be left for the flight of stairs in the kitchen, and the door only put in till the money was on hand; the little "conservatory" and the large rear platform need not be built at the time the house is; the space for china closet and windown shelf and drawers can be left ready for the finish; the sidewalks and cistern are not absolutely necessary. A deduction of about $600 might be thus made. The idea is to build a reasonale size of frame, and the $120 sun parlor and all these things may be added to it when the ship comes in.

Location.—As already pointed out, location often counts more than building; and it is sometimes good business policy, even with this $600 on hand for all the desirable things temporarily left out, to invest the money in a better lot than one that may seem good enough. Each case of this kind has to be judged on its own merits. It might be foolish for some to pay away this extra amount for a better location.

But when the house falls in value a little owing to depreciation, it is pleasant to find that the land rises. In ordinary residence districts the land, once fixed in value, stays unchanged. It is unwise to put a good house in among houses of lower cost, unless the lot is owned there. But it is better to buy a lot in a new district where all the houses must be new, rather than in an old one.

It is also a losing game to build too small a house in a location where the price of lots is high. In case it has to be sold few care to buy it, and the house-mover has to be called in. There is always a better chance of selling a house that corresponds with the others around it.

The contract for the construction of the proposed 22-story office building for the Union Central Life Insurance Company in Cincinnati has been awarded to the Thompson-Starrett Company, New York City. The building will be erected on the old Chamber of Commerce site at Fourth and Vine Streets. Garber & Woodward, Cincinnati, and Cass Gilbert, New York, were the architects.

Exhibition of Clay Products in Chicago

Competition in Brick Bungalows a Feature--Names of Prize Winners--Prize Bungalow Constructed in Coliseum

WHAT was undoubtedly one of the most interesting expositions of clay products ever held in this country took place in the Coliseum, Chicago, from March 7 to 12. In the big hall where many candidates for President of the United States have been nominated the manufacturers of brick, tile, pottery and other building materials that come from the clay were shown in attractive array.

One of the principal features of the show, which attracted thousands of people to the Coliseum during the week, was a $3,000 prize bungalow, complete in almost every detail, which was constructed at the north end of the building in just five days.

A year ago at the Building Trades Show in London, England, a house was erected in nine days. That stood as a record of rapid construction, but American industry went a few better and put up the home in five days.

By night of the first day of work the little square

Perspective View of the Prize Bungalow Erected in the Coliseum

Exhibition of Clay Products in Chicago

selected for the bungalow was covered with ten feet of ornamental brick and the scaffolds were in place for the upper work. By night of the second day the exterior walls were up to the eaves and the interior walls were raised to the ceiling of the first floor. By the third night the house was all ready for the roof. By the fourth night the roof was mostly on, the plaster was in place, the floors laid and ready for finishing and the garden wall was up. The last day the decorators were put at work and filled in the lawn with artificial grass, strung artificial flowering vines over the porches and on the brick walls, and before the show was ready to open the bungalow looked "just like home," as may be seen from some of the pictures presented herewith.

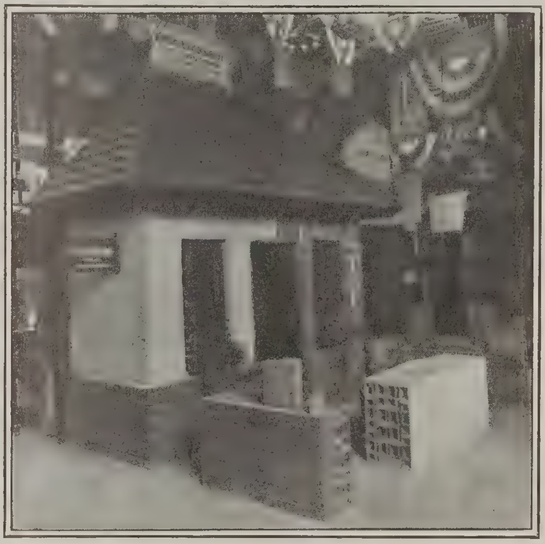
This magic bungalow was offered as a prize to the home lovers of Chicago. Every person who visited the show had a chance to win, the idea being to erect the prize bungalow on a Chicago lot later on.

It may not be without interest to state in this connection that the Clay Products Exposition Company, under whose management the show was conducted, offered $1,000 in prizes for the best designs submitted by architects for a $3,000 brick bungalow and more than 660 sets of plans were submitted in the contest. The prize winners were as follows:

First prize, $500..........Ralph J. Batchelder, Boston
Second prize, $250......Jack Lehti, Washington, D. C.
Third prize, $150....William Boys, Jr., Pittsburgh, Pa.
Fourth prize, $100..Charles Willing, Philadelphia, Pa.

It was the design awarded the first prize that was erected full size in the Coliseum.

Manufacturers of brick, tile, terra cotta, pipe, fancy



Display of the Denison Interlocking Tile

Detail of the Porch Entrance of the Prize Bungalow

pottery, etc., from all parts of the United States and Canada, attended the show. A hundred or more concerns had exhibits of their products in the Coliseum and a few are shown herewith.

There were two distinguished visitors at the show, President Taft and James R. Garfield, formerly Secretary of the Interior. President Taft visited the Coliseum in the forenoon on Saturday, March 9, and made a short talk. Mr. Garfield addressed the National Brick Manufacturers' Association at its annual banquet Friday evening, March 8.

Several associations of manufacturers engaged in clay working industries held conventions in Chicago during the show. These were the American Ceramic Society, National Brick Manufacturers' Association, Clay Machinery Manufacturers' Association, Building Brick Association of America, Face Brick Manufacturers' Association, Illinois Clay Manufacturers' Association, the Drain Tile Manufacturers' Association and the American Terra Cotta Manufacturers' Association.

The great fire loss of approximately $500,000,000 in the United States during 1911 gave an added interest to the Clay Products Exposition. Manufacturers of brick and terra cotta took advantage of the opportunity afforded to exploit the advantages of clay products for fireproof construction.

Impetus was also given to the good roads movement and manufacturers of paving brick had many excel-

our readers are also illustrated, these including the following:

National Fireproofing Company, Pittsburgh, had a most interesting display of hollow tile, arranged in a way to attract marked attention.

The National Roofing Tile Company, Lima, Ohio, had in its booth a miniature house, the roof of which was covered with the company's tile. Various forms of the latter were also arranged about the space and in addition were samples of finials, cresting, etc.

Hocking Valley Products Company, Columbus, Ohio, had a booth which was constructed of brick, showing to good advantage the effects that could be produced in panel work, piers, etc. Surmounting the corner piers of the booth were ground glass globes enclosing electric lights.

The practical application of the Denison Interlocking Tile in connection with building construction was shown by means of a miniature house, a portion of the front walls of which were cement finished and the other portion was left showing the appearance of the tile in the wall. A section of wall with specimens of the tile formed the foreground of the exhibit.

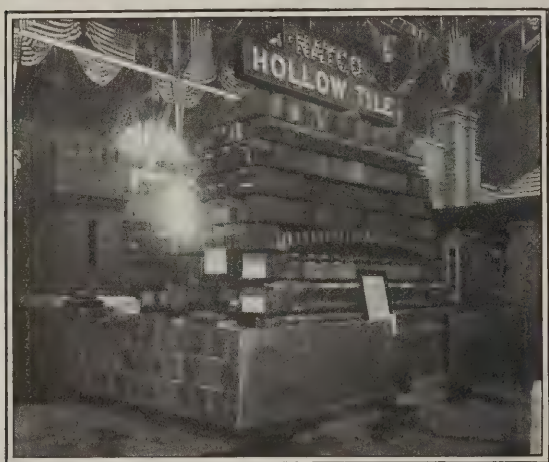


Exhibit of the National Fire Proofing Co.

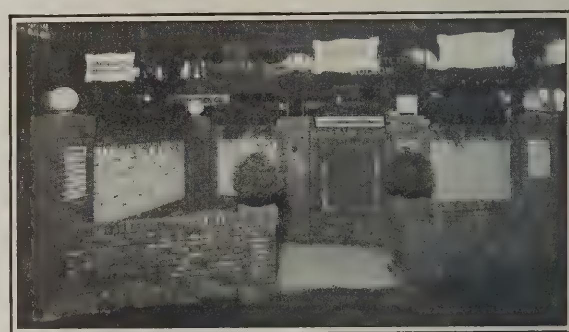
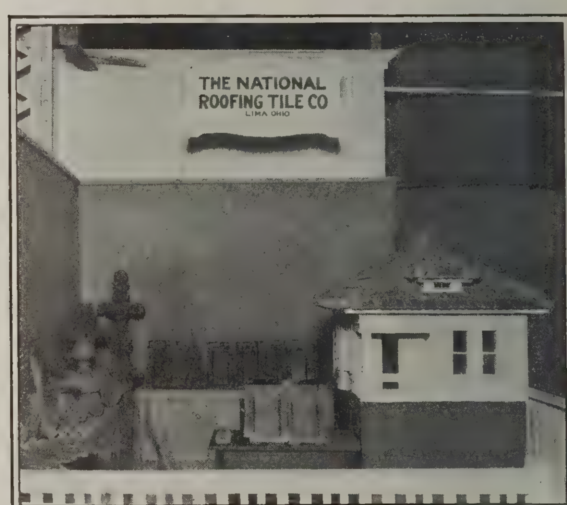


Exhibit Showing How Brick May Be Utilized to Good Advantage for Decorative Effects

Display of Terra Cotta for Ornamental Purposes



An Interesting Display of Roofing Tile.

Exhibition of Clay Products in Chicago

lent displays to show the attractiveness and desirability of brick paved streets. Mayors and other public officials from many cities attended the show and the paving brick men were given an opportunity to demonstrate the advantages of brick pavements.

The use of terra cotta for ornamental as well as for utilitarian purposes was well demonstrated by the Northwestern Terra Cotta Company, Chicago, which constructed an ornamental fountain set in the center of four terra cotta columns and this attracted a great deal of attention.

Some of the exhibits which are of special interest to

Just beyond this display was that of the Dahlstrom Metallic Door Company, Jamestown, N. Y., and a glimpse of which may be seen in the picture of the exhibit of the Interlocking tile.

A number of cement block cottages are being built at Plymouth, England, but Consul Joseph G. Stephens says that the blocks are made in rough models, which is more expensive than concrete falls. Two men and a boy earning a total of $2 a day make 125 of the blocks a day.

Hardwood Doors and Interior Finish

Beauty and Permanency of Hardwood Trim in the Modern Home -- Birch a Favorite Wood

IN the modern up-to-date dwelling the advantages of hardwood as an inside finish or trim are being more and more appreciated and the use of hardwoods for this purpose is correspondingly on the increase. The beauty of finish, permanency and general richness of effects which may be produced are such as to more than offset the increased cost as compared with some of the other woods, although this increase is not so great at the present time as some may imagine.

In fact, to render more popular the use of hardwood trim the cost has been reduced and the permanence and stability of the wood increased. Effects that were impossible in the past are now easily obtainable and fine interior trim, both handsome and permanent, is more easily within the reach of the modest home builder today than it was to the man of wealth 15 or 20 years ago. Naturally these results have been largely accomplished by the efforts which have been put forth by leading hardwood veneered door manufacturers who have spared neither time nor trouble in bringing the beauties of hardwood as a trim prominently to the attention of the architect, the builder and the house owner. It is a well-known fact that a house finished in hardwood is much more salable than one which is not so finished and at the same time it tends to bring a much better price, while giving the occupant a vast deal of satisfaction.

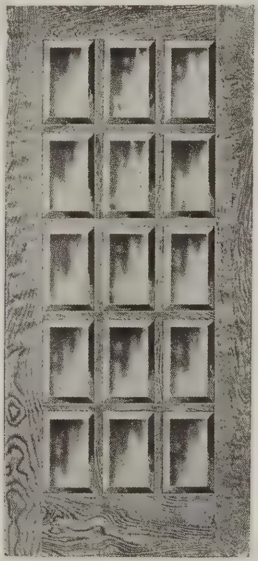
In selecting the stock for the panels of the doors only the most beautiful woods are utilized and even in woods noted for their beauty it is only the logs of unusual beauty of grain and figure that are used for this purpose. These logs are taken for veneer and by cutting very thin are made into a great many faces, the plainer stock being used for less conspicuous purposes. Of all the woods that have been utilized for interior finish the leading hardwood door manufacturers are practically a unit in the opinion that Wisconsin birch is the most beautifully adaptable and serviceable for doors. In fact, they call Wisconsin birch the "Queen of the Hardwoods," and the appearance and behavior of the veneered doors made from it would seem to fully justify the name.

In previous issues of this paper we have called attention to the economy of recommending and using hardwood veneered doors on all jobs and to the satisfaction which has resulted where carpenter-contractors and builders have induced their customers to make use of this material in connection with the finish of their homes. The specimens of doors which are here shown afford a slight idea of the appearance of some of the many styles which are available for those who wish to finish their rooms in birch.

An "M & G" Front Door of Birch

A "Max Ideal" Red Birch Door

A Two Panel "Korelock" Door



A Morgan Red Birch Sash Door

Hardwood Doors and Interior Finish

Hard Steel Bars for Concrete Reinforcement

A change in the building code in Cleveland, Ohio, has been agreed to which will permit the use of hard steel bars in concrete reinforcing work in that city. Complaint was recently made by the Franklin Steel Company that the test requirements under the present code were impossible to meet with hard steel bars made from rerolled rails. The amendment to the code will provide that the physical tests for hard steel bars shall be the same as for soft steel. One test is to be made in an approved laboratory for each 10-ton lot of bars. The bars are to be hot twisted, instead of cold twisted as required for soft steel bars.

Mechanics Institute

The one hundred and twenty-sixth annual report of the General Society of Mechanics and Tradesmen of the City of New York, issued the second week in March, showed that in the School Department known as Mechanics Institute, 20 West 44th Street, New York City, there were enrolled 3218 students for the season of 1911-12.

It is interesting to note from the historic sketch printed in the report that the society was founded in 1785 and incorporated in 1792. The first building owned by this society stood at the northwest corner of Broadway and Park Place and was built in 1802; the second was built at 10 to 14 Chambers Street in 1821; the third in Crosby Street near Grand in 1832; the fourth at 18 East 16th Street was purchased in 1877, and the present building at 18 to 24 West 44th Street was occupied January, 1900.

According to the circular of information which it has recently issued the exhibition of the school work of the year will be held during the third week in April. The courses of instruction for the 1912-1913 season are outlined together with the evenings when sessions are held. The courses cover architectural and mechanical drafting, freehand drawing, modeling, mathematics and science.

A Thousand Dollar Concrete Cottage

What a practical man may accomplish when acting as his own builder is well illustrated in the cement cottage which Joseph Roderick has just completed in Skowhegan, Me. It is the only cement house in the place, and according to the Waterville *Sentinel* it proves that a comfortable dwelling of modern style can be built for about $1,000. Mr. Roderick has erected a house 28 x 24 ft. in plan, with an L measuring 12 x 17 ft. and a shed 15 x 15 ft., and will later build a stable, also of concrete. According to the authority in question, Mr. Roderick used 3000 concrete blocks in putting up the building. There are 37 courses of blocks, nine of which were required for the cellar. He performed the work himself with the help of a tender, and occupied 60 days in the operation, the estimated cost of the material being about $700. He has made new molds for the work on the cornice, the frieze and coping.

The chimney in the house is entirely original, he having made the molds to make the concrete blocks. The blocks are 4 in. high and 3 in. thick and 9 in. long, and the chimney is double. Mr. Roderick reckons that he not only will save in the original cost of this building, but because it is concrete he will not need insurance on it, and therefore will save considerable expense. The $750 estimate has been reckoned for one who buys blocks at the rate of 25 cents a block, but having made them, he estimates the cost of the building to him when finished inside at not more than $700.

Competition in Plans for Concrete Houses.

Announcement has just reached us of a competition in plans and specifications for small concrete houses in which cash prizes aggregating $300 are offered by the Blaw Steel Centering Company, Westinghouse Building, Pittsburgh, Pa. The competition will be conducted under the rules of the American Institute of Architects and is open to all. Designs must be in the hands of the committee by May 15 and awards will be on the basis of merit, it being the desire to have presented for the consideration of owners suggestive designs that will give the greatest value for the expenditure and also new ideas that will tend to stimulate the construction of "poured" concrete houses.

CONTENTS.

What Builders Are Doing

Bird's-Eye View of Building Situation in Leading Cities—Permits Issued and Estimated Value of the Projected Developments

A PRETTY good criterion of the feeling among architects, builders and contractors as to the outlook for the season which is now opening is found in the reports for the month of February which reach us from leading centers of the country. It is a well-known fact that a portion of the month at least, more especially throughout the West, witnessed weather of unusual severity, and it would naturally be supposed that comparatively little attention would be paid to building prospects. Notwithstanding the weather, however, the statistics available show that the month of February was considerably more than 20 per cent. ahead of the same month last year in the estimated value of the buildings for which permits were issued. This certainly bears striking testimony to the hopefulness which pervades building circles as regards the future, and there are many other signs since developed which tend to show that this feeling is well founded.

The increased activity in the filing of permits is shown in a most striking manner in widely scattered cities, notable among which are Boston, New York, Albany, Chattanooga, Portland, Me.; Louisville, Detroit, Toledo, Norfolk, Va.; San Diego, Oakland, Cal.; Kansas City and Buffalo. Those showing decreases are scattered over an equally wide territory and embrace, among others, Chicago, St. Louis, Baltimore, San Francisco, Pittsburgh, Minneapolis, Cincinnati, St. Paul, Spokane, Tacoma, Indianapolis, Springfield, Ill.; Springfield, Mass.; Hartford, and New Orleans.

Should no serious labor differences occur on the first of May the situation would continue full of promise and with the plans which are monthly being filed would insure employment for thousands of men in all the various branches of the building industry.

Baltimore, Md.

The February report of Building Inspector Stubbs shows a decided increase in activity as compared with January and also with February a year ago. The present season has been an unusually severe one so far as weather conditions are concerned and this increase in the filing of plans for projected buildings is looked upon by architects and builders as an indication of a busy season. The figures of the report show that permits were issued for new construction work costing $550,050, which with the additions and alterations gives a total of $675,850. Of this amount $167,650 was for 93 two-story brick dwellings and $257,500 was for 5 manufacturing and warehouse buildings.

For the two months of the current year the total value of new construction work was $1,043,250 and with the additions and alterations the total reached $1,277,510.

Buffalo, N. Y.

The number of permits issued by the Bureau of Building for the month of February was 121 and the estimated valuation for same was $1,228,000. This is an increase of 401 per cent. over February, 1911, when 159 permits were issued with an estimated valuation of $245,000. The large total for the past month is due to the filing of plans for several large buildings—warehouses, factories and apartment buildings.

The Superintendent of the Building Bureau states that the outlook for a big year in the building line is very good and the indications are that the total cost of building operations will exceed any previous year in the history of the city.

Some of the buildings for which permits have been issued are a six-story and basement warehouse for the International Harvester Company to be erected by the Keystone Warehouse Company at Seneca street and the Pennsylvania Railroad, to cost $150,000; warehouse and factory addition for the Hoefler Ice Cream Company, $55,000; malleable iron foundry, 225 x 550 ft., and pattern vault for the Pratt & Letchworth Company, $100,000; factory building, 70 x 200 ft., three stories and basement, for the F. F. Dalley Company, $50,000; Sidway Building addition, Main and Goodell streets, lofts and light manufacturing, $45,000; Professional Building, Delaware avenue and Chippewa street, $50,000; remodeling Public Market, Washington and Chippewa streets, 200 x 450 ft., $100,000, from plans of City Architect Howard L. Beck, Municipal Building; remodeling Third National Bank Building, $30,000.

A refrigerating and bottling plant is to be erected for the J. L. Schwartz Brewing Company to cost $55,000. A brick and stucco dwelling for Washington B. French, Chapin parkway and Windsor avenue, to cost $30,000. Ten dwellings of stone and cement at Central Park, to be erected by Warner & Warner at costs ranging from $10,000 to $35,000, and a large number of moderate priced dwellings and apartment houses.

Revised plans are being prepared by Architect Martin C. Miller, Mutual Life Building, for the Technical High School to be erected by the City at Bennet Park and Clinton street, the bids upon the original plans having largely exceeded the estimate and appropriation, which was $600,000.

The State Legislature has passed a bill, and same has been approved by Governor Dix, appropriating $100,000 as the initial amount toward the erection of a new State Normal School in Buffalo, to be completed at a cost of $400,000. Plans have been completed by State Architect Franklin B. Ware for a group of buildings to be erected on the square bounded by Normal avenue, York, Fourteenth and Jersey streets, upon which the present Normal Building stands. The old building is to be removed upon the completion of the new structures.

The plans, which have been approved by the State Department of Education, provide for three-story and basement buildings, an administration building and two wings, U-shape in plan, surrounding a court 120 ft. in width. The architecture will be Colonial in style and the material stone, red tapestry brick and terra cotta. The buildings will be fireproof in construction and will contain facilities for the instruction and training of teachers in every branch of educational work now taken up in public schools, including manual training. A complete laboratory will be an important part of the institution. The appropriation of $100,000 will enable the State Architect to make a start early this summer towards the erection of the new buildings.

Cincinnati, Ohio

Building activity during February was far below normal, but the value of permits issued at the City Hall was almost exactly double that for January. Excluding plumbing inspections and elevator certificates issued, 363 permits were taken out, having a total valuation of $390,324. The month of January had a record of only $190,075 for proposed improvements.

A comparison with February, 1911, having $702,795 to its credit, may be somewhat discouraging, but the winter season last year was very mild as compared with weather conditions as existing during February, 1912, and this is given as the principal reason for the slump this year.

In addition to several large office and hotel buildings planned, or now under way, architects are generally very busy drawing up plans for schools and residences, and it is predicted that the present spring season will be one of the busiest in the history of Cincinnati. So much work was held up on account of the weather during the winter just over that this prediction will probably come true.

At the meeting of the Builders' and Traders' Exchange, held March 7, the following officers were elected:

President............................A. G. Weist
Vice-President....... ....C. T. Handman
Secretary..........................E. A. Powell
Treasurer.... ....T. J. Tanner

The Cincinnati Architectural Club is a new organization, and commodious quarters have been secured at 31 West Fifth avenue. Monthly smokers are planned, at which talks will be made by leading architects and builders.

Cleveland, Ohio

A large amount of building work is being figured on and some good-sized contracts have been placed recently for construction work to start in early spring. There is a good volume of work in prospect for hotel, office and mercantile buildings, and engineering firms are making plans for factory buildings for a number of Cleveland manufacturers. Taken altogether, the indications are that building lines will be unusually active during the year. Contracts have been placed for a new ten-story hotel to be built in the downtown district on Superior Avenue. Another hotel building will be a large addition to the Hotel Euclid.

Building permits issued during February showed a falling off of nearly 50 per cent., as compared with the same month a year ago. This, however, was attributed entirely to the continued cold weather which prevented outdoor work. During the month there were 288 permits issued for buildings to cost $390,135. Of these 58 were for frame buildings to cost $99,800, 23 for brick buildings to cost $73,800, and 207 were for alterations and additions to cost $116,120.

Columbus, Ohio

The members of the Builders Exchange held in February what they were pleased to designate as a "Boosters' Banquet"—so called, no doubt, because the officers of all the big boosting organizations of the city were present and explained their own system of boosting the city of Columbus. The banquet was attended by 150 guests, and in introducing the speakers Secretary Kelley of the Exchange lauded the efforts of the civic organizations of to-day and referred to the great good Columbus organizations of business men were doing.

President Herbst of the Chamber of Commerce spoke in regard to the centennial celebration which is to be held in the city of Columbus in August and September and pointed out that the city was making preparations to entertain at least a million visitors. President Conway of the Columbus Real Estate Board talked about the Flower and Garden Club which the real estate men have organized to make the city a veritable flower garden, when the visitors arrive for the celebration, by sowing flower seed and planting vegetables on all the vacant lots. President Ackland of the Retail Merchants Association addressed the members of the Exchange on the Civic Center scheme that his organization is fostering. It is proposed to take a city square close to the center of Columbus and near the capitol and locate on it the new school administration building, the city hall, and two state office buildings.

President Thomas of the Columbus Society of Architects praised the organizations for their public spirit and stated that nothing would do more for the uplift of citizenship than the beautification of the city by a Civic Center, the beautification of the water fronts and the establishment of more parks and boulevards.

The new home of the Columbus Builders Exchange was boosted and the builders declared themselves in favor of all the plans that had been perfected. President Hibbs presided and several of the members offered brief remarks. There were moving pictures and plenty to eat and drink, to say nothing of lively singing and playing by a colored orchestra.

Building conditions in prospect for the ensuing year look bright and the plan room at the Builders Exchange is so full of good material that contractors from all neighboring sections have their eyes on the Ohio Capital City. It is expected that $1,000,000 worth of work will be let in Columbus before the first of April.

Crookston, Minn.

Those prominently identified with building interests in Crookston have recently perfected the organization of the Builders' and Traders' Exchange with officers as follows:

President.......................Peter P. Boukind
Vice-President......................E. W. Vance
Treasurer.........................A. O. Busterud

Arrangements for a permanent office and a secretary have been perfected and it is expected that very soon everything will be in good running order.

Detroit, Mich.

The Builders' and Traders' Exchange, with offices and exhibition rooms in the Penobscot Building, held its annual election and general meeting early in the year. The polls were opened at 9 o'clock in the morning and closed at 3 o'clock in the afternoon. After the polls were closed President Scholl called the members to order, and Treasurer Burkheiser presented his annual report, after which Secretary Charles A. Bowen stated that the board of directors held 25 meetings during the year and that the daily average attendance of members had been 145. The total membership reached on the first of January of the current year was 320. During the year an auxiliary Builders' and Traders' Exchange was formed known as the Executive Board of Building Trades Employers, which is made up of one representative from each Contractors' Association which is in existence, and two members from the Exchange at large.

President Scholl delivered his annual address, briefly reviewing the work of the Exchange during the year and expressing appreciation of the loyalty which the membership had shown in connection with various matters in which the Exchange was taking an active part.

The newly elected directors met on January 3 with the directors remaining over for 1912 and selected the following officers for the year:

President.......................William R. Kales
Vice-President.................E. M. Harrington
Treasurer...........................Emil R. Pett
Secretary......................Charles A. Bowen
Assistant Secretary...........George T. Wallace

On the 4th of January President Kales announced the standing committees for 1912, of which the following is a list with the name of the chairman of each:

Legislative and Public Improvement.—Otto L. Misch, chairman, mason contractor.

Membership.—Fred Galster, chairman, Acme Fancy Wire works.

Entertainment.—Charles Y. Smith, chairman.

Finance.—Walter J. Fritsch, chairman, Fritsch & Scrase, plasterers.

Room and Rules.—William H. Whittingham, chairman, Stokes & Whittingham, masons.

The "Bulletin News" for January, which is published for the members of the Builders and Traders Exchange, contained a brief report of the annual meeting, together with notice of meetings and elections for local associations. There is also much other matter of special interest to builders, all bearing upon the advantages of membership in an organization of this character.

Fond du Lac, Wis.

The Builders' and Traders' Exchange of Fond du Lac, which was recently organized, has elected the following officials for the ensuing year:

President...............................John Hutter
Vice-President ....J. W. Rosenbaum
Treasurer.........................H. O. Michler
Secretary..........................F. O. Funkey

At this meeting 50 members were present and a constitution and by-laws were adopted. Papers of incorporation were ordered prepared and filed with the secretary of state at Madison.

Los Angeles, Cal.

Building operations since the first of the year have been on a larger scale than ever before at this season. The value of buildings for which permits were issued last month exceeded by $628,694 the highest previous valuation for a similar month, which was February, 1910. Last month's figures were $2,152,963, compared with $2,456,872 for January, while the total for February last year was $1,009,277. Applications for permits now on file indicate another record-breaking month for March.

In last month's figures the amount going into permanent construction slightly exceeds the value of small dwellings, though the latter class of work also continues to increase. As it is, the progress of home-building is barely keeping up with the requirements of the population, and vacant buildings of this class are hard to find. The growing demand for business and office buildings is the logical result of the increase of population.

Contracts were let last month for a 7-story reinforced concrete apartment house on a lot 150 feet square for H. W. Bryson, F. H. Noonan and C. H. Kyser, architects, the general contract going to the F. O. Engstrum Company. The entire cost is estimated at $400,000. It will follow Spanish Renaissance lines, and will contain 75 apartments of two to five rooms each. The Barber-Bradley Construction Company has taken an $85,000 contract for general construction of an 8-story reinforced concrete hotel for F. W. Braun at Second and Clay streets, W. J. Saunders, architect. E. P. Clark has placed a contract with the F. O. Engstrum Company for an 11-story concrete hotel on Hill street, near Fourth, at $645,197. Harrison Albright is the architect.

Plans will soon be up for figures on the following buildings: the 8-story stone building for the Title Guarantee & Trust Company at Fifth street and Broadway, at an estimated cost of $500,000, Morgan, Walls & Morgan, architects; a group of three buildings, dormitories and auditorium, the former to be 10 stories high, for the Los Angeles Bible Institute, on Hope street near Sixth, Walker & Vawter, architects; the Western Building & Investment Company's 6-story reinforced concrete office building on Spring street near Sixth, to cost about $200,000, Alfred Champ, architect; an apartment house for P. L. Auten at Ninth and Alvarado streets, to cost $200,000, Train & Williams, architects; a $125,000 building for A. L. Cheney on Broadway, Parkinson & Bergstrom, architects, and a $100,000 residence for J. J. Haggerty on West Adams street, Knapp & Woodward, architects.

The Knights of Columbus of this city are making arrangements for a 4-story building, to cost about $150,000.

The Los Angeles Builders' Exchange is planning to erect a tall building at a cost of about $700,000, money for which is now available, and the building committee is looking for a suitable site.

An architectural exhibition was held here the first of the month by the Architectural League of the Pacific Coast, coinciding with the third annual exhibit of the Los Angeles Architectural Club. The attendance was about twice as large as last year. Norman D. Bishop was manager of exhibits and business manager.

Memphis, Tenn.

Building activity developed in a marked degree last month as compared with this season a year ago and according to the figures of Building Inspector Dan C. Newton there were 268 permits taken out for new construction work involving an outlay of $601,921. In February last year practically the same number of permits were issued, the exact figures being 264, but the amount of vested capital involved amounted to only $340,120, thus clearly indicating that a year ago the buildings planned were of a more modest character than those which are now being projected.

The members of the Builders Exchange enjoyed their annual "Smoker" on the evening of February 19, when an entertaining program was greatly enjoyed. There were addresses by a number of prominent members and guests and the attendance is said to have been the largest at any "Smoker" the Exchange has held. The master of ceremony was Charles R. Miller, president of the Builders Exchange, while the speakers included John M. Tuther, secretary of the Business Men's Club; Dan C. Newton, Building Inspector of the city; Max Furbringer, an architect of the city, and I. N. Chambers and D. N. Crawford, both ex-presidents of the Exchange. Mr. Furbringer touched upon the building trade from the architects' standpoint and pointed out that the best efforts of the architect, the contractor and the material man alwavs spelled success.

Clarence DeVoy, who was chairman of the entertainment committee and to whose efforts much of the success of the Smoker was due, kept the guests in high spirits by a ballad which he rendered at the close of the evening's entertainment.

Minot, N. D.

The members of the Builders' Exchange held their third annual meeting the third week in January, when officers for the ensuing year were elected as follows:

President..........................D. A. Dinnie
First Vice-President.................R. W. Thorp
Second Vice-President..............J. A. Carlson
Secretary.........................F. L. Sherman
Treasurer...........................J. A. Roell

There were also three directors chosen to serve for three years and several new members were elected to the organization.

Montreal, Canada

The city of Montreal witnessed a gratifying degree of activity in the building industry last year and as a result several imposing structures have been added to the architecture of the building section. The work includes among others 2120 houses, 42 factories, 20 warehouses, 108 stores, 11 schools, 5 hotels, 6 churches and 91 stables. The total value of the improvements for which the 3736 permits were issued was $14,561,481 which compared with the valuation of permits for 1910 showed a decrease of $1,254,378. This decrease, however, is more apparent than real as in 1910 the estimated cost of the addition to the Canadian Pacific Railroad station, the transportation and express buildings were included, although they were not actually constructed until 1911, and which alone amount to nearly $4,000,000.

The main feature of the building season from an operative standpoint was the construction of the Transportation & Dominion Express buildings on St. James place in a space of time which set a record for the Dominion and which with other big buildings was largely responsible for the phenomenal increase in real estate values in the downtown district.

The fourteenth annual report of the Montreal Builders' Exchange, John Herbert Lauer, secretary-treasurer, covered a number of interesting topics, among which were the revised building code which the Exchange has been earnestly advocating for the past four years; the Montreal technical school, to the formal opening of which the Builders Exchange was officially invited in August last, the Uniform Contract which is recommended for use by the members when submitting tenders, the movement to amend the tariff on building stone; commercial ratings; franchise to business corporations, and the establishment by the Board of Control of a Bureau of Industries and Publicity.

A feature of the exchange which has proved a most successful experiment and one that appears to have at least solved the problem of bringing the members more frequently into friendly and social contact is the noon hour lunch talks. These latter have included such topics as heating and ventilation, reinforced concrete, wages and labor in Australia, lumber business, organization, etc.

Newark, N. J.

The Builders' and Traders' Exchange of Newark held its annual meeting in January at the headquarters of the organization, 45 Clinton street. The report of the treasurer showed a membership of 175, which is an increase of 25 as compared with the list on the roster a year ago.

The officers elected for the ensuing year are:

President.........................George Ding
Vice-President...................Hugh Kinnard
Secretary...................Charles M. Glover
Treasurer.........................C. L. Rusling

New York City

Something of an improvement is to be found in the building situation, if one may judge from the showing made by the statistics of the month just closed as compared with February a year ago. The better showing last month, however, is due very largely to the increased number of store and loft buildings planned, permits having been issued for 13 such structures, involving an estimated outlay of $3,082,000, while in February last year five such buildings were planned, costing $650,000. Last month, too, there were nine places of amusement planned to cost $1,253,800, as against two such structures costing $250,000 in February a year ago.

According to the report of Rudolph P. Miller, superintendent of buildings for the Borough of Manhattan, permits were issued last month for 54 new buildings, costing $5,751,700, as against 42 permits for new buildings costing $2,698,050 in February, 1911.

Last month's operations are slightly less than in January of the present year, when permits were issued for 72 new buildings to cost $6,252,175. January witnessed the filing of plans for 21 apartment houses calling for an outlay of $1,555,000, and for five store and loft buildings, calling for an outlay of $1,475,000.

During February of the current year 246 permits were issued for alterations and repairs, calling for an outlay of $1,225,946, while in February last year 230 permits were issued involving an estimated cost of $503,335.

In the Borough of the Bronx there was a decided increase in the amount of work planned, the figures showing permits to have been issued for 75 buildings, costing $1,848,245, whereas in February a year ago 66 buildings were planned, costing $949,700.

In Brooklyn 255 permits were issued for construction work, calling for an outlay of $1,680,405, and in February last year 176 buildings were planned, costing $1,598,400.

From these figures it will be seen that the greatest change in the estimated cost of construction work was in Manhattan, and it will also be noted that the expenditure per building in Brooklyn was much less than in the other two boroughs.

The figures clearly show that the tendency in the Borough of the Bronx is more largely toward business structures, while in Brooklyn the tendency is in the direction of dwelling houses, especially in the outlying districts.

The figures for the three boroughs mentioned, including new work and alterations, are $22,678,000 for the first two months of this year, as against $21,569,000 for the corresponding months of last year.

Oakland, Cal.

Notwithstanding the fact that contracts for several large business buildings for the shopping district have been temporarily held up, building activities have increased remarkably during February, making it one of the busiest months on record for this time of year. This is remarkable, in view of the fact that there were no single items of much importance, and can only be accounted for on the ground that home builders were encouraged by the dry weather to begin work which would otherwise have been delayed until summer.

Scores of cottages and bungalows of low cost are being started in the "annexed district" to the southeast, and many more elaborate bungalows, with some expensive residences, are under way in the hillside districts, and the separate municipalities of Piedmont and Berkeley.

The official total of building permits issued last month was $515,593, compared with $326,712 for January, and $363,508 for February, 1911.

Progress on the proposed municipal auditorium, to cost about $500,000, has been temporarily halted by litigation over the site. The Board of Education has presented a requisition to the Board of Public Works for plans for eight school buildings provided for in last year's bond issue.

One of the finest church edifices in Oakland will be the new building of the First Methodist Church, plans for which have been finally adopted, Norman F. Marsh of Los Angeles being the architect. It will be at the intersection of Broadway, Twenty-fourth and Webster streets, with three frontages, and will cost $150,000. The architecture combines features of the Corinthian and Byzantine periods, the materials being brick and cement on steel frame, with oak interior. The length will be 200 ft. over all, width across transept 150 ft., nave 80 ft. long. Two towers will be 95 ft. high, with a dome 105 ft. high. The main auditorium will have seating capacity for about 1200.

John Galen Howard, head of the architectural department of the University of California, is completing plans for a $200,000 reinforced concrete and granite campanile to be erected on the campus in Berkeley.

In an effort to increase its membership, the carpenters' union in the adjoining town of Alameda has reduced its initiation fee from $30 to $15. The union has now 147 members. A large amount of small building work on this side of San Francisco Bay is being done by non-union labor.

Oshkosh, Wis.

The Builders' and Traders' Exchange continues in a most flourishing condition, and since its incorporation several years ago it has rapidly grown in strength and influence.

At the annual meeting, held the third week in February, the following officers for 1912 were elected:

President......................C. W. Dukershien
Vice-President...................Albert Abraham
Secretary-Treasurer................John Edwards

The directors elected for three years were Albert Ebernau and Louis Larson.

Philadelphia, Pa.

Conditions unfavorable for outdoor occupation have prevailed during almost the greater part of the month, with the result that the usual early spring building movement still continues delayed. From records compiled by the Bureau of Building Inspection, it may be seen, however, that the total for February is but slightly behind the records for that month during the past few years. Permits were issued for 795 operations, the estimated cost of which aggregates $2,029,385, an increase of 202 operations, and $764,365 in cost, as compared with the month of January.

The total for the first two months of 1912, however, shows a decrease of $1,275,690 in cost, when compared with the same months last year, due largely to the apathy displayed during January. There has been a material improvement in dwelling house work, although the volume is still below that of February during the past few years. Permits were taken out for 285 two-story dwelling operations, costing about $522,250, while those of other characters totaled but $39,600 in estimated cost. Manufacturing buildings and warehouses together, on which work was started, show an aggregate expenditure of over $600,000, while the permits taken for the new Convention Hall involve an expenditure of $107,000. Office and hotel buildings in the centre of the city promise considerable business to the trade. Work has been started on the new Stock Exchange Building; the contract for the new Manufacturers' Club has been let, and bids are going in for the new Hotel Vendig. Several large dwelling operations are in contemplation and it will only require somewhat more favorable weather conditions to get outdoor work moving at a rapid pace.

The contract for the new Manufacturers' Club has been definitely let to Irwin & Leighton, at $670,000. The building, to be erected at Broad and Walnut streets, will measure 100 x 100 ft. in plan and will be ten stories high. It will be of structural steel frame, stone and brick, and entirely fireproof.

M. P. Wells has the contract for the new temporary Convention Hall, to be built for the city, to cost $107,000. The building is to be frame and plaster on metal lath, one story high, 265 x 409 ft.

John W. Emery is understood to have the contract for a two and three-story, brick and steel fireproof Police Station, fire house, patrol garage and stable, 57 x 84 ft., 59 x 46 ft., and 28 x 84 ft., to be erected at Fifty-fifth and Pine streets. The contract price was slightly over $86,000.

Plans and specifications have been posted for the new Government Pier in connection with the Immigrant Station for the Port of Philadelphia, to be erected at Gloucester, N. J., on the Delaware River. The pier is to be 400 ft. long by 250 ft. wide, and will be of reinforced concrete construction.

Guy King, architect, is taking bids for the erection of a nine-story and basement manufacturing building, 100 ft. 11½ in. x 396 ft. 10 in., to be known as the Metropolitan Building, the cost of which is estimated at $1,000,000. The building will be of concrete. Windows will occupy four sides of the building and represent 75 per cent. of the wall space. Eight elevators will be installed and a 1000-horsepower plant will be put in as an initial unit. Over 400,000 sq. ft. of floor space will be available for manufacturing purposes.

Plans are being drawn for a proposed 18-story office building to be erected for the Continental Trust Company, at the southwest corner of Twelfth and Market streets.

Among the apartment house projects under consideration is one for the Carson Realty Company, four stories, 68 x 200 ft., to be erected at Broad and Wharton streets. Plans have been filed for a four-story apartment house for the Bellevue Apartments Company, Wayne avenue, below Hansberry street. The building measures 24 x 88 ft., and will contain eight suites of six rooms each.

In dwelling operations plans are noted for 25 two-story two-family dwellings, 20 x 80 ft., to build at Forty-seventh and Sansom streets, for J. C. Milligan. The Model Building Company has been taking estimates for 40 two-story houses and two stores and apartments, to be erected in West Philadelphia, from plans by E. Allen Wilson. Ground is about to be broken for an operation of 20 three-story houses at Forty-ninth and Locust streets, by O. B. Carmean. Title is reported acquired by Storch & Schied for a tract of land in the vicinity of Twenty-fourth and Morris streets, on which it is proposed to begin work on an operation of 136 two-story dwellings.

Portland, Ore.

The building record for February is the best for the same month in several years, the total valuation being $1,199,861, as compared with $1,064,425 for February, 1911, and $901,272 for January of this year. Though below the average of summer months, this is considered highly satisfactory for the rainy season, and a steady improvement is expected during the spring. Plans for a number of large buildings were held over in the Inspector's office, and the permits for these will be added to this month's valuation. The number of permits for February, however, was among the largest ever issued in any one month, being 820, compared with 563 for January, and 571 for February last year. About two-thirds of the permits were for dwellings, the greater part of the increase, both in number and value, over January being for business and office structures. There has been a general feeling that Portland and vicinity have been somewhat over-promoted, and builders manifest a much more conservative attitude than a year ago, in view of which the present gain is most encouraging.

The more important structures contemplated for construction during the spring are the following: a $75,000 apartment house to be erected at First and Multnomah streets, MacNaughton & Raymond, architects; a $225,000 warehouse at East First and Salmon streets, for Fisher & Thorsen; a 14-story Class A building at Seventh and Oak streets, to cost $500,000, for the Pacific Telephone & Telegraph Company, plans drawn at the San Francisco offices; a 4-story fireproof apartment house for M. E. Lee, on Main street near Thirteenth, to cost $80,000, W. H. Cowan, architect, and a $60,000 hotel for the H. W. Scott estate at Thirteenth and Morrison streets.

Architect F. A. Swingle of the Bross Construction Company has plans for a bungalow court to be built the coming summer. The plan includes 14 bungalows in an enclosed court, with a concrete garage at one end, all buildings to be heated from a central plant.

Thomas Burgoyne has taken the general contract for the $100,000 Westminster Presbyterian Church at East Sixteenth and Hancock streets, the plans being by Architect E. F. Lawrence. Architects MacNaughton & Raymond have let contracts on the $80,000 brick building of the Crown Trust Company on Stark street near Tenth. The same architects are drawing plans for a $40,000 Y. M. C. A. building at Baker City, Ore.

Sacramento, Cal.

February brought a material improvement in local building activities over the preceding month, though conditions are still rather quiet, even for this time of year. It is believed that the situation has been somewhat affected by the drought in the surrounding valley, and that this month will bring a further gain. The value of buildings for which permits were issued last month was $104,465, compared with $94,577 for January, and $132,090 for February last year. Some objection has been made to recent figures, owing to alleged undervaluation by owners applying for permits. A case has been cited in which it is claimed that a $120,000 building was erected on a $9,500 permit. Since this matter has been brought into public notice, it is believed that more care will be taken in ascertaining correct valuations.

The principal building for which plans are being prepared is a $100,000 structure for Siller Bros., at Ninth and L streets, the architects being Seadler & Hoen.

San Diego, Cal.

February building values, though smaller than for January, still make a total surpassing all former records for the corresponding month. The entire valuation is $494,688, compared with $528,252 for the preceding month, and $231,925 for February, 1911. The feature at the close of the month was a boom in dwellings in the La Jolla district, which brought the total since the first of the year to over $1,000,000.

J. M. Anderson, architect, formerly of Seattle, Wash., will erect a 4-story hotel building to cost about $125,000 at the corner of Sixth and B streets. Architects Bristow & Lyman have plans for a 6-story reinforced concrete store building, to cost $150,000, at Sixth and C streets for the Prevert-Bledsoe Furniture Company. Patrick Martin is preparing to erect a $50,000 hotel at Eighth and F streets.

A new building ordinance for this city has been compiled by Charles Quayle, John Campbell and J. L. Bacon, who were appointed for the purpose December 30, 1911. The former ordinance, prepared by local architects, was vetoed by the Mayor on the ground that practically no building could comply with it.

The new measure forbids buildings higher than 100 ft., from sidewalk to top of cornices, but parts of a building may exceed this height if they fall below a line drawn upward at 45 degrees from the line of intersection of the top of the cornice with the building line on the street fronts.

San Francisco, Cal.

The amount of new work started in San Francisco last month was a little less than in January, although reports from both architects and contractors indicate fully normal conditions. Unusually rapid progress for this time of year has been made on buildings under construction, owing to the absence of seasonable storms.

The valuation of building permits in San Francisco for February was $1,764,252, compared with $1,870,617 for January and $1,455,824 for February, 1911, a comparison which offers some encouragement, especially as several large plans which were completed about the end of the year are now coming up for final figuring. The new contracts include none of unusually high valuation, but there are a number of business and apartment or hotel buildings of moderate cost, and one notable residence.

The building material market in general is gaining a little more strength. Crushed rock, lime and cement are still rather weak, owing to heavy production and lack of large outside demands, but reinforcing steel is a little firmer. Common brick is in ample supply, but the manufacturers look for a heavy demand later on and are holding for an advance of 50 cents, quoting $7.50 per M. The lumber market still tends upward, but the northern output is increasing and prices are slow to advance. The comparative cheapness of reinforced concrete at present is causing its use in many good-size buildings.

The eastern members of the architectural commission of the Panama-Pacific Exposition met here a few weeks ago, and plans were completed for the general arrangement of the principal buildings. From now on the detail plans for individual structures will be taken up as rapidly as possible. All permanent buildings, with the exception of an auditorium, will be placed in Golden Gate Park, the temporary buildings being at the Harbor View site, and the auditorium at the Civic Center. For the latter building, the Exposition Company has appropriated $1,000,000, and work on the plans will be started at the same time as for the new city hall, arrangements having been made to keep the architectural features of the two buildings in harmony. The States which will take part in the Exposition will select the sites for their buildings this month.

The General Contractors' Association of San Francisco held its annual meeting last month at the temporary quarters, 402 Kearny street, and elected the following officers: Chas. A. Day, president; C. W. Gompertz, vice-president; C. J. Lindgren, treasurer; Wm. B. Hague, secretary. The association will soon have permanent offices in the new Sharon Estate building on New Montgomery street, which is being fitted up especially for contractors and material dealers.

Local architects say that many owners are now building on a commission basis, or by day labor, with the supposed object of avoiding trouble under the lien law.

Two exceptionally fine residence buildings are now under construction in this city. One of these is on Broadway near Webster street, and was designed for James L. Flood by Architects Bliss & Faville. So far only the contract has been let for the general concrete work and fireproofing which goes to the Clinton Fireproofing Company at $51,750, and for the structural steel, of which about 500 tons will be used, which was taken by Dyer Bros. at $42,496.

The other residence soon to be completed was designed by Architects Macdonald & Applegarth for A. B. Spreckels, at Octavia and Washington streets. The exterior is a combination of Manti stone and bronze, in the French Renaissance style, while the interior will be adorned with elaborate marble work. The interior decoration will follow French period styles. Notable features will be a dining room of oval shape, and a court in the Pompeiian style overlooking the Golden Gate. Playrooms and a roof garden will be placed on the upper part of the building, which will have elevator accommodations.

Among the principal buildings on which contracts are to be let shortly are the following: the Crocker estates's 6-story Class A store and office building at Market and Ecker streets, to cost $150,000, Lewis P. Hobart, architect; a 4-story brick and steel loft and office building for the White Investment Company, to be erected on Battery street near California, Lewis P. Hobart, architect; a brick and steel building on Market street near Seventh for James D. Phelan, to cost $100,000, Wm. Curlett & Son, architects; a 7-story reinforced concrete hotel for Geary street near Mason, to cost $100,000, Righetti & Headman, architects; a 9-story Class A hotel for the Clift estate, to be built at Geary and Taylor streets at an estimated cost of $200,000, Macdonald & Applegarth, architects; an 8-story Class A apartment house at Pine and Powell streets, to cost $100,000, C. R. Barrett, architect; and a 6-story brick and steel apartment house at Powell and Sacramento streets, to cost $100,000, Houghton Sawyer, architect.

In addition to the above, plans are being prepared by Architect Ignatius Dwyer for a $250,000 building for the Young Men's Institute, and Architect W. C. Hays has plans for a $500,000 group of buildings for the Wilmerding school, to be erected during the next three years.

Contracts are being let for an unusual number of fine buildings in the smaller towns of the State, the most notable being the Powell building, Fresno, Cal., in which 400 tons of steel will be used. Figures have also been taken on the $150,000 reinforced concrete Y. M. C. A. building at San José, Cal., Wm. Binder, architect.

The Bakersfield, Cal., Builders' Exchange was recently incorporated for the purpose of erecting its own building. The capital stock is $10,000, the directors being M. T. Kean, R. Pile, G. M. Wilkins, W. G. White, C. Daly, C. D. Brown, J. R. Rogers, O. C. Schatz and J. F. Endert.

A new building material to be introduced in this market shortly is Colonial wall board and hard wall plaster made by the Mound House Plaster Company, which has a large gypsum deposit at Mound House, Nev., and has just started a manufacturing plant at Emeryville, Cal., with offices in San Francisco.

Seattle, Wash.

There was very little change in the building situation during the second month of the year as compared with the corresponding period of 1911, the only noticeable feature being a slight falling off in the number of permits issued. This was due principally to the let-up in the filing of plans for detached residences. According to the report of Superintendent R. H. Ober, there were 775 permits issued in February for building construction involving an estimated outlay of $473,940, while in the corresponding month of last year 834 permits were issued for buildings costing $491,245. Of the totals for last month 154 permits were for private dwellings costing $229,710, as against 191 permits for this class of buildings costing $255,050 in the corresponding month of last year.

For the two months of the current year 1537 permits were issued for construction work involving an outlay of $1,248,750, whereas in the first two months of last year 1624 permits were issued for building improvements costing $997,250.

St. Louis, Mo.

The severity of the weather which this section of the country has been experiencing is reflected somewhat in the falling off of new building projects as compared with this month last year. According to the figures of the Bureau of Building Inspection there were 480 permits issued in February for buildings costing $1,002,164, while in February last year 541 permits were taken out calling for an estimated expenditure of $1,147,584.

The members of the St. Louis Building Industries Association enjoyed a very pleasant evening when 125 of them on February 7 sat down to a dinner at the City Club and talked over the business situation as well as the objects of the organization and the value of arbitration.

The toastmaster was O. G. Selden, who expressed the view that the organization had been of much benefit to both the masters in the trades represented in the membership and to the laborers in their employ. Short addresses were made bv Fred B. Adams, first vice-president of the Association; Walter Wimmer, president of the Sheet Metal Contractors Association; H. H. Jacobi, president of the Ornamental Glass Manufacturers Association; Harry O'Connell, of the St. Louis Master Painters Association; George Corroa, president of the St. Louis Electrical Contractors Association; C. W. S. Cobb, of the St. Louis Supply Dealers Association; C. L. Gray, second vice-president of the Building Industries Association and representing the General Contractors Association; F. G. Boyd, secretary of the association, who was also the prime mover in arranging for the banquet, and Fred Grentzemacher, of the St. Louis Stone Cutters Association.

While the speech-making was in progress word was received by Toastmaster Selden that John M. Sellers, president of the St. Louis Roofing Company and a member of the organization, had passed away, and Secretary Boyd was instructed to send resolutions of sympathy to members of the family.

Trenton, N. J.

The amount of building projected during the year which has just closed made a very favorable comparison with the amount of capital involved in the operations for 1910. Last year, it is true, the number of permits fell off somewhat as compared with the previous twelve months, but the shrinkage was in no wise significant. Last year as a whole developed a great deal of new work and the suburban sections showed a gratifying degree of activity in the way of house building. According to the figures of Building Inspector Hancock there were 891 permits issued in 1911 for building improvements estimated to cost $2,010,509, while in the twelve months of the year previous there were 943 permits issued for construction work estimated to cost $2,170,444.

Windsor, Ont.

At the annual meeting of the Builders' and Traders' Association of Essex held at Windsor, Ont., January 9, officers for the ensuing year were elected as follows:

President..........................T. W. Brooke
Vice-President..................James Penington
Secretary-Treasurer..............Robert Parker
Recording Secretary..............G. W. Freeman

Building operations during the year just closed were of a highly gratifying nature and a continuation of the building activity is expected during 1912.

Winnipeg, Manitoba

At the annual meeting of the Builders' Exchange the reports of the secretary and treasurer showed the organization to be in a flourishing condition. The following officers for the ensuing year were elected:

President........................W. J. Davidson
First Vice-President...............Fred. Hinds
Second Vice-President..........John MacQuarrie
Treasurer..........................T. D. Robinson

Woodstock, Ont.

A movement has recently been inaugurated among the leading builders of London and Woodstock, looking to the organization of a Builders' Exchange in the latter city. A joint meeting of the builders in the two places was recently held, when brief addresses were made by representatives of the London Builders' Exchange pointing out the advantages that would result from the formation of a Builders' Exchange in Woodstock.

Youngstown, Ohio

At a recent meeting of the Builders' Exchange President Henderson announced the following standing committees for 1912:

Financial—Henry Niedermeier, W. W. Drake and W. J. Scholl.

Membership—S. J. Eich, H. C. Teal and Joseph Millham.

Legislative—Louis Heller, A. S. Miley and J. R. Squire.

Social—Parker Beck, G. M. McDonald and E. C. Lynn.

Arbitration—W. O. O'Connor, J. E. Nutt, Phil. Schmidt, George Kuhns and C. M. McGreegor.

At this meeting Charles Sharp read a very interesting paper on the "Progress and Efficiency of Builders' Exchanges."

Law in the Building Trades

Right to Vary Terms of Written Contract

A builder suing for compensation under a written contract cannot show that when the agreement was made it was understood that certain items called for by the specifications should be omitted. (New York Supreme Court, Appellate Term; Zack vs. Gans; 128 New York Supplement 737.)

No Liability for Failing to Furnish Signalman

The fact that an employer on foundation work failed to furnish a signalman to warn a workman of the danger of being struck by a bucket does not show liability of the employer for the injury under the New York employers' liability law. (New York Court of Appeals, Simpson vs. Foundation Company, 95 Northeastern Reporter 10.)

Persons Entitled to Benefit of Contractor's Bond

A bond given by a contractor to indemnify the owner against liens, extending to "all persons who may become entitled to liens," covered a claim for material furnished by one who might have enforced a lien though he took no steps to do so. (St. Louis Court of Appeals, North St. Louis Planing Mill Company vs. Christophel, 137 Southwestern Reporter 295.)

Forfeiture of Architect's Right to Compensation

An architect forfeits his right to compensation for furnishing plans for, and superintending the construction of, a building, by breach of duty toward the owner in serving the contractors or materialmen or receiving compensation from them, without the owner's knowledge. United States Circuit Court of Appeals, Fifth Circuit; Audubon Building Company vs. F. M. Andrews & Company; 187 Federal Reporter 254.)

Time of Taking Effect of Mechanic's Lien

A half day's work by a subcontractor in tearing down part of a brick wall of a building left standing after a fire, preparatory to construction of a new building, was not visible commencement of the construction work, within the Pennsylvania statutes, which make a mechanic's lien date from the visible commencement upon the ground of work, as affecting priority of the lien over a mortgage given by the owner before any further work was done. (United States Circuit Court of Appeals, Third Circuit; George M. Newhall Engineering Company vs. Egolf, 185 Federal Reporter 481.)

Builders' Appliances and Equipment

Some Things of Seasonable Interest to Those Having To Do with the Building Business

Wall Board and Its Uses

During recent years there has been a remarkable development of this comparatively new building material which has come to be regarded with a good deal of favor among builders, as a convenient substitute for lath and plaster. Wall boards have advanced beyond the experimental stage. The great problem has been to make a board that would not shrink or warp, that would not contract or expand to any appreciable extent under atmospheric changes and that would "stay put" once it had been applied to a wall. Constant experimenting has overcome these difficulties in the best of the wall boards now made, and the house owner or builder can use this very convenient material with very satisfactory results.

Wall Board and Its Uses—Fig. 1—Showing Application in Living Room

It is safe to say there is not a new home built in which wall board cannot be used somewhere to advantage. There is not a garage or summer cottage, an office or a factory in which it will not add to the economy and efficiency of the builder's work. And in the houses that are already built, the opportunities are almost without number for using it in repair work, in making partitions, in turning waste spaces into cozy rooms or closets, in building shelves, or making clothes chests, wardrobes, etc. The man who has tools and likes to use them will find wall board a most convenient and economical material.

Fig. 2—Interior of Kitchen Finished with Wall Board

A practical application of wall board is on an interior wall for summer cottages or bungalows. The board can be set between the studding, but about three-quarters inch back from the stud face, so that the face of the studs forms the wood strip which divides the wall into panels. Among the practical and durable wall boards now on the market are those made in long sheets that reach from the floor to the ceiling and clear across the room overhead, thus eliminating all cross joints. It is an obvious fact that wall board, made in various size sheets to fit walls of different hights and ceilings of different widths, is the most suitable board to use. It goes without saying that a wall board which is waterproofed against atmospheric moisture and one that has the least contraction and expansion is the board which gives the best satisfaction. A wall board that is waterproofed against atmospheric moisture will render the home lined with it free from dampness and make it clean, dry and sanitary. Applications of the board are shown in Figs. 1, 2 and 3.

A good composition wall board, made of the right materials and properly applied, is an excellent nonconductor of heat and cold, and a building lined with it will be kept warm in winter and cool in summer. A wall board which combines these features is that made under the name "Utility" by The Heppes Company, 4501 Fillmore street, Chicago, Ill.

Fig. 3—Showing Effects When Used in a Bath Room

There are many advantages to be obtained by using Utility wall board in nearly every class of building. It is easy to apply, all the tools required being a saw, a hammer and a square. Any man who can use a saw and a hammer can apply it by using ordinary care, and obtain a very satisfactory job.

The board being nailed directly to the studding and ceiling joists does away with the litter and confusion incident to a lath and plaster job. And, as it is perfectly dry when applied, the home builder saves time in the completion of the building. As soon as the board is applied the building is ready for the finish and decoration. And when one uses a board that is waterproofed against atmospheric moisture it naturally makes the building dryer and more sanitary. If Utility wall board is properly applied it will stay in good condition and last as long as the building stands. It is adaptable to nearly any style or type of building and to any panel design or style of decoration. It can be painted, kalsomined, papered or burlapped, the same as a plastered wall. The wall board being much smoother and having less suction it does not require as much paint as porous plaster.

In taking into consideration the cost of wall board as compared to other wall linings, the builder should not consider the initial expense of applying only, but the lasting qualities of the different materials as well. When a good wall board is used the first cost is the last cost, and this factor of permanency and elimination of repairs should be taken into account in comparing the cost, though usually the initial cost is considerably less than other methods of wall treatment.

Oshkosh Mfg. Company at Chicago Cement Show

Among the many interesting exhibits at the Fifth Annual Cement Show held in the Coliseum at Chicago, February 21 to 28, were several which demonstrated before the eyes of the visitors the work which could be accomplished by means of the machines on display. One which is of particular interest to readers of this journal was that of the Oshkosh Mfg. Company, Oshkosh, Wis., who had one of its Portable Saw Rigs in operation. The workman took a small block of wood and with deft manipulation showed the different kinds of work which the machine would do and the reader can gain an excellent idea of the variety of its capabilities by inspecting Fig. 4 of the engravings, which represents one of the blocks of wood in question after it has been operated upon. The practical demonstration of the merits of the saw rig attracted a great deal of attention on the part of visitors to the show and proved an excellent medium for accomplishing the purpose for which the exhibit was intended.

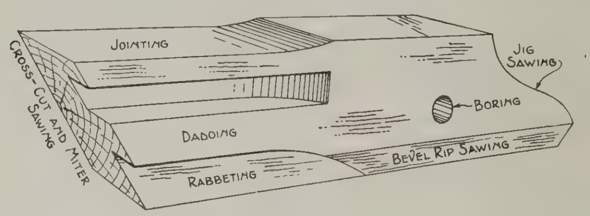
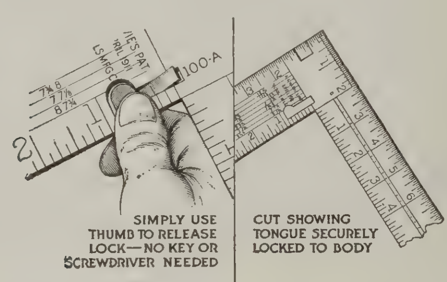


Fig. 4—Specimen of Work Turned Out on Portable Saw Rig of Oshkosh Mfg. Co.

Nicholls New Take-Down Square

The Nicholls Mfg. Company, Ottumwa, Ia., has recently made an improvement in its new Take-Down Square which renders the tool even more satisfactory than it was before. The square is now fitted with a thumb lock, as clearly indicated in Fig. 5 of the engravings, which securely locks the tongue to the body of the square. It is easy to operate with the thumb, no screw driver or key being necessary in order to release the lock. In bringing the improvement to the attention of the trade the company points out some of the important features of the Nicholls Square and which relate more particularly to the manner in which the points are machined. Referring to Fig. 6 of the illustrations it may be stated that the points A and B are machined perfectly square with the edge of the tongue and body. The tongue of the square does not touch the body at the point C and only rests on the beveled portion indicated by the points A and B. These bevels are so straight as to answer the same purpose as a straight shoulder and the claim is made that they will not slip. The clearance at the point C allows the tongue to settle down as the bearings wear in taking the square apart and putting it together, thereby producing constant accuracy. The end of the tongue springs down under the button and is held down at the other edge of the body by a very rigid spring. The company furnishes a rust-proof canvas case with each Take-Down Square.



Nicholls New Take-Down Square—Fig. 5—Showing How Lock is Released and Also the Parts Locked Together

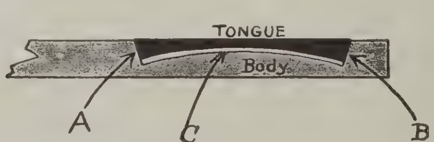


Fig. 6—Showing How Points Are Machined

Banquet of the P. & F. Corbin Club

The members of the P. & F. Corbin Club, New Britain, Conn., held its sixth annual banquet in Hartford on the evening of February 15. The menu cards were an excellent specimen of the printers' art. The first two pages were devoted to P. & F. Corbin monograms, after which were full-page portraits of prominent officials of the corporation and company. There was a sketch of the P. & F. Corbin clubhouse with the factory buildings in the background, and on the facing page was M. H. Norton, club president, presiding over the menu. The toastmaster was represented in a standing position as if he were about to tell a story while he performed the duties of his office. A collection of songs printed in a folio which are at present more or less the rage was placed at each plate. The songs were all numbered and any member could call out the one he desired the musicians to play. The speeches were pertinent to the occasion and the affair was enjoyable in every way.

Stanley's Improved Bedrock Plane

The Stanley Rule & Level Company, New Britain, Conn., and 100 Lafayette street, New York City, has recently perfected the Stanley Bedrock Plane by the incorporation of several important improvements, and as now offered is greatly strengthened. Particular attention is drawn to the one-piece effect and absolute solidity, which, we are advised, is as much a fact as if the parts were but one piece, because the entire under surface of the frog is in perfect contact with the solid seat cast in the plane bottom. The new method of fastening the frog to the seat permits of the frog being adjusted either forward or backward without moving the lever or the cutter.

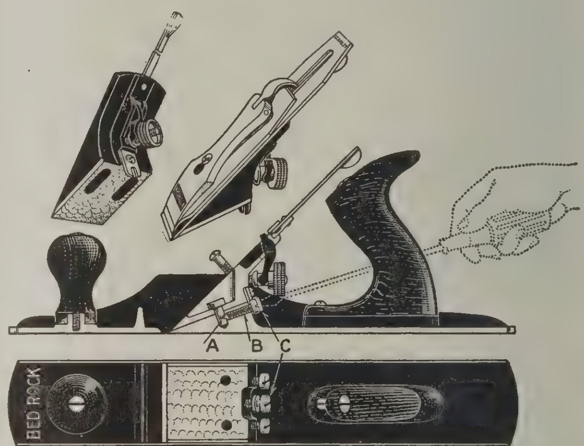


Fig. 7—Improved Stanley Bedrock Plane

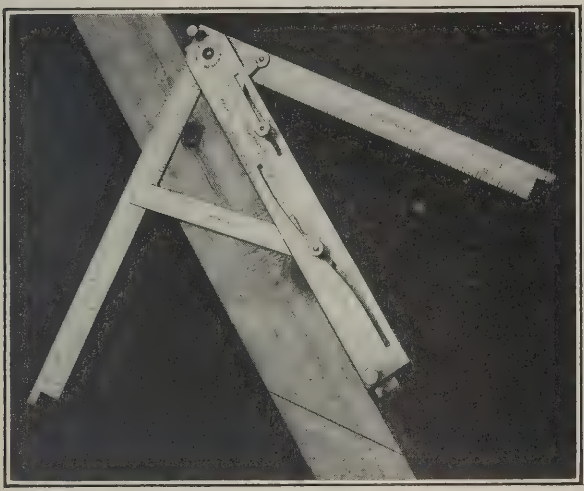
A further betterment is the change in the design of the sides, this distinctive feature adding greatly to the strength and rigidity of the plane at the point where it is most needed at the mouth or opening for the cutter. The shape of a knob affords a much firmer and convenient grip than heretofore. Various views of the tool are shown in Fig. 7 of the cuts. Only high-grade material is used, and great care is taken in the manufacture, the company guaranteeing the planes in every respect.

"Bulletin" of Hartmann-Sanders Company

We have before us the first issue of the *Bulletin* which has just been published in the interest of the wood column trade by the Hartmann-Sanders Company, Elston and Webster avenues, Chicago, Ill., and with eastern office at 1123 Broadway, New York City. The initial issue contains much valuable information relative to the construction of the columns manufactured by the company, their dimensions, priming, waterproofing, reinforcement, taper, etc. The prime object of the *Bulletin* is to present this information in such shape as will greatly facilitate the specifying of the columns; the securing of a correct estimate or prompt entry of an order of any list of wood columns or pilasters that may be required. It is pointed out that the great difficulty heretofore has been to properly inerpret the wants and requirements of customers owing to the very meager information usually received from them, particularly as to the exact number required, the thickness and kind of stock, the style of caps and bases, etc. The Bulletin in question is intended to obviate this difficulty and enable the prospective purchaser whether he be building constructor, architect or houseowner, to make his wants clearly understood. The company calls attention to the fact that it publishes for free distribution three catalogues, one of which relates to "Cement, Garden and Hall Furniture," another to "Pergolas and Sundials" and the third to "Wood Columns for All Purposes."

The Taintor Framing Tool

The latest candidate for popular favor in the way of a carpenters' and builders' tool designed especially for framing purposes and one which can be applied directly to the timber to be marked is the Taintor Framing Tool, illustrated in Fig. 8 of the engravings, and made by the Taintor Company, 146 Lafayette street, Newark, N. J. It is entirely of steel and so constructed that a single setting



The Taintor Framing Tool—Fig. 8—Showing It Applied to a Piece of Timber and Indicating Plumb and Horizontal Cuts

will put the various blades in position to give the perpendicular, horizontal and miter cuts and also the amount of gain per foot to the rise of the rafters. Although it is not a combination tool, yet it can be used as a square and bevel. The tool consists of a stock or handle 1½ in. wide by 12½ in. long, to which are pivoted two blades that can be closed into the stock, the whole then occupying a space of 1½ x 13 in. It has also a spacing blade which can be extended so that any space up to 24 in. can be obtained. A link marked "Miter Blade" gives the line for the miter cut of a jack rafter against a hip or valley rafter. The under portion of the stock is plain while the upper portion is engraved with letters and figures. It also has two grooves, one curved and the other straight, all as clearly shown in the illustration. The left-hand blade is connected with the curved groove by the "miter blade" as shown, and when the left-hand blade is at right angles to the stock the miter blade is at an angle of 45 degrees to both blade and stock. The figures 1, 2, 3, 4, etc., on the left-hand side of the curved groove indicate the rise per foot for the common rafter, the groove being so curved as to bring the miter blade into the proper position to cut the miter upon a jack or cripple rafter to fit against the hip or valley rafter for the pitch at which it is set. The figures in the line under the word "Gain" give the gain per foot of the common rafter for the amount of rise. The figures under the word "Hip Rafter" at the right of the curved groove give the same results for the hip rafter. The right-hand blade is connected with the short groove by a link curved so that the tool may be applied directly to the hip rafter to obtain the backing. The screw at the top of the left-hand blade will secure the two blades at right angles to each other, when the tool can then be used as a steel square. The tool, which weighs 21 oz., is to the carpenter and builder what the slide rule is to the engineer and the adding machine to the accountant.

Full directions for using the tool, which is in no way a complicated affair, are contained in a pamphlet illustrating and describing the device.

Plastergon Wall Board

The demand for a practical wall board that would entirely eliminate lath, plaster and wallpaper as well as the dirt, inconvenience, delay and expense accompanying their use, is said to have been the cause of the Plastergon Wall Board Company, Tonawanda, N. Y., placing upon the market its product known as "Plastergon." It is made of wood pulp and is rendered bone dry before pressure is applied to it. It is then impregnated by a patented process used exclusively by the company which counteracts the action of the weather on it and renders it practically moisture-proof. The company states that Plastergon is first artificially seasoned by a new process which removes all moisture, after which it is stored in warehouses for natural seasoning from 15 to 21 days, depending on conditions. When it is properly seasoned and ready for shipment each panel is inspected and guaranteed to give satisfaction. The sizes of the panels depend on requirements. The panels can be nailed directly to the studding or joists with 1⅛ in. flat head nails. It can also be put on old walls or ceilings without removing the lath or plaster. After Plastergon has been applied it is painted with either oil or water colors according to conditions, while the joinings of the panels are covered with decorative strips of wood, thus giving a great variety of pleasing and artistic panel effects. The wall board is admirably adapted for use in residences of all kinds, hotels, clubs, offices, restaurants, stores, factories, etc.; is excellent for remodeling purposes, while some of its special uses are backings for store windows, partitions for offices or rest rooms, construction of telephone booths, display booths, trunk trays, fruit cabinets, etc., etc. The sizes most commonly used are 32 in. and 48 in. wide by 4, 5⅓, 6, 7 and 8 ft. in length. The sizes carried by the factory for immediate shipment are 24, 32, 36 and 48 in. wide and in any length from 1 ft. up to and including 10 ft. A folder which the company has issued sets forth at length the merits of Plastergon and refers to its cost as compared with lath and plaster or lumber.

Johnson's Book of Wood Panels

A rather novel and attractive method of showing their products on the actual wood has been adopted by S. C. Johnson & Son, Racine, Wis., this consisting of a series of panels pasted in a three-fold cloth binder which when folded measures 11 x 5¾ in. in size. The binders are so constructed that they are very effective and at the same time constitute a neat, durable and convenient means for the recipient to carry around with him. The concern is sending these binders out in large quantities to building contractors, painters and other large users of their finishes and have kindly consented to furnish those readers of the *Building Age* who wish it with one of these useful books of wood panels. It is only necessary to drop them a card advising that you are one of the patrons of the *Building Age* and they will send it to you promptly free of charge. Those of our readers who are interested are likely to find this folder of great assistance in securing contracts as clients can quickly be shown the effect of different shades of Johnson's wood dye on various woods.

Stanley Screen Door Sets

The Stanley Works, New Britain, Conn., are bringing to the attention of carpenters and builders the merits of the Stanley Screen Door sets, an illustration of which is

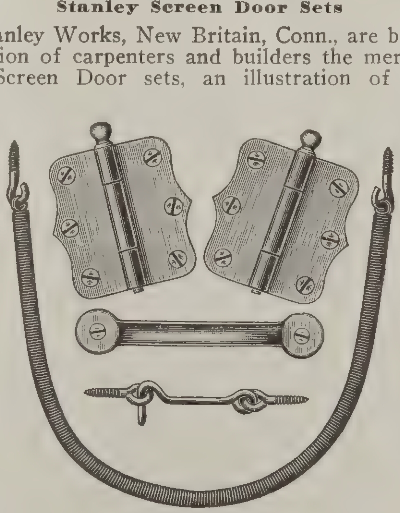


Fig. 9—Stanley Works Screen Door Sets

found in Fig. 9 of the accompanying engravings. These sets consist of one pair of 3 x 3 ornamental loose pin butts to screw on the surface of the door; one 5-in. door pull, one No. 3 steel wire spring, one gate hook and eye, together with the necessary screw eyes and wood screws to put up the door. The sets are finished in Japan, antique copper or dull brass plate or the new "Stanley" Sherardizing. The last-named finish is referred to by the company as the best method yet discovered for preventing iron and steel from rusting, and is particularly suitable for hardware exposed to weather. Each set is packed in a strong telescope paper box, which insures the set reaching the consumer in good condition clean and free from rust. A copy of Circular "E," illustrating and describing these sets, will be mailed to any carpenter or builder who may make application to the company for it.

Jig Saw Attachment for Luther Grinder

One of the attachments which can be used in connection with the new Luther Grinder and one that is of undoubted value to the carpenter and cabinet maker is the jig saw

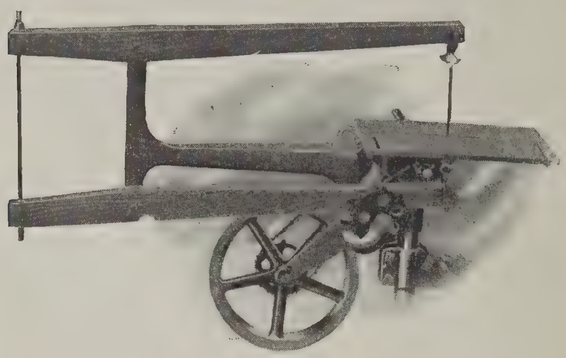


Fig. 10—Jig Saw Attachment for Luther Grinder

attachment, which is illustrated in Fig. 10 of the engravings. This attachment is used on the same frame as the head for the grinding wheels, another cap being supplied for the regular cap that is used in grinding. In the conduct of his business and more especially in connection with the operation of his wood-working shop, the carpenter has more or less use for a jig saw, and for scroll work and pattern making it is indispensable. The jig saw here illustrated is heavily built, and although a wide range of work can be executed with it, the necessary power can be easily developed by means of the foot dreadle. The machine is made by Luther Grinder Mfg. Company, 117 Michigan street, Milwaukee, Wis.

The "American" Portable Variety Woodworker

Something more than a year ago the American Saw Mill Machinery Company, Hackettstown, N. J., placed on the market its "American" Contractors' Portable Saw Bench, an illustration of which appeared in these columns in June, 1911. This machine was built for permanent service with a view to bringing mill facilities directly on to the building or job. It contained many important features, but apparently no one realized more clearly than the builders that it had certain limitations, and while filling orders for it the company gave attention to a new machine of

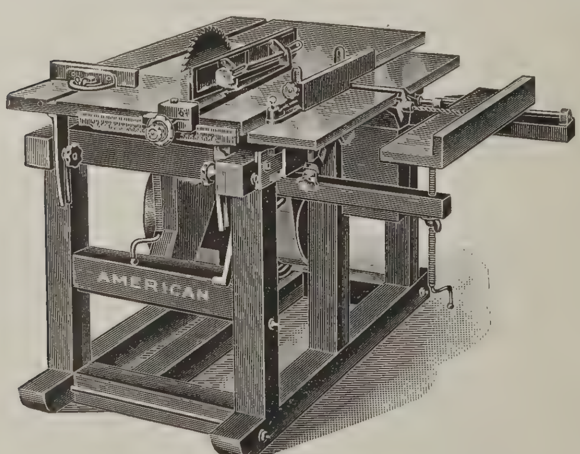


Fig. 11—"American" Portable Variety Woodworker

still greater capacity which is now being placed upon the market under the name of "American" Contractors' Portable Variety Woodworker, a general view of which, with gasoline engine as the motive power, is presented in Fig. 11 of the engraving. It is really a development of the portable saw bench idea of combining in one machine a number of the functions ordinarily performed by several distinct machines with the further advantage that it can be carried directly to the job. The new "American" Variety Woodworker is in effect a miniature planing mill complete in its several details and capable of doing a wide range of work. The new machine is of such a nature that three men may work at one time on three different jobs, as, for example, one may be operating the rip saw, cut-off saw, miter saw or dado heads on the table; another can be jointing or planing, while the third may be boring, the claim being made that this combination requires no change in the machine or its adjustments.

The top or table of the machine is of cast iron hinged at the rear, raised or lowered by means of a hand screw and can be clamped in any position. The table rests on a frame of seasoned hardwood strongly put together and bolted. The adjustable ripping gauge opens out to 14 in. from the saw. It has a tilting fence for bevel sawing and a rapid, accurate adjustment with a positive lock. The cut-off gauge slides in a groove the full length of the table and is adjustable to cut squares, miters or any angle. The regular rip and cut-off saws are 12 in. in diameter and 14-in. saws can be used if desired. Two dado heads ½ and ⅞ in. are also furnished.

The jointer or planer is entirely independent of the top of the machine, being separately supported on the frame. Its tables are 7½ in. wide with a combined length of 43 in. and are adjustable to any desired position. On the side of the table is an adjustable fence tilting to any desired bevel for such work as chamfering. The jointer has a steel cutter head fitted with two 6-in. knives with two extra slots to receive matcher bits or molding cutters for working a great variety of shapes.

A sander drum is provided which can be substituted for the jointer head. The boring table is outside of the jointer and has a travel of 6 in. in line with the spindle and an up-an-down adjustment of 3½ in. A feature of the machine on which the company lays strong emphasis is the fact that the mandrel boxes are strongly yoked together in a single casting, thus insuring permanent alignment and cool-running bearings. The "American" is furnished with either gasoline engine or electric motor built in, according to preference.

Yankee Plain Screw Drivers

North Brothers' Mfg. Company, American Street and Lehigh Avenue, Philadelphia, Pa., has just added to its already extensive assortment of Yankee tools the two styles of plain screw drivers illustrated in Fig. 12 and known respectively as Nos. 90 and 95. The former is

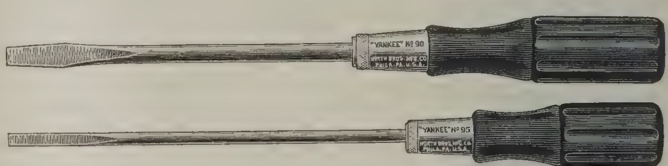


Fig. 12—"Yankee" Plain Screw Drivers, "Standard" and "Cabinet Styles

referred to as the Standard Style and the latter as the Cabinet Style. They are of same high quality of material and workmanship as other Yankee tools turned out by this concern and are offered in a great variety of sizes. The fastening of the blade and handle is such that they cannot become loosened in use or with even the usual amount of abuse to which tools of this nature are frequently subjected. The handles are of hardwood, finished in dull dead black, while the blades and barrels are finely polished. Before being sent out the screw drivers, like all Yankee tools, are thoroughly tested and the company states that they are guaranteed in every particular as to quality.

Dixon's Silica-Graphite Paint

The practical opening of the building season renders more than usually interesting an article which appears in the April issue of "Graphite," published by the Joseph Dixon Crucible Company, Jersey City, N. J. It is entitled "Spring Is Here," and after referring to the flowers that bloom in the spring and to the candidates which come afterward—ornithological, political or otherwise—the paint candidates are considered with the suggestion to examine their combination and record. Attention is called to the fact that the National Hardware Bulletin of October, 1911, urges users to shun protective paints that use petroleum or its products as a vehicle or adulterant. Dixon's silica-graphite paint, it is said, uses only pure boiled linseed oil as its lasting and elastic vehicle. There is a persistent cling and resistance to abrasion about it because of the paint's silica ingredient. It costs a little more, but is economical because of longer service, thus saving in labor and material. Dixon's silica-graphite paint has been made in one quality only for nearly 50 years, is offered in four colors, and is used around the circle of the world on leading buildings, railroads, fences, water towers, roofs, bridges, gas tanks, trolley poles, steel cars and wherever there is steel or iron to protect from corrosion.

A Substantial Post Borer

Any building mechanic who has had occasion to work around a carpenter-contractor's shop or other woodworking establishment knows what an advantage it is to have available for use a good boring machine. He is therefore

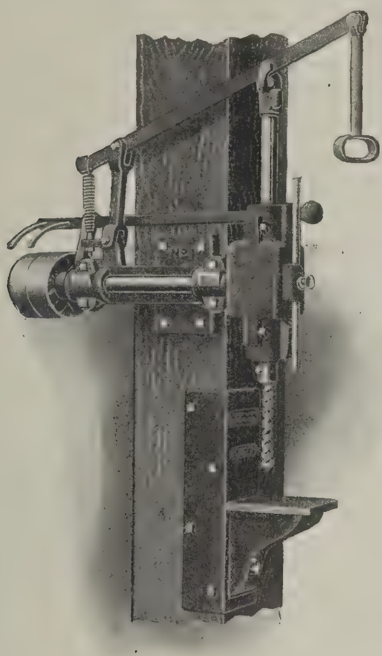


Fig. 13—A Substantial Port Boring Machine

likely to be interested in the salient features of the machine which is illustrated in Fig. 13 of the engravings. It is known as Fay-Egan No. 1 Post Borer, and is for general work in all kinds of woodworking establishments. It can be quickly and easily installed in any part of the shop by bolting it to a post. It is claimed to be able to bore accurately and rapidly holes up to 1½ in. in diameter. The mandrel is always in one position, and is protected by encased gearing. The stroke of the spindle is 9 in. The table has a vertical adjustment of 7 in. It is made by the J. A. Fay & Egan Company, 221 to 241 West Front Street, Cincinnati, Ohio, and the statement is made that it is strongly and substantially built, that it is equipped with tight and loose pulleys and makes 650 revolutions per minute.

Catalogue of Crescent Universal Woodworker

We have just received a copy of what is known as Catalogue No. 51, issued by the Crescent Machine Company, Leetonia, Ohio, and giving a very full and interesting description of the Crescent Universal Woodworker. Not only is the description complete, but it is supplemented with many half-tone engravings showing numerous details of the machine and all presented in a way to be of unusual interest to the woodworker. There are general views of the machine as well as of the various attachments, including the re-saw gauge designed to fasten to the top of the band saw table for splitting or re-sawing boards edgewise; the jointer of rigid design and practically of the same size and construction as the company's regular 8-in. Crescent jointer; the round safety head; the shaper; the tenoner; the borer; the knife grinder; the disk grinder, etc., etc. The machine is referred to as being constructed on entirely different designs from other combination machines and "should not be classed as combination in the sense of a single machine that can be adopted for different uses. It is, however, a combination of machines, each independent of the other, arranged compactly and self-contained, so that all are driven by one main belt from the line shaft." The company points out that it is not necessary to run more than one machine when only one is in use, but four persons may use different machines at the same time without hindrance. There are no difficult or complicated adjustments to be made for doing different kinds of work, each part is made sufficiently heavy, with large bearings and plenty of driving capacity to do the work quickly and efficiently. Any reader of the *Building Age* who is interested in having a copy of this catalogue can obtain one upon application to the address above given.

Purchase of Hoist Building Plant

We are informed that the Lansing Company, Lansing, Mich., has recently purchased the entire hoist building plant of the Butcher & Gage Company, Jackson, Mich., and in future will manufacture the Wolverine hoists in Lansing. The "Standard" apparatus is a single drum contractors' hoist capable, it is claimed, of moving a 3000-lb. load 55 ft. per minute. The hoist is fitted with a drum for rope or wire cable, the drum being 13 in. between the flanges. While the flanges are 20 in. in diameter the hoist has a friction clutch and gear with cut teeth for hoisting and a reverse motion at twice the speed of the hoisting. The apparatus is equipped with a powerful foot brake which will hold any load up to the capacity of the hoist. The hoist is equipped with engine gear for either 3, 4 or 6-hp. engine, as required.

Metal Ceilings for Residences

More or less discussion has recently been held relative to the adaptability of metal ceilings for private residences, and the preponderance of evidence, so to speak, seems to be largely in favor of such use. Metal ceilings are sanitary and fireproof, while their manufacture has been brought to such a state of perfection that a room ceiled with metal of an appropriate design and decorated in good taste presents a very attractive appearance. One mistake which frequently occurs is the use of so much oil in the mixing of the paint as to produce a glossy surface—just the thing a metal ceiling should not have. The proper way to secure the most satisfactory results with this style of decoration is to treat it with a dead flat white without tints, this giving the effect of modeled plaster or stucco. The play of light and shade on the relief which it practically makes for beauty in a pattern is absolutely destroyed by a gloss such as comes from the use of cheap

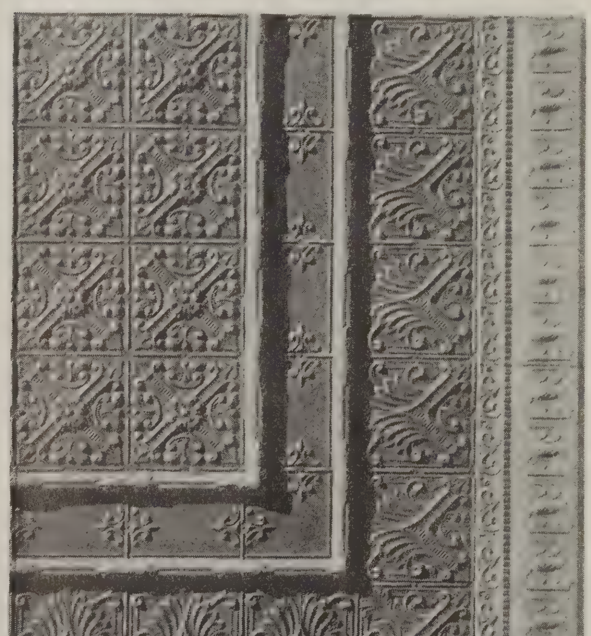


Fig. 14—New Design of Sheet Metal Ceiling for Residences

mixed paint. One of the concerns making artistic designs in metal ceiling work is the Brooklyn Metal Ceiling Company, 283 to 287 Greene avenue, Brooklyn, N. Y., and in regard to the matter of metal ceilings for residences the management states that 68 per cent. of work erected by the company is private house work. When one has a metal ceiling erected he can rest assured of its durability, which is something which cannot always be said of plaster.

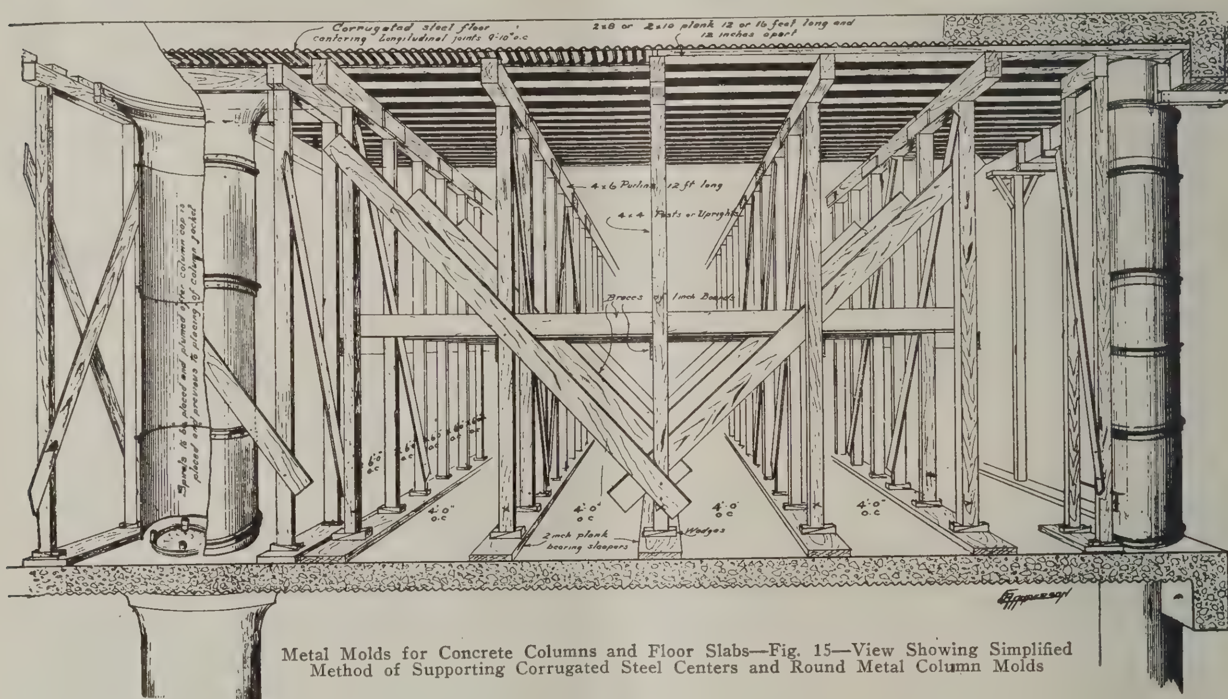
Then again leaks—a great bugaboo of plaster ceilings—are more or less absent in the case of a metal ceiling, for an ordinary leak would in time become absorbed and leave no trace, but if, on the other hand, it did show, that portion of the ceiling could be easily removed in single panels and replaced with new ones without disturbing the rest of the ceiling—an advantage not to be overlooked. In the case of the metal ceilings made by the company, and a specimen of which is illustrated in Fig. 14 of the engravings, a lap joint has been used in the construction for the last 25 years, and with great success. While the first cost of a metal ceiling may be a trifle more than some other kind, yet its durability is such and the "up-keep" practically a minus quantity that it proves economical in the end. If it becomes soiled, warm water and soap will clean it.

Metal Moulds for Concrete Columns and Floor Slabs

The rapid advance in concrete construction and its appliances has necessitated better methods and material for centering than were first used and which are even yet frequently seen in modern building operations. In the absence of anything cheaper or better, wood "forms" were naturally used for concrete support, but in many sections attempts have been made with varying degrees of success to substitute metal forms for them. The increased cost of harder, smoother surface. The method of supporting the centers is shown in Fig. 15.

Many systems of concrete construction require an enlargement of the column top or capital to permit of the necessary spreading of the reinforcing steel rods. This cap when formed with wood molds is necessarily plain and unattractive, but in form and proportion of parts, the molded capital made possible with metal molds is certainly a great improvement.

Owing to the greater simplicity of construction, wood forms lend themselves almost exclusively to the formation of square columns and the only departure from this is their occasional octagon form, but in the great majority of cases, square columns are their natural result. It is the general practice of concrete contractors to use circular steel spirals in all columns, whether round or square, for instance, making the same diameter spiral for 18 x 18-in. square column as would be used for a round column of 18-in. diameter and giving both the same computed strength. There being 21½ per cent. more area and consequently more concrete in the former than the latter, the adoption of the round column represents 21½ per cent. saved in volume of concrete without in the least reducing the estimated strength. This is in addition to the saving of valuable floor space and the less obstruction of light. The interior of the metal molds in direct contact with the concrete is coated with oil before each casting, which pro-



Metal Molds for Concrete Columns and Floor Slabs—Fig. 15—View Showing Simplified Method of Supporting Corrugated Steel Centers and Round Metal Column Molds

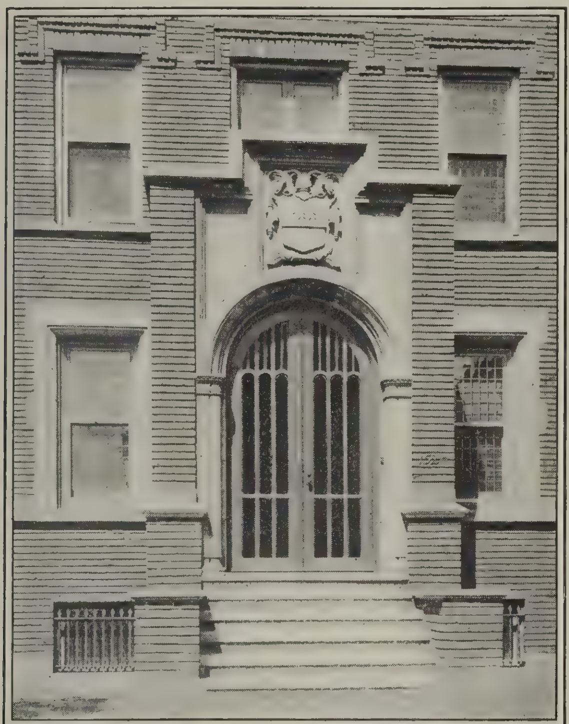
metal rendered it necessary that metal molds be made adjustable to various sizes of columns, so that they might be used repeatedly and for different buildings, thus reducing their final cost and enabling their use in competition with wood on the same or less basis of cost to the contractors. In order to further facilitate their use so that the contractor need not equip with the complete stock of parts it has now been so arranged by the Deslauriers Column Mould Company, 311 Chestnut street, St. Paul, Minn., that it contracts to erect its patented metal molds in position at the building and remove them after the concrete is sufficiently set. The contractor is thereby relieved of the necessity of buying or making molds, and since the cost to him is no more with metal than with wood, he readily adopts the more modern method.

From the standpoint of the builder and owner the advantages of metal over wood consists in the fact that it is rigid and immovable, holding the concrete in its original position undisturbed during the process of setting and crystallization. This, as all will agree, is essential to the proper production of strong hard concrete, and that this is not possible with the use of wood is easily seen when it is known how readily wood swells when brought in contact with the moisture of fresh concrete and shrinks as that moisture is absorbed. This swelling, shrinking and warping of the wood fails to give the concrete the rigid undisturbed support which is necessary to the best results.

The metal being practically water-tight does not permit of the escape by leakage of the liquid cement, a condition which is almost unavoidable with wood forms. This retaining of all the cement causes slower setting, better crystallization and consequently stronger concrete with duces a smooth unbroken surface which serves as a finish without necessitating a coating of plaster, an item which in itself would offset nearly the whole cost of the use of the molds. The advantages enumerated above for column forms apply with equal force to corrugated steel centering as compared with wood used for this purpose. The more true and harder surface, corrugated by the molds, presents a neat and finished appearance and needs no coating of plaster to produce a satisfactory finish. The molds being practically water-tight retain the liquid cement, producing slower setting, better crystallization and consequently stronger concrete floor and roof slabs than is possible with wood. These metal molds and corrugated steel centering are covered by letters patent owned by the Deslauriers Column Mould Company, St. Paul, Minn., and are used by them in the erection of reinforced concrete buildings in many of the larger cities of the United States and Canada.

Dahlstrom Metallic Doors and Trim

The alarming frequency of fires during the recent past has tended to direct attention more keenly than ever before to the necessity of interior fireproof construction. Anything which serves as a fire retardant is obviously a subject of more than usual interest, and while much has already been said and written on this topic it is far from having been exhausted. The literature sent out by concerns engaged in the manufacture of fireproof materials is full of timely hints and suggestions, while at the same time directing notice to the merits of the goods which they produce. We have before us some interesting comments dealing with the metal doors, window frames and trim used in residences, office buildings, theaters, etc., made by the Dahlstrom Metallic Door Company, Jamestown, N. Y. Reference is made to the fact that in the year 1903 Charles P. Dahlstrom, an expert mechanical engineer who had for a long time been identified with the metallic furniture industry, realized that the time had arrived for providing some means for positively fireproofing each room or unit of an otherwise fireproof building to prevent the spread of fire, and that such preventive must be artistic in appearance, and at the same time be able to with-



Dahlstrom Metallic Doors and Trim—Fig. 16—Front Entrance Doors to an Office Building

stand extreme heat and the force of fire streams in times of need. The result was that he devised a fireproof door —a door of cold-drawn steel provided with air chambers to insulate, instead of wood, which would char and collapse at the most critical moment. The replacing of wood and all other combustible or semi-combustible interior trim —fire-inviting or somewhat fire-retarding—with cold-drawn steel was a comparatively easy and simple matter, and wherever custom called for an installation of wood

Fig. 17—Interior Finished with Metal Trim

its absolute elimination was made possible. A building equipped throughout with the Dahlstrom products and being, of course, otherwise fireproof, simply means that one has done away with everything that can burn with the exception of the contents of the building. When the contents of the principal unit in which the fire originated are consumed the fire is extinguished because it has nothing to feed upon. In Fig. 16 of the illustrations is shown a pair of main entrance doors of a building made by the concern named, while in Fig. 17 is shown the metallic trim of a room which tends to retard the spread of fire which may occur within it.

The Ford Auger Bits

In discussing the subject of auger bits the Ford Auger Bit Company, Holyoke, Mass., makes the statement that no double lip bit can equal the single lip auger bit as the latter will not turn off when boring against the side of knots or across season cracks and where it is necessary to bore at a very slight angle with the grain of the wood the screw of the single lip bit will not follow the grain, but will bore perfectly straight at whatever angle the bit may have been started. It is for these reasons that the single lip bit is said to be the best for the use of stair builders and pattern makers. In boring through two or more thicknesses of wood the single lip bit will not cut a so-called "button" on leaving each piece, but will bore as if in solid timber. The single lip bits are so made that whether the operator pushes in or pulls back they will bore the same number of turns to the inch in either hard or soft wood and never too fast for the finest work. The steel from which it is made is from a formula which the company states has been proven by tests to be admirably adapted for auger bits. The company turns out three styles of double lip bits, single twist double lip, single twist double quick bit and solid center bit. The ship augers with screw are said to be of such a nature as to work satisfactorily where a no-screw auger has been deemed necessary. The ship augers without screw will bore fast and draw themselves in whether the wood be hard or soft.

Perfection Bi-Pedal Grinder

The El Starr Mfg. Company, 656-658 Third street, Milwaukee, Wis., manufacturer of grinding machines and

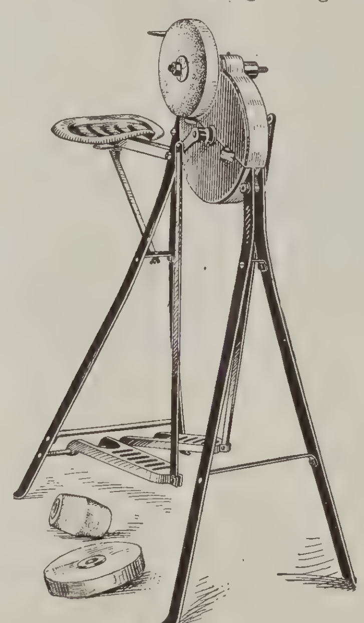


Fig. 18—Perfection Bi-Pedal Grinder

hardware specialties, is now marketing the No. 6 Perfection Bi-Pedal Grinder, a view of which is presented in Fig. 18 of the cut. Some of the characteristics to which attention is called by the company are that it is dustproof, noiseless, oil tight, can be used for foot power or bi-pedal, and will run up to 3000 revolutions per minute. It is suitable for innumerable kinds of grinding and sharpening, and can be made compact for shipping purposes. It is regularly equipped with a 7 x 1-in. grinding wheel. Extras include a 7 x 1-in. grinding wheel, coarse or fine; 6-in. sewed buffing wheel; a sickle-grinding wheel and attachments and a twist-drill attachment. It weighs net about 45 lb., and is packed one each in a crate.

"Gal-Va-Nite" Roofing and Flooring

Some very interesting information relative to the merits of "Gal-Va-Nite" roofing and flooring is contained in an attractively printed pamphlet sent out by the Ford Mfg. Company, St. Paul, Minn. The pamphlet is entitled "Co-operation," and refers to the relations which should exist between the dealers in and manufacturers of the roofing in question. Gal-Va-Nite Roofing is said to be triple asphalt coated, and is referred to as a non-conductor of heat. It is suitable for very steep or flat roofs, and is put up in rolls of 108 sq. ft. complete with zinc-coated galvanized nails, cement and illustrated direction sheet. It is made in three weights and is said to have been approved by the National Board of Fire Underwriters, thus taking a low rate of insurance.

Gal-Va-Nite flooring is in imitation of oak and is made of an indestructible felt base beautifully colored and grained by a special process. It is protected with a triple coating of varnish, and it is claimed will not crack, peel or blister. It is damp-proof, odorless, sanitary and vermin-proof. It can be used for wainscoting or interior finish, according to requirements. It is put up in rolls 38 in. wide and is sold by the yard. We understand that samples of the roofing and flooring will be sent to any architect, builder of contractor on application.

Exhibition of Sheet Metal Products

An attractive exhibit of sheet metal products, as shown in the accompanying illustrations, was made by the Milwaukee Corrugating Company, Milwaukee, Wis., at the exhibit in connection with the recent annual meeting of the Wisconsin Hardware Dealers' Association in that city. The exhibit, as may be seen from Fig. 19, was unique in its design and the statement may be ventured that it was something of an innovation at a hardware convention. A full line of samples of eaves trough and conductor pipe trimmings were shown in galvanized steel and copper. The large booth was 14 x 18 ft. and constructed of galvanized sheet metal. The roof was covered with Titelock metal shingles, some of which were galvanized, some painted tin and the balance stamped from 14-oz. cold rolled copper. The round pillars and railing were made of sections of conductor pipe and the square towers of galvanized rock face stone corners, surmounted with Nu-Air ventilators. In Fig. 20 is shown a miniature bungalow entirely constructed of steel, the roofing and gables being covered with miniature Titelock shingles. The outside dimensions of this little house were 24 x 38 in. and 30 in. high. It attracted a great deal of attention and will be used by the Milwaukee Corrugating Company at the various hardware conventions throughout the West.

Exhibition of Sheet Metal Products—Fig. 19—Appearance of the Booth

Fig. 20—Miniature House in the Booth Covered with "Titelock" Shingles

Asbestos Protected Metal

An exceedingly attractive catalogue of 36 pages printed upon tinted paper and bound in embossed covers sets forth in detail the merits of what is known as asbestos protected metal manufactured by the Asbestos Protected Metal Company, Beaver Falls, Pa. This material is applicable to a wide range of service, such as roofing, siding, interior sheathing and for fireproofing in buildings of all kinds. It is composed of a sheet of steel so heated as to expand the minute cells or pores on the surface and is then passed through a bath of special compound, the basis of which is asphaltum. This bath is heated to a temperature of 500 degrees so that the compound becomes of a liquid consistency and penetrates the pores or cells on the surface of the sheet. As the sheet emerges from this bath the asbestos is rolled on both sides and then imbedded under heavy pressure in the asphalt compound, after which the sheets are allowed to gradually cool, contract and harden. They are then passed through the company's weather-proofing process, which is said to eliminate the necessity of painting or similar treatment after they leave the factory. The product is manufactured under three brands and is made in three colors. It is light in weight, does not require wood sheathing, but is applied directly to the purlins and attached by wire hangers and lead washers, nails or straps as may be preferred. The claim is made that the protected metal is impervious to moisture, acids or coal gases, thus rendering it of special value in connection with gas works, chemical plants, foundries and buildings where fumes are present. Figures of cost are given in the catalogue, also tables of weights and instructions for applying the material. The company has branches and agencies in the leading cities of the country, and has recently opened a new and much larger factory at Beaver Falls, Pa., as stated above, where it has also established its head office.

Metal Tile Roofing

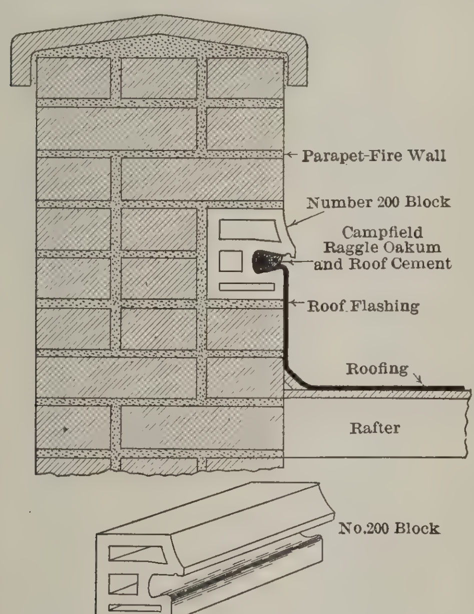
We have received from the Kanneberg Roofing & Ceiling Company, Canton, Ohio, a copy of its attractively printed catalogue illustrating and describing the Kanneberg Metal Tile. The advantages of this tile for roofing purposes are set forth at length and illustrations are given showing some of its varied applications. In the construction of the tile the obviously important part is the lock and the company feels that the method of which it makes use is calculated to insure entirely satisfactory results. On the right-hand side of the tile is formed the nailing flange and lock into which the hook on the left-hand side of the next tile is inserted. The tile, when lying flat, cannot be pulled apart by any ordinary force, and while fitting closely is so arranged as to provide for the natural contraction and expansion caused by changes of the atmosphere. The nails of the first tile are protected by the second tile fitting over the flange—a point on which the company lays special emphasis. There are two styles designated as "A" and "B," although there is very little difference between the two. The side lock and over-lap features are precisely the same, the difference being in the fact that Design "A" is somewhat plainer and not so ornamental as "B." The tile are made in the one size, 10 x 14 in., and 136 tile are required to cover a square. They are packed for shipping in strong crates containing sufficient tile to cover 100 sq. ft., each shipping case containing complete instructions for laying.

"Sarco" Asphalt Floors

Within the covers of an attractively printed pamphlet of 20 pages profusely illustrated by means of halftone engravings are set forth in entertaining style the merits of the "Sarco" Asphalt Floors as constructed under the specifications of the Standard Asphalt & Rubber Company, 137 South La Salle street, Chicago, Ill. In presenting this booklet the company states that it has not attempted to include in its recommendation "any but the most practical instructions for the preparation of the floor mixture and its installation." The point is made that the formulae and methods advocated are based on wide, practical experience and scientific study and the information is presented in such shape as to be found useful to the architect, the builder, the contractor and the engineer. Sarco Mastic is composed of very fine particles of mineral matter, principally limestone dust, finely ground, well graded and proportioned and saturated in the process of manufacture with Sarco Matrix, this treatment giving, it is claimed, not only cementing value but renders the entire mass proof against oxidization, decay, wear or other changes in physical or chemical characteristics. Sarco Asphalt Flux is prepared especially for use in connection with the Mastic, the former being added to the latter on the site of the work in varying quantities to regulate the hardness of the asphalt floor and to assist in melting or breaking down the Mastic blocks. The mineral aggregate which is added to the Sarco Mastic and Flux after they have been thoroughly melted consists of washed torpedo gravel, washed limestone or granite screenings, and contain no particles appreciably larger than will pass through ¼ in. mesh screen. These three materials properly proportioned after being thoroughly heated to a temperature of 400 degrees Fahr. and mixed together are spread evenly to the required thickness on the foundation or base and rubbed to the proper surface in much the same manner as a cement floor is finished, except that sufficient pressure must be applied with the trowel or float to produce a dense and compact mass. Sarco Asphalt Floors may be laid on wood, concrete, brick or any other base, old or new. For school, hospital and other floors not subjected to trucking 1 in. asphalt is sufficient; for warehouses and factory floors subjected to trucking the floors should be 1½ in. thick, and for loading docks, stables, driveways, etc., the asphalt should be 2 in. in thickness. The halftone illustrations relate to buildings in connection with which asphalt floors of the character indicated have been laid.

Campfield Raggle Block and Wall Coping

One of the serious difficulties frequently encountered in building construction is leaks which will now and then occur in roofs at the wall connections in spite of all the builder can do to prevent them. With a view to enabling a roof at the point named to be so built that the liability of leaks will be reduced to a minimum, if not absolutely prevented, a raggle block has been placed upon the market which is intended not only to prevent leaks in roofs at the wall connections, but also to firmly anchor the roof covering. The block is made for fire and parapet walls, chimneys, gables and waterproof floors. It is known as the Campfield Raggle Block and is made by the Campfield Raggle Block Company with general offices in the Colonial



Campfield Raggle Block and Wall Coping—Fig. 21—Section Through Parapet Wall Showing Shape and Application of Block No. 200

Building, Richmond, Ind. The blocks are made in various shapes and sizes and the company points out that fittings are made which are adjustable to nearly every pitch of roof and design of wall or chimney, in angles, joints and connections. The block may be used wherever the building wall extends above the roof and likewise the blocks may be used in chimney construction. In either event the roofing or flashing is firmly anchored and all danger of water getting between the wall or chimney and the roof is said to be avoided. In Fig. 21 is represented a section through a parapet wall showing the shape and application of block No. 200 which is intended for any kind of roofing. It will be noticed that the joint is treated with oakum and roof cement. In Fig. 22 of the engravings a vertical cross-section through the roof construction and parapet walls is presented showing the use of combination raggle blocks and coping with single and double socket joints. These sections so clearly indicate the general construction employed that extended comment would seem to be unnecessary. The company points out that it manufactures the blocks to fit the brickwork of a wall two, three or four courses of brick in thickness. When step flashing angles

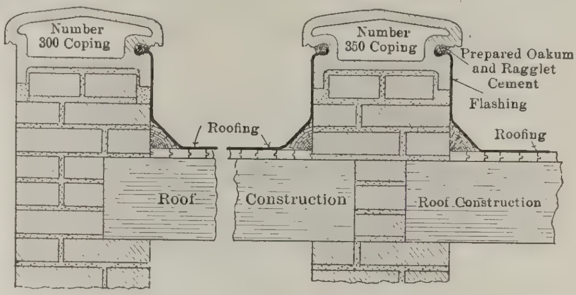


Fig. 22—Section Through Roof Construction and Parapet Wall Showing use of Combined Raggle Blocks

are required the No. 200 block is recommended as this is just right to lay up with two courses. The claim is made that when the Campfield Raggle Block connection is used no counter flashing is needed. Another claim is that the wall is not damaged by careless workmen chiseling out mortar joints and allowing the sand and gravel, old mortar and pieces of brick to fall behind and beneath the roofing. Snow, it is said, can remain on the roof and the latter will not leak by backing up under the counter flashing. As indicating the estimation in which these blocks are held by architects and builders it may be interesting to state that the block has been specified for the 55-story Woolworth Building, now in course of erection on Broadway, opposite the Post Office, in New York City.

Racine Spring Hinges

The Racine Metal Stamping Company, Racine, Wis., has just issued from the press what is known as Catalogue No. 3, illustrating and describing a varied line of builders' hardware, the main features of which are the Racine Spring Hinges. These are both single and double-acting spring butts and are made of special tempered cold drawn steel. The bearings are set wholly within the barrel and are formed by part of the ball tip and the tension adjustment. In this way a large bearing surface is secured and at the same time a plain outside surface is presented with no protruding parts to gather dirt or tarnish. Each ball tip is made with the Racine Patent Tip Retainer, and the claim is made that it cannot come off unless a plyer or wrench be used. The springs are extra long, are of large diameter, and it is claimed possess more power than the average hinge of the same size. In connection with the various styles of hinges are tables showing the size of hinges to apply for doors not larger than the dimensions stated, the numbers in which the goods are offered, the style of finish and the prices.

In addition to Racine Spring Hinge the catalogue gives attention to cast metal boxes, which give the proper setting for floor hinges in cement or tile floors; screen door hinges and floor bumpers, non-destructible file handles, Racine door guards and the Racine automatic burglar-proof window ventilating lock.

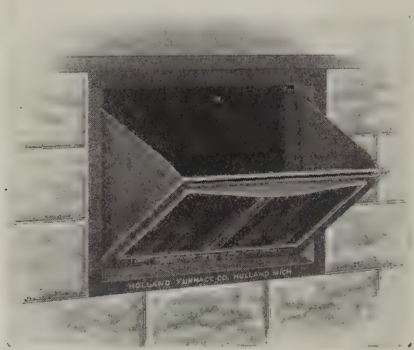
New Building for Yale & Towne Mfg. Company

A building for the exclusive use of the company under conditions which secure to it a long tenancy is soon to be erected for the Yale & Towne Mfg. Company at 9 and 11 East Fortieth street, New York City. The new structure will occupy a plot about 50 x 100 ft. and will be 12 stories in hight. The store and basement will be used for the city sales department, for stock, packing and shipping as well as for the repair department. On the first floor there will be an exhibition room for the display of builders' hardware and the artistic products of the company. On the top floor will be the executive offices and on the intermediate floors the offices of the managers of the various department, treasurer's office and clerical force. For the present several of the floors will be sub-let to other tenants, but ultimately the company expects to occupy the entire building.

The company has long had exhibit rooms at 251 Fifth avenue, at the corner of Twenty-eighth street, for the accommodation of its expert staff handling contract and all special work in order to be in close touch with architects, contractors and builders mainly concentrated in that neighborhood. The move in question, however, will enable the company to have all of the departments under one roof. The new building will be erected by John Downey, 410 West Thirty-fourth street, New York City.

Holland's Improved Window Chute

One of the points in house construction which does not always receive the attention which its importance demands is the cellar window and facilities for readily and conveniently delivering coal to the basement bins. A form of



Holland's Improved Window Chute—Fig. 23—The Chute in an Open Position

window chute which embodies a number of valuable features and which is well calculated to serve the purpose desired is the Improved Window Chute Illustrated herewith and manufactured by the Holland Furnace Company, Holland, Mich. A distinctive feature is found in the fact that it is both a window and a chute and saves the cost of a frame and sash otherwise necessary. It also saves another opening through the underpinning of the house, which is sometimes found difficult to locate. The construction is such that when the chute is open as shown in Fig. 23 of the illustrations a heavy steel apron covers and protects the glass. When closed a recessed window is produced which serves for lighting the cellar or basement. It locks itself automatically when it is closed, as shown in Fig. 24, and cannot be opened except from the inside by lifting the steel apron from the locking lugs, which may be done with a stick without climbing over the coal pile. There are no locks, bolts, catches, clips or other contrivances to prove annoying, neither is the device an ugly-

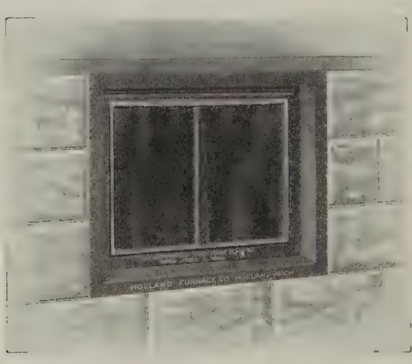


Fig. 24—The Holland Window Chute as it Appears When Closed

looking cover hanging on the wall, but a substantial glass window without hinges, bolts or other fixtures on the outside. The smaller size is 18 in. wide by 22¾ in. deep, while the larger size is 24 in. wide and 22¾ in. deep.

Low-Priced Building Material for the Farm

Much attention has been attracted to the new building material for the farm which takes the place of lath and plaster, and costs much less and is claimed gives far more satisfaction. This material is an asphalt mastic wall board which it is said will not burn. In hot asphalt-mastic kiln-dried dressed laths are imbedded at a pressure of 500 pounds to the square inch. The other side of the asphalt-mastic is surfaced with heavy, sized cardboard. Laths are the only thing that will hold a wall board stiff and flat and prevent it from warping and cracking. The wall board comes in sheets 4 x 4 ft., ready to go on. There is no waiting for setting or drying as with plaster. It does not freeze—has none of plaster's troubles—a home can be finished with this wall board in the dead of winter just as well as in summer time—and any time it will save a month in the building of a home of ordinary size. A great variety of uses are made of asphalt-mastic wall board. New rooms can be made anywhere in the house. Simply set up the studding and nail on the wall board. It is ready at once for paint, paper or any kind of decoration. Any man with ordinary skill with saw and hammer can make walls and ceilings with it. It is easily handled. The sheets are easily cut to fit around doors and windows. Many use it to make an air tight, rat-proof storeroom in the attic. A comfortable bedroom may be made in the attic with this wall board. Sheathing is made of the same materials as the wall board, only not finished so smooth. It is claimed that it saves 75 per cent. of the cost of applying lumber and building paper. It is used in barns, stables, bins, poultry houses, milk houses and, in fact, every kind of farm building to make them rain-proof and rat-proof. A large sample and a booklet explaining all the uses of asphalt-mastic wall board and sheathing will be sent to any reader on addressing The Mastic Wall Board & Roofing Manufacturing Co., 362 Este avenue, Cincinnati, Ohio.

Peck's Combination Extension Divider and Calipers

W. A. Peck, 141-145 Brewery street, New Haven, Conn., is introducing the combination extension divider and calipers illustrated in Fig. 25. The tool comprises an extension divider and inside caliper and an outside caliper, either tool

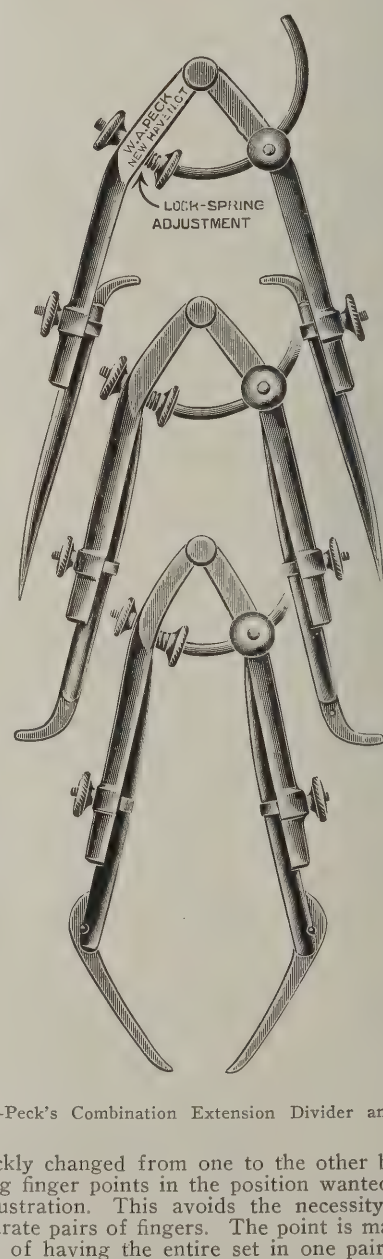


Fig. 25—Peck's Combination Extension Divider and Calipers

being quickly changed from one to the other by clamping the folding finger points in the position wanted, as shown in the illustration. This avoids the necessity of having three separate pairs of fingers. The point is made that the advantage of having the entire set in one pair of fingers, all packed in the same box, overcomes the objection of loose and separate parts and renders the tool available for any of its uses at any time without having to look up extra parts.

The curved wing is provided with a positive locking device. After setting the fingers with the locking device a fine adjustment can be made by means of the adjusting nuts and spring, and after getting this fine adjustment the nut may be turned back, compressing the spring and locking arms rigidly.

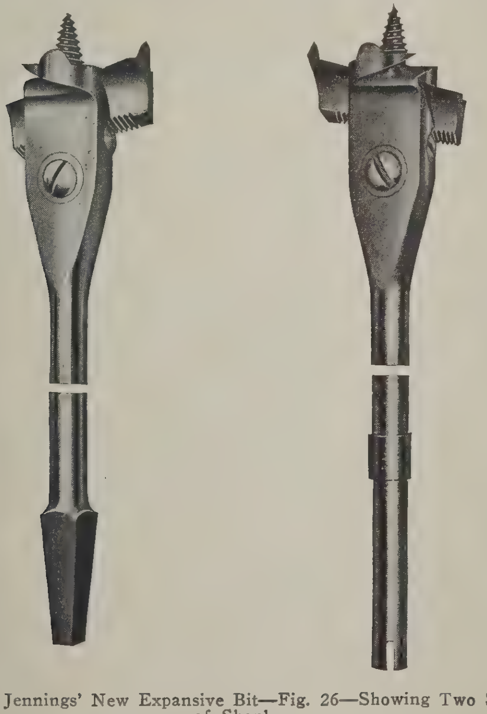
The listing sizes are 7 in. and 9 in. and represent the length of the two sizes in which the tool is made before extension, as each size can be extended 2 in. The 7 in. can be extended to strike a circle 26 in. in diameter and will caliper from 1⅛ to 11½ in. and 11 in. outside. The 9-in. size can be extended with divider to make a 34-in. circle and will caliper from 1⅛ in. to 16 in. and 13 in outside. The divider points are tempered, and the entire tool is referred to as first class in workmanship and material.

A New Chain Saw

The International Endless Chain Saw Company, 34 University place, New York City, has built a line of sawing machines possessing a number of novel mechanical features. The saw blade frames of the smaller machines are balanced automatically by a sliding weight which keeps the parts in equilibrium at all times. The chain saw itself is made up of punched steel sections riveted together with teeth on one side and a guide on the other, the former being spaced far enough apart to give clearance for the saw blade, which is made up of three pieces of flat steel riveted together so as to form a channel on each edge for the link guides to travel in. This chain is driven by a sprocket at the inner end of the blade and runs over another at the outer end, which is mounted on a tension device that keeps the chain taut at all times and yet provides the give required in a mechanism of this character.

Russell Jennings' New Expansive Bit

The Russell Jennings Mfg. Company, Chester, Conn., has just placed upon the market the new expansive bit, illustrated in Fig. 26, and which possesses features that cannot fail to interest all mechanics having occasion to use a tool of this kind. The expansive bit has a solid head and the cutter is easily and accurately adjusted. The claim is made that when once adjusted the cutter positively cannot "creep" and in this way the tool eliminates the faults of expansive bits. The solid head makes the bit absolutely the strongest



Russell Jennings' New Expansive Bit—Fig. 26—Showing Two Styles of Shank

in use and also prevents the chips from choking in under the cutter. The cutter is regulated by an adjusting screw, Fig. 27, which meshes with a rack formed on the side of the cutter, Fig. 28. The pitch of the adjusting screw is such that one turn moves the cutter 1/16 in., changing the diameter ⅛ in. This does away with the need of trying and changing the cutter several times before the right size is attained, which is a serious fault in many expansive bits. Again, after the cutter of the Russell Jennings' bit is set a very slight pressure on the clamping screw prevents the cutter from creeping, for the clamping screw will prevent the adjusting screw from turning and the adjusting screw is in mesh with the rack on the cutter and never lets the cutter slip. This non-creeping feature of the Russell

Fig. 27—Adjusting Screw

Fig. 28—Small Cutter ⅞-In. to 1½-In.

Fig. 29—Beveled Washer

Russell Jennings' New Expansive Bit

Jennings' bit is most important as workmen are relieved of the annoyance of finding the cutter has moved after boring but a short while. A view of the beveled washer is shown in Fig. 29. The new Precision bit is being made with either the ordinary bit shank or the new Precision turned shank, which latter makes the tool quicker and easier to place in the brace chuck and which cannot wobble or pull out. The expansive bit is sold separately or as a part of the Precision sets, which include full set of turned shank bits, bit brace with Precision chuck for turned shank tools or Universal Precision chuck for either ordinary bit shank or turned shank bits, bit extension, screw drivers, countersinks and expansive bits.

Keystone Floor Construction

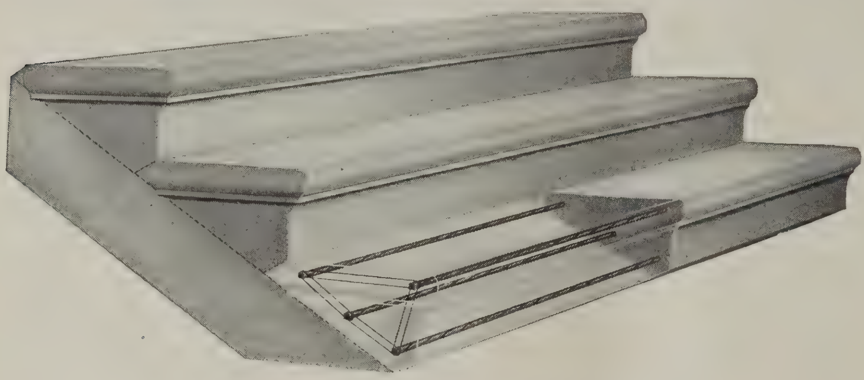
Interesting details descriptive of the "Keystone" floor construction are contained in an attractive pamphlet illustrated with numerous half-tone engravings sent out by the National Mixer Co., Rochester, N. Y. The floor construction in question is of the unit type, and beams and slabs being factory-made and transported to the job. When, however, the contract is of such a size as to warrant it and time is permissible, the beams may be made on or near the building site, and after they are properly hardened they may be hoisted to their position in the same way as structural steel beams. After the beams are placed in position the company's standard Keystone slab is keyed between them. When a sufficient section is so placed a thin grout is poured in the joints, thereby forming a monolithic structure, and at the same time a structure which could be taken apart should conditions ever require. The Keystone beam in section is T-shaped, the top of the beam being provided with a longitudinal slot formed by two angle irons into which the reinforcement of the slab is inserted and keyed, thus forming an absolutely rigid connection between the slabs and beams. The upper corners of the beams are shaped to such an angle as to conform with the angle on the slab, so that when the slab is placed an arching effect is produced between the beams. The top surface of the slab is left a rough float finish, so that a wearing surface of cement or other suitable material is easily applied. The slabs are provided with nailing plugs, so that in case wood floors are desired they can be nailed directly to the slabs without the necessity of using sleepers. In cases where a flat ceiling is desired metal lath is fastened to the underside of the beams and then plastered in the usual manner. Between the beams there is ample room for piping, wiring, etc. Keystone slabs are made on a molding machine from poured concrete, the machine having a vibrating table so that the concrete produced is of a much denser nature than would otherwise be the case. The pamphlet in question sets forth the advantages of this floor construction, and the illustrations show in detail how the work is done.

A Radiator Cabinet

The Radiator Cabinet which cannot fail to prove interesting to many readers has been designed by the Wooden Ventilator Company, East Palestine, Ohio, to add to the appearance of a room by providing an ornamental screen for the heading medium. It may also be installed so as to be used as a mantel and its finish may be made to harmonize with the finish of the room or with the furniture as may be desired. Such cabinets allow a free circulation of air over the heating surface and do not interfere with the efficiency. The grating is so constructed that it may be removed and the radiator may be cleaned with a brush when desired. It is pointed out by the company that this ventilator may also be furnished so as to be placed between the studding and to use this space for an air flue, or it may be used in connection with the regular brick flue where it is convenient. In addition to the two constructions shown herewith, a circular issued by the company gives a variety of designs and patterns of ventilators and cabinets for use in bay window seats or in a cozy corner and in a variety of applications adapted to the needs of the man who makes a specialty of heating and wants to leave little trace of his visit.

A New Interlocking Concrete Step

The building of substantial, durable and inexpensive steps is a problem which is constantly confronting architects, builders and property owners, and while in the past step construction has been confined very largely to marble, stone, iron, wood and concrete "poured" in forms, a new step built in units at the factory has just been placed upon the market by the Granitine Mfg. Company, Chicago, Ill. The step is adequately reinforced and made in concrete, granitine and terrazza. A view of three steps so constructed with a portion of one of them broken away so as to indicate the method of reinforcement is presented in Fig. 30 of the engravings.



A New Interlocking Concrete Step—Fig. 30—General View of the Steps with Portion Broken Away, Showing the Reinforcing Material

The principal features of this new step are uniformity, perfect alignment, nosing and general finished appearance. While step construction of this character is new in this country it has long been in use in Europe and we understand is indorsed by leading European architects. As showing the versatility of the construction employed it is interesting to note that the new interlocking step has been installed in a warehouse at Eighteenth street and the river, in Chicago, where 640 steps were used involving 140 varieties. Strong emphasis is laid upon the adaptability of this step for warehouse purposes, particularly by reason of its fireproof qualities, while its cost is said to be at least 50 per cent. less than stairs constructed of other material. As an outside step for high-grade residences, apartment houses, public buildings, stores, etc., it is of a nature to meet with instant approval.

Phoenix Metal Tiling

Under the above name there has been introduced to the attention of architects, builders, contractors, plumbers and house owners generally a product having its own distinctive value as a sanitary covering for walls and ceilings where a germ-proof condition is desired and which is of special interest to a large class among the readers of this journal.

The point is made by the Phoenix Metal Tile Company with offices in the Metropolitan Life Building, No. 1 Madison avenue, New York City, that the flexibility of the Phoenix metal tiling permits of its being bent to any angle or curve without injury to either the enamel or metal. Another point is that where rooms are wainscoted with marble or ceramic tiling and the walls and ceilings plastered and painted, metal tiling can be applied to the plastered portion with great advantage, as it does not crackle or change color and is inexpensive. From an artistic point its admits of almost endless decoration and is adaptable to many requirements. It is light in weight, a feature which commends it for many purposes where marble or ceramic tiling would be prohibitive. Economy in space is frequently an important factor and here metal tiling is readily adaptable owing to the fact that it requires only 1/16 of an inch. It is easily and quickly applied and is well adapted for covering old plastered walls. The company states that it manufactures a special cement for fastening metal tiling, the plain tiling requiring only about 4 oz. and the embossed metal tiling about 6 oz. of cement to the square foot. A neat four-page folder sent out by the company sets forth the merits of enameled metal tiling and shows some of the effects which may be produced by the use of the tiling in connection with borders, moldings, etc.

Revolving Door and Fixture Company

Within the paper covers of a daintily printed pamphlet, sent out by the Revolving Door & Fixture Company, Marbridge Building, Sixth avenue and Thirty-fourth street, New York City, the statement is made that the company has been organized to manufacture in its own plant fixtures for revolving doors, the idea being to enable the contractor for the interior finish of a building to purchase the fixtures and make and erect the revolving doors. The company points out that it has some patented improvements on revolving doors that are claimed to eliminate faults of doors now in use, while, at the same time, the fixtures are such that stock doors can be used by the contractor, thus rendering it unnecessary to make doors of irregular construction. In other words, the contractor for the interior finish in a building can buy the fixtures and put in the revolving doors as easily as he buys his hinges and puts in the regular doors. The company is prepared to furnish the complete set of fixtures in different grades and at correspondingly different prices per set. The fixtures can be furnished for revolving doors that can be used in a circular enclosure or in an enclosure with straight side walls, the latter reducing the cost of construction while increasing the capacity of the door. The pamphlet in question sets forth some advantages that can be obtained by the use of the fixtures supplied by the company, not the least important of which are the panic-proof features of the fixtures, which give ready egress in case of a panic, as the four wings fold out flat against each other and lock. The hand rails are set 3 in. from the glass, thus allowing people to catch hold without danger of having their fingers caught. The flexible fiber and felt weather strip furnished by the company is guaranteed for four years' wear, and in connection with the oscillating straight side walls the structure can be so regulated as to let in no air in cold weather, or as much or as little as may be required in milder weather. The president of the company is Walter S. Ely.

TRADE NOTES

United Machinery Company, 88 to 90 Centre street, New York City, has brought out a Variety Saw Table embodying features which cannot fail to appeal to a large class of our readers, especially those having to do with woodworking establishments. The frame is rigid and heavy and has an iron table made in one piece and grooved for the steel tail pieces of the cross-cut and miter gauges. The table is 36 x 44 in. and will rise and fall 5 in. on the gibbed ways by means of screw and hand wheel. It will tilt to an angle of 45 degrees and can be held firmly at any angle up to this pitch desired. The ripping fence is made to move on either side of the saw and all parts are carefully and thoroughly fitted. The tight-and-loose pulleys are 8 x 5 in. face and should make 750 revolutions per minute.

Tycrete-Concrete Products Company, manufacturers of "everything in concrete," has just removed its office to the Builders' Exchange, in the Lincoln Building, Louisville, Ky., and expects in the near future to again move with them to the new Realty Building as soon as the latter is completed.

The Plymouth Gypsum Company, 1215 Ashland Block, Chicago, Ill., made an interesting display at the recent Cement Show held in the Coliseum in that city. In addition to specimens of its own products the exhibit included a self-clinching nail of such a nature that it operates in a way to anchor itself automatically while being driven in hollow walls, ceilings and other places inaccessible from the rear.

(Trade notes continued on second page following)

TRADE NOTES—Continued

The Waterloo Cement Machinery Corporation, Waterloo, Ia., had a very complete display of their concrete mixers and machinery at the Cement Show held in Chicago, February 21 to 28. Prominent among the display was the company's "Polygon" Concrete Mixer, an illustration of which appeared in these columns some time since.

A novel piece of printed matter has been issued by the Cortright Metal Roofing Company, Philadelphia, Pa., in the way of an unusually clever booklet. The cover when the booklet is closed bears the question, "What is the right roof?" When one cover is opened a part of the other cover is exposed and is so arranged that part of the words used in the question now become the answer: "It is the Cortright metal roof." As a running head for each page some particular merit of such a roof is mentioned and is followed by the reason therefor in smaller type. This booklet, which contains many terse selling arguments for Cortright metal shingles, may be had for the asking, as may also the "Cortright Metal Shingle Advocate," the monthly magazine which the company publishes to give its customers all its fresh selling arguments for its products.

The Barrett Mfg. Company, 17 Battery place, New York City, had a rather elaborate exhibit at the Cement Show held in Chicago, February 21 to 28. The display consisted of the company's coal tar products, Barrett's specification roofs, waterproofing, tar rock sub-floor construction, paving pitch filler, etc.

Work on doubling its manufacturing capacity has been started by the Canton Mfg. Company, Canton, Ohio, maker of the Canton patented ventilator, fireproof windows and doors and special sheet metal work of all kinds, such as metal furniture, metal porch columns, coal hole casings and chutes, steel awnings, cornices, crestings and the like. E. C. Stuart is the present general manager and treasurer of the company.

Kimball Prothers Company, Council Bluffs, Ia., has opened an office in Minneapolis, Minn., in charge of E. J. Gillet. The company has lately taken the contract for installing electric elevators in the Gale Building at Tenth street and Nicollet avenue, Minneapolis, and also had the contract for the elevators for the Leamington Hotel, Minneapolis. Mr. Gillet has been with the company for eight years as traveling salesman and erecting superintendent and will hereafter look after the interests of the concern in the Northwest.

Wood-Mosaic Company, Rochester, N. Y., and New Albany, Ind., suggests to enterprising and wide-awake carpenters that they open correspondence with a view to acting as agents for its hardwood flooring. The company has been engaged in the business for 25 years or more and states that its material is kept in heated stock rooms until the time of shipment, thus avoiding any trouble by shrinkage in finished floors. The company has issued a very interesting book descriptive of the best methods employed by the largest floor-laying agencies, this being entitled "Instructions for Laying and Finishing." Those of our readers who are at all interested in hardwood flooring should send for a copy of it.

An attractive calendar has been presented to its customers and others by Auld & Conger Co., Cleveland, Ohio, manufacturer of roofing slate. The calendar possesses unusual interest in that it depicts a battle scene in which the two senior members of the firm, J. W. Conger and T. Auld, Jr., and his two brothers were active participants. The battle of Corinth was one of the most bitterly contested engagements of the Civil War, and the picture shows one of the attacks by the Texas Rangers from a sketch made at the time by D. Auld, Jr., on the battlefield. The picture is artistically mounted and the calendar is altogether a unique one.

The Waddell Mfg. Company, Taylor and Coldbrook Streets, Grand Rapids, Mich., has issued a very attractive catalogue of wood carvings for interior finish. It is known as Catalogue No. 21, and is of such a character that the company will send a copy of it to any architect or builder upon receipt of 15 cents in stamps.

Those who contemplate building this year are likely to be interested in a "New Process" glass which has been brought out for use in the manufacture of sidewalk and vault lenses. A glass for this purpose requires to be unusually tough to withstand the strains placed upon it by reason of temperature changes, and the claim is made that Tanex glass, as the new process product is known, will meet all the requirements of the case. It is sold at the same price as the old brittle glass that has given so much trouble on account of chipping and crazing, and we understand that the Berger Mfg. Company, Canton, Ohio, are using it in all their sidewalk and vault light construction.

The Standley Rule & Level Company, New Britain, Conn., has just issued a circular illustrating and describing its breast drills for carpenters' use. These are offered in 12 styles, including single and double speed, and are made with steel and iron frames having four distinct styles of jaws. Any reader who desires a copy of the circular can receive one on application to the company.

The Milwaukee Corrugating Company, Milwaukee, Wis., and with a branch at Kansas City, Mo., was granted, on March 12, a patent covering their Crimpedge Gutter.

C. B. Hewitt & Bros., 48 Beekman Street, New York City, has just issued a price list of building, roofing and insulating papers covering the leading lines which they furnish. These include "Venetia" and "Oakland" sheathing, U. S. Fiber Plaster Board, "Black Hawk" and "Red Hawk" waterproof building papers and "No Noise" deafening felt.

The Louden Machinery Company, Fairfield, Iowa, has issued a pamphlet of a size convenient to carry in the pocket calling attention to the specialties which it manufactures. Among those of special interest to our readers are barn door hangers for big, little, heavy, light, wide, narrow, high and low doors; cow stalls, cow stanchions, etc. In view of the impression that more barn buildings will develop the coming season than for many years past architects and builders cannot fail to be interested in the barn equipment which is offered.

Frantz Mfg. Company, Sterling, Ill., has issued a 48-page catalogue, in which the merits of the "Glide" door hanger and track are set forth at some length. The shape of the track has the effect of forming a perfect watershed over the top of the door, and not only is the hanger itself protected from the water but the formation of the rail prevents the entrance of rain, sleet or snow at the top of the door. In the catalogue reference is also made to door latches, fuel chutes, hinges, coat and hat hooks, turnbuckles, drawer pulls, sash lifts, hooks and staples, post-hole augers, etc.

Oak Flooring Bureau, 870 Hammond Building, Detroit, Mich., have just issued an attractive booklet containing valuable information of the laying, finishing, scraping and care of oak floors, together with other features likely to appeal to readers of the Building Age. Those who so desire can secure a copy of one of these booklets by writing to the address given.

Genuine Bangor Slate Company, Easton, Pa., makes a practice of issuing regularly some very interesting literature bearing upon its specialties, and that which it has sent out as the Tenth Dish of "Roof Salad" and "Handshake No. 22" is no exception to the rule. The company issues a number of booklets free of charge, and any one desiring copies can procure them upon application. The list includes among others "Slate and Its Uses," "Roofs and Fires," "Roof Thoughts," "Suggestions for Specifications," "The True Cost of Things" and "Natural Slate Blackboards."

The L. S. Starrett Company makes announcement of the recent death of Lewis G. Kuhn, manager of the New York store at 150 Chambers Street. Mr. Kuhn had been in the employ of the company since its New York branch was established in 1897 and became its manager in January, 1908.

Rudolph Hegener Company, 9232 to 9234 Harbor avenue, Chicago, Ill., lays special stress upon its Colonial columns, which are made with Hegener's Patent Lock Joint. These columns are made from the smallest size up to 40 in. in diameter and 30 ft. long. The company also furnishes composition capitals of standard design, the leading features of all of which are referred to in a catalogue which the company has issued.

Milwaukee Corrugating Company, Milwaukee, Wis., has been distributing a revised net price list which became effective March 1. The book has been prepared with a great deal of care and architects and builders are likely to be interested in what is contained within its covers.

Central Mantel Company, 1217 Olive street, St. Louis, Mo., has issued a 100-page catalogue showing distinctive designs of Central mantels, a copy of which will be sent free to carpenters, builders and "those building a home." A varied line of mantels is illustrated and the make-up of the catalogue is such as to render it an attractive addition to the trade literature of the architect and the builder.

(Trade Notes continued on second page following.)

TRADE NOTES—Continued

Ideal Epworth Acetylene Company, Johnstown, Pa., is bringing to the attention of architects, builders and house-owners generally an acetylene light which is especially adapted for use in isolated dwellings where city gas and electricity are not available. This light is said to be so white that dark blue may be easily distinguished from black in its light alone. The Ideal Epworth generator is automatic and is said to require filling but once a month or so. The statement is made that refilling with calcium carbide is like coaling a furnace—it is easy.

Syracuse Corner Block Company, 204 Burnet avenue, Syracuse, N. Y., states that the Zimmerman iron base for columns has a center-bearing which is sufficient to carry the required weight without allowing the corner supports to sink into the floor, and at the same time it preserves the base of the column as well as the floor. The open center of the turned wood base ventilates the column shaft and prevents it from opening.

The Huber Builders' Material Company, 48 to 50 Vine street, Cincinnati, Ohio, has issued a new catalogue of mill work, builders' materials, hardwood and parquetry floor, rolling partitions, steel ceilings, etc., which will be sent to any reader sufficiently interested to make application. Special attention is called to the line of high grade sash, doors, frames, blinds, moldings, inside trim, grilles, stair and porch work, mantels, grates, tiling, art glass, etc., etc.

The William Connors Paint Mfg. Company Troy. N. Y., offers to send to any interested reader color cards and catalogue of "American Seal" paint and "American Seal" mortar color and cement coatings. Reference is made to the great durability of these paints and other points are touched upon which cannot fail to interest the architect and the builder.

The Indianapolis Corrugating Company, Indianapolis, Ind., points out that every carpenter-contractor can build up in his own home town a good paying business by pushing the sale of metal ceilings. A catalogue issued by the company gives interesting information in this connection.

Dosch Mfg. Company, Third street, Bridgeport, Conn., is making carpenters and builders a special offer in connection with its regular Champion floor scraper. The claim is made that if the machine on inspection is not found absolutely satisfactory in every way the purchase money will be returned. A copy of Circular "B," relating to the matter, will be sent to any reader on request.

Detroit Show Case Company, 483 Fort street West, Detroit, Mich., offers to send a free copy of its booklet on "Modern Store Front Construction" to any reader who may desire one. Special reference is made to the Petz bars, which are used in the construction of the store fronts, the claim being made that this form of construction gives more light, better ventilation and breaks less glass.

Cordesman-Meyer & Co., 26 to 30 Central avenue, Cincinnati, Ohio, has issued an attractive catalogue relating to its leading lines of woodworking machinery which is of special interest to carpenter-contractors, builders, managers of planing mills and woodworkers generally. A copy of it can be secured on application to the company.

The Bicknell Mfg. & Supply Company, Janesville, Wis., is directing the attention of woodworkers to what is known as Bicknell's combination machine, which consists of a jointer, sticker. dado, boring, tenoning, sawing and gaining machine all on one arbor. The merits of this machine are set forth in a catalogue which the company has issued and which also calls attention to Sanders and other machinery turned out by this concern.

The Building Age

New York, May, 1912

A Frame Cottage at Knoxville, Tenn.

Designed and Built by the Owner -- Brief Specifications and Estimate of Cost

The attractive little cottage which forms the basis of the present article and which is illustrated and described upon the pages that follow was designed and erected in Knoxville, Tenn., for his own use, by P. O. Andrews. An examination of the half-tone engraving will afford the reader an excellent idea of the appearance of the finished cottage, while the floor plans and details show the arrangement and general construction. It will be seen that a piazza with cement floor extends entirely across the front of the cottage, and from the piazza the visitor enters a large reception hall with open fireplace. From the hall rises the main flight of stairs at the left, and separated from the reception hall by folding doors is a parlor with open fireplace, while beyond it is the dining room. Access to the kitchen is direct from the front hall, but communication between the kitchen and dining room is by means of a commodious pantry, or it may be through the door directly connecting the two rooms. On the second floor are three sleeping rooms and bath room with linen closet opening from the main hall.

All the foundation work is laid up with hard-burned brick, the exposed outside walls being laid with heavy joints in cement and lime mortar stained to match the brick. The outside walls are covered with heavy tar paper and sided to the top of the first-story windows with ⅞ and 8-in. material laid rough side out and stained a red brown with a creosote stain. The walls above this are sheathed and papered and then covered with Washington cedar shingles dipped two-thirds their length in a dark-green creosote stain. The shingles on the roof were dipped in a green stain, but a shade lighter than the walls.

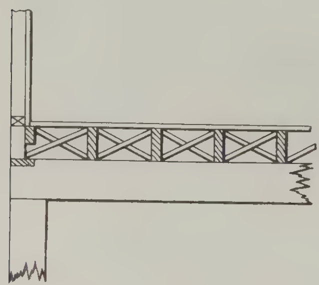
Frame Cottage Designed, Built and Occupied by P. O. Andrews, Knoxville, Tenn.

All rafter ends are exposed, with a 2-in. crown mold nailed directly to them, except the cornice around the front porch, which is boxed.

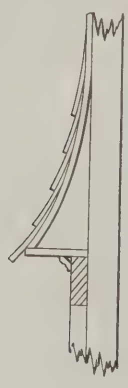
An unusual feature in cornice work is the way the ends of the rough sheathing in the gable were treated, being covered with thin beaded ceiling running with the rake of the roof and nailed directly to the under side of the sheathing. The 2-in. mold on the end of the rafters hides the ends of them, a barge board on the ends of the sheathing receiving this ceiling, also the 2-in. bed mold on the opposite side.

All framing and finish is yellow pine, the mud sills being 2 x 6 in.; the girders 6 x 10 in.; the joists in the clear; a detail of the construction used is shown among the sketches here presented. After being in use for two years it has not sagged enough to break the bond of paint on the joint of the soffit.

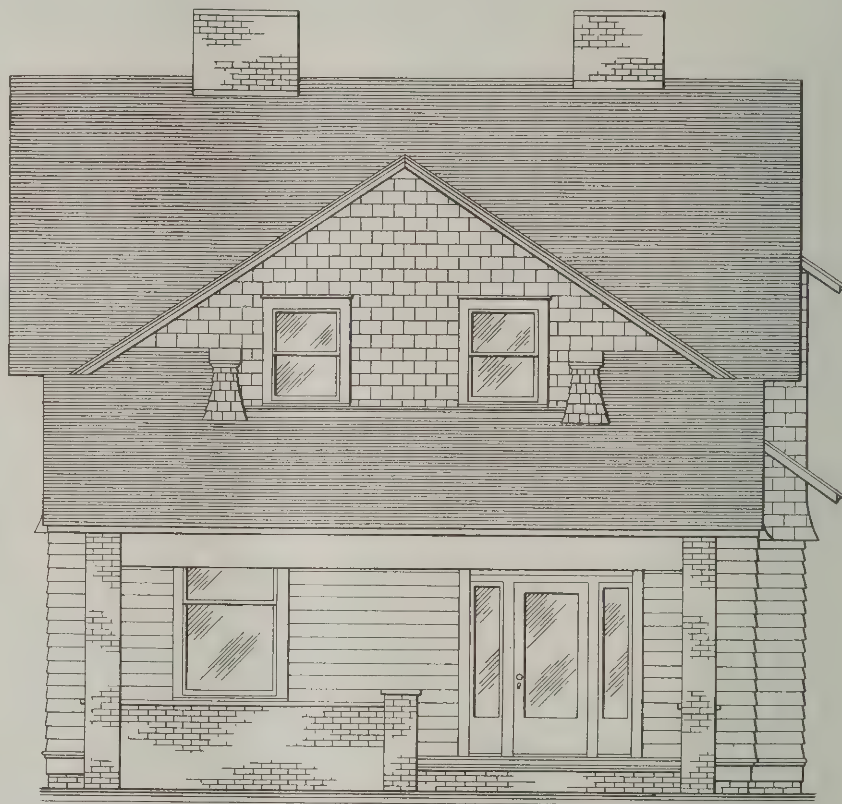
The fireplaces in the principal rooms on the first floor are supplied with Clubhouse grates and ash dumps. On the second floor the fireplaces have grates



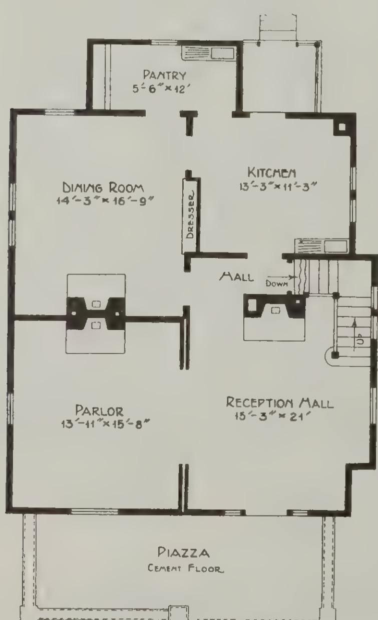
Detail of Floor Construction—Scale ¼-In. to the Foot



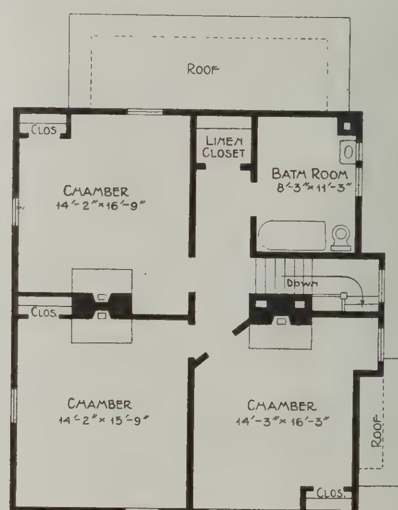
Detail of Belt Course Scale ½-In. to the Foot



Front Elevation—Scale ⅛ in. to the foot



Main Floor



Second Floor

Scale 1/16 in. to the foot

A Frame Cottage at Knoxville, Tenn.—Plans and Elevation

2 x 8 and 2 x 4 in., and the outside and inside studs 2 x 4 in. placed 16 in. on centers. All corner door and window studs are doubled.

The opening between the hall and parlor is supplied with track and door carriages, but space between stops was closed when the house was finished.

Another feature of the frame work is the long span of the front porch plate, which is 23 ft. 8 in. and ash pits with self-connecting dumps leading to pits in the basement, where they are provided with cast-iron frames and cleanout doors.

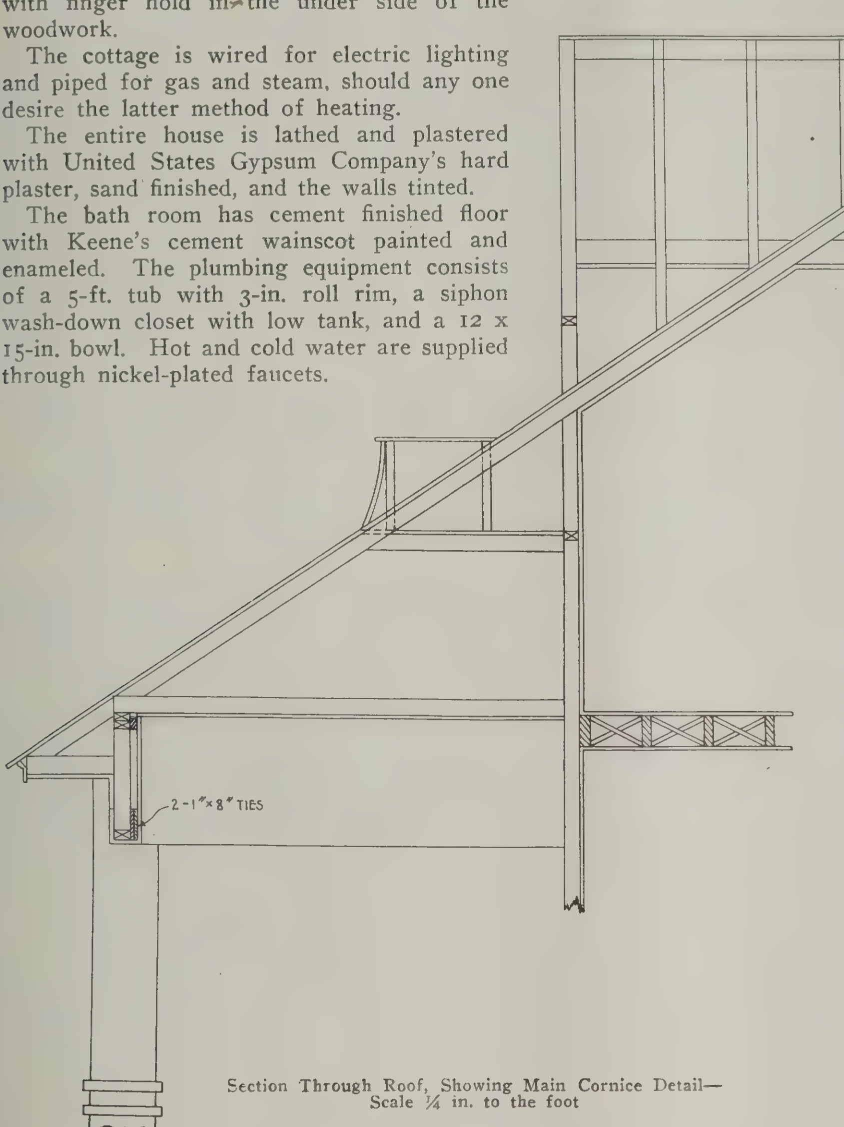
The chimney for the open fireplace in the reception hall is built to the ceiling, of dark red pressed brick laid in red mortar. In the parlor is a brick mantel built of gray speckled brick laid in black mortar. The mantel in the dining room is of rough brick selected from the foundation brick and has raked joints. All hearths are laid with tile to match the color of the brick.

The dining room is finished with plate rail and paneled plaster beneath, all woodwork being stained a dark green and varnished. There is a built-in china closet in the dining room with the usual drawers below and the shelves above, one drawer being a secret drawer in the heavy mold under the counter with finger hold in the under side of the woodwork.

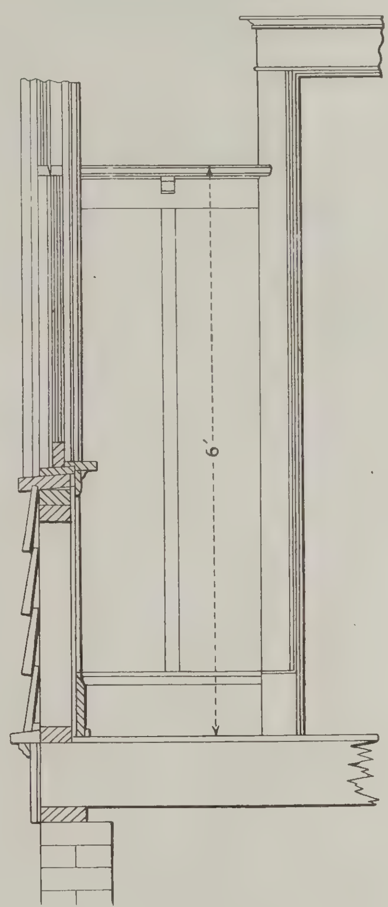
The cottage is wired for electric lighting and piped for gas and steam, should any one desire the latter method of heating.

The entire house is lathed and plastered with United States Gypsum Company's hard plaster, sand finished, and the walls tinted.

The bath room has cement finished floor with Keene's cement wainscot painted and enameled. The plumbing equipment consists of a 5-ft. tub with 3-in. roll rim, a siphon wash-down closet with low tank, and a 12 x 15-in. bowl. Hot and cold water are supplied through nickel-plated faucets.



Section Through Roof, Showing Main Cornice Detail—Scale ¼ in. to the foot



Details of First Story Construction—Scale ½ in. to the foot

Side Elevation of Trussed Plate for Porch—Scale ¼ in. to the foot

Miscellaneous Constructive Details of Frame Cottage at Knoxville, Tenn.

All plumbing is of the exposed type with sinks, wash bowl and tub supplied with Fuller waste cocks.

The complete cost of material and labor was as follows:

Brick and cement work, including all materials	$367.88
Framing lumber and mill work	896.00
Plumbing	166.00
Lathing and plastering	58.79
Valley and flashing trim	6.90
Electric wiring and fixtures	$59.90
Staining and varnishing	34.05
Water bill	3.35
Setting tile	9.00
Hardware, paint and shingles	551.39
Carpenter's work	646.00
	$2,799.26

All lights are controlled with push-button on switches, including ceiling lights on front and rear porches of the building.

Heating a Building with Incompleted Walls

Heating a building before the outer walls were completed and before the roof was on was resorted to by the builders of the new 12-story Statler Hotel, Cleveland, Ohio, during the cold weather of the winter in order to prevent interruption in building operations. The hotel is to be ready for occupancy October 1 next and every day's delay counts. Work on the exterior brick and terra cotta walls was being rushed and this was finished up to the eleventh floor when intense cold put a stop to the work. As the outside walls were laid the fireproofing between the floors was laid and the steam piping was put in.

When zero weather came the window frames in the lower half of the building were covered with cloth and steam was turned in the pipes from the mains of a commercial heating and lighting company which will furnish the steam for heating the building after it is completed. This provides sufficient warmth to enable the workmen engaged in work on the lower floors to continue their work during the coldest weather.

up an estimate sheet of all items which his estimate must include, as well as a call sheet of sub-contractors from whom estimates are desired. Then the estimator gets down to business and first takes off quantities relating to excavating, grading, sodding, etc., concrete foundations, concrete surface, reinforced concrete, brick and stone work, fireproofing material, which includes terra cotta floor, partition, column covering, beam protection, etc., throughout the various items specified. These quantities are then figured by one clerk and checked by another to be sure that no mistake exists. All this work is not done by every contractor, but a wise man will do it as a check on his sub-contractors.

Estimating is a great gamble in many respects because a builder must depend on the accurracy of his clerks and sub-bidders. Unless each sub-bidder reads the specifications and examines the plans carefully he may fail to estimate on some item mentioned in the specifications under some other head, than where he usually expects to find it, or an item may be shown on plans and omitted from specifications which may seriously affect his bid. The sub-contractor may even decline to proceed with the work when notified that his proposal is accepted, thus necessitating the general contractor to use the next lower figure which means so much of the contractor's profit has decrased.

Graining in Imitation of Mahogany

Mixing the Colors -- Treatment of a Door -- Applying the Colors -- Finishing

WHAT follows descriptive of the method of graining a door in imitation of mahogany represents English practice and is taken from a late issue of one of our London contemporaries.

In the first place the ground color can be prepared by mixing equal parts of yellow ochre and orange chrome yellow, and adding one-fourth part of bright venetian red. To get the brighter color the yellow ochre may be omitted and half the quantity of white base substituted. The color should be thinned with one part raw linseed oil to three parts of turpentine and sufficient liquid driers to dry the color in from 12 to 15 hours. When the door has been thoroughly sandpapered and dusted the first coat of color is applied. After an interval of at least three or four days the second coat is applied, and when thoroughly dry the graining is done. This portion of the work may be done wholly in water color, or by being done partially in water color, and it may be finished in oil color.

The graining colors are burnt sienna, vandyke brown and rose lake or rose pink. For a very bright shade crimson lake may be used in the overgraining color.

Vandyke brown alone ground in water is used for the water color stippling, when the work is to be finished in oil color. The vehicle for applying the color is one par stale beer or vinegar to two parts clean water. The color is applied in a thin wash and while wet is stippled or flogged with the long bristle made for that purpose. The object desired is to endeavor to produce the effect of the dark pores of the wood.

When dry the oil color is applied over the stippling The color is made by mixing equal parts of burnt sienna, vandyke brown and rose pink. Thin this color with a mixture composed of one part raw linseed oil to two parts turpentine, adding a sufficient quantity of driers. Make the color thin and apply with a soft brush evenly over the stippled work. When slightly set take some of the graining color and thicken it with some of the rose pink and vandyke brown, and with a small fitch tool make the dark veins in the wood. Draw the dry rubbing-in brush first lengthwise with the grains and when the color is leveled or smoothed blend lightly crosswise, but always in one direction. This will produce an effect similar to that seen in the natural wood. A badger blender may be used instead of the rubbing-in brush. One edge of the darker veins is invariably darker than the other and seems to recede into the wood.

Study the grains of the wood and notice all the lights and shades and endeavor to reproduce their counterparts in the work. When dry the oil color may be overgrained in oil, using a thin wash of the graining color. Or the crimson lake may be used alone, reduced to a very thin wash with the thinners previously mentioned, or with a mixture of liquid drier one part to two parts turpentine. When thoroughly dry this may be varnished.

Where the work is done wholly in water colors the graining color is composed of the same proportions of pigments, and they may be mixed together or used separately and a dip of each applied and blended on the work. The latter method is most frequently pursued by trade grainers if the work is not of very large size.

The work is first damped over with a sponge wrung out of some stale beer or vinegar. The color is then applied sparingly and worked up with the mottler, sponge and blender to produce the effect of light and shade in the wood. This process cannot be described with accuracy. Nothing but a study of the real wood and a careful attempt to reproduce similar effects can afford an idea of how it is done. The darker, finer grains (which usually run in the general direction of the heart grains of the wood) are represented by using a thin overgrainer charged with dark color and applied over the dry water color, and blended at once to produce a sharp, clean edge on one side of the work. When this is dry it may again be overgrained, using thinner color, and when all is dry the hand can be passed lightly over the color to remove any surplus dry color and the final overgraining may be done in oil color as previously described. A very thin wash is all that is necessary for this overgraining, as the thicker color obscures the sharpness of the work done in water color.

When dry the work can be varnished or it may be finished in oil, using two parts raw linseed oil to one part turpentine, adding sufficient liquid drier.

Reading Architects' Drawings—I.

Some Pertinent Suggestions for Those Who Desire to Familiarize Themselves with Architects' Drawings

By Arthur W. Joslin

NO doubt any practical contribution to the literature dealing with the reading of architects' drawings will prove interesting to many readers of this journal and, while the topic is one rather difficult to handle, the writer will do his best in the hope that many may be benefited by what follows.

A plan is a set of "conventional" signs, usually drawn to scale, intended to convey to mechanics and others having to do with buildings, engineering work, etc., what is intended to be built. A properly drawn plan, correctly read or understood, conveys a perfect mental picture of the completed work.

Scale of Drawings

Most building plans are drawn ¼-inch or ⅛-inch scale. This means that each ¼-inch or ⅛-inch, as the case may be, on the plan, represents one foot in the structure. Therefore a floor plan that measured 10 in. on one of its sides would mean 40 ft. in the actual building, there being 40 one-quarter inches in 10 inches.

If the plan was drawn to the scale of ⅛-inch and measured 10 in. on one of its sides, it would mean 80 ft. in the actual building, there being 80 one-eighth inches in 10 inches.

To put the case in a few words, the ratio of the plan to the work to be built is as the scale of the plan to 12 whole inches. Thus on a ⅛-inch scale plan every part that can be measured is 1/96 of the intended length, width, hei ght or thickness, there being 96 one-eighth inches in 12 whole inches. Likewise a ¼-inch scale plan shows everything reduced 1/48 from the intended size or dimension. A ½-inch scale shows things reduced to 1/24 actual size. A ¾-inch scale shows things reduced 1/16 actual size. A 1½-inch scale shows things reduced ⅛ actual size. A 3-inch scale shows things reduced ¼ actual size. A 6-inch scale shows things reduced ½ actual size. Drawings made the actual size of the parts shown are termed "full size details." Drawings made to ½-inch scale or larger up to but not including full size are termed "scale details."

Full Size Drawings

Details drawn to large scale or full size are made to show essential particulars that it is impossible to show on ⅛-inch or ¼-inch scale plans. On all drawings where figures are supplied they are given in numerals followed by the customary signs for feet and inches, thus a dash to the right of and just above the figure signifies feet, two dashes similarly placed signifies inches; six feet and nine inches would be written on a plan as follows 6′-9″; or twenty-one feet and three-fourths of an inch thus 21′-0¾″.

The different plans usually furnished for a building are floor plans, elevations, sections and more or less scale details. Basement and cellar plans come under the head of floor plans.

Elevations are plans of the sides of buildings, and they show doors, windows, pitch of roofs, etc., which can not be fully shown or made clear on a floor plan. Thus, a floor plan can, by the conventional sign, show the location of a window in a wall, but it can not show its height, width of casings, thickness of stool, whether having backband molding or not, manner of cutting up sash into lights of glass, etc. All of these things must be determined from the elevations, and in particular work these ¼-inch or ⅛-inch scale elevations are further supplemented by large scale or full size elevations and sections.

A sectional drawing is a representation of the construction of a building, or part of same, showing of what members or parts the building, or part of same, are made up. For instance, a section of a cornice, belt, window cap, etc., shows how same would look if cut into and separated so that the end of cut could be viewed. If it were practical to cut a completed building in two vertically and separate the two parts, the view of either half of the two parts, if reduced to scale and put on paper, would be a sectional drawing. All parts actually cut through would be "cross hatched" on a sectional drawing.

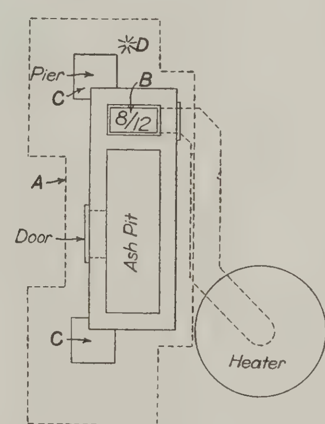


Fig. 1—Part of Cellar Plan Showing Chimney, Etc.

Reading Architects' Drawings—I.

"Cross hatching" is a series of diagonal lines filling in the entire space between two or more lines defining the outline of any member or part of the building cut through and brought into view by a sectional drawing. Where members abut each other the direction of the cross hatching lines is changed to more clearly define or emphasize each separate part going to make up the whole. Portions of a building or parts of same brought into view by a sectional drawing but not cut through are elevations. Thus a drawing taken on an imaginary line through a building would be in part a sectional and in part an interior elevation drawing.

Those of the readers who live in large towns and cities occasionally have an example of what makes a sectional drawing, as public improvements sometimes require the literal cutting in two of a building and the destruction of one part.

The part left standing, showing the end of joists, walls, partitions, etc., and the walls of various rooms with doors, base trim, mantels, etc., all in plain view, is a living example of a sectional drawing.

As before stated, all plans being conventional signs, the person reading them must put what knowledge he has of construction with his common-sense, and arrive at a correct solution of what the plan is intended to convey. In other words, it is a case of putting two and two together and getting four.

It should be understood that a cellar, basement or floor plan is supposed to be the view that one would get if the building were sawed in two horizontally somewhere about half way between the floor and the ceiling and the upper part was removed. If one were at a sufficient elevation above the building thus operated upon, to bring it all within his vision without moving his eyes, what he would see would be what a floor plan is intended to convey.

Parts Represented by Dotted Lines

Objects above the imaginary line upon which the plan is made, or below the floor, have their outline or form shown by dotted lines. Therefore, parts of a plan shown dotted usually imply something over the imaginary line or under the floor, and conveying information necessary for a proper understanding of the plan.

There are cases where parts shown dotted mean something else, and these will be explained later.

Plans are usually accompanied by specifications, which in great measure describe at length the kind and quality of the materials to be used in carrying out the work, and the methods and order of performing same.

Assuming that the reader knows very little about plans, the first thing he should do is to read the specifications carefully. This will help him to determine what some of the lines or signs on the plan mean.

To illustrate the point made above observe Fig. 1 which is a part of a cellar plan showing a chimney, piers built in connection therewith and the heater and smoke-pipe. You probably found in reading the specifications that all walls, piers, chimneys, etc., were to have footings. Now as footings are below the cellar floor and cannot be seen on the plan, and as you probably know without being told that they extend beyond the parts over them, you at once identify the irregular dotted line "A" as the outline of the footing for the chimney and two piers built in conjunction therewith. If you know so little about a plan as to be in doubt as to how a chimney is shown, the fact that the inner rectangle is marked "Ash Pit" ought to help to identify the pair of parallel lines enclosing it as a chimney.

Details of Chimney

Having made up your mind it probably is a chimney that is shown, the parallel lines, which will be found by using a scale rule, are 4 in. apart, it is at once determined that it is the brick wall which makes the chimney. It is recognized that an ash pit must have walls of some kind around it; that presumably they would be brick, and being brick they would be 4 in. thick. Now observe the smaller rectangle inclosed in double lines "B" about one inch apart by scale, and above the ash pit as you look at the plan. It is known that a chimney has a flue or flues, and you should readily identify this as a flue having a flue lining. The double lines, one inch apart by scale, with the four-inch wall around it, should convince you beyond doubt that it is a chimney that is shown. If further evidence is necessary, there is the circle marked "Heater" and the dotted lines from the heater to the flue, meaning of course the smoke pipe, leading as they do from the heater to the flue. The figures within the flue, "8/12," signify that it is an 8" x 12" flue, which you know to be one of the regular sizes of flue linings in general use. The method of noting size on the plan (8/12) is a sort of short hand, as there is not room to write out the size in full with "inch signs" added to numerals (8" x 12").

The extension on the two corners of the chimney "C" are piers built up with, and bonded to, the chimney. One of these being noted as a "Pier" there should be no doubt in the mind of the reader as to both of them being piers. Even if the note were not there the least knowledge of construction, coupled with their general appearance and the fact of their being of no use to the chimney, ought to lead to the right conclusion.

There is also the note "Door" with an arrow pointing to a place on the plan where an extra line is shown at the side of the line indicating the outside of the wall of the chimney, and about 15 in. in length by scale. This is a cleanout door for the ash pit. The specifications probably mention this door and give its size. The small star or asterisk "D" denotes a gas or electric light outlet and fixture. The general lighting of the house as described in the specifications would determine which it were.

This covers everything shown in Fig. 1, and it can readily be seen that the slightest knowledge of construction, taken with the notes on the plan, the specifications and a little common sense, should lead to a correct understanding of what the drawing means. Now by using a scale on the drawing the size of the chimney, piers, heater, etc., are found and the work can be laid out.

Use of a Carpenters' Rule

If, using a carpenter's rule each one-fourth (¼") of an inch means one foot (1'-0") in the actual work, it naturally follows that one-sixteenth of an inch represents three inches; one-eighth of an inch six inches and three-sixteenths of an inch nine inches in actual work. Such dimensions as 1", 2", 4", 5", 7", 8", 10", 11" are determined by "eye" when using the carpenters rule. If a scale rule is used there are graduations reading to each inch.

Having thoroughly analyzed the small portion of a plan shown in Fig. 1 we will now analyze a complete set of plans for a small dwelling. The set of plans are shown in the following diagrams of which

Fig. 2 is Foundation and Cellar Plan.
Fig. 3 is the First Floor Plan.
Fig. 6 is the Second Floor Plan.
Fig. 7 the Attic Floor Plan.
Fig. 8 the Front Elevation.
Fig. 9 the Rear.
Fig. 10 the Side (Left) Elevation, and
Fig. 11 the Side (Right) Elevation.

All of these drawings are made to scale of ¼" to 1'. Each drawing is supplemented by numerous notes and figures, also by detached sections and elevations from ¼" to ¾" scale.

(To be continued)

Bricks That Float

At the present time there is no particular demand for a brick that will float, but such a thing will be regarded as a curiosity the world around. This special brick is designed to be used as an insulation in the construction of cold storage plants, breweries and refrigeration plants and is meant to take the place of cork, flax, charcoal fiber and sawdust, all of which are imperfect insulating materials, the use of which is attended by foulness and rot or are otherwise offensive. The brick, in water-proofing, says the *Scientific American*, is so burned that 45 per cent. of its volume is confined and with the result that one of these bricks being cast upon the waters will float along like a block of wood.

Making Men Work

Method for Maintaining Right Degree of Efficiency -- Card Index Record of Each Man

"HOW do you make men work?" a prominent contractor was asked recently. "I don't make them work," he replied—and that is probably the reason of his success with men—they work of their own accord, work because they respect him and because they like his treatment of them, his sympathetic though firm leadership, his loyalty and fairness.

There are all kinds of men and all kinds of results to be obtained from employing them. Some are profitable for their employers, others are not. Many are willing to work and some willing to shirk and the difference between working and shirking is frequently the difference between profit and loss for the employer.

Making Men Work—Fig. 1—Lessening the Slope of this Gangway Saved Money for the Contractor

All employers are concerned about the same proposition—how to make profit out of men. Many in business for years have not yet discovered the way to make labor pay, though other employers have solved the problem comparatively easily. Why does one firm get good work out of its men when another firm is always up against it when it comes to labor? Why is it that one employer has no labor troubles and another is in hot water all the time, though apparently both treat men equally well?

The first requisite for loyal labor is being loyal yourself. No man who hires another can expect to get any better treatment than he gives, and if he shows a disposition to treat his men any less than well he may reasonably expect poor work from them. Almost every builder has at one time or another been a hired man and he need take but a few moments of reflection to recall the jobs he held which were of most profit to himself and his employer. Any builder who can call back to his mind some of the early jobs before his own shingle was hung out will remember that he did the best work for that employer who treated him with most fairness, and this work, you may be sure, was profitable for employer and employed.

Contrary to the opinion of many, labor is practically an exact science. Wages are fixed in advance and every builder of experience knows about how much work he may expect as the result of each day's labor. In checking labor items this is the first computation to make—how much is a fair day's work? After having done this contractors should expect good average efficiency from everyone in their employ well up to the standard day's work they know men are capable of, under right conditions. Mechanics who drop below this efficiency will bear watching and a builder should keep tabs on his men to the extent that he may know whether they are keeping up to the mark or not. Many contractors, recognizing the necessity of examining into the efficiency of their men, keep a card index record of each, marking every man a certain percentage at the end of every week's work. For instance, if inspection of the time card of the employee under scrutiny, in addition to inspection of the man's work, shows that a brick wall such and such size was built in a week, and if the amount of wall built in that time was sufficient according to the ideas of the employer, then that workman's card would be marked 100 per cent. If only three-quarters as much wall was built as the experience of the builder deems proper for that amount of time then the man would be marked 75 per cent., and so on. In this way, after several weeks' time, any employer can size up his help practically and scientifically. He will know which men are profitable and which are not, and can then determine what to do about it.

There are various ways to keep men up to the right degree of efficiency. Many builders have found it pays to watch carefully to see that no workers are taking unnecessary steps or using false motions in executing work. One builder discovered that the lengthening of a gangway, as shown in Fig. 1, making it one plank longer, produced thirty wheelbarrows of concrete a day more than formerly, as the gangway was made less steep and men could heap the barrows, carrying more at greater speed. Workmen had made this gangway themselves, but with poor judgment. When the change was made they were themselves pleased with

Fig. 2—This Concrete Mixer and Loading Platform Lessens Labor and Increases Profit

it, as it took very much less effort to climb up.

Mixing concrete by machinery is now known to be the best way to get the largest amount of material properly mixed, and the installation of a concrete mixer has put dollars into many a builder's pocket besides earning him the gratitude of his men. See Fig. 2.

Even after a mixer is installed one builder will produce his concrete at less cost per yard than a competitor, because he scientifically arranges a scaffolding so that loading and unloading is as automatic as possible. One machine properly arranged will eat up a constant string of wheelbarrowsful of material, and it has been found in most localities that hand mixing is no longer profitable however cheap labor may be.

Every builder wishing to make money out of his men should realize that common sense is necessary to bring about that result. Even a piece of machinery needs oiling occasionally, must be taken care of and kept in good repair to get the maximum of efficiency out of it. Precisely the same facts hold with labor. Every man on the job must be worked intelligently. Help your employee to help himself, for in no other way can he do his best work. Fair, loyal treatment is demanded of the employer as well as the employed.

One contractor in business a number of years put on a new foreman and suddenly found his men inclined to grumble. Upon first talking it over with the foreman he could find no just cause for complaint, but finally one of the men, more frank than the others, said to him: "You give Charley more work than you do the rest of us. Last week he got in fifty-six hours and we got in but forty-eight."

"How is that," said the contractor; "don't you all work the same hours?"

"No," replied the man; "there isn't always work enough to go round, but the foreman keeps Charley busy anyhow." And so it proved. That foreman was guilty of rank favoritism, and when work petered out he saw to it that his particular friend got something to do though the rest of the men were laid off. Nothing destroys a builder's reputation in the minds of his men quicker than the idea that he is not treating every one alike. It is never a good plan to keep one or two men at work and lay off others of the same gang. If there is not work enough for all it is usually better to lay them all off.

That every builder should keep his men as steadily employed as possible goes without saying. The best and most loyal squad of workmen is composed of men who have worked for the same employer for years. They know his ways and he knows theirs, and that usually makes a combination bound to be efficient. No favoritism should be tolerated, and, in connection with this, let me advise, also—no beer. Why should men drink beer on a job? I have investigated this point many times and at every visit to a job where men had a case or two of beer handy I perceived lost time and slow motions. One bottle of beer will slow a man down, physically and mentally, more than anything I know of, and it is, in my estimation, a great mistake to allow beer on any job. After business hours, beer if you like—but during business hours, never. One owner I know of was so anxious to keep mechanics good natured that he sent them a case of beer every day. What was the result? Instead of increasing their efficiency he decreased it . The men thought he was a "good fellow" and more soldiering was done on that job than any I ever saw.

The foreman is the key to many a builder's bank account, though frequently builders do not realize it. An efficient, loyal foreman is the most important acquisition to any contractor's staff, and when a foreman is secured who is really a winner the contractor had better love him like a brother. Probably more wrecks in the contracting business are caused by inefficient foremen than from any other cause. Your foreman can be firm so long as he is fair and yet be popular with men. In truth, workmen are inclined to respect firmness wherever found, firmness tempered with justice. It seems to be characteristic of human nature everywhere to admire a real leader, and that is what your foreman should be, a leader—a captain who gets the utmost efficiency out of the squad under his command, gets it by executive ability and tact. One contractor has adopted the custom of assisting his foremen (he has three) to invest their savings. A little over a year ago, during a slack season, he built a row of cottages with his own money and the earnings of his foremen. An example is shown in Fig. 3. Thus these men are attached to him by bonds of like interest—the strongest kind of tie. As this builder gets on in the world his foremen prosper with him and the result is he has one of the strongest, most loyal organizations I ever saw. He has discovered how to make men work.

Workmen in the building industry are very much like workmen everywhere. They have the same likes

Fig. 3—Type of Cottage Built with Earnings of Workmen

Making Men Work—An Excellent Example of the Results and dislikes. You can lead them but you mustn't drive them, diplomacy usually accomplishing more than mere force. Most inefficiency is caused not by lack of desire to work on the part of mechanics, but by lack of organization, and this is properly the fault of the contractor or his foreman. Present high wages make it of utmost importance for builders to study their working forces to see if every man is properly equipped with tools and make sure that the work is laid out effectively and executed without waste motion. Workmen should be encouraged to do work the *easiest* way when the easy way is best. Every time a workman saves breaking his back by pushing, for instance, a wheelbarrow containing seven hollow tiles, as in Fig. 4, with the same amount of energy required to carry two on his shoulders, as in Fig. 5, he has added to the profit of his employer. One might think workmen would automatically choose the easiest way, but they don't The average workman does not plan his work scientifically, and that is where the builder should come in—to plan work for his men so as to get the most out of them and at the same time make it easier for them.

Making Men Work—Fig. 4—Seven or More Pieces of Hollow Tile are Easily Carried in a Wheelbarrow—Laying a Hollow Tile Floor

Visitors around the job are frequently a source of loss to the contractor and this nuisance sometimes assumes serious proportions. There are plenty of curious idlers in every town to climb over the work, question the workmen, get in the way and take up time generally. Ten minutes' loss of time an hour makes eighty minutes a day—over an hour and a quarter—which is certainly some loss. It is not always good policy to put up the sign, "No trespassing," for fear of offending the public, but a good way is to display a sign reading, "Visitors Welcome During the Noon Hour," which is a gentle hint to keep away at other times.

Small boys are the greatest time consumers, and the foreman should be cautioned not to permit boys on the job, as in Fig. 6. In addition to time lost is the danger that boys will be hurt climbing about the structure. In keeping an efficiency record of workmen the fact that a man falls behind in his percentage is no sign that he is incompetent. It may mean, simply, that he is not expert at that particular branch of work. When this occurs, if possible try such a man with some other kind of work and see if he will do better. Some men are skilful at one kind of work and some at others, and it is up to the contractor to keep each man at the work he is best fitted for if he wants to make his labor profitable. Though willing enough, men frequently cannot do work that counts. This isn't their fault. They should be kept busy at work they understand better.

Be firm with your men but sympathetic and loyal. Encourage them to be thrifty, to own their own homes or invest their savings in the homes of others. Put responsibility on their shoulders. That is, perhaps, one of the greatest truths of all in studying how to make men work—responsibility almost invariably brings increased efficiency, especially with young men. One contractor who has discovered this fact finds that his best foremen are those who have had no previous experience in running a job. He picks out young mechanics who appear to be of the right stuff and makes foremen of them. The result is he has developed a number of hustlers anxious to make good and not so old they cannot be taught. Their efficiency is very high.

Give your men a comfortable place to loaf in during the noon hour, as shown in Fig. 7. Even a rough shanty with a fireplace or stove in cold weather may mean an increase of effort in doing the work, for in this way you will be more likely to keep the best men: Let the other fellow have the disgruntled men, but you should try and get the happy ones and do your utmost to keep them happy. Then you will have learned how to make men work.—*Charles E. White, Jr., in Building Progress.*

Fig. 5—Not the Right Way to Handle Hollow Tile Efficiently

How to Make a Felt-Paper Floor

To every painter there comes at some time or another the problem of finishing an old wornout floor which may be full of cracks, splinters and other irregularities, and the best way to execute the job is often the basis for a wide diversity of opinion. In discussing the matter not long since Harry Martin described in the columns of the *Painters' Magazine* a method which he had used for the last ten years and which has given entire satisfaction. The following particulars are of interest:


Making Men Work—Fig. 6—The Small-Boy Problem. Workmen Lose Time When Visitors Approach

Take ordinary heavy building felt, which comes in 50-yd. rolls and weighs 50 lb. to the roll. Prepare plenty of flour paste, to which add a little glue. Cut the strips about 6 in. longer than the floor and paste them all, using plenty of paste. Fold and stand aside.

Get the floor perfectly clean and paste 3 ft. of it, or the width of a strip. Now take a strip of the paper, unfold it and paste it, again re-fold and lay on the pasted part of the floor and brush out all air spots.

Lay the next strip in the same manner, being sure to paste the floor, but let it overlap the first strip by an inch and a half; this is to allow for trimming.

Take your straight edge and lay on the joint and trim, using either a wall paper trimming or a sharp casing knife. Take the small strip from underneath and you will have a perfect joint. Let the floor stand until dry, then get ordinary muslin, say about 12 cents a yard. Cut it in strips about 6 in. longer than the floor to allow for working. Start at one end of the room and lay with paste brush. Of course, the cloth being thin, the paste goes right through. Be sure to brush out all the wrinkles and saturate the cloth with paste.


Fig. 7—Men Work Better After the Noon Hour Spent in a Comfortable Place

Lay the rest of the strips in the same manner, lapping an inch and a half and trim the same as the paper. When the cloth is dry the next thing to do is to paint it. The floor may be filled with a mixture of glue and whiting, but we usually use keg lead in oil and oil with a little japan drier, and a half pint of turps to the gallon, held fairly stout and rubbed well into the floor.

The surface should have at least four coats of paint, and then if you want to relieve the plainness of it you may stencil a border around it.

This makes an ideal floor for a house where there is a large family or any place where many people congregate, as it is almost noiseless. Of course, the object of putting the cloth on is to keep it from scruffling up as it would otherwise do.

One of the latest improvements on the Forty-second street block between Fifth and Sixth avenues, New York City, is the new dry goods store for Stern Brothers, who have decided to remove from West Twenty-third street, where they have been located for many years. The new building, which has been designed by Architects J. B. Snook's Sons, 73 Nassau street, will be eight stories in height and will contain 76,000 square feet of floor space. The estimated cost of the new building is placed at $1,500,000. The contractor is Charles T. Wills, Inc., 286 Fifth Avenue, New York

In regard to the use of stucco there is evidence in Egyptian ruins that it was extensively employed and the early Spanish missionaries in Mexico and later in Southern California adopted it as the covering for their buildings of adobe brick, now known to all the world as the original Mission structures.

Forms for Reinforced Concrete*--IV.

Making Form Sections on Benches -- Types of Column Forms -- Erecting Column Forms

By Frederick W. Taylor and Sanford E. Thompson

THE making up of sections of forms that are duplicated over and over again is essentially shop work, even though the work is done on the job. It is easier to systematize this work than to systematize the operations of erecting or removing.

The pieces should be cut to length on a mill saw and made up on benches, the work being carefully laid out in advance.

The following scheme may be followed to good advantage:

(1) Design the section, indicating by a drawing or sketch the thickness, length, width and number of boards or plank, the size of the cleats, the location of the cleats, the number and locations of nails and the size of nails.
(2) Number each section to correspond to number on plan; for example, beam sides may be designated as BS1, BS2, etc.
(3) Mark on the plan each piece of lumber in the section. The like pieces on different sections, that is, pieces of the same width, thickness and length, may have the same mark. In this way, when passing through the sawmill, pieces that are cut alike can be sawed in one lot regardless of where they are located in the forms.
(4) Design in this way, either by sketches using carbon paper, or by regular drawings and blue prints, all the forms to be used on the job, except the comparatively few sections, like foundation forms in rough places, that cannot be laid out in advance.
(5) Take off schedule of all the lumber in these designs just as one would schedule steel, indicating the mark, the sections requiring each mark, the sizes, etc.
(6) Order lumber from mill either cut to exact widths and lengths, as per schedule, or else in such a way as to have as little waste as possible.
(7) Deliver lumber to yard piled so that any pieces can be readily found. Each pile should be distinctly marked.
(8) Saw the lumber to schedule, marking each.
(9) Pile by marks or deliver at once to bench where form sections are to be made up.
(10) Lay out each section on a bench, using the drawing or sketch as the Instruction Card. The bench is described below.
(11) Make all the like sections of forms at one time.
(12) Pile sections and deliver to proper location by laborers working under a labor boss. Use hand carts wherever possible for transportation.

This method of work means a system that cannot be handled by the office force generally employed on a construction job. A man is needed to plan the work and another man is needed to see that the lumber is properly marked and piled and routed to the place where it belongs. On a small job these two duties or functions may be given to a single man.

The extra cost of these men, even if the job is so large as to require a special department with several assistants, will be made up many times over by the saving in time of the carpenters who make up and erect the forms. Not only will the forms be made cheaper, but they will be made more accurately so that they will go together in place and the labor of sawing and fitting in erection will be avoided. Furthermore, with a job organized in this way it is a comparatively simple matter to take time studies on the workmen and lay out definite daily tasks for each workman.

Work Benches.—If a contractor or builder has considerable work in one locality, well constructed benches that may be carried from one job to another are economical. A style of bench that has proved satisfactory in practice is shown in Fig. 3.

In laying out a section, cleat holders are tacked across the bench so that the cleats may be dropped between them, the boards or planks are laid on top of them, then clamped and nailed. If the cleats are

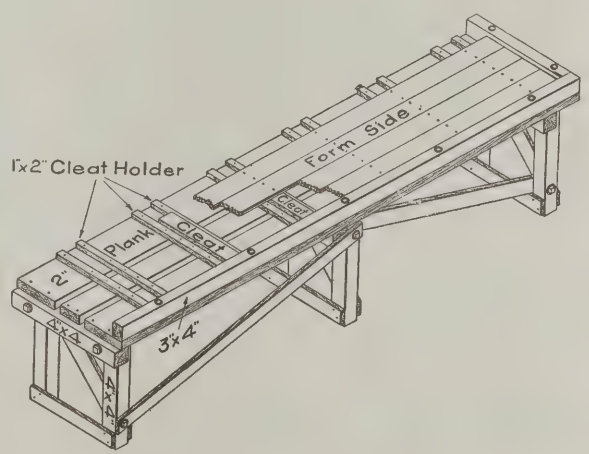


Fig. 3—Carpenter's Bench for Making up Forms—All Bolts Shown Are 5/8-In.

Forms for Reinforced Concrete

1-inch thick and the section is to be used over and over again it must be turned over and the nails clinched.

For beam sides and column forms the cleats should be of such size and so located as to serve as clamps when erecting the forms. Wherever possible, one carpenter should work at a bench. This is contrary to ordinary practice, but one man will always, where the work is not too heavy, do more than half the work of two men working as a gang.

Where one man works alone at a bench the lumber should be piled at right angles to the bench instead of parallel to it. This method of work has been followed satisfactorily by Frank B. Gilbreth with a great saving of time over the ordinary plan of two-men gangs.

The design of forms for foundations is governed by the design of the structure to such an extent that it will not be discussed in detail. Many of the remarks already given on construction and also the discussion which follows will apply more or less to this class of form work.

Column Forms.—Having fixed upon the requisite

*This article is adapted by the authors for the *Building Age* from a chapter in their forthcoming book, "Concrete Costs."

strength of a column form, the design should be governed by the question of economy in making the sections of the form, assembling them in place, removing them and remaking them for subsequent use.

At first sight it appears to be a very simple matter to accomplish the purpose, but, on a job of any size, with labor and lumber at high prices, the question of the best method of construction presents itself in an entirely different light. The methods employed by different builders are so varied and frequently so complicated that the individual operations of all the processes must be studied quite minutely to distinguish clearly between the good and bad points of each.

A surprising number of factors play an important part in the economy of column construction. Some of these are:

(a) Kind of lumber.
(b) Thickness of lumber for sheathing, *i.e.*, whether 1, 1¼, 1½ or 2-inch stock.
(c) Dressing, *i.e.*, whether square edge, tongue-and-grooved, shiplap or bevel edge.
(d) Width of lumber for sheathing.
(e) Method of making forms.
(f) Kind of clamp to use.
(g) Number of clamps for each size of columns.
(h) Method of placing clamps.

Widths of Boards for Sheathing.—If possible the boards or plank should be ordered from the mill of a width to fit the column without splitting. Sometimes the dimensions of the column may be altered very slightly to permit this, the cost of the extra widths being more than made up by reduction in form cost. If this is not feasible, the boards of odd widths should be split on the power saw and not by hand. Frequently this is done after the sections are cleated.

Use of Narrow Strips for Convenient Remaking.—A plan that has been followed successfully is to make up the column form for the first story with narrow strips on the edges so that one strip may be removed for each reduction in size. For example, if the first story column is 30 in. sq. and the first reduction is to 28 in., the next to 26 in., and so on, a part of each section may be made up of strips 2 in. wide so that one strip can be taken off for each reduction.

Column Heads.—The tops of the column forms that are intersected by beams may be made separate from the rest of the column so as to reduce the labor in adjusting different beam sizes.

Bevel Strips.—The corners of square columns should always be chamfered both for the sake of appearance and to prevent danger of breaking off sharp corners when removing forms. The triangular strips to form the bevels should be nailed on to two opposite

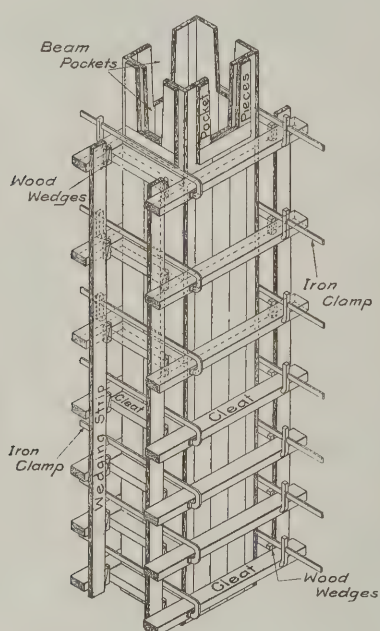


Fig. 4—Column "Form" with Iron Clamps and Wedge Strip

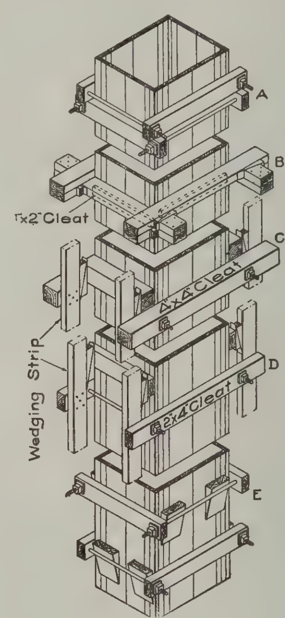


Fig. 5—Showing Various Designs of Column "Forms"

Forms for Reinforced Concrete

(j) Method of erecting columns.
(k) Method of removing and transporting.

Types of Column Forms.—When reinforced concrete was first introduced, the sides of column forms were made of horizontal boards set piece by piece, so that the concrete could be placed in thin layers. Now, columns always are filled from the top and the sheathing usually is vertical.

The common types of column forms may be classified as follows, the first three types, which refer to square or rectangular columns, being distinguished by the character of the clamps.

Type 1—Wedge strip type.
Type 2—Wood wedge clamp type.
Type 3—Bolted clamp type.
Type 4—Octagonal column forms.
Type 5—Circular column forms.

Before discussing different types of construction in detail some of the elements which are common to all of them will be considered.

sides of the column forms when they are made up.

Cleanout Holes.—A cleanout hole must be cut in one side of every column. For convenience in replacing, this may be cut so as to come up to the middle of the first clamp. The piece of board cut off should be tacked to the column side so that it will be all ready to put back in place after the column is cleaned out and before the concrete is poured.

Erecting Column Forms.—The best method in erecting a column form is to attach three of the sides together before setting in place, and the fourth side afterward. If, as is sometimes done, each side is raised separately, there is time lost holding the sides at place while another carpenter nails them together. In some cases the four sides may be put together before raising, but, if the reinforcement sticks up above the floor, extra laborers are needed to raise the form and then lower it over the reinforcement and also to place the new reinforcement from the floor above after the form is set.

The advantages of the three-side method are therefore:

(a) Column reinforcement can be placed before the column form is set.

(b) Column reinforcement from story below can project up as high as desirable.

(c) Two carpenters can assemble and erect.

(d) One carpenter is not required to hold form while the others are nailing.

The design of column forms with iron clamp and wedge strip of Type I is illustrated in Fig. 4.

Study of the time of the carpenter constructing this type indicates it to be one of the best and most economical methods of construction. It is quickly assembled, requires little nailing and is easily removed.

The cleats, which are shown as 2 by 4 in., may be placed on edge or flat, according to the strength required, and serve not only as cleats but also as clamps. For large columns 4 by 4 inch cleats may be required.

The design shows iron clamps, sometimes called "Hennebique clamps," which hold the long sides together and are easily attached and driven tight. These clamps give good satisfaction, provided the edges of the long piece are sharpened when it becomes rounded from use, so as to prevent its slipping. The short cleated sides are wedged against the upright wedging strips with wooden wedges as shown. These wedging strips may be 1 by 4 in., 1 by 6 in., or heavier stuff, and should be firmly spiked to the longer cleats.

With this type of clamp the cleats do not have to be exactly on the same level, a variation of say ½-inch not affecting the security.

Assembling by the Three-Sided Method

In assembling by the three-side method referred to above, the sides are brought up to the floor where the form is required and three sides—two with long cleats and one with short cleats—are tacked together on horses by a few nails. This three-side form is then set up around the column reinforcement on lines already laid out by another gang, the fourth side is raised and lightly nailed on and the clamps then placed.

This type of column form was devised by Jesse E. Hodges, superintendent for the Ferro Concrete Construction Company. The contractors state that it is the only square column form which they have ever used that automatically will square up absolutely true and water-tight.

A type of form used extensively where the clamps are held together by wooden wedges is illustrated in section B of Fig. 5. With this type the boards are usually battened together as shown, and the clamps are put on separately, so that the blocks may be easily changed when re-making. This clamp is easy to remove, but is expensive to re-make because the short stop blocks must be ripped off and usually a new block cut and nailed on. These small blocks should be cut in advance on the mill saw and stored for use.

Several styles of forms with bolted clamps are shown in Fig. 5. The style given at the top as A is that used as the standard design for Type 3. As in Type 1, the cleats are nailed to the sides when making, so that they are a part of the clamp.

Sections for D and E of Fig. 5 illustrate various other methods of holding the sides of the form, using only one pair of rods to each clamp.

(To be continued)

Metal Ceiling as a Fire Retardant

The fire retarding action of metal ceilings was most forcibly brought to the attention of master builders generally at a fire which damaged a portion of the Builders' and Manufacturers' Exchange, Washington, D. C., on Tuesday night, February 27, at which time the members of the Exchange were holding a smoker and banquet, which was largely attended by delegates attending the annual convention of the National Building Trades' and Employers' Association of the United States, in that city, and a report of which appeared in these columns last month.

Over two hundred members and guests were about ready to participate in the refreshments when a fire broke out in the automobile establishment of David S. Hendricks, occupying a portion of the first floor of the building. The conflagration was caused, it is stated, by the ignition of a 10-gal. can of gasoline from which the tank of the automobile was being filled. The can exploded and the interior of the warerooms immediately became a mass of flames. The entire building was quickly filled with smoke and some difficulty was experienced by the assembled builders in getting out of the building.

Metal Ceiling as a Fire Retardant—Interior of Garage After Fire Showing Protection Afforded by Metal Ceiling

What caused the delay in any spread of the fire was evidently the fact that the ceiling of the automobile warerooms was of the metal type. The building itself was not fireproof; the floors were of wood, but thin brick party walls separated the business establishments on the first floor. With the fire confined between the walls and the rafters and floors protected by the metal ceiling, the fire department found but little difficulty in confining the flames to the one apartment. The rafters under the metal ceiling caught fire, but only after the danger was passed and a large part of the ceiling was torn down to permit of extinguishing the smouldering fire behind the ceiling.

It is interesting to note that the flooring of the second story, over the portion burned, was not seriously damaged by the fire. The accompanying reproduction shows the appearance of the wareroom after the fire.

It is stated that there was a saving of $25,120 in the cost of the Statler Hotel building, Cleveland, Ohio, by using hollow tile for the wall construction.

Legal Obligations of Builders

Degree of Skill Required--Work Under Defective Plans.--Responsibility to Third Persons

BY A. L. H. STREET.

THE following stated legal principles, which are deduced from decisions of the appellate courts of the several states and of the United States, have constant application to building operations. The subject of this article being too broad to permit a detailed statement of all the rules of law embraced by it, the writer has selected what appears to him to be the most important principles.

As stated by the Rhode Island Supreme Court, "the law exacts from masons, carpenters and other mechanics, ordinary skill and care. It does not require the highest degree of these qualities, such as the most skillful and careful mechanics use, nor is it satisfied with the lowest degree, or such as the most ignorant and careless exercise, for this would be gross negligence; but it takes the medium as the rule." Hence, unworkmanlike performance is not excusable on the ground that the builder did the work as well as he could.

Contractor's Presence Not Necessary

A contractor's agreement to have the work performed "under his own personal and immediate superintendence, and not by sub-contract" has been held in Missouri not to require him to be constantly present while the building is being constructed, nor to prevent him from employing assistants. According to a decision of the Minnesota Supreme Court, a builder is not responsible on account of inferior character of brick bought by him in good faith, if the defects were not discoverable on careful inspection, and were not disclosed until after the building was completed and the brick were exposed to the weather. It has been decided in Iowa that a builder who has contracted to carry on work during freezing weather cannot avoid responsibility for a settling of foundations due to such weather. On the other hand, the Michigan Supreme Court has held that a contractor, who followed the terms of his agreement and the specifications, was not responsible for injury to a wall caused by the mortar freezing. A contractor is under no obligation to carry insurance on the building pending its completion, unless so required by the contract. Hence, his failure to take out a policy does not affect his right to recover for work done before destruction of a partly completed building, if his agreement did not require insurance.

Defective Performance Due to Plans

It is generally stated that if a contractor performs his work according to the plans and specifications, he is not responsible for defects in the work, due to defective plans and specifications, unless he has warranted the sufficiency of the plans and specifications. It has been held, however, that a contractor becomes a guarantor of the strength and safety of a building by departing from the terms of his contract without the owner's consent. The Texas Supreme Court has ruled that a contractor, having failed to complete a building according to plans and specifications, it having fallen when nearly complete, was liable for the loss, though the structure fell through architectural defects and without his fault. The decision proceeds upon the theory that the owner did not warrant the sufficiency of the plans, and that the builder, by undertaking the contract, impliedly stated that he understood the plans.

If the builder is an "independent contractor"—that is, if he has undertaken to do certain work at an agreed price, retaining the right to control the method of doing the work, being accountable to the owner for the result of the work only—the builder is alone liable for injury to third persons due to his negligence or negligence of his workmen. But the owner is responsible for injury to third persons caused by inherent defects in the plan of construction, the builder having faithfully performed his agreement. Thus, a builder was exonerated from liability for injury caused by the collapse of a hotel porch after delivery of the building to the owner, the accident having been caused by a defective plan. A builder who sublet contracts for the setting of stone was released by a New York court from liability for injury to an outsider, caused by the subcontractor's negligence. In the same state, a contractor for the construction of a cement floor was held responsible for injury to an employee of a contractor for the brickwork of the building, due to premature removal of the temporary supports of the floor before the cement set, on the theory that the cement contractor was bound to do his work so as not to be a source of danger to others lawfully engaged in work on the building.

The Alabama Supreme Court has held that a builder was not liable for injury to a passerby, caused by a brick falling from a properly constructed wall, if the accident resulted from an intentional or negligent act of a workman outside of the scope of his employment, even though no scaffolding or guards had been constructed to prevent the fall of material. Where a scaffold is suspended over a street, the builder must take precautions to avoid injury to pedestrians through fall of material. He owes the same duty to workmen employed in interior construction under staging, etc. But the builder is not liable for injury to trespassers upon runways, scaffolds, etc. This rule extends to the unauthorized use by the workmen of one contractor of scaffolds constructed for the exclusive use of another contractor employed on the same building. The Wisconsin Supreme Court has decided that if an ordinance requires a contractor, in erecting a building along a street, to cause a roofed passageway to be built in front of the building after completion of the first story, a builder who does not comply with the regulation is liable for consequent injury to a pedestrian while passing along the sidewalk, unless the pedestrian was guilty of negligence contributing to his own injury.

Primitive Bath Rooms in British Arabia

According to Consul Walter H. Schulz writing from Aden, drinking and bathing water is drawn from the sea, condensed and delivered to residences in wagons at ½ cent a gallon. There is no plumbing and modern bath-room fittings are conspicuous by their absence. Wash tubs are used for bathing purposes, and for shower baths an ordinary tin bucket with a sprinkler soldered in the bottom and suspended from the ceiling.

A Small Cold Storage Building

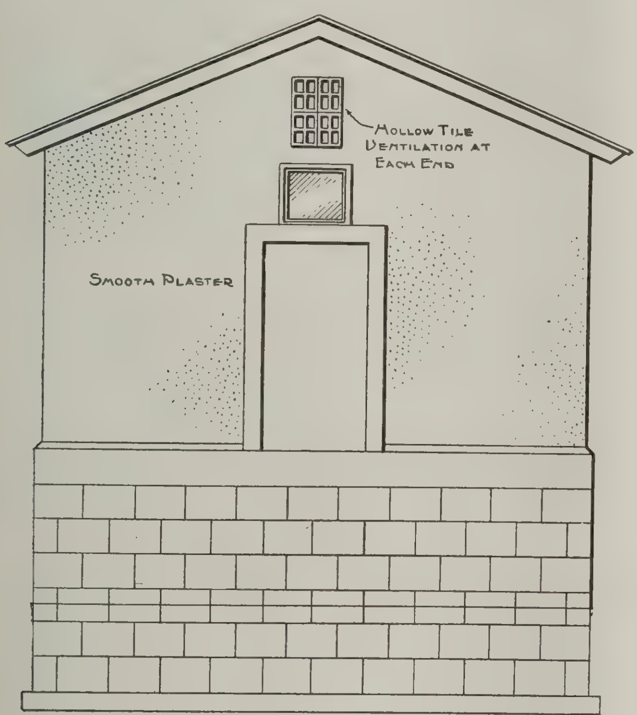
Double Walls of Concrete Hollow Tile -- Reinforced Roof Slab Laid in One Operation -- Method of Insulation

COLD storage construction for whatever purpose the building or room may be used is always a source of interest to builders and contractors at the present day owing to the rapidly growing popularity of this form of preserving fruit, vegetables, dairy products, meats, wines, etc. Obviously the economy of cold storage depends upon the insulation. If this is not properly provided for the results are anything but satisfactory and the work is a waste of time, trouble and expense. The prohibitive cost of adopting stone, brick and wood in the construction of cold storage rooms has prevented the providing of cold storage facilities in times and places where constant refrigeration would have been desirable and profitable, but with the advent of cement concrete in connection with hollow tile the problem has resolved itself into one of simple solution.

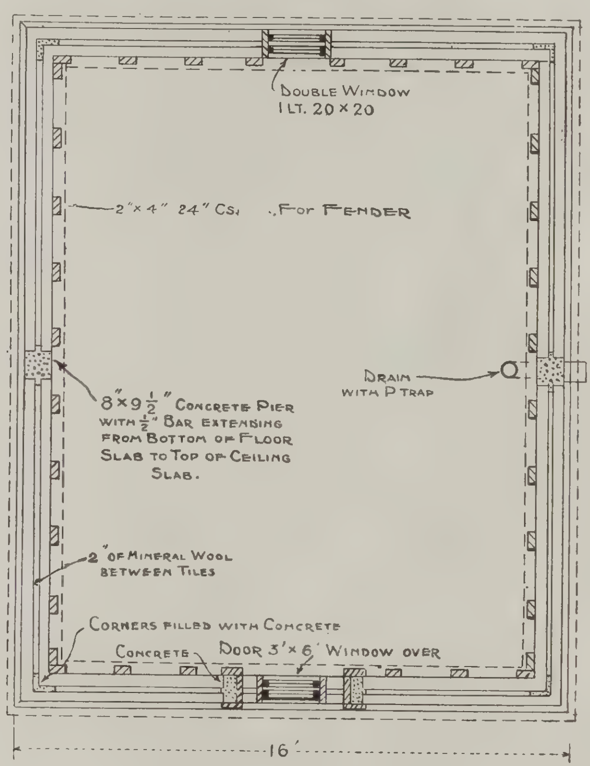
The illustrations which are presented herewith relate to a small cold storage building in which the walls are of hollow tile. The plan affords a good idea of the construction of the walls of the building, while the vertical section shows the method employed in connection with the floor and ceiling slabs, as well as with the foundations. The building is a cold storage station located alongside the tracks of the Chicago & Alton Railroad at Lemont, Ill., and is used by a brewery for storing a carload of beer in kegs and bottles. The building measures 16 x 20 ft. in plan and is 14 ft. in hight. The footings of concrete were laid 4 ft. below grade and upon them were placed 7 courses of concrete hollow tile filled with slush concrete. The foundation wall extends about 3½ ft. above grade or about on a level with the floor of a railroad car.

Double walls of 4-in. hollow tile carry the roof slab, which is of standard tile and reinforced concrete beam construction, use being made of 4-in. hollow concrete tiles. At the four corners and the centers of the walls concrete reinforcement is provided inside the tiles, thus making six concealed solid concrete columns extending from the floor to roof. Between the two walls is a 2-in. space packed solid with mineral wool.

At grade and in the top course of tiles 1-in. steel rods were embedded in the concrete filling for the purpose of tying the foundation walls firmly together.



Front Elevation, Showing Tile and Plaster Finish



Plan of Cold Storage Room, Showing Method of Insulation

A Small Cold Storage Building—Concrete Hollow Tile Used in Walls and Floors

A reinforced concrete floor was made, using 1-in. rods on 2-ft. centers and heavy triangle mesh wire fabric in the lower half of an 8-in. slab, the floor slab being graded to drain from all directions into a "trap," as shown on the plan.

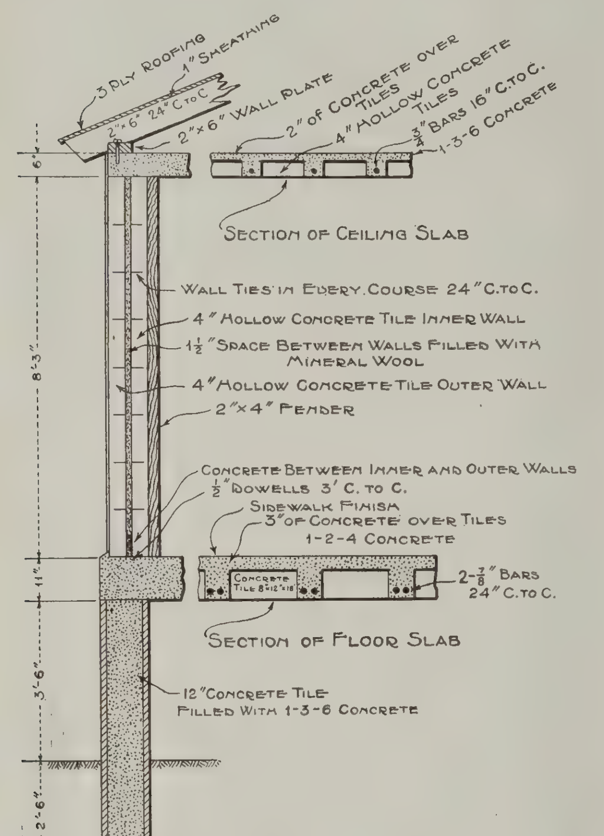
A false wooden ceiling of sheathing to carry a layer of tarred felt immediately beneath the roof slab was supported by 2 x 4-in. timbers spaced 24 in. on centers, these also serving the purpose of fenders to protect the walls.

The roof slab was laid in one operation so as to attach the slab to the walls all around, having steel rod reinforcement in both directions over the walls. The beam rods were spaced 16 in. on centers to form 4-in. beams between rows of tile 12 in. wide. The slab was 6 in. thick and provided 2 in. above the tiles as the compression member of the T-beams of concrete. A shelter roof of ordinary composition carried on 2 x 6-in. rafters placed 24 in. on centers was bolted to the roof slab as shown in the section view, and was provided with concrete hollow tile ventilators.

The outside of the tile walls was covered with one coat of cement and lime plaster, this coat being protected at the corners with Parker corner beads and having a 2-in. beveled wash or water table.

The concrete used throughout was a 1:2:4 mixture of Universal cement, bank sand and crushed rock, sufficiently wet to pour smoothly. The two small windows just below the roof slab are of such a nature as to give dead air spaces and provide sufficient light. The single door opening is provided with double doors and curtains to insure proper insulation at this point.

The concrete hollow tile for this building was furnished by the Chicago Structural Tile Company, Chicago, and is of the well-known Pauly type of concrete tile, which has been found particularly adapted for cold storage structures of this kind. The plans and specifications were prepared by the officials of the brewing company.



Vertical Section Through Main Wall Indicating also the Construction of the Floor and Ceiling Slabs of Tile and Concrete

A Small Cold Storage Building

Manufacture and Uses of Veneers

The increasing use of veneers in the United States is forcibly illustrated by the statement that in 1910 there were 477,479,000 ft., log scale, of wood made into veneers, which was about 10 per cent. more than the consumption in the previous year. Fomerly veneer making was confined to a few hardwoods selected for beauty of grain and used as an exterior finish for high-grade cabinet work and furniture. With the improvement of veneer machinery, however, and methods of drying there has developed a large demand for veneers cut from cheap woods and used for drawer bottoms, glass backing, filling in three-ply lumber, packing boxes, fruit baskets, veneer barrels, etc. On account of the constantly increasing price of hardwood lumber used for making cabinets, furniture, fixtures, etc., built-up lumber which is usually made of three-ply veneer is being extensively substituted.

The principal methods of manufacture are rotary cutting, slicing and sawing. The first named is the method most extensively used and by it the cheap veneers are cut. Although the highest grade veneers are made by sawing, veneers made by the slicing and rotary processes are more extensively used than the sawed product, as they are less expensive to manufacture.

According to a bulletin issued by the Bureau of the Census of the Department of Commerce and Labor, red gum was much more widely used for veneer in 1910 than any other wood and in that and the three previous years it constituted approximately 30 per cent. of all the wood used. The tendency of red gum to check and warp when used as lumber is overcome by converting it into veneer. It cuts well especially in the rotary process and with improved dryers is easily kiln dried. For the manufacture of built-up lumber red gum is especially adaptable because it takes glue readily and because it can be used as either face wood or filler.

Next to red gum yellow pine is the most important wood in respect to the quantity used in the manufacture of veneer. During each of the past two years maple, yellow poplar, white oak and birch have shown increases in consumption, while each of these woods showed a decrease in 1908. The adaptability of Douglas fir for making veneers is becoming more widely recognized as is indicated by the fact that the quantity reported in 1910 exceeds the combined quantities for the three previous years.

In 1910 Michigan, Indiana, Illinois, Arkansas, Missouri and Wisconsin each report a consumption of veneer material amounting to over 30,000,000 ft., log scale. Taken together, these six states used 42½ per cent. of the total quantity consumed in that year. The veneer industry is now most important in the central Mississippi Valley and the states bordering on Lake Michigan.

Building Progress in Australia

The following excerpt from a report by Consul-General John P. Bray, Sydney, New South Wales, serves to emphasize the growing value of that section of the world:

"Sydney has again established a record in building operations. Great as was the expansion during 1910, when 5470 buildings were completed, last year eclipsed the previous year's record, 6503 buildings being completed up to December 15. The cost of the 6503 buildings completed was approximately $17,795,000. There are about 425 houses and buildings of various descriptions in course of erection, at an estimated cost of $1,460,000. A rough estimate of expenditures in additions to existing building is $2,430,000. The total building expenditures for the year exceed $25,000,000. This does not take into account such items as wharfage, water and sewerage, tramway extensions, and railway works, but if those amounts were added the total expenditure for the year in construction work within the metropolitan area would probably reach $34,000,000, or $9,720,000 increase over 1910.

"This is a remarkable record of progress. The increase of buildings for 1911, as compared with that of the previous year, reaches a total of 1033. Taking the figures from an official source, 22,214 buildings have been erected during the past four years."

During the past two years buildings to the value of $15,000,000 were erected in Johannesburg, South Africa.

How Old-Fashioned Houses Could Be Remodeled

Suggestions for the Builder Regarding Changes That Would Render Old Dwellings More Attractive and Comfortable

By L. C. Breed.

IN the suburbs of Boston, we recently inspected a house which probably was built fifty years ago, and when compared with homes in England, this could hardly be called an ancient residence, though in America it is termed old-fashioned. And yet, while it is provided with the ordinary modern improvements, one notes many features that really justify this term being applied to it.

A new owner, doubtless, would make many changes which would render the house more attractive. Probably the first thing he would do would be to widen the hall by throwing into it a part of the large parlor which extends across the entire width of the building, with the usual old-style folding-doors in the center. The dining-room, which is on the north side of the house, has but two windows, and for that reason is not well lighted. In a modern dwelling, the north side would not be likely to be chosen for the dining-room. In this case, the introduction of a bay-window would give more light and render the room much more cheerful. The new owner would probably cause two bay-windows to be placed in the parlor.

Proceeding to the bath-room, open plumbing would be substituted for the old-style fixtures, and throughout the house, electric lighting used instead of gas. In addition to furnace heat, some of the rooms have open grates, and the rooms are provided with closets, most of them quite large.

In the third story, besides the bed-rooms, there is a large attic, which, as usual, is used for storage, and strange instance of thoughtlessness on the part of the builder is seen when one notes that the door-way to the attic is hardly five feet in height, so that, during all these years, every person who had occasion to go into the attic was bound to bump his head if inattentive.

The basement has a concrete floor, and is well provided with store-rooms, closets and coal bins. Here another lack of foresight is seen, in that the ashes from the furnace have to be carried up the cellar stairs, when it would have been practicable to have provided an entrance to the cellar from out-of-doors, with the usual incline, thus rendering the removal of the ashes much easier.

A new owner would remove the porch and build a large veranda along the side of the house. He also likely would build a new front entrance, providing two front doors, and thus in the winter prevent the ingress of cold air to a much less extent than at present.

Another faulty feature is that one door to the basement opens in on the stairway, and there is no landing. If a child, unattended, should push the door open there would be much risk of falling down stairs. One gate from the grounds opens out on the side-walk, and persons passing along in the dark are liable, if it is open, to be injured.

The house in question is well built, and for a frame house is warm in winter, owing in part to the board sheathing being matched. There are many such dwellings which, with ordinary care, will furnish comfortable homes for fifty years more. The singular thing is, that, so often it is to be seen, many people will continue to live on in them without making the changes and improvements which, to a visitor, it is obvious should be made.

Building Concrete Houses Without "Forms"

As showing the possibility of making concrete serve as its own form by erecting the work by stages the following description furnished by John J. Smith, architect and concrete engineer, Boston, Mass., may not be without interest to many of our readers.

The foundation wall was of reinforced concrete built without wood forms. Expanded metal rib studs were set up 14 in. apart and a stiff metal lath wired to both sides of studs (which are made 6 in. apart) gave a form for the wall and also provided reinforcement set up in place. The outside of these walls was given a heavy coat of cement mortar containing a little lime and hair. This when set made a rigid hollow wall which was then filled solid with concrete mixed in the usual way (but not too wet) in proportion 1:2:4. The walls, both inside and out, were floated to a sand finish with a wooden trowel. This made a very strong substantial wall built without wooden forms and only required a single bracing for the metal studs, using a piece of 2 x 4 as a straight-edge and bracing either inside or outside, as most convenient, by driving stakes in the ground.

The walls of the house were made by setting up 2 x 4 studding similar to the balloon frame, but omitting the corner and other posts, also the girts and substituting in place of these solid concrete posts and girts reinforced with two pieces of the metal rib studs, which for the girts were bent in the form of a truss. Metal strips were nailed to the studding on which were applied metal lath; this was then coated with cement mortar, using lime and hair sufficient to make it trowel readily. The metal lath was backed up on the inside with a cement mortar, so as to bury the metal at least 1 in. The outside was then given a second coat of cement mortar made three of clean, sharp sand and one of cement. This is mixed with a waterproofing compound and stippled, while the wall is green, with a mixture of one of sand and one of cement well beaten to the consistency of a thick cream and applied with a kind of brush made by tying together a bunch of light twigs.

Winding Stair Rails

How They May Be Developed by the Methods of Descriptive Geometry -- Principle Applied to a Ramped Piece -- Art in Handrailing

By Triangulus

WITH the elevation and plan of a wreath piece completed, all as shown in Figs. 4 and 5 of the April issue, it now remains to outline the shape of the plank from which it can be cut. Its width can be obtained upon the plan by first drawing one side through the points *a* and *a'* near the ends, and drawing the other side parallel to it and tangent to the outer curve, at its middle point, *t*. The thickness of the plank can be obtained from the elevation by drawing the line of the top from point *a'* of that view at its upper end and making it tangent to the curve near *r*, extending the line somewhat in either direction preparatory to determining the angle or cut of the ends. As the piece is the same at both ends the lower line will be drawn through corresponding points on the lower side, that is, from point *d*, and made tangent to the curve before reaching H at the upper end all as shown. We have now only to draw the two ends by continuing the line *b c* at the lower end of the elevation to meet the two lines just drawn at J and G, and the line *b' c'* at the upper end which is continued to meet the previously drawn lines at K and H.

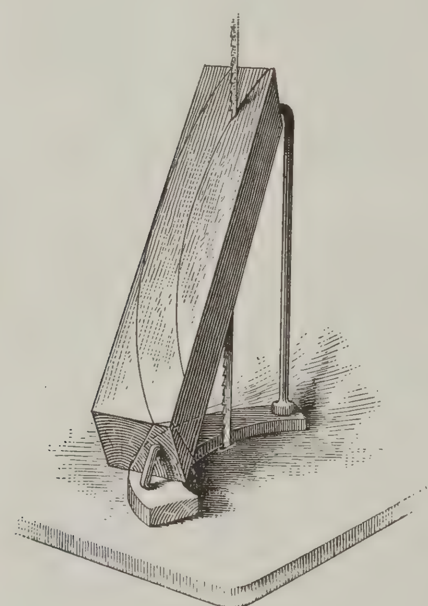


Fig. 6—Method of Giving Proper Curves by Means of a Band Saw

Having completed upon paper the outlines of both the wreath piece and the plank from which it is to be cut, the workman should have no difficulty in transferring the various points and lines thus obtained to the plank itself after it has been first cut to the required shape and dimensions all as just described. Several views of the plank are shown to the left of the elevation upon which is shown, by the lines of projection, how the several points are obtained. The first view shows the side of the plank toward the well and is simply a reproduction of the outlines in the elevation from which the lines showing the blank itself have been omitted. By cutting off the end of the plank at the angle shown by J G, a surface is obtained in which the two points *b* and *c* are found. Their distances from either J or G can be measured upon the side view with the compasses or by scribing two corresponding lines horizontally across the end of the plank, after which their respective distances from either side of the plank can be taken from the plan and set off upon the scribed lines, all as shown in the end view just below. The position of the point *d* which, as shown in the elevation, is upon the bottom of the plank, and shown in the bottom view, can be obtained by measuring its distance from either side upon the plan, and from the end G upon the elevation. A line drawn through *b* and *c* upon the end of the plank will if continued strike the bottom edge at *k*,

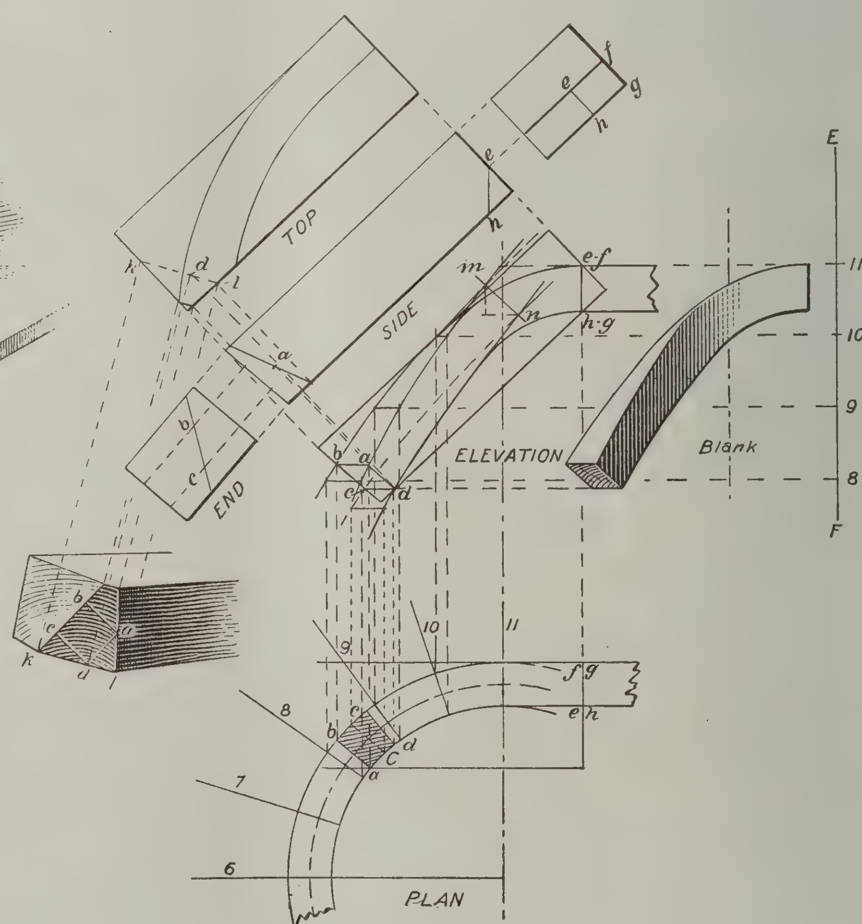


Fig. 7—Method Shown in Fig. 4 Applied to a Ramped Piece

Winding Stair Rails—By "Triangulus"

and a line from k drawn through d on the bottom will give, with line $k\,l$, shown on the bottom view. These are the lines for cutting off a corner of the plank which cut, if accurately made, will pass through the point a, on the inner side of the plank, thus giving the plane of the joint. This cut is clearly shown in two views below the end view of the plank. The upper of these views is a projection on a plane parallel to the line $k\,l$ of the top view, while the other shows the same part in perspective. The position of point a upon the side of the plank can, like the others, be obtained by measuring its hight from the bottom of the plank and setting the distance off on the line where the saw emerges after the cutting just described. Its position can also be obtained by projection as shown, and located on the plank before the cutting. As before stated, both ends of the plank are alike; hence if the plank be reversed by turning over, that is, by bringing the upper end to the position occupied by the lower, and the lower side to the top, still keeping the same side (the hollow side) in front, the operations just described may be repeated without change in obtaining the shape of the upper end.

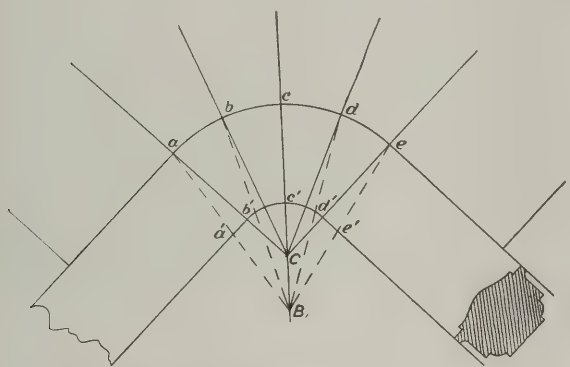


Fig. 8—Illustrating a Method of Changing the Generated Form

The curves for the top and bottom of the plank, commonly known as the face mold, can be obtained by means of any convenient set of parallel lines drawn across the plank. Take, for instance, the points marked r, s, t and u on the plan, and draw vertical lines through them crossing the plank, projecting them at the same operation, on to the line J K of the elevation as shown. The several distances J r, J s, J t, etc., of the elevation can then be set off on the top of the plank as shown on the top view and lines drawn or scribed squarely across the plank as shown. The distance of the points r, s and u, also of r', s', t', u', etc., of the plan, from either edge of the plank, may then be set off on corresponding lines on the plank and the curves drawn through the points thus obtained all as shown by J′ t K′ and L t'' M on the top view. The plank can then be reversed as above described and the bottom laid off from the same measurements, as shown by the dotted lines in the top view and by full lines on the bottom view which represents the plank turned over. With all the outlines upon the plank, the mechanic should have no difficulty in cutting out the blank, which may be done in accordance with usual methods. In the matter of sawing the wood to the curves given it will be seen that the geometrical character of the piece as described at the beginning, could be realized by fixing the plank firmly at the angle given in the elevation upon a jig whose base is a segment of the curve of the plan, and then feeding it into a band saw as shown in Fig. 6. If the edges of the base are kept against the saw, the saw will then follow the curves as drawn upon the top and the bottom of the plank.

It will be seen from the foregoing that the success of the method here described depends upon the accuracy with which the several operations are conducted; that the method is not one of approximation, leaving something to be trimmed in the final assembly of the parts, but one in which every point is located and every line drawn with precision and the plank cut

Fig. 9—A Wooden Rail of Perfect Curve

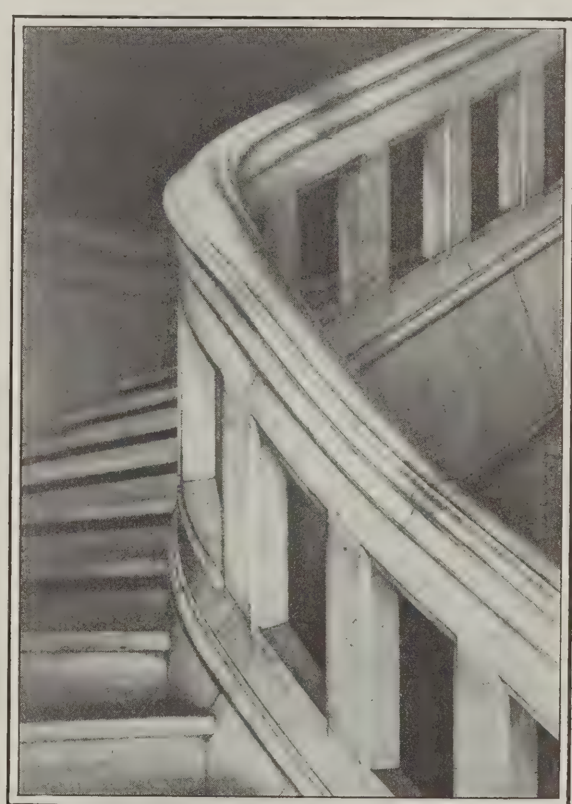


Fig. 10—An Example in Marble of an Imperfect Curve

Winding Stair Rails—By "Triangulus"

to the line. Thus in taking a glance at what has been described we see that first, two accurate views, a plan and an elevation, have been drawn upon paper by methods familiar to every mechanical draftsman; second, that the outline of the plank from which the blank is to be cut is drawn around the plan and elevation in such a manner to just contain the blank. This gives a plank upon the sides or ends of which every point in the joints of the wreath piece can be located before any cutting is done beyond that necessary to bring the plank to its required shape. Finally, after the sides have been sawed by any available or practicable method, the dip of the curve of the rail or its deviation from the surfaces of the plank as seen in the elevation, can be drawn upon the outer and inner sides of the now partially sawed plank, by any convenient method of measurement.

Principle Applied to Ramped Piece

Fig. 7 shows how the principles above described can be applied to the piece containing the ramp or easement which connects the wreath with the level rail at the top. The plan of the joint and the referenced letters used at the lower end of the piece are the same as those in Fig. 4, to which the foregoing description will apply, while the method of locating the points at the upper end is so clearly shown by projection as to require no explanation. The risers are numbered in the plan in continuation of those used in Fig. 4. The piece from the joint until the ramp begins, which is above the tenth riser, is thus a duplicate of the one shown in Fig. 4. Since, however, the curve of the rail is different from this point, the outlines and angle or position of the plank from which it is to be cut are necessarily different. The lower outline of the piece at the ramp or easement is, of course, not the same as that on the upper side as was the case in Fig. 4, being obviously of a shorter radius. The line $m\,n$ corresponds in every respect with $m\,n$ of Fig. 5. In drawing the elevation it is well to continue the lines from the joint at the lower end to $m\,n$ first, as though no ramp were to be made, so as to insure correctness of outline, then to change the course of the lines from the beginning of ramp to the upper end as required.

From what has been said in connection with Fig. 4 it will be gleaned that the strictly geometrical character of the rail as a generated solid renders the construction of the plan and elevation of its blank purely a matter of deduction or sequence. In applying the methods set forth, to the more complicated forms which occur in hand rails, however, it will necessarily require a very careful analysis of those forms to first discover their geometrical nature and to then determine what modifications may be demanded when considered from an artistic viewpoint. This will not be difficult and need not involve principles or methods not generally understood in stair building.

Stairs Constructed in Cramped Positions

Conditions, for instance, sometimes arise, as when stairs have to be constructed in cramped positions, when strict adherence to the geometrical or generated form as adapted to stairs built where more space is available might produce results which would not be satisfactory and could not be called artistic, as in making a very sudden turn, when the rail, if not somewhat modified in form, would have the appearance of a violent twist. In such a case it becomes necessary to make changes. What the stair builder then requires is what may be called a rule for violating a rule, or in other words, a systematic method of departure from the generated form.

A suggestion as to how this may be done can be gathered from an inspection of Fig. 8, which shows a plan of a sharp turn in a very wide rail, that is, one in which the radius of the shorter curve is less than the width of the rail. The stair builder can here resort to a method frequently employed in spacing the risers under the same conditions. A point other than the center C, from which the curve is struck, can be assumed according to judgment, as B, from which the elements of the upper and lower surface of the blank can be drawn to the points a, b, c, etc., on the larger curve. The points a', b', c', etc., thus obtained on the shorter curve, can then be used in getting its elevation in the same manner as 4′, 5′, 6′, etc., of Fig. 4, were used in getting that elevation. The effect of this is to extend the pitch of the inner edge of the wreath over a greater space than the quadrant properly included in the curve, thus making it less violent. It, however, makes the entire wreath piece an irregular form in the designing of which much judgment must be used. There can be no doubt that the geometrical or generated form satisfies the requirements and cannot be improved upon where space permits, but when necessary to deviate therefrom, it becomes very necessary that the constructor shall thoroughly comprehend the geometrical principles involved (since that is the key to the mechanical construction) and at the same time possess an artistic eye to curves, for upon that depends the pleasing results.

Where Failures Occur

Instances of failure in respect to these points are frequently to be encountered. In illustration of the foregoing facts, reproductions from two photographs are herewith presented. In Fig. 9 is shown a wreath of perfect curvature, while Fig. 10 plainly shows a failure to obtain either geometric or artistic curves.

Despite all the science that can be brought to bear in the construction of the hand rail of a winding stair it must be recognized that art plays an important part when results entirely satisfactory are obtained. Notwithstanding that the forms are those said to be "generated" in accordance with well understood operations of solid geometry, there is yet an element, as is the case in Fig. 8, that yields to the impulse of the designer. The grand effect of some of the great staircases is due to the fact that the designer had an eye for fine curves.

New Trade School for Young Men

A new public trade school for boys and young men was opened at 232 East 38th Street, New York City, on April 1, when the Board of Education took over the establishment of the privately conducted Preparatory Trade School and will continue it as part of the city's educational system. The courses taught include house carpentry, and construction, cabinet making and bench work, as well as the principal branches of plumbing, electric wiring and installation; also mechanical and architectural drawing. Sessions are held on Monday, Tuesday, Wednesday and Thursday evenings from 8 to 10 o'clock.

The teachers have all been regularly e mployed workmen in the branches taught. With a view to increasing the size and broadening the field of the school and insuring its permanency the Preparatory Trade School directors donated its entire equipment and organization to the Board of Education.

For more than nine years the Preparatory Trade School at 305 East 41st Street, taught the trades in night classes to the boys and young men of that section. The work, which was supported entirely by private contributions, demonstrated the value of a permanent trade school for that section of the city.

What is said to be the largest building operation in th vicinity of Washington is at High View and involves the construction of 300 six-room houses.

Metal Ceilings for Residences

Some Arguments For and Against Their Use for Such Purposes by an Expert

AN unusually comprehensive treatment of the subject of the adaptability of metal ceilings for residences has been contributed by one who has the interests of sheet metal at heart and who has chosen to use the *nom de plume* "Flynn." We quote as follows:

"Relative to the use of metal ceilings in residences we believe that a list of the most prominent arguments 'for' and 'against' would be appropriate, and when a short explanation of the reasons pro and con are attached there can be no doubt of the argumental value.

Arguments Against Metal Ceilings

"The arguments against deserve attention first in any attempt to refute them. Call them disadvantages and label them: (1) Fixed decoration or style; (2) greater first cost; (3) sound carrying; (4) heat and cold radiation.

"It is true that a design of any kind applied to ceilings and side walls is permanent and is likely to become monotonous to the eye, and that such fixed design does not readily lend itself to change of style of decoration to afford relief from the monotony. Please consider that no elaborate changes of any kind can be made in any room without considerable expense. Another thing to consider is that metal will lend itself to any sort of color scheme whether modest or gaudy. The owner's brain will be taxed to a greater extent in order to arrange various tasty decoration schemes, but he will also have the feeling that he has worked out something original. Originality bespeaks a healthy, active brain and is worthy of cultivation.

"It is true that metal ceilings erected cost more than plaster ceilings which, when put on as a part of the general contract or in connection with other work, cost on the average about 20 cents per square yard, but pay is claimed for the entire surface area of ceilings and walls, including all openings. In buying metal ceilings and walls you pay only for the actual area covered.

"Metal ceilings are naturally more resilient and carry sound waves more freely than wood lath and hard plaster, although it is difficult to realize how anything could beat some of our present hard plasters in this respect. It is claimed that this sound carrying may be greatly lessened in all kinds of ceilings and walls by weaving good building paper in and out about the studding and joists after the style of the sketch herewith.

"This would be inexpensive and should it prove effectual as claimed it would materially improve the sales of metal ceilings for residence.

"Sheet metal is a great conductor of heat and cold. A house roofed with sheet metal (other things being equal) is colder in winter and hotter in summer than one roofed with any other form. Sheet metal artisans will not care to acknowledge the above, but it need not work harm to the trade. The same theory will hold good with rooms with metal ceilings and side walls. The owner must, of course, counteract these conditions if he knows of them and can do so, but it is a conscientious workman's duty to advise his employer or the man who ultimately pays the bills in every way he can when adverse conditions would arise from the lack of knowledge. This looks pretty strong against metal, but this feature may be overcome by working on a principle similar to that in next paragraph above.

Advantages of Metal Ceilings

"Passing to the advantages of metal ceilings and side walls for residences, the following claims may be listed: (1) permanent, (2) no repair bills, (3) fireproof, (4) fire retardant, (5) dustproof, (6) verminproof, (7) sanitary, (8) safe and solid, (9) artistic, (10) architecturally correct, (11) no cracks, no holes, (12) easily cleaned, (13) economical, (14) decorative.

"When a metal ceiling or side wall is properly put on it is there to stay. There has been but one case of a metal ceiling falling and that was attributed by the trade—if we remember the reference correctly—solely to improper application by inexperienced or careless workmen.

"No repair bills are necessary. Cracked and falling plaster and dilapidated and unpasted wall paper and burlaps are done away with. Such conditions are not possible when metal is used. When wall papers are used they must be replaced every few years. Metal once on is always there.

"Metal ceilings and walls cannot burn and have kept many a fire confined to a single room or to a single building. Such material is a pretty good insurance. Many metal ceilings are being used in fireproof construction buildings more for the decorative purpose than any other.

Method of Sound-Proofing a Metal Ceiling

"Good metal ceilings have such properly fitting lapping beads that they are dustproof, and have no crevices for hiding places and homes for obnoxious vermin. It was claimed at one time that the metal ceiling joints harbored hordes of bed bugs and such creatures, but recent investigation has failed absolutely to disclose any such conditions so far as one very prominent brand of metal ceilings is concerned. It has been considered as rational "competition argument," but it is a point worthy of thought. The consumer ought to satisfy himself before he buys. Quality counts for more than price in such questions. Make sure of the quality both as to material and workmanship.

"Anything that will keep out dust and vermin and is easily cleaned and easily kept clean is sanitary. Metal ceilings are sanitary.

"Plaster ceilings have been known to fall, doing serious harm to furniture, carpets, clothing and general interior finish as well as to persons in the room. This is impossible with metal equipment, which is so safely anchored as well as because of its lighter weight per square foot or yard.

"Metal ceiling designs appropriate for residence work are quite numerous and the number is increasing rapidly because of the more frequent calls in recent times.

"The largest and most reliable manufacturers have designs drawn and stamped in true architectural style for all types and periods of architecture. The style of the building or room and personal taste of the owner must necessarily govern. The sheet metal man can furnish almost any design he may have call for.

"There are no yawning openings or unsightly cracks in metal ceilings and walls, and manufacturers who carefully guard their reputation will not ship out plates, panels, sheets or any other members of a ceiling with breaks or holes in them.

"Metal ceilings are naturally finished with paint applied in such manner of style as the purchaser's taste requires. When it needs cleaning, warm water, soap, sponge and drying cloths are all that are needed. For change of decoration a new coat of paint will do the work. The expense for such change will hardly equal the cost of good wall paper and will last much longer.

"From the length of service without trouble, worry or repairs, and as protection from fire, metal ceilings are truly economical. When all these are considered the first or initial cost does not look nearly so great. Time and service only show what is really economical as distinguished from what is 'cheap.'

"The man who lives under the ceiling and within the walls is the individual to say how the rooms should be decorated. Metal materials lend themselves to any decoration or color scheme that may be applied to wood or plaster.

"In the selection of designs for small rooms such as residence rooms usually are, it is well to look at the small neat figures or something that can make a 'run of the room' and be cut anywhere without spoiling some figure of panel.

"If the writer of this article has gone astray in any of his figures or statements, he will be glad to be corrected and to be shown why his conclusions have not been true ones."

Ventilation of an Inside Bath Room

At the present day it is a well-known fact that the great majority of modern bath rooms which do not have an outside exposure are provided with ducts or

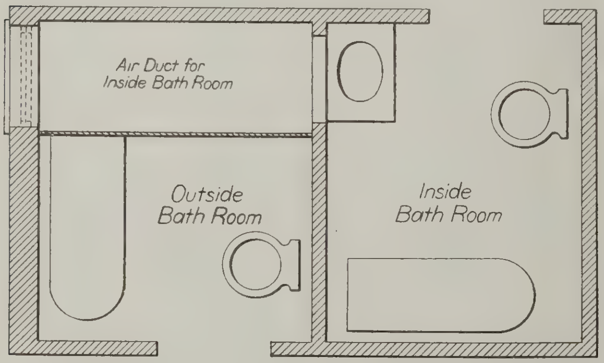


Fig. 1—Plan of Bath Rooms, Showing Ventilating Duct

Ventilation of an Inside Bath Room

other means of ventilation, but in the case of rooms in some of the older buildings there is no provision for such necessary means of introducing fresh air and removing that exhausted. In the construction of the Hotel Hermitage at Nashville, Tenn., simple and effective methods for securing this have been provided.

The bath rooms are arranged in duplex plan, as shown in Fig. 1, and over the window of the outside bath room is an opening to an air duct constructed of concrete 3 ft. x 2 ft. 6 in. This passes through the ceiling of the outer room and a ventilator is installed in the wall of the inside bath room, as indicated in Fig. 2. These ducts are of sufficient size to insure a proper circulation of air in the room without any mechanical equipment and the outside appearance of the ventilator is such that no deterioration in the architectural effect is made. The discomfort attending the use of a bath room of this type without ventilating appliances, especially where all the windows in

Fig. 2—View of Ventilator for Inside Bath Room

a building are equipped with metal weatherstrip, is obvious and a simple provision like this is to be much commended.

Modern Buildings on Site of an Old New York Landmark

The site of the old Atlantic Garden on the Bowery, New York City, is about being improved by two buildings of a character which will be distinctly different from any structures hitherto erected on the lower east side. One is to be a 12-story loft building on the Bowery side of the site and the other a six-story model apartment house on the Elizabeth Street side in the rear. The apartment house will be a distinct innovation in lower east side tenements. The entire building will be steam heated, equipped with electric lights and will have suites for 90 families. Each apartment will open directly upon an iron and marble staircase, thus avoiding the old type of dark interior corridors and staircases.

The loft building, which has been designed in the Italian Renaissance style of architecture, will be of fireproof construction with doors, windows and trim of metal.

The apartment house, which has been designed in the Venetian Renaissance style, will have stores on the ground floor and shops in the basement, which will be reached by street entrances to comply with the new building regulations.

It may not be without interest to state that this is the site of the old Bull's Head Tavern of Colonial days and the theater was the successor of the old Bowery Theater erected in 1826.

The winner of the prize Bungalow which was erected in the Coliseum at Chicago in connection with the Clay Products Exposition mentioned in our last issue was Mrs. H. C. Leemon of Chicago, who we understand intends to have it erected on a lot near the South Shore Country Club fronting on Lake Michigan.

Concrete Construction in Cold Weather

Method of Heating the Sand -- Salamanders for Inside Heating -- Salt Used in the Concrete

A MOST interesting example of what may be accomplished in the way of concrete construction in very cold weather is found in a four-story reinforced concrete machine shop erected this past winter in Lowell, Mass. In spite of the severely cold weather the work progressed rapidly and there is every reason to believe that it will be as satisfactory as if executed in summer, inasmuch as the concern executing the contract has for the last 18 years carried through each winter several concrete jobs with good results. The building in question is 150 x 50 ft. in plan and has brick curtain walls. The general policy of the contractors is to heat both the sand and the stone when it is to be used in concrete work in freezing weather. However, on the job above referred to only the sand was heated as the owners who provided the heat had not sufficient steam capacity to also heat the stone. However, particular care was taken that the stone be protected as far as possible from the cold.

The stone was received in cars and while the car was on the siding precautions were taken to keep snow out of it by a canvas covering. The sand was delivered in wagons and dumped directly on to steam pipes laid on the ground and furnished with a continuous supply of steam during the daytime only at about 12-lb. pressure.

Showing Use of Canvas in Cold Weather

To supplement this the contractors used flexible rubber steam hose and iron pipes which were thrust into the sand heaps in specific places when there was reason to doubt the temperature of the sand. The steam supplied the contractors was first used in the engines, then for heating the building and lastly came to them at a very low pressure. This made it quite difficult to obtain sufficient sand in proper usable condition at proper times.

The water was heated by having a steam pipe reaching to the bottom of the water barrel. The man in charge of the mixer turned the steam into the water until it was so hot as to be uncomfortable to the hand.

Salt was used generally in the proportion of about 2 per cent. by weight of the amount of the cement used, the percentage being varied slightly as the temperature changed. The method of applying the salt has been to make a saturated solution in a separate barrel of water, keeping this barrel warm and also agitating by the insertion of a steam pipe near the bottom of the barrel. A pail or pail and one-half of brine, as the case may require to carry the proper weight of salt, was added to each batch as put into the mixer, insured perfect mixing. The Aberthaw Construction Co., Boston, Mass., who did the work, believe this is the only safe way of adding salt, as the salt, when other methods are used, is apt to be seen through the mass in crystals rather than in solution, where it can do its work properly.

Salamanders were used after placing each floor. When the forms for the columns and floors were in position the entire building was surrounded with canvas reaching up and over the wall beams, and hanging down below the floor below, as shown in the accompanying picture. It was drawn in somewhat at the bottom. As many as 40 salamanders were used in the area of the building, which approximated 6000 sq. ft. of floor surface. Some of the weather when this cement was curing was down as low as 10 below zero. Usually it was found quite possible to keep the average temperature inside the canvas at 30, or, when running the salamanders very hard, at 40, deg. above the temperature of the atmosphere outside. Special precautions were taken to prevent the base of the columns from getting chilled by preventing the draft from coming through at this point, and keeping the salamanders as close as possible to the columns.

In order to prevent possible ignition of the forms from the red-hot salamanders in which coke was burning, chemical fire extinguishers were placed at accessible points of the building and a night watchman was always left in charge of the salamanders while the cement was curing.

The length of carriage from the mixer to the point where it was placed on the job in question would average less than 100 ft. The method of distribution in cars, which take an entire four-bag batch at one time, is very much more conservative in retaining the heat in the mass than when the concrete is distributed in barrows. The contractors have never attempted to use a spouting system during the cold months, as it seems to them to be out of the question by reason of the thin stream of concrete becoming frozen upon the sides of the chute.

The building was erected in accordance with drawings prepared by Architects Lockwood, Greene & Co., Boston, Mass.

Twelfth Century Windows in Chartres Cathedral

There are in Chartres Cathedral 175 stained glass windows which are regarded as being among the most wonderful in the world, most of them dating from the twelfth century. Scarcely one of them dates from later than the thirteenth century and the entire collection is considered the most complete gallery of the rich mosaic glass of that period. The Cathedral offers to the student of glass, says *Handicraft,* a perfect model, not indeed of detail, for upon the path which leads to the perfection of detail the thirteenth century glazier has still many steps to take, but of effects in decorative coloring. In 124 of the windows are 3 great roses, 35 lesser roses and 12 small ones and in these are painted 3889 figures including 32 contemporary historical personages, a crowd of saints and prophets in thirty-eight separate legends and groups of tradesmen in the costumes of their guilds.

Economical Building Construction

Some Hints for the Architect and Builder as Well as For the Man Doing the Work

By Edward H. Crussell

THERE are many items that enter into the construction of a building, and when, as is often the case, it becomes necessary to cut down the cost it is a matter of considerable study and calculation to discover which item can be most easily dispensed with or which if any of them are increasing the cost out of due proportion. It requires a very thorough knowledge of the practical side of the carpenter's business to be able to pick out these latter items, but it is the intention of the writer in the present article to describe one or two instances taken from his own experience that may possibly prove of interest.

It is a long way from one side of this country of ours to the other and not a few of these items of cost have to do with the varied building practice in different localities. When the writer was working in the east 16 ft. was the longest ceiling, flooring or siding obtainable—13 ft. being perhaps the length most generally used. In the west this material can be had in lengths up to 30 ft. Every one appreciates the fact that this longer material means less joints for the workman to fit, but there are other points in connection with it not so generally realized. Where the ceiling, flooring or siding must be cut so as to bring the joint on a stud or joist, every joint means a certain amount of waste, and every board, long or short, has two waste ends. It does not take much figuring to prove that 6 in. of split ends on a 10 ft. board is a larger percentage of waste than 6 in. on a 30 ft. board.

Another item in which locality has an effect upon cost is the fixing of corner boards and outside casings. In some parts of the country the siding is first put on and the corner boards and casings are nailed over it. In other parts it will be difficult to convince carpenters that this way of doing the work is ever practiced, as all of their siding is cut in between the corner boards.

A man gets into the habit of thinking that the way of doing the work to which he is accustomed is the only proper one, but as we journey along through life or move from place to place we see or hear of plenty of things to make us change our opinions.

The writer well remembers with what contempt he first viewed the practice of nailing the corner boards over the siding, yet he now thinks it is the only proper way, not only because it is cheaper but because it makes a stronger and more weather-proof job. Cutting the siding in between the corner boards has nothing to commend it, not even the item of appearance once you can look at the job from an unprejudiced viewpoint, and the difference in cost between the two methods is something hard to realize until you have tried both of them.

Where the siding is put on first the workman does not have to bother with either measuring, cutting or fitting. He takes the nearest length of siding that will cover the space and puts it on one piece after the other as high as he can reach, letting the ends project past the corner of the building or across the window openings; then he takes his saw and cuts them all at once. If the ends that come off are long enough to cover some other space he carries them over, nails them on and then trims the ends again. Compare this with the careful measuring, cutting and perhaps fitting with a block plane required for the other method, and remember there is no danger of the corner boards shrinking away from the ends of the siding and opening the joint. Even in the matter of setting the nails one saves a little because the end rows of nails being covered by the corner boards do not require setting.

Sometimes, of course, the siding is mitered and no corner boards are used. This practice is about the same in all localities and the writer has often thought that many estimators do not allow sufficiently for the extra labor required by this class of work. A cockney friend of the writer says:

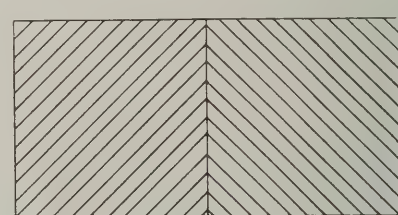


Fig. 3—Proper Method of Diagonal Boarding

Fig. 1—Section of three-lap "Rustic"

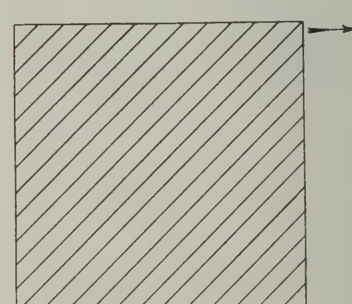


Fig. 4—Incorrect Method of Diagonal Boarding

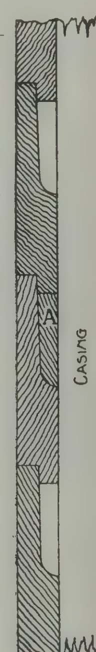


Fig. 2—Section of "Rustic" Showing "Plugging"

Economical Building Construction

"If some of these 'ere blooming architects 'ad to do this mitering themselves there wouldn't be 'arf so much of it used."

What is known in some localities as drop siding or shiplap is known on the Pacific Coast as "Rustic." It can be had from 4 to 10 in. wide—the wider widths being usually molded so as to give the appearance of three rows of siding, as indicated in the sectional view, Fig. 1. This wider material is called three-lap rustic or sometimes three-channel rustic. It is usually of redwood, "clear as a bell," and one man can put on considerable of it in the course of a busy day.

An item that is rather surprising when we come to examine it occurred on a job where narrow rustic of the design shown in Fig. 2 was being used. Following a whim of the designer we had to fit small plugs of wood behind the corner boards and casings in the molded portions of the rustic as shown at "A" in Fig. 2. This "plugging" was gotten out in long lengths at the mill and we were just supposed to cut it the proper length, slip it behind the casing and fasten it in place with a brad. Now, out of several guesses, how much will this little scheme increase the cost of labor for putting on the rustic? If you had a plan of the building showing the numerous doors and windows you would perhaps be able to make a better guess, but I am confident you would not be able to guess high enough. I dislike to have to say it, but it took nearly twice as long to fit the plugging as it did to put on the rustic, so that this little scheme increased the cost of the labor for the rustic nearly 100 per cent. This would not have been quite so bad if there had been an improvement in the appearance, but if you will take the word of the fellow on the job, despite all our care in fitting the plugs it would have been an improvement to have omitted them.

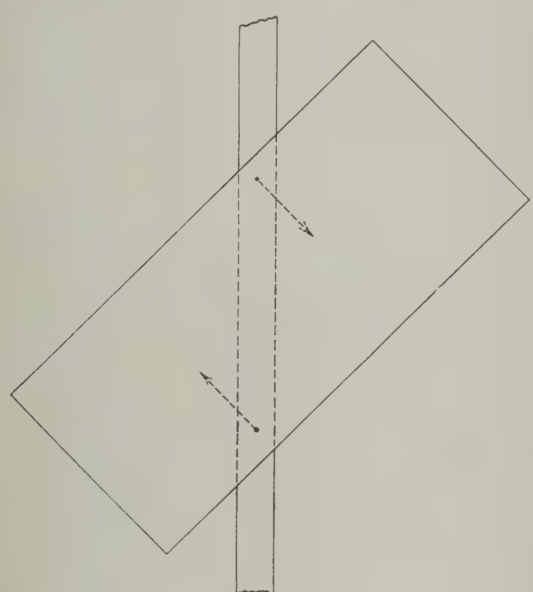


Fig. 5—Showing the Effect of Shrinking of Diagonally Nailed Boarding

Another thing that usually follows the designer is board-and-batten construction. Some time ago we built two houses near each other; the first we covered with rustic—for "rustic" read "drop siding" or "shiplap," according to the choice of the reader—the second with boards and battens. I was certainly surprised to find that the board-and-batten construction had been introduced into the second house in order to lower the cost. Any one who has done any of this sort of work knows that to make it look like anything at all it is necessary to have the spacing of the battens pretty nearly equal. For instance, it will never do to space the battens along the side of the building on 12 in. centers and then at the corner have two of them only 3 in. apart. You must rip an inch or so off the last two or three boards so as to give the battens a more symmetrical appearance and the same thing must often be done at the doors and windows. Under these conditions it takes longer to put up the boarding than it does to put on "rustic" and then it takes longer to put on the battens than it does to put up the boarding. The battens have to be fixed straight and plumb, equally spaced and cut to fit in between the frieze at the top and the beveled base at the bottom.

Diagonal boarding has been the cause of many heated arguments and there is always room for discussion on this subject. Although you will not find two people of the same mind as to its merits, everybody is agreed that it is costly both as regards labor and material. There are people who claim great merit for the diagonal boarding as a method of bracing the building. Everybody is entitled to his own opinion and there is no use beating around the bush, so I stand right up in meeting and declare that diagonal boarding for bracing purposes has no merit whatever over horizontal boarding—that is, when the diagonal boarding is properly applied as shown in Fig. 3. When put on, as in Fig. 4, nine times out of ten—yes, ten times out of ten—it will throw the building out of plumb in the direction of the arrow. This is something the writer has never seen explained before and is not theory but was brought to his notice by actual experience. It is the shrinking of the boarding that causes the trouble and whether little or much it is always there.

On the occasion mentioned the building was one story high with a half pitch roof. The boarding was 1 x 12-in. mountain pine, very green, and two days of hot sun shrunk the boards until in some cases there was more than ½ in. space between them, and threw the gable end of the building ⅝ of an inch out of plumb in 12 ft. If the reader will examine Fig. 5 it will perhaps help to explain how the shrinking of the lumber causes this trouble. In the illustration a short piece of board is shown nailed diagonally to one stud; turn the paper until the piece of board stands vertically and then imagine the board shrinking. Notice that the nails will not pull along the stud toward each other—as they would if the board were nailed at right angles—but will move in the direction of the dotted lines, causing a turning motion of the stud. This turning effect would not be serious if there were any other bracing in the walls, but the diagonal boarding is being put on for bracing purposes and as there is nothing to counteract the effect of it, over to starboard the building goes.

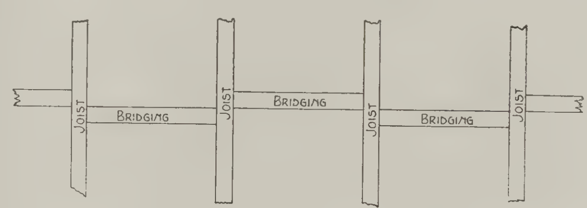


Fig. 6—Plan of Solid Bridging

Economical Building Construction

When the boarding is put on, as shown in Fig. 3, one side counteracts the other, yet I do not think this system as good as horizontal boarding, because of the unbroken joint in the center. If we saw a man put on horizontal boarding and making all his joints on one stud, we'd yell our heads off at him, and yet within 100 yards of the writer's home an expensive residence is being constructed with diagonal boarding put on in just that way.

There is one serious drawback to horizontal boarding, and that is, it cannot be covered with clapboards or siding and produce a good job. It is all right when the walls are to be covered with shingles but for siding the shrinking of the wide inner boards will either split the outer ones or put some big joints in them. For work of this kind the writer, if left to himself, cuts in two or three rows of horizontal girts or "nailers" between the studs and puts the boarding on vertically. Taking into consideration the waste of material and extra time required for the diagonal boarding the vertical boarding is the cheaper of the two—even with the cost of the girts—and when you have the siding properly nailed at right angles with it—well! if you ever saw anything that will twist it out of shape you'll hardly be in a position to tell about it.

This diagonal boarding talk for some reason raises thoughts of herringbone bridging for floor joists. The writer has not put in any herringbone bridging for years and does not expect to unless he should drop down the scale to where he must work under some other fellow's directions again. Even then he'll try to make the other fellow see the matter from his standpoint. Herringbone bridging is a job on which the average carpenter can use up a lot of time. Many contractors in these parts get their bridging cut to the proper length and bevel at the mill so as to save a little on this item. Any "dub" can cut and nail the solid bridging and the herringbone style must be well fitted and well nailed, indeed, to be equal to it. For material there are usually one or two pieces of lumber too crooked to use for joists that may be cut up to advantage for this purpose or perhaps there may be some short ends. Even when so much of it is required that a special order is necessary, there is not much difference in the cost of one piece of 2 x 8 and two pieces of 2 x 3.

Most people when fixing solid bridging put it in place in a straight row and most architects show it on their drawings in the same manner. The writer sets every alternate piece on opposite sides of a straight line as indicated in Fig. 6 of the sketches and instead of toenailing it drives his nails through the joints—the staggering of the pieces making this easily possible.

And now in conclusion the writer would say that though this article may be radical there is nothing dogmatical in it and if he has said anything to be sorry for he is willing to be forgiven. The article expresses the views of a practical workman on the subjects mentioned. If you think you know of something that will cause him to change these views, please do not leave him in ignorance.

Convention of Master House Painters and Decorators of the United States and Canada

In the importance and variety of the matters discussed and in the attendance, which was largely in excess of any former meeting, the twenty-eighth annual convention of the International Association of Master House Painters and Decorators of the United States and Canada, held in Rochester, February 13 to 16 inclusive, was without doubt the most notable in its history. Some idea of the widespread interest in the gathering may be seen from the fact that more than 1100 people were in attendance.

The address of President William G. Baxter was of unusual interest, and what he had to say was followed with close attention. Among other things he touched upon the relations existing between employer and employed; the growth and work of the organization; the workmen's compensation and liability laws, and the Association's co-operation with other organizations, all making for the uplift of manufactured goods as to purity and standard weights.

Much routine business followed the address of the President, convention committees being appointed, and reports of Secretary Kennedy and Chief Organizer Alexander Peters being presented.

At the second day's session W. L. Albrecht, of Toledo, read an interesting paper on "Employers Liability Compensation Laws," which brought out some valuable discussion.

The forenoon session of the following day was largely devoted to the report of the committee to revise the constitution, and each section was acted upon as presented. The afternoon session was given up to routine matters and to Association Queries and their solution, these being continued on the following day. Among the topics discussed was that of "Sanitary Conditions Pertaining to Wall Coatings," which brought out much timely discussion.

H. A. Gardner, assistant director of the Institute of Industrial Research, Washington, D. C., read a paper entitled "A Hygienic Consideration of Wall Coatings," in which he touched upon wall papers, water paints, flat finishes, enamels, painting cement, etc. Other members participated in the discussions, which occupied the rest of that session and continued into the afternoon, when James G. Merrick, secretary of the Employer's Association, of Toronto, Canada, read a paper entitled 'The Relation Between Employer and Employee and the Relation That Should Be Sustained by Each."

Following the reading of the paper a resolution was unanimously adopted as the sense of the convention, "that the Federal Government should exercise the same supervision and control over the labor unions as is now exercised over corporations engaged in interstate commerce."

"Modern Flat Wall Finishes—Their Merits and Demerits" were discussed at considerable length, as were also trade conditions past and present. On the last day of the meeting the chairman of the committee on trade schools made some interesting remarks on the subject, and he was followed by the report of the Legislative Committee and the report of the Apprenticeship Committee.

The election of officers for the ensuing year resulted in the following choice:

President—James W. Morley, of Winnipeg.
Vice-President—John M. Stiles, of Chicago.
Secretary-Treasurer—Joel Kennedy.
Chief Organizer—Alexander Peters, of Boston.

It was decided to hold the next convention of the Association in the city of Denver, Colo.

New Million Dollar Armory Building

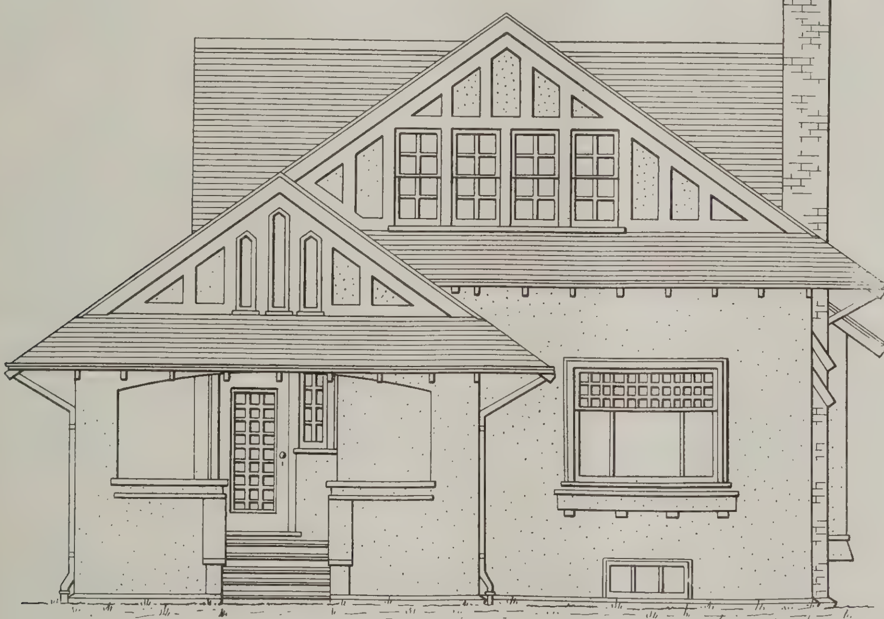
Plans have recently been filed for a new armory for the Eighth Regiment, N. G. S. N. Y., which will be erected on a portion of the site of the Jerome Park Reservoir, which was acquired several years ago by New York City to handle the Croton water supply and was subsequently abandoned in favor of the Ashokan Dam project. The building will front 600 ft. on Kingsbridge road and 375 ft. along Jerome avenue, giving a ground area of 225,000 sq. ft. or about three times the area of Madison Square Garden block. According to Architects Pilcher & Tachau, 109 Lexington avenue, the cost will approximate $1,000,000. The drill floor will have an area of about 180,000 sq. ft., being three city blocks in length and 1½ blocks in width. When completed the structure will be one of the largest military buildings in the country, if not in the world.

The officers of the recently organized American Face Brick Association are President J. M. Adams, who is secretary and general manager of the Ironclay Brick Company, Columbus, Ohio; Vice-president E. C. Clark, who is general manager of the Kittanning Brick & Fire Clay Company, Pittsburgh, Pa., and Secretary W. H. Hoagland, who is secretary and general manager of the Claycraft Brick Company, Columbus, Ohio.

A Five-Room Bungalow

Showing How the Rooms Can Be Compactly Arranged to Save Steps of the Housewife

THAT small houses tend to solve the servant problem and make life worth living cannot be successfully disputed, and the present trend of home-owners building bungalows of from five to seven rooms leads this publication to take notice of successful houses of that class. The five-room bungalow illustrated upon this and the pages that follow claims interest in the line of economy of space, every foot of which is in daily use by a family of three persons. A 40-ft. lot is ample to contain the building. A comfortable walled porch with a 3-ft. wide overhang on all sides is noticeable in approaching, and this leads to a small vestibule 4 ft. 6 in. x 6 ft. the door of which is set with 18 lights of 9-in. x 12-in. glass, giving abundance of light to the entrance.



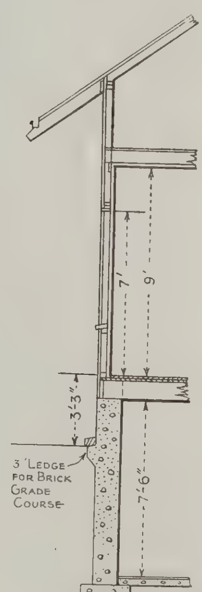
Front Elevation—Scale 1/8-In. to the Foot

A Five-Room Bungalow—Rollin S. Tuttle, Architect, Minneapolis, Minn.

The living-room on the right is 13 ft. 6 in. x 19 ft. in area, the trim being of clear birch, stained a dark mahogany color. At the far end as one enters is a fireplace with breast and hearth laid in 8-in. x 8-in. deep blue tile—the color of blueprint paper—with 1/4-in. buff-colored joint, emphasizing the size of each block and bringing out in good effect the color of the tile. A shelf 12 in. wide encircles the chimney breast and continues over the bookcases at a height of 4 ft. 6 in. from the floor.

Each side of the fireplace, built-in bookcases extend to the sides of the room, having doors of art glass of the same design as the casement windows above. In the front wall of this room is a large landscape window, divided into three sections, with casement sash, both upper and lower opening in for convenience of cleaning and ventilation. A ledge on the outer wall under this window supports window boxes in the summer. At the opposite end from the fireplace a group of three high casement windows 5 ft. from the floor are placed to permit of an upright piano underneath, thus giving with the other windows in the room free circulation of air from three sides, insuring comfort in any part of this country. A beamed ceiling presenting a panel effect is noticeable, and from the four intersections of beams lantern electric lights are hung. Small bracket lights in lantern effect are also placed on the chimney face and on the walls. This room is floored with quartered white oak blocks in basket pattern with three mahogany lines placed 8 in. from the baseboard, the central line having a corner laid at the turns. The vestibule is similarly floored but of smaller pattern to suit that area. The ceilings are 9 ft. high.

Immediately back of the vestibule and living-room is the dining-room, 13 ft. 6 in. x 12 ft. 6 in., with bedroom, 12 ft. 6 in. x 11 ft. 6 in., extending through the width of the house. This affords further ventilation through a high casement two-part window placed in the wall



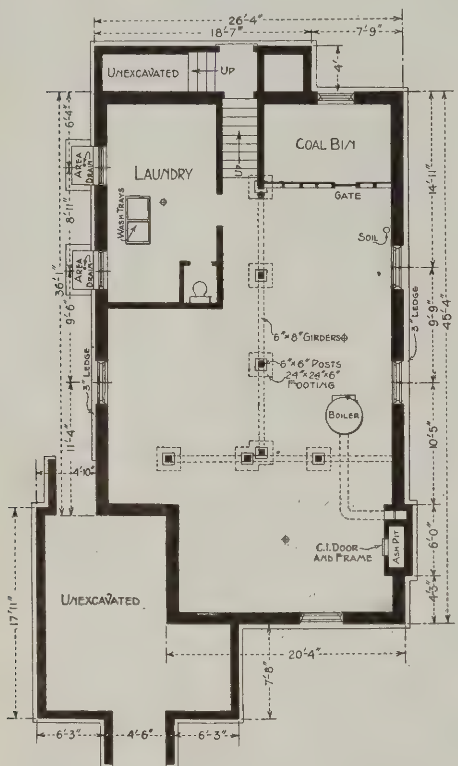
Section—Scale 1/8-In. to the Foot

between the two rooms, allowing sideboard under in dining-room and to permit the head of a bed under in the other room if desired. The dining-room and the two bedrooms are floored with long lengths of 5/16-in. by 2-in. face quartered white oak laid across the under floor, having border lines to match the trim in each room. The dining-room has built-in sideboard with skeleton wainscoting, beamed ceiling and casement windows, all in plain sawed red oak stained a dark brown, weathered effect, the line borders in the lighter floor being of dark oak to match the stained woodwork.

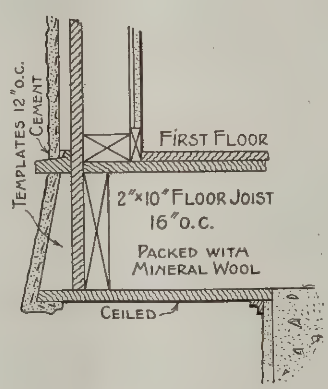
From the dining-room to the rear is a passage leading to the attic stairs at the head of which is a large double window in the rear gable lighting the stairs and this passage through a glass door at the lower step. This passage also serves the kitchen and back bedroom.

The kitchen is 12 ft. 6 in. x 10 ft. in plan with ample shelves and cupboards built-in. A connecting secret slide partition above the shelf of the sideboard in the dining-room offers convenience of handling between these two rooms whenever desired.

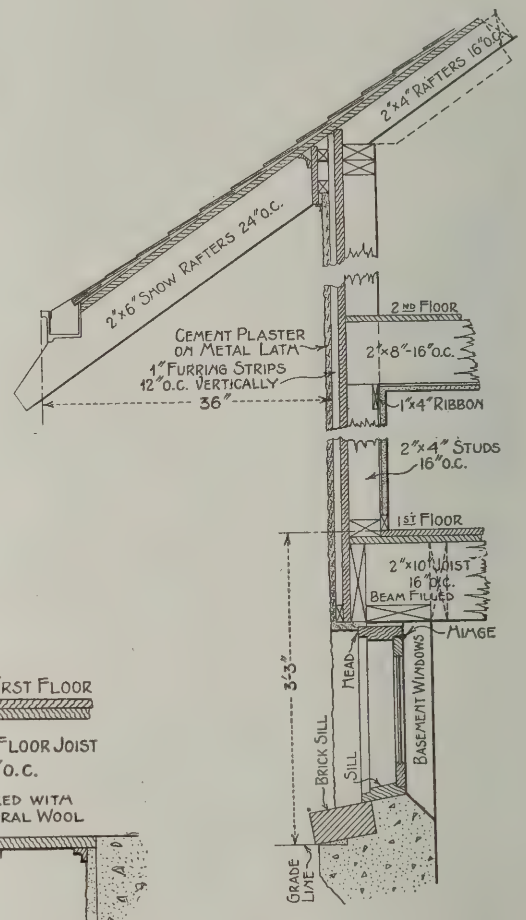
An outside entry leads up to the icebox and rear door of kitchen, also down to the cellar without entering the house proper. The two bedrooms have ample closets and unite in use of a generous, fully equipped door at the foot of the stairs; also a coal bin 9 ft. x 12 ft. in front of the furnace. A generous ash pit is built into the chimney base. The laundry tubs were furnished by the Central Supply Co., Indianapolis, Ind.



Foundation—Scale 1/16 In. to the Foot



Bath Room Overhang—Scale ¾ In. to the Foot



Details of Main Cornice and First Floor Construction—Scale ½ In. to the Foot

Side (Right) Elevation—Scale 3/32 In. to the Foot

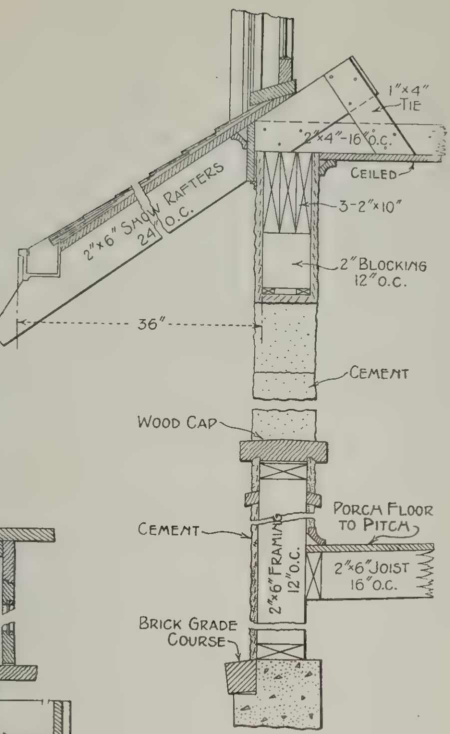
A Five-Room Bungalow—Elevation and Miscellaneous Constructive Details

bathroom—a plan found practical in the living arrangements of such a house.

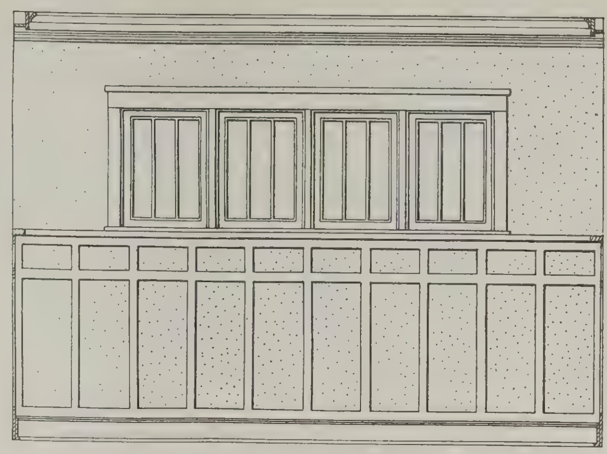
The cellar is fully excavated with the exception of under the porch, where cinder is filled in on the ground and cement floored. Two drainage pipes 2 in. in diameter are carried to the outside of the porch walls from brass strainers set into the cement floor. The cellar has a laundry 10 ft. 8 in. x 18 ft. 2 in. in plan, brick partitioned from the cellar with entrance

The attic has 700 sq. ft. of floor space with headroom of 6 ft., both end and side gables lighting it perfectly. This space, with or without partitions, affords convenient and easily accessible room for a great many uses.

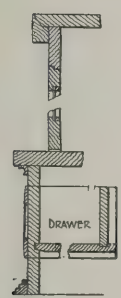
The exterior has a pleasing effect with its yellow colored cement walls which are of two-coat work laid on No. 24 gauge American ingot spiral lath nailed to 1-in. x 2-in. furring strips applied to sheathing verti-



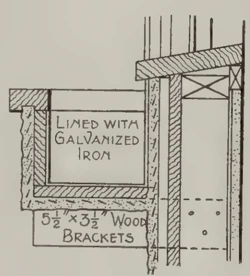
Details of Front Porch—Scale ½ In. to the Foot



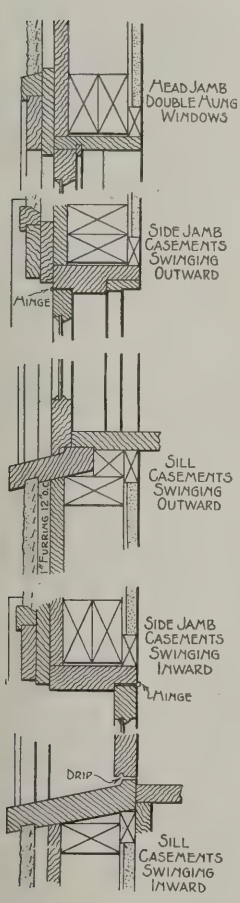
Side of Dining Room Looking Toward the Bedroom—Scale ½ In. to the Foot



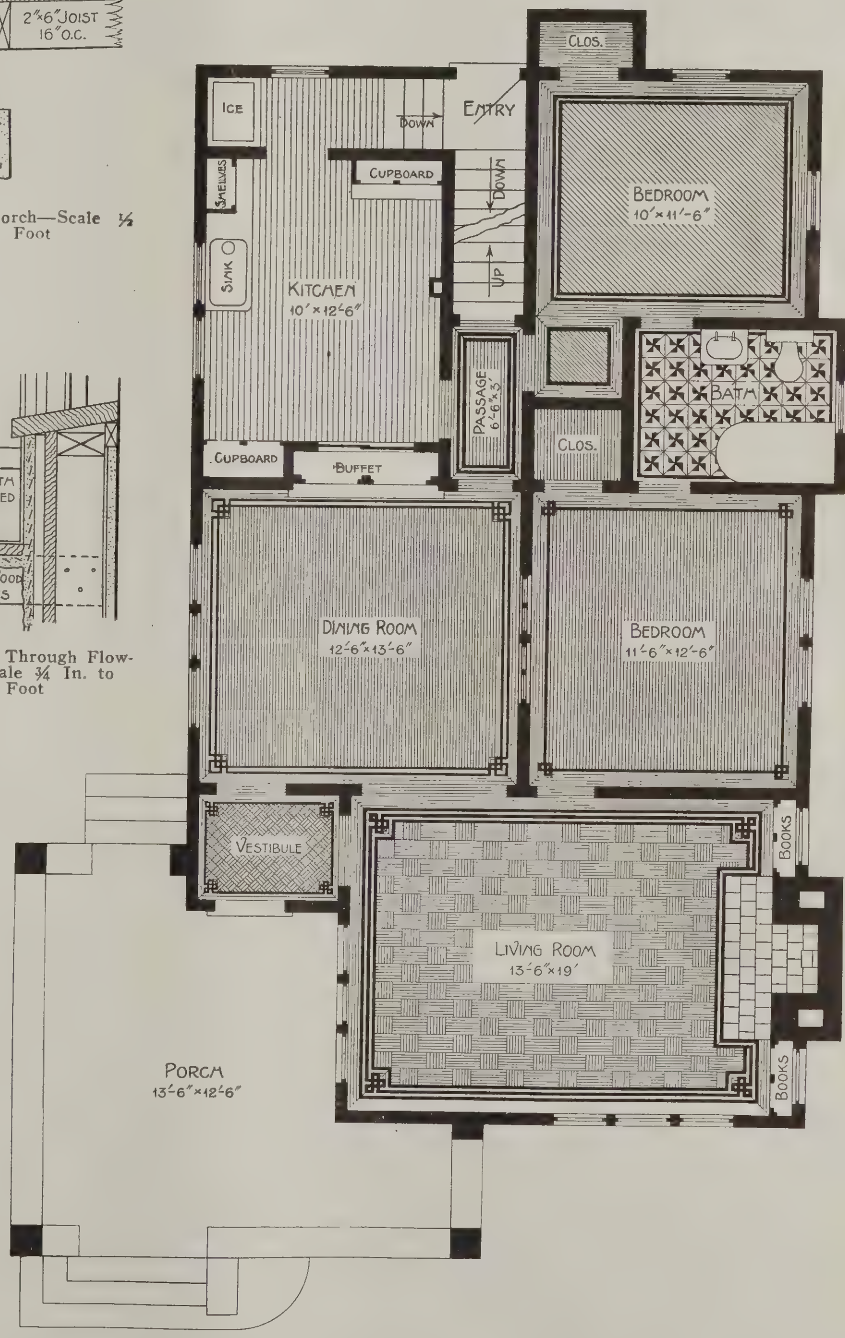
Section Through Bookcase — Scale ¾ In. to the Foot



Cross Section Through Flower Box—Scale ¾ In. to the Foot



Various Window Details—Scale ½ In. to the Foot



Main Floor Plan Showing Style of Floors in the Various Rooms—Scale ⅛ In. to the Foot

Miscellaneous Constructive Details of a Five-Room Bungalow cally 12 in. o. c. These walls extend from foundation to the attic floor line, where a heavy overhang 3 ft. wide extends around the entire house, giving it a sheltered appearance and offering limited protection to the windows and walls.

The gables are all close cropped, each framed with a facing 6 in. wide painted white. The half timber effect in gables is with cypress given a dark brown stain enclosing the yellow panels of cement. All window sash and panels are white.

The outside chimney is of "Tapestry" brick which blends with the red stained shingles and gives the color scheme which with a setting of tree foliage and massing of shrubs complete the picture of this attractive little home.

This house is to be erected for Raymond F. Stilz of Indianapolis, Ind., according to plans and specifications prepared by Architect Rollin S. Tuttle, 630 Andrus Building, Minneapolis, Minn.

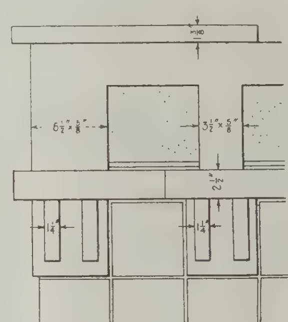
Hot air is the system of heating the bungalow, the furnace being made by L. C. Thiele Co., Indianapolis, Ind.

The floor work is a separate contract and done by the Interior Hardwood Co., Indianapolis, Ind., who are specialists in this particular line.

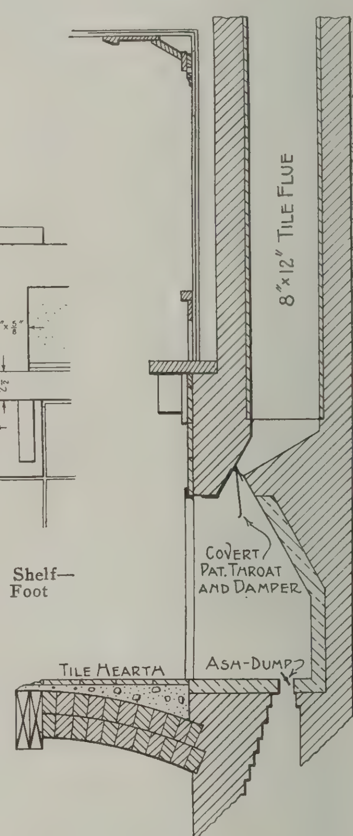
The general contractor for the erection of the building is Dennis Phelan, also of Indianapolis, Ind.

The new state plastering law which went into effect on the first of January is not proving very popular among New York builders, and some of them are considering the plan of testing its constitutionality.

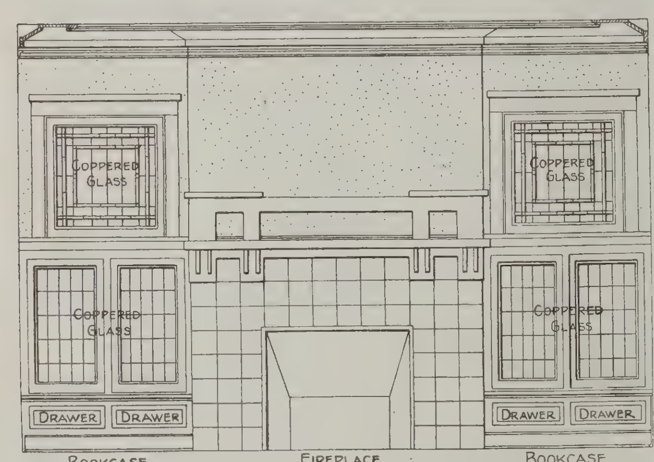
Elevation of Buffet Side of Dining Room



Detail of the Mantel Shelf—Scale ¾ In. to the Foot



Vertical Cross Section of Fireplace and Chimney



Elevation of Bookcases and Open Fireplace in the Living Room

Miscellaneous Constructive Details of a Five-Room Bungalow

Eccentric Loads on Columns

In order that there may be uniformity of practice in the Borough of Manhattan, Superintendent Rudolph P. Miller of the Bureau of Building has issued a bulletin to the effect that stresses in columns shall be computed as follows: The maximum unit stress shall be taken as the sum of the unit stress due to the concentric load and the algebraic sum of the stresses due to eccentric loads. The unit stress due to any eccentric load shall be determined by dividing the product of that load times its distance from the neutral axis by the section modulus. In steel columns, the total unit stress shall not exceed by more than 25 per cent. the stress allowed by Section 138 of the Building Code, but in no case shall it exceed 16,000 lb. per square inch. In cast-iron columns, the total unit stress shall in no case exceed the stress fixed by Section 138 of the Building Code.

Spanish Mission Houses

Stucco, the field of which is constantly broadening in this country, has in no case been more happily applied than in the adaptations of the beautiful type of Spanish mission homes, of which splendid examples are still to be seen in Southern California, chiefly at Santa Barbara, Carmel, San Miguel and San Luis Rey. For these fine structures, still excellent and appealing examples of architecture, we are indebted to Spanish missionaries who journeyed northward to California from Mexico. The first of these were of rude construction, but with passing years and accumulated wealth, their character improved and their tiled roofs, beautifully arched cloisters, fine towers and exquisite façades are now serving as models for every really artistic community in the country.

Construction of Fireproofed Houses

Great Increase in Houses of This Kind -- Economy of Construction Largely Responsible -- Some Processes That Will Eliminate the Fire Risk

POPULAR interest in the construction of fireproofed dwellings has been aroused within the past few years for the first time in the history of the country, and the conscientious architect and the good structural engineer have secured freer play for their ideas along these lines than they have ever had before.

A change in economic conditions has, of course, been instrumental in bringing about this increasing interest in fireproof construction, says a writer in the *Architectural Record*. Americans have become habituated to inferior methods of construction and inferior materials, because such methods of construction and materials were for the time being profitable. Lumber was cheap and was easily obtained. The difference in cost between a frame building and one of substantial masonry was so considerable that very few people could afford the better class of construction.

Preference for Wooden Houses

Even those who could afford it were not without good reasons for preferring a wooden house. The time had not come for investing large sums of money in permanent buildings. The country was new. Its social and economic conditions were fluid. The ordinary business man did not want to tie up his capital in structures whose permanence seemed to promise more advantage to his descendants than to himself. It was really cheaper to erect cheap temporary buildings, which could be replaced whenever such replacement became economically desirable. Americans were forced by the pressure of constantly changing conditions to make their arrangements very much for the present and very little for the future. They never knew what a few years might bring by way of a change in economic and social conditions, and they had no assurance that their children would care to carry on their business or to live in their houses.

Of course, a wooden house still remains the type of building whose initial expense is least burdensome; but in certain cases a man could figure that a fireproofed building might be actually cheaper in the end. He could figure that in the course of a decade he would save enough in the cost of insurance, in the cost of repairs and in the absence of deterioration more than to compensate him for the larger initial expense. The consequence was that of late years a number of small fireproofed dwellings have been erected, costing from $5,000 to $15,000; and this number is increasing.

Reduced Cost of Materials

The diminished expense of certain excellent and comparatively novel fireproofing materials and methods of fireproof construction has been due to an interesting and significant cause. The enormous demand during periods of business prosperity and expansion has resulted in the building of vast plants for the manufacture of the different kinds of fireproofing materials—in particular such materials as hollow tile and cement. These plants are employed to the limit of their productivity as long as business is active; but during a period of inactivity their owners are in very much the same situation as the owners of a steel rail plant. They find it very hard, under such circumstances, to keep their machinery working; and they have naturally been seeking some source of consumption which might prove to be more permanent. The only possible source of a more continuous demand is that which might be developed among the builders of residences. Of course, the number of dwellings erected in a prosperous period is larger than the number erected during a period of business depression; but the population of the country increases steadily and the variations in the demand for the materials entering into residence construction are slighter than those entering into the construction of large business buildings. The tile and cement manufacturers have, consequently, been willing to make sacrifices and to spend money in order increase the use of fireproofing materials in domestic building; and their efforts have been attended with a certain measure of success. All over the country hollow tile and cement houses are being erected in larger numbers than ever before, and the movement has only begun. There can be no doubt that the small, as well as the large, fireproofed dwelling is destined to become a common type of building.

Materials for Fireproof Construction

The materials which enter fireproof construction are already fairly familiar to the layman. Hollow tile he has seen used so much in recent years as a floor material in fireproof city buildings and as a fire protection for the structural steel beams and columns, while concrete is equally well known in the same way. He may even have noticed entire buildings cast in concrete over a network of slender horizontal and vertical steel rods. In the suburban and country houses of hollow tile these materials are used in a similar manner, but much more simply. Rows of hollow tile, with alternating beams of concrete, containing at the bottom one or sometimes two very slender steel rods (generally only one ¾-inch, ½-inch or ⅝-inch rod in each beam is necessary), form the floors, while the hollow tile, laid in Portland cement, constitute the walls; thinner hollow tile blocks, similarly laid, serve as the interior dividing walls.

Under ordinary conditions the floors and walls are built of the same size tiles, which are divided interiorily by intermediate integuments called webs, from ⅝ in. to 1 in. in thickness. These tiles are burned under a temperature of about 2500 deg. Fahr.; those most commonly used in walls are about 8 in. deep, 12 in. wide and 12 in. high, and, on experimental tests, have been found to possess a crushing strength along their height of over 3200 lb. to the square inch of material in the cross-section, which allows for a very generous factor of safety in the walls and floors where they are used. Walls and floors so built are accordingly 8 in. thick, in addition to the thickness in the case of walls of ½ in. of plaster for the inside and an inch or more of cement for outside protection from the weather.

The floors are then plastered on the underside with about ½ in. of plaster, as is the inside of the walls, and the upper side of the floor may be treated as preferred. Colored tile, laid in cement, may be used, a white or colored cement-finished floor alone may be adopted, or a wood floor may be laid on wood strips embedded in several inches of cinder concrete placed on the structural floor already described. The last method makes a good sound-proof construction.

The Building Age

Formerly Carpentry and Building

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Index to Reading Matter, Page 292.

MAY, 1912

Three Months' Local Building Operations

With the passing of the first quarter of the year figures are available which serve much better as a criterion of the general building situation throughout the country and the prospects for the immediate future than is the case where much briefer periods are contrasted one with another. It is gratifying to note that the plans filed in the three principal boroughs of New York City, involve a much greater amount of vested capital than did the building operations projected during the first quarter of last year. Naturally the greatest increase is found in the Borough of Manhattan, where in January, February and March of the current year permits were issued for 793 new buildings estimated to cost $28,330,200, while in the same period of 1911 there were 191 permits issued for new construction work involving an estimated expenditure of $23,286,155. With the cost of the alterations for which permits were issued in the two periods, the totals for this borough were respectively $31,067,495 and $25,740,807. In Brooklyn for the first quarter of this year 1016 permits were issued for new buildings costing $7,858,860 as against 816 buildings costing $5,069,540 in the first quarter of last year. Adding the amounts for alterations and repairs, brings the totals for the two periods to $8,581,180 and $5,802,025 respectively. In the Borough of the Bronx new buildings and alterations were projected in the first quarter of 1912 to a value of $8,830,839 as against $3,579,355 in the first three months of last year. In the Borough of Queens since the first of the present year 1231 plans were filed calling for an estimated outlay of $4,568,630 as against 1473 plans filed in the corresponding period last year and involving an estimated outlay of $5,994,834. From these figures it will be seen that a goodly amount of building is being undertaken which will provide work for many of those connected with the building industry.

Fire Loss in the United States

During the first two months of 1912 the reported fire loss in the United States and Canada exceeded $64,000,000. With the exception of the Chicago, Boston, Baltimore and San Francisco conflagrations, this furnishes the greatest fire loss in two consecutive months in the history of the country. Investigation of the subject shows that at least one-third of this loss is caused by carelessness or, as it is sometimes termed, "taking chances." If the year is completed at the same rate, the total loss will amount to $380,000,000, which is far greater than that for any year excepting 1906, which witnessed the San Francisco conflagration. It should be remembered that this loss is not more than half the total taxes levied (and collected) by the fire demon. The balance represents the cost of upkeep of our fire departments and the cost of placing insurance.

During the eleven years from 1901 to 1911 inclusive, new buildings in the United States to the extent of approximately $5,100,000,000 were constructed. This represents the largest amount of construction in any period of equal duration in any country on the face of the globe. During the same period the total loss from fire, including both buildings and contents amounted to $2,484,000,000, or 48.2 per cent of the value of new buildings constructed. The percentage throughout this period varied from 32.7 in 1909, with a record of $625,000,000 construction, to 68.5 per cen in 1904, the date of the Baltimore fire, and 82.9 in 1906, when the San Francisco conflagration occurred. If we assume the usual proportion in these fires of hal building and half contents, it is evident that durin the period under review we burned up one-fourth o all the building value which we erected. If our fire had been on the same relative basis as is usual through out western Europe, our total fire loss over this perio would have been reduced to approximately $300,000,000,, and the total cost of fire, including both loss an the upkeep of fire-fighting appliances, would probabl have been less than $600,000,000.

Domestic Water Supply

Great comfort and convenience has attended the us of gas hot-water heaters for providing a supply fo domestic purposes. During a good portion of the yea the kitchen with the coal range is sufficiently hot without a great hot-water storage tank being placed in it to add further to the temperature or the burden of the cook and those who must occupy the kitchen. In many of the private residences in the larger cities already the gas-water heater has supplanted the water back and the coal range and in fact in many instances the coal range has taken its departure when it has been discovered how simple a matter it is to secure all the hot water required from a gas heater and do all the family cooking with a gas range, making it only necessary to put a register or a radiator from the general heating apparatus in the kitchen to insure a comfortable temperature in it during the winter season. This change in the method of supplying hot water has gone on more rapidly as the manufacturers of these devices have improved them so that the service is not only satisfactory but it is far more economical than those which were earlier brought into use. With the coal range as used to keep the kitchen warm as well as to do the family cooking, it was assumed that the water was heated without additional expense, but naturally this position is untenable. In some cases it has been observed when the cost of heating water alone with gas has been known it has been found to be a mere trifle in comparison with the convenience of having it always ready in ample quantity and without increasing the temperature of the kitchen in the warm season. In some instances where the two-fuel range is used there is no hot-water storage tank or water back connection in the kitchen, but instead there is a domestic gas-water heater which is depended upon to furnish hot water for all the purposes of the family, and this method of supplying it has been found to be both satisfactory from the point of economy and convenience.

Building Foundations in Quicksand

In erecting the 11-story dormitory annex of the West Side Young Men's Christian Association a rather interesting problem presented itself and that was the building of the foundations in a basin of quicksand through which ran a stream of water. The new building is on West Fifty-sixth street, New York City, and on one side is the present dormitory of the Association and on the other a seven-story apartment house. Foundations of both buildings rest on this basin of quicksand and to excavate for a foundation beneath the level of the footings of these two adjoining buildings meant that the quicksand would ooze from beneath them and both structures be undermined.

In successfully performing this engineering feat piles were first sunk through the quicksand to bed rock, the piles varying in length from 20 to 45 ft., due to the slope of the rock surface underneath. So treacherous was the quicksand that the piles could not be driven with the ordinary drop hammer for the reason that the vibration would have a tendency to destroy or injure the adjoining buildings and it was therefore necessary to use a steam hammer having a sharp blow.

There is a swimming pool 20 x 60 ft. in the basement of the new dormitory and to provide for this caused the architect and builder no little concern, as the foundations for the pool and a portion of the pool itself extend below the footings of the adjoining buildings. It was evident that if an excavation was started for the pool the quicksand would fill in as quickly as taken out. Something rather novel, therefore, in foundation construction was finally decided upon. At the time the piles were sunk a wall of sheet steel piling was driven down all around the lot, thus effectually preventing any movement of the quicksand. Excavation for the swimming pool was then made without danger to the surrounding property, the pool resting on a reinforced concrete bed, which in turn is supported by the piles.

New System in Building Inspection

A new system of inspection of buildings in the Borough of Manhattan, N. Y., has just been inaugurated by Superintendent of Buildings, Rudolph P. Miller, which is expected to secure more efficient service in the future by means of a division of the work.

Heretofore each inspector of masonry and carpentry was assigned to a district within which he was not only to inspect the work on new buildings and alterations, but to look after all minor alterations and repairs, to investigate complaints, to examine buildings for proposed alterations, to report on buildings damaged by fire, to discover unsafe buildings, and to patrol the district thoroughly enough to find any work that might be going on without a permit. Under the new arrangement the inspection force is divided into two classes—construction inspectors and district inspectors.

The construction inspectors will devote their entire time to the inspection of new buildings and alterations and the district inspectors will investigate complaints and do all other work formerly done by every inspector, with the exception of new construction.

The superintendent has in his office a large map of the borough, on which a complete record is kept, corrected up to date, showing all uncompleted work for which permits have been issued. By means of colored pins he is enabled to see whether the operation is a new building or alteration, and, in the case of a new building, what type of construction is to be used. The map also indicates what inspectors are in charge of the work.

Exhibition of Chicago Architectural Club

The twenty-fifth annual exhibit of the Chicago Architectural Club took place at the Art Institute, Chicago, from April 9 to 28, and the best works of architects in Chicago, Milwaukee and vicinity were exhibited to many thousands of interested visitors.

Some of the views and plans were of work already constructed, others of work about to be begun, and many were idealistic designs, the subjects ranging from skyscraper office buildings to bungalows of the most ornate type.

Architectural Treatment of a Brick Chimney

Architectural treatment of a brick chimney for a power house in Montreal consists of a buff brick for the body of the chimney, with a panel course of gray terra cotta blocks spanned by arches of the same material; this course is about 20 ft. below a projecting course of terra cotta near the top. The panels and arches project about 4 in. from the face of the chimney and are backed by common brick with circular reinforcing bands of iron, 1/4 x 2 in. in size, laid between the two courses at regular intervals. The total height of the structure from the top of the foundation is 211 ft. with an external diameter at the bottom of 17 ft., decreasing uniformly to 9 ft. at the top.

CORRESPONDENCE

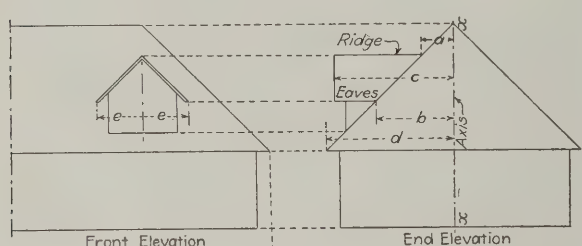
A Department Where Those Interested Can Discuss Practical Trade Topics--All Are Invited to Participate

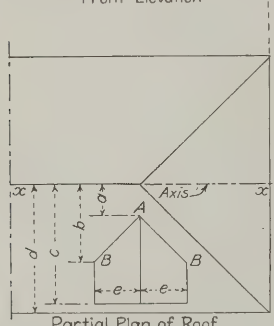
A Question in Architectural Drawing

From W. M. L., Tucson, Arizona.—I have a little problem in architectural drawing which I would like to have some of the profession elucidate. It is this: In a hip roof of 45 degree pitch and having in the side elevation two dormer windows, is it necessary that the elevation of the dormer be drawn first in order to ascertain how far the straight line would have to be carried back to intersect the splay line?

Answer.—In reply to the above query, the author of the serial article, "Lessons in Architectural Drawing for Beginners" now running in current issues of the papers, comments as follows:

In regard to the drawing of the splay line of dormer it is always well to draw the elevation first, although under the conditions given by the correspondent it would not be absolutely necessary so to do since the pitch of the roof is 45 degrees and assuming that the pitch of the dormer roof is also 45 degrees. The latter, however, is not always the case. I would refer the correspondent to the accompanying diagrams in connection with which I will point out the various steps





A Question in Architectural Drawing—Diagram Accompanying the Answer

to be taken in order to correctly obtain the lines of the roof of the dormer on the plan. Draw the dormer of the front elevation first, showing the overhang of the roof of the dormer; then draw the side elevation by projecting the lines from the front elevation obtaining the length of the ridge line as well as the lines of the eaves. Finally draw the roof plan and the axis x-x. Measure the distance on the side elevation and lay off on the plan from the axis x-x. Project the ridge and eave lines of the dormer from the front elevations and so obtain the point A on the plan. If the pitch of the dormer roof is the same as that of the main roof, the line A-B will be parallel to the hip; if the pitch of the dormer is different from the main roof, measure the distance *b* from the side elevation. It is clearly seen that it is well if one wants to be on the safe side to draw the elevations first, especially when one is not familiar with architectural drafting.

After obtaining A and B connect them by a line which in this case is the line A-B. All other points are to be gotten from the front and side elevations, as clearly shown in the diagrams.

A Question in Hopper Bevels

From B. F. B., Kirksville, Mo.—I would like to see in the Correspondence columns of the paper a demonstration of the following problem: Find the pitch of the sides of a three-sided hopper such that the butt joint will be a square cut across the edge of the sides. The sides are to be of one length and the material square edged.

Some Questions in Plastering

From R. L., Chauncey, N. Y.—Being a reader of the *Building Age* I take the liberty of asking through the Correspondence columns several questions pertaining to plastering:

1. For the third or white coat, what proportions of lime, putty and plaster of Paris are used?
2. Should the wall be wet before applying the white coat?
3. What causes this coat to crack?
4. Does heat have any effect upon it?
5. Will it crack if it is not troweled sufficiently?
6. How thick should this coat be made?
7. In mixing should the plaster of Paris be mixed with water first and then mixed with the lime?

Building a Circular Track in a Gymnasium

From E. L. L., Langdon, N. D.—Will some of the readers of the *Building Age* tell me how to build a circular track in each of the four corners of the ground floor of a gymnasium 36 x 30 ft. in plan. The track is to be used for running and not more than one person will use it at a time.

Trouble with Graining Machine for Imitating Quartered Oak

From H. M. S., Indianapolis, Ind.—In reply to "W. T. D.," Waynesboro, Va., who states in the April issue of the paper that he has had trouble with the composition roller which he uses in connection with a graining machine for making imitation quartered oak, I would say that I find the following among my formulæ for composition rollers. The correspondent can try it out and see how it works:

Glue	100 parts
Glycerine	500 parts
Koalin (finely powdered)	25 parts
Water	375 parts

Possibly some of the other readers may have something different, and if so, it would be interesting to have them send it along for publication and state their experience in connection with it.

Lining Chimney Flues

From A. L. W., Carbondale, Pa.—Answering the question of "V. P. G.," Lewisburg, Pa., in regard to lining of chimney flues I would say, by all means line the chimney with the best white clay flue lining and select that which is not burnt hard and black. Get the lighest color you can find and it will not crack. Make your joints good and you will have a first class job.

Use a 8 x 8-in. flue or a 8 x 12-in. flue according to the size of the furnace installed in the house.

I cannot refrain at this time from expressing my appreciation of the *Building Age*. In looking up my files I discover that I began taking *Carpentry and Building* in 1885, and when I compare the copy of the paper just received for April I am led to exclaim, what a vast difference from the first copy and what a wonderful store of information each number contains for those who will make good use of it!

The information furnished on fireplaces and chimney construction has been especially valuable to me.

System of Bookkeeping for Builders

From D. P. B., Redford, N. Y.—Referring to the inquiry of "Skookum," Vancouver, B. C., I would say that in my estimation the best form of bookkeeping for anybody hiring help is an ordinary double ruled Day Book or Journal. Place at the top the job or workman with the month and year; in the left-hand space put the day of the week and in the second space the date. In the body of the page tell what he did, as, for example, "work on Smith's house, ¾ hour; in shop, ¼ hour." In the extreme right-hand column put his wages and at the top of this column put "Cr." When you pay him anything place it in the first right-hand column, at the top of which is written "Dr.", all as indicated in the example below.

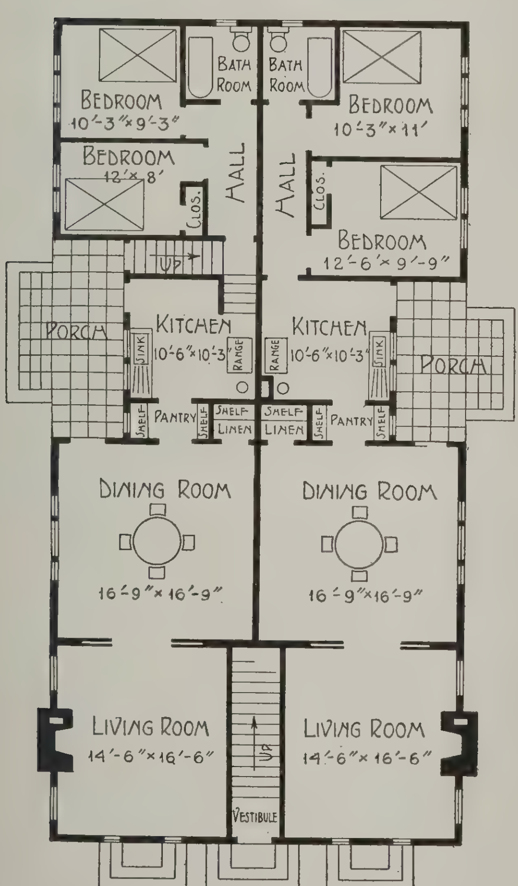
		Tom Moore July, 1912	Dr.	Cr.
Mon.,	15.	Worked ½ on Hall; worked on opera house ½		$3.00
Mon.,	26.	Paid him order on Santa Claus	$45.00	

Use your forms, your material, men and your jobs in the same way. You can tell where you stand in 15 minutes and have a record from year to year.

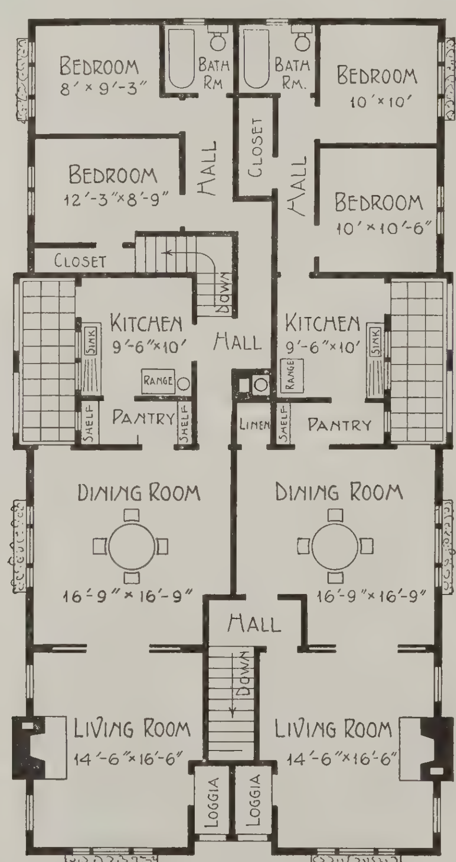
Design for Four-Family House

From H. C. W., Hood River, Ore.—Some time since a correspondent in Pasadena, Cal., expressed a desire for a two-story frame house arranged for two apartments of five rooms each on each floor, the building to occupy a ground space about 35 x 70 ft. In reply to his inquiry I am enclosing front elevation and two floor plans showing an arrangement which I think may prove of interest to him and possibly to other readers of the paper.

Front Elevation



Main Floor



Second Floor

Design for Four-Family House—Scale 1/16 in. to the Foot

Best Method of Placing Sheathing Boards

From J. C. B., Dowagiac, Mich.—I should like to see more interest manifested by the practical readers in the Correspondence Department of the journal are wish they would furnish answers to some of the many inquiries there set forth. Without attempting to enumerate them all I would refer, for instance, to "Plans for a Small Wayside Inn," on page 230; also "Sheathing Horizontally or Diagonally," on page 404; not omitting "Chamfering Corners of Veranda and Porch Columns, etc.," on page 551 in the volume for 1911.

I was a sufferer from the tornado that swept through Michigan November 11 last and if there is anything to be gained by sheathing diagonally I would like to know it. Of course, I have my own theories about it but would prefer to see what the more experienced men in the trade have to say and perhaps some of the Institutions, when they have the necessary apparatus, might be induced to test the two systems and the results be published in the paper.

As perhaps the readers know, two persons were killed outright and 20 were injured at Owosso, a thriving manufacturing town of this State, on the night of November 11 last.

The question is "Does it pay, considering the waste of lumber, time required and labor, to sheath diagonally?" After my experience I venture to say *it does*, where a building is erected in an exposed location as on a farm. One State is as liable to be visited by these terrible disasters as another and the correspondent who asked this question in the journal asked it because he certainly must have been interested.

Now in conclusion I desire to express the hope that the men who are qualified to answer this question will give us their opinions and the benefit of their experience for the good of all who may be interested.

Some Comments on Hardwood Floors

From H. H. B., Rochester, N. Y.—I have been greatly interested in what G. D. Crain, Jr., has to say about hardwood floors in the April issue of the paper and consider it the best popular article I have seen. So pleased am I to see an article which endeavors to educate the public along the lines indicated that I hesitate to find ground for argument from the standpoint of those who make a specialty of the laying of fine parquetry, wood-mosaic or ornamental flooring.

The parquetry floor layer does not only lay squares and fancy patterns, such as are mentioned in Mr. Crain's article, but probably lays just as many feet of parquetry strips as he does of the more elaborate patterns. He would, therefore, hesitate to include maple along with oak as being well adapted for flooring without going further and excluding it from the class of ornamental flooring. Just as the parquetry floor man should advise his customer against putting an oak floor in the kitchen, which is the place for maple, so he should keep maple out of the finer rooms.

Mr. Crain is so particular in specifying the care with which flooring should be handled that he must be anxious to secure a result which will last without cracks developing in the surface under proper treatment, or, at least, to arrive as nearly as possible at such a desired result.

Maple is probably more susceptible to varying atmospheric conditions than any other wood used in flooring. With the greatest possible care, a maple floor will swell and shrink alternately so that dust and dirt will get in the cracks and make black lines which will certainly spoil the appearance of a floor too much to permit of its use in the better rooms in a house. The very fact of its natural whiteness will accentuate these black lines.

I cannot agree with Mr. Crain in his characterization of quartered red oak. It may be the case that there are localities where people do not pay much attention to the fact that the floor is of quartered white oak or quartered red oak, but these localities are certainly very circumscribed. In the large cities of the east it is almost impossible to get an architect or decorator to allow the quartered red oak flooring to be used. So much is this the case that the very finest class of white oak, which some times has a slightly pinkish cast, is frequently objected to and has to be cut out of a floor before it will be passed upon by the architects.

I will grant that this is a very extreme attitude, but I must acknowledge that red oak makes a much inferior floor to white. Though perhaps the foundation color is just as uniform as white oak, and even at times more so, it is subject to black streaks in the way you do not find in the white oak. It is of a far more porous grain, so that after scraping, the filler is liable to sink in in a way to make discolored patches.

Being softer it will show heel marks, etc., through the finish, more easily than will white oak. The figure is not as fine as white oak and it is generally considered an inferior floor. The proof of this is that the quartered red oak lumber in the highest grade can be bought for about $20 per thousand feet less than the corresponding grade of white oak. It is true that much of it is put down, but this is a matter of price somewhere along the line. All this does not mean that quartered red oak does not make a good floor, but it should not be classed in with the quartered white oak.

To come to the finish, I note mention made of wax and varnish. To the ultimate consumer varnish and shellac may mean the same thing, but to people as versed in technicalities as readers of the *Building Age*, I think they mean something different. I know that many floor finishers use varnish, but I think it would be safe to say that of the largest firms making a specialty of floor laying it is rare to find one who uses it. Shellac and wax is nearly always used for a high class, thin-face, nailed floor. Much of the finest work in tongue-and-groove flooring is finished simply in wax without any shellac but most of this fine work is still finished in shellac and wax. Of course it is necessary to get the very best white shellac which can be procured. This is some times not so easily done as one might think. In fact it is almost impossible to find, in the ordinary paint and oil store, a good enough shellac to make real fine work in floor finishing. Most large floor finishing firms either cut their own shellac or buy it very heavily cut and thin it themselves with denatured alcohol.

A floor finished in shellac and wax does not give one the impression of looking at the grain of the floor through some other substance, such as plate glass, as does a floor finished in varnish. A varnish finished floor, moreover, generally has a rather unpleasant reddish appearance on the quartered figure which should show up silvery under a good shellac.

Mr. Crain is correct in the statement that parquetry flooring requires more skill in laying and finishing than the regular mill or lumber yard flooring. I would, however, like to qualify this by the statement that I do not believe there is a parquetry manufacturing firm in existence which does not issue instructions on laying and finishing so explicit that if followed by a careful man, there should be no trouble in getting good results. These instructions are up to date and should give much better results than the inherited recipes frequently followed by many of even the best carpenters.

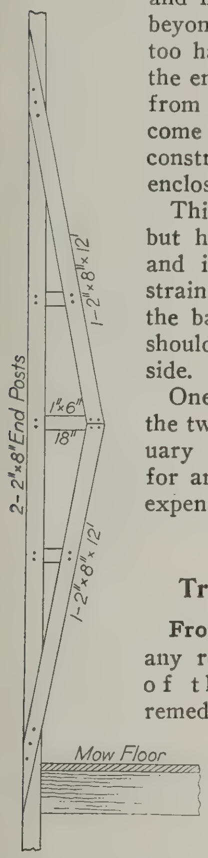
These are all probably minor points and may be considered extremely technical. I would like again to express my thankfulness for the original article in the extreme stress laid upon the necessity for keeping hardwood flooring away from any possibility of absorption of moisture.

Criticism of Plank Frame Barn Construction

From F. E. A., Winnebago, Minn.—In the March issue, page 142, I find a letter from a correspondent criticising plank frame barn construction. In regard to the matter I wish to say that we are using this design to quite an extent in this section of the country and find nothing so complicated as to be beyond any man of ordinary ability. We too have noticed the natural tendency of the ends to spring both from the wind and from the load within the barn. To overcome this we have been using a truss constructed in accordance with the sketch enclosed herewith.

This truss not only strengthens the barn but holds the falling hay from the end and in this way helps to keep off the strain. For wind against the outside when the barn is empty the joint of the truss should be tied by a third piece on the side.

One of these trusses on each post—see the two 2 x 8 posts, on page 17 of the January issue—will give sufficient strength for any ordinary barn and the room and expense are comparatively nothing.



Criticism of Plank Frame Barn Construction

Trouble in Painting a House

From H. D. H., Hillsdale, N. Y.—Can any reader suggest through the columns of the Correspondence Department a remedy in the following case: There is in this village a house that has been built something over 40 years, but upon which the paint cannot be made to hold. As a consequence the building has to be repainted once in about three years. All kinds of paint have been tried without success, the paint cleaving from the wood, thus leaving it bare. A barn located but 2 or 3 rods from the house does not appear to be affected in the same way. There are large trees about the house, but not near enough so that but what the sunlight reaches the building. The rear of the house is not affected in that way and a neighboring house not more than 100 ft. away is not affected. Can any one tell me how to overcome the difficulty?

Note.—We shall be glad to have the practical painters who are readers of the paper offer suggestions for remedying the trouble of which our correspondent complains. It is possible that by repainting the house during a spell of dry weather after removing all of the old paint, good results may be obtained. The first or priming coat should be of pure white lead and linseed oil with little drier, while the second coat should consist of pigment and equal parts linseed oil and turpentine, with drier, so as to produce a fairly hard, non-porous ground for the finish. The last coat should be composed of a good linseed oil paint with sufficient drier and anywhere from 15 to 20 per cent. of hard gum spar or outside varnish.

Durability of Spruce and White Pine Clapboards

From W. I. W., Rumford Falls, Me.—Referring to the request of "C. D. A.," in a recent issue for an expression of opinion concerning the lasting qualities of spruce and white pine clapboards, I wish my vote recorded in favor of pine, for the following reasons: They absorb the priming coat of paint more readily and thoroughly, as you seldom see any with the hard, glossy surface that many spruce clapboards have, which kind refuse to hold the paint any length of time. The pine is more sure to be straight grained, and less apt to check and crack.

More than 25 years ago I removed pine clapboards from a house that had been built 70 years, and they were in a good state of preservation. At that time (70 to 90 years ago) nearly all buildings were built almost entirely of pine—the frame, clapboards, shingles and inside finish.

The old-time pine forests of Maine were something wonderful, but are a thing of the past, and the vast spruce forests are fast passing into pulp and paper, while clapboards of either spruce or pine are sometimes so scarce here that we use redwood and cedar from the Pacific coast.

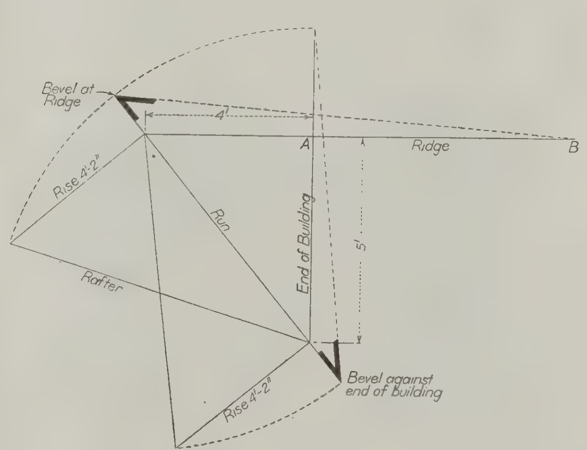
Estimating Cost of Buildings by the Square

From C. H. S., Brooklyn, N. Y.—I would like very much indeed to hear through the Correspondence columns of the paper from "J. T. C.," Marion, Va., regarding his method of estimating by the square.

Obtaining Bevels in Roof Framing

From J. MacV., Providence, R. I.—I am under the unpleasant necessity of asking for space to correct an error I made in the diagram accompanying my comments in the last issue of your valuable journal.

In answer to the inquiry of J. F. Johnson in the November issue relative to finding the top bevels for a hood rafter I made use of a method shown me many years ago by one whom I supposed was thoroughly familiar with the methods of obtaining bevels in roof framing. Although I never happened to make use of it I had always supposed it to be correct, so I used it in the above case on account of its simplicity. I cannot excuse myself for the error because had I given the matter a little thought I would have seen that the correct bevels could not be obtained in that way.



Obtaining Bevels in Roof Framing

Now in order to set myself right in the matter and also to prevent any of the readers from making use of an erroneous method I ask space for the accompanying diagram which I trust may be readily understood without the aid of extended explanation except to state that the point *B* is found by measuring the length of the run of the rafter from the point *A* which indicates the end of the building.

Building Conditions in Hawaii.

From C. H. Cornell, Honolulu, T. H.—No one method of doing carpentry work prevails on these islands, but the workmen represent nearly every nationality, the Japanese and the Chinese predominating. There are very few Americans here and little inducement for them, as it means strong Asiatic competition and wages are necessarily affected thereby. Wages range from about $2.50 to about $4, which a very few obtain, for eight hours "for the better pay." The climate is very good if one does not mind a little wet, the almost daily showers being mostly on the mountains, for only a comparatively few reach Honolulu, which is only a few feet above the sea level.

Nature has done much to beautify the city, various palm trees, shrubbery and plants blooming so far, as I can judge, the year in and out, thus giving constant summer, for the thermometer seldom falls below 60 degrees or rises above 95 degrees.

To remove Nature's work would leave a town of narrow, crooked streets, mostly in the business portion of the town, and many flat-roof, square wooden buildings surrounding the business portion, "within the Chinese circle, so to speak." The residences are mostly wooden, the boards being placed upright and surfaced inside. They are somewhat rough outside, so that whitewash or stains adhere better. He is a poor man who has not one or more baths in the house. There is plenty of ventilation and screens are required, as mosquitoes are "said to be" bad here. In the central part of the city there are one or two buildings—native skyscrapers—six stories in hight. Young's Hotel is the principal one, boasting a roof garden on a portion of it. There are a few three-, or even four-story buildings, but the majority are not more than two and the residences are mostly one-story high, situated on large plots surrounded by tropical trees and plants, giving a very picturesque effect to one not accustomed to such environment.

There are some good substantial and somewhat artistic buildings, showing evidence of architectural supervision. A few good school buildings and churches without number—some fairly good, some poor, and others indifferent.

The Executive Building, formerly the King's Palace, is well designed. The Throne Room—that was—halls, stairs, etc., are of massive design, finished in native wood resembling mahogany. The workmanship is excellent, the joints being at the present about as good as when first made.

The Royal Hawaiian Hotel, not far distant, apparently was *the* hotel of the city for some years. The Court House, only a short distance from the block occupied by the palace, is of similar design to it, but is now being repaired. In front is a statue of King Kamehaha, the "Washington" of these Isles.

The Bishop Museum, a more modern construction, has fine massive stairways and one can easily devote with interest two or three hours in visiting it. Among other things is a fine cabinet showcase which is well worth a woodworker's attention. Here one can see more of the customs of the natives of the islands, New Zealand, Australia, etc., in three hours than he can in months of travel. Anything tourists may wish to know of Asiatics will be fully satisfied by a visit to most any restaurant, which business is almost entirely monopolized by the Chinese and Japanese. One finds these people in all lines of business, from shipbuilding to dressmaking; especially in building, contracting and carpentry work the supply far exceeds the demand, and one only wonders how they all exist with the cost of living as high as it is here. There is a reinforced concrete library building in course of erection.

The general building business, however, as compared with that in Portland, Ore., which place I left not long ago, is extremely poor. There is very little doing here at present, regardless of the weather, and the "climate" is all there is in it for the carpenter class.

Calculating the Stress in a Beam

From John R. McConnell, Polytechnic Institute, Worcester, Mass.—At a season of the year when work is slack, the progressive young carpenter, or mechanic, will grasp the opportunity of delving a little deeper into the mysteries that envelop his profession and thereby increase his earning capacity and raise the standard of efficiency. With the coming of spring, and its rush of manifold duties, a hundred and one details must be dealt with. Each detail must be viewed from all sides in order that every possible defect, or flaw, may be early discovered. Perhaps one of the above details will involve a knowledge of the theories set forth in that part of mechanics—the strength of materials. It may be necessary for him to know how to properly design some joist supported floor, such as that of an ice house with a cellar beneath, or a basement barn. He should be able to calculate the strength of the joists and sills in a mathematical way rather than leave this important step to be settled by an unreliable guess.

Suppose we have to design the substructure for the floor of the gangway of a barn. The joists, 14 ft. long, are to rest on sills, which in turn rest on posts, or columns of stone, or reinforced concrete. This substructure must sustain the dead load, consisting of the floor and the live load, say 150 lbs. per sq. ft. of floor. Assuming the joists to be spaced 15 in. on centers, and that a 2-in. floor weighs 10 lbs. per sq. ft., the total load on a joist (150 plus 10) 15/12 x 14 is 2800 lbs.

Referring to some good publication of mechanics to the chapter on the strength of beams, we find that the formula suited to our purpose is:

$$M = \frac{1}{8} Wl = IR'/e, \ldots\ldots (1)$$

where M is the maximum bending moment in inch pounds, W the total weight in pounds on the joists, l the length of the joists in inches, e the distance to the outer fiber from the neutral axis, or center, measured in inches, R′ the safe fiber stress per square inch of the material, I the moment of inertia of the section, which for a rectangle, as the cross-section of the joist would be, is $1/12\ BH_3$, where B is the breadth, H the height in inches. Substituting these values and reducing I/e, we have

$$M = 1/6\ BH^2R' \ldots\ldots\ldots (2).$$

In order to simplify the calculation let us use the first part of equation (1), $M = \frac{1}{8} Wl$. Substituting the values we have

$$M = \frac{1}{8} \times 2800 \times 14 \times 12 = 58{,}800.$$

Assuming that a 2″ x 12″ joist will be of sufficient size, let us substitute and solve for R′ in equation (2), $M = 1/6\ BH^2R'$, $58{,}800 = 1/6 \times 2 \times 12 \times 12\ R'$.

$R' = 1225$, the allowable fiber stress per square inch for Douglas fir, long and short leaf pine, spruce, Western hemlock and white oak.

Next in order would be the sills, which may be calculated in the same way.

For lack of space the calculation for a wooden column cannot be entered into, but it might be stated that for a short column where the ratio of the length divided by the least side in inches, is near 12, the permissible stress per square inch for yellow pine, white pine and spruce and oak is 800, 600 and 700 lbs. per square inch, respectively.

Rendering Cellar Walls Water Tight

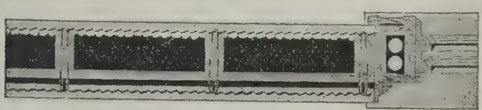
From A. J. G., Needham, Mass.—Will some of the practical readers of the paper tell me how to make my cellar walls, which are built of stone, water tight?

Some Comments on Stucco Houses

A Brief Talk Touching Their Faults and Advantages -- How to Insure the Best Results

A VALUED correspondent in discussing the above subject contributes the following views for the consideration of builders:

The term "stucco houses," as used in its modern sense, refers to houses of wooden frame covered with lath (either wood or metal) and plastered with Portland cement plaster. The last 10 or 15 years have seen a large number of buildings constructed in this manner. As this method of construction is comparatively new in this country, there has arisen in the minds of architects and builders some questions as to the durability of stucco exteriors. Some have even gone so far as to make a statement that stucco houses are not practical and will not last for any great length of time. There are, in the vicinity of Chicago, a large number of stucco houses which have been erected a number of years, and the larger portion of them are in as perfect condition today as they were at the time of their completion.



Some Comments on Stucco Houses—Detail Showing Construction of Exterior Wall

There has been a number of failures in stucco construction, but there have also been failures of buildings constructed of other materials. In nearly every instance failure of stucco can be traced to some fault in the method of construction, or to the use of improper material.

It is generally conceded that metal lath is one of the most suitable materials to use in connection with exterior plaster work. It is practically impossible to secure an A-1 grade of wooden lath, and the best that can be obtained is expensive. Wooden laths have great attraction for moisture, and it is practically impossible to construct a building in such a manner that the moisture will not reach the wooden lath. This results in a constant contraction and expansion, which causes the plaster to crack. The "key" formed by the plaster on wooden lath is none too strong, and in a short time the cracks become so bad that the stucco falls off from the lath.

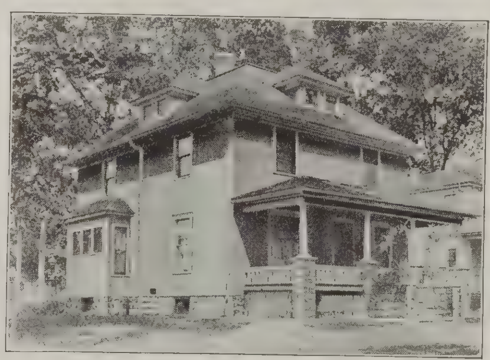
The use of metal lath does away with this difficulty, because it does not contract and expand from changes in atmospheric conditions. Many people are averse to using metal lath, particularly expanded metal lath, as they believe that in a very few years the lath corrodes and practically disappears. This has been true in some cases, but it can be traced to the use of a very light gauge of lath and also to the fact that it was unprotected in any manner. Any iron or steel, when exposed to moisture, will corrode, and it is practically impossible to keep all moisture away from lath when it is used on the exterior of a building.

To insure best results, metal lath should either be coated with a high grade of carbon paint or else *galvanized after manufacture*. When a material thus protected is used for stucco construction there is absolutely no chance of the lath corroding owing to the presence of moisture.

Vertical cracks are a cause of considerable worry to some owners of stucco houses, but in most instances they are due to the use of wooden furring strips, which absorb the moisture from the plaster and do not allow it to properly set. This can be avoided by the use of the galvanized furring strip, which should be sufficiently wide to bring the lath far enough away from the sheathing so that the plaster will form a perfect "key" and leave a small air space between the plaster and the sheathing.

As to the construction of the frame of the building, the same method can be followed as that which is employed in constructing a frame house. A greater number of houses at the present time are built with a balloon frame, and very little extra work is required to prepare the building for metal lath. The frame should be sheathed in the usual manner and one or two layers of building paper fastened over the sheathing. The crimped steel furring strips are then fastened vertically on the sheathing directly over the studding. These strips do not need to be fastened at less intervals than 18 in. or 24 in., as they are more securely fastened when the lath is applied. The lath is placed over the furring strips with the long dimensions of the sheet at right angles to the strips, and stapled securely about every 4 in. along the strips with a galvanized wire staple long enough to go into the wood about ¾ in. or 1 in.

There are a number of so-called self-furring laths on the market, but they do not prove so satisfactory as the flat expanded sheet lath used over furring strips. The reason for this is that while these self-furring laths allow a certain amount of "key," it is impossible to completely cover the back of the lath, and a large portion of the material does not have the advantage of being thoroughly protected by the plaster. Another difficulty in using this kind of a lath is that the plaster comes directly against the wood and is more liable to be affected by the contraction and expansion of the wood due to the absorption of moisture.



A Good Example of Stucco Construction

As stated before, a plain lath should never be used for exterior work. A house in one of the suburbs in Chicago was wrecked about a year ago, and it was found that the metal lath which had been on the building for some 15 or 16 years was in the best of condition. This lath was a painted expanded metal lath, and the plaster was Portland cement mixture.

Not all of the failures of stucco construction can be traced to the lath. It is just as important that the plaster should contain the proper materials and be properly mixed. It is impossible to secure a satisfactory job by using lime mortar, although a small per cent. of hydrated lime may be used in the first coat to make the material work easier.

Small hair cracks on the face of the plaster are sometimes seen on a smooth-faced stucco and are generally due to too much working or troweling of the finish coat. This fault, of course, would not be found in a rough-cast or pebble-dash finish.

It is very easy to obtain a prepared plaster which is colored. Some very artistic results are obtained by using this material on stucco houses, and if an experienced plasterer is employed the color matter can very often be mixed with the plaster to secure any result which may be desired.

The great advantages of stucco houses are the reduction in the cost of repairs, and if the roof is made of some fireproof material they are practically fireproof so far as any danger from outside fires is concerned.

More artistic results can be obtained with this method of construction than the ordinary wooden house. If the house is built as outlined above, with an air space, it is warmer in winter and cooler in summer. This method of construction is being adapted to the reconstruction of old houses, and which is called "overcoating."

What Is Fireproof Construction?

By H. B. McMaster

An agitation of the subject of saving our created resources is not complete without directing effort to the determination of the properties of building materials by some medium through which can be formed an absolutely impartial judgment.

When the committee or commission that may be formulating the building code of a city or state is pursuing its work, they are throughout their deliberations besieged and besought by salesmen and representatives of the various manufacturers of building materials, each with his evidence all built up to convince one that his material should be given preference, or at least a recognition, and this a competitor may later dispute.

This competitor will apparently have a case as strong as his rival—and so the "merry war" goes on, but the men who are building the code are confused and often with all integrity back of their conclusions, will take action that is the result of good "salesmanship" rather than of a presentation of facts.

Much that is offered as evidence of the fire-resisting quality of materials is not based on scientific data and, in fact, it is doubtful if absolutely unbiased conclusions in these investigations will be found except they come from tests or experiments conducted by a bureau of the government. Many of the problems now confronting insurance engineers, constructing engineers, architects, city and state governments and others would be solved were investigations to ascertain definitely and scientifically the properties of building materials, particularly as to their fire-resisting qualities, to be pursued by the Bureau of Standards. This bureau, with a limited appropriation at its disposal, has begun work of this sort, but as yet has not been given facilities to demonstrate the relative fire-resisting values of the different materials that go into buildings.

With delay in having this important research made by this bureau, which is the one best equipped for that work, there will be continued waste of effort and futile endeavor on the part of states and cities to fix standards.

The prime thing in favor of having the Bureau of Standards carry on this research is that it would undertake to learn just what various materials will do under all conditions that might be created in a conflagration and their findings would be free from prejudice as between the manufacturers of competing materials.

This matter is deserving of agitation that a sentiment shall be created which may result in this very important work being taken up by the Bureau of Standards and through that medium have settled for all time what materials can best be depended on to retard a fire

This data is very much needed by those who say what shall be used in buildings and a manufacturer of building material who would object to the development of facts along the lines proposed might be suspected of a want of confidence in his material or a lack of integrity.

If this project could have the support of the several trade journals whose columns are devoted to all that will promote engineering, architecture and building construction generally, it would soon crystalize into a definite movement which should soon result in legislation and appropriations commensurate with the importance of this work.

American Architecture as Seen by a Paris Architect

Some very interesting opinions concerning American architecture were expressed by Mons. Hector Guimard, a well-known architect of Paris, and vice-president of the Societé des Artistes Décorateurs, who recently visited this country for the first time. He found New York a wonderful city with architectural effects "both to be praised and to be criticised." He said that he came to this country to see if it were possible for the lofty buildings here to be pleasing to the eye as well as useful in housing their many business tenants. "I find," he said, "that it is possible, but to my mind many of your examples of high buildings are disappointing in that one harmonious idea in construction has not been followed by the architect. The lines of a lofty building it seems to me should be less pronounced and decorative the higher they go and should finally blend or be lost in the sky. Tower-like effects after a succession of plain stories seem incongruous and it evidently was intended that such structures should only be seen by persons approaching New York by water.

"American architects should exchange ideas so that there may be some continuity and harmony in the buildings which successively rise. America's architects show more strength and understand their business more thoroughly I think than those of Germany and England, but my impression of New York is rather as a collection of buildings than as a city like Berlin or London, in which more harmonious groupings prevail.

"Every European country is making this effort to express itself in its own architectural way. Germany has made a tremendous effort along this line, and that it has been largely successful is apparent to one who visits Berlin. Italy also is striving for a new, individual architecture, and France, mindful of the impress left by the Louis XIV and Louis XV periods, is seeking a new, distinct type. Mme. Maintenon lived to posterity because of the Trianon; why should not the present epoch be productive of an architecture which always would be recognized as of this age?"

The New York State Association of Master House Painters and Decorators, which held its annual convention at Rochester in February, elected Caspar Glunz of Buffalo president and Carl H. Dabelstein of New York City secretary-treasurer. The city of Buffalo was selected as the place of meeting for the convention for next year.

Specifications for Finishing Concrete Floor Surfaces

Suggestions for the Treatment of Damp Floors, also for Concrete Floors of Fine, Coarse and Irregular Texture

By F. P. Foster, Jr.

DURING recent years more than usual attention has been given to the development of special materials for the perfection, protection and decoration of modern building construction with special reference to concrete surfaces. For the benefit of master painters as well as for architects, builders and contractors, it is well to furnish detailed specifications relative to the proper use of such materials. The subject of the present article being the treatment of concrete floor surfaces, the writer will not attempt to describe any complete line of finishes for waterproofing or decorating concrete, but will be limited to the subject in hand. There are at present on the market for treating concrete floors numerous materials made by various manufacturers. It is well after experimenting to learn the value of one special material and to become absolutely familiar with the best method of using it. One of the well-known materials for this purpose is Glidden's Concrete Floor Dressing, which is made in the following colors: Light drab, dark drab, terra cotta, tan, white, green and also in transparent. This floor dressing has a capacity for covering with the first coat from 300 to 350 sq. ft. to the gallon, U. S. measure, and 360 to 430 sq. ft. to the gallon, Imperial measure. The second or finishing coat will cover from 350 to 400 sq. ft. to the gallon, U. S. measure, and 430 to 500 sq. ft. to the gallon, Imperial measure. The cost of the material itself is approximately half a cent per sq. ft. to each coat. The cost of labor varies from 2¼ cents to 3¼ cents per sq. ft. for the finished job, which includes two coats and for any touching up that may be necessary, or about ⅞ cent to 1⅜ cents per sq. ft. for each coat, according to the rate per hour paid for the labor.

The transparent floor dressing is of special value for the floors of factories, warehouses, mills or any other floors which are subjected to severe conditions of wear. In this connection it is essential to note that concrete floors should never be treated or dressed until they are thoroughly dry and well seasoned and the dressing should be applied before they have been subjected to traffic or wear.

Damp Floors

Concrete floor dressing should not be used upon damp floors or floors which are subject to seepage. A coat of Glidden's Liquid Rubber applied over the floor surface will, however, overcome such conditions. This liquid rubber is a black elastic bitumen and is applied by means of a brush over which an inch top coat of concrete thoroughly waterproofed should be applied, using 2½ lb. of waterproofing to each bag of cement used in the concrete aggregate. When the concrete is thoroughly dry and seasoned two coats of concrete floor dressing should be applied in accordance with the above specifications. This same specification may be used upon damp basement walls which are subject to seepage, making a cement mortar veneer of ½ in. thickness and applying two coats of white liquid cement (coating) upon the surface after it is thoroughly dry in place of two coats of floor dressing. This specification will serve for damp basement floors and walls and it produces a sanitary and light radiating basement.

Concrete floors having very fine, close texture floated to a dense surface which give at times a semi-gloss finish should be treated as follows: The surface should be gone over lightly with a carborundum rubbing brick in order to establish a bonding surface that will enable the concrete floor dressing to knit close to the floor structure and practically become a part of it. This will prevent scaling and peeling of the floor dressing. The floors should of course be cleaned, thoroughly dry and well seasoned before the priming coat of floor dressing is applied. It should be put on by means of a suitable brush and worked well into the pores of the concrete, spreading it well over the floor surface to develop a thin film. The second coat should be brushed out evenly over the surface in the same manner as one would apply a finishing coat of floor varnish and it should be given from four to six days for thorough hardening. Two coats develop a satisfactory result, although three coats should be used where floors are submitted to unusual wear.

Concrete Floors of Coarse Texture

Concrete floors of very coarse texture should be cleaned thoroughly dry and well seasoned before the priming coat of concrete floor dressing is applied. Either the transparent floor dressing or any color desired may be used and should be put on with a brush as already described. After the first coat is thoroughly dry all surface areas or spots which may show unusual absorption or penetration of floor dressing should be "touched up" in order to prepare a uniform surface for the finishing coat. The latter should be applied after the first coat is thoroughly dry, and should be allowed to harden from four to six days.

Floors of Irregular Texture

Concrete floors of irregular texture; that is, those made up of very fine and very coarse texture laid irregularly, which is sometimes due to carelessness, but often due to unforeseen conditions, should be given a joint application of the specifications described for concrete floors of fine and of coarse texture. Concrete floors of normal, uniform texture should be cleaned, thoroughly dry and well seasoned when the first or priming coat of concrete floor dressing is applied. In this instance as well as in others it can be put on with a brush and worked into the pores of the concrete, spreading the surplus well over the floor surface to develop a thin film. Floors which are laid in colors such as terra cotta, green, etc., or where inert colors are mixed throughout the cement veneer or wearing surface, should be given two coats of transparent floor dressing applied under the same conditions as for the normal or uniform texture.

The adaptability of concrete for industrial buildings as well as for garden uses was well shown by a very interesting collection of photographs exhibited by the Aberthaw Construction Co., Boston, Mass., in the gallery at the Master Builders' Association Building, in Boston. These pictures attracted much attention and were on exhibition during the week of March 17.

Commencement Exercises of the New York Trade School

The popularity of the trade school methods of training young men to work at a trade, not only among the young men themselves, but among their parents and friends, was demonstrated in the large attendance in the auditorium of the New York Trade School, Sixty-seventh street and First avenue, New York City, on Wednesday night, March 27, when the commencement exercises for the thirty-first year of the school were conducted in charge of the president, R. Fulton Cutting. Enrollment of pupils at the school this year was between 700 and 800 and there was a large number of the graduates and their classmates in the school assembled in the auditorium in the center rows of seats, while the remainder of the large auditorium was filled with mothers, sisters and other members of the family.

The addresses this year were short in order to give the pupils and their friends an opportunity to visit the various class rooms to see the work that had been done during the year. President Cutting opened the exercises with a few remarks of welcome.

John Beattie spoke of the wonderful work which had been accomplished by the school since it was established, and said that he as far as he knew was the first tradesman to ask an organized body of tradesmen to indorse the school. He pointed out that the young men might have every other quality and fail to succeed unless they cultivated the power of concentration on the object they desired to accomplish.

The Rev. William N. Grosvenor, of St. John's Cathedral, was then introduced and gave a talk replete with advice to the graduates.

The gold medal presented by the Master Steam and Hot Water Fitters' Association to the student showing the highest proficiency in his class was presented to Herbert Rupp of New York City. Two other members of the class were entitled to "Honorable Mention," these being George E. Lockerbie, Edmonton, Canada, and J. William Collins, Trenton, N. J.

H. V. Brill, the superintendent of the school, presented a set of scientific books donated by a graduate of the school to Merton S. Carleton, Waterford, N. Y., as the honored pupil of the class in carpentry, and Albert A. Baker, Valhalla, N. Y., was entitled to "Honorable Mention."

Frank Reynolds, from the master plumbers' committee, stated that the work of the class was the best for many years and that some difficulty was experienced in reaching a decision as to whom the master plumbers' gold medal should be awarded. The fortunate member of the class was L. E. Marschner, Wheeling, W. Va.

The Honor Roll Certificates to the graduates were then presented by J. P. Morgan, Jr.

The graduates in the carpentry class were 9 in number; in the class in cornice and skylight work there were 10; in sheet metal pattern drafting, 4; in plumbing, 76, and in steam and hot water fitting, 7.

The exercises were concluded with the singing of the national hymn, after which the audience visited the various class rooms to inspect the work which had been done by the young men during the school year.

Low Tones in Current Decorations

For door and window draperies of the Marie Antoinette salon or a colonial drawing-room there is a new idea brought out for 1912—gray effect. This gray tone is never obtrusive, does not weary the senses, is dignified, charming and picturesque. Gray curtains made of chintz, china silk and sheeting or the sumptuous brocade and satin are the ideal accompaniment of the house where every color scheme is kept in low tone, says a writer in *Decorative Furniture*. The result is a habitation very soothing to the eyes and nerves, and one of which nobody wearies quickly.

A feature of the fifth annual convention of the Inter-State Builders' and Traders' Association of Maryland, District of Columbia and Virginia, held in Richmond, Va., a short time ago, was the distribution of an 86-page souvenir with the compliments of the Builders' Exchange of Richmond. Naturaly the text has largely to do with the city of Richmond, its points of interest, its history, its administration, financial and industrial institutions, building operations, etc. It is profusely illustrated by means of half-tone engravings and is gotten up in a shape to be of more than usual interest not only to those who attended the convention in question, but to the public at large.

Edson A. Cass, a Cleveland architect, and a member of the County Building Commission, died suddenly on April 10, in Washington, D. C.

CONTENTS.

What Builders Are Doing

Bird's-Eye View of Building Situation in Leading Cities -- Permits Issued and Estimated Value of the Projected Improvements

DURING the month which has just closed the building situation presented a somewhat varied aspect, although the net result was a showing of projected improvements which contrasted favorably with March last year. With few exceptions the leading cities of the country show an increase in the estimated value of the improvements for which permits were issued, this being particularly noticeable in New York City, where some expensive work was planned, although the number of permits filed were appreciably less than in March a year ago.

The unseasonable weather throughout certain sections of the West undoubtedly was an influence in the planning of new work and among the cities showing important decreases may be mentioned: St. Louis, Portland, Ore., Kansas City, Spokane, Omaha, Duluth, Grand Rapids, St. Paul, Denver, Chicago, Cleveland, Cincinnati, Indianapolis, Cedar Rapids, Springfield, Ill.; and in the East, Worcester, Mass.; Atlanta, Buffalo, Baltimore, Newark, N. J.; Washington, D. C., and Philadelphia.

Outside of New York City in which is included Brooklyn, prominent gains are noticeable in Portland, Me.; Troy, Fort Wayne, Paterson, Jacksonville, Pittsburgh, Milwaukee, Seattle, New Orleans, New Haven, Springfield, Mass.; Rochester and Sacramento, Cal.

The season opens, however, with a feeling of encouragement as to the immediate future and while nothing like a "boom" is anticipated yet contractors and builders are looking for at least an average year's business. There were manifestations of labor unrest in some sections as the season's work commenced but in most cases the differences have been adjusted and the men are now busily engaged.

Buffalo, N. Y.

The report of the Bureau of Building for the month of March shows the number of permits issued during that month to be 266 for which the estimated cost of construction was given as $507,000. The totals aggregate considerably less than those for the corresponding month of 1911 when the permits numbered 299 and the estimated cost of construction was $699,000. The permits issued for January and February, however, were much above the average in total cost and building operations now under way are of record-breaking proportions.

A statement recently issued by the secretary of the Bureau of Publicity of the Chamber of Commerce sets the amount of investment in big buildings now in course of erection or for which plans have been completed and erection is to be started immediately at $8,500,000, exclusive of the smaller industrial and residential operations, of which there are the usual number.

The larger proportion of the permits for the month just closed covered residence construction, although a fairly good amount of the cost column represents commercial and industrial structures. The more important of the buildings included in the month's report, or for which plans have been completed are as follows: Eight-story steel-frame office building for the Buffalo Natural Gas Fuel Company, $250,000, from plans of Architects Wood & Bradney, Mutual Life Building; six-story store and office building for Harlow C. Curtiss, $50,000, from plans of Architect Paul F. Mann, Mutual Life Building; six-story store and loft building for Hays-Schoepflin Co., $50,000; four-story store and loft building for W. M. Schultz, $35,000; four-story warehouse for D. Ullmans Sons, 100 x 300 ft.; four-story warehouse for the W. L. Loeser Co., $35,000; machine shop storehouse and office building for Empire Limestone Co., $30,000; addition to machine shop Atlas Works, Standard Oil Co.; two-story addition to silk mill, Guilford Mfg. Co.; addition to plant of the Linde Air Products Co., Chandler St.; factory and laboratory for the Foster-Milburn Co., Main and Bryant streets, $60,000, from plans of Architects Colson & Hudson, 35 Dun Building; New York State Research Hospital for Study of Malignant Diseases, $50,000; Polish Library Building for the Adam Mickiewicz Library Association; Polish Club House for the Moniuszko Singing Society, $28,000; addition to the Nardin Academy for Girls, Cleveland avenue, stone and brick school, 75 x 200 ft., three-stories, for the Church of the Annunciation, R. C., from plans of Architect G. Morton Wolfe, Ellicott Square Building, $46,000; church and school for All Saints R. C. Church, Essex and Henrietta avenues, from plans of Esenwein & Johnson, Ellicott Square Building, $50,000; church edifice for the Normal Park Methodist Church, Barton and Albany streets, from plans of Martin C. Miller, 1069 Mutual Life Building, $30,000; new Masten Park High School (to replace building recently destroyed by fire), $500,000, forty-five frame dwellings at Satler Park (in addition to fifty-two dwellings now being constructed), for John G. Satler, and a brick and stone residence, Bryant street, for Arnold B. Watson, $35,000, from plans of Architects Lansing, Bley & Lyman.

Canton, Ohio

The Canton Builders' Exchange has just been organized with 30 members and has secured quarters in the Savings and Loan Building at 206 West Tuscarawas street, the rooms being centrally located and admirably adapted for the purpose.

The officers elected for the ensuing year are:

President.. ....Chas. M. Kilgore
Vice-President............John L. Van Kirk
Treasurer...................Louis E. Deuble
Secretary...................Chas. R. Kumpf

The above officials with Charles E. Bowen, John W. Walter and Eli Knobb constitute the board of directors. These men are all prominent in the city and cannot fail to give the organization prestige.

Chicago, Ill.

The first three months of 1912 were disastrous to building operations in Chicago, as cold weather and heavy snows greatly reduced the number of building permits usually issued during the first quarter of the year.

During January, February and March, 1912, there were 1539 permits issued with a total frontage of 39,671, as compared with 2221 permits, with a total frontage of 60,874 feet for the corresponding period in 1911. The total estimated cost of building authorized the first three months of 1912 was $10,520,000, as compared with $16,963,600 for a similar period last year.

March, usually a very active month in building operations, shows a record of only 672 permits, with frontage of 18,531 feet, and a total estimated cost of $4,743,600, while March, 1911, had a record of 1199 permits, with frontage of 32,580 feet and a total estimated cost of $9,553,700.

Favorable weather coming about the first of April brought with it a boom in building that had been delayed by the unfavorable weather preceding. During the first thirteen days of April the permits issued showed an aggregated estimated cost for construction of $3,829,550, and on this basis the month will show a total of about $10,000,000.

Cincinnati, Ohio

Adverse weather conditions during March are again to blame for a rather unsatisfactory showing during that month. Exclusive of plumbing inspections and elevator permits 717 building permits, carrying a total valuation of $868,305, were issued in March. In this total are included 47 billboard permits, having an estimated valuation of

$2,607; and it is rather curious to note the rapidly increasing number of billboard permits taken out each month.

March, 1911, has a showing of 661 permits issued, valued at $1,099,540, but a number of manufacturing buildings were included in that month's estimate.

Although March, 1912, was behind the corresponding month of last year, it was a decided improvement over February, which only had a record of $390,324. In fact, the total valuation of improvements for both January and February is only $580,399.

As our previous month's report indicated, both architects and builders expect a very busy summer season. So many plans have been delayed on account of the weather that it is quite probable when the rush does begin there will be trouble in securing enough skilled labor in this section of the country.

A great deal of residence work is either under way, or planned, in the suburbs of Norwood and Oakley.

A. H. LeRoy, of the James Griffith & Sons Company, Cincinnati contractor and planing mill operator, delivered a very interesting address at the monthly meeting of the Builders' and Traders' Exchange, March 4. His subject was the "Cost Study Movement."

Cleveland, Ohio

Building operations became very active during the early part of April. Builders got a late start this season because of the cold weather, which lasted through the greater part of March, and weather conditions had the effect of making a light volume of permits during the first two months of the year. The number of permits, however, during March was large, there being 677 permits issued during the month for buildings to cost $998,230. Of these 174 were for frame structures to cost $378,155; and 61 were for brick, stone and steel buildings to cost $403,840, while 442 were for additions and alterations amounting to $220,730.

The building outlook is very favorable in all lines of construction. A number of good-sized contracts for office, store and hotel buildings have been made during the past few weeks and a very satisfactory amount of additional work is being figured on by contractors.

Dayton, Ohio

Building conditions in Dayton seem to be in exactly the same status as in many other sections of the country, i.e., prospects are very encouraging for plenty of work during the season, but the severe winter and late coming of spring weather have delayed the awarding of contracts. Quite a good deal of residence work has already been figured, but it requires a few nice sunny days to assist the owner in making up his mind to proceed with the work.

Contracts have been awarded recently for the erection of two Carnegie branch libraries, one in the east and one in the west section of the city, at an estimated cost of $25,000 each. Plans are in progress for an 11-story steel and brick addition to the Reibold Building. Architects will soon be ready for bids for a $275,000 Y. W. C. A. Building at Third and Wilkinson streets. Excavation has been started on the new Post Office and Court House.

Plans will be completed in 10 days for concrete, steel and brick car barns for the Oakwood Street Railway Company. The Ohio Electric Railway recently awarded contract for a $15,000 freight house to be erected on Kenton street. The People's Street Railway Company will build an extensive addition to its car barns. The Dayton Light, Heat & Power Company has acquired a large tract in South Edgemont on which a large power station will be erected in the near future.

La Crosse, Wis.

The officers elected at the permanent organization of the Builders' Exchange, New York City, are as follows:

President....................O. J. Sorenson
First Vice-President...........John J. White
Second Vice-President...........W. F. Baker
Treasurer........................A. Kohlhaus

Nearly 50 contractors and builders are members of the new organization and it is expected to increase the number to 100 in the very near future.

Lima, Ohio

The new Builders' Exchange recently formed at Lima has upwards of 40 members and is well started on what promises to be a successful career. A smoker and rally meeting was held on the evening of April 4th and was largely attended by representative builders and material dealers of the city. A feature of the evening was an address by Edward A. Roberts, secretary of the Ohio State Association of Builders' Exchanges, who emphasized both the direct and indirect benefits of such organizations and outlined some of the obstacles to be encountered in their operation.

New quarters have recently been entered by this Exchange and are in charge of John P. Maynard as secretary-manager.

Los Angeles, Cal.

Building operations for the first quarter of 1912 have surpassed all former records, the permits issued exceeding those of the same period last year by 900, while the increase in valuation is over $1,000,000. For March, however, the volume of new work fell off materially, the latter part of the month being comparatively quiet. The month's valuation altogether amounted to $1,687,780, compared with $2,152,963 for February and $2,122,886 for March, 1911. While a few rather large buildings were started last month, the average value was comparatively small, showing another marked gain in the construction of dwellings and bungalows of moderate cost. The number of permits issued last month was 1137, against 967 for the same month last year.

One of the most important items of the next few months will be the construction of a large number of school buildings, two of which, to be erected at once, will amount to $400,000. The Board of Education has considered plans for four schools to cost about $130,000, and on May 2 will consider plans for four more, to cost about $355,000.

Another feature worthy of comment is the number of churches for which plans are under way. Architect Elmer Grey has completed plans for a fine edifice for the First Church of Christ, Scientist, and the Baptists are figuring on a $50,000 building. Magnus Johnson has taken a $40,000 contract for an Episcopal church at Santa Barbara, Cal.

The Pacific States Investment Company has taken a contract for the construction of a $60,000 apartment house on Figueroa street, near Fifth, for Jesse Rains, the plans being by Architect E. C. Andrus.

Among the principal buildings for which plans are about ready are the following: The Children's Hospital, a semi-public enterprise, at Sunset Boulevard and Vermont avenue, to cost about $150,000, Hunt & Burns, architects; a 12-story office building at Sixth and Hill streets, for the W. I. Hollingsworth Company, to cost about $1,000,000; a 15-story office building for Sixth street, adjoining the Consolidated Realty Building, to cost about $1,000,000, Thornton Fitzhugh, architect; and a 9-story hotel on Figueroa street, near Sixth, to cost about $180,000, Anton Rief, architect.

A picturesque hotel, to follow the lines of a mediæval castle, has been planned by Alfred Priest for the Canyon Castle Corporation, to be built at a cost of $85,000, in Laurel Canyon, on the road to Lookout Mountain, near this city. It will be built of concrete.

Memphis, Tenn.

The members of the Builders' Exchange enjoyed a "smoker" on the evening of March 18, when they had for guests a number of the architects of the city. In fact, it was the first time in several years that the architects and contractors had been brought together in this way, the "smoker" affording excellent opportunity for a most interesting discussion of building matters and of the relations existing between the two important factors in the development of the city.

The "smoker" followed the regular monthly business meeting of the Exchange, and when the social feature had made due progress President Charles R. Miller, as master of ceremonies, introduced the several speakers, all of whom were prominent architects of the city. G. M. Shaw was to have been the first speaker, but at the last moment he was prevented from attending and his address was read by Mr. Miller.

Mr. Shaw urged a better understanding between the contractors and the architects, and expressed himself as being confident that the Builders' Exchange would within the next few years be a vital factor in the development of this section of the country. In touching upon the question of opening bids in public at a stated time he expressed the view that on some occasions this plan would work satisfactorily and upon others it would not. It was a matter which should be left to the discretion of the architect and the owner.

The next speaker, Max H. Furbinger, a member of the firm of Jones & Furbinger, recommended that the Builders' Exchange adopt as few rules as possible and enforce them. He favored the public opening of bids whenever consistent, but did not endorse the plan as a standard regulation. There were times, he said, when it was not for the interest of any one concerned to open the bids in public, and then, too, it was often impossible owing either to the laxity of contractors in not promptly submitting their figures or to non-attendance of the owner at the proper time.

Vincent A. Smith of the firm of Alsup & Smith, pleaded for closer affiliation between architects and contractors. It was within the power of the contractors, he said, to either materially assist or to greatly embarrass the architects in their efforts to obtain the best results. He, too, favored public opening of bids whenever it was possible.

John Gainsford advanced the "City Beautiful" idea. Memphis, he declared, had vast possibilities in this respect and could be made one of the prettiest cities in the country. He asserted that the builders should insist upon legislation that would make unsightly frame shacks and single roofs an impossibility. Cheap houses erected by unskilled labor, he said, were a menace to any community, and he did not hesitate to state that there were about four times too many of them being erected within the limits of the city.

He complimented Dan C. Newton, building inspector, for his rigid inspection of the fire escape ordinance. No building is absolutely fireproof he said; even in our tall office structures there is enough inflammable material in the rooms as furnishings to cause sufficient heat to warp the steel girders. He touched briefly upon the business ability of contractors, whom he declared should not be forced to rely upon the figures of the sub-contractors, but should know their business thoroughly enough to have all necessary information at their fingers' ends.

Nashville, Tenn.

The building outlook is regarded as of a most encouraging nature by architects and builders in this vicinity, and with the season opening somewhat earlier than usual and the conditions favorable, a goodly total for the year is expected. In fact, the impression prevails in many quarters that this will be one of the busiest seasons in the building lines that Nashville has witnessed in many years. Quite a number of handsome buildings are in course of construction in various sections of the city and architects have plans for many others for which contracts are about being awarded.

According to Secretary Evans of the Builders' Exchange the first three months of the current year have shown fully 50 per cent. more business than for the same period a year ago. The buildings thus far planned have ranged in cost from $5,000 to $20,000 each and the members of the Exchange feel much elated over the splendid building prospects. Mechanics are busy and are likely to have all the work they can handle.

The total value of the improvements for which permits were issued in March is $75,163, which is not up to the average, but it is an increase of $4,000 over the previous month.

Newark, N. J.

A slight falling off occurred in the number and estimated value of building improvements planned last month as compared with the same period a year ago, but there is nothing in the situation to justify discouragement. The report of William P. O'Rourke, Superintendent of Buildings, shows that 276 permits were issued last month for buildings estimated to cost $790,234, while in March a year ago 297 permits were taken out for construction work involving an estimated outlay of $1,027,228.

For the first three months of the current year the permits issued were 552 against 708 in the corresponding period last year, while the figures representing the estimated value of the improvements were $1,858,067 and $2,422,499, respectively.

Oakland, Cal.

Local building operations are steadily increasing, and, though the year began rather quietly, the amount of new work undertaken last month was well up to the average of last year. The total valuation of building permits for March was $759,858, compared with $515,593 for February, while the valuation of $1,027,756 for March last year was rather out of the ordinary. It is difficult to make any predictions for this month, as there are many plans on the boards which may not be ready for figures before the middle of summer. It is certain, however, that a very large amount of residence work will be undertaken in April and May, and a great part of last month's total is made up of this class of work.

The largest contract let of late was for the Kahn Bros.' department store, which will be the largest structure of the kind in the city. The steel work will be done by the Judson Manufacturing Company, a local concern, which is also working on the new city hall.

Arrangements are rapidly being completed for the many schools which are to be erected this year. The Board of Education has presented a requisition to the Board of Works for plans for the proposed $600,000 Manual Training School at Fifty-fourth street and Broadway, which has been contemplated for several years, and architects have been named to draw plans for twelve school buildings and additions, costing from $65,000 to $160,000, and totaling $2,483,900. This work will include many different classes of construction.

The local Woodmen of the World have made financial arrangements to carry out their proposed structure, to cost about $149,000. Other projects to be figured in the near future are: A 6-story apartment house at Fifteenth and Jefferson streets, to cost $125,000, A. W. Smith, architect, and the reconstruction of the frontages of the Macdonough Theatre building, W. J. Mathews, architect. Plans for a $75,000 school at Richmond, north of this city, are being drawn by Architect L. L. Stone.

Local contractors and material dealers met April 5 with the directors of the Chamber of Commerce to consider means of keeping municipal work for local dealers and contractors. The material men have been aroused by the awarding of plans for school work, etc., to architects of other cities, which is expected to result in the purchasing of materials, etc., in other places unless a firm stand is taken by local commercial bodies. It is stated that the Mayor was pledged before election to give municipal work as far as possible under the charter to local architects, contractors and dealers.

Paterson, N. J.

According to the figures compiled in the office of Building Inspector Quigley, there were 188 permits issued in the first quarter for building improvements estimated to cost $481,900, while in the first three months of last year there were 224 permits issued for building improvements to cost $297,938.

The season is starting out with everything to encourage the builder and the permits which are being filed show a strong tendency to increase month by month over last year. In March there were 106 permits issued, calling for an outlay of $311,245, while in March of last year 118 permits were taken out, which involved an estimated expenditure of $238,885.

Philadelphia, Pa.

Records for the first quarter's building operations do not compare very favorably with those for the first three months of 1911. Extremely unfavorable weather conditions were an important factor, although the expected decrease in small dwelling house operations has had a material influence on the situation. Statistics compiled by the Bureau of Building Inspection show an authorized expenditure of $6,986,300 for 3021 operations in the first three months of this year, while during the same period in 1911 the expenditure was $10,151,390, covering 4184 operations. The most important decline in any one class of work was in 2-story dwelling houses, the approximate cost of which during the first quarter of 1911 was $5,611,600, as compared to $2,711,040 in the past three months. The number of dwellings on which work was begun during the respective quarters was 2468 in 1911 and 1278 in 1912.

With the opening of the building season a considerable volume of delayed work has been started, so that the month of April should show a very material increase. In addition to this the statistical position should be materially improved by permits for several large office buildings, hotels and club houses, such as the Stock Exchange Building and the Manufacturers' Club, work on which is under way, although actual construction has not been started.

During March permits were issued for 1633 operations, estimated to cost $3,691,895, an increase of 838 permits and a gain of $1,662,510 in estimated cost over February, but a sharp decline when compared with March last year, when 2501 operations, costing approximately $5,581,295, were authorized. The comparative statistics between March, 1911, and this year, indicating a decline of $1,889,400, was almost entirely made up in the falling off in dwelling house operations, the past month showing a decline of $1,722,470 alone in this class of work. For apartment and tenement house work permits were taken out aggregating $180,000, involving six operations. The total expenditure, $1,168,955, under the class of additions, was materially augmented by the permit for the Bellevue-Stratford addition, amounting to upwards of $800,000.

Plans are under way for a Real Estate and House Building Show to be held in the First Regiment Armory, May 22-29. It is proposed to show various types of houses by models and drawings; a very complete exhibit of specialties in the way of construction will also be shown.

E. Allen Wilson, architect, is preparing plans for 17 flat houses to be erected for James Steele, at Fifty-fourth and Chestnut streets. They will be of brick, two stories high and each 18 x 63 feet in plan.

Baker & Dallet, architects, are taking bids for a marble, stone and brick 1-story bank building, 36 x 112 feet, to be erected in West Chester, Pa., for the First National Bank of that city.

A project is under way for the construction of a club house for the Philadelphia Athletic Club, at 1108 to 1114 Walnut street, to cost $600,000. Plans are by Barnett, Haynes & Barnett, care C. H. Genslinger, North American Building. The proposed building is to be 17 stories, of steel, brick and terra cotta.

A site for a 10-story fireproof apartment house, at 1500-1502 Pine street, has, it is stated, been acquired by McIlvain & Company. The property has a frontage of 40 feet and a depth of 130 feet. Plans for the improvement are being made by McIlvain & Roberts.

John H. McClatchy is reported to have purchased a plot of ground 250 x 214 feet at Forty-eighth and Chestnut streets, which is to be developed by the erection of a number of 2-story dwellings.

Among the various dwelling operations on which work has been recently started may be mentioned an operation of 63 2-story houses, costing $143,000, by Burton C. Simon, in the vicinity of Twenty-second and Jackson streets. George Edel has started work on 58 2-story houses at Ontario and High streets. An operation of 49 dwellings and two stores has been begun by Harry Brocklehurst in the vicinity of Darien and Luzerne streets. The houses will be 2-story, 16 x 34 feet, the estimated cost of the operation being $113,000. John W. Shisler is building 52 2-story dwellings in the vicinity of Front and Dufor streets, while Martin Maloney is beginning work on an operation of 25 2-story dwellings at Fifty-eighth and Pine streets.

Portland, Ore.

Building operations are normally active for this time of year, the value of buildings for which permits were issued last month being greater than for the same period in 1910—Portland's record building year. The total given out by the building inspector is $1,750,414, compared with $1,199,861 for February and $1,993,648 for March of last year. The gain over last month is considered highly satisfactory, especially in view of the large number of plans which are nearing completion. The number of permits for March—932—is the largest ever recorded for that month, and while the permit for a dormitory of Reed College, amounting to $250,000, is the largest since the first of the year, most of the other work undertaken is of a small nature. In fact, the quarter just closed has been remarkable for the amount of residence work. While the great majority of this work has been on small, low-priced dwellings, the last few weeks have brought out considerable activity in residences of fairly good construction, ranging in cost from $6,000 to $12,000. The cheapness of lumber in this market keeps it far ahead of all other materials for residence work, though the climate necessitates more expense on a building of the same size than is required in California.

The largest contract recently let was for the Sullivan & Considine theatre at Seventh and Yamhill streets. The steel work will be furnished by the U. S. Steel Products Company for $39,000.

Plans are under way for several important public buildings. Architects Whitehouse & Fouilhoux are working on plans for the $200,000 Failing School, to be erected this summer, and the plans of Architect Emil Schacht & Son have been accepted for the new city jail. The latter building will be five stories high and will cost $156,000. The elevations show it to be, from the outside, one of the most attractive buildings in the city.

Other projects which will soon be up for figures are the following: The Waverly Golf Club house, to cost $90,000, Whitehouse & Fouilhoux, architects; a 3-story tapestry brick and stone apartment house, Emil Schacht & Son, architect; a 10-story steel and concrete office building at Seventh and Morrison streets, and a brick home for the Portland Women's Union, to cost $150,000.

Sacramento, Cal.

Showing a steady increase since the first of the year, local building activities are now about normal. The official valuation of buildings for which permits were issued last month is $210,834, compared with $104,465 for February and $173,268 for March, 1911. This total can obviously include no buildings of much individual importance, though several business structures of permanent materials are under construction. The character of residence work, on the whole, is improving, though wooden buildings of this class are the rule. About the largest contract let last month was for a theatre for Chas. Godard, which amounted to $26,500.

The State architect, M. I. Diggs, recently completed plans for the new Normal School at Santa Barbara, Cal., which will be a concrete structure in Spanish Mission style, containing 25 class rooms and costing $150,000.

Since then Mr. Diggs has resigned, and it is announced that no successor will be appointed. Instead of a State architect there will be a superintendent of construction, and consulting architects will be employed in the leading cities. Allison & Allison have been engaged for this purpose at Los Angeles, and a San Francisco architect will be named later.

San Diego, Cal.

The past month has brought out a substantial volume of new work, and the local building trades are in a healthy condition, though no records are being broken. Just at present operations are somewhat interrupted by strikes in certain industrial lines, but this trouble is not expected to continue.

The valuation of building permits for March was $537,690, compared with $494,688 for February and $549,660 for March last year. The largest job undertaken is the $105,000 hotel for J. M. Anderson, plans for which were filed with the inspector March 14. Several other large jobs in prospect have been held up owing to the new building ordinance which limits the height of buildings in an apparently unreasonable manner.

The High School Board opened bids April 1 for a Polytechnic School, the Pacific Construction Company being lowest at $153,594, not including a $17,000 heating job. Another 2-story concrete school, costing $80,000, will be built this summer. Architects Quayle Bros. & Cressey have completed plans for a $50,000 department store for Lubin Bros., and Architect Richard Griesser, Chicago, has sent plans for the new $30,000 brewery of the Bay City Brewing Company. Architect I. J. Gill is drawing plans for a $30,000 residence for Nelson E. Barker, a local banker.

San Francisco, Cal.

The optimism noticed early this year as to local building conditions was well founded, as indicated by the marked increase in activity during the past month. The total valuation of buildings for which permits were issued in March was $2,593,780, the highest record for this month made by any city on the Coast. The total for the previous month was $1,764,252, and for March, 1911, it was $2,090,703. There is nothing in the present situation to indicate any great decrease in the immediate future, as many good-sized projects are about ready, but permits have not yet been issued. Plans are under way for an unusual amount of costly work. The greater part of the increase is in frame construction, and reports from building contractors show increasing attention to dwellings, and still more to frame apartments in the western and southern portions of the city. Contracts have been let, however, for several large permanent structures, and April will doubtless bring an increase in this class of work.

A firmer market is noted for the principal materials used in concrete construction, cement having advanced 10 cents per bbl., and crushed rock being in good demand, though reinforced steel is a little unsettled. Lime is a little steadier, and brick remains firm at $7.50 per M., with a greatly increased demand. Pressed brick and terra cotta are also in much better demand than for months past, and many large marble jobs are pending, though the cut stone trade is rather quiet at the moment. Most of the structural steel contracts let recently have been at very low prices, eastern fabricators being anxious for work in this market. The lumber market is very strong, and some descriptions are higher, supplies being slightly curtailed by a strike at the Gray's Harbor mills.

The fact that apartments are by no means monopolizing the attention of local builders is shown by the nature of the principal contracts recently let, which include several places of amusement. Aside from the Tivoli Theatre, on which figures were taken about the end of March, contracts have been let on a $150,000 theatre for the Boston & San Francisco Amusement Company, the steel going to Milliken Bros., and the concrete and carpentry to N. A. McLean. The architects are Cunningham & Politeo. Architect Wm. Beasley has also let contracts for a $150,000 theatre on Fifth street, the front of which will be of white marble. The largest single contract placed during the month was for the 5-story reinforced concrete department store for Hale Bros., Inc., Reid Bros., architects, the general contract for which was taken by MacDonald & Kahn at about $354,000. Another job of some importance is a 6-story Class A building on the A. B. McCreery property on Pine street near Sansome, Chas. Paff, architect, to cost $100,000. The Portland Concrete Pile Company has the foundation work and the Ralston Iron Works will furnish the structural steel.

Among the important jobs to be figured shortly are the following: A 7-story steel frame building of 210 rooms at Mason and O'Farrell streets, to cost $250,000, Cunningham & Politeo, architects; an 8-story brick and steel apartment house at Maple and Washington streets, to cost $100,-

000, Frye & Schastey, architects; a $70,000 brick and steel apartment house on Bush street, near Jones, C. H. Barrett, architect; a 6-story Class A apartment house for Emily V. Flood at O'Farrell and Taylor streets, to cost $85,000, Salfield & Kohlberg, architects; the Wigwam Theatre on Mission street, to cost about $80,000, W. H. Crim, architect, and a 6-story reinforced concrete apartment house at Van Ness avenue and Bush street, estimated cost $85,000, MacDonald & Applegarth, architects. The First Congregational Church has received plans for a $250,000 edifice to be erected at Post and Mason streets.

The activity in frame apartment houses will be checked by a recent decision on the illegality of the 7-ft. basement, as no more permits are being issued for buildings of this type. The State law limits frame apartment houses to three stories and a cellar, which must not be more than 4½ ft. above the curb, and the excavation involved is frequently found unprofitable.

The new mechanics' lien law, passed through the 1911 Legislature, after much effort on the part of sub-contractors, material men and workmen, has been brought in question by a suit by a plumbing specialty manufacturer against the owner of the building, the general contractor and the plumbing contractor. It was rumored that Judge Graham had pronounced the lien law invalid, but this is not the case, the decision merely necessitating an amendment of the complaint. It is expected that the case will be carried to the higher courts, and the material men will make every effort to uphold the law.

D. G. Craig, Pacific Coast manager for the Beaver Company, manufacturers of "Beaver Board," has been looking over the Pacific Coast cities with a view to establishing branch factories. He announces that a plant will probably be started near San Francisco and another at Portland, Ore., or Seattle, Wash.

Architect John Galen Howard, professor of architecture of the University of California, recently declined an invitation to become head of the school of architecture of Columbia University. This action was due to his attachment for California and his work in connection with the university, where he has charge of the development of the Phœbe A. Hearst architectural plan, as well as his important work in connection with the municipal buildings of San Francisco.

At the annual meeting of the Builders' Exchange in San Francisco, held at their headquarters, 180 to 188 Jessie street, officers for the year ending March 31, 1913, were elected as follows:

President....................James A. Wilson
Vice-President..................E. J. Brandon
Secretary.....................R. J. H. Forbes
Treasurer..................C. W. Withington
Financial Secretary.........S. A. D. Schenck

The annual report showed the Exchange to be in good condition and that during the year the membership materially increased until now it stands at 497.

A feature of the Exchange is that the entire membership make it a practice of assembling daily between the hours of 12 and 2 and in this way have opportunity of becoming better acquainted with each other. The large assembly room at the "noon hour" is a veritable beehive where business is transacted and friendships renewed. This get-together spirit facilitates business and establishes confidences to such an extent that verbal contracts are made every day running into thousands of dollars and seldom or ever is one of them repudiated.

In addition to the general assembly room the Exchange has on the second floor 20 figuring rooms, a directors' and an assembly room, which members can use for estimating on their work or associations of contractors can hold their meetings.

The organization also has an office building in connection with and owned by the Exchange, all of which tends to bring members in closer touch with each other, and while the keenest competition takes place on all work the members show special pride in the upbuilding of the Exchange as well as of the city.

Seattle, Wash.

The filing last month of the permit for a $300,000 office building is in part responsible for the better showing of projected building construction, the total figures for March representing an increase of a trifle more than $100,000 in the estimated cost of the projected improvements as compared with the corresponding month a year ago. Residence construction was not quite up to last year, but the situation considered as a whole is of a most encouraging nature and the season now under way is full of promise. According to the report of Superintendent R. H. Ober of the Department of Buildings, there were issued in March 914 permits for buildings valued at $848,985 as contrasted with 1179 permits for buildings valued at $737,640 in March a year ago.

Of the above totals 6 permits were for store and office buildings valued at $318,140, as against 8 buildings of a similar nature planned in March, 1911, to cost $11,400. There were 208 detached dwellings planned last month to cost $297,785, as against 257 dwellings planned in March a year ago, to cost $352,265.

For the first three months of the current year the department issued 2451 permits for building improvements, valued at $2,097,735, while in the corresponding period last year 2803 permits were issued for building improvements valued at $1,734,890. From these figures it will be seen that the year is starting out under somewhat more favorable conditions than was the case a year ago.

Builders' Appliances and Equipment

Some Things of Seasonable Interest to Those Having To Do with the Building Business

Hints on Oak Flooring

Withing the covers of a booklet of a size convenient to carry in the pocket and compiled by W. L. Claffey, 403 Hammond Building, Detroit, Mich., is to be found valuable information for the handling, laying, scraping, finishing and care of oak floors. Every detail from the bundle to the finished floor has been carefully written so that it may be easily understood by even the laymen.

The booklet which refers to oak flooring as "the king of flooring" contains in addition to the above information the revised grading rules, the standard widths of oak flooring and the method of ascertaining the amount of flooring required for any specific space.

The finishing of an oak floor is referred to as a very important feature upon which authorities fail to agree, but the question resolves itself into a matter of cost as to the color or brilliancy of finish desired. Personal taste, the author states, as well as artistic or decorative effects are the guide for the floor finisher. Wax finish is described, also varnish finish and what is known as floor oil finish. Emphasis is laid upon the profitable nature of laying oak floors by carpenters and contractors, more especially during the season when outside work may be delayed. The matter is arranged with a great deal of care, as Mr. Claffey has handled his subject in a manner which shows thorough familiarity with all its various details.

Titelock Metal Shingles

The Milwaukee Corrugating Company, Milwaukee, Wis., and with branch at Kansas City, Mo., is distributing miniature shingles 3½ x 2 inches in size, which are, in design and construction, exact duplicates of the large Titelock shingles made for practical use. This company is carrying on an educational campaign, knowing that only by the most persistent efforts can a large proportion of the people be made to appreciate the importance as to why the old-time inflammable, undurable wooden shingle should be relegated to the background to make room for the shingle made from a good grade of metal, of popular style and design, with locking features to insure a waterproof roof. Among authorities quoted is Frank Lock, United States manager Atlas Insurance Company, who in an address before the Chamber of Commerce, Richmond, Va., said, in part: "If I were asked to name the one condensed evil, productive of the greatest fire loss, apart from the carelessness to which I have referred, I would name shingle roofs. They are wholly bad and should not be tolerated in any state or city where they are on buildings within reasonable reach of any other buildings. Twenty-seven per cent. of all fire losses are due to exposure; that is, they are spread from one building to another, and the main cause of exposure fires, apart from unprotected windows, is that of shingle roofs."

The fire insurance companies and their experts are very emphatic in their denunciation of the wooden shingle. The "Quarterly Bulletin" of the National Fire Protection Association says: "Wooden shingles are the principal American conflagration breeders. When dry they ignite like tinder when flying sparks or brands alight upon them. Once a shingle roof is on fire the draught of the flame tears off the light shingles and carries them to other roofs, to be ignited in turn and in their turn furnish new flying brands."

The experimental stage in metal shingles has now passed, as is demonstrated by the samples that can be obtained from the Milwaukee Corrugating Company, and while it is unfortunate that so many dwellings in this country have wooden shingle roofs the situation will steadily improve, as architects and contractors are realizing that their patrons should be properly advised and if possible induced to protect their property against damage from fire.

Ornamental Concrete Illumination Standards

The benefits to be derived from better street lighting are widely recognized, for it is a fair assumption that the value of a business location is directly proportionate to the number of people who pass it. The crowd will generally follow the light and especially so if the illumination is presented in an artistic and attractive form. Property on any public thoroughfare can be increased in value, as can the streets tributary thereto by a good system of lighting, and this applies with equal force to residential districts and boulevards. In public park development the ornamental illuminating standard is almost as indispensable to the artistic scheme as is its primary purpose of illumination. The latest and highest development in connection with ornamental illumination has resulted in the reinforced granite concrete standard, the artistic possibilities of which are practically unlimited. The Doric design illustrated in Fig. 1 is a good example of what can be done. This standard was produced by the Pettyjohn Company, Terre Haute, Ind., and has the granite finish with all the appearance and durability of granite. The use of this standard on Wabash Avenue, Terre Haute, is one of the best examples of what it can accomplish in the dual purpose of illuminating satisfactorily, while adding to the attractive appearance of the street.

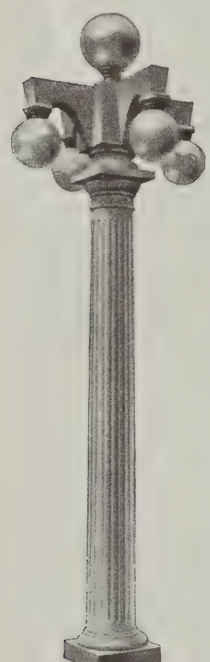
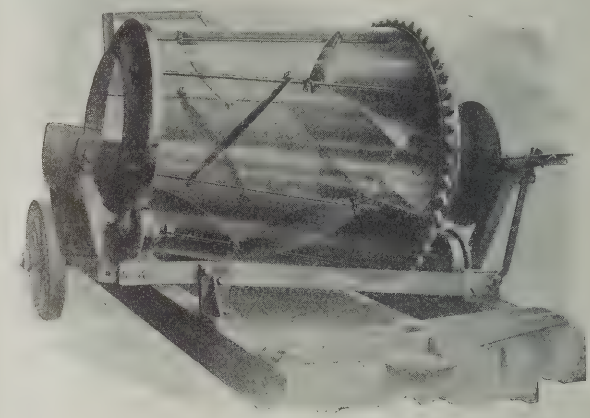


Fig. 1—Ornamental Concrete Illumination Standards

The standards are molded in heavy substantial cast iron molds from material of a special formula containing crushed granite. All members are reinforced during the process of manufacture, four corrugated bars ½ in. in diameter being used longitudinally and seven ⅜ in. diameter corrugated bars bent to a circular shape and placed 1 ft. apart. The standards are molded hollow so as to permit of the insertion of gas pipes, electric wires and conduits, and when erected this central space is filled with slush concrete and reinforced with rods so that the standards are then solid and substantial. After the molds are removed the standards are given a surface treatment which brings out the life, sparkle and glitter of the natural granite. Later on they are given another surface treatment which has the effect of rendering the standards thoroughly waterproof. In addition to granite concrete the standards are also made in pure white, several shades of gray and buff, and upon special order are made to match various kinds of natural stone. The design of standard here illustrated is but one of many stock designs which the company is prepared to furnish and can supply special designs and sizes with various surface texture according to requirements. The company has issued a very attractive catalogue entitled "Ornamental Illumination," which deals with the subject in a way to attract widespread attention, and a copy can be had on application.

Northwestern Concrete Mixing Machine

It is generally recognized as a fact among contractors and builders making use of concrete to any appreciable extent in connection with their building operations that one of the first things to be considered in a concrete mixing machine is the mixing principle. No matter how well the machine may be constructed or how much it may weigh or cost, if it will not turn out a satisfactory mix in a short space of time it is a poor mixer. A machine which is



Northwestern Concrete Mixing Machine—Fig. 2—View Showing Interior Mechanism

claimed to be so constructed as to give entirely satisfactory results in operation and to combine the mixing principles of the cone, the cube, the polygon and the cylindrical shape machines is that which is illustrated herewith and which is manufactured by the Northwestern Steel & Iron Works, 1056 Spring Street, Eau Claire, Wis. It is known as the Northwestern Cone Batch Mixing Machine and is claimed to combine the mixing principle of scattering and shifting the material back and forth. The bottom slopes toward the discharge end which carries the material away from the loading end. Paddles are placed at various angles and in different positions to shift the material back and forth and it is picked up and scattered in all directions by means of a scoop. One of the features to which special attention is invited is the low down opening which is only waist high, thus enabling the workmen to shovel the material directly into the drum, while the opening is so large that a half dozen men can load into the mixer without interfering with each other. Low loading platforms only 24 to 30 in. high may also be erected and the material dumped directly into the drum with wheelbarrows if so desired.

In Fig. 2 of the illustrations is shown the interior mechanism and affords an excellent idea of the adjustable paddles; the method in which they are fastened and the ease with which they can be moved into different positions and angles by simply loosening the nuts and straps. The illustration also shows the chute and the manner of discharge. The square door shown at the right is bolted to the drum head and swings inward. When the door is shut the drum is closed and the material flows through the end of the chute. When the door is swung open the material flows out the front of the machine. If open a few inches the ma-

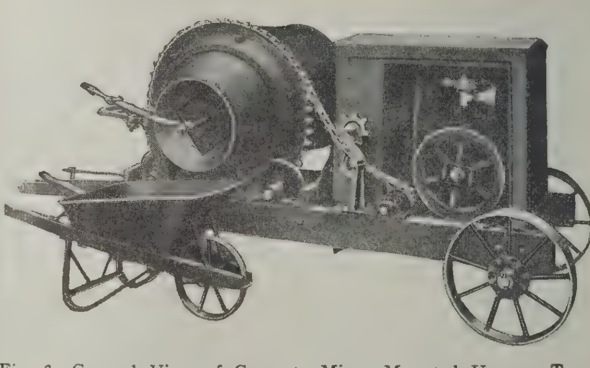


Fig. 3—General View of Concrete Mixer Mounted Upon a Truck

chine will discharge an ordinary wheelbarrow of wet material in one revolution, or if swung all the way back it will dump the entire contents in about three revolutions, making it very slow, medium or very rapid, as desired. An examination of the picture will also show the self-cleaning features. The machine has chain drive which permits of starting the mixer drum without undue jerking when the power is thrown on and makes a smooth, easy running machine throughout. In Fig. 3 of the illustrations is shown a general view of the mixing machine mounted with gasoline engine upon a truck provided with broad face wheels, so that the whole apparatus can be readily moved from place to place according to requirements. The machine has a capacity of one sack and dumps into the highest wheelbarrow. The drum proper consists of a sheet steel shell connecting two semi-steel cast drum heads. The latter are grooved near the edge and the shell fits into the groove which is packed, rendering the joint water tight. Six long, heavy rods hold the drum heads and shell together, the rods being located about 2 in. from the shell on the inside and serve the same purpose as blades in a continuous mixer; that is, they assist in mixing by breaking up the material and adding to its effectiveness and speed. The mixer is made in all sizes, thus adapting it to meet varying requirements.

The company has issued a very interesting and attractive catalogue in which the merits of the various lines of concrete mixing machines manufactured are set forth and the attention is called to the fact that in addition to the mixer here illustrated the company's line includes pressure block machines, tile machines and a complete line of staggered air space, continuous air space, single and double wall block machines, culverts, etc.

Models of Farm Buildings at Chicago Cement Show

One of the most striking displays at the recent Cement Show in Chicago, consisting of no less than 30 all-concrete models of farm buildings and miscellaneous structures for the farm, was made by the Chicago Portland Cement Company, Chicago, Ill. The space devoted to the display of the models had a frontage of 24 ft. on the main aisle and a depth of 10 ft., and was surrounded by concrete posts and steel and wire fencing. All the models are built to a scale of 1 in. to the foot, the farm house being 22 in. wide, 36 in. deep and 28 in. high. It was a seven-room structure two stories in hight and completely furnished. We understand that the exhibit is now installed in the Record Building, United States Stock Yards, Chicago, where it will remain on exhibition until the state fair season opens.

Improvement in Famous Universal Woodworkers

An important improvement has just been made in connection with the Famous Universal Woodworker in that an iron saw table has been substituted for one of wood and a similar change has also been effected in regard to the ripping gauge. The changes in this machine have been made by the Sidney Tool Company, Sidney, Ohio, in order to give the Famous Universal increased durability and to conform to the company's scheme of "all-steel-and-iron-construction." The increase in the quality of the machine has made no change in the price. Carpenter-contractors and builders are rapidly appreciating the advantages offered by a machine of this character as compared with older styles and the man of moderate capital is

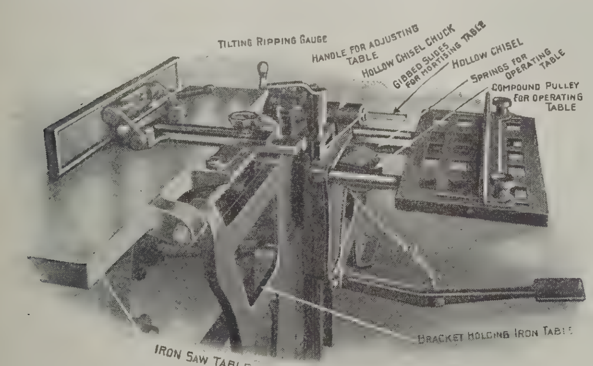


Fig. 4—Improvement in Famous Universal Woodworkers

placed in a position to do his own millwork, thus avoiding the necessity of being obliged to resort to local planing mills with delays often incident thereto. In this connection it is interesting to note the fact that over 1100 Famous Universal woodworkers are in use to-day. Although of comparatively recent origin it to-day occupies a most prominent place in the equipment of the woodworking shop operated by the carpenter-contractor and builder. Three or four years ago there were less than 100 of the Famous Universal woodworkers in use and as the manufacturers express it "the novelty of 1908 is the necessity of 1912—simply because it fills a want." The working qualities of 16 various machines are embodied in the operation of the Famous Universal woodworker, thus permitting a wide range of work to be executed on a single machine. The statement is made that four men can work at the machine at the same time when desired. In Fig. 4 of the accompanying illustrations we show a detail of the improved machine with the names of various parts clearly indicated.

Red Devil Stirrup Loop Sash Chain

The latest specialty in the way of new tools and builders' hardware which the Smith & Hemenway Company, 150 Chambers Street, New York City, is placing

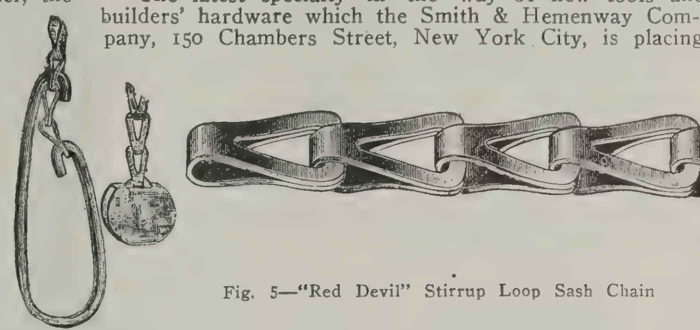


Fig. 5—"Red Devil" Stirrup Loop Sash Chain

upon the market is a sash chain for which strong claims are made. The manufacture of sash chain and sash chain fixtures has been under consideration and experiment by the company for some time past, but the perfecting of a special grade of bronze metal that would add from 15 per cent. to 25 per cent. to the strength of the chain has only just been completed. This latest production of the company is known as Red Devil Stirrup Loop Sash Chain, the general appearance of which is indicated in Fig. 5 of the accompanying engravings. It is claimed that the manufacture is such that a very large percentage of strength is added to the chain as compared with that which is cut in the ordinary square link fashion. The "Red Devil" sash chain is made in all sizes and is finished in bronze, in steel and in steel coppered. It is put up on reels containing 500 ft., and prices, samples, etc., will be sent to any reader of the *Building Age* who may make application for them.

A Seasonable Booklet "Concreting in Winter"

"Concreting in Winter" is the title of an attractive booklet recently issued by the Aberthaw Construcion Company, 8 Beacon street, Boston, Mass. It embodies some of their experience in cold weather reinforced concrete work, extending over a period of 18 years. The booklet is well illustrated, and besides giving a description of the methods used by the Aberthaw Construction Company, it points out why reinforced concrete should be selected for winter work in preference to other types of construction. To factory owners and all who have anything to do with reinforced concrete it will be found interesting, as it shows just what can be done in the winter by experienced concrete contractors. It will be sent free on request to the Aberthaw Construction Company, Boston, Mass.

Greening's and Grimm's Wire Lathing

Within the covers of a very neat and attractive pamphlet which reaches us from the Buffalo Wire Works Company, Buffalo, N. Y., and 30 Church Street, New York City, are set forth in convincing style the merits of Greening's Patent Trussed Steel Wire Lathing and Grimm's Galvanized Corrugated Wire Lathing, for both of which strong claims are made. In the case of the trussed steel wire lathing it is supplied in continuous lengths up to 50 yards with a selvage on each side and in widths to suit the spacing of the studs or joists. Owing to the truss formation of the lathing the company states that it may be stapled or nailed directly along studs, joists or sheathing without the use of furring strips, a feature which cannot fail to be greatly appreciated by practical carpenters and builders generally. When so ordered the company gives the lathing a coating of specially prepared rust-proof paint at a small advance on the prices of the plain lathing.

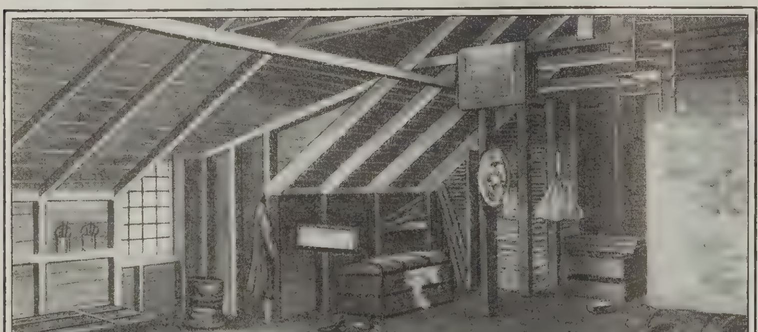
Grimm's galvanized corrugated wire lathing is galvanized after it is woven, thereby soldering each joint as well as covering the entire surface of the wire with zinc, which renders it rust-proof and non-corrosive. The corrugations in the lathing are V-shaped and are imbedded in it at intervals of 6 in. The lathing is applied to walls or ceilings, etc., with galvanized staples and the claim is made that the plaster is so firmly keyed that it will not drop or fall off and that the walls and ceilings will not crack. In the pamphlet attention is also invited to Buffalo Crimped Wire Reinforcing for concrete. It is made of plain steel and also of galvanized wire and can be had in sheets or rolls of any desired shape or size.

New Manufacturer for the Milks Pocket Miter Box

We are informed that a new company has taken up the manufacture and sale of the Milks Pocket Miter Box, which was prominently brought to the attention of the trade through the advertising pages of the *Building Age* in the early months of last year. The new concern for the manufacture and sale of the device is known as the Parsons Tool Mfg. Company, Parsons, Kan., who acquired the patents covering the device on the 16th of October, 1911, filed papers for incorporation on the 20th and now have a fully equipped plant for promptly meeting the demands of the trade. We have been informed that some of those who ordered the tool failed to receive it, and if any of our readers are of this number the new company will be glad to hear from them if they will give date of their order and such information as will be necessary in tracing the order. In taking over the patents covering the Milks Pocket Miter Box the present company did not assume any of the obligations incurred by the former manufacturers but will use their best efforts to assist those who did not have their orders filled to secure one of the tools. The Pocket Miter Box is of special interest to carpenters as well as to paper hangers for mitering moldings and plate rail and for use on the scaffold or ladder in places and conditions where it would be impossible to make use of the common miter box. The Pocket Miter Box, as its name indicates, can be carried in the apron pocket, thus having it within convenient reach wherever the carpenter may be working at the time. The tool will also be found handy and accurate in putting down base boards, base molding, quarter round or cutting flooring. It is made of aluminum and weighs about 7 oz.

Some Applications of Bishopric Wall Board

The tendency of the present day among progressive carpenters and builders is to demand materials which save time, money and annoyance in handling—materials that resist destruction from any cause except the professional building wrecker. The remodeling of a plastered house is always more or less of a bugbear both to the builder and to those attempting to live in the house while the work is in progress. No doubt many a houseowner has done without desired changes simply because of the unbearable nuisance of having old plaster carried out and new plaster



Some Applications of Bishopric Wall Board—Fig. 6—Attic Storage Room

carried into his house. All these annoyances are claimed to be unknown in connection with the use in a building of Bishopric wall board, a product which is made of Asphalt powerfully toughened called "Asphalt-Mastic" and into which lath is embedded as closely as it is ordinarily nailed to studding. The reverse of the wall board is heavy high grade card board, thoroughly sized. It is nailed to the studding so that it is held rigid through all changes of temperature and is claimed to be air-tight, moisture-proof and fire-resisting. Another point is that the wall board is a sound-deadener to a remarkable degree, is vermin-proof and is easily applied. It comes in sheets 4 ft. square, and an entire room can be quickly finished by any one of sufficient skill to drive a nail. The sheets meet evenly at the edges, forming a smooth surface over the whole wall. As soon as the wall board is nailed in place it is ready for any kind of decoration, whether it be paper, paint, frescoing or burlap. The wall board itself is of a soft silver gray, dull finish, and when the joinings at the edges are covered by thin strips of wood nailed over them the result is a paneled wall of attractive appearance and moderate cost. Some idea of the manner in which the wall board may be ad-

Fig. 7—Same Attic Room Turned Into an Up-to-Date Nursery by Use of Bishopric Wall Board

vantageously used is shown in the accompanying illustrations in which Fig. 6 represents an attic space, while Fig. 7 shows the rooms transformed by the use of the wall board into an up-to-date nursery. In fact, by using the wall board it is an easy and inexpensive matter to partition off a cozy bedroom, for example, in the attic, or separate storage room in the basement or change a room or hall in any part of the house. For rougher use than inside walls the Mastic Wall Board & Roofing Mfg. Company, 370 Este avenue, Cincinnati, Ohio, makes what is known as Bishopric sheathing, which is exactly like Bishopric wall board only it is not so finely finished. It is being widely used for the walls of garages, barns, stables, poultry houses and other farm buildings of all kinds where protection from cold, heat or dampness is desired. The sheathing is also used as a foundation for outside stucco or cement work. It forms an air-tight, moisture-proof, fire-resisting wall, and the rough lath is said to be an excellent foundation for holding rigid the cement coating. The company will be glad to send to any one who requests it a simple method of determining just how much wall board or sheathing is necessary for any purpose, and it also offers a free sample of the wall board as well as a copy of an attractive catalogue demonstrating and suggesting its various uses.

Texas Agency of Edwards Mfg. Company

Attention is called to the fact that the Edwards Mfg. Company, Cincinnati, Ohio, has opened a branch house at 1625 to 1627 Pacific Avenue, Dallas, Texas, in charge of J. F. Agnew, who has represented the company in Texas for several years past. The new branch carries in stock a large assortment of ceilings of various patterns, including the moldings, and in the near future it is the expectation to carry a complete line of metal shingles, Spanish tile, eave trough, conductor pipe, imitation brick and stone siding and in fact a full line of sheet metal building materials. By opening this branch the company places itself in a position to make prompt shipments to customers in that section of the country and to handle its business even more satisfactorily than before.

Rockford Bolt Company, 100 Ruby Street, Rockford, Ill., is offering a number of specialties of particular interest to builders and contractors, these including bars for concrete work, scaffold bolts, plates, stirrups, turn-buckles, strap and T anchors, truss rods, etc., etc.

(For Trade Notes see second page following)

COLOR PLANS and designs for decorating any room in any home, office, store or church with Alabastine, will be supplied by our art department free of all expense to architects, carpenters and builders having charge of such work.

Beautiful cut stencils for carrying out the decorative work now so much in vogue will be furnished by the Alabastine Co., to be used in connection with

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WHAT IT IS

Alabastine is a water color, fine in texture, artistic in tint, for use on all interior surfaces, whether plaster, brick, cement, wall board or canvas.

It is a dry powder in white and many tints and colors, that may be used as manufactured, or combined and intermixed to produce any color desired.

Alabastine is ready for use by mixing with cold water. It is put up in 5-lb. packages and specially packed in bulk for large jobs where desired.

It is durable, sanitary, artistic and economical. Write us for more detailed information.

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Alabastine is best because it is durable, by that we mean that when once applied to a suitable surface, it can later be retinted and redecorated, putting succeeding coats of Alabastine over the old ones without the necessity of going to the expense or passing through the disagreeable experience of washing the walls.

Should you ever desire to wash Alabastine from your wall it can be done, which is not the case with paint once it commences to scale off.

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Alabastine is the ideal material for all new buildings because, unlike kalsomine sold under various names, when once on the wall it forms a perfect surface for any future treatment. Paper can be applied over Alabastine, a new coat of Alabastine can be put on or it may be painted. Many people desire to allow their new building to stand until it is through settling and all cracks have shown. Instead of living in a building with white, glaring walls, soft Alabastine tints may be put on and afterwards treated in any way desired without removing this Alabastine. Alabastine for an ordinary plastered surface or on wall board will not, when purchased at retail price, cost for regular tints to exceed 1½c per square yard for material. The cost of applying would be extra, but it costs no more to apply Alabastine than the cheapest kalsomine.

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Alabastine makes the only suitable material for use on the various wall boards. It costs much less than paint, is too superior to be compared with any kalsomine as it is durable and may be recoated. The surfaces of these boards vary, some of them will take a coat of Alabastine with no preparation, others will work by giving them a coat of varnish or shellac size. If interested please write us.

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Gentlemen: Please send us your special literature to contractors and builders. I am desirous of investigating further. Yours truly,

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TRADE NOTES

"Neponset Proslate" roofing is the subject of an announcement by F. W. Bird & Son, East Walpole, Mass., which cannot fail to interest architects, builders, contractors and houseowners generally. The point is made that by means of this material a really artistic roof is produced that resists fire and at the same time is within the reach of the average man's pocketbook. It is easily laid in laps 18 in. wide, special fastenings making the roof an airtight blanket without a single nail hole exposed to the weather. It is made in red and green colors. Carpenters and builders who are interested should write to the manufacturers for their special proposition which they make in regard to this matter.

W. E. Dunn Mfg. Company, 41 and 42 Fillmore Street, Chicago, Ill., is offering to any carpenter, builder or contractor who may be interested a book on concrete machinery which it will send free of charge if mention be made of the *Building Age*. It is not exactly a catalogue because it gives the cost of making concrete blocks, porches, chimney brick, etc., and tells all about the making of drain tile for farmers.

Peter J. Seippel Lumber Company, 213 South Locust Street, Dubuque, Iowa, directs the attention of carpenters, contractors and builders to the saving effected in securing lumber direct from the manufacturer and in order to prove the justice of this claim the company states that the next time a builder or contractor requires as much as a car of lumber that he go to Dubuque at its expense for hotel bill and railroad fare both ways and see just what the company has to offer. Reference is also made to "Dux Bak" roofing, which is durable, elastic and weatherproof. Catalogues and prices can be secured on application to the company. The company points out that inquiries are solicited only from Iowa, Indiana, Illinois, southern Minnesota, Wisconsin, northern Missouri, western Nebraska and South Dakota.

The Cyclone Vacuum Cleaner Company, Bradford, Pa., refers to the Cyclone Vacuum Cleaner as the modern, dustless, sanitary method of keeping the home wholesome and cleanly. The machine is usually located in the basement or cellar with a standpipe extending to the upper stories and with suitable connections for a rubber hose at each floor. By attaching the cleaning tools to the hose and turning an electric switch all the dust and dirt are deposited in a receptacle in the basement. There is no dusting or moving of the furniture and no taking up of carpets, but everything is absolutely clean and wholesome.

Architects, carpenters, builders and others having charge of, or interested in the interior decoration of houses, offices, stores or other buildings will be supplied with a series of beautiful and harmoneous color plans and designs free of all expense by the Alabastine Company, Grand Rapids, Mich., if they will make application to the company for them and mention *Building Age*.

The Stanley Rule & Level Company, New Britain, Conn., has prepared a very attractive folder setting forth the merits of its "Bed Rock" planes, various styles of which are illustrated, together with the various parts of which a "Bed Rock" plane is composed. This tool is referred to by the company as being an especially desirable adjunct of every carpenter's kit, as it embodies features which cannot fail to arrest the attention of every lover of high grade tools. Any reader of *The Building Age* who desires a copy of the interesting folder in question can secure one by making application to the company.

Simonds Mfg. Company, Fitchburg, Mass., is in full swing in the sixth consecutive year of its campaign of "Simonds Saw publicity." The company is sending out a few proofs of the advertisements of the Simonds Saw which it is carrying in trade and other papers, the names of which are given. The merits of the Simonds Saw are strikingly set forth and the make-up is such as to command immediate attention.

George H. Bishop & Co., Lawrenceburg, Ind., is offering a nest of saws especially designed for electricians and plumbers' use wherin the handle and blades are so constructed as to allow the blades to be changed and adjusted to suit the work in hand. The hack blade is toothed and tapered to permit of its use in sawing metal.

Northrop, Coburn & Dodge Company, 43 Cherry street, New York City, has issued a very interesting booklet relating to its metal tiling, which is referred to as "just the thing for walls and ceilings of bathrooms, kitchens, bakeries, butcher shops, etc." The company has also issued a very interesting catalogue of metal ceiling designs which are of a nature to especially interest architects and builders. The agitation of the question of metal ceilings for residences makes the catalogue referred to of unusual interest just at this time.

The Irwin Auger Bit Company, Station E 31, Wilmington, Ohio, directs the attention of carpenters and builders to the merits of the Irwin bit, which, it is claimed, makes a clean, smooth hole through soft or hard wood. It will bore through knots without bending or breaking, as it is made in one piece of extra high-grade crucible auger-bit steel "headed" and formed in the rough. In the process of its manufacture the bit is put through 50 distinct handlings.

H. H. Mayhew Company, Shelburne Falls, Mass., is directing special attention to the tip of the Peerless screw driver, which it manufactures, the tip being a feature which prevents all slipping and consequent marring of the screw heads. Other features of the screw driver are a folding ebony handle, nickeled steel ferrule and the steel blade extending through the handle so as to permit of its being pounded without injury.

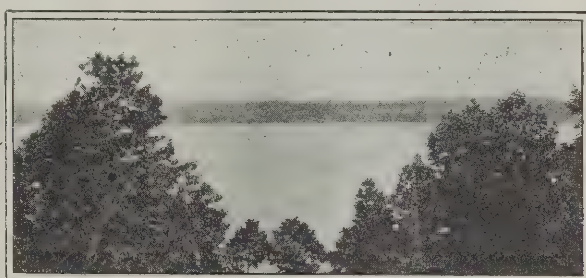
The Building Age

New York, June, 1912

A Bungalow at Grand View on the Hudson

Design Showing Artistic Effects Produced by the Use of Cobblestones in Combination with Shingles

PICTURESQUELY situated on the bluffs overlooking the shores of the historic Hudson river, often referred to as the "Rhine of America," is the attractive example of that cozy-cottage type of architecture known as the "Bungalow," which constitutes the basis of the present article. It is so located as to have a commanding view of the river as indicated by the upper panel picture of the group here shown, and is reached by the highway running from Grand View Station as depicted in the lower engraving. The house strikingly illustrates the artistic effects which may be produced by the judicious use of cobblestones in combination with a shingled exterior.

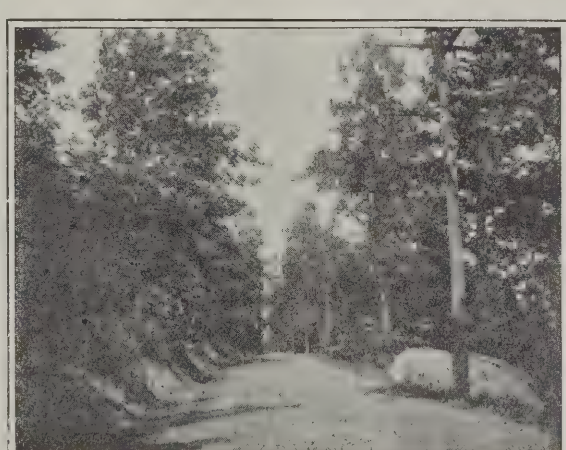


View of the Hudson River from the Porch

View of Bungalow Showing Cobble Stone Porch and Chimney

View of House with Garage at the Rear

Another clever feature of the architectural treatment is the dormer directly over the front porch and which gives light to the alcove room on the second floor. The two central views upon this page show the front and sides of the bungalow, one clearly outlining the cobblestone chimney, while in the other the garage is seen just at the rear.



A Section of the Highway Leading to the Bungalow

A Bungalow at Grand View on the Hudson River

Interiorly there is upon the main floor a commodious living-room with its open fireplace of rugged design in which field stone is the constructive material. Upon another page we give two views in the living-room, showing the fireplace and mantel as well as a hint of the finish. A well-arranged dining-room with its built-in buffet and serving table, a well-equipped kitchen and an enclosed porch at the rear are some of the other features of the main floor of the house. A view in the dining-room clearly shows the buffet and serving table. At the front of the house and opening out of the living-room is the owner's den.

The main flight of stairs rises from the further side of the living-room directly opposite the entrance from the cement floored porch and lands at the rear of the house on the second floor. The winders near the top are amply lighted by a large window. At the front of the house on the second floor and lighted by the dormer is an alcove bedroom or if preferable it may be made to serve the purpose of a sewing-room. At the right and left of the hall is a commodious bedroom, out of which open ample store rooms and closets. The bathroom is at the rear of the house and readily accessible from the main hall.

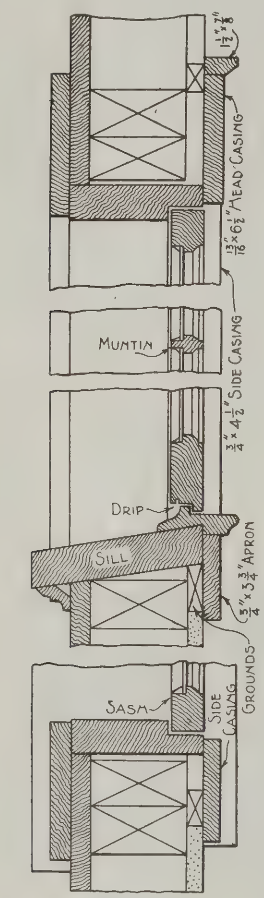
According to the specifications of the architect the foundation walls are 20 in. thick, laid up in cement mortar, all the stones being selected from an old stone wall in the vicinity. In the framing of the house the sills are 4 x 6 in.; the first floor beams, 2 x 10 in.; the second floor beams, 2 x 8 in.; the rafters, 2 x 6 in., and the studs, 2 x 4 in. The outside of the framing is covered with 1 x 8-in. tongued and grooved North Carolina pine, over which is a layer of Cabot's Quilt, this in turn being covered with 18-in. Perfection cedar shingles dipped in Cabot's brown creosote shingle stain and laid 5½ in. to the weather. The roof is similarly covered except that green stain is used in place of brown and the shingles are laid 5 in. to the weather.

paper is used between the sub-floor and the finish floor.

The finish of the first floor is oak stained to represent Old English with the exception of the kitchen, which is the same finish as the second floor and that is white wood with white enamel.

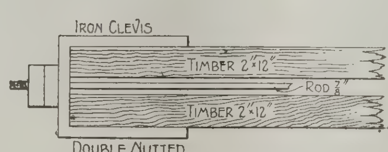
The front door is 2¼ in. thick, made of oak and of the type and finish indicated by means of the picture of it appearing upon the second page of this article.

The bathroom is equipped with tub, basin and water closet, made by the Standard Sanitary Mfg. Company, Pittsburgh, Pa. The kitchen is equipped with a white enameled sink, a 40-gallon hot-water circulating boiler and a No. 448 range, made by the Richardson & Boyn-

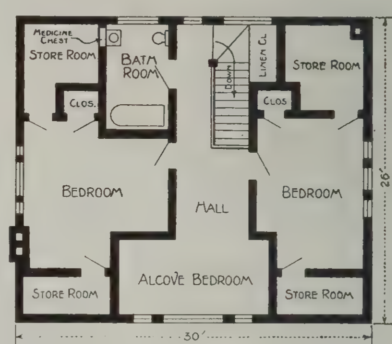


Window Details—Scale 1½-In. to the Foot.

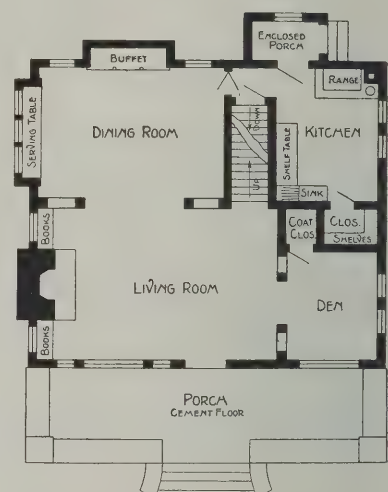
Elevation of Front Door



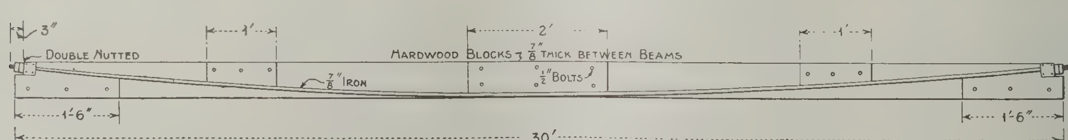
Detail of Ends of Truss



Second Floor



Main Floor—Scale 1/16 In. to the Foot



Side Elevation of Truss Used in the Construction of the Front Porch.

A Bungalow at Grand View on the Hudson River

The porch is arched over in such a way as to provide a vegetable cellar under it. On this page with the floor plans will be found details of the trussed girder which is used on the front porch of the house and has a span of 30 ft. The manner in which the ends of the truss are constructed is clearly indicated in the detail shown immediately below the picture of the front door.

The caps on the cobblestone rail of the front porch and the rakes of the steps are of brown stone 4 in. thick and 30 in. wide.

All floors throughout the house are double, the finish floor being of maple, waxed and polished. Building

ton Company, 31 West Thirty-first Street, New York City.

The bungalow here shown was designed and built by Tracy L. Freeman, Nyack, N. Y., for S. M. Underhill, of New York City. The house is situated on New Broadway, Grand View, N. Y., and the contract price was $5,800.

As already intimated, the lower picture on the first page of the article represents a section of New Broadway running from Nyack to Piermont at Grand View on the highway from Grand View to the Underhill bungalow.

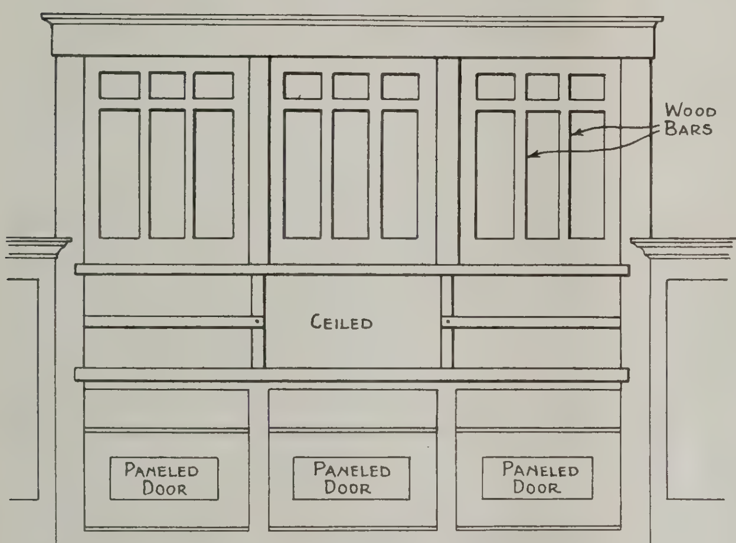
Skyscraper for Providence, R. I.

One of the most important building improvements recently undertaken in the city of Providence, R. I., is about to be commenced at the intersection of Westminster and Weybosset streets, a point known for so many years as Turk's Head. The improvement will consist of a 16-story structure, which, when completed, will be the tallest in the city, rising as it will 200 ft. above the level of the sidewalk, and will be surmounted by a clock tower. The plans, which have just been filed by Architects Howells & Stokes, of 100 William street, New York City, call for the completion of the structure in May, 1913.

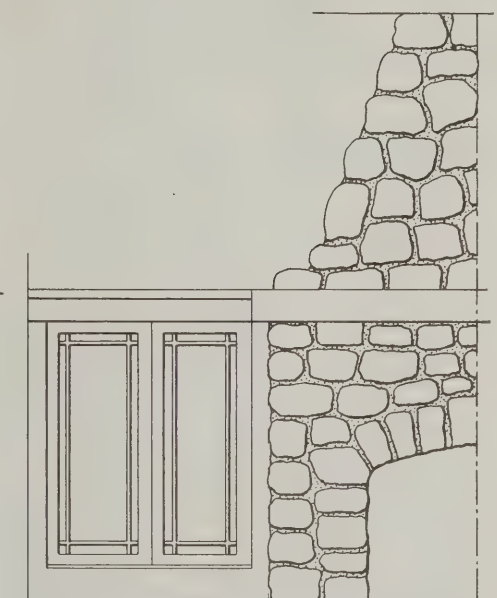
The building will be of steel skeleton-frame construction with curtain walls for the first four stories of polished granite and above them cream colored brick. An ornamental cornice will mark the line of separation. In the peak prominently located will be an exact replica of the ancient Turk's Head, from which the building derives its name, and the tradition of which it will perpetuate.

The lower floor will be devoted to stores with public entrances on both streets, which will lead to an interior court. The other entrance from the stores on the ground floor will also lead to this court or air shaft, which will afford light to all of the 16 floors, each of which will contain about 7800 sq. ft. The building will be equipped with all the modern improvements and appliances and a battery of six electric elevators so located as to be accessible from the two main entrances as well as from the entrances of the stores will be installed.

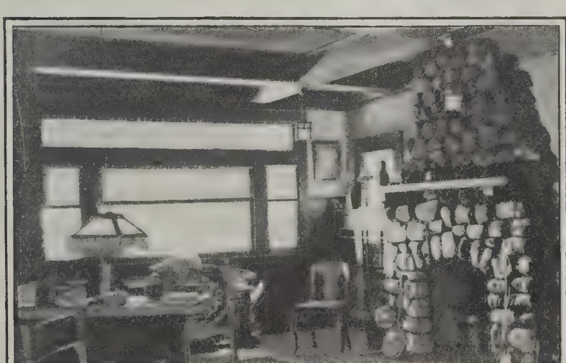
View in Living-Room Looking Toward Fireplace



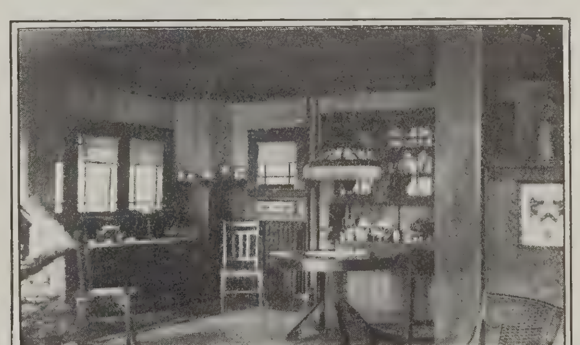
Elevation of Buffet in Dining-Room



Detail of Fire Place and Mantel



Living Room as Viewed from Cased Opening Between It and the Dining-Room



Dining-Room Showing Built-In Buffet and Serving Table

A Bungalow at Grand View on the Hudson River

Plans have recently been filed for the construction of a 12-story apartment house on Park Avenue between Fifty-second and Fifty-third Streets, New York City, which is estimated to cost $1,250,000. According to Architects Rouse & Goldstone, 40 West Thirty-second Street, New York City, the façade will be of limestone and brick and the building will have accommodations for 107 families. It will have a frontage of 200 ft. on Park Avenue and 174 and 180 ft. on the two streets respectively.

Architects' Rights Concerning Compensation

Use of Plans Unnecessary -- Limitation on Building Cost -- Right to Enforce Lien

By A. L. H. Street

WHILE glory partly compensates an architect for his labors, pecuniary gain is not to be despised as an element of reward; and the writer seizes upon it as the subject of this article, especially since employing owners are occasionally reluctant to pay money where they begrudge no praise of the work for which payment is demanded.

According to uniform decisions of the American courts, the reasonable value of an architect's services measures the amount of compensation to which he is entitled, unless an amount is expressly fixed by his contract of employment. It has been held in Minnesota that a charge of five per cent. on the estimated cost for preparing plans and specifications and for superintending construction is reasonable. The schedules of the American Institute of Architects have frequently been sustained as proper measures of the reasonable value of services, though the Louisiana Supreme Court has decided such a schedule is not conclusive against an employing owner if he did not know of it when he contracted.

Payments on Monthly Estimates

A custom entitling architects engaged to prepare plans, etc., and to supervise construction to payment of a certain percentage when the plans and specifications are completed is controlled by a special agreement for payment on monthly estimates. The Connecticut supreme court of errors has determined that under a contract to pay a percentage on the "estimated cost," the architect's compensation is limited to that percentage on the reasonable cost of the building. In Maryland an architect who furnished plans and specifications and supervised construction under agreement that he should receive an amount equal to 10 per cent. of the total cost, was awarded that percentage, though the total cost exceeded $12,000 and though the architect's contract provided that the estimated cost should not exceed $12,000; bad faith on his part not being shown. An architect who performed services with a view to future employment was denied recovery in the Michigan courts of percentage compensation for preliminary sketches which were not accepted, based on the probable cost of the building; it being decided that such services, unless volunteered, should be paid for, if at all, according to the time spent in doing the work.

In the absence of contrary agreement, it is no defence to a suit for compensation for preparing plans or specifications that they were not used. This rule has been applied to services rendered a city in furnishing plans for a proposed building. But the Louisiana Supreme Court holds that the fact that the owner received no benefit from the services is entitled to some weight in determining the reasonableness of the compensation claimed.

If the contract of employment restricts the estimated cost of a building for which plans are drawn, there can be no recovery for plans calling for a materially more expensive building, unless the owner waives the condition limiting the cost. A contract to prepare plans for a building to cost "about $100,000" has been decided to have been substantially complied with by furnishing plans for a building at an estimated cost of $102,000, exclusive of architect's and building superintendent's fees aggregating 5 per cent.

A builder has been denied recovery as for extra services for preparing a plan according to which he contracted to erect a building for a fixed amount, no reference to compensation for preparing the plan being made.

That an architect's failure to protect by copyright or letters patent plans prepared by him does not affect his right to compensation has been seldom questioned, but the Pennsylvania Supreme Court once upheld the soundness of the proposition.

Necessity for Delivering Plans

By a New York court it has been decided that before an architect can recover for preparing plans, he must show their delivery or a tender of delivery. By a later decision of the Appellate Term of the supreme court it is held that if the owner was not aware of the fact that drawings and specifications belong to the architect, the latter was not entitled to recover compensation without establishing delivery of the drawings and specifications.

Strange as it may seem, litigation has been necessary to establish the legal propositions that an architect may validly agree that his right to compensation shall depend upon such conditions as approval of the plans prepared, acquisition of a lease by the owner, etc.

An architect's right to a lien against the premises concerning which he has rendered services is dependent upon statutory provision; there being no common law right to a lien. California, Illinois and Wisconsin, and perhaps a few other states, give a lien by expressly mentioning architects; and in many of the states, including Alabama, California, Colorado, Louisiana, Minnesota, Nebraska, New Jersey, New Mexico, New York, North Dakota, Ohio, Pennsylvania and Rhode Island, architects have been judicially determined to be included by statutes giving a lien to any person who performs work in and about the erection of a building—the general mechanics' lien laws. But in Kentucky, Maine and Missouri there are decisions which deny that an architect is entitled to a lien as a "laborer," "workman," or "materialman"; and the right to a lien under the last mentioned class of statutes is generally denied where no services are rendered in superintending construction, though the decisions conflict on this point. For the further protection of the interests of the profession, the writer recommends to the architects of states where their right to a lien is denied or uncertain, consideration of the example set in those states where architects are expressly protected.

Fireproof Hotel Construction

Novel Features in the New Vanderbilt Hotel Which Represents the Work of Local Builders

By W. H. Radcliffe

WITH the opening of the Vanderbilt Hotel, at Park Avenue, Thirty-third and Thirty-fourth Streets, New York City, in January, the last word was spoken in fireproof hotel construction. If a fire should start in any part of this building, it would simply consume the inflammable contents confined at the point of the fire's origin. Owing to the fireproof, hollow-drawn steel and asbestos-filled construction of the doors and all interior trim, coupled with the stone and metal construction of the elevator shafts, doors and stairways, a fire could not spread, because it could not eat its way from room to room, or from floor to floor. That this is an actual fact, and not theory, was demonstrated by a fire that started in the corridor on the third floor three days after the official opening, and which was controlled with ease.

Fig. 1—General View of the New Fireproof Vanderbilt Hotel

Fig. 2—Foyer in the Hotel, Showing How the Electric Lamps are Used for Decorative Lighting

Fireproof Hotel Construction

Each guest's chamber, or suite, is virtually a building in itself, and although a fire may start in a dozen of them at the same time, and on various floors, the safety of the hotel is not affected.

This fire precaution is still further strengthened by employing for the furnishings, in so far as practicable, non-burning substitutes for wood and draperies. The fireproofing scheme is carried out from basement to roof, without detracting from interior decorations. Where hollow-steel is used, it is enameled with pleasing effect.

The insulation of the garbage room and of the servants' dining-room presented an unusually difficult problem. It had to be of the highest efficiency, not so much on account of preventing fire, as to prevent the heat from the boilers spreading and raising the temperature in the room above.

Unlike most hotels, the servants' quarters, instead of being on the top floor, are on the third floor. This innovation was partly due to the top floor being considered the most desirable in the building on account of the extensive view afforded to the north, south and east. The Vanderbilt apartments, comprising nine rooms, are located on the top floor. The servants' quarters being on the third floor, allow this floor to be used as a distribution center for the electric cables, running up through the building, and all piping of mechanical equipment. Thorough fireproof and soundproof insulation in the form of J-M Asbestos Plaster is used in the walls of the servants' rooms.

Concrete floors are used throughout the building. This material, of course, is fireproof, but without rugs or carpets would be unsuitable for a hotel of this character. To afford a purchase for the tacks used in laying the rugs and carpets, metal sockets about one and one-quarter inches long are embedded in the cement at intervals of about four inches around the rooms.

Guided by the report of the United States Geological Survey that 60 per cent. of the fire danger to buildings comes from exterior fires, unusual care was taken by the architects to insure an absolutely fireproof roofing for the hotel. The entire top of the building was therefore covered with J-M Asbestos Roofing. Over this a layer of vitrified tile was laid. A pent house on the roof is also covered with the same roofing.

Of the 600 rooms in the hotel, each bed-room is provided with a bath and telephone. Desk telephones are used, and the box containing the signal bell is countersunk in the wall so as not to encroach on the space in the room. Owing to the position of the bell in the wall, special precautions are taken to prevent the sound of the bell reaching an adjoining room. An iron box, open on one side only, is mounted in the wall with the open side toward the room associated with the bell, and to still further guard against the sound of the bell going astray, the iron box is lined with Keystone Hair Insulator.

Ice water pipes run from the basement to serving pantries on the 2nd, 5th, 8th, 11th, 14th, 17th and 18th floors. These pipes are enclosed in J-M Pure Cork Sectional Covering to maintain an even temperature within them.

The eighteen stories of the hotel are served by six hydraulic elevators, on the plungers of which are J-M Sea Rings, the new automatic packing.

Fireproof construction has been carefully followed in the foyer and halls, which are built largely of marble and Caen stone. The lighting has been especially well handled in the foyer, where J-M Linolite electric lamps, screened with attractive reflectors, give a soft, pleasing

Fig. 3—Smoking and Reading Room in the Vanderbilt Hotel

Fireproof Hotel Construction

effect, and amber frosted lamp bulbs in brackets and cut-glass chandeliers add to the attractiveness.

With the exception of the pictures, the marble, and some of the bronzes, which were imported, the Vanderbilt Hotel represents throughout the work of local manufacturers, architects and builders. The Ajev Co., Park avenue and 34th street, were the general contractors, and Warren & Wetmore, 3 East 33d street, the architects.

Architect and Manufacturer

That manufacturers of equipment and materials entering into the construction of buildings have contributed much to the development of architecture in America is generally acknowledged. Without their aid and collaboration architects would have had greatest difficulty in producing, and in fact would have been entirely unable in some cases to produce the results that to-day mark a distinct advance over the accomplishments of fifty years ago, says the *American Architect.* The present situation has been brought about largely by reason of an understanding and appreciation both by the architect and the manufacturer of each other's function and field. That it be not destroyed seems of highest importance in the interest of both.

Obviously, however, where relations are as close as are those of architect and the manufacturer of materials and utilities employed by him in the execution of his work, nothing short of the strictest regard not only for each others unquestioned rights, but also for the unwritten and to some extent undefined rules which govern architectural practice, and business activity generally, will serve to preserve those relations undisturbed. For example: it is quite evident that the architect could not undertake to manufacture building materials or equipment and retain unaffected either his professional standing or his previous professional relations with other manufacturers. Similarly the manufacturer who suddenly displays a willingness to usurp even to a rather limited extent, the functions of an architect by furnishing for little or no direct money return, copies of indifferent plans for houses, bungalows or other types of structures, can scarcely expect with reason to continue on his former footing with architects, after it becomes apparent that his course is not due to misapprehension or hasty and unconsidered action, but is the result of a deliberately formulated plan of procedure. In any event, if there is available that which may fairly be considered a substitute for the product of the free-plan distributor, it would be imputing to the architect more than human qualities of mind to assume that his subsequent selections of materials or equipment, as between the two products would be unaffected.

It is frankly conceded that there are certain building products which can be furnished with advantage to what might be termed two markets. First—direct to the consumer, generally a somewhat limited field, and second, through the medium of the architect's plans and specifications to another variety of consumer. This latter probably constitutes the world's greatest market for most materials of construction and building equipment. Where these two markets conflict it is for the manufacturer to choose between them, or possibly both might be served by adopting totally different selling plans. But any scheme which involves an attempt to stimulate the first market by exploiting the man who practically controls the second seems to disregard one of the first laws of human nature.

Good Building Outlook

In view of the plans which have been filed thus far the present year in Brooklyn Superintendent John Thatcher, of the Bureau of Buildings, inclines to the opinion that 1912 will show more than usual activity in the building line, notwithstanding the usual reserve and hesitation of business interests incident to the uncertainties of a presidential campaign. In his annual report Mr. Thatcher calls attention to the fact that suburban development within the city limits continues to outclass all other sections both as to labor and total value of the structures erected.

As indicating a better state of affairs at the present time he refers to the fact that in the first ten weeks of this year there was a gain over the corresponding weeks of 1911 of $1,377,000 in the estimated cost of building improvements for which permits were issued.

It is stated that pumice stone-concrete floors have been used for various concrete buildings with great success. They are in the form of large slabs which are placed over the construction beams and upon these wire mesh reinforcement is placed, this in turn being covered by a second concrete slab.

Designs of Sash and Solid Partitions

Materials Most Used -- Designs Shown Represent Construction Most Common at Present Time

THE Carpenter-contractor, and more especially, perhaps, the cabinet maker, is often called upon to execute jobs of work involving the erection of partitions of various kinds, particularly those dividing a large space into many smaller compartments such as might be found in stores, offices, etc., and they are naturally interested in designs for work of this nature. With a view to affording suggestions which may be of possible value we present herewith a series of partial elevations representing designs of this character. We also show vertical sections through the different partitions, all of which clearly indicate the general manner in which the work is executed.

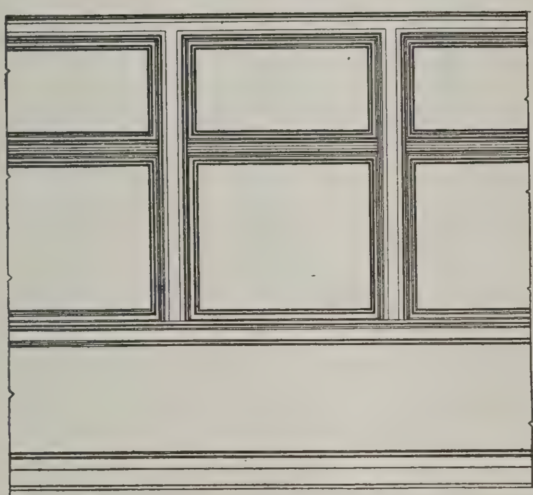


Fig. 1.

Fig. 3.

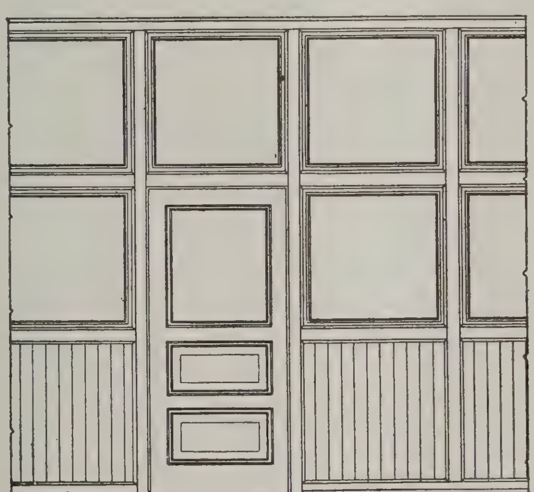


Fig. 2.

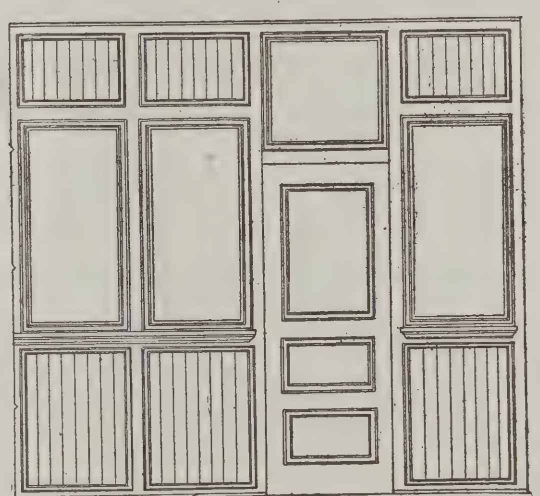


Fig. 4.

A Few Designs of Sash and Solid Partitions

The partitions are for the most part made of white pine, cypress, yellow pine, chestnut, etc., and the ceiling strips may in all cases be used with or without a beading, according to preference. The sizes of the partitions are with one exception shown suitable for 10 ft. in hight. In the actual work they would naturally be made whatever hight was necessary in order to meet the requirements of the case. The designs which are here shown represent construction which is most commonly used for partitions at the present time.

The solid partitions represented and which, like the other designs, are intended to be executed in beaded ceiling, are more commonly used in mills or factories to divide them into sections. They are also utilized for partitions in many other places where a solid partition from floor to ceiling and of neat design is wanted.

In those designs of partition which have the upper portion arranged for the use of glass, the latter may be ribbed or plain to suit the requirements of the case.

Present Day Tendencies in School Architecture

In the course of a paper read before the recent convention of the National Educational Association in San Francisco, dealing with present day tendencies in school architecture, Normand S. Patton, a well-known architect of Chicago, said the special improvements in modern school buildings included, among others, better construction especially in resistance to fire and in better provision for exits.

The larger cities require all schools to be of fireproof construction and the example of these buildings leads architects to approximate at least fireproof construction in other communities. The approximations consist in more numerous brick walls; making stairs and corridors fireproof; the substitution of metal for wood lath, or the use of tile partitions; the making of the main floor fireproof even though the upper floors and roof are combustible. The object to be sought in the construction of a school is to make a building in which the escape of the pupils cannot be cut off by fire or smoke. If a school is reasonably well planned and built there is little danger of actual contact with fire. The greatest danger is from panic and the resulting crushing on the stairways. The conspicuous avoidance of all combustible materials in the corridors, and stairs will do much to allay groundless fear and thus avoid panic.

Another improvement is in the line of better sanitation. The heating and ventilating system is also a

No one who has observed school buildings of recent years can have failed to have noticed an improvement in the character of the designs. This improvement is due partly to general advance in the quality of American architecture, but, perhaps, still more to the improvement in the quality of school boards and their appreciation of good architecture, which leads to the selection of a higher grade of architects. An examination of recent designs of school buildings by many architects and in all parts of the country shows a tendency to greater individuality of design and a following of no particular architectural style. The best school design is that which follows no historical style of architecture but is developed rationally from the conditions of the problem.

The past ten years have seen rapid changes in build-

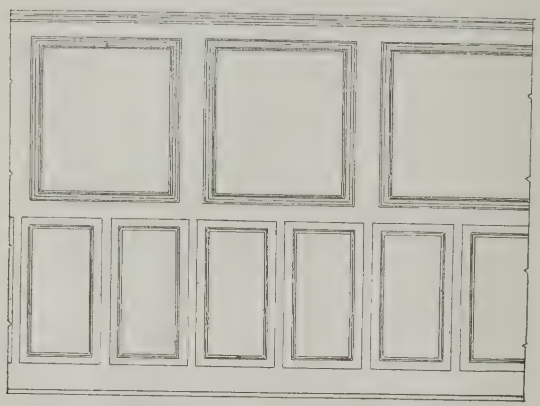


Fig. 5

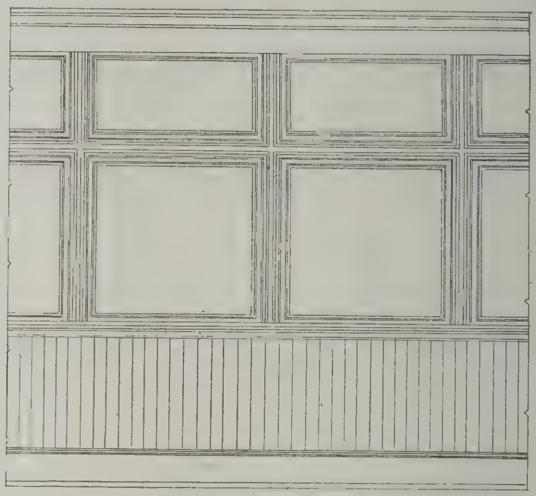


Fig. 6

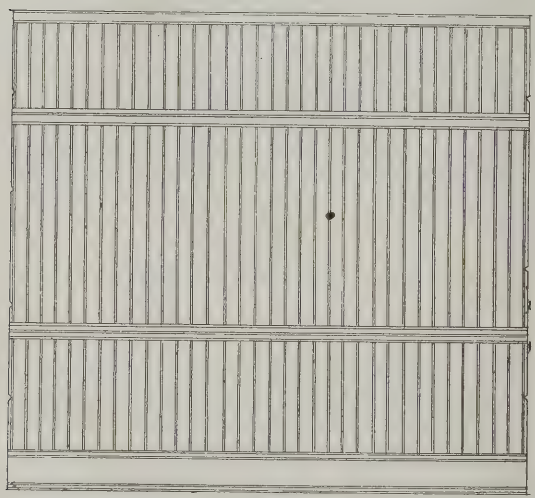


Fig. 7

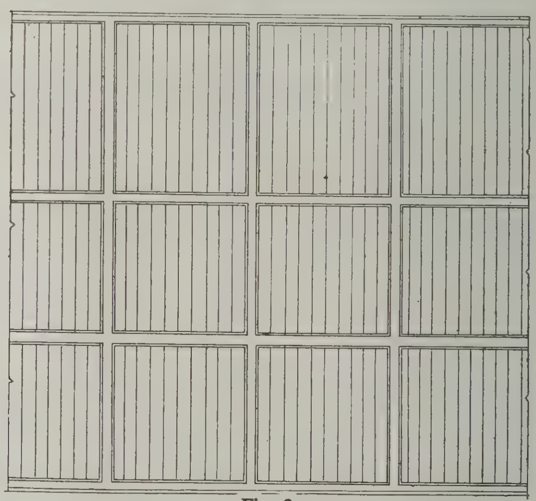


Fig. 8

A Few Designs of Sash and Solid Partitions

most vital part of a modern school. Steam heat is supplanting hot-air furnaces. Ventilation by natural draft can be made fairly efficient for graded schools of not over eight rooms, but for larger buildings and all high schools mechanical ventilation is now considered a necessity.

The ratio of window surface to the floor area is controlled by law in many states and there is little danger of insufficient windows in the school rooms of to-day. There is danger, however, of cutting off the light by an improper use of window shades. The object of shades in a school room is not to make the room dark but to screen it from the direct rays of the sun. The best method of placing shades is to hang two shades to each window, both rollers being placed at the meeting rail of the sash, one shade to pull down and the other shade to pull up.

ing materials. Architectural design is affected not only by the purpose of the building but by the material used. It is an axiom of architecture that no material should be used in imitation of another but each material should be treated in accordance with its nature.

Exterior plastering in Portland cement has largely taken the place of wood as a covering for wood construction, but such a construction of wood framing covered with plaster is appropriate only for very small schools. Exterior plastering has been introduced by architects as something better than wood siding or shingles and as a rule it has been handled in a truthful and artistic manner in accordance with its nature. It is used, however, as plaster and not in imitation of any other material.

In contrast to this cement blocks have been invented as something cheaper than stone. They can be made in a truthful and artistic manner, but their large and uniform size makes them a poor material from the point of view of design.

Concrete poured in place can have a satisfactory treatment of the surface but such treatment is expensive and this material is better adapted to constructive than decorative forms.

Of all new materials vitrified brick seems the best adapted for general use in school building. The old idea was mechanical perfection and attention was concentrated on the individual brick rather than on the wall. We sought brick with smooth surfaces, straight edges and uniform color laid with fine joints. What was the result? A wall without force or character. Now we no longer think of bricks but of brickwork. We seek a wall surface of varied colors and a marked texture. We want a material that will appear as solid as stone and will be washed clean by every rain. We prefer large joints that bespeak strength rather than fine joints whose noblest quality is neatness. With our wall of brick it is built course by course but when made of materials vitrified by fire and bound into one mass by cement we lose sight of the individual bricks and see the wall which rivals stone in durability and massiveness and exceeds it in its capacity for color.

The latest improvement in the manufacture of brick is to roughen the surface of the stiff mud as it comes from the machine by cutting with wire, thus producing a variety of beautiful textures, according to the nature of the clay. Vitrified brick is so different in character from the smooth and porous pressed brick that it is leading to the development of new styles of architectural treatment.

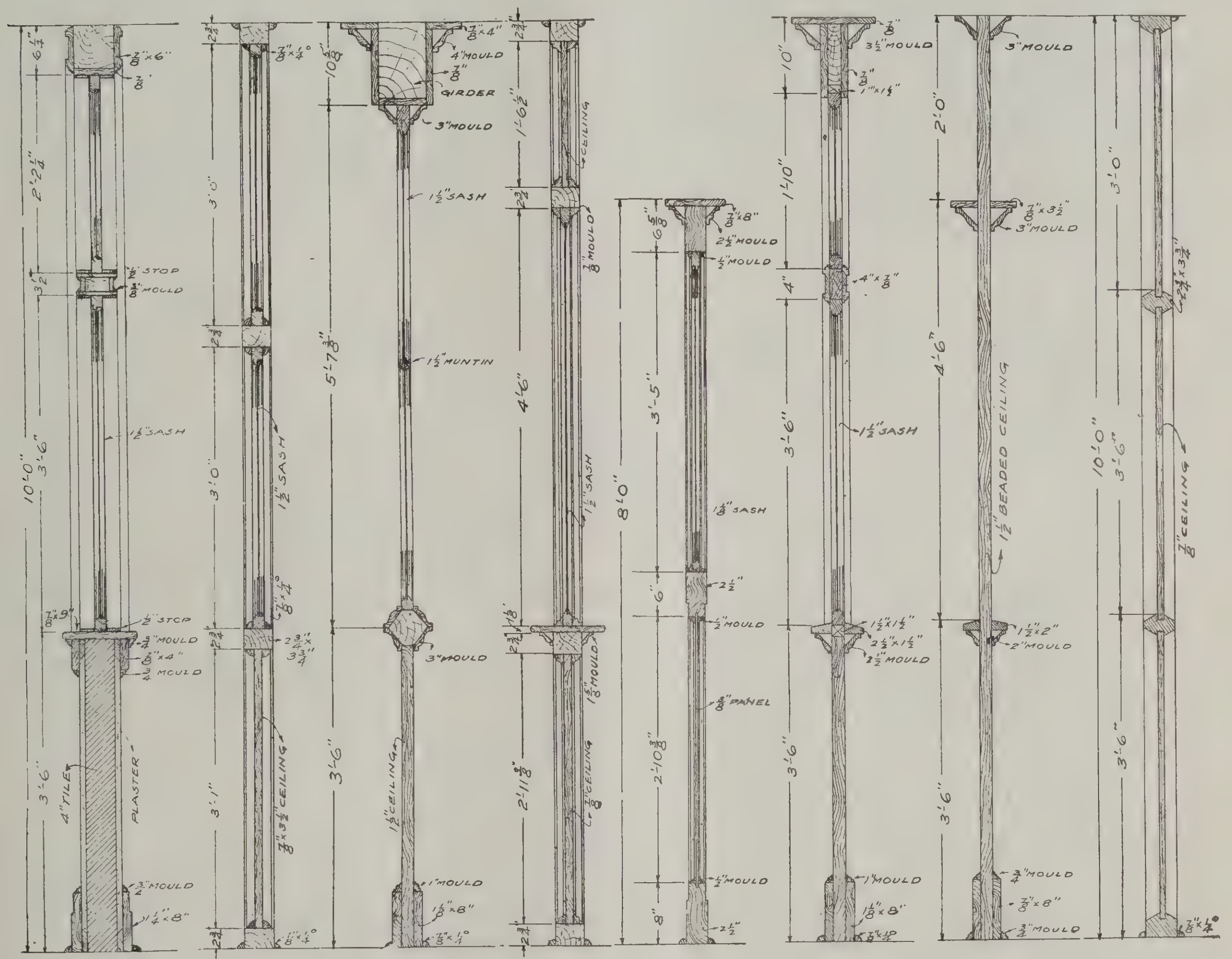


Fig. 9. Fig. 10. Fig. 11. Fig. 12. Fig. 13. Fig. 14. Fig. 15. Fig. 16.

A Few Designs of Sash and Solid Partitions—Vertical Sections Through the Partitions Shown in Figs. 1 to 8 Inclusive

Lacquering Carpenters' Tools

Not so very long ago there appeared in these columns brief reference to the manner of preventing carpenters' tools from rusting and supplementing the suggestions which have already been presented the following comments from a writer in the Brass World may not be without interest:

The majority of carpenters' tools are sold with a bright finish. This finish, of course, must be preserved, both while in stock at the factory of the maker, and at the store of the hardware dealer. It has always been the custom of such manufacturers to coat such bright tools over with grease in order to protect them from rusting. While efficacious (provided the grease is of such a character that it will not rust the steel itself) the tools thus covered are not only unsightly, but cannot be handled by the customer without soiling his hands. In other words, the use of grease on the polished steel work is quite unsatisfactory.

When lacquer is used for coating the bright steel goods, it not only protects the steel from rusting, but leaves it bright and clean. There are few customers that would really know that lacquer had been used on the goods. The tools are left in an ideal condition for displaying in a hardware store as they remain bright indefinitely and the lacquer, being so thin, does not interfere with the working qualities.

Reading Architects' Drawings--II.

Analysis of the Foundation and Cellar Plan, with Section Thereof

By Arthur W. Joslin

WE will first take up the Foundation and Cellar Plan Fig. 2 and the sections Figs. 3 and 4, the latter given to amplify the plan. Probably the first thing observed upon looking at the plan is that two parallel lines form a somewhat irregular rectangle. The outer of these lines represents the outside of the foundation upon which the house is to be erected. The inner line, which is figured in several places as being 16″ from the outer line (see A-B), represents the inside line of the foundation. The figures 16″ between these the figures, as in the case of the dimension 34′ 0″ at the top of the plan "C," which, by the location of the witness marks at the right and left of it shows that these figures represent the length of the building on that side.

The reason for reversing the arrows in the case of the 16″ dimension is that the two parallel lines are so near together that there is not room to continue the shaft lines towards each other and leave room for the figures. The usual custom in regard to the "extended arrows," or dimension lines, put on plans is to make them of red or diluted black ink, so that when the blue print is made they come out as a faint line. While faint they are easily distinguishable, but not prominent enough to be confused with the full prominent lines of the plan.

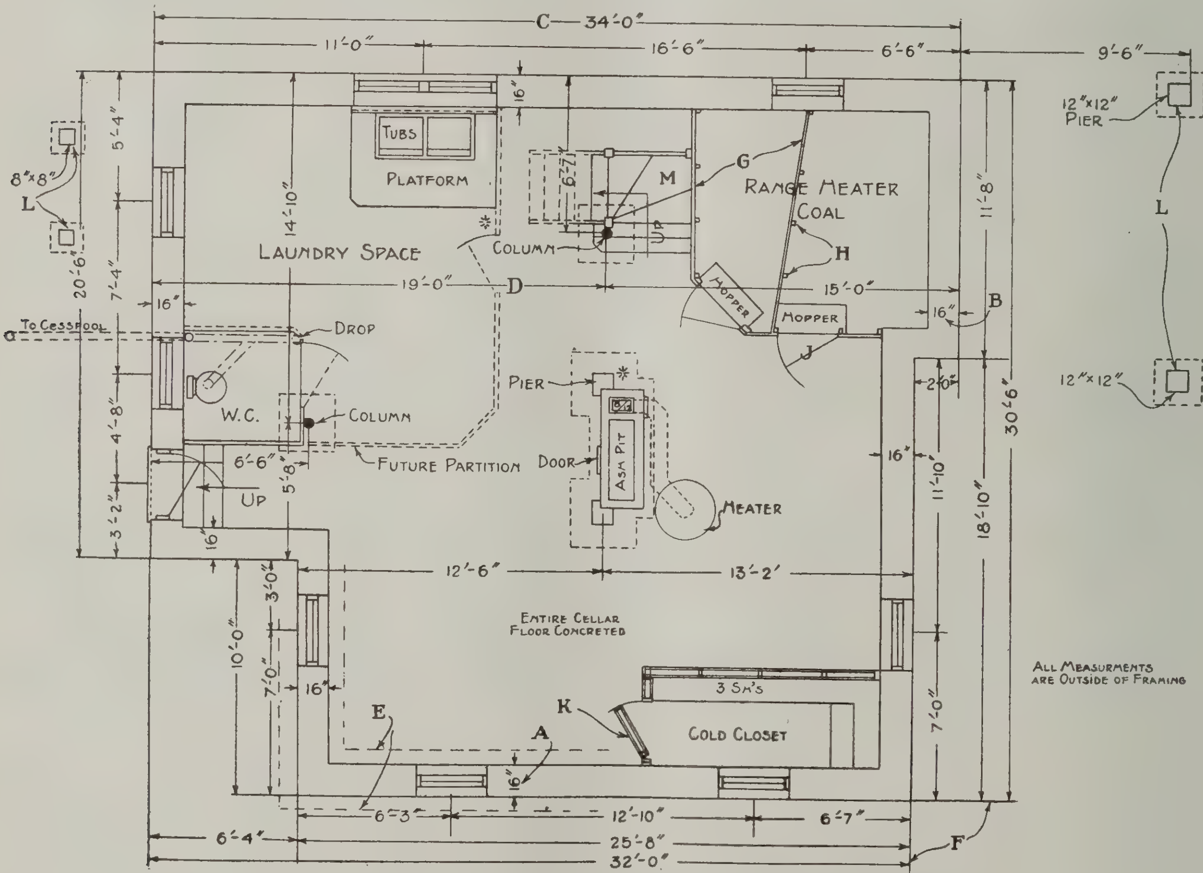
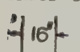


Fig. 2—Plan of Foundation and Cellar—Scale ⅛ In. to the Foot

Reading Architects' Drawings—II

lines at several places call attention to the fact that the foundation wall is 16″ thick.

Notice that wherever this dimension is put on the plan between lines representing the outside and inside lines of the foundation, there are small arrows, thus:  The arrow points thus used are called "witness marks," and they convey the information that the 16″ is from one of these marks to the other. Ordinarily the shaft of the arrow would be towards

The witness marks or arrow heads are put on drawings in black ink so that when blue-printed they will stand out prominently and call particular attention to the points between which the dimension is taken. In laying out work from a plan figures should always be followed in preference to dimensions obtained by scaling the plan. In using the figures particular care should be taken to note to what lines or points the witness marks indicate the dimension to go.

Where intermediate measurements, as well as over all, are given, as in the dimension next below the 34′ –0″ referred to, the said intermediate figures should be checked to see that their total agrees with the "over all" figure. Thus the figures (on the line of figures under 34′ –0″) 11′ –0″ from outside of wall to center of mullion window, 16′ –6″ from center of mullion window to center of single window and 6′ –6″ from center of single window to outside wall are found to total 34′ –0″.

Go down further on the plan to the line of figures D and we find the figures 19′ –0″, witnessed from outside of wall to a line continued from the center of a column, followed by the figures 15′ –0″, witnessed from center of column to outside of the opposite wall. We find that the dimensions 19′ -0″ and 15′ -0″ added also give us 34′ –0″. As the outermost witness marks in the case of the last two of these lines of dimensions are from the same lines on the plan as those of the line C, each should total 34′ –0″, as in C. Failing to do so is evidence that there is an error somewhere in the figuring. By comparing plans over and under the one in question, checking their figures, and by using the scale rule where figures are manifestly incorrect, a correction can usually be made by the person attempting to lay out the work from the plans. Failing to discover the error by the above method the matter should be referred to the architect or his representative, who will determine what to do.

To study the outside wall further we have recourse to the section of foundation wall shown in Fig. 3. We will assume that the specifications call for footings. To make the plan Fig. 2 strictly correct the footing lines should show as at E, but as the addition of unnecessary lines serves to confuse the plan, and it is made plain in other places that footings are required, the plan is just as clear as though they were shown.

Now look at Fig. 3, which is a section through the foundation wall. Here are shown the thickness of wall at the top and bottom, respectively 16″ and 2′ –0″; the depth of the cellar from under side of first floor construction when plastered to the top of concrete (7′ –6″); the shape and location of footing; size of the sill and its location on the wall; and several other points of construction. You have probably noticed that the vertical lines representing the wall are not continuous as at A. The lines are "broken," as it is called, to compress the drawing into a smaller space. If you scale the distance figured 7′ –6″ you will find that it falls short of this figure. The height of wall as shown in this section being broken twice, once above and once below the line B, which denotes the outside grade, establishes the fact that the amount of wall above and below the grade is variable, as is noted on the drawing. In order to determine the relation of the grade to the top of the wall reference must be had to the elevations.

Also notice that this section shows a 4″ x 6″ sill laid flatways on the wall and far enough from the outer edge of wall, so that when the wall is studded up above the sill and outside boards put on, the outside line of boarding is flush with the outside of the foundation.

Now to refer back to Fig. 2 in lower right-hand corner, we find the note, "All measurements are Outside of Frame." If you look carefully to the dimension lines you will see that lines extending from the corners to which dimensions are figured, are by scale about 1″ short of coming out to the full line representing the outside line of the foundation (see F).

A glance at Fig. 2 shows that the floor joist C is sized onto the sill about 1″, that there is an under and upper floor, denoted by the two lines drawn parallel to the line representing the upper edge of the joists; and that the ceiling of cellar is sheathed or plastered, as denoted by the line below and parallel with the line representing the bottom edge of joist. The specifications probably confirm the matter of the two floors and state whether ceiling is sheathed or plastered.

The plans have constantly to be considered with each other and with the specifications, and then coupled with some little knowledge of construction, in order to have them convey to the person attempting to read them what the architect intends to have built.

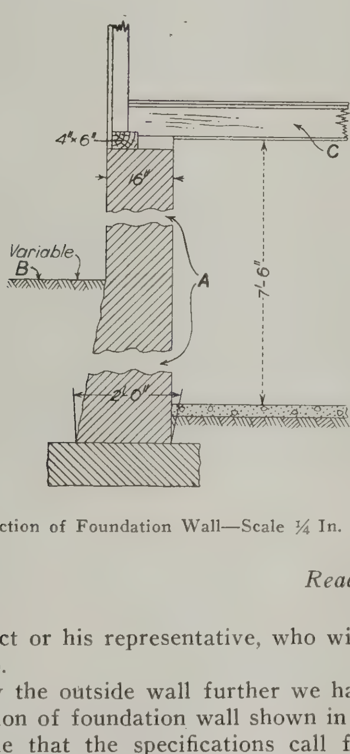


Fig. 3—Section of Foundation Wall—Scale ¼ In. to the Foot

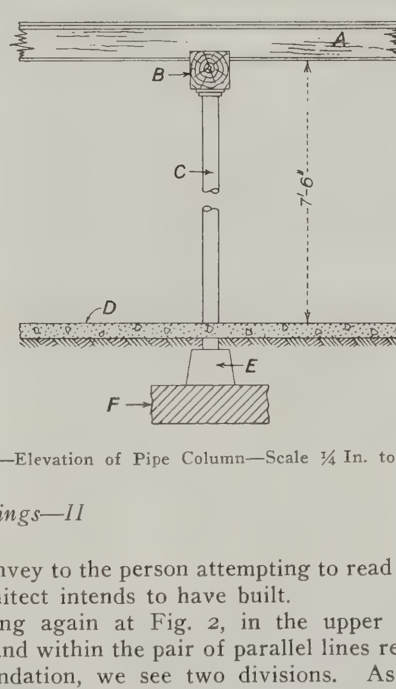


Fig. 4—Elevation of Pipe Column—Scale ¼ In. to the Foot

Reading Architects' Drawings—II

Looking again at Fig. 2, in the upper right-hand corner and within the pair of parallel lines representing the foundation, we see two divisions. As these are plainly marked "Range and Heater Coal," there can hardly be misunderstanding here. Look closely at the lines which bound these coal bins in the cellar and form the partition between them. Being about 1″ apart by scale, do they not imply a partition of 1″ or ⅞″ boards, and can you not see the studs, which would be a necessity to nail the boards to, about 30″ apart by scale (Partition G—Studs H).

At J is shown the door, supposedly partly open to show the "Swing." Behind the door something else is drawn, and as it is noted "Hopper" no explanation is needed. If the note "Hopper" had not been put upon the drawing you should identify the lines showing it as meaning a hopper, for what else of about this shape as seen from above, would go behind a coal bin door?

In the lower right-hand corner of Fig. 2 is shown another compartment. This is marked "Cold Closet," and is shown by lines similar to those showing the coal bin, except that there are two parallel lines each side of the studs. This, of course, means that the cold closet partition is boarded on each side of the studs, and an examination of the door K shows that this is of double construction also. The lines inside of cold room are to represent shelves, and as a plan could not show how many and there is no section given, the note "3 Sh's" (3 shelves) is added. Possibly the specifications would mention this, but whether it did or not the note settles the question of how many shelves, and the drawing shows the width.

In the upper left-hand corner is the note "Laundry Space," and parallel dotted lines enclose the space. This is one of the cases before referred to where dotted lines may mean something else besides things under the floor or above the imaginary line upon which the plan is supposed to be taken. In this case the information is given in the note "Future Partition."

Notice the tubs under the windows and the platform upon which they set, also the water closet (W. C.), which is also shown on a platform, although it is not so noted. Study the plan carefully at this point and you will see that a platform is shown here as well as at the tubs where the fact is noted.

Fig. 4 shows a typical column such as those shown on the cellar plan Fig. 2 near W. C. and foot of stairs. Here are shown a side elevation of floor joist A; section of girder B; elevation of column C; section of concrete floor D; elevation of small block of cast concrete usually sold with columns E, and a section of the footing under the column F. For convenience in drawing, this column is shown "broken," but the figures give the correct dimension between floor and ceiling and agree with the section shown in Fig. 3.

Outside of the lines representing the foundation on Fig. 2 to the right and left at the top, are shown the piers supporting the front and rear porches. The size of piers is figured as well as drawn to scale and the footings in all cases are shown dotted.

We have now examined in detail nearly everything shown on this cellar plan except the stairs indicated at M, which start straight with two steps, take a right angle turn with "winders" and continue up to first floor. See bent arrow marked "up" to make this clearer if necessary. Notice that stairs are shown in full lines about halfway up when they change to dotted lines. The upper part of these stairs can be seen on the First Floor Plan, where the arrow is noted "Down."

The height of the foundation out of the ground, the style of the cellar windows and other similar particulars are obtained by referring to the elevations which show all four sides of the building.

(*To be continued*)

Proportions of Concrete for Monolithic Construction

The following proportions of mixture for plain or monolithic concrete construction were given by DeWitt V. Moore in the course of a paper read not long since before the Indiana Engineering Society:

It is usual to specify 1:2½:5 or 1:3:6 for the proportions of cement, sand, and gravel for plain or monolithic concrete work, and the usual specifications for reinforced concrete are 1 part cement, 2 parts sand, and 4 parts gravel, although some specify a richer mixture for columns. Inasmuch as there still exists a general ignorance on this point, whereby these specifications are understood as being 1:7½ or 1:9 or 1:6, respectively, it would seem that the best specifications should read that a mortar should be mixed of one part of cement to so many parts of sand, and this mortar should then be mixed with so many parts of the aggregate.

The ideal mixture of concrete assumes that the aggregate and mortar are mixed in such proportions that the most dense, solid, and homogeneous mass is secured. This result may be secured by expert engineering supervision; but in reality the good common sense of the expert concrete laborer may be depended upon. The artisan who is accustomed to handle concrete can determine, by the appearance of the concrete mixture, and by working the mixture, whether he is securing the best results, and after a long experience, the author is inclined to say that he would just as soon trust a practical common sense laborer's opinion as to base his work upon the report of a so-called expert engineer.

If a 1:2:6 mixture will satisfy the necessary strength required for construction, there is no necessity of specifying a 1:2:4 mixture, inasmuch as the first mixture will require approximately 1 bbl. per cubic yard, while the latter will require 1½ bbl.—a difference of at least 50 cents per cubic yard in actual cost. Many times, for footings and monolithic work ¾ bbl. per cubic yard of concrete is all that is necessary. Why specify a rich mixture when one with a less amount of cement will answer the purpose? If the contractor is at all skilled in estimating the extra cost will be included in his proposal.

Meeting of New York State Association Master House Painters and Decorators

One of the important matters considered at the twenty-seventh annual convention of the New York State Association of Master House Painters and Decorators held in the city of Rochester recently was the adoption of a revised constitution. President Thomas Pierrepont delivered his annual address, in which he referred to the work of the organization and to the fact that within the past few years changes have developed as regards business conditions and that these changes have brought about new methods and new materials. The master painter of 20 years ago is not a master to-day unless he has kept abreast of the times and re-adjusted his methods to meet present requirements. He also pointed out that the master painter of to-day will be a back number in the very near future if he neglects to improve every opportunity for enlightenment and advancement—one of the strongest arguments for association.

The reports of the secretary and of the treasurer showed the association to be in flourishing condition.

The election of officers resulted in the following choice:

President—Caspar Glunz, of Buffalo.

Vice-president—C. H. Dabelstein, of New York.

Secretary-Treasurer—Carl Goeddertz, of Rochester.

After some discussion it was decided to hold the 1913 convention in the city of Buffalo.

Just before the convention adjourned President Glunz appointed the following legislative committee: F. W. Siems, of the Borough of the Bronx, New York City; D. T. Holland, of Troy; John H. Bailey, of Rochester; F. M. Bottsher, of Elmira, and Carl Goeddertz, of Rochester.

A Wood Products Exposition

A Wood Products Exposition in this country is imminent according to the *Lumber World Review*, which expects to have detailed plans made and to urge the matter upon the lumber world until the movement crystallizes into a show which will help to right many of the wrongs that have been forced upon lumber interests by their lack of enterprise in matters of exploitation and to set the trade straight with the great building material consuming population of the country.

Plaster Buildings for Temporary Purposes

Some Comments by an English Writer Touching the Construction of Monolithic Structures

By John Y. Dunlop

MONOLITHIC buildings may be grouped into two classes—semi-fireproof and non-fireproof—and the purpose of this article is to show how each class of building is constructed and also to show any special qualification certain material has for this class of work.

The semi-fireproof building is one, the walls of which are built on a wooden frame filled in with brick or tile and treated with plaster or cement on the outside and finished internally with asbestos sheets.

A non-fireproof building would consist of a timber frame, the outside treated with plaster and the inside of the walls carefully covered with canvas.

Plaster Buildings for Temporary Purposes

The chief consideration in these classes of buildings is the character of the exterior and the interior finish and that they may be erected at a price reasonable when compared with the more conventional style of building. But in the general sense they must cost more money than the framed building as we know it to-day.

The construction of a building of this kind is not essentially different from the construction of a warehouse or a house excepting that it generally calls for more careful designing.

Frequently the walls of the ground floor are raised on a brick foundation to preserve the timber from damp. In that case means should be taken to ensure a true connection between the brick foundation and the timber.

In designing, the greatest care should be taken to arrange all the principal timbers to coincide vertically so that from the ground sill to the head post, the principals shall be in the same straight line.

The designing of the floor as far as the strength is concerned is a matter of pure engineering and one which has become so largely standardized at the present time that it need not be taken up here.

Generally these floors are covered with wood, and if a maple flooring laid on wood joists imbedded in cinders be used there should be no room for complaint.

There are other methods of laying wood floors, such as imbedding the top surface boards in a mixture of tar and sand, which is laid on structural concrete, but the difficulty in this method is the getting rid of the concrete when the building comes to be taken down.

There is one other point in the designing of those floors which the layman has probably raised in his mind, and that is concrete floors. This would mean the weight bearing part of the floor and its posts and beams, and as the economy of this construction would depend on its long service it must be left out of count in this article.

The roofs can be built of wood framing or with steel couples and covered with corrugated iron or slated.

The repairs and up-keep of roofs of this type have to be taken into consideration after being up for a short time, and for small buildings a concrete roof might be suitable.

It is practically impossible to build a concrete roof which would be waterproof unless it is treated with tar and roofing felt covered with gravel or sand.

As the chief consideration in this class of work is the general appearance, much depends on the decorative features. These features proceed from the structure, and the first condition at which we should aim is to make the outward form accord with the structure.

One of the pictures shows the progress of the work in one of these buildings, the wood framing being covered with slabs of fibrous plaster, which is to be afterwards finished with stucco, which is the term loosely applied in England to all kinds of external plastering.

The fibrous plaster slabs are all cast on a table, each slab being strengthened on the back with canvas and wood. The key for the external coat is obtained by the slabs being left slightly rough on the face. The surface is then wet before the rendering is applied.

With regard to the ornament it is cast in molds and its handling is a matter largely of experience. In putting together care should be taken to prevent the joints leaking after the work is finished, so that they will be sufficiently strong to sustain their own weight.

These parts must all be designed so that they can be easily removed from the molds. Furthermore, the process of removing to the job must be considered so that it can be taken with a minimum amount of expense.

An Exhibitor's Stand

Erecting a Plaster Castle

Plaster Buildings for Temporary Purposes

Repairs and painting are a constant burden in this work and especially where the buildings have been up for over one season. Still for exhibition work this class of building seems to fit into the landscape better than almost any other type of construction.

A Kinemacolor Theater

Historic Mendelssohn Hall on West 40th Street, New York City, is being replaced with a 22-story office and theater building which will involve an expenditure approximating $2,000,000. The top of the structure will have an 8-story advertising tower. A portion of the building will be the permanent home of the Kinemacolor Theater and will have a seating capacity of 1400 persons. It will contain seven aisles on the main floor, but no stage, as the screen will be hung on the 40th Street wall. This theater and the offices of the Kinemacolor Company will occupy the first four floors. The concert hall will be on the fifth floor and will contain a Mendelssohn organ.

An Extemporized Builders' Hoist

A Quick Working Derrick Which May Be Used to Great Advantage in Construction Work

By James F. Hobart

An enterprising builder who had a lot of low two-story structures to erect was badly handicapped by the lack of a quick-working derrick whereby he could hoist the beams, plates and roof trusses, set posts and columns, etc., quicker than could be done with the ordinary A-hoist so much used by builders. After a bit of calculating a shaft seven feet long and two inches in diameter was procured and fitted with a 10-in. cast-iron truck wheel at either end, a pin and washer outside of each wheel preventing their coming off the shaft.

Two 4-in. by 6-in. timbers, each 7 ft. long, were bolted together at one end, spread out A-shaped with a 3-in. by 4-in. scantling between the close together ends. The far ends were spread about 6 ft. apart and bolted to either end of the shaft above mentioned and just in-

An Extemporized Building Hoist

side the truck wheels. The ends of the timbers were beveled off parallel with the truck wheels.

A 6-in. by 6-in. sill was bolted to the wide apart ends of the A-frame a few inches back of the shaft, and a mast, consisting of two 2-in. by 6-in. and one 2-in. by 10-in. planks, spiked together, was erected, as shown herewith. The 3-in. by 4-in. scantling was bolted to the upper end of the spiked-up mast. The scantling thus served to stiffen the mast fore and aft, while two more 3-in. by 4-in. scantlings were fastened to either end of the 6-in. by 6-in. sill and in turn bolted to the mast near its top end.

The upper end of the mast was also fitted with three pieces of plank, two vertical, and bolted to and between the 2-in. by 6-in. mast scantlings. The other piece of short 2-in. by 6-in. plank was spiked on top of the two vertical pieces seen at the top of the mast. These pieces of plank were just far enough apart to permit a pair of sheaves to be placed between them, one as far front as possible, the other sheave equally as far toward the rear of the masthead. This made a very strong masthead housing, which was also weather proof as much as necessary.

The mast and the two side braces were additionally stiffened by bolting on a lateral girt about six feet above the A-frame, which served as sills for the hoist. Between the girt and the 6-in. by 6-in. cross sill short studs were bolted in place and to these studs was attached the winding drum and cranks from the old A-frame derrick.

As arranged, the greater part of the weight of this device is at the wide-apart end of the A-frame, and comparatively little weight is carried by the narrow rear end of the frame. Two methods are open to the maker of one of these derricks. One way is to let the narrow end of the frame be dragged around upon the lower end of the 3-in. by 4-in. scantling, which serves as a fore-and-aft brace for the upper portion of the derrick-hoist. The other way is to place beneath the apex of the A-frame a large caster, the wheel of which is at least four inches in diameter.

Such a construction will permit the hoist to be readily moved in any direction by simply prying the wide end of the A-frame ahead, the caster following readily, no matter in which direction the hoist is being moved. When the frame rests upon the end of the scantling instead of upon a caster it is of course more work to move the hoist around, but it will have greater steadiness without the caster and will be less likely to move out of place through external stress.

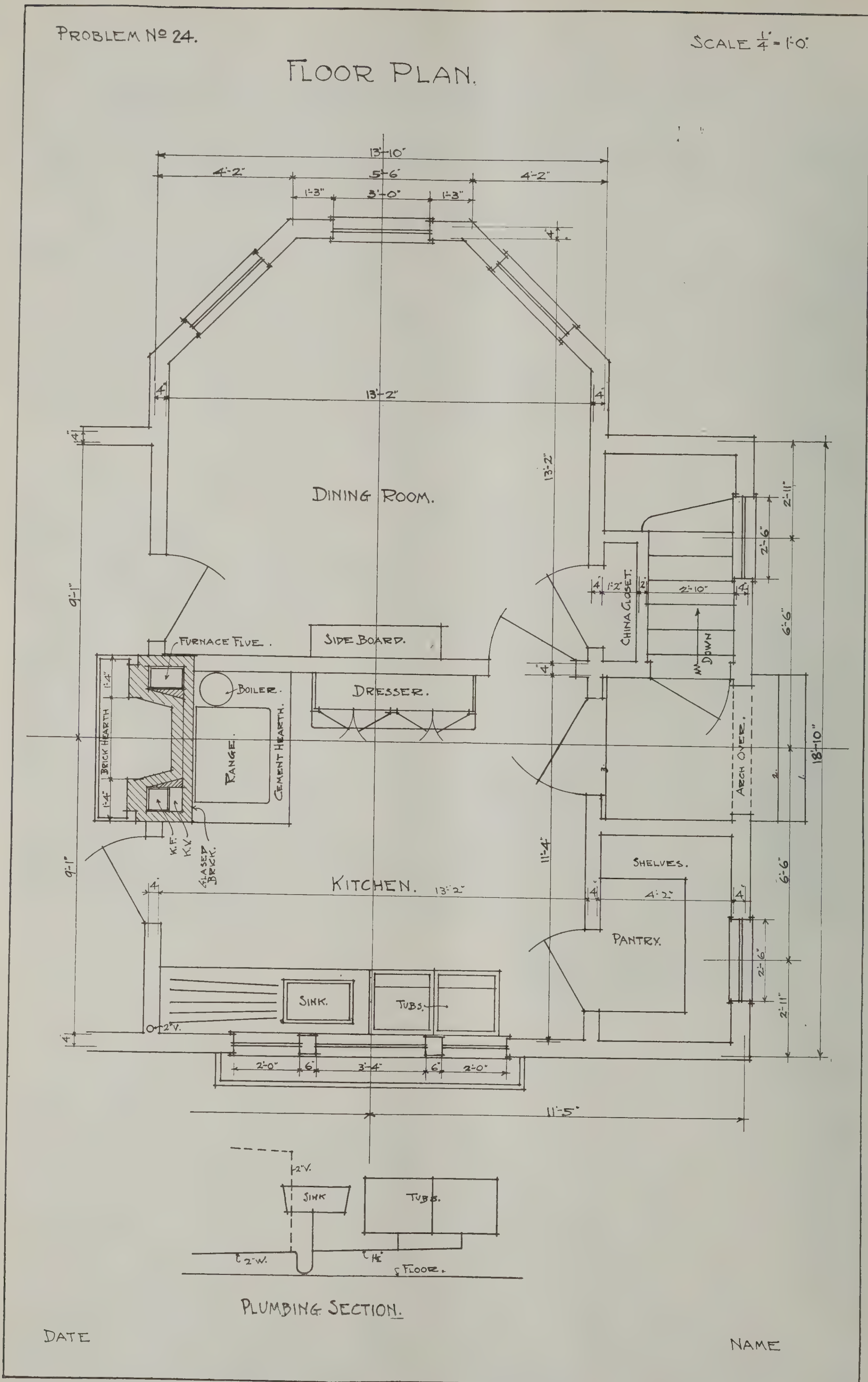
As shown, the hoist is fitted with a single line about one inch in diameter, which leads from the winding drum directly to the first top-mast sheave, then over the second sheave, thence downward to the hook, which is fitted with a counterweight sufficient to cause the rope to overhaul when it is unwound from the drum.

The cost of this machine was so small that the owner dismantled it after the completion of each job, replacing the drum upon the A-frame derrick and keeping the base of the tall derrick intact for use when the device was needed upon another job.

A Really Fireproof Building

What is said to be a *really* fireproof loft and office building is that under construction in 38th Street just west of Fifth Avenue, New York City, from plans prepared by Hazzard, Erskine & Blagden, 437 Fifth Avenue, of the city named. In its construction there is absolutely no combustible material. The exterior is of white marble and white glazed terra cotta, while all trim will be metal and all floors cement or composition. A 100 per cent. sprinkler system will be installed which will insure the tenants the lowest possible insurance rates.

Out of a total of 3,695 building operations commenced and 3,552 completed in New York City in 1911, there were 1,194 and 1,115 respectively located between 23d and 59th streets; that is, in an area approximately 18 per cent. of the Island of Manhattan about 32 per cent. of the building operations were conducted.



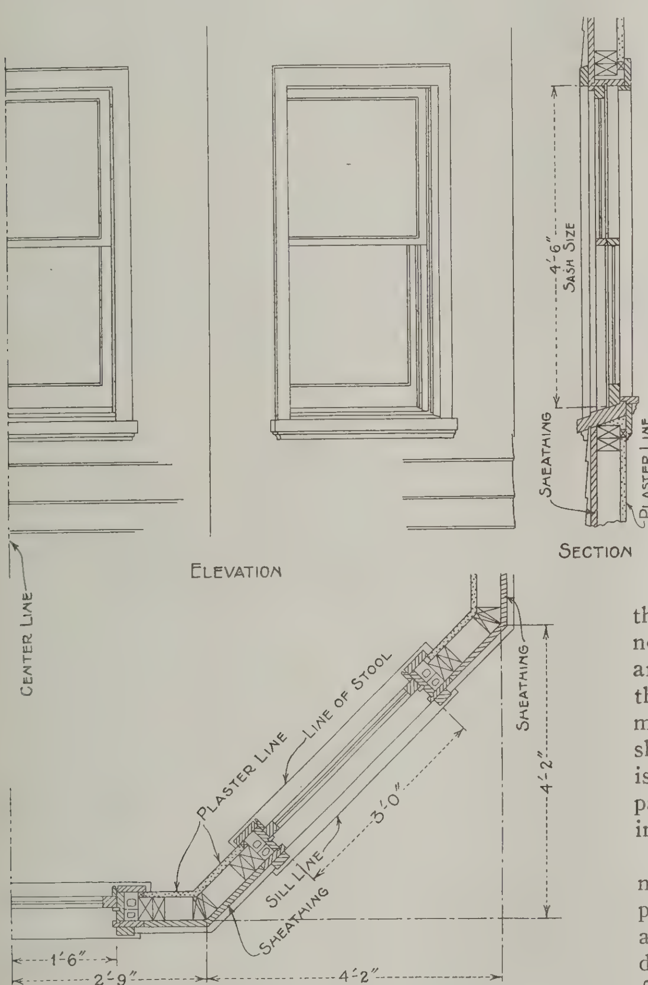
Lessons in Architectural Drawing for Beginners—Scale of Sheet One-half Original Size

Lessons in Architectural Drawing for Beginners

Planning a House—Important Points To Be Considered—Laying Out the Drawings

By Alfred Auslander

WITH our twenty-fourth lesson we take up the planning of a house, and as may be noted by the full-page drawing opposite, we show how to indicate the various rooms to a scale of ¼ in. equals 1 ft.—a scale generally used for working drawings. At the outset it may be stated that working drawings are generally made in outline, disregarding the various materials used in the construction, although walls and partitions are frequently cross hatched in order to render them more conspicuous to the foreman on the job and for whose use the drawings are made.



Details of Window Construction—Scale ⅜-In. to the Foot

Lessons in Architectural Drawing for Beginners

The general plans, elevations and sections should show upon them the dimensions of all parts, as they cannot be drawn full size of the object to be executed, and this will avoid the necessity of the workman referring to the scale, which is not only very troublesome but often leads to many mistakes detrimental to the work.

The working drawings show the extent of the work and the arrangement and distribution of the several parts. They consist of plans of the various stories, including those of the excavation, foundation and roofs; in fact, of any part of the building where some peculiar treatment renders explanation necessary; elevations of every side of the building or of so many sides as present a different appearance, and sections—longitudinal and transverse to the building—showing the internal structure, arrangement of the works, hight of doors, interior cornices, picture moldings, chair rails, etc. On each of these drawings the dimensions of the whole and of the various parts should be carefully figured and checked, the direction in which the measurements are taken being shown, either dotted, red or fine black lines, and the points from and to which they are measured being clearly defined by an arrow head or some such designation. So much of the details are shown on these drawings as the scale will allow.

Such parts of the work as cannot be shown on the general drawings with sufficient clearness and accuracy are afterwards indicated by detail drawings which are prepared either full size or to such a scale as shall make them clearly intelligible to the workman. Such drawings are required both for the decorative and constructive parts of a building. These include, for example, the capitals and bases of columns, entablatures, cornices or any other enrichments, also the sections of moldings, stairs, dressers, fireplaces and mantels, etc. Besides these may be mentioned the method of framing the floors, roofs, etc., and of everything in short of which a particular description is necessary. It saves much trouble if the detail drawings are prepared on separate sheets for the different parts; these drawings, like the others, should have their dimensions clearly figured upon them and every drawing should have the scale marked to which it is drawn. It is usual in detail drawings to tint, color or hatch such parts as are in sections, while the elevations are shown in plain lines.

Referring to the full-page drawing the student will notice that the entrance, the kitchen, the dining room, pantry, etc., are all figured, the dimension lines shown and the points from and to which they are taken indicated by arrow heads. The size of the dining room, for instance, is 13 ft. by 13 ft. from finished plaster wall to plaster. The figures, however, on working drawings are always given from stud to stud, allowing 1 in. for the lath and plaster on each wall or partition which is plainly marked by a fine line in the wall.

The detail drawings necessary for this plan are exterior detail of the entrance or bay window in the dining room illustrated in the accompanying sketches, the flower boxes in connection with the kitchen windows, the interior details of the dresser, the stairs to the cellar, the fireplace and mantel, besides the floor framing, most of which have been explained in some of the previous lessons, except perhaps the bay window and the construction of the dressers.

We would suggest that the student work out all these details as well as the exterior elevation and then compare them with the drawings of them which will appear in future lessons and thus the student will see for himself wherein he failed, if at all, to understand the meaning of the exolanations here given. To properly do the work it is necessary for the student to know the hight of the rooms—8 ft. 6 in. in the clear—sill of kitchen windows 3 ft. 6 in. from the finished floor; hight of kitchen windows 3 ft.; hight of opening for entrance—see plan where it says "arch over"—6 ft. 8 in. above the floor. The student should also work out the foundation plan as well as the framing plan and compare them with following lessons.

Timber Construction of Old Buildings

In writing of his experiences in dealing with structures that have been built 75 or 100 years, a contributor to a recent issue of the "Journal of the Incorporated Institute of Certified Carpenters" presents some very interesting particulars. In many of these, he points out, timber has been used in places and under conditions when now it would be avoided. On a soft soil it is to be found under the main walls of the building, as large sleepers, distributing the weight of the walls over a large area of the loamy earth; and above the footings would be built inside the wall horizontal timbers distributing the weight acting through the piers.

An Interesting Example

In a case in mind an oak post, about 9 in. by 9 in., was taken out of the center of one of the piers of the lowest story, that in turn carried a 12 in. by 7 in. joist plate of the ground floor. A great weight must have been carried by this post, as the decay of the post at the base gradually let down the pier; and I am of opinion that only the horizontal bond timbers above saved a serious collapse of the brickwork remaining. The front and back walls are similar in construction. Above the lintels of the windows would be built in on the inside a horizontal plate, about 7 in. by 4 in., the full width of the building, and intermediately in the pier shorter plates, and these make a fixing for the windows and linings.

If we look for a reason as to the use of timber in the construction of walls and in places where we should now not advise its employment, we are forced to believe that the materials of the brickwork were considered not strong enough to be used independently of a lateral tie. The thickness of the brickwork of the walls will generally comply with the requirements of the London Building Act, but we find lacking good building bricks; the facings are of a fair quality, but imperfectly bonded into the place, or commoner quality brick backing. The cementing material is stone lime mortar, generally well gauged, but long since perished, the London atmosphere and changes of temperature being greatly responsible for its decay.

Strength of Brick Walls

Given inferior bricks and poor mortar, one can agree with the readiness with which timber was used in walling, and timber, though a decaying substance, and perishable under some conditions, has justified its adoption, as it is repeatedly taken out and reused. The then builder, realizing the incompleteness and limitation of the carrying strength of brick walls, readily used a material that was obtainable in length and good quality; then timber was much cheaper and of higher quality than it is to-day, and thereby helped him in framing up high buildings in a simple manner, and the bond timbers in the walls gave the lateral tie and support to strengthen the brickwork.

In prohibiting timber in brick construction of the present time, leaving out the question of its inflammability, we do so because we fail to protect it from the diseases of dry and wet rot. If timber is placed in a wall or building where the bricks and mortar perish from want of a damp course or want of protection from external moisture, or a stone projecting course breaks away for want of a lead dressing, is it not to be expected that timber will fail if used under similar conditions? We can often view porches and gateways made solely of wood, with the simple protection of paint applied as an ornamentation.

In the construction of roofs and floors, I feel the carpenter of to-day is quite as capable as his predecessor in dealing with their construction. Strutting, either herring-bone or solid, would not be omitted to-day, as I have seen recently in some old floors of quite large span, and often the arrangement of timbers shows a want of their judicious application. The floors are simple in construction, a binder spans from the head of the partition to one of the piers, whilst in the floor above the binder crosses to the adjoining pier, so as not to collect the load on any one pier. The joists are tenoned into the binders and pinned, and the other ends at the wall are built in. The pinning of tenons with hardwood or oak pins is to be recommended, as with the old floors I have seen the binders shrink away or cast in sagging, so that the shoulder is right out of the housing, and only for the pinning the tenons might be drawn.

Roofs are varied in construction; trusses are met within the large spans; but in the attached houses the roofs are more likely to have collar trusses, the collars carrying the ceiling joists and the principals supporting the ridge and purlins. Often ties only are used to connect the wall plates, the purlins are then strutted off these, and a pole plate to take the rafters is pinned to the ties.

Rights of Draftsmen in Illinois to Make Plans for Buildings

The Board of Examiners of Architects for the State of Illinois received at its meeting held in Chicago in March a written opinion from its attorney defining what rights draftsmen and office assistants have under the law in making plans for buildings and what rights are forbidden to them. According to one of the sections of the architects' license law of Illinois it is provided that "Any person who shall be engaged in the planning or supervision of the erection, enlargement or alteration of buildings for others, and to be constructed by other persons than himself, shall be regarded as an architect within the provision of this act and shall be held to comply with the same." Another portion of the same section of same chapter says: "Nothing contained in this act shall be construed to prevent any person, mechanic or builder from making plans and specifications for, or supervising the erection, enlargement or alteration of any building that is to be constructed by himself or employees."

In his written opinion the attorney says: "I am of the opinion that any such draftsmen employees, whether regular or only occasional draftsmen employees, of such 'person, mechanic or builder,' who are engaged in the making of plans and specifications for building to be erected by such 'person, mechanic or builder,' and who perform such work on such plans and specifications as to make the plans and specifications essentially their own, must be regarded as practicing architecture within the meaning of said Section 9, and are liable to the penalties denounced under the act for practicing architecture without being licensed so to do."

It is calculated that in the woodworking industries about 2 h.p. of energy is used to each man employed.

Forms for Reinforced Concrete*--V.

Octagonal Columns -- Design and Construction of Beam Forms -- Distinction Between Beams and Girders

By Frederick W. Taylor and Sanford E. Thompson

A DESIGN for an octagonal column form is shown in Fig. 6. There are various methods of making octagonal forms. Sometimes they are made up as square forms with triangular pieces inserted in the corners. The style given, made with 8 independent sides, four of them with beveled edges, appears from our time studies to be the most economical. The method of forming the small triangular haunches at the top of the column, so as to give it a neat appearance, is shown by the triangular corner pieces in the drawing.

The style of column form shown in Fig. 7 was designed and used by W. W. Wilson of Wilson & Tomlinson. Angle irons are set vertically at each corner to brace the cleats and drilled at frequent intervals to permit bolting the column form wherever needed.

In considering the distinction between beams and girders it may be stated that beams support simply their own load and that of the slab, while girders support beams which run into or intersect them.

There is less variety in the design of beam forms than of column forms. The variation in details affects the time and cost of construction less than in columns, provided the design is such as to permit easy removal of the forms after the concrete has hardened.

In Fig. 8 is shown a typical beam form in combination with a girder and a column form. The supporting posts are shown and the "joist bearer" for supporting the joists under the slab form.

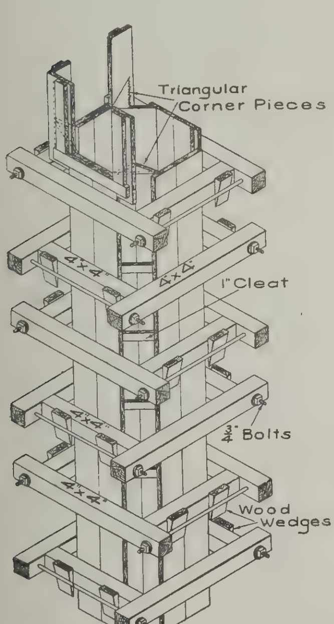


Fig. 6—Column Form for Octagonal Column

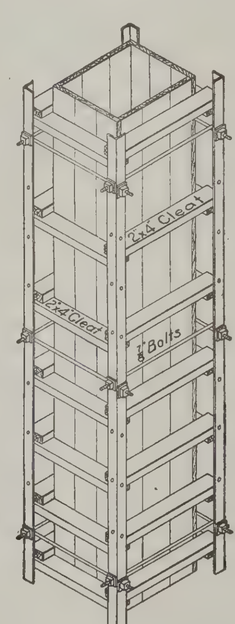


Fig. 7—Column Form with Angle Iron Verticals

Forms for Reinforced Concrete

Making Beam Sides and Bottoms.—The forms for beam sides always should be laid out and made up on benches as described above. The boards run horizontally the full length of the beam and are held together by the cleats laid flat, which should be nailed securely enough to bear the necessary racking of removing and resetting forms. Cleats are preferably 2 by 4 inch stock.

The bottoms for the beam forms when more than one plank in width should also be made up on benches in a similar manner. If a single plank forms the bottom, it should be cut to length on the mill saw, marked and piled near the side sections.

The bottom plank should be the net width of the concrete beam while the sides should lap down over the edges of this bottom plank to permit their easy removal in advance of the bottom.

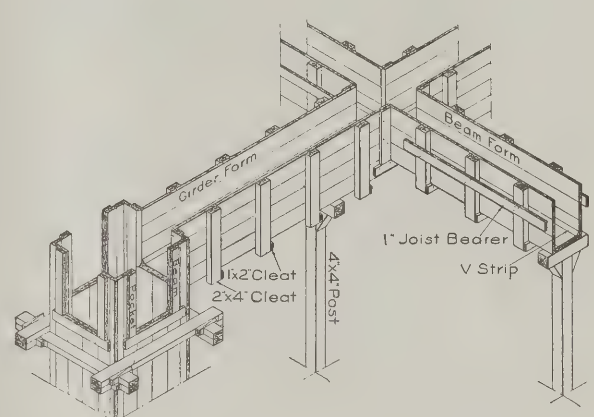


Fig. 8—Typical Forms for Beam, Girder and Column Head

If the design is made with a view to the most economical form construction or if the architect will permit a slight variation in schedule sizes, both the width and the depth of the beams often may be made to correspond to combinations of mill stock sizes.

For beam sides 1 inch (7/8-inch) or 2 inch (1 7/8-inch) stock sometimes is used, but the thinner stuff is most economical. Beam bottoms, unless very narrow, should not be thinner than 2 inch stock.

Cleats should be spaced symmetrically on each side of the center line so as to make the layout easier.

All sections should be carefully marked and piled to facilitate their transportation to place. The proper marking and piling of materials, as already has been stated, is one of the essentials in a well managed job.

Methods of Erecting Beam Forms.—There are two general methods of erecting beam forms: (1) forms put together on horses on floor below and then raised to place as one member; (2) sides and bottom placed separately on the scaffold near the required location, then assembled and connected in their final position.

The first method, that is, putting together on horses, has been found by our test observations of time to be best and quickest. A man can work more efficiently on the floor than on the scaffold, and the scaffold for setting need not be so elaborate. Much time is lost by picking up material which falls to the floor and in getting nails and tools.

Whichever plan is used the forms should be handled by a gang of laborers. In the first method they raise the assembled form to place and in the second method

*This article is adapted by the authors for the *Building Age* from a chapter in their forthcoming book, "Concrete Costs."—

carry the beam sides and bottom and place them on the staging.

Methods of Clamping Beam Forms.—Three methods of clamping beam forms together are shown in Fig. 7. At the right is shown the most common plan, in which 1 by 2 inch horizontal cleats are nailed to the vertical cleats. In another style, shown also in section, the sides are held together by bolts which run through the form, and, protected from the concrete by a sleeve, are taken out when removing the forms. The holes may be filled with concrete or a permanent rod for hanger supports run through and cemented in. The sleeve provides a bearing for the reinforcing bars.

Another method, using iron clamps of the Hennebique type, is shown at the left of the drawing. This plan is the cheapest to erect and remove.

Joist Supports.—Fig. 9 also shows two methods of supporting joists, one at the right of the drawing where there is a 1 by 4 inch joist bearer and the other at the left where the beam cleats are notched out to receive the joists. The former method represents more usual practice.

Posts.—Posts for supporting beam forms are illustrated in Fig. 10.

The drawing shows the simplest type of post for

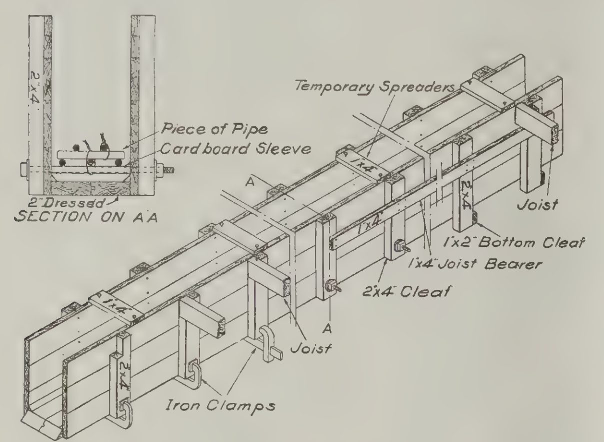


Fig. 9—Beam Form Showing Three Methods of Construction

Forms for Reinforced Concrete

ordinary construction and also a post for supporting a lintel. Detail designs of knee braces are shown in the lower part of the figure.

(*To be continued.*)

The Heating of Country Houses

From the standpoint of comfort, health and economy there is no element of a country house of more importance than its heating plant. Yet this is a feature of house building with which the average owner deals under great disadvantages, which unfortunately are not usually offset by the assistance of architects and builders who may ordinarily be entrusted to carry out the owner's wishes and ideas in other respects. There are several modern conveniences as, for example, gas, electricity, running water, and sewerage, which are not so readily available in the country as in the city but in the matter of heating, which should depend only upon the fuel supply, the country house should present no more difficulty than the city dwelling.

With the so-called warm-air furnace, which is frequently selected because of its lower first cost, says J. H. Boughton in "Country Life in America," the main considerations are to secure proper capacity and efficiency in the furnace itself; a good chimney draft; an ample intake pipe for the cold air; and last, but not least, conductor pipes to the various rooms of sufficient size to convey readily the heated air from the furnace. Finally, it should be seen that the furnace and the conductor pipes are well insulated with asbestos or similar material to prevent undue loss of heat by radiation. Each heating installation must be treated as a distinct problem, and no universal rule or set of rules can be formulated which will cover every case, and this is particularly true of warm-air apparatus.

The Hebrew Technical Institute

A very interesting exhibition of the work of the students of the Hebrew Technical Institute, 36 Stuyvesant street, New York City, was given on Monday and Tuesday, May 6 and 7. The work shown included that of the classes in architectural drawing, carving, cabinet work, pattern making, freehand drawing, electric construction, machine work, etc. All departments of the

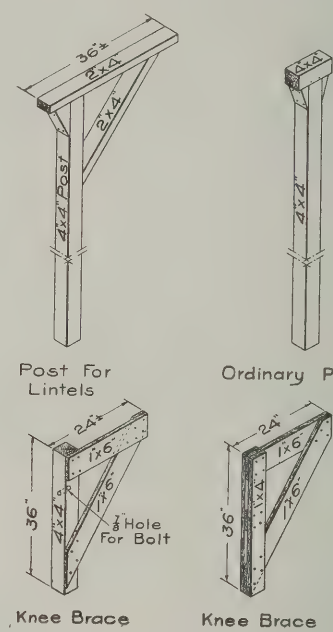


Fig. 10.—Posts for Supporting Beams and Knee Braces

Institute buildings were thrown open to the friends of the students and to those interested in the technical training of the youth of the city.

On Wednesday evening, May 8, in the large hall of Cooper Union, Eighth street and Third avenue, the commencement exercises of the graduating class were held in the presence of a large gathering.

The principal address of the evening was made by Joseph L. Buttenwieser, second vice-president of the Board of Directors. He spoke at length of the opportunities offered by the institute for practical education for those who seek to earn their living in technical lines. He reminded the students of the sacrifices made by their parents in providing them with an opportunity to obtain a technical education. In conclusion he said: "The greatest happiness in your life will be obtained from duty well performed."

Roof Bridges as Fire Escapes

One of the amendments to the New York Tenement House law recently enacted provides additional means of escape from one building to another in case of fire. It reads as follows: "An open-slat bridge or platform may be hereafter extended across the yard from the roof of one tenement house to the roof of an adjoining building to furnish roof egress providing the bridge or platform does not exceed 4 ft. in width."

The Architect from the Builders' Standpoint

Unfair Specifications -- Contracting Business a Gamble -- How Architects May Advertise to Advantage

At a recent meeting of the Columbus Society of Architects a short address was delivered by John A. Kelley, secretary of the Builders' Exchange of the city of Columbus, Ohio, he taking for his subject "The Architect from the Standpoint of the Builder." What he had to say upon that occasion covers so many interesting points that we give the following copious extracts:

As a class and individually the architect is preyed upon and succors more parasites than any other profession with which I am familiar, and yet these dependents are necessary in a way. An architect who turns his face from the newspaper man; who refuses to see the material man; who is not at home to the manufacturers' agent or the man with the mechanical device is treading the downward path. It is certainly a fact that the attitude of the building industry toward an architect marks his standing in the community in which he operates. I would not be here to-night perhaps had it not been for an unfortunate circumstance of a few weeks ago when one of the members of our Exchange endeavored to make us shoulder a burden we did not desire to carry. It was in regard to your universal specification cover, and it was charged that the Exchange was against the cover because some of its members had grievances against the architects. This, however, proved to be entirely unwarranted and was disproved in the presence of your committee.

Builders Have No Grievance Against Architects

The Builders' and Traders' Exchange of Columbus has no grievances against the Columbus Society of Architects. There are no doubt members of your society who do not get out sufficient details, or whose specifications are indefinite, or who require too many alternate bids, or whose general conditions are too stringent. These are matters to be taken up with the individual architects in question, either by a committee from the Exchange or by the individuals who figure out of these offices. The Exchange has, however, appointed an Architects' Conference Committee, which may bring before you at a later date some matters pertaining to the conduct of business or general practice of the relationship of the architect and the builder.

Of course there are contractors who do not figure in the offices of certain architects just as there are architects who do not care for figures from certain contractors, and so on. But these cases are so rare that to me, as a man between and watching both sides from the inside, it is marvelous how many differences will arise in connection with the construction of a building. Some contractor may believe he has been worsted or some architect believe that a contractor has worsted him, and there will be such cases as long as the world exists.

Architects Cannot Serve Two Masters

The architect cannot serve two masters—he cannot serve the owner and the contractor. The contractor knows that often the action of the architect in letting contracts is influenced by the owners. It is primarily the architect's business to look after the business of the owner and to this extent he has autocratic power.

The contractor is, figuratively speaking, "under the architect's thumb." The contractor must look to the architect, and no matter how much he is imposed upon he has no redress. If he appeals to the owner or goes over the head of the architect he "gets in bad." If you were a contractor in Columbus, where there are not more than 30 or 40 architects, you would hesitate a long time before causing a rupture with one of the architects. Every time a contractor has differences with the architect he cuts off a slice of his opportunity for income. There are many cases happening every day where a contractor goes into his own pocket to avoid trouble with the architect; that is, in supplying something that the architect has omitted or in correcting some mistake.

Architects' Autocratic Power

The point I desire to make is to impress you with the full realization of your autocratic power. This power, I believe, should make you more lenient toward the contractor. Unexpected difficulties will always arise in the erection of buildings, be they large or small, owing to the peculiar working conditions of the industry. Your plans are ofttimes prepared in a hurry and the contractors are compelled to figure in a hurry. No wonder trouble arises.

The contracting business is a gamble pure and simple. The contractor gambles for the job, and landing it, he gambles that his sub-contractors will do their part; gambles that the materials are suitable and that they will arrive on time; gambles on the specifications of the architect, if they are not clear; gambles against the weather and time and labor troubles, and sometimes gambles on getting his money. The contractor should be given credit for knowing the architect. You are few and you are in the limelight all the time. Each one of you is discussed daily at the Builders' Exchange. If your general conditions are too strong all the contractors know it, whether they figure in your office or not. If your details are lacking it is soon known from the millman to the general contractor, and so on through the trade. If your specifications are not clear the contractors talk it over and everybody knows the state of affairs. If you make a practice of giving the contractor small consideration and forcing him to the limit, it becomes a byword in the trade.

Builders Keep Tabs on Architects

Every one of you is listed and labeled in the minds of the contractors. They know your history from the beginning. They know just what you did to this contractor on this, that or the other job, and they even know the exact details of how you get your work or what influence you have behind you. In fact, there is nothing about you that we do not learn—even the minute details in your offices. We know when somebody is low on a job and you do not want him to have it. We do not tell you these things, but we know them. Therefore, I believe that you should be perfectly frank with the building industry because it is to your best interests to do so. In so far as I am concerned I find that most of you are frank with me and it is highly appreciated.

You would be surprised to know how conditions in your offices or inherent in yourselves affect the prices of buildings you design and the class and number of contractors who figure them. There can be nothing as false as the accusation that the contractors are banded together so closely that they fix prices among themselves. Human nature does not permit of such a condition in the contracting trade, as yet at least. There are 200 contractors in the Exchange, and it is certain that there is not enough work to be divided equally among them. However, contractors are influenced unconsciously perhaps by association. If an architect has a reputation of bringing in trouble through some details that are not in the original plans, this situation gets into the pencil points of the contractors and they naturally add something to be on the safe side. Eventually, such practice on the part of the architect causes him to lose the estimate of the most reliable contractors and the best interests of no one are served.

Unfair Specifications

If your specifications read anything like what follows how can you expect a contractor to figure your work, or, how can you expect the right kind of a price?

"The plans are intended to call for a completed building and no extras to make it complete will be allowed, but the contractor must supply them even though they are not expressly called for or shown."

The contractor gets that far in the specifications, and if he has any sense of pride he lays them down and quits right there. If your specifications are mixed up and the plumbing specifications call for the doing of brick work like one of recent origin, providing that "the enameled brick wainscoting be done by the plumber," how can you expect to avoid difficulties? The brickman does not read the plumbing specifications in order to take off the brick work.

In a recent plan, floor sleepers were called for which required under-filling. The plans also showed a section of floor raised 6 in. above the floor. There were no specifications for cinder filling. Will you compel the contractor to fill with cinders when it is not in the specifications?

One of the latest impositions generally found in specifications is as follows: You design the reinforced concrete work; you designate the size of floor slabs; the materials; the mix; the size and placement of the reinforcing, and then you ask the contractor to test out the floor for an assumed load, and in case of failure, to stand the expense of it and of damage to the work. Is this right? Why don't you stand back of your design instead of placing the burden on the contractor?

Selection of Superintendents

Along these lines I want to say a word at the instance of the contractors in regard to your superintendents. We appeal to you to be more careful in the selection of your superintendents and in giving them such unquestioned power. You take a young engineer out of college and place him over practical builders who have been all their lives in the contracting business. This young superintendent has read in books and heard professors lecture on how to handle the contractor and he has strong views on a lot of things about which he knows absolutely nothing. We know of young men superintending your work in some instances who have instructions to use their own judgment, and "do not bother us any more than you have to." It is under these inexperienced youngsters that the contractor battles with the work and fights for his rights.

The reputation of an architect, I believe you will admit, rests largely with the building interests in the community. Parties who expect to build are influenced by the opinions of material men, of contractors, etc. They usually talk with a contractor before selecting an architect. The slightest word against an architect is sufficient. A good word always goes a long way. The contractors in Columbus are loyal to the architect. Time and again we have urged an owner to have his plans drawn by an architect. Our contractors will not figure plans that are not drawn by an experienced architect.

The Speculative Builder

One of the greatest enemies of the architect and the legitimate contractor is the cheap speculative builder who makes his own cheap plans and constructs his own cheap buildings. A city is as sound as it is builded well, and if we continue to permit the erection of these buildings we shall all suffer. The public should be taught to be wary of these builders. There are some good speculative builders, but they are scarce.

Personally the architect cannot advertise. It is unethical. But as a Society you may promulgate information and do it in a manner that will bring you commendation. Eventually I believe that such organizations as yours will have a permanent paid secretary to act in a way as your press agent. This is essentially a day of advertising and it often makes me wish I were one of you to see how you neglect your opportunities in this line.

How Architects May Advertise their Work

If I were in your place and I designed as many pretty homes and as many substantial buildings as you do I would get all kinds of clean, legitimate advertising out of it. I would take pictures of these buildings inside and out and I would give them to local papers and to magazines devoted to the building trades. The press is only too glad to get them, but the press has not the time to secure the photographs and descriptive particulars themselves. Such matters are called "features" and the newspaper must necessarily spend most of its time in collecting live news, but "features" are necessary also. You may by seizing your opportunities obtain thousands of dollars' worth of advertising in a year free of cost except the expense of the pictures. As a Society you could hire an architect who would give you special rates to members. No matter what are your ethics you must admit the value of advertising.

Your organization should use the Builders' Exchange and make it more useful to you. The Exchange is here and has been for 20 years and will be for 20 years longer. Through the Exchange you save yourself lots of valuable time. You should give out all your information through the Exchange and educate the building industry to look to the Exchange for its information instead of bothering you. Keep the Exchange in mind and it will save you much bother.

Announcing the Bids

Now as to the bids. If the owner does not object, why not give them out to the contractors on the job? It is no more than right. The contractor who spends his time and labor in figuring a building should be repaid at least that much. It creates a better feeling. It brings more bids. It gives the architect a reputation for fair dealing. I am glad that most of you give out the bids and the results of your lettings. A few of you do not, and I am sure that it will ultimately result to your disadvantage if it is not already doing so.

Another thing we cannot protest too strongly against is the outside contractor coming into Columbus and carrying off some of our larger work. Some of our contractors go out of the city for work, but it is where the local contractors in those towns are not equipped to handle them. We have contractors in Columbus who have constructed and can continue to construct the largest and finest buildings you may design. Although these large contracting firms who come into Columbus have big organizations and strong buying power, they do not and cannot serve your interests like a local contractor.

Watering Tanks and Troughs of Concrete

How the Work May Be Conveniently and Economically Done -- Bill of Materials and Estimate of Cost

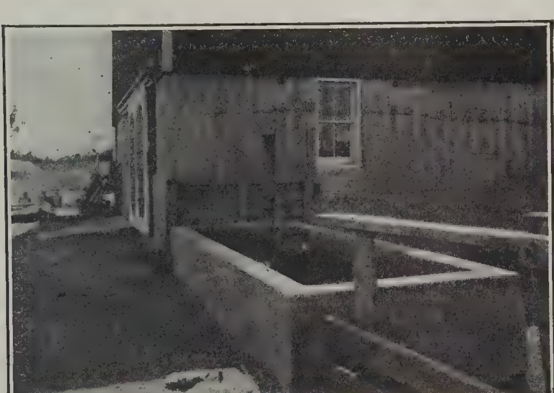
IN many sections of the country, more particularly in the rural districts, watering troughs or tanks are necessary adjuncts of the well equipped farm or ranch and some suggestions as to how these may be conveniently constructed are likely to prove interesting to many readers of this journal. Concrete is used for the purpose and the tank or trough may be of any size or shape desired. For purposes of illustration we will explain the plan to be followed, taking for the subject a watering trough having a capacity of 30 barrels of 31½ gallons each. To build such an oblong tank, a view of which is shown in the half tone engraving, mark out on the ground a space 5 x 14 ft. Within these lines dig a foundation trench 10 in. wide and 2½ ft. deep around the entire trough or tank as some might term it. Lay the in-flow and over-flow pipes—not less than 1½ in. in diameter—so that the ends, fitted for connections, will be even with the bottom of the tank.

In doing the work it is well to construct "forms" and have all materials on hand before the actual digging of the foundation trench. For the forms use 1 in. siding on 2 x 4 in. uprights spaced 2 ft. apart. The outside form is a bottomless box 5 ft. wide by 14 ft. long, inside measurements. It should be constructed 3 ft. high to provide for a 6 in. floor and a clear depth of 2½ ft. According to the Association of American Portland Cement Manufacturers, to whom we are indebted for the accompanying illustrations, the inside form must be narrower and shorter to make provision for walls 5 inches thick at the top and flaring to a thickness of 8 inches at the bottom of the tank. When ice forms, this slope allows it to slip up the tank walls instead of pushing directly against them. The sides and ends of the forms may be made separate and put together in place; or, if there is sufficient help, each form may be entirely completed and set up as one piece. The forms are held in position by 2 x 4-in. liners at top and bottom and, if necessary, by sloping braces nailed to stakes driven in the ground. Cut strips of heavy woven wire fencing long enough to cover the bottom of the tank crosswise and to project up into the walls to within 6 in. of the top, and likewise a strip 4 ft. longer than the inside length of the tank.

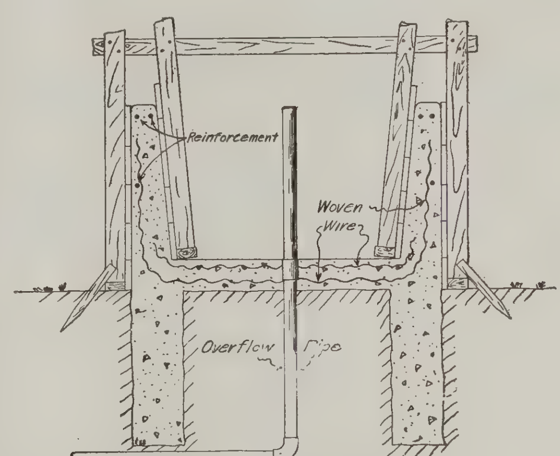
With the forms ready, mix the concrete 1 part Portland cement to 2 parts sand to 4 parts crushed rock. In measuring the materials, count 1 bag of cement equal to 1 cu. ft. If bank-run gravel is used, mix the concrete 1 part cement to 4 parts gravel. Fill the foundation trench with concrete. Set the outside form in place. See that it is level, so that the tank will be level and can be entirely filled with water. Lay the 6 in. bottom reinforced 1½ in. from the under side with the short lengths of woven wire crosswise and 1½ in. from the upper side with the long strip of fencing. Bring up the extra length of wire so that the ends will project up into the future side-walls and can be fastened to the reinforcing rods. (This wire reinforcing in the bottom will prevent possible cracking due to heaving by frost.)

With the bottom finished, immediately set the inside form in place and fill the wall space with concrete mushy wet. Half-way up the side, and 1 in. from the outside, lay a ⅜-in. rod (or several hooked together) entirely around the tank. Again 2 in. from the top and 1 in. from both inside and outside, imbed two more ⅜-in. rods in the concrete. Round the top edges of the tank with a trowel or a sidewalk tool. If a tank cover is desired, insert ½-in. bolts, heads down, in the soft concrete with sufficient length above the top of the wall to pass through the wooden cover and to receive a nut and washer.

When the tank is three days old, remove the inner form and paint the inside of the tank with a mixture of cement and water as thick as cream. Screw into the over-flow connection the necessary length of over-flow pipe. The tank may be used in ten days provided the outside form is left in place. If the outer form is removed at the same time as the inner, do not use the tank for two weeks.



General View of the Completed Tank



Vertical Cross Section through the Trough or Tank

Watering Tanks and Troughs of Concrete

BILL OF MATERIALS.

Crushed rock	6½ cu. yds.	@ $1.10	$7.15
Sand	3¼ cu. yds.	@ 1.00	3.25
Portland cement	10½ barrels	@ 2.50	26.25
12 Rods	⅜" x 10', 45 lbs.	@ 0.02¼	1.00
Total			$37.65

By getting prices from local dealers, the cost may be found to be less. Such a tank is the cheapest to be had, since it never needs repairs and never wears out.

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JUNE, 1912

The Architect and the Fire Waste

Just at the present time a great deal of thought is being given to ways and means for reducing the fire waste of the country and numerous are the suggestions which have been made tending to the accomplishment of this result. It is obvious that in order to prevent conflagrations it is necessary to have better fire-resisting construction. We must so build that the firemen may confine the flames to the building in which the fire originates. Inflammable roofs breed conflagrations through flying sparks and embers, while unprotected window openings allow the spread of the flames from building to building. In a recent address before the Boston Society of Architects, C. M. Goddard placed particular stress upon the good work in bettering fire conditions which has been accomplished and can still further be augmented by architects working either individually or through their associations. He points out that the whole problem is based on the carelessness of the American people in taking a chance and the love entertained by many for the almighty dollar. Only a few years after the Collinwood School disaster the city of Boston decided to change the school building requirements from strictly fireproof to sub-standard fireproof, because it cost too much to give absolute protection to the school children. To offset the effects of inflammable roofs, unprotected window openings and more or less inadequate construction, the best internal protection, such as is afforded by automatic sprinklers, is a powerful adjunct not only in confining fires to buildings in which they originate but also in keeping them out of buildings having sprinklers when they originate elsewhere. Reasonably small floor areas and protected vertical openings in floors, especially where the buildings are filled with combustible goods, are of great advantage. No body of men, however, is in better position than the architects to assist in the education of the public along the lines of better building construction.

Drinking Water for Office Building

The provision in office buildings of a system of drinking water supply, cooled artificially or by means of ice, and kept in circulation so that it is available at all times is not being sustained by the demand from those who erect such buildings. When this method of supplying the tenants and occupants of a building with cooled drinking water was first presented it met with favor as the desired solution of an important problem. This subject was recently discussed by a number of men connected with the design and installation of kindred equipment, and one sanitary engineer stated that he had been consulted as to the advisability of including it as a part of the equipment of a new building. His investigation previous to making a recommendation had brought out the fact that instead of it being a convenience to those who occupied the offices almost invariably some cooled spring water supply was used in the offices and that the drinking fountains in the halls were used by messenger boys and visitors to the building, particularly those who were sent there on errands of various kinds, rather than the visitors who had important business to transact. The result of the investigation was to recommend that the cooled drinking water system be omitted from a rather large and important office building to be erected in New York City.

Skilled Workmen in Demand

Wherever there is a large number of laborers out of work, an examination into their competency, both as skilled workmen and as to the possession of a thorough knowledge of the work they follow would probably show that few could pass an examination which would put them in the first class. Every young man or older man seeking work can call to mind acquaintances who have not lost a day for a number of years when they were able to work and desired to work. In many instances they seem to think some favor has been shown rather than accept the record as an indication of the superior handicraft of these men, as well as their superior knowledge of everything that has an influence on their work. When they have applied for work they have frequently been asked questions which they were unable to answer in a satisfactory manner, and as a result, instead of being taken on, merely have their names taken, and they have the discomfiture of seeing those who have applied to the same man at a later time engaged, showing that there was need of workmen, but that only those of the highest proficiency were acceptable. This should be the incentive of every live man, whether he be just out of his teens or in the thirties, to make an effort to improve his qualifications. In these days, when there are so many correspondence schools as well as manual training schools, there is no reason for any workman to continue in the undesirable and unemployed class. He can change his condition by his own effort. It is not to be expected that the change can be effected in a few weeks, because men who are occupying the desirable position can on interview show that they have been for years adding to the store of knowledge in their possession and seeking to add to the skill which they possess. There was never a time that the truth of the old proverb, "Knowledge is power," was more evident than at the present time, and as this old proverb has stood for generations it should be a sufficient suggestion for every man, whatever his field may be, to add continually to his knowledge of that field.

Officers of Building Trades Employers' Association

At the annual meeting of the Building Trades Employers' Association held in April in the rooms of the organization, 30 West 33d Street, New York City, the following officers were chosen for the ensuing year:

President................William Crawford
First Vice-President............F. G. Weber
Second Vice-President.......Edwin Outwater
Treasurer...................A. N. Chambers

William J. Holmes continues as secretary of the organization, his office being an appointive one. Charles J. Kelly was chosen chairman of the Board of Governors.

C. G. Norman, retiring chairman of the Board of Governors, was presented with a handsome testimonial in the shape of a beautiful gold watch and fob. The gift was expressive of the esteem in which he is held by the building fraternity of the city. The presentation was made by Otto Eidlitz, who was chairman of the Testimonial Committee.

Limiting the Hights of Tenement Houses

One of the most important provisions of the Wagner Tenement House bill, passed at the recent session of the New York State Legislature, modifies the old law as to the hight of buildings. Hereafter the hight of any tenement house shall not exceed more than one-half the width of the widest street upon which it stands.

The hight shall be the perpendicular distance measured in a straight line from the curb level to the under side of the roof beams, but if the cornice shall exceed one-tenth the hight of the building the measurement shall be taken to the top of the cornice.

Where bulkheads occur exceeding an area of more than 10 per cent. of the roof the measurement shall be taken to the top of the bulkhead, but this shall not apply to elevator bulkheads that do not exceed 23 ft. in hight, nor to open pergolas or similar open ornamental treatment for roof gardens or playgrounds.

The measurement for hight in all cases shall be taken through the center of the façade of the house, and in buildings fronting on more than one street or avenue the hight shall be measured through the center of the façade on the street having the greatest grade.

Another provision says that in all fireproof tenement houses in which one or more passenger elevators are provided and operated, penthouses may be erected on the main roof, but these penthouses, including all bulkheads for elevators or stairs or any other purpose, shall not cover more than 50 per cent. of the area of such roof.

Such penthouses shall not be used or rented as apartments; their use shall be limited solely to laundries, storerooms or to servants' and janitors' quarters. They must be set back at least 10 ft. from both the front and rear walls of the building and at least 3 ft. from any court wall, and shall have finished ceilings inside all rooms of not less than 9 ft., and shall not be more than 12 ft. in hight from the high point of the main roof to the high point of the penthouse roof. Moreover, they shall not be deemed as affecting the measurement or hight of the building, as described in the first part of this article, and shall be built entirely fireproof, including floors, walls, trim, doors, etc.

New York's Greatest Hotel Building

The plans have just been filed with the Bureau of Buildings for the Borough of Manhattan for what will be, when completed, one of the largest hostelries in New York City, if not in the country. It will be known as the "Biltmore" and will occupy the entire block bounded by Madison and Vanderbilt Avenues, Forty-third and Forty-fourth Streets—the site formerly occupied by the offices of the New York Central Railroad.

The structure will be 25 stories in hight, will have façades of brick, limestone, terra cotta and granite and will be fireproof throughout. Its foundations will extend over 12 sets of railroad tracks to be used by the railroad for its incoming suburban traffic and the lower part of the building will be the station for this service.

According to the architects, Warren & Wetmore, 3 East Thirty-third Street, New York City, the hotel will be 305 ft. high and the cost will be $4,500,000.

Owners of Buildings Are Responsible

According to an opinion just handed down in the Appellate Term of the Supreme Court of the State of New York, the owner, and not the lessee, is responsible for the sanitary conditions of a property. The decision was an appeal from a judgment of the Municipal Court in the case of the owners of a tenement house in West 45th street, who had declared that they were not responsible for the violations of the sanitary regulations of the Tenement House law because they were not legally in control of the property, they having leased it to another.

A movement is under way to reorganize the Builders Exchange in Akron, Ohio, and also to organize new exchanges in Massillon and Zanesville. Formerly there was an exchange in Akron and also one in Zanesville, and the plan now is to revive these associations and put them on a successful basis.

The Master Builders' Association of Boston, Mass., has planned a series of social events for the coming season, which will include among others, a ladies' night, a clambake and a banquet in December next. George S. Sinnicks is chairman of the entertainment committee and has arranged an attractive program.

CORRESPONDENCE

A Department Where Those Interested Can Discuss Practical Trade Topics--All Are Invited to Participate

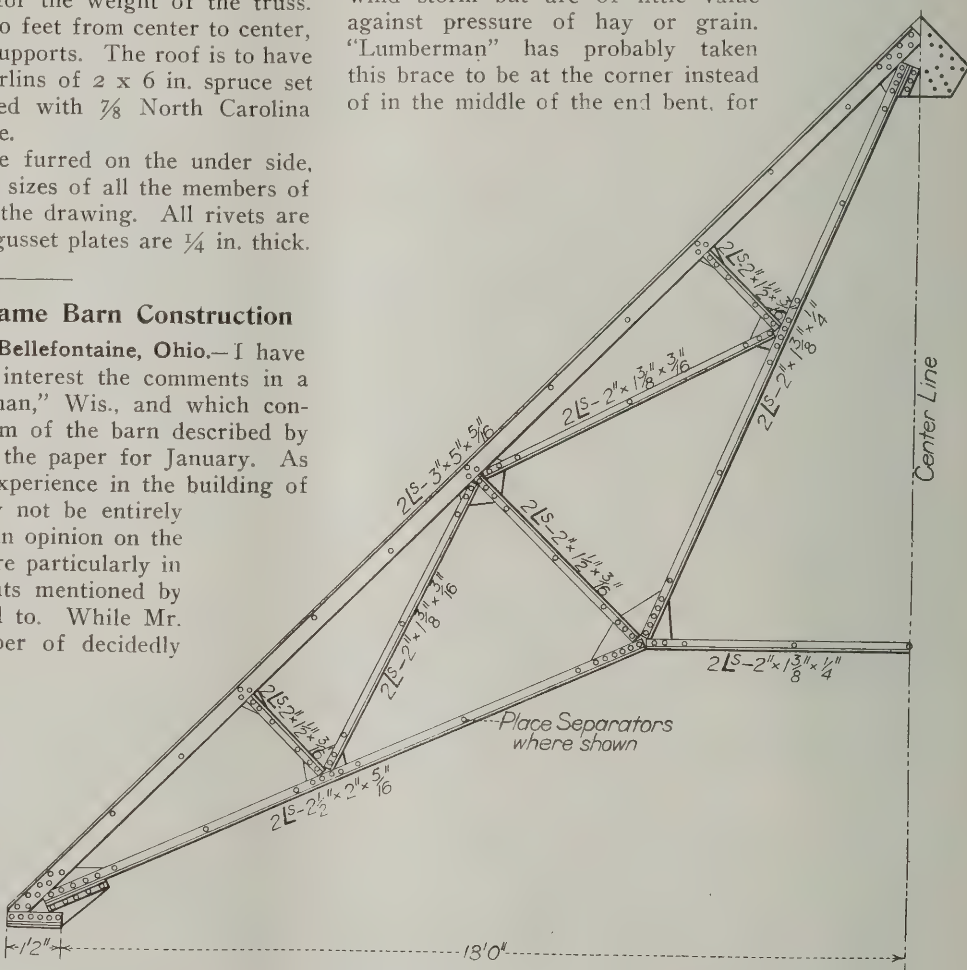
Roof Trusses for Mechanics Hall

From X. X. X., Yonkers, N. Y.—I have noticed for some time previous that there has been considerable discussion in these columns on engineering problems, which I have often found interesting. I therefore offer the structural steel roof truss for criticism (in regard to economy and strength) by some of the readers who are familiar with this subject.

In computing the stresses, a dead load of 38 pounds per square foot, and a wind load of 36 pounds per square foot normal to the slope are assumed, allowing 8 pounds for snow, 4 pounds for sheathing, 6½ pounds for slate, 8 pounds for lath and plaster, 8 pounds for purlines and 3½ pounds for the weight of the truss.

The trusses will be set 10 feet from center to center, spanning 36 feet between supports. The roof is to have a pitch of 45 degrees; purlins of 2 x 6 in. spruce set 16 in. on centers, sheathed with ⅞ North Carolina pine and covered with slate.

The purlins will also be furred on the under side, lathed and plastered. The sizes of all the members of the truss are indicated on the drawing. All rivets are ⅝ in. in diameter and all gusset plates are ¼ in. thick.



Roof Trusses for Mechanics' Hall—Scale ¼ in. to the Foot.

Criticism of Plank Frame Barn Construction

From John L. Shawver, Bellefontaine, Ohio.—I have noticed with considerable interest the comments in a recent issue of "Lumberman," Wis., and which constitute in a way a criticism of the barn described by Mr. Hand in the issue of the paper for January. As I have had considerable experience in the building of plank frame barns it may not be entirely out of place if I express an opinion on the subject in general and more particularly in regard to the special points mentioned by the correspondent referred to. While Mr. Hand's barn has a number of decidedly weak points which may be easily detected by any competent builder, yet the criticisms of "Lumberman" are not wholly correct.

In the first place it should be noted that the barn in question is a very small affair and what will answer for a barn 30 x 48 ft. in plan would never do for one 40 x 100 or 60 x 240 ft. like some of the barns we have built and some of which have been illustrated in back numbers of the *Building Age*. I might say for the benefit of "Lumberman" that I have erected buildings as large as 86 ft. wide by 360 ft. long and as much as 65 ft. high, and did not use whip-sawed timber 100 years old for them either. Seasoned timbers are always preferred, but in many cases green timber directly from the sawmill has been used with no serious trouble resulting.

I have found that a green white oak 2 x 8 in. in cross section and 16 ft. long will shrink in length about ⅜ of an inch. Now if all the timbers are green the shrinkage will be practically uniform throughout the building and if the frame has been properly constructed there should be no tendency to become lopsided.

In the barn under consideration, however, the Ridge Plate has been seasoned for 100 years and should therefore be perfectly seasoned. If all the other timbers that extend horizontally are fresh from the sawmill and the purlin plates shrink 1⅛ in. some part of the roof will necessarily be out of plumb.

The criticism of the beam is well founded, for there is no provision for bracing it at all except it be the foot braces which show in the side elevation and these are of little value against pressure from within. These will resist pressure from without as in the case of a wind storm but are of little value against pressure of hay or grain. "Lumberman" has probably taken this brace to be at the corner instead of in the middle of the end bent, for the foot of the brace is indicated by the dotted lines as connected with the outside girder.

By the time Mr. Hand has built a few more of these plank frame barns he will find several places where he can improve his frame materially and at the same time cheapen the cost of construction. The greatest fault I have to find with the barn, however, is that it is too small by far for a farm of 855 acres of rich Wabash bottom lands. The owners should have about 34 barns of this size just as soon as they can have them built or what is still better, erect 16 barns each 40 x 80 ft. in plan, for a mule's hind feet are too liable to let loose without any reference to a kicking board for a stable only 12 ft. deep. I prefer horse stables not less than 14 ft. and for mules I should want them 20 ft. or more.

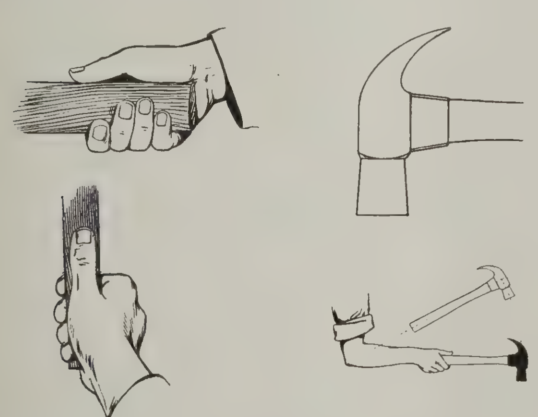
If "Lumberman" will be good enough to send me the names of some of the people who have had plank frame barns constructed on mechanical lines I will be pleased to inquire how seriously they have failed to give satisfaction. I have been in the business of building these plank frames for 20 odd years and have never yet found one unsatisfactory where it was properly constructed.

Some Hints on Nailing Siding and Shingles

From E. S. Crull, Webster Groves, Mo.—No doubt the carpenter or other building mechanic who has had occasion to do the work has often wondered why it is that siding and shingles so frequently split when nails are being driven into them. The reason, according to my way of thinking, is that the nails are not properly driven. The real secret of successful nailing lies in the ability to "strike the nail squarely on the head" every time. Strange as it may appear the true way of driving nails is seldom taught. No doubt the neglect arises from the underrated importance of a supposedly natural faculty that is deemed too insignificant to receive special instruction. The fact of the matter is that entirely too few of those who practice it have served any considerable or worthy apprenticeship. Yet it is an operation that at once determines the worker's skill and should be a part of the apprenticeship training as much as that of the plane.

An experienced "old-time" employer of workmen once remarked that his greatest difficulty had been to inspire his workmen with the habit of leaving off the last hammer blow in nailing siding and shingles. It seems rather curious that so many workers regard these light and frail materials as they do the heavier framing material, when nailing.

While nailing may be the immediate cause of splits, another very pronounced cause of the splits that appear in siding, after it is nailed in place, is the practice,



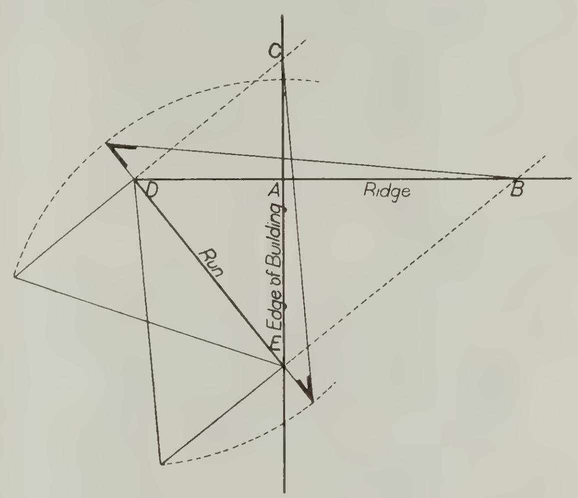
Some Hints on Nailing Siding and Shingles

which is steadily increasing on the plea of economy, of sheathing parallel with the course that the siding takes. This practice, though rarely regarded in its true effect, is entirely inconsistent with the recognized laws in mechanics, which do not permit the laying of parallel fibers in building up thickness, as in veneer work or the laying of floors, one over another. This has possibly come about, so generally, from the use of shingles in the place of siding; and for shingles it is permissible practice. But for siding the sheathing should be placed diagonally across the studding, not squarely. This method adds very considerably to the stability of the walls, as it serves to brace them against twist or rack.

As intimated above, however, the true way to drive a nail is to hit it squarely on the head, and this is easily accomplished if the hammer is properly grasped and the arm movement is true and perpendicular just like that of the trip-hammer, with the principal movement from the elbow. The sketches which are here presented illustrate the method perfectly. Once the "trick" is caught it becomes easily possible to repeat each stroke in exactly the same spot, causing the nail to drive absolutely straight.

Obtaining Bevels in Roof Framing

From A. E., Hartford, Conn.—I noticed in the *Building Age* for May that "J. McV.," Providence, R. I., has attempted to correct an error he made in the April issue in regard to finding bevels for hood rafters. In my opinion he has made another error which would be



Obtaining Bevels in Roof Framing

more pronounced if the run of the hood rafter was set at a different angle to the end of the building.

The accompanying diagram I believe will fully explain my method to him and others. The point *"B"* is not "found by measuring the length of the run of the rafter from the point *'A'*" but by a line drawn at right angles to *D-E* from the point *E* to intersect the ridge. The point *C* is similarly found by a line drawn from *D* at right angles to *E-D*.

This method if correctly developed will apply to hip, valley or hood rafters of any pitch or angle.

Some Questions in Plastering

From R. M. C., Tottenville, N. Y.—I am enclosing a few comments in reply to the several questions in plastering propounded by "R. L.," Chauncey, N. Y., on page 284 of the May issue of the *Building Age*. At the outset I would say the application of a third coat termed "hard finish" in plastering depends upon the material used and the user. Slacked lumped lime will in many instances prove the cause of unsatisfactory results such as checking, scaling, etc. Care should be taken in slacking lime that it does not become burned as more water is consumed in the slacking process of one lime than another. Very fat lime will slack quickly while poor meager lime will take longer and swell more in proportion to the same quantity of good lime used.

Before using lime for hard finishing it should be slacked and buried or covered and protected from the air, sun and varying elements for a period of three weeks or longer if possible. If lime is buried it will keep for years and improve continually.

The proportions of plaster of Paris and lime to obtain a good hard finish are one measure of plaster of Paris "calcined" or "casting" to two of lime and about 1 quart of marble dust or white sand added. This must be thoroughly mixed or gauged as follows:

Mix the lime and sand or marble dust together thoroughly and then ring out the center after being mixed to receive the water. In the proportion of four pails of lime, two pails of plaster of Paris, add about one pail of water. The ringing out is merely piling lime in a heap on the board and scooping out the center enough to hold the water. When this has been done and the water added, shake the plaster of Paris lightly into the water until the water is all absorbed, care being taken that it does not become too dry. After this has stood for two or three minues or long enough for the plaster of Paris to become soaked, then mix and gauge thoroughly by turning over and over until it is uniform.

On very dry browning it is best to dampen the work before applying the finish coat, and also have as little air blowing on the work as possible, for this will cause checking and necessitate several trowelings before these checks are obliterated. This is in reference to hand-made or old-fashioned mortar.

Where the brown coat is composed of patent mortar the practice of late has been to apply the finish coat before allowing the brown coat to become too dry, as the water will have a tendency to lessen the tension of it should it become so.

In applying the finish coat it requires three applications; namely, first "scratching" or applying thin; second, "doubling up" or covering even, and third, "laying down" or "filling" of all flaws, scratches, holes, etc. When this has been done it is then troweled with water until a hard surface has been obtained. Two trowelings are sufficient and good results are assured by following these suggestions.

Except in cases of "flanking" the finish coat should be from 1/8 to 3/16 of an inch in thickness, although to hold it to this thickness is sometimes impossible, as the condition of the browning may require more. This 1/8 to 3/16 inch thickness only pertains to an even hand floated surface of brown coat.

Hard finish is only affected by heat when it strikes directly upon it and it will turn yellow, crack and in many instances expand to such an extent that it is almost impossible to obtain an even surface without taking the work down for a considerable length on each side of the expansion track. There are instances recorded of intense heat causing a ceiling to crack and one side hang 1½ in. below the other and yet be in fair condition to be patched.

Cracks in hard finish are mostly due to settlement and "buckling" or "warping" of lath on lath work. A large majority of cracks are due to the use of "dope" carried by plasterers to hold back plaster of Paris from setting too quickly and not sufficient troweling.

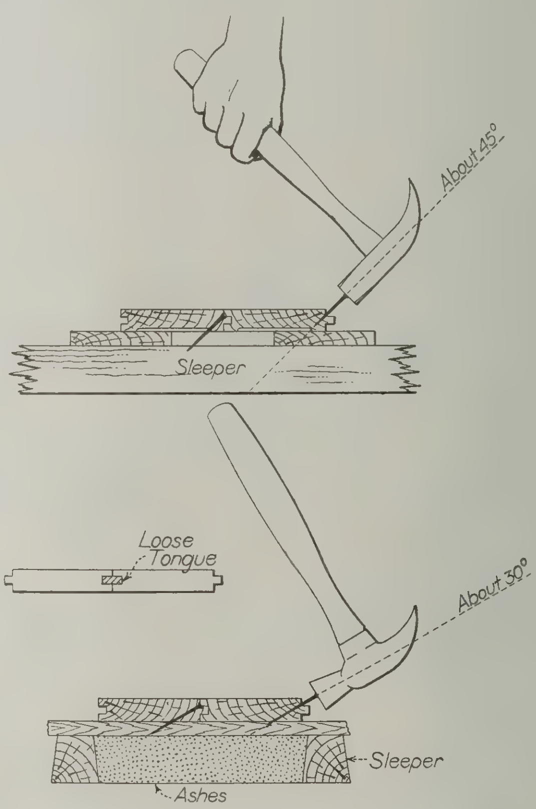
Let me add in conclusion that for good suggestions, practical and beneficial information for builders and mechanics, the *Building Age* is *the* paper. Other books are not in it. The 22 copies of the paper which I possess I would not swap for any of the other building publications, and I have had them all.

Suggestions for Laying Floors

From James Barry, New York City.—I was highly delighted to read the communication about floor laying in a recent issue of the *Building Age*. It certainly is "slaughter" the way they lay floors nowadays and a disgrace to civilization. I am sending two sketches which show how flooring is laid in connection with fireproof jobs and where wood floors are not tabooed altogether. I think the method indicated in the upper sketch the better way of the two, although both rough and finish flooring run the same way, for there is a chance for solid nailing. If the finish floor is run across the rough or sub-floor the latter should be nailed on sleepers diagonally. In my opinion, however, the best way of all is diagonal rough and finish floor across sleepers.

It is much better to have no rough or sub-floor and nail into the wooden beams than to be obliged to nail as shown in the bottom sketch, where the sleepers run the same way as the finish flooring. The use of wire nails now in vogue makes a bad job according to my way of thinking. The old flooring brads are the best. The method shown in the lower sketch is the one now in order for the purpose of "beating the other fellow in the next room." Such a thing as going down on your knees to set a nail is almost unheard of, for the first thing you would know you would "get your money" —otherwise the G. B.

Nowadays, particularly in large loft buildings where maple flooring is almost exclusively used, it is the rule to work the men in gangs, using a "square head hammer" and utilizing the nail next to be driven to punch the one you have just hammered into place. Is it any wonder the floor squeaks before the tenants move into the building?



Suggestions for Laying Floors

I can state from my own personal experience that some time ago in a large church in which the floor sloped like an auditorium, a line was struck down the center and two rows of floorings started with a loose tongue in both grooves, as indicated in the small sketch. With a half dozen men on each side it was rip and tear until 5 o'clock. Such a thing as setting a nail was out of the question, as you had to keep moving or the other fellow on your left would go behind you and leave you behind. The next thing you would probably "get your money" or the G. B., which is the same thing. However, the floor, which was good oak flooring—not tongued and grooved on end as nowadays—had to be taken up inside of two years, as it was not properly nailed and another floor could not be laid on top of it because it squeaked so loudly when people walked on it that the services were disturbed.

Method of Deadening Floors

From Prof. John R. Bell, Huntingdon, Pa.—Relative to the inquiry of "C. McG.," Detroit, Mich., as to the best method of deadening floors, I would say that soundproofing a floor is not the only thing to consider in soundproofing a building. First consider the main walls of the building, which I assume are to be of brick. In this case the inside course should be fireproof hollow brick or interlocking tile, as these are not only fireproof but soundproof as well. Gaged or cement mortar can be satisfactorily used with fireproofing brick. If hard waterproof brick are used, common lime and sand mortar will answer. If both materials are of monolithic consistency the walls will be a conductor of sound.

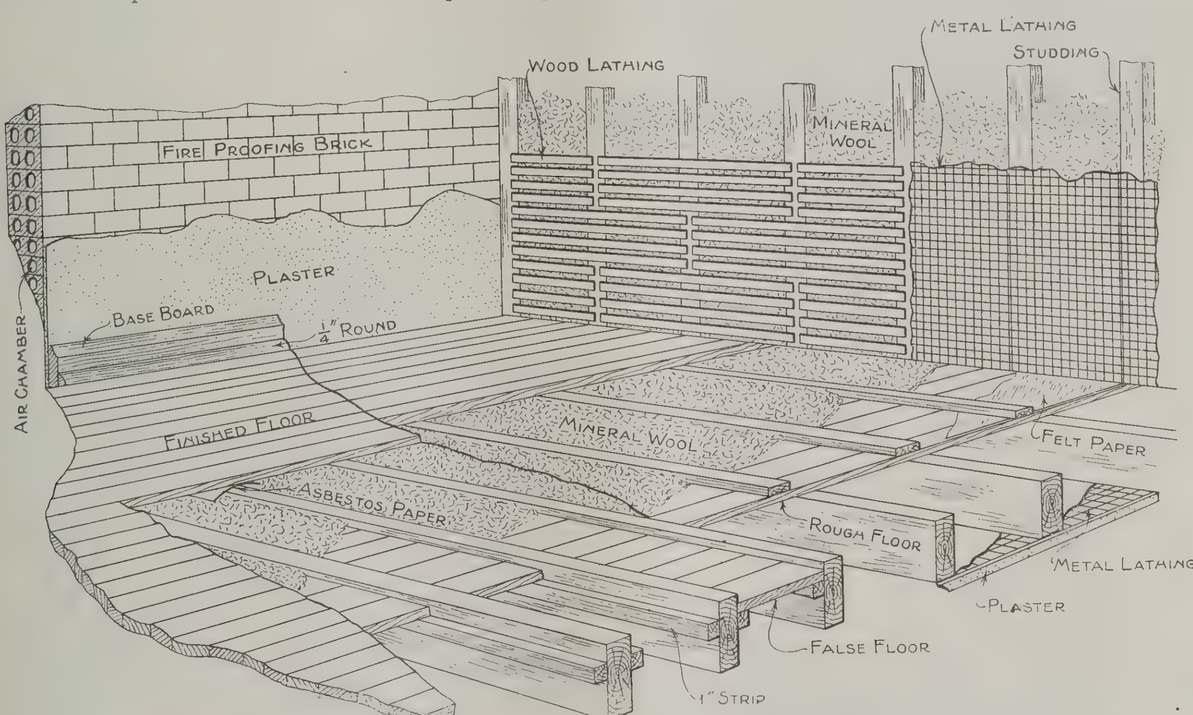
If the partition walls are of brick the same remarks will apply as in the case of the main walls. If the walls are furred and lathed with either wood or metal lath the space between the lath and the wall should be filled in with some such material as mineral wool or asbestos cotton. This would also apply to frame construction. Care must be exercised in placing this material against the lath, for if packed in a condensed form the plaster will not properly key.

Another important consideration is the plastering of concrete are also light and considerably cheaper, perhaps, than mineral wool, which costs about 12 cents per square foot of 1 in. thickness. I have had good results, however, with each of the materials mentioned. Sawdust concrete is cheaper than cork and lighter than cinders, therefore better.

I would advise a 1:4 mixture; that is, one part cement to four parts of sawdust. If desired, this concrete can be 2 in. thick instead of 1 in., as indicated on the drawing.

The heavy black line on the sketch indicates a division between the two methods of floor and lathing. I will first consider that portion of the drawing shown at the left, where a rough, false floor is placed between the joists by nailing on a strip of 1 x 2 in. about 2 in. from the top of the joist. The false floor of 1-in. rough boards, which can be made of lumber that is too short to be otherwise utilized is nailed to these strips. On this false floor the mineral wool or concrete is placed to within ¼ in. of the top of the joist. If it is not kept below the joist the material will interfere with the laying of the floor.

Before laying the finish floor place asbestos paper or heavy felt over the joist, as indicated on the drawing, and this will tend to prevent the transmission of



Method of Deadening Floors as Suggested by Prof. Bell

a building. Unless the building is soundproof throughout patent mortars containing gypsum or cement should not be used, as they are transmitters of sound and very often act as a sounding board. Even the voice echoes in a room plastered with this material. The best mortar for plastering if soundproofing is desired is the old-style lime and hair mortar. The practice of not plastering below the top of the baseboard is also responsible for the transmission of sound. The plaster should extend to the floor. Very often about ¼ in. of space is left below the baseboard for the edges of the carpet to be concealed, but this is bad practice, as it permits of the transmission of sound. A quarter round strip nailed to the floor at the bottom of the baseboard will help to overcome the difficulty.

The floors of a building are of equal but perhaps not of more importance than the walls and partitions. The accompanying sketch shows the general construction suggested and the use of mineral wool and asbestos cotton as sound deadeners. Cork, sawdust and cinder sound through the joist and so through the floor.

If a greater thickness of mineral wool or concrete is desired, the strip can be placed lower than 2 in. from the top of the joist.

Referring now to the portion to the right of the heavy black line it will be seen that the rough floor is nailed on top of the joist, which requires less labor but better or longer boards than the method just described. This floor should be covered with asbestos paper, or felt, if the former is too expensive. On top of the rough floor and immediately over and parallel with the joist a 1-in. strip just the width of a joist should be nailed. Mineral wool or concrete should then be filled in between these strips and the finish floor put down.

In either of the methods described and as indicated on the sketch if mineral wool is used it should be placed on either metal or wood lath, as this will prevent the transmission of sound, provided the previous conditions are observed. No concrete of any form should be placed on the lath, as it will prevent the plastering from properly keying.

The steam-heating pipes should be well covered with asbestos between the floors, so that no open space will be left about the pipes.

Steam-heat pipes are conductors of sound, which can be mitigated by anchoring them to the brick walls wherever possible, or at least by having them well secured to the joist, etc.

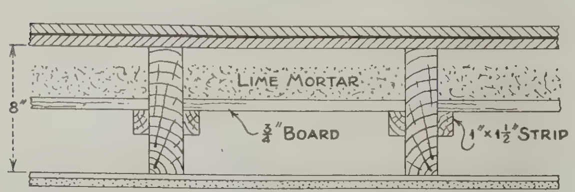
The best heating system for soundproofing purposes is the modern system of conducting the cold air from the top of the building through an air well and passing it through a series of steam-heat coils and fanning it into moderately heated and hot-air chambers and distributing the air through round, square or oblong pipes to the various rooms. The degree of heat or air desired should be regulated by a thermostat and the entire system worked automatically by the application of condensed air.

In steel construction where the floors are arched with hollow tile fireproofing the previous considerations need not be observed, as the hollow tile is in itself a nonconductor of sound.

From the inquiry of the correspondent, however, I should infer that the flat building is of frame and brick construction, hence my comments.

From R. W., St. Johns, N. F.—In looking over my copy of the April number which has just come to hand I notice a young contractor signing himself "C. McG.," Detroit, soliciting some help as regards deadening floors. I am not a contractor myself but being in the joinery business for 28 years, and part of which time I spent on outside work, I have some knowledge of what the correspondent requires. For the last 18 years I have been employed by a lumber company, working for many years of that time as benchman. I am now foreman and draftsman in the carpentry department, a position no man should envy.

I have taken the trouble to make a rough drawing to illustrate what I mean in regard to the method of deadening a floor, which I shall briefly describe. Here in Newfoundland builders especially make use of the kind of deadening illustrated, and as far as I know it is satisfactory. Referring to the sketch, the first thing is to nail about half way up on the joists, 1 x 1½ in., furring strips, then cut in between the joists some rough boards, making use of any convenient material for the purpose. On top of these boards and between the floor



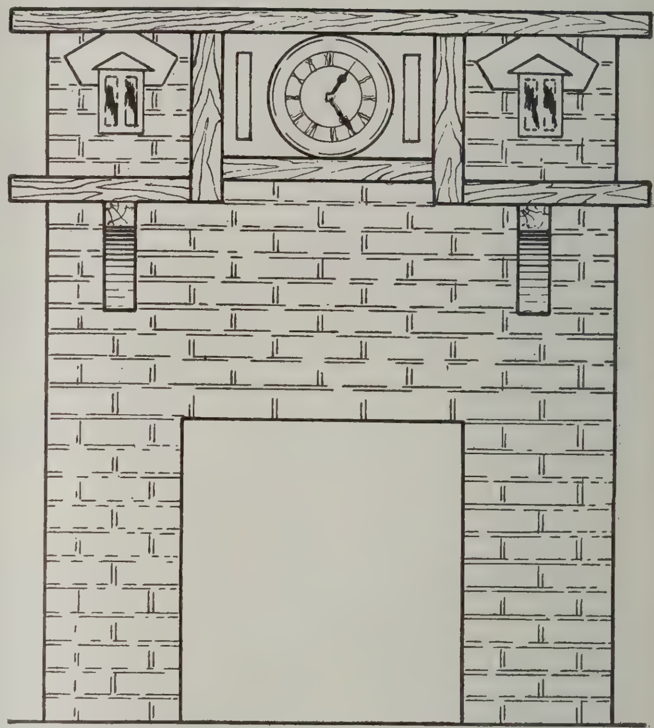
Method of Deadening Floors Suggested by "R. W.," St. Johns, N. F.

joist fill in an inch or more of lime mortar, or any old rubbish left from plastering. It is unnecessary to fill the whole space flush with mortar as that would increase the expense to the contractor. The filling is merely thrown in roughly between the joists, and it is not absolutely necessary to have even a level surface.

When laying the floor, which should be double, place heavy building paper between the two so as to assist in promoting the sound deadening qualities of the construction. I think the sketch is so clear that the correspondent will readily understand what I mean.

Appropriate Mantel for Fireplace

From R. M. Dunbar, Monroe, Mich.—In the issue of the paper for March there appeared an inquiry from "A. G," Duluth, Minn., asking for a design of mantel which would best suit the fireplace in the living room of a house he is thinking of building for himself. In



Appropriate Mantel for Fireplace

reply to this request I send the accompanying design which I trust may be of interest.

The bricks in the mantel may be either a light tapestry brick or a varied color paving brick, the latter I think giving the best results. The lanterns in the corners must center with the brackets on the lower shelf or the effect will be lost. The wookwork is a dark mission stain and the lantern fittings dull brass.

Why Does the Roof Leak?

From W. A. E., East Waterford, Me.—In reply to "G. M.," Canton, Ohio, my opinion is that if his roof and flashings are tight the trouble is caused by the water soaking into the brick and going down back of the counter-flashing as I have known it to do in several cases. If the correspondent will go over the roof very thoroughly with some kind of waterproofing paint I think it will stop the trouble.

A bevel strip should always be put in the angle over which to bend flashings or roofing. Another thing, the coping on the parapet wall should have a drip cut or cast on the under edge to keep the water from running down on the brick and the wall should be flashed from roof to coping on a brick building.

Dry Rot in Wooden Joist

From T. M., Colonial Beach, Va.—Will the practical readers of the paper who have had experience in this line tell me if there is any danger of dry rot when the ends of wooden joist are embedded in concrete in a poured Portland cement concrete house.

Will coal tar add to the durability of wooden fence posts?

Gypsum Plaster on Metal Lath

Some Comments on the Behavior of Iron and Steel in Contact with Gypsum

By S. G. Webb

OBJECTIONS are often met with to the use of gypsum plaster in contact with metal lath or steel. These objections when inquired into are usually found to be based upon prejudice alone, but objections are sometimes met with based upon isolated cases where the iron or steel lath in contact with gypsum plaster has been corroded. In these cases the observers, viewing the particular cases in a superficial manner and taking no cognizance of any other factors, have jumped to the conclusion that gypsum plaster has a particularly bad effect upon steel or iron. Curiously enough such conclusions are not arrived at when metal lath is found corroded when plastered with lime or Portland cement mortar. Why this discrimination against gypsum?

A brief presentation of this subject in your columns for the benefit of the readers seems entirely opportune because the same misconception has been given expression in the suggested specifications for "Stucco on Metal Lath," by H. B. McMaster, which appeared in your April issue.

Gypsum Plaster on Metal Lath—An Interesting Example

This suggested specification, having back of it the weight of the influence of the Associated Metal Lath Manufacturers, may tend to confuse and implant uneasiness in the minds of users of the materials, and of some building material dealers who sell to their trade both metal lath and calcined gypsum or hard wall mortar.

Unfortunately the impression seems to have been created—doubtless without intention—that calcined gypsum plaster is unsuitable when placed upon metal lath, *either for exterior or interior work,* although presumably the intention was to recommend specifications dealing entirely with exterior work.

It is not disputed by any competent observers that calcined gypsum plaster should not be used upon metal lath universally and everywhere for exterior work. Unfortunately it is hard to distinguish in general specifications between the behavior of different materials under different conditions of climate, humidity of atmosphere, etc., and for this reason, the recommendation for the use of calcined gypsum plaster upon metal lath for exterior work is invariably withheld, although

A Unique Design of Cement-Coated Bungalow

experience in dry climates has shown no objection whatever to its use.

The writer, believing that the question of corrosion of metal was a question of the access to the metal of damp air and was wholly irrespective of the character of plastering material used, whether Portland cement, lime, or cement and lime mixed plasters, or gypsum plaster, about two years ago conducted a country-wide investigation into this subject to learn the actual behavior of metal laths when used for exteriors and when covered with different kinds of plasters.

The investigation disclosed the fact that in damp locations, particularly on the sea coast and in the Mississippi valley, the corrosion of the metal lath was relatively great, and that this condition was irrespective

An Effective Architectural Treatment of Stucco Exterior

of what kind of plaster had been used. On the other hand, in higher altitudes and drier parts of the country, the corrosion of the metal lath was practically nil, also irrespective of the kind of plaster used.

This investigation was made entirely upon the behavior of metal lath when used as a lathing base for exterior plaster work, and the observations included ingot iron unpainted lath, painted steel lath, galvanized lath and also plasters of different compositions, including Portland cement and gypsum.

Isolated experiments covering periods of time running into the years, in dry and damp locations, have been made upon metal laths of different types, gauges and composition of metal, from low carbon irons to the high carbon steels and with different kinds of protection when covered with gypsum plasters.

These experiments have clearly confirmed the above conclusions and show *that the question of preventing corrosion is a question of keeping damp air from coming into contact with the iron or steel,* irrespective of whether Portland cement, lime or gypsum plasters are used.

As pointed out above, the suggested specifications for "Stucco on Metal Lath," presented in the April issue as the recommendation of the Associated Metal Lath Manufacturers are confusing because they seem to indicate that calcined gypsum or hard wall plasters should not be used anywhere, either outside or inside of a building when in contact with metal lath, and in the interests of truth and justice, this erroneous impression should be corrected. There is no question whatever that gypsum or hard wall plasters have been successfully used for interior work, *where the construction is dry,* in contact with metal lath.

It seems to be a reasonable requirement to make of the manufacturers of metal lath that they should protect their metal lath by coatings that would prevent the access of damp air to the iron or steel.

That the protection of many metal laths is insufficient seems to be recognized in the specifications referred to because, quoting from them: "Care should be taken not to expose the lath to the weather while it is lying about the building." Again, "The lath shall be painted to protect it until it can be applied and covered with Portland cement plaster." Further, it seems to be recognized that metal lath should be kept from moisture, even when covered by Portland cement, because, in speaking of exterior work, the article says: "Lath and plaster should not be carried all the way down to the ground," evidently desiring in this way to protect the lath from ground moisture.

The writer of the present article entirely concurs with the suggested specifications in the idea that the metal lath should be entirely imbedded in plaster, although he does not concur in the suggestion that this should be Portland cement mortar and only Portland cement mortar.

The writer has in mind a sample of naked metal lath that was imbedded in gypsum plaster and allowed to remain in a damp location for 2½ years. A critical examination of this sample showed that where the metal was entirely imbedded no corrosion occurred, but that where the damp air was able to have access to the metal, corrosion did occur.

It is very unfortunate, in considering this subject, that there is so much misunderstanding as to the exact meaning of the word "stucco." Originally, and even today, the word "stucco" indicates that the material is composed of plaster of Paris. A transition from this definition to a meaning embracing all character of plastering on exterior surfaces seems to have taken place, although it is distinctly confusing when many people believe "stucco" to be plaster of Paris, others Portland cement, and still others any plaster when used for exterior work.

Building Operations in Canada

That building operations in the leading cities of Canada are being conducted upon an extensive scale may be gathered from reports from more than 30 cities for the month of April which indicate an increase in the estimated cost of the improvements for which permits were issued of 44½ per cent. as compared with the value of buildings for which plans were filed in April last year. The total for April is $20,689,988, which is only about $3,000,000 less than the combined returns for the first three months of the year.

The city of Toronto heads the list with buildings projected having a valuation of $2,842,995, with Montreal second with a total of $2,314,021, Winnipeg third with a total of $2,106,900 and Edmonton fourth with a total of $2,103,170. There are also four other cities having a total in excess of $1,000,000, Calgary having $1,708,380, Vancouver $1,632,805, Saskatoon a total of $1,485,700 and Moose Jaw $1,004,250. Out of the 30 odd cities reporting for the month of April only two show a decrease as compared with April last year, the only one of account being Toronto where building operations were $429,823 less last month than was the case a year ago.

Officers of Gravel and Slag Roofers' Association

At the recent convention of the National Gravel and Slag Roofers' Association, held in New York City, the following officers were elected for the ensuing year: President, L. W. Harrington, New York City; vice-presidents, John Ingram, Chicago, Ill., and Lee H. Gould, Cleveland, Ohio, and secretary and treasurer, L. P. Sibley, New York City.

Definition of a "Tenement House"

The following definition of what constitutes a "tenement house" was adopted by the New York State Legislature, recently adjourned:

Section 2, Subdivision I.—A "tenement house" is any house or building, or portion thereof, which is either rented, leased, let, or hired out, to be occupied, or is occupied, in whole or in part, as the home or residence of three families or more living independently of each other and doing their cooking upon the premises, and includes apartment houses, flathouses and other houses so occupied.

In other words, any house by whatever name it may be commonly designated, if occupied by three or more families living independently and doing their own cooking on the premises, is a tenement house and subject to the jurisdiction and regulations of the Tenement House Department.

If, however, a building not erected as a tenement and not altered to comply with the tenement house law is occupied by three families, it is an illegal tenement and the duty of the department is to vacate such premises and prosecute the owner.

Cost of Concrete Silo

In discussing concrete silo construction a builder states that the cost of one 15 ft. in diameter and 36 ft. high, with solid walls, is about $238. The forms are movable, consisting of two circular shells 3 to 4 ft. high, with a 6-in. space between for the wall, and a horizontal framework of 2 x 4 in. timber cut to a circle and covered with sheet metal or wooden lagging.

A 1:2:4 mixture of concrete is used with ⅜ in. reinforcing rods 10 ft. long laid horizontally at variable distances on centers, the vertical rods being spaced 18 in. apart. Concrete footings 1 x 2 ft. are set 1 ft. below ground and a 4 in. concrete floor laid on the natural clay bottom. The concrete roof is cone-shaped, with a rise in the center of 2 ft. and an overhang of 1 ft. The roof is reinforced with ⅜ in. rods laid radially and spaced 18 in. at the eaves.

Reinforced Concrete Construction*

Advantages Over Other Forms of Construction -- Some Causes of Failure -- Proportions of Mixtures -- Detailed Drawings Required for Doing the Work

ONE of Cleveland's leading engineers, a man who during his thirty or forty years of active practice has designed many million dollars worth of structures in timber, structural steel and reinforced concrete, recently made this statement: "A reinforced concrete building properly designed and constructed is the best building which can be built, but improperly designed or constructed is the poorest."

Some of the advantages of reinforced concrete over other forms of construction are permanence, strength, freedom from vibration, fire-proofness, economy, ease and rapidity of erection and sound-proofness.

Under the head of permanence little need be said as the fact is generally recognized that concrete instead of deteriorating with age continues to grow stronger with years. Probably the best examples of its enduring qualities are to be found in the work of the ancient Romans as evidenced by the Dome of Pantheon and parts of the House of Vestals and the Aqueduct of Venus. Although the cement used was of inferior quality made by grinding together lime and volcanic lava, the concrete in these structures is in good condition to-day while the natural stone in many cases has disintegrated and disappeared entirely. Iron cramps used for tying the masonry together have been taken out of the mortar joints in as good condition as when they were put in over two thousand years ago. With such evidence as this before us, we do not have to rely on our modern work for the answer to this very important question as to the permanence of both the concrete and the reinforcing steel.

As regards strength, a reinforced concrete building is much stronger than one of timber or structural steel designed to carry the same load. This may sound a good bit like the Irishman's remark, "Tim was a big boy for his size," but let me explain.

If a steel or timber beam is put into a testing machine and the load applied, the beam will fail under a load, which can be quite closely calculated beforehand. The same thing is true of a reinforced concrete beam if subjected to the same treatment. If similar steel or timber beams are erected in a building and the floor is loaded to the point of failure, the steel and timber beams will fail under a load practically the same as that which caused failure in the testing machine. The concrete beam, however, when built into a floor becomes part of a large monolithic structure, and will carry a much greater load than that which caused failure in the testing machine. This is due to the continuous nature of the construction and the support given to each member by the adjoining portions of the floor. That this exceptional strength is found in actual construction has been proven by the many tests made on completed buildings. Of course, in our design, we take advantage to a slight degree of these facts, but only to a very slight degree. Most building codes and authorities on design permit a reduction of 20 per cent. in the bending moment of continuous beams and girders.

In perhaps a hundred tests of floors in actual buildings at which the writer has assisted, or been present, in not a single instance did a floor fail to carry a load of two and a half to three and in some cases as much as four times the figured live load, and in many cases where the design and workmanship were good there was little or no permanent deflection after the load

Reinforced Concrete Grand Stand of the Forest City Live Stock and Fair Co. at Randall, Ohio

Reinforced Concrete Construction

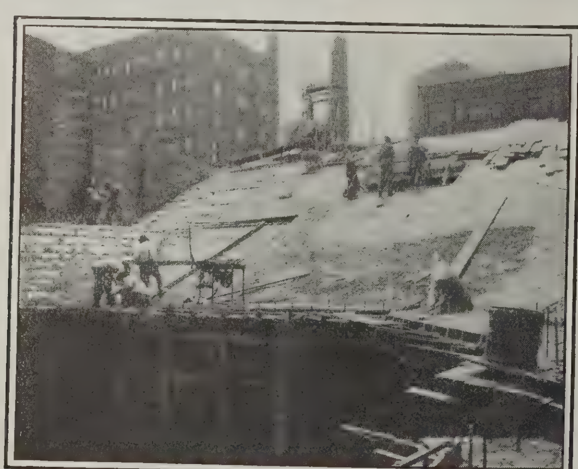
*A paper read before the Ohio Engineering Society by Sam W. Emerson, contracting engineer, of Cleveland.

was removed. In cases where the design and workmanship were not what they should have been, more or less permanent deflection was caused by these loads, which of course meant that the floor would ultimately have failed if the load had been left on long enough.

Right here I wish to say something about the erroneous impression that frequently exists to the effect that if a concrete building should be over-loaded in

Reinforced Concrete Construction—"Pouring" a Theatre Balcony

any way, the failure would be in the nature of a sudden collapse without any warning to those occupying the building. This is a great mistake, arising, no doubt, from the reports of such failures as those of the hotel at Long Branch, California, The Eastman Kodak Building at Rochester, N. Y., the Garford Automobile Building at Elyria, The Henke Building in Cleveland and the more recent failure at Indianapolis. In all of these the failure was a sudden collapse, and in each case resulted in serious loss of life. All these, however, occurred during the construction of the building and were due to faulty design or workmanship, or in most cases to removing the forms before the concrete had properly hardened. In all cases the failure came immediately or shortly after the forms were removed. There have been very few failures of concrete buildings after they have been completed and ready for occupancy, and none of these, to my knowledge, have been serious or resulted in loss of life or serious injury to the contents of the buildings.



Another Stage of the Theatre Operation

The writer has run across in his own experience only four cases where trouble has been experienced with the concrete in a building after it was completed and ready for occupancy. Two of these cases were in concrete slabs carried by steel beams and girders. Both of these were buildings which had been constructed some years ago when our knowledge of concrete was in its infancy, and in none of the cases were the slabs designed to carry even a small part of the loads to which they were afterwards subjected. In neither case did the slabs actually fail, but sagged and cracked, until after several years of this abuse a part of the heavy load which they were carrying had to be removed. Both floors are in use to-day, and carrying heavier loads than conservative practice would sanction. In the other two buildings, in one of which some large concrete girders had to be strengthened, and the other in which part of the columns started to fail, warning was given for months beforehand by cracking and spalling of the concrete. The same results are observed where concrete structures are overloaded for testing purposes. Failure in every case is preceded by large deflections and cracking of the concrete.

One serious mistake which is being made at the present time is the erection of important structures with no other plans than general drawings furnished

A Light Manufacturing Building in Course of Construction

by the engineer, which give only the main sections and show in a general way the position of the rods, leaving all the important details such as the length of the splices, the position of the bends, length and spacing of the sheer rods, etc., to be decided by some estimator in the contractor's office, or foreman in the field, who has no knowledge of either the nature or amount of stress to be resisted. I can see no good reason why the contractor for reinforced concrete work should not be required to furnish complete shop or working drawings showing all the details of his work, in the same way that the structural steel contractor is required to do. When such drawings are prepared and checked by the engineer in charge of the work, it results in better construction and the saving to the contractor in the ordering of material and erection of the work in most cases more than pays for the cost of preparing the plans.

It is needless to say that good material should be used from which to make the concrete. Our greatest trouble in this vicinity is with the sand, because of the temptation to use inferior bank sand, produced from the many excavations which are going on here all the time. Of course, there is nothing better than a good coarse, comparatively clean bank sand, but good concrete cannot be made with some of the fine, dirty stuff which is sometimes used.

For apartment buildings, hospitals, hotels, etc., the high resistance which concrete offers to the transmission of sound is a great advantage as well as its fireproof qualities. As a fire-resisting material, concrete has no equal, either when used alone as reinforced concrete, or when used for fireproofing structural steel. Additional proof of this is furnished every time a fire-proof building burns up, as, for example, the Equitable Building, which was not fire-proofed with concrete. But I imagine I hear someone say, "If concrete is so superior as a fireproofing material, why is it not used for all important buildings." Probably the principal reason is to be found in the youth of reinforced concrete. It takes time to get architects and builders to change from materials and methods to which they have long been accustomed, and when one stops to realize the short length of time reinforced concrete has been used, the progress made is really remarkable.

The first reinforced concrete building erected in Cleveland—the Salvation Army Building on East 9th Street—is less than nine years old. The concrete work in this was executed by the Hennebique Construction Company of New York under the supervision of Architect Frederick Baird, and the building was completed in 1903. It was practically two years before any further concrete work of importance was attempted. The Ulmer Building on Euclid Avenue and a small warehouse for the Sterling & Welch Company were built by local contractors in 1905. However, it may be said that reinforced concrete got its real start in Cleveland in 1906 or practically only five years ago. During that year a number of important buildings were constructed including a large storage warehouse, a six-story factory, and a large office building.

Naturally a new business growing so rapidly and attracting so much public attention has proved a very tempting but not always profitable field for contractors.

Acetylene in Country House Lighting

For a long time past acetylene has been used for a variety of purposes, one of the more important of which has been country house lighting, but it is probable very few people know much about its history and therefore the following particulars as given by Vivian Lewis in an article in a late issue of the London *Field* may not be without interest.

It was in the spring of 1892 that Thomas L. Wilson, a Canadian engineer, while attempting to make aluminum bronze in an electric furnace and, failing in his project, tried to reduce lime by carbon, expecting to obtain metallic calcium, but found that in its place he obtained that body now so well known as calcium carbide, and shortly after the method of preparing this substance was independently discovered by the French scientist, Moissan.

In January, 1895, I read a paper before the Society of Arts in which I showed the generation of acetylene by the action of water on calcium carbide and the wonderful illuminating power of this hydro-carbon, which now for the first time had become a commercial possibility. Now it is used for the head lights of motor cars, for omnibus lighting and for country houses, where neither coal, gas nor electricity are available.

The use of acetylene for country home lighting has rapidly spread, as the beauty of the light, its intensity and the ease of its production making it, when properly installed, a most beautiful illuminant, giving that pure white light which is the nearest approach that can be artificially obtained to true sunlight. It was in 1895 that I put in at the country farm house in which I live during the summer months an installation of acetylene and for the first month or two I invariably made the gas myself, fearing that the ordinary rough-and-ready manipulation of the gardener might lead to danger.

In 1902 I built a large billiard and play room on to the premises, which practically trebled the consumption of gas and necessitated the introduction of a larger holder. For the eleven years since, however, the supply has been thoroughly satisfactory, and it is only now, after sixteen years, that the iron pipes put into the old house are beginning to show signs of their internal area being diminished, probably by the formation of dust deposits from traces of fine lime which during that long period had gradualy built up in the bends and which will necessitate simply a cleansing of the system. This is largely due to my having put in ¼-in. pipe in the first place, whereas I should have used ⅜ in.

The great secret of a successful country house installation of acetylene is to put in a generator and holder of good construction and solid make and to have all the fitting work done by a man who understands his business. In every case that I have investigated where acetylene has not given full satisfaction I have found that the whole trouble has arisen from small but fatal economies in installing the system.

Another point is that it is false economy to try and use an acetylene installation without a purifier. It is almost impossible to obtain the lime and carbon from which the carbide is made absolutely free from traces of impurities and these find their way into carbide and into the acetylene made from it and, although they may amount to only a small fraction of one per cent., yet they form gaseous compounds on burning with the acetylene which are better not in the air of the room and which tend to affect the burners and lead after a time to smoking.

Painting the House

For those who wish to give their houses a fresh coat of paint, it may be interesting to know that most architects have generally discarded the so-called "Colonial" effect of yellow ochre with white trimmings, and that, for large houses, plain white lead for the exterior is more and more in favor. There was a time, says a writer in "House Beautiful," when white for country houses was denounced as "glaring" and "vulgar"; but architects, who have no time to spare for sentimentalizing, and who remember the ivy, geraniums and purple clematis trailing over the whitewashed Italian walls, or the passion flowers and roses casting shadows on white French and English villas, know well that no other color adapts itself so well to stately and beautiful rural effects. For small cottages, especially where they are near the street, and need to be made as unobtrusive as possible, the olive greens once popular among architects have been revived, with great advantage. Builders whose attempts to produce soft effects with emerald green or medium chrome have not been crowned with success, do not sympathize with the architects in this matter; but a really good broken green is one of the most charming and lovable colors that can be put on the outside of a small house, well buried in shrubbery. It is hardly necessary to say that red cornices should be avoided.

Slate is used almost exclusively for roofing purposes in Southern Ireland. It is sold by the ton. With a 4-in. lap one ton of the heavy grade will cover about 350 square ft. and of the light grade about 400 square ft.

Permanent Exhibit of Building Materials

A Display of Materials Entering Into the Construction of Buildings and of Special Value to the Home Builder

IN connection with the Builders' Exchange of Milwaukee, Wis., an interesting, permanent exhibit of building materials is being conducted for the benefit of the home builders of that city. The exhibit occupies the basement and a part of the first floor of the Builders' Club, 456 Broadway, Milwaukee, Wis., and although only recently opened it has already been demonstrated a complete success. We show four general views of the exhibition rooms which will afford the reader a good idea of the general scheme.

This department is conducted by A. E. Millies, who acts as the representative for manufacturers who have exhibits and shows prospective builders everything for construction from brick for the foundation and walls to vacuum cleaners for keeping the building free from dirt after it is completed.

The method followed by the management of the Builders' Exhibit is this: Invitations are sent out to all prospective builders to inspect the materials on display before they begin the work of construction. The builders' exhibit makes no attempt to sell building material, nor does it recommend the use of any manufacturers' line as against any other. Its plan is to give builders the information about all of the materials that are displayed and let them choose for themselves. The builders' exhibit will not even take their order for materials, but will upon request put the manufacturer in touch with them.

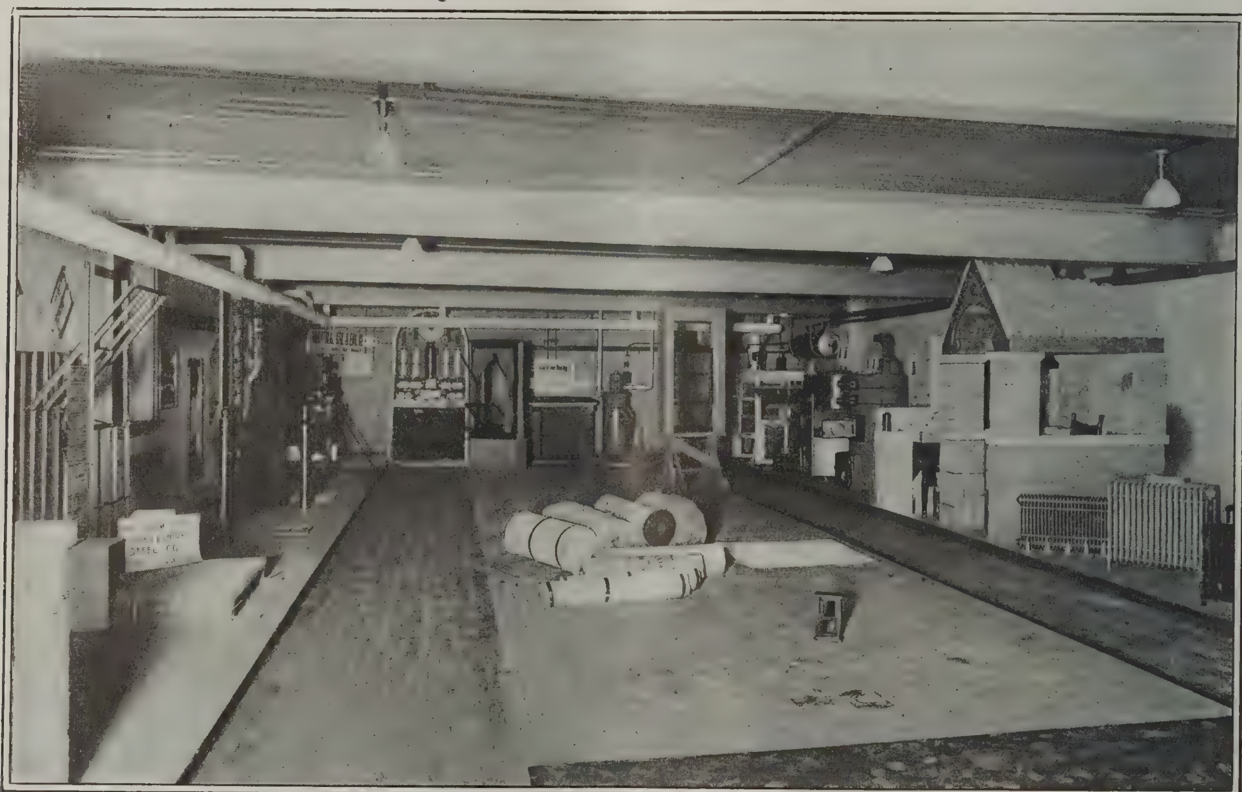
When a prospective builder responds to the invitation sent out and calls at the builders' exhibit he is shown through the rooms and given all the information he can absorb. All of his questions are answered as well as possible and if there is anything the management does not know it will get the information for him.

Starting with the foundation of a structure the prospective builder is first shown concrete blocks and brick. The Johnson-Steensbo Company and the Granite Concrete Company, both of Milwaukee, have exhibits of concrete blocks. Common brick is shown by the Milwaukee Building & Supply Company and composite brick by the Wisconsin Composite Brick Company. An assortment of face brick is also shown in the exhibit of the Milwaukee Building & Supply Company.

If the builder wishes to use gray granite he is shown that exhibited by Mr. Fletcher of Hardwick, Vt., and the Wisconsin "mahogany" granite quarried by the American Granite Company of Milwaukee. Pink limestone is exhibited by the Badger Building & Supply Company of Milwaukee.

Next the demonstrator calls attention to millwork and samples of this work by the Interior Woodwork Company, Pederson & Grobben and the Gruhl Sash & Door Company, all of Milwaukee, are shown and the prospective builder is enabled to form his own opinion of the work and place his order accordingly when the proper time arrives.

The Gruhl Sash & Door Company shows the Gruhl reversible window frame. When closed one cannot detect the difference from the ordinary sash and frame, but for cleaning purposes you turn thumb screws, the



General View in One of the Rooms Where Building Materials are Exhibited

Permament Exhibit of Building Materials at Milwaukee, Wis.

frame can be reversed and the glass on the outside can be cleaned from the inside.

Another interesting feature for the windows is the Rollaway screen made by Brusky & Voelkner of Milwaukee. When the sash is closed the screen is not visible, but when the window is opened the screen is pulled into place, preventing flies from coming in. The screen is of bronze wire and cannot rust.

The Consolidated Sheet Metal Works shows a fireproof window sash. Various kinds of wire glass are also shown, the polished plate, the rough plate, the ribbed and the maze.

Steel window frames and sash made by the Trussed Concrete Steel Company of Detroit, Mich., are next shown to the prospective builder.

The next thing explained is concrete floor construction. In this exhibit the "Kahn bar" is used for the girders and "rib metal" for the slab construction. For roof and curtain wall construction there is the "Hy-Rib." All of these products are made by the Trussed Concrete Steel Company, Detroit, Mich.

Products of the Northwestern Expanded Metal Company of Chicago are also shown. Various sizes of mesh and gauges of expanded metal for reinforcing and for solid plaster partitions are on display. Knapp corner beads are shown to the builder with the advice not to permit any sharp corners in his walls without having metal corner beads on them. Porous partition and glazed tile and various kinds of cements and waterproofings, made by the same concern, are included in its exhibit.

The Northwestern Expanded Metal Company is represented in Milwaukee by the W. H. Pitkorn Company and this concern also shows many other building specialties, including Burson steel stud partition, Plymouth plaster board, gypsum products such as Plymouth partition block, Gypsumite studding partition, Adamant imitation tiling and Imperial plaster in both trowelled and flat finish.

The Western Lime & Cement Company of Milwaukee represents a number of manufacturers of building materials and has in its exhibit Beaver board, which takes the place of lath and plaster, and Truscon waterproofing and various cement products.

"B. & S." board, which also takes the place of lath and plaster, is shown by the Interior Woodwork Company of Milwaukee. The same concern also shows Paroid and Proslate roofing and the various sheathing and building papers.

A large number of roofing materials are demonstrated. These include a four-ply tar and gravel roofing made by the South Side Roofing Company of Milwaukee and the Illinois Damp Proofing Company's products; asbestos cap roofing made by Winding & Gezelschap of Milwaukee; the Federal Cement Company's Tile Roofing and glass tile for skylights; tile roofing made by the American Cement Tile Company; the Johnson-Steensbo Company's cement shingle; cypress shingles made by the Schroeder Lumber Company, and the roofing products of the American Flexible Slate & Covering Company.

When it comes to doors the builder sees samples of the work of the Paine Lumber Company and the Morgan Sash & Door Company, both of Oshkosh, Wis.

The Tegge Lumber Company, Milwaukee, has an exhibit of all the hardwoods in their natural finish and stained in all shades to show the pretty effects obtainable.

The Pratt & Lambert Company, Chicago, shows its "Vitralite" wood finishes and products of the La Salle Varnish Company are also on display.

Metallic doors are shown by the Dahlstrom Metallic Door Company, Jamestown, N. Y.

Hardwood floor exhibits are made by the August C. Beck Company and the Schroeder Lumber Company of Milwaukee.

Ornamental stucco work done by Christian Schmidt of Milwaukee is a feature of the exhibit rooms. Ornamental iron work is exhibited by the Colnik Manufacturing Company and the Wisconsin Iron & Wire Works, both of Milwaukee. The Milwaukee Ornamental Carving Company shows ornamental work in cement cast and stucco.

Another interesting thing in the permanent exhibit

Views in Other Rooms Showing Displays of Various Manufacturers of Builders Materials

Permament Exhibit of Building Materials at Milwaukee Wis.

is the model bathroom put in by the Tile Dealers' Association of Milwaukee to educate people in the use of tile for bathrooms. The plumbing goods installed are those of the John Douglas Company, this concern also showing its silent flush closet bowl and tank. "Liketile" for bathrooms is shown by Kraus & Koken of Milwaukee; the Hess medicine cabinets are displayed and the Milwaukee Seat & Tank Company, Milwaukee, shows its product.

Samples of art glass are shown by the Wagner Bros. Art Glass Company and the Enterprise Art Glass Works, both of Milwaukee.

"Tuec" and United Vacuum Appliance Company's vacuum cleaners; boilers and furnaces made by R. J. Schwab & Sons Company, Milwaukee; Kinnear steel rolling partitions, William Hammann's ventilators, Crown ventilators, Worthington water meters, electric appliances, safes and vaults, clothes driers, door fixtures and hangers, Ruud and Pittsburgh instantaneous water heaters, Standard natural ventilators, Kinnear pressed radiation, Portland cement, weather strips, wood preservatives, McCray refrigerators, Allen Water Service Company's "germproof" water filters, the International Hoist Company's material hoists, paints, oils, varnishes, floor finishes, etc., complete the exhibits.

The list takes one through the entire process of building and gives the prospective builder a splendid idea of the new and novel utilities of modern construction. Perhaps there is no more complete display of building supplies in the country under one roof and yet the Milwaukee Permanent Exhibit management has as yet scarcely begun in its work. Its plan is to rent space to manufacturers by the year giving the demonstrations free of charge and distributing advertising literature to prospective builders when so requested.

The exhibit has been greatly appreciated by Milwaukee builders, and manufacturers have been able to trace many orders to the demonstration furnished by the exhibit management.

Use of Paper Under Tin Roof

A rather interesting discussion as to the relative merits of building and tar papers under a tin roof has been in progress in recent issues of the *Metal Worker* and various correspondents have contributed their views upon this question. The matter is one which has such a bearing upon roof construction that we present a few extracts for the benefit of our readers.

A correspondent writing from Memphis, Tenn., states that in his opinion "building paper is better than tar paper under a tin roof under ordinary conditions. Tin roofing and tar paper get along about as well together as a red flag and a bull. Those of us who have had experience in this matter have a sad tale to relate. However, in exceptional cases, tar paper can be used under tin roofing to fairly good advantage if one is extremely cautious in applying same. Where a tin roof is to be put on over a chemical plant or where the roof would be exposed to the condensation of steam underneath, I have found a good quality of tar paper, protected by a couple of layers of building paper from direct contact with the tin, will make a good job. The incompatibility, if I may use the word, of the two materials is too obvious to be seriously considered."

A Kansas writer is an advocate of building paper, as its use on the underside of tin prevents moisture forming and consequently prevents the rusting of the tin. He says: "Building paper has advantages over tar paper as the latter contains 60 per cent. tar. The tar contains acid which eats and destroys the tin roofing under which it is placed. Iron results in the roof heating in the sun, causing the tar to melt and adhere to the tin. Painting the underside of tin roofing is objected to, because nailing or tacking the roof seams causes heaving in the center of the sheets, water settling along the seams and joints. The paint on the roof coming in contact with hot solder, as it is run along the seams, blisters the paint, leaving the tin exposed. For a first-class roof my preference is any good 40-lb. Old Style I. C. tin, cut 14 x 20 in., with good No. 1 rosin paper under it."

Still another writer says: "There are advantages and disadvantages attending the use of paper between the sheathing and the tin plate. If the sheathing boards are refuse lumber with plenty of cracks the use of paper will prevent air reaching the underside of the tin plate through the cracks in the board and will also form a cushion for the uneven thickness of the sheathing boards. Some of these sheathing boards may have lime or something else upon them which is calculated to start corrosion if the atmosphere has free access to the underside of the tin. If the tin plate is so heavily coated that it would be impossible for anything in the tar paper to work its way through the coating to the base plate, possibly there would be no objection to the use of tar paper, but I would not use it if I wanted the roof to last some time. It is far better to use a rosin-sized paper.

"My advice to any man erecting a building is to use good sheathing boards and no paper. If there is paper between the sheathing boards and the tin plate the water, should there be a leak, may follow along the top of the paper and show its presence several feet from where it came through the tin covering, thus making it difficult to locate the leak. The wet paper would cause dampness to spread and affect a much larger surface under the tin than it would on board sheathing and its contact with the tin for long periods increases corrosion."

A Perfect Floor Plan

The distribution of the various rooms in a detached dwelling in their relation to exposure and sunlight should receive consideration according to the following facts, says the *Bulletin* of the Real Estate Board of Brokers:

A western or southwestern exposure is not good for a dining-room, as the afternoon sun heats it unreasonably in summer. The outlook should be preferably to the south or east or to the north as a last resort, but never to the west unless unavoidable.

The living room, which should be bright and cheerful, should face the east. The morning room, drawing-room or reception room, usually little used, can face to the north or west.

The library must be dry, may face the east. The morning room should face east or southeast. Kitchens require cool locations where possible, and the northerly exposure is therefore best.

Bedrooms should have the utmost possible amount of sunlight as it is materially conducive to health, and in building the positions of the beds should be indicated on the plans. You should not have them in a direct draft between doors or windows or windows and fireplace. nor should the eyes of the sleeper face the light on awakening, neither should the side of the bed be placed against the wall. Every bedroom should have an open fireplace on a ventilating flue.

Bathrooms and plumbing on different floors should be placed over one another to give direct simple drainage. Ceilings should be from 10 to 11 feet from the floor in the clear, and the windows are often best designed when grouped, as inside wall space is essential.

Windows that are too large and too many make the house hot in summer and cold in winter, but this may be remedied in part by using plateglass.

Unit Costs of Reinforced Concrete for Industrial Buildings

A Comparison Showing Unit Costs on the Square Foot and the Cubic Foot Basis

AMONG the very interesting papers presented at the eighth annual convention of the National Association of Cement Users held a short time ago in Kansas City, Mo., was one by Chester S. Allen of Lockwood, Greene & Co., Boston, Mass., from which we present the following extracts:

As a general proposition we have found that reinforced concrete is the lowest priced fireproof material suitable for factory construction, and while it is true that its first cost will generally run from 5 per cent. to 20 per cent. higher than first-class mill construction, we have recently had several instances where, with lumber at a high price, reinforced concrete has worked out cheaper than brick and timber. It is especially adapted to heavy construction and for heavy loads of 200 lb. per square foot and over where the spans are 18 to 20-ft. centers not even timber can compete with it.

The unit costs of projected or completed buildings are commonly figured either as so much per cubic foot or so much per square foot of area occupied. The accompanying table gives the unit costs both on the square foot and the cubic foot basis, together with a general description of a number of reinforced concrete industrial buildings of different types erected during the past two years. It will be seen from an examination of this table that the average cost per square foot of these buildings, excluding the one-story structures, was $1.12, while the average cost per cubic foot was 8.7 cents. The one-story structures both had reinforced concrete sawtooth roofs and the average cost per square foot was $1.77, while 8.5 cents was the average cost per cubic foot. The above costs are for the finished buildings, including plumbing, but do not embody heating, lighting, elevators, sprinklers, and power equipment. The cost per square foot of floor area was obtained by dividing the cost of the building by the total number of square feet of floor area exclusive of roof area, but including basement floors and cost per cubic foot by dividing cubical contents into cost of the structure.

On much of the reinforced concrete work which has been done under our supervision it has been possible owing to the contract being either on a percentage or cost-plus-fixed-sum basis for us to obtain quite accurate and comprehensive cost data. This data, of course, is only of particular value where all the local color of each specific case is known, but average results are interesting.

The average unit cost of the 1:2:4 concrete in the floors, including the beams, girders and slabs, was $6.10 per cubic yard and for the columns $6.70 per cubic yard. Where 1:1-½:3 mixture was used for the columns the average cost was $7.60 per cubic yard. This cost was made up of the items of cement, sand, stone or gravel, labor and plant. The cement, of course, varied greatly with the demand, but the average net cost was $1.35 per barrel, including 3 cents for tests. The sand averaged 80 cents per cubic yard and the crushed stone $1.25 per cubic yard. The cost of labor of unloading the materials and mixing and placing the concrete varied from 65 cents to $2.90 per cubic yard. The cost of plant, consisting of freight, depreciation or rental of mixing and hoisting towers, erection of same, power and coal, and losses and waste on 6 small tools was 50 cents to $1.50 per cubic yard of concrete placed.

Next to the proper design of the structural features of a concrete building the economical design of the form work is of paramount importance. The truth of this statement is borne out by the fact that on the average job the cost of the forms amounts to about one-third the cost of the entire structure. On the buildings under consideration the average cost of the forms for the floors, including beams, girders and slabs, was 10 cents per square foot, and for the columns 13 cents per square foot. The lowest cost was in a building of the so-called "mushroom" or flat slab type of construction where by the intelligent use of corrugated iron for the slab forms the cost of the floor forms, including wall beams, was 7 cents per square foot, and the highest cost was for an artistic but not elaborate overhanging cornice on a 12-story building, which was 32 cents per square foot. This last item rather forcibly demonstrates that any attempt at architectural development is apt to be a costly proposition.

The cost of the labor of making, erecting and stripping the forms varied according to the price of lumber, design of the structure, method of forming, character of the supervision and the skill of the workmen from 4¾ to 12 cents per square foot. The cost of lumber, nails and oil, divided by the square feet of forms, averaged from 2¼ to 4½ cents per square foot.

TABLE OF UNIT COSTS

Type of Building.	Dimensions.	No. Stories.	Story Height.	Live Load Lbs. per Sq. Ft.	Type of Construction.	Col. Spacing.	TOTAL COST.	
							Per Sq. Ft.	Per Cu. Ft.
Machine shop	120′ x 50′	4	12′	150	Beam	10′ x 24′	$1.17	$0.09
Cotton mill	550′ x 129′	2	16′	75	Beam	10′8″ x 25′	.98	0.07
		4	12′6″	150	Flat slab	17′ x 20′	1.09	0.077
Weaving Mill	140′ x 60′	5	12′6″	150	Flat Slab	17′6″ x 20′0″	1.50	0.12
Knitting mill	220′ x 75′	2	14′	125	Beam and girder	22′ x 25′	1.09	0.073
Factory	223′ x 56′	2	16′	300 & 1000	Beam and girder	18′6″ x 18′6″	1.55	0.10
Weave shed	341′ x 231′	1	..	125	Sawtooth skylight	13′ x 21′4″	1.79	0.07
Machine shop	220′ x 100′	1	..	...	Sawtooth skylight	20′ x 20′	1.75	0.10
Store house	181′ x 56′	4	14′6″	150	Flat slab	18′ x 20′	1.15	0.07
Store house	580′ x 109′	10	12′	250	Beam and girder	19′3″ x { 19′ / 25′ }	0.85	0.071
Store house							0.76	0.05
Store house	256′ x 100′	12	8′	150	Flat slab	16′0″ x 16′8″	1.04	0.12

The cost of bending and placing the reinforcing steel, including the necessary wire, averaged $10 per ton, the range being from $5.75 per ton to $17.20 per ton.

Granolithic floor finish 1¼ in. thick when laid before the concrete below it had set so as to form one homogeneous slab cost on the average of 4½ cents per square foot. When put on after the rough concrete slab the cost averaged 7 cents per square foot.

Cost of Materials for Curtain Walls

Inasmuch as the only economical design of a reinforced concrete structure is one which closely resembles that of the steel skeleton type, the relative cost of the various materials commonly used for curtain walls under the windows may be of interest. The writer has used brick, vitrified tile, concrete blocks, cast concrete slabs and solid concrete walls for this purpose.

The most common type of curtain wall has been either on 8-in. or 12-in. brick wall resting on the concrete wall beam. The average cost of these walls has been 45 cents per square foot. There is practically no difference in cost between the 8-in. and the 12-in. brick curtain wall, as the saving in material is offset by the extra labor in culling and laying the thinner wall.

An excellent and inexpensive spandrel wall is constructed by using 8-in. x 12-in. x 18-in. vitrified tile. This is a non-absorbent wall and when properly laid in cement mortar makes a tight weather-proof curtain wall. The cost of this wall averages about 25 cents per square foot. If the tile is plastered both sides the cost is about 38 cents per square foot.

Where 8-in. concrete curtain walls were cast in place after the skeleton frame was completed the average cost was 40 cents per square foot, and when poured simultaneously with the columns 48 cents per square foot. Four-inch cast concrete slabs cost about 35 cents per square foot.

While concrete blocks make a very cheap and light curtain wall, the price being about the same as for the 8-in. tile, the writer's experience with them has been rather unfortunate on acount of extreme porosity.

Where the location of the buildings have demanded special treatment of the exposed surfaces we have generally specified rubbing with a block of carborundum. The average cost of this work has been 4 cents per square foot. In two instances portions of the structure have been bush-hammered with a resulting average cost of 7 cents per square foot.

Concrete piles were used on the foundation of several of the buildings and the average cost of the piles was $1.15 per linear foot.

Waterproofing Concrete

The most common methods of waterproofing concrete structures are by the introduction of foreign ingredients into the concrete, by the application of a compound to the concrete surface, by the use of paper or felt waterproofing and by accurately grading and proportioning the aggregate and the cement.

Where an addition of hydrated lime in the proportions of 10 per cent. to the weight of the cement has been used the added cost to a cubic yard of 1:2:4 concrete has been 50 cents. Patented compounds similar to Hydrolithic cement have cost from 25 to 35 cents per square foot of surface covered. On horizontal or inclined surfaces we have sometimes used a granolithic surface of rich mortar of Portland cement and sand, or Portland cement and screenings in the proportions of 1:1 laid at the same time as the base and troweled as in side walls construction. The cost of this work has been about 5 cents per square foot.

Taken as a whole, the lowest possible cost on a reinforced concrete building can be obtained only by a careful study of each particular case to determine the cheapest type of construction and most economical spacing of columns. As a general proposition we have found that for light loads with ordinary beam and girder construction the most economical spacing of columns has been 18 ft. each way and for flat slab construction 20 ft. each way. For heavy loads, such as 300 lb. per square foot and over, it has been our experience that the cheapest column spacing for beam and girder construction is 15 ft. by 15 ft. and for flat slab construction 17 ft. by 17 ft. In arriving at the most economical layout it is always well to bear in mind that the construction which allows the greatest simplicity of form units together with the maximum number of repetitions of same is invariably the one that will work out cheapest in the end. The fact that the actual amount of concrete or steel required for a certain floor construction is less than that required in another by no means implies that this is actually the cheapest floor construction, as the unit labor of the form work may easily have been increased out of a proportion.

Cottage Built and Furnished by a Woman

One of the pleasantest cottages we ever dwelt in was built and furnished by a woman who spent more ingenuity and thought on it than she did money, says Isabel Gordon Curtis in *Success*. A village carpenter made a good deal of the furniture, to which she gave the finishing touches. Toilet tables were boards attached to the wall by brackets; over them stood excellent mirrors which did not cost as much as the fearful distorters we often encounter in a rented house. She bought the mirrors cut in proper sizes at the factory, had them backed to protect the quicksilver, then around them the carpenter set plain, varnished, picture-molding for frames. Seats were fitted into window spaces, by the fireside, or in jogs of the wall. They were covered with green denim and when I lifted hinged lids they showed a clean interior lined with paper cambric. Thus she did away entirely with bureaus. There is nothing more aggravating than the joggly, cheap, ugly bureau of a shore cottage with balky drawers that would make a saint swear. The boxes were suited to hold waists, underwear, shoes or skirts laid out full length; besides they served for chairs.

The dining room had a neat dish cupboard with white enameled shelves; there was a buffet made like a toilet table and the big dining room table was immaculate with a white oilcloth cover. The entire house was done in white enamel or white oilcloth and green denim. Before each bed was laid a strip of grass matting bound with green; all over the house the curtains were neat strips of unbleached cotton, and the same material bordered with a green-and-white cretonne was used for spreads.

Everything had a spotlessly clean, cool, summery appearance, which was so attractive that one did not hesitate at paying a good rent. This woman was wise enough to know that the average housewife prefers cleanliness and comfort to gimcrackery, lurid imitations of furniture, and the flamboyant things which are a delusion and a snare. What she saved on furniture she spent on mattresses, springs, blankets, a first-class stove and substantial granite cooking utensils.

What is probably the highest altitude occupied by a carpenter shop is the one which has just been completed on the roof of the building occupied by one of the largest and most powerful banking institutions in New York City. This somewhat novel location was selected to enable all repair work and minor alterations about the building to be done much more expeditiously as well as economically than has heretofore been the case.

New Publications

Constructive Carpentry.—By Charles A. King, Director of Manual Training, Eastern High School, Bay City, Mich. 188 pages; size 5¼ x 7½ in.; 138 illustrations. Bound in cloth covers. Published by the American Book Company. Price 70 cents postpaid.

This little work is especially valuable, both to the workman and to the apprentice. It is one of a series of five volumes of which two were reviewed in these columns in August last year. Constructive Carpentry has been planned with special reference to the needs of students of technical, industrial or trade schools who have passed through the work of the first two volumes or their equivalent in this series, namely "Elements of Woodwork" and "Elements of Construction." The subjects treated are those likely to be found of greatest value to both prospective and finished workman.

The matter is comprised in eight chapters followed by a glossary of terms used in architecture and carpentry. The first chapter relates to foundations and masonry. The second has to do with "Forms of Construction" in which the full frame, the half frame and the balloon frame are considered. The third is devoted to "Mill Construction." In the fourth chapter what is referred to as an entirely new method of presenting the steel square is given. The point is made that the methods taught in the book are applicable to every pitch planned or combiuation of them. The subject of roof construction immediately follows the chapter about the steel square, and chapter six deals with the outside finish and the enclosing of the frame of a building. Roof coverings are considered in the seventh chapter, while the final chapter is given up to plastering.

The matter has been arranged in a way to appeal to the building mechanic and has special reference to the laying out and planning of the construction of wooden buildings for the foreman as well as for the man who is to work under him.

Reinforced Concrete Buildings.—By E. L. Ransome and Alexis Saurbrey; 236 pages. Size, 6½ by 9½ in. Profusely illustrated. Bound in board covers. Published by McGraw-Hill Book Company. Price, $2.50.

The above work consists of a treatise on the history, patents, design and erection of the principal parts entering into a modern building of reinforced concrete construction. The matter is embraced in three parts, of which the first relates to the history of reinforced concrete construction with special reference to the patents granted by the United States; while the second has to do with compression and lateral expansion, bending theory and initial and allowable stresses. The chapter on transverse stresses and U-bars is stated by the author to be original and avoids the use (or misuse) of the word "shear." In reinforced concrete the steel is supposed to act in tension and the U-bars must follow this general rule.

The third and concluding portion of the work is devoted to practical construction. Here more attention has been given to the useful facts not generally known than to those that are matters of common knowledge. While there is no particular necessity at the present day for describing at great length the various types of buildings and their component parts, an exception has been made to what is known as "unit construction," which appears to be coming rapidly to the front. There are chapters on fireproofing and repairs likely to be found of interest and the superintendents' specifications cannot fail to attract more than ordinary attention. Another chapter is devoted to the engineer, and this is followed by one on the theory of beams as illustrated by tests.

House Wiring.—By Thomas W. Poppe; 104 pages. Size 4½ x 6½ in. Profusely illustrated with original drawings. Bound in paper covers. Published by the Norman W. Henley Publishing Company. Price 50 cents.

The extent to which electric lighting and electric bells are being used in the home of the present day renders it desirable that the builder should know something about the wiring of a house for this purpose, and in the little work under review much valuable information along the lines indicated is presented. In fact the little work is a treatise describing and illustrating up-to-date methods of installing electric light wiring. It is intended more especially perhaps for the electrician and the apprentice, but at the same time the matter is given in such shape that the general reader cannot fail to absorb many valuable hints and suggestions as to the way in which the work should be done. The author points out that it is intended as an aid in solving all wiring problems and contains nothing that conflicts with the rulings of the National Board of Fire Underwriters. The matter is arranged in a way to appeal to all interested in the subject and the diagrams and sketches aid materially to a clear understanding of just the way the wiring should be done.

Knots, Splices and Rope Work.—By A. H. Verrill; 102 pages. Size 5 x 7 in. Illustrated with 150 engravings. Bound in board covers. Published by Norman W. Henley Publishing Company. Price 60 cents.

There are many occasions when it is exceedingly convenient for the builder to know how to quickly make knots and splices in ropes, more especially in those sections where pole scaffolding is used to any considerable extent. Carpenter-contractors and builders are therefore likely to find much that is of interest and value in the little work mentioned above. It is not expected that they will ever find it necessary to make use of all the knots and splices there described as those presented are of such an extensive nature as to be adapted for the use of travelers, campers, yachtsmen and in fact all others having to use or handle ropes for any purpose.

The matter is contained in seven chapters, the first four of which deal with the subject of cordage; simple knots and bends; ties and hitches, and nooses, loops and mooring knots. Then follows a chapter on shortenings, grommets and selvagees in connection with which it may be interesting to state that a "selvagee" strap is made by passing a number of strands or yarns around pins or nails set in a board and binding the whole together with a seizing of yarn, thus producing a ring or strap much used for handles to boxes and chests and similar purposes. The sixth chapter is devoted to lashings, seizings, splices, etc., while the last chapter is given up to fancy knots and rope work.

Practical Manual of Steam and Hot Water Heating.—By Edward Richmond Pierce; 340 pages. Size, 5¾ by 8¾ in. Numerous illustrations. Bound in board covers. Published by the Domestic Engineering Company. Price, $2.50.

The author of this work is exceptionally well qualified, by reason of his varied practical experience, to discuss the subject in hand, and what is presented is primarily for the every day workman in the heating industry, and is therefore without those formulæ and scientific phrases which so frequently tend to confuse and embarrass the mechanic who desires to acquire a knowledge of a technical subject. The author expresses the hope, however, that the simplicity of treatment will not unfavorably prejudice the more experienced man and technical student. The subject matter is contained in

45 sections and covers practically every problem likely to be met with in estimating and installing heating apparatus under varying conditions. These have been treated in such a way as to reduce the chances of misunderstanding to a minimum.

The author, who has been connected with those who manufacture and sell boilers and radiators for steam and hot-water heating for something like a quarter of a century, states in his preface that the agency system of sale that prevailed until within a few years in the heating industry "left as a legacy to those who must carry on the work of to-day questions for the manufacturer to solve as momentous as those that confront the architect, engineer and steam fitter. The purport of these questions and the aid that the architect, the engineer and those that carry out their plans, can give to the heating industry by a more complete knowledge of the fundamental principles of the science I have endeavored to make evident. When these factors have each a personal acquaintance with the principles which underlie the science of heating and ventilation, these contributors to public health and comfort will take their rightful position as among the greatest of practical sciences."

The Elements of Structures.—By George A. Hool, S.B., Assistant Professor of Structural Engineering in the University of Wisconsin. Cloth, 188 pages, illustrated. Published by the McGraw-Hill Book Company, 239 West Thirty-ninth street, New York. Price, $1.75.

Prepared in the Extension Division of the University of Wisconsin, this book was designed for use in correspondence study. It deals with the fundamentals of structural engineering in a direct manner, which Professor Hool has made as simple and interesting as possible. The work assumes that the student has had an ordinary training in arithmetic, algebra, plane and solid geometry, logarithms, trigonometry, mechanical drawing and strength of materials and is a prerequisite course to all the regular structural engineering studies offered by the Extension Division of the university. As to design, it treats only of the general methods to be followed. Following the text book idea, the volume contains many definitions and is divided into assignments as well as chapters and other subdivisions.

Brooklyn's $3,000,000 Library Building

The new structure which will be known as the Brooklyn Central Library and about being erected at the junction of Flatbush Avenue and Eastern Parkway, facing Prospect Park Plaza will, when completed, be one of the best equipped and most attractive library buildings in the country. It will be in the style of Louis XVI and the material used will be a combination of gray limestone with a granite base, while the interior will be finished with polished marble. The site selected comprises an area of 2½ acres fronting 69 ft. on Prospect Park Plaza, 332 ft. on Eastern Parkway and 486 ft. along the north side of the Reservoir Mound.

According to the plans submitted by Architect Raymond F. Alrimall, 185 Madison Avenue, New York City, the building will be eight stories high and will cost $3,000,000. In the sub-basement there will be located the machinery, boiler, coal storage and men's sitting rooms, while on the basement floor will be the heating plant, newspaper and periodical storage room, women's sitting room and quarters of custodian of the building.

On the ground floor will be the public document room, the newspaper reading room, children's reading room, library for the blind, the book order, supply, package delivery, information and coat rooms.

Above this floor in various parts of the building will be the map room, teachers' reference room, auditorium, bindery, etc., etc. The new structure will be as complete in details of construction and convenience as it is possible to make it.

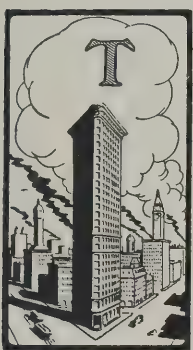
One of the unique features of the 18-story loft building just commenced in West Twenty-seventh street, near Fifth avenue, New York City, is the absence of intermediate columns in the entire front, thus making it possible to secure the greatest number of windows. Throughout the interior also there will be but four exposed columns. The plans which have been prepared by Buchman & Fox, 11 East Fifty-ninth street, New York City, call for an estimated expenditure of about $400,000. The front of the three lower stories will be of Indiana limestone with ornamented terra cotta above.

At the convention of the Building Brick Association of America, held in Chicago, in March, Ralph Simpkins was elected president and J. Parker B. Fiske was chosen secretary-treasurer.

CONTENTS.

What Builders Are Doing

Bird's-Eye View of Building Situation in Leading Cities — Permits Issued and Estimated Value of the Projected Improvements



THE building movement appears to be making rapid progress in most of the leading centers of the country and the reports of plans filed for construction work during April indicate a very gratifying increase in the amount of vested capital involved as compared with the same month last year. While in many respects the spring is decidedly backward, the weather has not seriously interfered with building projects and now that the season is fully under way there seems to be every prospect of an active year. Confidence, which is a prime factor in all business relations, is growing in leading branches of industry, and this with the steady growth of population requiring added housing accommodations is reflected in the carrying out of many projects which had for some time past been held in abeyance pending more favorable developments.

The figures from widely scattered sections of the country indicate an increase in April in the estimated cost of the building improvements for which permits were filed of something like 18 per cent. as compared with the same month last year, and where decreased activity is reported it is only here and there that the percentage is notable, and even this is found in cities where heretofore unusual activity has prevailed.

Baltimore, Md.

According to the report of Building Inspector Stubbs for April permits were taken out for improvements estimated to cost $978,698, the notable feature being the number of two-story brick dwellings, of which 278 were planned to cost $500,000. There were eight manufacturing establishments and warehouses costing $164,298.

From January 1 to April 30 inclusive there were 886 two-story brick dwellings planned costing $1,481,390 and 30 three-story brick dwellings costing $138,000. There were also 33 manufacturing establishments costing $592,648.

Bismarck, N. D.

The Builders and Traders' Exchange is the name of an organization of contracting builders which has just been formed here in Bismarck. The officers chosen for the ensuing year are:

President..........................H. J. Milsted
Vice-President.....................John L. Larson
Secretary..........................F. G. Grambs
Treasurer..........................Walter Lomas

All the northwest has been made honorary members of the Exchange.

Buffalo, N. Y.

The building outlook for 1912 in Buffalo is very bright, a large number of new building projects being under way, or in contemplation. The only cloud upon the horizon is the carpenters' strike, which at the present writing has not been settled. The members of the United Brotherhood of Carpenters and Joiners went out May 1 on account of not being granted an advance in wages of 5 cents per hour (from 45c. per hour to 50c.), and an all-the-year-round Saturday half-holiday by the 45 contracting and building firms in the Builders' Exchange Association. Some employers not affiliated with the Builders' Association have acceded to the demands of the Union and kept their men at work; but the larger proportion of the union men—about 2000—still remain out.

The number of permits issued by the Bureau of Building during the month of April was 455, representing an estimated investment of $848,000, a considerable gain over March, for which month the permits numbered 266 and the estimated cost totalled $507,000, and a slight loss (7 per cent) as compared with April, 1911, when the amount of the permits totalled $918,000. Buffalo's gain in building investments for the first quarter of 1912 over the same period for 1911 was 40 per cent.

Mercantile buildings take quite a large proportion of the total outlay involved in the current month's building figures, and a number of these structures are to be located in the new Franklin street business district. They include an eight-story and basement store and office building at Franklin and West Mohawk streets, to be erected by William H. Crosby, president of the Niagara Life Insurance Co., from plans of Architects Colson & Hudson, estimated cost $200,000; a six-story and basement store and office building at Chippewa and Franklin streets, with a frontage of 178 ft., from plans of Architects Esenwein & Johnson, to be erected by the Francis H. Root Estate, to cost $175,000; a six-story and basement store building for the Queen City Improvement Co., at Delaware avenue and Chippewa streets, from plans of Architect Edward H. Moeller, to cost $125,000, and a modern commercial building, five stories and basement, for August Keiser, at the northwest corner of Chippewa and Franklin streets, to cost $100,000—all of these to be of steel frame construction.

Other structures of importance to be erected under current or recent permits or for which plans have been completed are as follows: A department store annex at Washington and East Eagle streets, five stories and basement, for the J. N. Adam Co. from plans of Esenwein & Johnson; hippodrome and theatre building, 94 x 200 x 116 ft., Main street to Pearl street, south of Chippewa street, for the Shea Amusement Co., $300,000; remodeling commercial building into theatre, Washington street, near Broadway, for R. R. Hefford, cost $60,000; South Park High School, from plans of Green & Weeks, estimated cost $600,000; Hutchinson High School, on Johnson Park, from plans of Architect H. Osgood Holland, $625,000; remodelling Washington Market, at Washington and East Chippewa streets, from plans of City Architect Howard L. Beck, $100,000; rebuilding Water Works Pumping Station, foot of Porter avenue, $350,000; two fire houses and a truck and ladder house, from plans of City Architect Howard L. Beck. The High School and city work enumerated is not included in the building permits.

A settlement house for the Buffalo Settlement House Association; a synagogue for the congregation of Ahavis Achim, Fillmore avenue, near Broadway, $35,000; church structure of gray stone for the Riverside Methodist Church at Potomac avenue and Bayes street, from plans of Architect John H. Coxhead, $70,000; St. Mary's Academy addition, Cleveland avenue, $100,000; power plant and laundry building for the German R. C. Orphan Asylum, $35,000; amusement pavilion for the Electric Park Amusement Co.; a four-story warehouse for the Erie & Western Transit Co.; a flour warehouse, 80 x 350 ft., three stories, Erie R. R. and Rapin avenue, for G. H. Buse, from plans of Architects Dunning & Dunning; also a number of new factories and additions to industrial plants, including a new foundry plant for the Strong Steel Foundry Co, Erie R. R. and Hertel avenue; a two-story brick factory for the Buffalo Corrugated Container Co., Imson street and the Lehigh Valley R. R.; four-story brick addition to cereal plant and a grain elevator for the H-O Company, $60,000; 100 x 200 ft. two-story addition to factory of the F. F. Dalley Co., manufacturers of polishes; two-story additions to plants of the Buffalo Gasoline Motor Co., Niagara street; the D. H. Stoll Co., Lansing street, and the C. Klinck Packing

Co., Erie R. R. and Depot street; additions to pump house and machine shop of the Standard Oil Co.'s Atlas Works, to the factory of the Electrolytic Products Co. and to the factory of the Lumen Bearing Co.

A 50 x 150-ft. factory for the Buffalo Weaving & Belting Co. and an addition to the factory of the Linde Air Products Co., on Chandler street, are projected; also an addition to the Howard Iron Works and the plant of the Farmers' Feed Co. of New York; new buildings for the Harvey Laundry Co., Chenango street, and the Taylor Ice Cream Co., Fifteenth street; also a power house for the J. L. Schwartz Brewing Co. and an addition to the power plant of the Fedders Mfg. Co.

Canton, Ohio

During the month of April there was a total of 102 permits issued for work ranging all the way from small repairs to large manufacturing buildings, including one theater. The valuations run from $125 to $80,000, the total valuation given by the records amounting to $226,975. Taking this valuation on its usual basis of two-thirds actual value, the aggregate expenditure for various operations during the month would be approximately $350,000. This seems to be a fair showing, considering the fact that the long continued cold weather has held up the building activities until so late a date.

According to the secretary of the Builders' Exchange the building outlook for the year seems to be very bright, as considerable large residence work is contemplated.

The Canton Builders' Exchange, at its May meeting, voted to affiliate with the State Association of Builders' Exchanges.

A committee on building code, to work in harmony with the authorities in the matter of securing the formation of a building code for this city, consisting of John L. VanKirk, John W. Walters and Henry Gonder, were appointed. Nine applications for membership were received and the applicants elected, bringing the membership to forty-three. A systematic campaign for new members is being planned by the secretary, to be put in operation at once.

At an open meeting and "smoker," held on Wednesday evening, May 8, V. D. Allen, the head of the Building Inspecting Department of Cleveland, O., delivered an address on the "Building Code."

Cincinnati, Ohio

The month of April was a rather disappointing one from a building contractor's standpoint. While, including elevator certificates and plumbing inspection permits, there was a total of 1256 permits issued, the entire valuation was $947,485, against 1033 permits taken out during April, 1911, with estimated improvements valued at $957,090.

In addition to a very late spring season, that has held up building operations, some trouble in labor circles is reported, and at this writing quite a large number of carpenters are out on a strike. However, differences between employers and employees are expected to be adjusted very shortly.

Secretary E. A. Powell, of the Builders and Traders Exchange, was the subject of a very complimentary notice in a recent issue of one of the Cincinnati papers, and accompanying it was an excellent likeness of this energetic officer of the organization in question. Mr. Powell came from Maysville, Ky., in 1895, and the following year he purchased the Western Architect and Builder and started in the printing and publishing business. A year later he formed the present firm of Powell & White. Mr. Powell is most energtic and is a firm believer in the idea that the Builders and Traders Exchange will become a great and successful factor of education and co-operation in the building trades.

Cleveland, Ohio

The number of building permits issued during April fell off considerably as compared with the previous month. There were issued during April 331 permits for buildings to cost $351,530. During March the number of permits was 677 for buildings to cost $998,230. From January 1 until May 1 permits were issued for buildings estimated to cost $2,367,787. During the first four months of 1911 the permits amounted to $4,006,511. To the unfavorable weather during April is attributed the falling off in the number of permits as compared with the previous month. The extremely cold weather during the preceding months is also largely blamed for the poor showing made as compared with a year ago.

Builders look for a very satisfactory year in building lines, and this is indicated by a good volume of work that is being figured on. Permits issued during the first week in May show a large gain over the previous month. A good volume of work is coming out in practically all lines, including residences, apartment houses, moderate-sized store buildings and factory buildings.

The Builders' Exchange has decided to hold its annual summer outing at Conneaut Lake the latter part of June. The Exchange held its outing at this resort two years ago, and many of the members wished to go to the same place last year, but it was decided instead to make a journey to Washington, Philadelphia and Atlantic City and to postpone the second trip to Conneaut Lake until this year. A special train will be provided to take the members and their families to the resort.

Dayton, Ohio

Building operations in the city of Dayton during the past month have been quite active, though still not all that can be expected. Real estate dealers have taken out permits for numerous better class residences to be built for sale, and the number of private dwellings being built is satisfactory. No buildings of any consequence have been awarded as yet, though several will soon be ready for bids.

The plans for the new Y. W. C. A. building have just been completed, and bids will be taken out in about ten days. This building will be located immediately opposite the new million dollar post office, and will be a 5-story concrete, brick and terra cotta structure of elegant design. The City National Bank Building will be a 10-story structure, and the architect will soon be ready for bids. The Reibold Building Annex of 11 stories will also be ready for bids. These operations are in the very heart of the city and will no doubt result in others very shortly.

Des Moines, Iowa.

The Master Builders' Association of the State of Iowa has filed articles of incorporation, with headquarters at Des Moines, although on the call of the president a meeting may be held at any city or town in the state. The existence of the corporation is to be 50 years from the date of filing the articles of incorporation.

Until the first annual meeting, which will be held on the third Tuesday in January, 1913, the board of directors will consist of W. J. Zittrell, C. W. Guthrie, J. C. Loomis, J. E. Tusant, C. F. Reimer, J. F. Leefers, J. F. Nebergall, H. E. Reimer and William Brereton.

Jacksonville, Fla.

The month which has just passed shows a heavy falling off in the cost of building operations as compared with the month of March, the figures being $284,925 and $434,245 respectively. In April 101 buildings were planned, of which 87 were of frame construction and 14 were of brick and stone. In March 137 buildings were planned, of which 121 were frame structures, 14 were brick and stone and 2 were of galvanized iron.

Since the great fire, which practically destroyed the city, 12,340 buildings have been erected, of which 11,455 were frame and 895 were brick and stone.

Los Angeles, Cal.

In view of the entire absence of large single items, the record for April is rather remarkable, the number of permits being the largest ever recorded for the month. The total valuation of buildings for which permits were issued was $2,650,461, compared with $1,687,780 for March and $1,613,485 for April, 1911. The record was the largest since last September. During the month nearly 1400 permits were issued, and of these only one was for a steel frame building, valued at $16,000, while three were for Class A concrete buildings of an aggregate value of $406,310. This shows a further increase in activity on buildings of the dwelling type, this class of work being more abundant than ever before. The value represented by dwelling permits was $1,308,915, the number being 622.

An important contract has been let by the Marion R. Gray Co. to Hugo Eckardt for a 7-story fireproof loft building on South Los Angeles street, costing $75,000.

H. W. Bryson has applied for a permit to erect a concrete apartment house on Wilshire boulevard to cost $308,000.

Among the principal buildings for which plans will soon be out are the following: A $125,000 apartment house for I. Laventha at Hope and Twelfth streets, Edelman & Barnett, architects; a 10-story hotel for the Los Angeles Cemetery Association on Grand avenue, to cost about $200,000, Noonan & Kysor, architects; a $250,000 concrete building for R. Marsh and F. R. Strong at Ninth and Main streets, Fred B. Dorn, architect; a $100,000 store and apartment building at Main and Washington streets for W. Sullivan, Neher & Skilling, architects, and a $75,000 apartment house on South Hope street, A. B. Benton, architect.

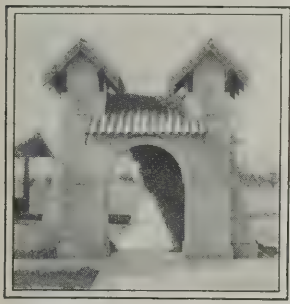
Architects J. C. Austin and W. C. Pennell, of this city, have completed plans for a high school at Ontario, Cal.

Architects Davis & Higgs are preparing plans for a country residence to be erected in the foothills north of Pomona, Cal., at a cost of $100,000, for Elsberry Reynolds, of Chicago.

The second annual convention of the Architectural League of the Pacific Coast met in this city April 10-11. The convention was well attended, and several interesting papers were read by prominent Coast architects. Officers for the ensuing year were elected as follows: President, E. F. Lawrence, Portland, Ore; vice-president, John Bakewell, Jr., San Francisco; secretary, J. W. Whitehouse, Portland, Ore.; treasurer, Myron Hunt, Los Angeles. The annual convention in 1913 will be held at Portland, Ore.

Louisville, Ky.

The estimated value of building improvements for which the 29 permits were issued in this city during April, according to statistics on file in the office of City Building Inspector Tilford, was $702,403. In April last year there were 287 permits issued for buildings that cost approximately $523,998. The large gain in last month's figures over those of April a year ago was due to the filing of the permit for the Young Men's Christian Association Building, which was taken out April 30. This is to be a 7-story brick and concrete steel structure, and will cost about $350,000.



Thus far the present fiscal year 1403 building permits have been issued for structures to cost $3,649,000.

The members of the Builders' Exchange celebrated the opening of its new headquarters on the fourth floor of the Realty Building with a housewarming party on the evening of May 10. A feature of the entertainment was a series of moving pictures showing the process of making roofing tin plate from the ore to the finished product. There was also a musical program and a bounteous luncheon.

The committee in charge of the arrangements consisted of Alfred Struck, chairman; E. G. Heartick, George T. Cross, Edward Wagner, Gus Albrecht, Jr., and Secretary J. M. Vollmer.

Montreal, Canada

The many friends in the United States of J. H. Lauer, for a long time secretary-treasurer of the Builders' Exchange, of this city, will be interested in learning that he has resigned that position to take the office of manager and secretary of the Marconi Wireless Telegraph Company of Canada. Mr. Lauer, who was also secretary of the Canadian National Association of Builders' Exchanges, will retain that position at least until the next convention in Calgary.

R. L. Werry, of Montreal, has been appointed to succeed Mr. Lauer as secretary-treasurer of the Montreal Builders' Exchange.

It may be interesting to state that the Builders' Exchange of Montreal and the Province of Quebec Association of Architects have agreed on a Standard Form of Contract which will be used by members of both organizations.

Nashville, Tenn.

Building operations for April were of gratifying volume, the cost of the improvements for which permits were filed aggregating $142,070. This is an increase over the previous month of $66,907. There are a number of dwellings going up in the suburban sections, some costly and others small, of which no record is kept by the city department. Local architects report more work on their boards than for a long time past.

About 75 members of the Builders' Exchange attended a very enthusiastic meeting at the headquarters on April 30. After the members had enjoyed a luncheon which had been provided they discussed business and co-operation. The meeting was so gratifying in many ways that it was decided to hold a similar one every quarter.

New York City.

While the value of new construction work in the Borough of Manhattan showed a falling off in April as compared with March, the figures are somewhat in excess of the total for April last year. The increase is due in a measure to the additional store and loft buildings which have recently been projected and to a somewhat greater number of apartment houses, not to mention two hotels involving an expenditure of a little over half a million dollars, as against no buildings of the latter class in April, 1911.

According to the report of Rudolph P. Miller, superintendent of buildings, there were 88 plans filed last month for 101 buildings, estimated to cost $14,095,175, while in March there were 61 plans filed, covering 67 buildings, involving an estimated outlay of $16,326,325. In April, 1911, there were 78 plans filed with the bureau, covering 86 buildings and estimated to cost $13,016,100.

Of tenement, or apartment houses, as they are more commonly called, 19 plans were filed in April, covering 25 buildings and involving an estimated outlay of $2,238,000, while in April last year 11 plans were filed, covering 13 buildings of this class and costing $1,155,000. There were 20 store and loft buildings planned last month, estimated to cost $5,375,000, against 11 such buildings planned in April a year ago, to cost $2,768,000. Of office buildings there were 6 planned last month, estimated to cost $3,120,000, and there were also 6 planned in April a year ago, but of a somewhat more expensive nature, as their estimated cost was $7,485,000. There were also 4 manufactories and workshops planned last month, involving an outlay of $1,675,000, as against 4 buildings of this class planned in April last year estimated to cost $696,000.

There were also alterations and additions planned last month calling for an estimated expenditure of $1,343,651, while in April a year ago the cost of such work was estimated at $1,779,097.

Greater activity was noticeable in the Borough of the Bronx in April, where plans were filed for buildings to cost $4,125,741, as against $1,767,530 in April last year.

In Brooklyn there was also an increase in the estimated cost of the operations, for which permits were filed as compared with the corresponding month last year, the figures standing $5,579,886 and $3,676,305 respectively.

At the recent meeting of the Building Material Exchange of the city of New York, held at its headquarters, 21 Vesey street, the following were elected for the ensuing year: President, A. W. Tuthill; Vice-President, A. V. C. Genung, Jr.; Treasurer, William C. Morton, and Secretary, George A. Molitor.

Oakland, Cal.

Local building operations continue in highly satisfactory shape, the volume of work being slightly above the recent average. Surprisingly little change is apparent in the last two months, the valuation of building permits for April being $759,392, as compared with $759,858 for March, though there is a substantial gain over the same month of 1911, when the total was $517,598.

Plans have been received for the new Post Office at Alameda, to cost $100,000, bids for which will be taken May 21. The building will be one story in hight, with Gothic entrance and elaborate marble interior.

The local Y. W. C. A. is making preliminary arrangements to put up a building at a cost of $225,000.

J. H. Spring announces that plans will soon be ready for figuring for his residence in the Thousand Oaks tract, north of this city, the estimated cost being $100,000 for construction alone. The house will be of marble, granite and concrete, most of the marble and woodwork being imported. John H. Thomas is the architect.

The Newell-Murdoch Co. has let a contract for 20 bungalows to be erected in the Northbrae and Fairmont tracts, north of this city.

A. Arlett, of this city, has taken a $61,000 contract for a school building at Richmond, Cal., another school contract in the same town being let to Stockholm & Allyn, San Francisco, at $59,672.

Philadelphia, Pa.

Unfavorable weather conditions have been a factor in building operations during the past four months, but the amount of new work begun in April was larger than that of the previous month, as well as that undertaken during April, 1911. Statistics compiled by the Bureau of Building Inspection show that 1150 permits for 1955 operations were issued at an estimated cost of $4,503,385, which is an increase of 322 permits and $811,490 in value, as compared with March, and a gain of 207 operations and $862,585 in estimated cost over April, 1911. Notwithstanding this increase, we are still $2,315,325 below the total estimated cost shown for the first four months of last year.

Builders, as a rule, take an optimistic view of the situation and express the belief that as soon as seasonable weather conditions prevail a more active building movement will result. Several very fair projects are under negotiation and prospects are bright for further hotel and general building work.

Horace Trumbauer, architect, is taking estimates on plans for a 12-story hotel building to be erected at the northeast corner of Thirteenth and Chestnut streets, on a site now occupied by the Boothby Hotel Co. Plans call for a steel, brick and terra cotta building, about 85 x 145 ft. on the ground plan, and is estimated to cost in the neighborhood of $1,000,000. The same architect has completed plans and received bids for a Ritz-Carlton Hotel in Atlantic City, N. J. This is to contain 600 rooms, will be 22 stories in height and measure 150 x 250 ft. on the ground plan. The building will be lighted by electricity and heated by steam. It will be of brick, steel and concrete construction, thoroughly fireproof.

Thomas, Churchman & Molitor, architects, have, it is stated, been commissioned to prepare plans for a new church building for the Protestant Episcopal Church of the Mediator, at Fifty-eighth and Spruce streets. The building will probably be of brick and stone, and measure approximately 72 x 124 ft.

William Howes is reported to have purchased a plot of ground, 265 x 214 ft., at Forty-seventh and Chestnut streets, which will be improved by a building operation, particulars regarding which are not available.

William R. Dougherty has been taking estimates for the erection of a 1-story and basement church building to be built in Camden, N. J., for St. Joseph's Polish Roman Catholic Parish. Plans are by George I. Lovath. The building is to be Romanesque in style, with a tower and lantern, and measure about 85 x 151 ft.

Considerable building operation work in 2-story dwelling houses has recently been started. Frank B. Thompson has broken ground for thirty 2-story stone and brick dwellings, 16 x 54 ft. at Gerhard street and Ridge avenue. The Quaker City Realty Company has begun work on seventy 2-story houses to be erected in the vicinity of Fifty-eighth and Washington avenue, at a cost of about $191,000. John Loughran is building twenty-three 2-story dwelling houses, 16 x 50 ft., in the vicinity of Fifth and Rockland streets. Benjamin Isenberg is reported to have begun operations on fourteen 2-story houses on Benner street, east of Vandyke street.

The Master Builders' Exchange held its annual "outing" and planked shad dinner at Washington Park-on-the-Delaware on May 9. Special trolley cars conveyed about 150 members and guests to the park, where, after engaging in various athletic sports, an old-fashioned shad dinner was served. Thomas F. Armstrong, acting as toastmaster, made a brief address and presented Edmund Webster, the oldest member of the Exchange, with a 10-pound shad. Joseph Culvertson also made a brief address, as did other speakers. The committee having charge of the affair consisted of John R. Livezey, chairman; W. A. Kramer, George F. Pawlings, B. K. Nusbaum and Edward E. Hollenback.

Portland, Ore.

The scale of local building operations is steadily increasing, and if the present activity continues the present year will surpass all former records. Permits were let last month for buildings of an aggregate value of $2,419,936, which, with the exception of August and December, 1910, is the highest valuation in the last three years. Compared with this, the record for the previous month was $1,750,414, and that for April, 1911, was $1,811,640.

The higher valuations of former months have always been due to special activity in large buildings, but the present activity is almost entirely on buildings of a smaller nature, mainly residences, with a fair number of small brick and concrete business buildings. The largest contract recently let was for the 10-story reinforced concrete office building of the Multnomah Securities Co., which was awarded to the Leonard Construction Co., having been designed by one of this company's engineers. Plans have been drawn for several good-sized business blocks, besides some important public buildings, but the letting of contracts is delayed. If a fair proportion of the work contemplated comes out during the summer last month's record will doubtless be repeated.

The Board of Education has decided to erect a new fireproof school building on Portland Heights at a cost of about $60,000.

The Southern Pacific Railroad has received bids for the construction of a large freight shed on the East Side, which, including grading and track work, will cost over $120,000.

Many important jobs are coming out in nearby towns. C. S. Voorheis has taken the general contract for the superstructure of the U. S. National Bank Building, Vancouver, Wash., at $42,000, not including heating, plumbing and wiring, and W. F. Tobey, this city, is preparing plans for the First National Bank Building, of Albany, Ore., a Class A, stone-faced, 5-story structure, to cost about $75,000.

Sacramento, Cal.

The local building trades are normally active, neither conditions nor values showing any appreciable change from March to April, and while last month's record is a little below that of a year ago, the difference is too small to be noticed. The total valuation of permits issued in April was $210,685, compared with $210,834 for the previous month, and $223,499 for the same month last year. The buildings now going up, however, are of a better class than was usual in the past, and most of the business structures are of permanent materials. Small business and office buildings are fairly numerous, and a few apartment houses are appearing.

One of the principal contracts for the steel and concrete structure of B. Frommer, at Eleventh and K streets, was let to Murcell & Haley at $63,740. Bids are in on the Mohr & Yoerk Building, on Eleventh street, to cost $80,000, and plans are about ready for the $85,000 Lauppe Building, Seadler & Hoen being architects for both structures.

Architect E. C. Hemmings is preparing plans for the $160,000 Y. M. C. A. building and for a $16,000 alteration job on the Third street commercial hotel. His plans for the Pacific Gas and Electric building, to cost $90,000, have been approved, and bids will soon be called for.

The Southern Pacific Railroad is preparing to spend about $500,000 on a new passenger station here.

Architect Glen Allen, San Francisco, is preparing plans for a 5-story brick and steel addition to the Clark Hotel at Stockton, Cal., to cost about $100,000.

San Diego, Cal.

Local building activities have received a great impetus in the last few weeks, and the official record of work started in April, $1,062,631, is one of the largest for any month in the history of the city. The valuation of permits for March was $537,960, while that for April, 1911, was only $398,690. It is hardly expected that this record will be repeated immediately, though a busy summer is assured, owing to the active preparations for the Exposition in 1915, as well as to many private enterprises now in the hands of architects. One of the principal contracts recently let was for the 6-story reinforced concrete building of Mrs. A. Bridges, Bristow & Lyman, architects. The general construction job was let to the William Simpson Construction Co. for about $100,000, the Hazard-Gould Hardware Co. getting the steel contract.

Another large contract is that for the general construction of the new Polytechnic High School, placed with John Campbell at $165,000. The Brown & DeCew Construction Co. has the contract for the Bay City Brewing Co.'s building at Middletown, near here, for $73,000. One of the important buildings for which a permit was taken out last month was the new county jail, a $120,000 building of steel and concrete.

What was probably the largest gathering of contractors, sub-contractors and dealers in building materials ever assembled at one time in this city was the meeting and banquet of the Builders' Exchange held in its quarters in the Pythian Building last month. The object of the meeting was to promote good fellowship, stimulate interest among those engaged in the building business and introduce to the attention of members a plan of conducting a builders' organization modeled somewhat after that of the Denver Master Builders' Association.

The principal speaker of the evening was James B. Jackson, president of the Denver Association, and he gave a very clear and comprehensive explanation of the Denver plan. The feature of this plan is that the organization backs its members in a contract where a bond is required by signing the contract as a co-partner with the builder. In this way the organization guarantees that the contract will be carried out according to specifications and takes the place of a bond. In return for this the contractor pays ½ of 1 per cent. of the contract price to the Exchange, this being the amount he would be required to pay the bonding company for a bond. While it costs the contractor no more, it helps place the organization on a stronger financial standing. The plan also provides that each member shall give to the treasurer his promisory note for $1,000 bearing no interest. It is termed a "surety note," to be held by the association until extinguished by the payment of ½ of 1 per cent. on the amount of business done.

Mr. Jackson stated that the plan has worked with entire success in the city of Denver, has met with the approval of the architects there and in every instance the owner has preferred the co-partnership signature of the Association to a bond. It is stated that during the three years the plan has been in use the Denver Association has accumulated $22,000 to its credit, and in only one instance has the organization been required to make good a loss, and this amounted to only $3,000.

Among those present were several architects, to whom a personal invitation had been extended, it being the desire of the Association to work in harmony with men of that profession.

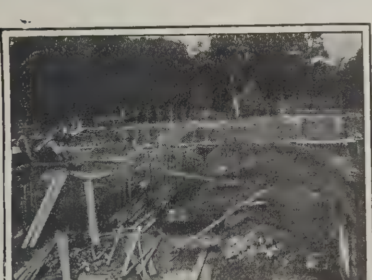
At the banquet E. L. Rambo, president of the local Builders' Exchange, was master of ceremonies, and he called upon several members and others to make remarks. The occasion was one of great interest, and those present seemed to feel that much had been accomplished in still further cementing the interests of architects and builders.

San Francisco, Cal.

Although no actual building has been started on the site of the Panama-Pacific Exposition, the San Francisco building trades have more work in hand at present than at any time in the history of the city, with the exception of a year or two after the fire of 1906. Confidence brought about by the Exposition and other civic enterprises is doubtless partly responsible for the present activity, but the majority of the work is being undertaken in view of actual needs.

The real condition is hardly shown in the record of building permits, which for April was $1,916,659, compared with $2,593,780 for March and $1,882,158 for April, 1911. These figures are encouraging, but the month has been unusual in the letting of large contracts, which reached a total of $3,435,344, the highest total on record for April except in 1907, when the total was $6,556,007. Contracts were let amounting to $1,891,688 for work on brick and concrete structures, the amount for frame buildings being $1,388,872, with $154,774 for alterations.

The activity is partly due to the recent decision of the Supervisors that all temporary wooden buildings within the fire limits, erected without permits after the great fire, must be removed at once. Funds have been appropriated for the Board of Public Works to tear down such shacks as are not removed by the owners, and the work is progressing rapidly. The extension of time allowed on these buildings expired a year ago, but at that time no active steps were taken for their removal, and last month there were 574 of them still standing, many of them occupied.



Following the recent organization of the California Building Contractors' Association at Sacramento, a movement has been started in this city to form a central body of all the local sub-contractors doing specialized work in the building lines. Most of the trades now have their own associations, but the need is felt of a more powerful body in which all lines are represented, as distinct from the association of general contractors. In the preliminary work Frank J. Klimm is representing the plumbers, Jesse Steer the plasterers and W. S. Hanbridge the electrical contractors, W. S. Scott being temporary secretary.

The standing of the sub-contractor, as opposed to the general contractor, is a matter of animated discussion at present in San Francisco on both public and private work. The proposal of the present city administration to do its work by general contract has been keenly contested by the special contractors, who are apparently trying to eliminate, as far as possible, the "middleman" or general contractor. The plumbing trade some time ago adopted a rule to take contracts from the owners only, and while this rule has not been strictly followed, the tendency is in that direction, segregated contracts having been let lately on a number of private buildings. A leading cause of the trouble is the number of irresponsible general contractors who have operated here in late years and the tendency of large contractors to let sub-contracts to outside firms.

The most marked change in the price of building materials is a further advance in lumber, and as dealers say that their business has not been profitable for some time, while the demand is now quite active, still higher prices are expected. Brick, lime and cement are fairly strong at former prices, while reinforcing bars are a little higher. Structural steel is still subject to close competition. Considerable stone and marble work is coming out, but price-cutting on marble jobs is the rule. Alaska marble is gaining a strong foothold in this market.

The consulting architects in charge of the competition for plans for the new city hall announce that all designs must reach the jury of award by noon of June 15, judgment to be rendered by July 1. The best plan will bring a prize of $25,000 cash, with the job of supervising architect under the terms of the American Institute, carrying a minimum compensation of $21,975. A prize of $1,000 each will be presented for the 20 next best plans. The jury will consist of the Mayor, a member of the Board of Public Works, a member of the buildings committee of the Supervisors, the three consulting architects and an outside architect to be named by the competitors.

Sub-contracts were recorded April 8 for the Hale department store, as follows: Plastering, Lyden & Bichel, $27,500; carpentry, L. & E. Emanuel, $13,700; sheet metal work, S. F. Cornice Co., $10,530; electrical work, Pacific Fire Extinguisher Co., $7,250; ornamental iron, Sartorius Co., $17,528; maple floors, Pacific Floor Sanding Co., $18,300; glazing, W. P. Fuller & Co., $14,000.

Among the other notable contracts let recently are the following: For Crocker Estate Building, L. P. Hobart, architect, steel, concrete and brick contracts amounting to about $100,000; the Hotel Metcalf, 7-story concrete, Righetti & Headman architects, general contract awarded to Mutual Construction Co. at $141,350; Hind estate building, 5-story concrete, Frye & Schastey architects, Braunton Bros. contractors, $60,000; Pickering apartment house, 5-story, Class C, on Bush street, near Jones, C. H. Barrett architect, J. O. Kuykendall contractor, $120,000; Green apartment house, at Sacramento and Powell streets, Houghton Sawyer architect, Stockholm & Allyn general contractors, $59,168, the fireplace and chimney work going to Brandon & Lawson at $6,600.

Among the principal buildings on which figures will be taken this month are the following: A 6-story Class A hotel for the Holbrook estate on Sutter street, near Sansome, MacDonald & Applegarth architects, to cost $100,000; a large Class A Catholic church at Tenth and Howard streets, of Class A construction faced with Bedford stone, in Romanesque style, to cost about $100,000, John J. Foley, architect; a 3-story Class A concrete building on First street for the Regents of the University of California, Bakewell & Brown architects, bids to be opened May 18; a 7-story concrete apartment house for the Condon estate, to cost about $100,000, J. E. Krafft & Sons architects; a 7-story Class C hotel on Mission street for the Voorman Co., to cost $100,000, W. J. Miller architect, and a 7-story annex to the Argonaut Hotel, to cost over $100,000, William Curlett & Son architects.

Two fine residences are to be built soon at the suburb of Hillsboro. One is for Mrs. F. J. Carolan, plans by Willis Polk, and the other for Joseph D. Grant. The latter, plans for which are being drawn by Lewis P. Hobart, will be of reinforced concrete in classic style, and will cost, complete, about $250,000.

Ward & Blohme, architects, are taking figures on a residence for Miss Annie Parker at Vallejo and Broderick streets, to cost about $26,000. It will have cement plastered exterior, tiled loggia, stone walks, tile roof, hardwood and enamel interior finish.

St. Louis, Mo.

In the report of building operations issued by Commissioner J. N. McKelvey for the month of April, it is shown that permits were issued for new construction work, alterations and repairs, valued at $2,416,240, while in April last year the total value of the permits issued was $1,724,620. This satisfactory gain over a year ago follows a decline of 54 per cent. in March of this year as compared with March, 1911. This heavy decline is claimed by builders to have been due in large part to the very inclement weather that month, which discouraged all building projects.

A feature of the showing by Commissioner McKelvey is the number of brick dwellings planned, there having been 138 brick residences, costing less than $20,000 each, involving an aggregated outlay of $389,546, and 129 brick tenements involving an estimated outlay of $702,120. There were 49 stables and garages costing $36,726, also a $80,000 hospital and 34 store buildings costing $392,100. There were 49 stables and garages costing $36,726, also an $80,000 conservatory costing $96,000, 2 churches involving a similar amount and 9 theaters and other places of amusement costing $50,800.

Seattle, Wash.

Although there was a slight falling off in the planning of frame construction work during the month of April, the filing of permits for two fireproof buildings estimated to cost $650,000 caused the report of Superintendent R. H. Ober, of the Department of Buildings, to show an appreciable gain in the estimated cost of the buildings for which permits were issued as compared with April a year ago. The figures show 930 permits to have been issued last month, calling for an outlay of $1,235,230, while in April last year 1,160 permits were issued for building improvements costing $902,000.

Of the above totals for last month 192 permits were for detached residences costing $279,145, as against 271 permits for detached residences costing $350,565 in April, 1911. Only half the amount of alteration and repair work was done last month that was done in April a year ago, the figures being $117,885 and $268,810 respectively.

For the first four months of the current year the department issued 3381 permits for new buildings, alterations and repairs estimated to cost $3,332,965, while in the corresponding months of 1911 there were 3963 permits issued for building work costing $2,636,890.

The Association of Western Portland Cement Manufacturers will soon be incorporated under the special state laws of Washington for non-profit sharing organizations. The purpose of the organization is to standardize, promote and further the use of concrete. John C. Eden, president of the Superior Portland Cement Co. of Seattle, has been chosen president of the new association. The secretary and manager is P. W. Rochester, for the past two years manager of sales and traffic for the Washington Portland Cement Company, who will soon remove to San Francisco, where his offices will be established.

Spokane, Wash.

At a recent special meeting of the members of the Builders' Exchange resolutions were adopted that every member post the "open shop" sign in his place of business. The contractors desire it understood that this is not in any sense a movement against the unions, for union men can remain on the job if they want to and do the work expected of them, but the employers will reserve the right to employ non-union men on the same job and at the same price and of keeping them at work so long as they give satisfaction.

The belief is expressed in the resolutions that the "open shop" principle is American and stands for the employment of the workman solely on the basis of ability and without regard to membership in any organization. The movement is not one for the reduction of wages, but gives equal opportunity for all who desire to work.

Toledo, Ohio

The building season is showing a most gratifying degree of activity, and new work is being planned upon a scale which is almost double that of a year ago at this time. The permits granted by the Bureau of Building Inspection during April numbered 285 and covered 350 improvements valued at $585,450, while in April last year 212 permits were issued for work valued at $267,473.

When the figures for the first four months of the current year are considered it is found that these are appreciably ahead of the corresponding period of 1911, the records standing $1,427,013 and $1,083,309 respectively.

Washington, D. C.

The Master Builders' Association of the District of Columbia, incorporated, held its tenth annual meeting May 7 in its headquarters in the Builders Exchange Building, when officers for the ensuing year were elected as follows:

President.....................Thomas H. Melton.
Vice-President....................W. E. Mooney.
Treasurer..................William H. McCray.
Secretary........................George Hough

It is interesting in this connection to state that Mr. Hough has served as secretary since the Association was formed in 1902, and his election at the recent meeting was unanimous.

In his annual report John C. Yost, the retiring president, predicted a satisfactory outlook for the year 1912, and stated that the absence of friction between employers and employed had made the past year one of the most successful in the history of the organization.

Builders' Appliances and Equipment

Some Things of Seasonable Interest to Those Having To Do with the Building Business

Niagara Junior Wall Plug

The attention of architects, contractors and builders is being directed by the Niagara Falls Metal Stamping Works, Niagara Falls, N. Y., to the galvanized wall plug which they have just placed upon the market and are offering under the name Niagara Junior. It is made after the same fashion and of the same material as the company's regular plug. It has been brought out to meet competition in price of inferior plugs, but the makers state the quality of the Niagara Junior has in no way been sacrificed. The new plug measures 2⅜ x 2¼ in., and the company will mail a sample to any architect, builder or contractor who may be sufficiently interested to make application for it. The plug is intended to be built into walls of brick, stone and concrete, and can be placed exactly where wanted. The claim is made that it takes a nail to perfection and holds it with unyielding grip. Being galvanized it will last as long as the building. By its use furring or lathing strips, wall strips, shelf brackets, base boards, window and door frames and casings, as well as any other attachments to walls, can be fastened and anchored with great convenience and security. A general view of the plug is shown in Fig. 1.

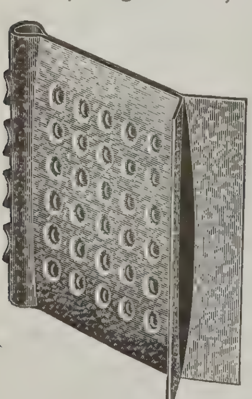


Fig. 1—Niagara Junior Wall Plug

Sheet Metal Columns for Lighting Systems

A typical instance of the growing civic pride of modern American communities is the attention which cities, towns and villages are giving to the methods of lighting their streets. People in general are taking a deeper interest in the appearance of the communities, and in line with this forward movement is the securing of a lighting system which will not only illuminate but will improve the appearance of the streets and harmonize with and enhance the architectural surroundings both by day and by night. One of the means which has been adopted for this purpose is the column or lamp post that can be made at a low cost of sheet metal and which can now be obtained in many varieties of artistic design and surmounted by gas or electric lights. These columns are made by the Union Metal Mfg. Company, Canton, Ohio, and in order to secure greater durability than is possible with ordinary sheet metal the columns are made of either copper or Toncan metal, a rust-resisting, anti-corrosive metal that will stand up under the exposure to which columns for outdoor lighting systems are exposed.

The Standard Whale Bone Wall Tie

A wall tie which is especially adapted for solid brick or veneer construction is the Whale Bone illustrated in Fig. 2 of the engravings and made by the Allegheny Steel Band Company, 888 Progress Street, North Side, Pittsburgh, Pa. This wall tie is made of galvanized steel, is 7 in. in length and the teeth are even and smooth edged so as to hold securely when bedded in the mortar. The tie here shown is known as the Standard Whale Bone

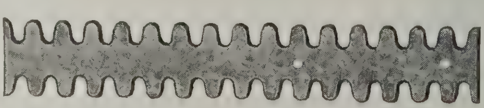


Fig. 2—The Standard Whale Bone Wall Tie

wall tie, while the Veneer tie differs slightly in length and shape from it. A portion of one end of the tie is without the corrugations or teeth, but is punched with two holes for securing it to the framework of the building which is being brick veneered. The Standard, as will be seen from an inspection of the engraving, also has two holes punched in one end of it so that it can be used in brick veneer construction as well as in solid work when so desired. The tie has given very general satisfaction in use and the demand is constantly increasing. A little pamphlet which the company has issued sets forth the merits of this and other specialties made by the company.

The Door Beautiful

It is generally conceded by architects, builders and houseowners that much of the artistic effect of the interior finish of the various rooms of a building is due to the style and quality of the doors that are used. In fact, the door is such a prominent detail of the building that the architect and owner can well afford to give serious consideration to the selection of it. In many cases the artistic effect of an otherwise attractive interior may be ruined because the doors do not harmonize with the architectural *motif*. It is doubtless due to these reasons among others that hardwood veneered doors have been constantly growing in popularity and it is not alone in the elaborate and expensive mansion that they are to be found, but also in the dwelling of more moderate cost, where rich and tasteful results are sought with a reasonable expenditure of money. Some very valuable hints and suggestions regarding the interior finish of rooms and the style of doors in keeping therewith are contained in a *brochure* which has been issued under the title at the head of this article by the Morgan Company, Oshkosh, Wis. The numerous designs which are presented within its covers are aimed to show the kind of door suited for different interiors, although the point is made that other styles of Morgan doors would be equally as effective as those illustrated. The designs presented are those most universally used and the architect and the builder cannot fail to derive excellent suggestions from a study of the interiors which are offered for inspection. As affording a contribution to the subject we present in the accompanying half-tone engravings two interiors in which different styles of Morgan doors are used. The upper picture Fig. 3, represents a three-panel Craftsman door in ash, although the same style is manufactured in different woods. The lower picture Fig. 4, shows a glass door between a living room and dining room.

Fig. 3—An Interior Showing a Morgan Door of the Craftsman Type

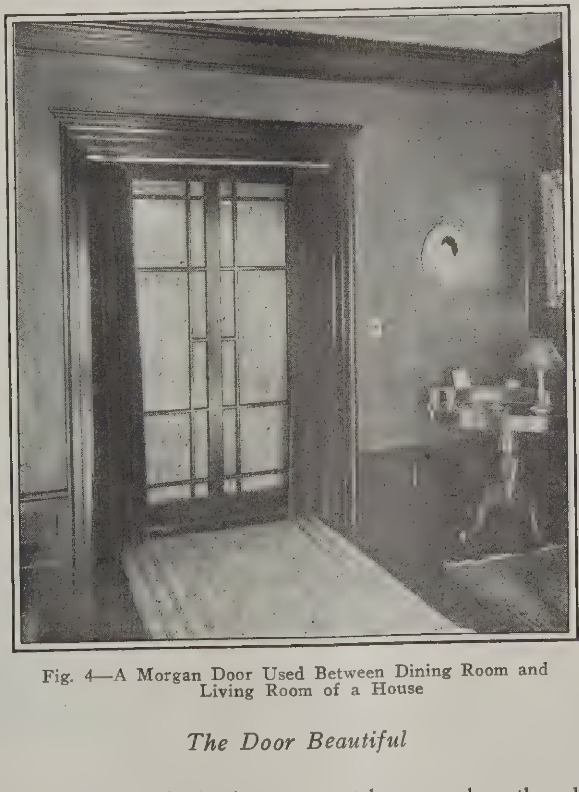


Fig. 4—A Morgan Door Used Between Dining Room and Living Room of a House

The Door Beautiful

One of the features on which the superior claims of these doors is based is that every piece of wood going into the door is absolutely dry. After having once been dried the wood is kept in rooms heated to a high temperature so that no moisture can re-enter the pores. After a thorough preparation in this manner the cores or foundations are built up with narrow strips of pine with edges of hardwood glued together under powerful hydraulic pressure and then the cores are planed to an even thickness. The face or surface veneers are applied and again subjected to tremendous hydraulic pressure for many hours. The grain of the core or centerpiece is always placed at right angles to the grain of the veneer, which is claimed to increase the strength and render swelling, shrinking or checking impossible.

One of the points which the builder should constantly keep in mind when hanging hardwood doors is that the door should not be hung in a damp, freshly plastered building. Mortar, as is well known, contains large quantities of water, and until the moisture has dried out of the walls the house is neither fit for occupancy nor is it in the proper condition to receive hardwood doors or other fine interior woodwork, which is quickly affected by climatic conditions. After the door is hung and no more fitting is required in connection with it the ends of the stiles both top and bottom should be covered with at least one coat of good paint which will tend to prevent moisture from entering the "end pores" of the wood. High-grade fillers, stains, varnishes and wax should be used, for with high-grade doors the best results in the way of beauty of finish and satisfaction in wear can be accomplished through the use of high-grade finishing materials. The increased cost of these above ordinary doors is so slight that it is economy in the long run to use them.

Why Some Abrasives Burn The Tools

In spite of the fact that it has remained unchanged since its first use during the Stone Age, the majority of carpenters are still making use of grindstones. In every shop will be found the same sort of stones that our ancestors utilized in keeping their weapons sharp. No doubt there is good reason for sticking to the old grindstones. Most tool users have on their scrap piles a discarded emery grinder that they have had to throw away because it spoiled more tools than it was worth. It left a rough cutting edge and unless they were extremely careful to dip the tools into water every few seconds the temper would be destroyed. Great improvements have been made within the last few years in every line. Abrasives have been improved along with the development of the wireless telegraph, the flying machine and the automobile. There is now on the market at least one abrasive that will cut much faster than the grindstone, but will still leave a smooth cutting edge, without danger of drawing the temper. It is known as Dimo-Grit, put out on all the machines of the Luther Grinder Mfg. Company, 517 Michigan street, Milwaukee, Wis. Anyone who has used emery knows that after a short time the wheel becomes old and shiny-glazes over. This glazing is what hurts the tools. The little particles in the wheel have become dulled and they no longer cut as they did when new. In order to get results the tool must be pressed on the wheel. This causes friction, which produces the heat to burn the tool and draw the temper from the finest steel. Dimo-Grit, however, is so hard and sharp that it cuts the steel, and on account of the cutting edges of the minute crystals of which the wheel is made being so hard they do not become dull or glaze over. Each crystal retains its sharp cutting edge an indefinite length of time. This means that the minute shavings of steel are cut away with a minimum amount of friction, with no possibility of drawing the temper. Again, instead of cutting the steel away in furrows, it takes it away in minute shavings, which leaves a smooth, mirror-like bevel that can only be improved upon by using a fine hone or oil stone. The manufacturers are so certain of what Dimo-Grit will do that they are sending out their machines on free trial, asking no money until everything has been proved as represented to the perfect satisfaction of the user.

"Justrite" Galvanized Roofing

Now that the building season is in full swing builders and contractors are more than ordinarily interested in the question of roofing, and among the candidates for popular favor is the "Justrite" Galvanized Roofing which is manu-

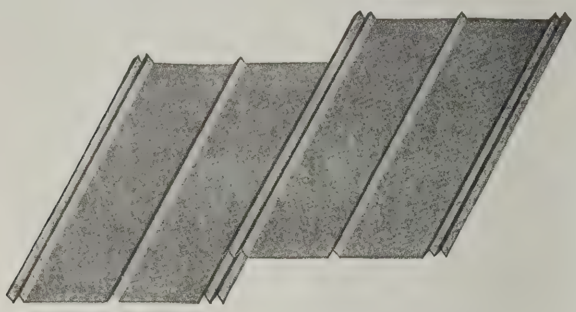


Fig. 5—The "Justrite" Galvanized Roofing

factured by the Moeschl-Edwards Corrugating Company, Inc., Covington, Ky., and the merits of which are set forth in a circular which the company has issued. This galvanized roofing is made in lengths of 5 to 12 ft. inclusive with a covering width of 24 in. The peculiar feature of the roofing is found in the two V's at the side edges of each sheet, these overlapping similar V's of the adjoining sheet when the roofing is laid, all as shown in Fig. 5 of the engravings. The object or purpose of the two V's at the edges is so that the second V may act as a water guard. The point is made that if water should pass or be driven by high winds over the first or outside V, as is often the case in common V-crimp, it would be impossible for it to pass the second V. "Justrite" roofing is applied without the use of wooden strips, the nails being driven through the top of the first or outside V. The claim is made that the V's are sufficiently rigid to permit this to be done without mashing them down. In the center of each sheet running up and down is a single V which adds to the rigidity of the sheet and at the same time affords a place for additional nailing, thus tending to overcome all rattling. The roofing is referred to as being easily applied and that anyone who can drive a nail can put on the roofing, as no special tools are necessary. It is adapted to roofs of both high and low pitch and the claim is made that buildings covered with sheet metal have never been known to have been struck by lightning. The roofing is said to be absolutely water-tight, requires no painting and no repairing, is moderate in price, and much more rigid than common V-crimp roofing. The sheathing boards may be placed further apart, thus decreasing the cost of the frame work and reducing fire risk. With "Justrite" roofing the company recommends the use of its "Never-Rust" galvanized nails.

Consolidation of Concrete Machinery Manufacturers

What is regarded as one of the most important consolidations in the history of the concrete machinery business is the merging of the Miracle Pressed Stone Company, Minneapolis, Minn., with the Northwestern Steel & Iron Works of Eau Claire, Wis., for the manufacture of concrete machinery and tools. Both concerns are well known, enjoying a high reputation among concrete workers and contractors both for the quality of their products and the excellent service they render. The Northwestern line has been established for the past ten years and its concrete-making machinery and tools are used all over the world where concrete work is the form of construction. It meets the demand for medium-priced machinery and its line embraces practically every kind of machine, tool or mold necessary for successful results in connection with concrete work.

The Miracle line, consisting of concrete machines of single and double staggered air-space, two-piece wall block machines, brick machines, mixers, tile molds, ornamental molds and molds for cornices, chimneys, piers, burial vaults, etc., is among the oldest lines with which the trade is familiar, and is thoroughly known to contractors and concrete workers throughout the country.

The consolidation of these two concerns means much to the trade and to all interested in concrete work. It enlarges the scope of the company to the extent of doubling its entire output, thereby greatly reducing manufacturing costs to contractors. The Minneapolis plant will be abandoned and all machinery, stock, etc., will be moved to Eau Claire, where the manufacturing will be done in the immense plant of the Northwestern Steel & Iron Works. This latter step was taken because of adequate facilities, added conveniences and the greater space afforded at the Eau Claire plant.

Socket Firmer Chisels

The James Swan Company, Seymour, Conn., with New York office at 108 Lafayette Street, under the management of Charles C. Haselton, for many years with the Russell & Erwin Mfg. Company, is manufacturing a line of bevel edge and plain socket firmer chisels in a between size, the blades of which are but 4½ to 5 in. long. This makes available a chisel midway between those of standard length, originally made, and the short, popular butt chisel, thus enabling the mechanic to choose from three lengths in socket firmers and in all widths. The intermediate line, like the others, has a range of width of from ⅛ to 2 in. inclusive.

New American Band Saw

A new 36-in. band saw embodying a number of features of interest to carpenter-contractors, builders and others operating wood-working shops has just been placed upon the market by the American Wood-Working Machinery Company, 591 Lyell Avenue, Rochester, N. Y. The upper wheel is fitted with a wire guard, while the lower one is protected by double doors which can be readily opened when access to the wheel is necessary, the entire arrangement being such as to eliminate the possibility of danger to the operator. Both wheels are provided with ball bearings of the most approved type, thus insuring an easy running saw—a very essential factor in a tool of this kind. Micrometer adjustment to the table with accurately graduated scale insures the proper tilt in either direction—45

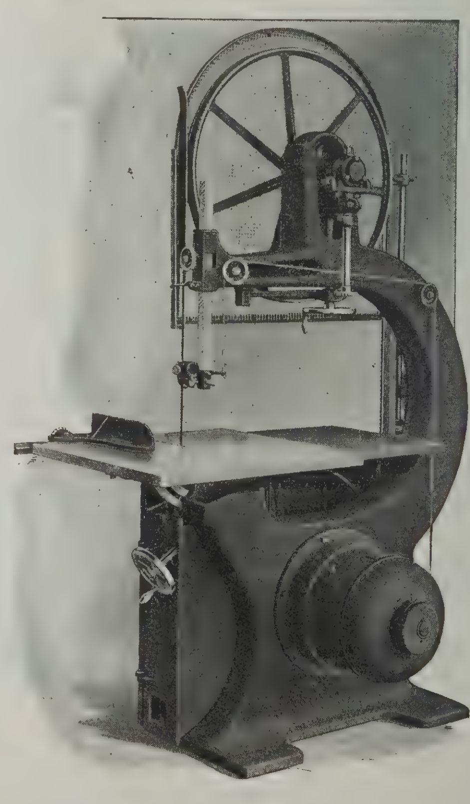


Fig. 6—The New American Band Saw

degrees to the right or 50 degrees to the left. The patent weighing strain to the upper wheel with indicator for adjusting the weight to different widths of blades relieves the operator from guesswork in adjusting and the saw blades from cracking or breaking. In Fig. 6 we present a general view of the new American band saw having direct connected motor with rheostat mounted on the machine. It is an arrangement which provides a very efficient means of driving a band saw. No belts are required, there is no lost motion and very little power is necessary in comparison with other forms. Those who are interested in this machine and desire additional details can secure a photograph and full description by communicating with the company.

An Aluminum Saw Guard

Something new and rather novel in the way of a saw guard made of aluminum has just been placed upon the market by the J. A. Fay & Egan Company, 221 to 241 West

Fig. 7—An Aluminum Saw Guard

Front Street, Cincinnati, Ohio, and the manner in which the guard is used is illustrated in Fig. 7 of the accompanying cuts. Although the device has been upon the market only a few weeks it has met with constantly increasing popularity and a large number of them are now in use, thus demonstrating its efficiency as a safety device for circular saws. The hood being made of aluminum is very light and does not interfere with the operation of the saw nor does it mar the work in any way. Another point to which attention is called is that the guard will not damage the saw blade should the hood by any accident be forced against it. The guard is mounted on a steel standard set in a plate which is countersunk into the table. The standard is easily removed while the hood is quickly set for various thicknesses of stock or can be thrown back when not required. The guard affords protection not only to the operator but to the manufacturers as well. The laws of practically every State now make it obligatory to use saw guards, and where none are provided there is no defense against an action for damages for injuries sustained by the operator.

The Parkhill Pitch Gauge

A device which is intended to materially assist the carpenter in quickly obtaining any bevels or pitches required in roof framing is the new Parkhill pitch gauge illustrated herewith and which has been placed upon the market by John Parkhill, 624 West College Street, Rochester, Minn. The device consists of two parts—a special graduated gauge and a small clamp, both adapted to be adjustably fastened on either arm of any carpenter's steel square, and

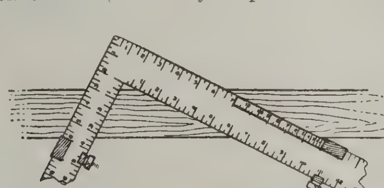


Fig. 8—The Parkhill Pitch Gauge

each having a dependent bearing which in use bears against the edge of the timber to be marked. In Fig. 8 the gauge and clamp are shown fastened on a steel square in proper position to mark a common rafter for a pitch of 6-in. rise to 1-ft. run. The gauge is universal, marks any pitch and is so simple that anyone, it is claimed, can make use of it, even though he understands little about roof framing. The gauge and clamp are of steel, nickel plated. The manufacturer points out that for marking bevels on braces or wide boards or for use as a stair gauge this device will be found rapid and satisfactory, as each clamp need be set only once to get its bearing exactly at the desired mark. The manufacturer also announces that a complete gauge set with directions will be sent prepaid to any one in the United States on receipt of the price, with the privilege of returning it any time within 30 days if for any reason it proves unsatisfactory, and the money will be refunded. Circulars which the manufacturer has issued set forth the merits of this pitch gauge for roof framing and also give examples showing how it may be quickly used in obtaining different cuts and bevels.

Standard Portable Combination Woodworker

The portable combination wood-worker is a machine which is rapidly growing in popularity with carpenter-contractors, builders and others associated with the building business and one of the later candidates for popular favor in this line is the "Standard," illustrated in several views in Fig. 9 of the engravings. The upper left-hand picture represents the portable combination wood-worker with jig saw and disk sander attachments. The picture immediately below it represents the machine when used as a jointer and also fitted with an emery wheel. The upper right-hand picture is the machine used as a rip saw and with the side table raised flush with the main top, thus giving a working table surface 44 x 40½ in. The lower right-hand picture shows the machine with dado head and boring attachment. The "Standard" represents the results of years of work in the manufacture and perfecting of a practical combination machine and is designed for woodworkers in every line embracing builders, cabinet makers, contractors, carpenters, wagon builders, etc. It is offered as a portable machine to be used by the builder on the job, the motive power being a gasoline engine either water or air cooled. It may also be used as a stationary machine for the shop with a gas or gasoline engine or it can be operated by electric motor. The table top can be locked at any desired level, thus insuring perfect molding and dado work. The jointer table top is 15 x 40½ in. in size and is also used in connection with sander and boring attachments. It is adjustable to any desired hight. Nine

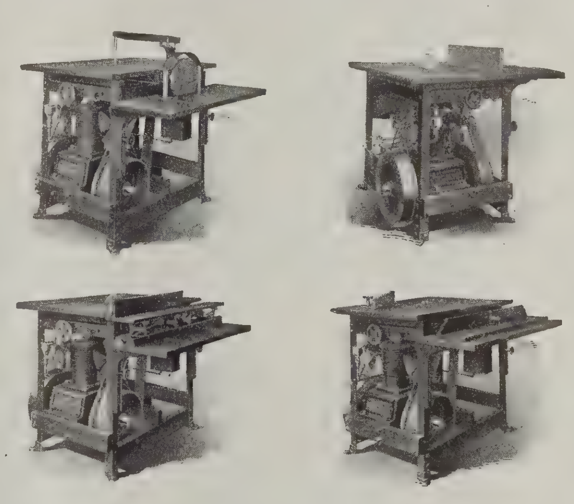


Fig. 9—Various Views of the Standard Portable Combination Wood Worker

distinct different kinds of work can be done on the machine, the latter being used as cut-off saw, rip saw, dado head, molder, jig saw, jointer, sander, boring machine and emery grinder, all operating on one shaft except the jig saw, which is driven by an eccentric belted from the mandrel. The Standard portable combination wood-worker is manufactured by the Atlantic Engine Company, Meadville, Pa., and the motive power is the company's latest type of air-cooled engine. All unnecessary working parts have been eliminated and the engine has been simplified in every possible way. There is only one adjustment, that being the governor, and this is regulated by a set screw. The claim is made that it is practically impossible for either a careless or inexperienced man to get the engine out of order.

The Fortieth Anniversary of the Orr & Lockett Hardware Company

A most interesting event in the history of the Orr & Lockett Hardware Company, Chicago, Ill., will be the celebration on May 27th of its fortieth anniversary. Keeping pace with the city of its birth this concern has grown from a very small beginning to the prominent position which it now occupies in the business world. Both Frank B. Orr and Oswald Lockett were experienced hardware men before they started this business. Mr. Orr received his training in Mansfield, Ohio, and Mr. Lockett had taken active part in both the wholesale and retail hardware business of Chicago and the West since 1863. To-day, when every detail about a building is given such careful consideration, it is hard to realize that at the time this company was organized practically no attention was being paid to the ornamental or artistic possibilities of builders' hardware, as even in some very costly buildings there would be a grotesque contrast between the expensive wood and marble used in their construction and the hardware. The influence of this aggressive firm, not bound by tradition or hampered by prejudice, was immediately felt. Designs in hardware which compelled attention from both the standpoint of artistic value as well as practical worth were submitted to the building fraternity.

Mr. Lockett's innovations, as shown in the following well-known Chicago buildings, mark distinct periods in the history of builders' hardware. Statuary bronze hardware was introduced when the Western Union Telegraph Building was erected in 1886. Cast iron made black and rustless by what is known as the Bower-Barff process was first used for builders' hardware on the Rookery Building in 1887. The lower floors of the Monadnock Block were furnished with the first aluminum hardware ever manufactured. Hardware made of solid German silver was first used on the Marquette Building, which is the most expensively furnished office building in the world.

The cooling room, refrigerator, restaurant and market work has been under the direct supervision of C. B. Orr. This department has to its credit such well-known installations as the Hotel La Salle, Sherman House, Blackstone Hotel, New University Club and hundreds of other large and small plants all over the country. Wherever the element of quality has received first consideration the Orr & Lockett equipment has invariably been installed.

Their Manual Training, Domestic Science and Arts and Crafts Departments are most comprehensive, and like the departments just named have a business that extends to all parts of the country. Supplies of all kinds and every imaginable tool and device used by the various building trades is always kept on hand. Some idea of the size of the stock this firm carries can be judged from the fact that it is comprised of over 100,000 different articles.

The company has made but four changes in its location in forty years, which in a rapidly growing city like Chicago is quite remarkable. They moved to their present location, 14-16 West Randolph Street, in 1893, and occupy the entire building, consisting of five floors and basement. The Orr & Lockett factory, where their refrigerators, cooling room and market fixtures and manual training outfits are manufactured, is located at Twenty-second and Jefferson Streets.

Korelock Door Designs

One of the handsomest catalogues of special interest to architects, builders, contractors and houseowners generally is that which has been issued under the above title by the Paine Lumber Company, Ltd., Oshkosh, Wis. It is a volume of 148 pages, profusely illustrated with admirably executed designs of Korelock veneered doors adapted to meet many requirements. It is a most interesting compilation on the subject of hardwood doors and serves admirably as a reference book owing to the fact that the doors have been grouped under sub-divisions which classify them architecturally so that any one interested for example in a colonial house can by referring to the index quickly locate the complete array of colonial designs. This applies to all sub-divisions. Another convenient feature of the book is the carrying forward of the index plan from page to page whereby any one considering, for example, the design of Door No. 380, on page 10, and desires information as to the size of the glass, the layout, standard sizes, designs trimmed, etc., he can readily locate the information from the index recorded on the same page that he is examining. Then again, if he be interested in sash doors and is considering design No. 381, on page 12, he will notice by the reference index on the same page that the sash door to match will be found on page 14. Such features are referred to by the company as original and at the same time convenient.

One page of the catalogue is devoted to tables of standard door sizes—something new and valuable, as it gives the architect, the builder or the contractor facts as to what is standard in door construction. There are suggestions for finishing, information regarding inlay work and other particulars which add to the interest and value of the work under consideration. The illustrations are direct reproductions from photographs of the finished designs and in addition to the designs of doors, pictures are presented of the forest from which the lumber supply of the company is drawn.

Special reference is made to the Paluco finish which is said to offer a perfect reproduction of the finest figured mahogany or quartered oak upon the surface of our native woods at a reasonable cost. The interior effects in those fancy and expensive woods are thus brought within the reach of the cottage builder. There are two full-page illustrations in colors, one showing an exact reproduction of a piece of birch treated by the Paluco process to imitate quarter sawed oak, while the other is an exact reproduction of a piece of oak treated by the same process to imitate figured mahogany.

The Jumper Disappearing Dumbwaiter

A feature of modern house equipment which seems to be rapidly growing in popularity is the disappearing dumbwaiter, which really constitutes a kitchen closet or refrigerator. A dumbwaiter of this nature which has recently been reconstructed and greatly improved is the Jumper, illustrated in Fig. 10 of the engravings, and made by J. G. Speidel, Reading, Pa. Unlike many other dumbwaiters, the Jumper is intended for use only between the cellar or basement and the first floor. It requires a clear hight between the cellar and the floor of the first story of 7 ft. The construction is such that all parts of the dumbwaiter are beneath the floor when not in use, while the top of it is flush with the kitchen floor or other room in connection with which the dumbwaiter may be used. The illustration shows the old way of utilizing the dumbwaiter and also the new way as represented by the Jumper. The car is made of hardwood enclosed on the back and sides, the front being made up of two cabinet doors covered by wire cloth which permits of a free circulation of air and at the same time keeps out the flies and other insects. The wire

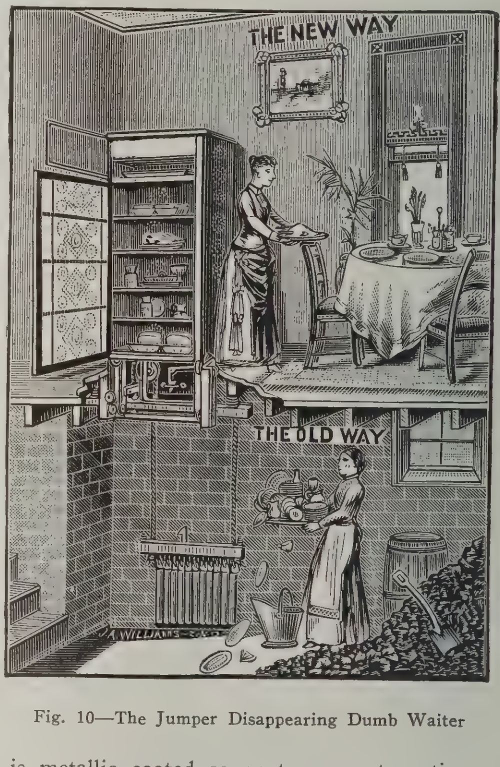


Fig. 10—The Jumper Disappearing Dumb Waiter

cloth is metallic coated so as to prevent rusting. The dumbwaiter has eight shelves, every alternate one being removable, thus giving a doubly wide space for large dishes, etc. In operation a small detachable rod is run through a hole in the floor releasing the catch holding the car down. The instant this catch is released the car comes up of its own accord, owing to the adjustable balance weights which are provided. When the dumbwaiter is no longer required in the kitchen or other room on the first floor it is only necessary to push it down, when the catch operates and holds it in position in the basement. The Jumper is sold complete ready to put in place, thus requiring the services of a carpenter for only a few hours to install it. The Jumper is made in two sizes, one having shelves 12 x 18 in. in area and the other 15 x 21 in. in area. The picture which we present so clearly indicates the general method of operation and construction that extended comment would seem to be unnecessary.

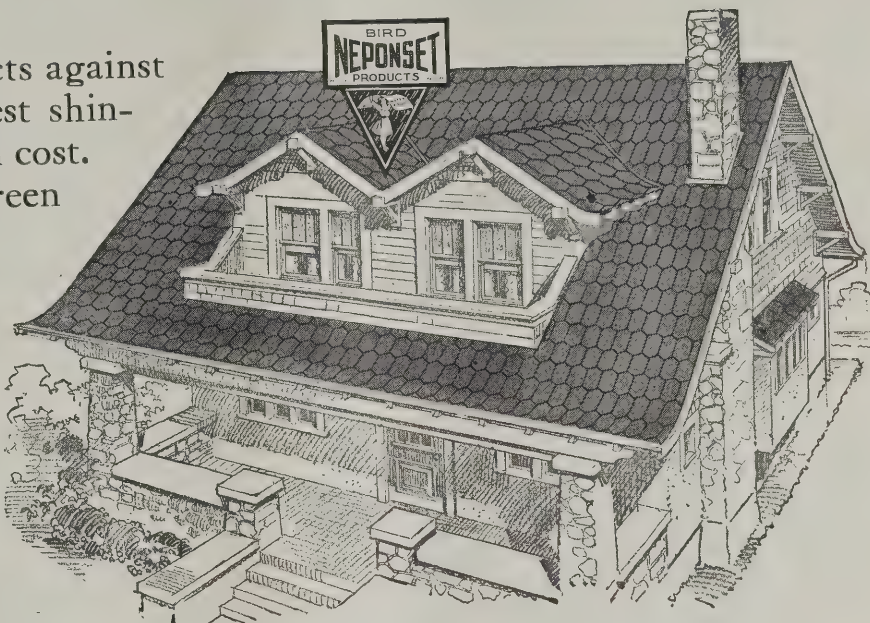
(For Trade Notes see second page followniq.)

NEPONSET PROSLATE ROOFING

Attractive. Protects against fire. Wears like best shingles. Moderate in cost. Made in red and green colors.

Easily laid in 18″ strips — special fasteners—not a single nail hole exposed to the weather.

Neponset Proslate is a money maker for carpenters and builders. Write us for the Neponset proposition.



Branch Offices:
New York
Washington, D. C.
Columbus, Ohio.

F. W. Bird & Son
East Walpole, Mass.

Established 1795.
Canadian Plant, Hamilton, Ontario.

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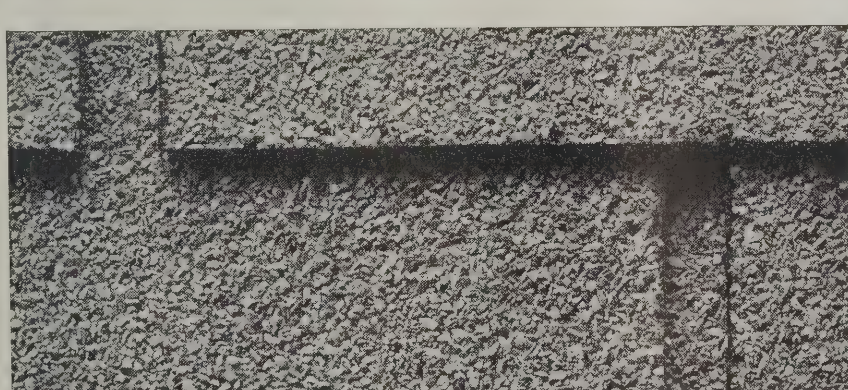


This Cut Shows the Surface of Flex-a-Tile Shingles—Beautiful—Convenient—Durable.

If we offered you a ten dollar gold piece you'd be foolish not to take it—don't you think?

All right—Here's dollars unlimited for the first man in your community who gets acquainted with—and pushes

FLEX-A-TILE Asphalt Shingles

It is the most remarkable roofing material you've ever seen. Makes a beautiful, brilliant, tile-like surface—easier to lay than wood shingles—several times as durable—and remarkably inexpensive.

It's a Winning Proposition for any Carpenter or Builder

Flex-A-Tile Asphalt Shingles have a chipped slate or granite surface, and this slate or granite is rolled into the asphalt under heavy pressure until it becomes an actual part of it. The natural colors of the slate and granite give the coloring to the shingles. Shades are deep red, greenish gray, silvery gray and brown. They are natural. Can't wear off or fade.

Flex-a-Tile comes in Rolls as well as in Shingle Form.

Write today for free sample. Be the first in your community to use this beautiful new roofing.

THE HEPPES COMPANY, 1011 Forty-Fifth Street, Chicago, Illinois

TRADE NOTES

In referring to the Peerless Screw Driver made by the H. H. Mayhew Company, Shelburne Falls, Mass., we learn that a wrong impression was created as to the ebony handle used with this important adjunct of the up-to-date carpenter's "kit" of tools. Special features of the screw driver are its *fluted* ebony handle, the nickeled steel ferrule and the steel blade which extends through the handle so as to permit of its being pounded without injury.

The architectural firm of Dodge & Morrison removed their offices on May 1 to 133 to 137 Front Street, corner of Pine Street, New York City. The new location affords the concern much better facilities for the conduct of their business than they had at their old quarters.

W. J. Gleason Company has been incorporated to do general contract work with headquarters at Duluth, Minn. The incorporators are W. J. Gleason, W. H. Small and J. J. Duggan.

The Holophane Company and the Fostoria Glass Specialty Company have been consolidated into one organization, to be known as the Nelite Works of the General Electric Company, with headquarters in Cleveland, Ohio. The factories will remain in Fostoria and Newark for the present.

The Chicago Millwork Supply Company has just taken possession of its new offices at 822 and 824 Heisen Building, Chicago, Ill. The company has in process a new catalogue which will show to good advantage its special lines of mill work supplies.

The Flintkote Mfg. Company and J. A. & W. Bird & Co., Boston, Mass., and with New York office at 66 Beaver Street, have secured George Price to represent them in the Metropolitan District on their line of building specialties, covering roofing, waterproof sheathings, waterproofing compounds, Rex wall board, cold water paints, Ripolin enamels, etc. Mr. Price was formerly with the Tide Water Building Company and later with D. C. Newman Collins and S. Fisher Miller, engineers.

The May issue of *Graphite* contains the usual quota of interesting matter and practical information relative to Dixon's Graphite productions. A valuable contribution to this issue is the concluding portion of an article by Elbert Hubbard on "Joseph Dixon—One of the World Makers." There are also given the results of the annual meeting of the Joseph Dixon Crucible Company in Jersey City, N. J., in April, together with many other matters which the user of Graphite will find interesting.

The Alabastine Company, Grand Rapids, Mich., desires that it should be clearly understood that its product, alabastine, is not a kalsomine and possesses none of its disadvantages. But, on the other hand, is a water color of smooth, velvety texture; sanitary, durable, artistic and economical and with an unlimited range of color combinations. Readers of *Building Age* interested in interior decoration will be supplied with a series of beautiful color plans and designs free if they mention this publication.

The Ventwell Store Front Company is the name of a new concern that has established a plant at 118 Noble Court, Cleveland, Ohio, for the manufacture of drawn copper and drawn steel moldings for store fronts. W. R. Phillips is the manager.

The Jansen-Peterson Company, Cleveland, Ohio, a new concern, has established a plant at 1688 Columbus Road for the manufacture of wood-working machinery, making a specialty of belt sanding machinery. The company has a capitalization of $100,000. Its officers are as follows: W. C. Bruce, president and treasurer; E. N. Jansen, vice-president and general manager; J. F. Peterson, secretary and sales manager.

Columbia Mineral Wool Company, 112 Clark street, Chicago, Ill., is distributing a very interesting pamphlet relating to the advantages of mineral wool as an insulating material and its use for deafening and fireproofing purposes. Illustrations are presented showing how it may be used in walls, floors and partitions. Information is given as to when mineral wool should be used, also in regard to some authoritative tests made by practical engineers and cold storage men to determine the value of different methods of insulation, and particulars are presented concerning the manner of finding the quantity of mineral wool required in any specific case. The information is all presented in a way to be of special value to architects, builders and contractors.

Carpenters and builders are likely to be interested in a book of instructions relating to slate roofing which has been issued by the American Sea Green Slate Company, Box 165, Granville, N. Y. The point is made that only a few simple inexpensive tools are required to do slate roofing, and that the operation is very much like laying shingles. As a consequence a profitable slate roofing business can be established by carpenters wherever they may be located, and it can be carried on in connection with their present line of work without extra trouble or expense.

The Universal Portland Cement Company, Chicago, Ill., states that its annual output is 12,000,000 barrels. Reference is made to the extreme fineness, high tensile strength and good color of the product, also to its regular setting qualities and uniformity.

E. G. Washburne & Co., 207 Fulton street, New York City, has issued a catalogue containing much interesting information in regard to copper weather vanes of all sizes and designs, and a copy of the little work can be obtained by any reader of the *Building Age* on application to the address given.

The General Fireproofing Company, Youngstown, Ohio, recently held its annual meeting, at which W. H. Foster, who has been vice-president and general manager of the company, was elected president to succeed M. I. Arms, who was made chairman of the Board of Directors. It was also decided to erect an addition to the steel furniture department of the plant.

E. C. Atkins & Co., the well-known saw manufacturers, Indianapolis, Ind., have recently opened a branch at 109 Powell Street, Vancouver, B. C., which is in charge of W. C. Birdsall, assisted by F. R. Arnett. The branch is in a new building, 25 x 100 ft. in plan and 6 stories high, thoroughly modern in all respects. The ground floor is fitted as sales and office room with private offices and social rooms for visiting customers. The upper floors accommodate the duplicate stock of all kinds of saws and tools, thus affording prompt delivery to the trade in that territory.

The business of the J. A. Fay & Egan Company, 221 to 241 West Front Street, Cincinnati, Ohio, was 82 years old in February last. It was established in 1830 and the company was a pioneer in the manufacture of woodworking machinery. The company points out that its success is based primarily upon its policy of constantly improving its line and the accumulated knowledge and experience of 82 years goes into every machine produced.

The Dahlstrom Metallic Door Company, Jamestown, N. Y., has opened a branch office in the Candler Building, Augusta, Ga., which is in charge of Ralph E. Parnham.

Regarding the prominence of expanded metal lath to which plaster has been applied a very interesting illustration of the durability of Kno-Burn Lath is found in connection with the ceilings of the Rothschild Department Store in Chicago, Ill., which was lately demolished. The ceilings were put up more than 8 years ago and the wrecking crew found them to be practically as good as new; in fact, the crew had considerable difficulty in knocking the lath off the ceilings and in getting the plaster from the lath. The North Western Expanded Metal Company, 37 Van Buren Street, Chicago, Ill., points out that in this particular case the lath were not exposed to the action of patent plaster or dampness, but where it is so exposed an acid-resisting material should be used.

The Sidney Tool Company, Sidney, Ohio, has just commenced the erection of a brick addition to its factory which will be used as a warehouse, crating room and paint room. It covers an area 42 x 140 ft. in plan, is 2 stories in height and will afford facilities which will enable the company to increase its output one-third.

The Building Age

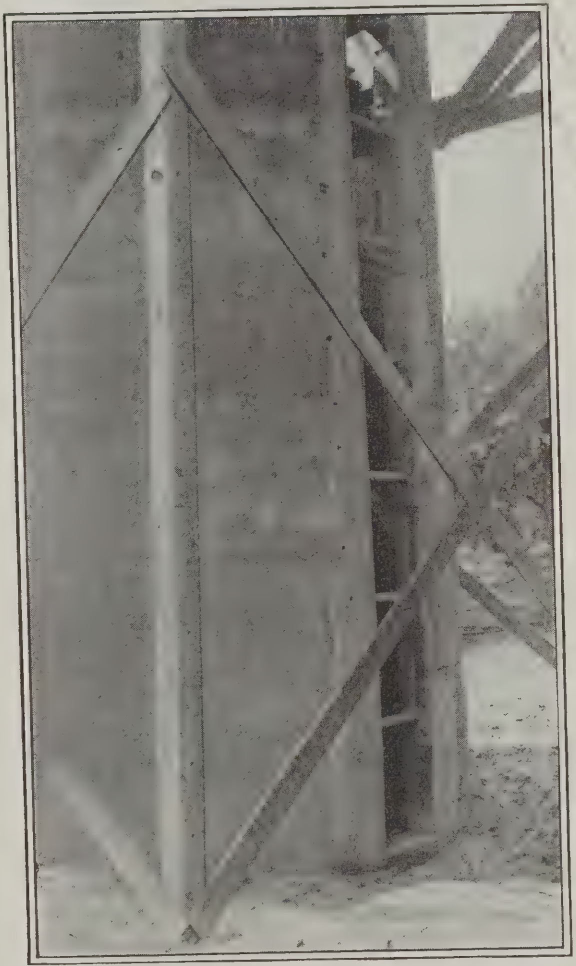
NEW YORK, JULY, 1912

A Silo of Concrete Construction

Suggestions for Building a Substantial Silo and the Materials Required for the Work

OUR observing readers will doubtless recall that in the issue of the paper for October, 1910, we presented some very interesting pictures with accompanying description relating to a 12-sided farm barn constructed of reinforced concrete upon the farm of Menno S. Yoder, located half a mile west of Shipshewana in LaGrange County, Ind. Shortly after the barn was completed Mr. Yoder commenced the erection of a silo located as shown in the first of the accompanying half-tone engravings. The work was done under the supervision of Mr. Yoder, who furnishes the following particulars which we present for the interest that they may have for a large class of our readers.

Side View of Silo, Showing Junction with the Barn



Showing the Continuous Door Before the Chute was Built—Side Boards of Door Frame Have Not Yet Been Removed

A Silo of Concrete Construction

In building this silo Mr. Yoder states that his first consideration was not simply how cheap he could build it, but also how good, making it not merely "a big tub like some of the old-time silos, but a real handy one that can be used by a poor man with but a few head of stock or by a man with more means who may have more stock to feed." In fact, a durable silo was wanted, one requiring no insurance, yet one that can be used for summer feeding and small quantities as well as for winter use when larger amounts of silage are fed.

In view of these considerations he constructed a concrete silo small in diameter—11 ft.—and measuring 51 ft. in hight. The great weight of the silage in a deep silo presses the air more completely out of the lower part of the silage, thereby preserving it much better than would be the case if placed in silos of half the depth.

In the construction of the forms, the hoisting derrick, the staging and the silo itself Mr. Yoder states that he followed his own ideas so that the time required in doing the work was much longer than would have been the case had he been experienced in silo construction.

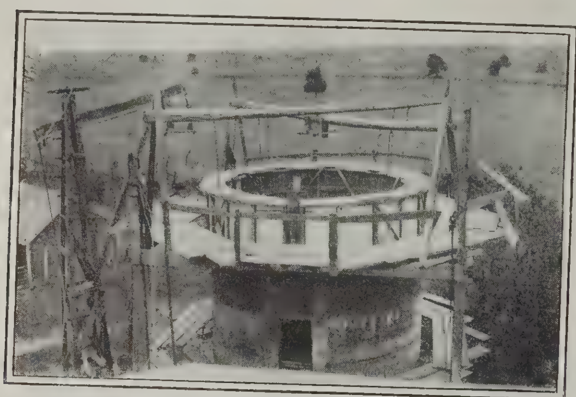
The foundation of the silo is 7 ft. in the ground and is 3 ft. wide at the bottom. The floor of the silo is 6 ft. in the ground but only 5 ft. lower than the stable floor in the barn adjoining. The concrete in the foundation was mixed in the proportion of one part cement to five parts gravel and then some stones were tamped into it. The concrete of the floor and superstructure was mixed in the proportion of 1:4. The walls of the barn, it will be remembered, were proportioned 1:5.

There are 10 ⅝-in. square and twisted bars of steel 18 ft. long standing upright in the foundation. An L hook was bent on the ends of the bars and these stand in the concrete 3 in. above the base. A circular steel bar rests in the concrete over the hooked ends of the uprights so they cannot pull up. These ten bars run

The staging "forms," etc., were raised by four fence stretchers used at the four corner posts. With every fill we made a groove an inch wide in the horizontal top surface for the next fill to register like matched boards. The glossy scum was brushed off this surface about 3 hours after filling the forms.

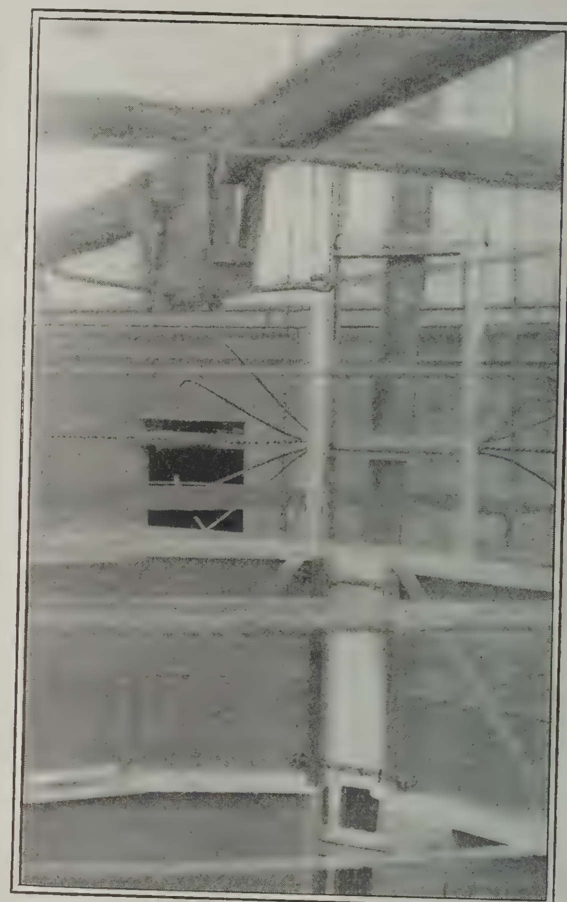
The roof is built in four sections and each quarter is so hinged that it can be opened to stand up like a lid. One section of the roof is fastened to a beam 12 ft. long that supports the central points of all the sections and this beam opens up with the portion of the roof to which it is made fast. It is tapered from the center toward the ends in order to give the roof the desired pitch. Each section of the roof has a strong lever 6 ft. long under the sheathing that can be pulled out half its length.

When the silo is to be filled a man can go up through



Top of Silo with "Forms" Ready to be Removed, as Viewed from the Cupola of the Barn

View of Silo with the Walls Completed



Showing How the Steel Reinforcing Bars Pass Through the Galvanized Pipe Across the Continuous Door

A Silo of Concrete Construction

up the full height of the silo wall and the splices are lapped 45 diameters with the ends turned sidewise or hooked.

The horizontal reinforcing bars were bent to the circle by putting them through the tire bender at the blacksmith shop. In the silo wall they are spaced 7½ and 10 in. apart according to the size of bars used and the outward pressure they are called upon to withstand when the silo is filled.

In the construction of the silo and chute about 1900 lb. of steel rods were used, the sizes being ¼, ⅜ and ⅝ in. square and in lengths of 18 and 20 ft.

The floor of the silo is 4 in. thick and is reinforced with steel. It is built out over the foundation and this extends out 15 in. further than the silo wall which rests upon it.

The outside of the silo wall tapers from 9 in. thick at the grade line to 6 in. at the top.

the chute, open the hinged lid on it and get up on the roof. He then removes four strips of crimps that rest over the upturned edges of the four joints in the metal roof. Then to each one of the sliding levers he hangs a strong wire 40 ft. long that has hooks tied to each end and then pushed out the levers 3 ft. He then descends and hangs weights to each wire heavy enough to raise each section of the roof to an upright position.

There is a patented glass top ventilator 2 ft. in diameter on one section of the roof and this has a sliding sleeve damper that can be opened and closed by a cord so that there is always light whether the damper be open or closed.

The roof is covered with Toncan metal and to prevent it from sweating and moistening the sheathing boards a double layer of heavy tar paper was placed between the metal and the closely fitted covering of boards.

The continuous door of the silo is 22 in. wide and has a 2 x 25 in. galvanized pipe across it every 30 in. in hight. The reinforcing steel passes through the pipes and spreads out like the ribs of a fan at both ends of the pipes, all as clearly indicated in one of the pictures accompanying this article. Two extra pieces of steel 6 ft. long are put through each pipe to better bind the silo across the door.

When filling the silo the door is first closed by a roll of felt roofing cut the right width and against this rests a column of silo staves cut exactly the right length to fit across the door. The roofing was unrolled and the planks were set up as fast as the silo filling progressed. The planks fit in grooves in the cement so that they stand flush with the inside of the silo wall.

There is a hole 10 x 12 in. in the silo wall 24 ft. above the ground for the entrance of the blower pipe and to fill the silo half full.

When this is done the hole is closed by a small door and the blower pipe is extended over the top of the silo wall. When the silage has been fed out to this hole a pane of glass can be substituted for the door and it can be left there until the silo is again filled.

The inside of the silo was painted with four coats of cement and water mixed as thick as could be brushed on well and it was put on as soon as possible after the forms were raised.

Mr. Yoder states that he always made it a point to

Appearance of the Barn and Completed Silo

A Silo of Concrete Construction

do this while the wall was new and wet in order that the cement wash would cure and harden with the wall and be a part of it. The outside was given two coats of cement wash. When the silo was finally completed both inside and outside was given another coat of paint as the staging was lowered.

The chute which was built after the silo wall was completed has five windows in it and these are protected by heavy wire screen on both sides. There is a ladder bolted fast inside of the chute and made with rungs of buggy spokes spaced 12 in. apart. The inside surface of the chute wall has four pairs of projection 1 in. thick upon which boards are placed and then when the silo door planks are taken off they are piled up on these shelves in the shed opposite the door. Here they are out of the way and yet are convenient for use again when filling the silo.

The steel reinforcing bars in the walls of the chute are hooked into steel staples put into the walls of the silo at the proper places and spaced 16 in. apart. The staples are made of ¼-in. steel bent to the right shape to hold.

In the silo no steel is left exposed to the air where it can rust. The material which was purchased for use in the walls, roof and chute of the silo, including 83 barrels of cement, cost $210. This, however, does not include lumber and iron for forms, nor the hoisting derrick, nor the staging. Mr. Yoder states that the labor to make ready and build the silo was worth about $300.

The King system of ventilation is used in the barn already referred to and now a second outlet has been made for stable ventilation by means of the silo chute and silo ventilator. The door to the chute is open 12 in. at the bottom to take the stable air from the floor and not from the ceiling. If silage freeezs to the silo wall in very cold weather the warm air from the stable passing upward helps to thaw it out. It also keeps the odors of the silage out of the stable.

While some do not consider a roof necessary in the case of a silo Mr. Yoder was of the opinion that what is worth doing at all is worth doing well, so he put on a roof to his liking and the material and labor amounted to $63.

In the construction of the concrete work "Wolverine" brand of cement furnished by the Wolverine Portland Cement Company, Coldwater, Mich., was used.

Fire Prevention in Cities

In a recent address dealing with methods for combating the stupendous waste due to fire, Franklin H. Wentworth, secretary of the National Fire Protection Association, offered some excellent suggestions regarding a solution of the conflagration problem. Some extracts from his address are as follows:

There is one way to solve this conflagration problem —not absolutely, but at least relatively. In the heart of nearly every city there are streets crossing at right angles, along which for a very considerable distance are buildings of brick, stone and concrete. Looked at upon the map this shows a more or less complete Maltese cross of buildings which are not wooden, and which operate to divide the wooden-built district into quarter sections, and which might hold a fire in any one of these sections if they were equipped to do so. These brick and stone buildings are ordinarily valueless as fire-stops because their windows are of thin glass and their window frames of wood. The small city that will trace out its Maltese cross of such buildings and equip them with metal window frames and wired glass will immedidately possess the equivalent of substantial fire walls crossing at right angles in its center, dividing it into four sections. By such a simple, inexpensive, but yet strategic procedure many a city may save itself from the destruction which now awaits only the right kind of a fire on the right kind of a night.

Having thus fortified city buildings one against the other, extensive fires within individual structures can be prevented by the use of the now well established automatic sprinkler system. With our window openings protected and our buildings equipped with such extinguishers, the conflagration hazard in mercantile districts will be eliminated. There will then remain for consideration our immense residence districts constructed almost wholly of wood surrounding the mercantile centers, like fagots around a funeral pyre. We can lessen the loss here by the abolition of the use of wooden shingles. Burning shingles can be carried great distances by the wind or draft of a conflagration, and when they alight in their turn upon other dry shingles they make fearful havoc. It will not be necessary to remove all shingle roofs immediately. An effective city ordinance might require all roofs constructed in the future to be of incombustible material, and that all roofs which shall hereafter require repair to the extent of one-third of their area shall be replaced with incombustible roofs.

Contractors and Builders of St. Paul, Minn., are now required to keep sidewalks clear of obstructions.

Reading Architects' Drawings--III.

A Study of the First, Second and Attic Floor Plans--Various Miscellaneous Details

By Arthur W. Joslin

NOW let us take up a study of the first floor plan shown in Fig. 5. Inasmuch as the cellar plan has been explained at such length in all particulars we will not go into so much detail on this plan. At first glance we see a pair of parallel lines which except for the front porch, rear porch and bay window (*B. C. D.*) conform to the same outline as the foundation and cellar plan shown in Fig. 2. Notice, however, that the two parallel lines are much nearer together than on the foundation plan. If you try a scale rule on these lines you will find that they scale 6 in. apart. In the ordinary frame house or other structure the outside is assumed to be 6 in. through. This thickness is made up as follows: Studding, 4 in.; outside boards, 1 in.; plastering, 1 in.; total, 6 in. To be accurate the studding is 3¾ in., the outside boards ⅞ in., the plastering ¾ in. The shingles, clapboards or other outside wall covering and the base inside are not taken into account in making ¼ in. or smaller scale drawings. The draughtsman assumes that you know of the existence of these parts and that you will look to the elevations, large scale and full-size details and the specifications for more particulars in regard to same. All interior partitions that are built of 4-in. studs are also assumed to be 6 in. and are so drawn. Partitions shown a little less than 6 in. by scale are of 2 in. x 3 in. studding, and if shown even thinner than those implying 3-in. studding they may be assumed to be built of 2 x 3 or 2 x 4 set flatways.

Partitions marked *E* on the plan Fig. 5 are of 3-in. studding; those marked *F* are of studs set the 2 in. way. The partition which divides the dining room from the living room and is figured 10 in. is for a large single sliding door. The two partitions about 3 in. apart (*G*) make a pocket for the door to slide into when open.

Windows in general, on small scale drawings for frame buildings, are shown by two parallel lines between the lines representing the outside wall, the length of these lines being the scale width of the sash. A typical window is shown at *H*. Where windows are grouped they are shown as at *J* representing a mullion window and *K* representing a triple window. These same parallel lines between partition lines would represent a sash in a partition. To find the style, height, etc., of these windows shown in the outside wall the elevations must be referred to.

Doors are shown by an opening in the parallel lines representing a wall or partition as at *L*. From these openings are lines at an angle with a segment of a circle faintly shown. The line at an angle represents the door and the faint line shows which way it swings. Notice that each door is figured for size. Wood, style and thickness or any other particulars must be obtained from other drawings and the specifications.

The door marked *M* represents a double swing door.

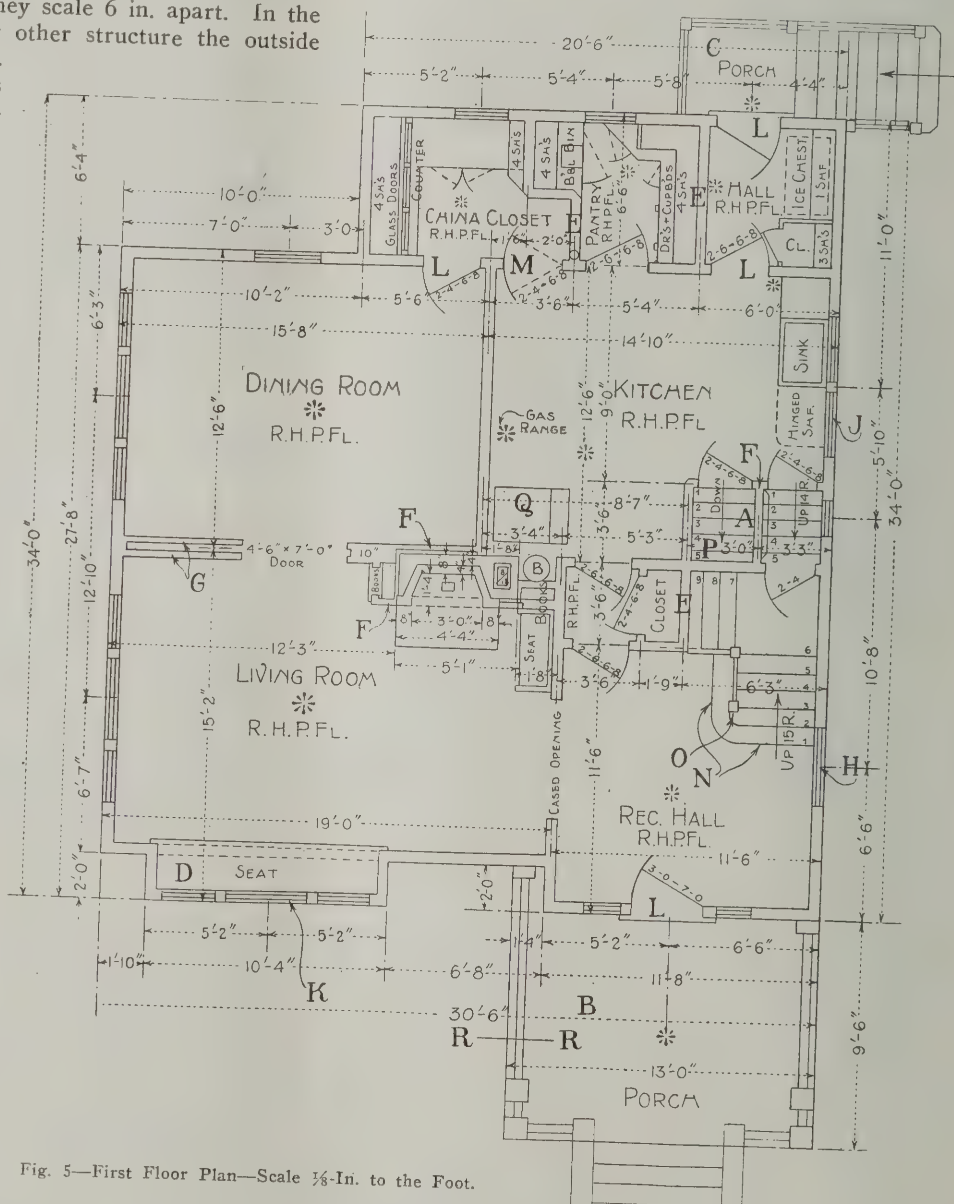


Fig. 5—First Floor Plan—Scale ⅛-In. to the Foot.

Reading Architects' Drawings—III

Notice that the angular line is dotted, shows both sides of the partition, and that the segment of circle, showing swing of door, continues each way from the partition. At the outside doors (from reception hall to porch and back hall to rear porch) you see a line about 2 in. by scale from the outer line of the two denoting the outside wall and running 5 in. or 6 in. by scale beyond the opening shown for the door. This shows the threshold and also implies a riser or difference in height between the levels of the floor in the building and on the porch. If you will step outside of your own front door and look at the threshold of it I think you will see at once the conditions just explained and the logic of the method of showing them on the drawing.

The kitchen, back hall, pantry and china closet have shelving and equipment of various kinds. The copious notes on the plans in these rooms, together with the lines shown, ought to make clear what is intended, especially when reference is had to a specification that would fairly describe the fittings of a special nature.

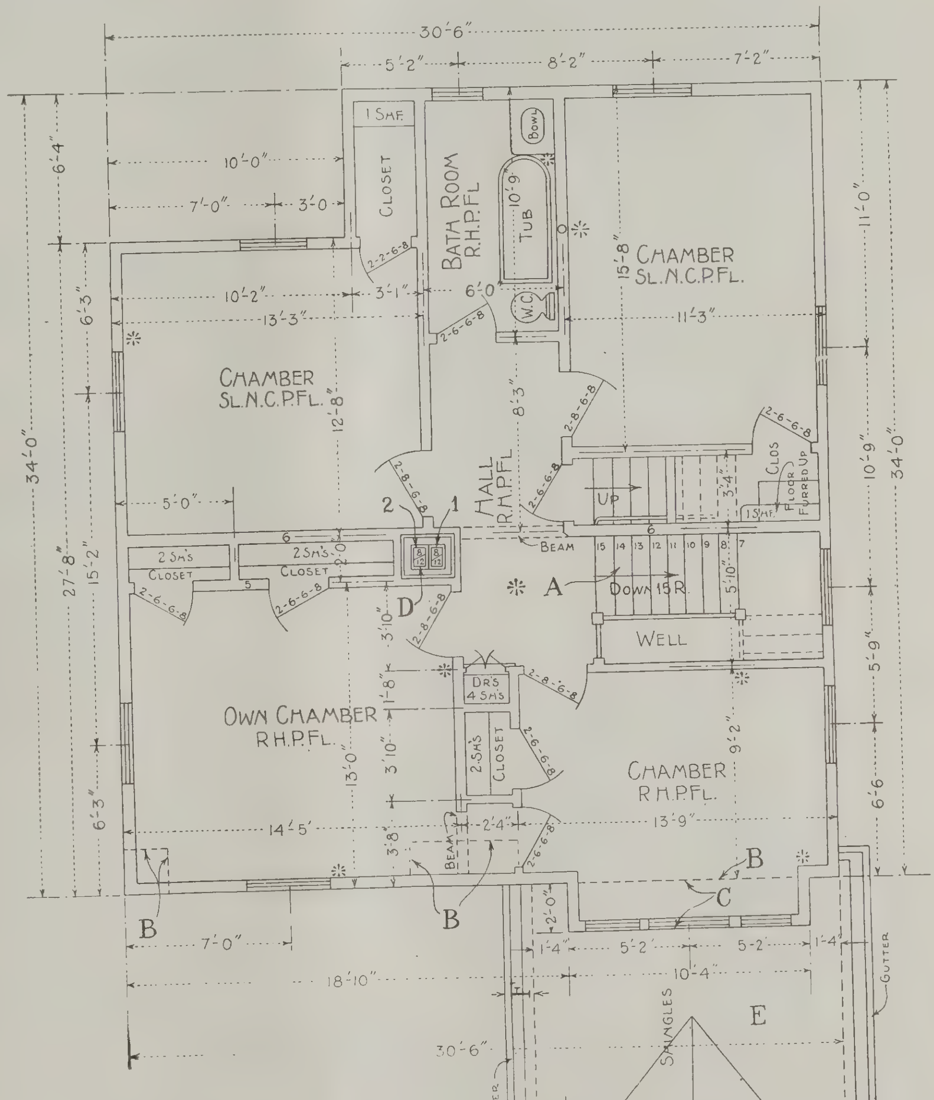


Fig. 6—Second Floor Plan—Scale 1/8-In. to the Foot.

Reading Architects' Drawings—III

Next examine the stairs going up from the reception hall. The first riser is carried around at right angles until it stops against the partition that follows down under the second run of stairs *N*, the corner being a quarter circle. This is called a block step. The newel *O* starts on this block step, the next riser 2 is also a block step, and ends in a small quarter circle against the newel. Next are the risers Nos. 3, 4, 5, 6 to a platform, a right angle turn and risers 7, 8, 9, where stair has reached a height somewhat above halfway to the second floor, and a closet is put in under them.

The balance of these stairs will be seen at *A* on the second floor plan, Fig. 6, where the riser numbers are picked up at No. 9, and continued to No. 15. Notice that the arrow at the start of these stairs on Fig. 5 says "Up 15 *R*." Now look at the stairs going up out of the kitchen where arrow says "Up 14 *R*." Here we find five risers up to the level of the platform of the front stairs. There is a door from the kitchen to these stairs, also a door at the top, on the platform, to cut them off from the kitchen and the front stairs. This part flight to platform is called a "box flight," as it is between two walls; consequently it does not require posts, rails and balusters, but has a wall rail on the right as you go up, shown by the parallel lines close together. The lines representing the rail turn with a quarter circle at right angles into the partition which denotes that the rail turns into the wall at each end, where fastened to the partition.

As we have six risers to get to the platform from the reception hall and from the kitchen we have five risers the fact is established that the height of each riser in the box flight from the kitchen is enough more than those of the front to take care of the distance from first floor to platform. An arrangement of stairs like this is called a "combination stair." Beside the box flight to the platform from the kitchen is the flight of stairs leading to the cellar *A*. Here the arrow says "Down." This is between partitions and is a box flight at the start, but as you go down into the cellar it becomes an open flight. The partition between these stairs and the front stairs at *P* would have to stop even with the under side of the stringer of the upper run of front stairs (risers 7, 8, 9, etc.) in order to make "head room" for the cellar flight. At the point where this partition occurs we have gone up 7 risers and down 5 risers from the first floor. As the average riser is about 8 in. high we have in the 12 risers about 96 in. or 8 ft. Out of this must come the depth of the stringer under risers 7, 8, 9, etc. As this would be only 5 in. or 6 in. you readily see that there is ample head room for the cellar flight. There is no way that this stopping of the partition under the upper run can be shown on the floor plans, but when the arrangement of stairs is studied the fact must be evident.

You will find that plans, particularly floor plans, have a number of such places where, as before stated, you must make 2 plus 2 result in 4.

The chimney in the corner of the living room is shown sufficiently plain not to require minute description. The 8-in. x 12-in. flue shown on the cellar plan Fig. 2 is in evidence. As the corner of chimney having this flue comes into the kitchen the inference may be drawn that this flue also serves for the kitchen range, which is shown in the corner of the kitchen *Q*. In a niche back of range is a circle about 1 ft. diameter, by scale, marked *B*. Does not this suggest the kitchen boiler?

Notice that the part of chimney showing in kitchen and boiler niche has no line enclosing it as in dining room at *F*. This shows that this much of the chimney is exposed and would require the brickwork to be laid up neatly and possibly of better brick than the rest of the chimney. This last is a point that we would have to refer to the specifications to settle.

The Bookcases and Fireplace

The fireplace is fully shown and carefully figured even to the face brick lining hearth, dump to ash pit under, etc. Notes on the plan at this point show that a seat and bookcases are worked in around the chimney corner. By careful study and scaling of the plan, approximately what is wanted can be determined, but full particulars can only be had from large scale or full-size plans, sections and elevations of these parts. As large scale or full-size drawings do not come as a rule until after a contract with the builders is made and it is about time to build in the special parts, the estimator has to make up his mind about what is required from the small scale drawings, the specifications and his experience with work in general and the architect.

A study of the porches *B* and *C* as shown in plan Fig. 5 and reference to the elevations ought to show which of the various lines represent steps, posts, rails, etc. Large scale details are shown of the front porch and living room bay, and these will be taken up later and references made back to the first floor plan.

The Second Floor Plan

We will now take up the study of the second floor plan, Fig. 6, but at much less length than was devoted to the first floor plan. Here we see the same outline as the first floor, except as regards the front of the building, where the dotted lines *B* show outline of first floor. As the parallel lines representing the front wall of the building show, the second floor overhangs to the face of the two projections on the front wall of the first floor, and that the part of the second story front wall over porch has a still further overhang or projection in the form of a square bay *C*. Everything in regard to partitions, doors and windows explained in connection with the first-floor plan applies to the second floor.

In the bath rooms are shown a bowl, bath tub and water closet. As each of these fixtures is noted as such you cannot help locating them on this plan. The conventional methods of showing these fixtures never varies from the way they are shown here and, even though the fixtures are not noted, no difficulty should be experienced in identifying them.

The Chimney

Notice the chimney *D*. Here we have a plain rectangular-shaped affair with two 8 x 12 flues. If you look at drawing carefully you will see that the two flues are side by side, having no brick withe (partition) between them. The flue No. 1 is the same one shown in the plan of the chimney on both the foundation and first-floor plans. The other flue, No. 2, is for the fireplace. As this starts midway between the first and second floors, and drawing the flue on the first floor over all the lines showing the fireplace would only serve to complicate and confuse the first-floor plan, no attempt is made to show it there. Knowing that the fireplace must have a flue you can hardly fail to recognize flue No. 2 as the fireplace flue.

That part of the plan marked *E* is the front porch roof. The roof and gutter lines are shown and the fact that the roof is shingles is there noted. The dotted line shows the outline of the frieze of the porch cornice. The distance from the dotted line to the outer edge of the gutter is the overhang of the cornice *F*.

While discussing the foundation and cellar plan attention was called to the fact that all dimensions were to "the outside of frame." This note applies throughout all the plans. Take the dimension 34 ft. referred to on foundation plan; compare the same side of first and second-floor plans and you will see that it is the same on both. You will also see that the 11-ft. dimension at the left and 6-ft. 6-in. dimension at the right, which are to the center of windows, or mullion windows, also applies to all three plans. An examination of the elevations of this side of the house will show by the lines drawn over the plan, running through the center of the windows, and groups of windows, that they center over each other and at the same figured distance from the corners of building as called for by the floor plans.

(*To be continued*)

The "Disappearing" Kitchen

In one of its monthly reports the California State Board of Health comments as follows upon what has come to be termed the "disappearing kitchen":

One of the problems of modern city growth is the condensation of the large, comfortable, family country homes of our forefathers into homes 10 ft. x 12 ft. x 50 ft. piled eight, ten or more high and flanked on either side by similarly condensed homes. These houses can have light only from windows in the front and back sides, and occasionally the diffused light from an air shaft. The only front yard is the fire escape; the only back yard is a narrow porch, and the limited air space made usable by an aerial clothes line. Under these conditions it is to be expected that disappearing beds, gas mantels and other similar devices for economizing space will be popular. To meet this demand has come what might be termed the disappearing kitchen. Just as the spacious, well ventilated old bedroom, with its wide-chimneyed fireplace, has been superseded by the small, illy-ventilated room which serves in the added capacity of sitting-room by day, so the great, open, cheerful kitchens of old are being superseded by the twentieth century kitchenette. Limited facilities for cooking and serving meals mean limited range of foods which may be considered for the table. Through invention and clever application of the scientific principles of food preservation this limit has been gradually extended until the tin-can dietary may be made to cover nearly all the ordinary demands for proper food, but the cook must know her trade or the family will severely suffer. It is probable that the "disappearing" kitchen plays a large part in the present-day prevalence of many diseases and functional disorders, especially of the alimentary canal.

The building occupied for so many years by Delmonico as a restaurant and more recently as the Café Martin on the south side of 26th Street extending from Broadway to Fifth Avenue, New York City, is giving way to a 20-story fireproof store and loft building which according to the architects, Schwartz & Gross, will cost in the neighborhood of $600,000. The new building will have a frontage of about 156 ft. on the street, 56½ ft. on Fifth Avenue and 60½ ft. on Broadway. The facade will be of granite, limestone and terra cotta.

Rustic Carpentry and Joinery

Construction of Picture Frames, Etc.—How the Carpenter Can Profit by Clever Use of His Tools

By Owen B. Maginnis

THE carpenter who is clever in the use of his tools often finds opportunity for the execution of attractive articles of ornament as well as in perfoming jobs in which rustic effects are the predominant feature. One of the many pieces of work he is often called upon to do, more especially if he resides in a country town or village where work of the character indicated is not so readily available, involves the making of rustic picture frames of various styles and sizes. This may be regarded as a pleasurable part of rustic joinery and an example such as we have referred to is shown in Fig. 1 of the sketches.

has been sawn the fault must be remedied by wetting the piece and clamping fast until it has "set," or by kerfing which must be very neatly done. If this is not the case the piece or pieces may readily be spoiled. To obtain the necessary miters at the corners it is best to follow the center or axis line method illustrated in Fig. 3 of the sketches, which may be accomplished as follows: In an ordinary miter box 4 in. wide in the clear and on the bottom piece, draw or scratch a center line 2 in. from and parallel with each side. Square this down on each end as may be noted in the two views in Fig. 3. Next divide the flat surface

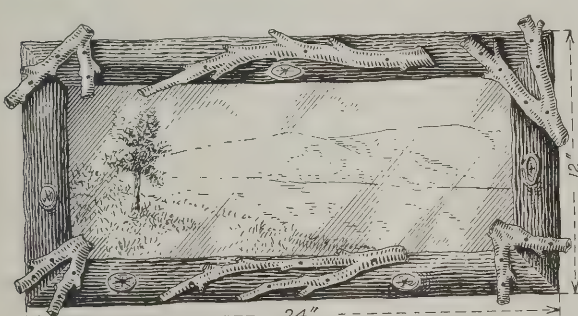
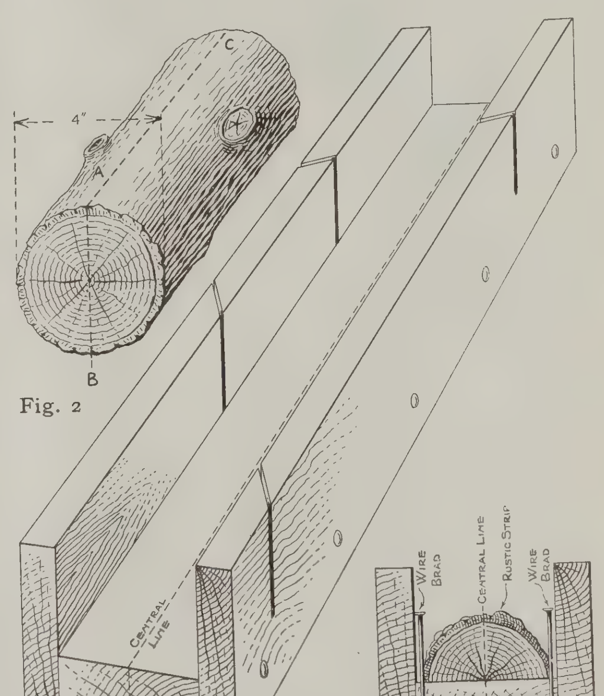


Fig. 1.—A Rustic Picture Frame



Figs. 2 and 3—Indicating Manner of Sawing Branch of Tree and Obtaining Miters for Picture Frame

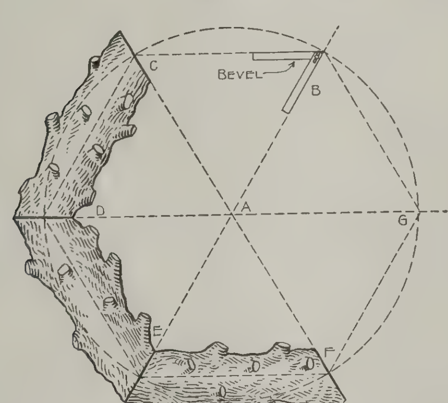


Fig. 4—Method of Making Hexagonal Frame

Rustic Carpentry and Joinery

This picture frame can be made both artistic and useful with the exercise of a little judgment on the part of the carpenter or cabinet maker and in performing the work it is as necessary to pick a good straight sound branch of cedar, white birch or silver birch, if obtainable; if not, ash, cherry or oak will serve. The branch to make this frame should be 4 ft. 6 in. in length, of straight grain and anywhere from 2 in. to 4 in. in diameter. With the rip saw split it longitudinally through the center as indicated by the dotted line *B-A-C* in Fig. 2. This indicates the direction of the cut, which should be superficially out of wind and flat. The branch should be fastened in such a way as to keep it from turning or twisting while being sawn.

Should it warp or bend while being ripped or after it

of the rustic pieces at each end into two equal parts and join these by a scratch line, using a straight edge from end to end. Place each strip in the box with the scratch line on the strip corresponding to and directly over the line on the bottom of the miter box which will give true miters. Wire brads may be tacked into the bottom of the box to hold and prevent the strips from moving while being sawn.

It can readily be understood that it would be impossible to miter this irregular stuff as accurately as would be the case with straight parallel pieces, owing to the incongruity of the material, which of course must be considered in its mechanical construction.

Should it be the desire or intention of the carpenter to make a frame of polygonal form, such for example as a hexagon or octagon indicated in Figs. 4 and 5 of the sketches, the following work may be done. In these examples the center line methods of mitering are again most applicable, so to construct them in a workman-like manner proceed to lay out the first figure by taking any point as A of Fig. 2 for a center. From this point with any stated radius—say 9 in., 10 in. or 12 in.—and with a pair of compasses or trammel rod describe the dotted line circle shown in Figs. 4 and 5. Referring to the former divide this circle into six equal parts using the radius measurement which will be the necessary length and join B-C, C-D, D-E, E-F, F-G and G-B, thus obtaining the center lines for the hexagon or six-sided figure.

Now make a new miter box which shall be accurate, square and true and to obtain the miter cuts for this figure set a bevel at the angle B for example and lay this across the top edges of the sides of the box, reversing for the right and left hands in the manner shown in Fig. 1 of the sketches; also square down on the outside faces and make the kerfs; likewise scratch the center line as previously described. When sawn all miter joints must radiate to the center A of Fig. 4 hazard yet they should always abut on radial lines.

If the curvature of the branches does not exactly conform to the laid-out circle they can be fitted with the draw knife or spoke shave when selected wide enough to allow of this being done. The difficulty of obtaining sufficient branches to execute circular or elliptical sweeps or forms in rustic work almost precludes their use, but in the vicinity of extensive forests or woods they might be done advantageously.

These miters are secured and tied together by wire brads which should be well greased in a piece of fat or soap before driving. They should not be too thick so as to avoid splitting the wood. The miters can also be strengthened by nailing branches across them, using forked pieces preferably as indicated in Fig. 1, which will increase their rustic value and at the same time securely tie the parts together. Branches, curves and knots may also be tacked on the faces should the wood be devoid of a rustic character.

The rabbet for the glass may be made by nailing ½ in. strips of thin box board along the flat backs about ½ in. away from the inside edges and the glass

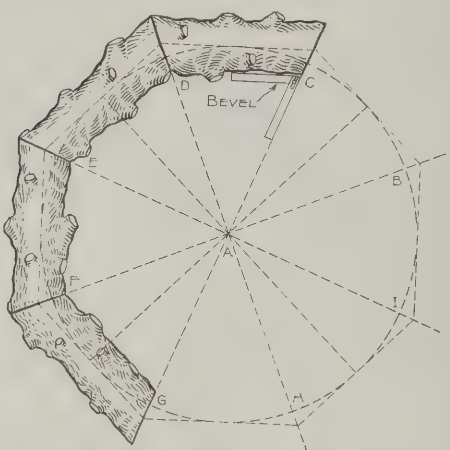


Fig. 5—Method of Making Octagonal Frame

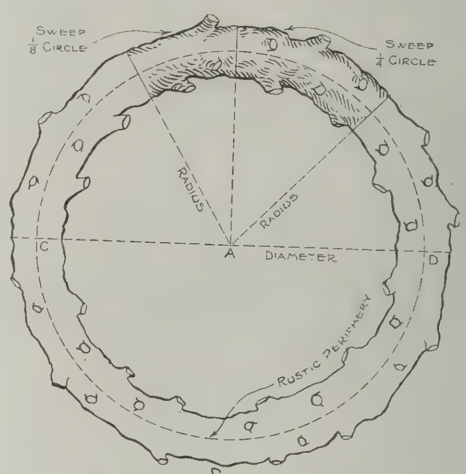


Fig. 6—A Frame of Circular Form

Rustic Carpentry and Joinery

and should they not come tight each must be planed and fitted until it is almost invisible.

Where there are many cuts to be made as in most polygonal figures it is almost impossible to have the miters fit exactly; some humoring and planing must therefore be done in order to obtain close joints.

Similar operations may be followed in connection with Fig. 5 of the sketches by describing the dotted circle with the stated radius and drawing tangential to the circumference diagonally, perpendicularly and horizontally, which will produce the eight-sided figure or octagon. As before the dotted lines represent the center lines of the pieces and so in the miter box.

It is neither wise nor mechanical to make too many saw cuts in one wood box, as the carpenter may inadvertently take the wrong cut and spoil a piece or pieces of good stock, although the used cuts can perhaps be filled up with strips, thus multiplying their usefulness.

Concerning circular work of this description it is to be said that here again the center line should be the working guides. Supposing the center A in Fig. 6 has been determined draw a level or horizontal diameter C-A-D and describe the dotted line as the middle central circumference. Of course in actual work these lines can be made continuous on the drawing board or floor. It would be best to build up the full periphery in eighth or quarter circular pieces of curved branches if the required width can be found to make it up. If not, the joints can be hap-

backs can be of wood or stiff cardboard covered with paper to keep out dust and insects. In the country glass can be dispensed with by covering the frames with gauze or muslin.

The possibilities of this sort of work are unlimited provided the wood is available for the purpose. The writer has built entire sets of furniture—beds, cots, bookcases, dressers, sideboards, stairs, wash stands, etc.; in fact many varieties of very useful articles, using grocery and packing boxes, crates and such like for tops and flat surfaces. Empty butter tubs for example with rustic legs make handsome rustic flower pots. Placed on posts set in the ground they form vases which can most effectually flake a doorway, especially when they are filled with clay, ivy and creeping plants.

As an adornment to bungalows and log cabins these details are a feature which if properly worked out to completion add much to their decoration. Finally as unusual examples of constructive woodwork they are well worth the attention and study of every amateur or professional carpenter and craftsman.

The foundations for the walls and columns of the new Fulton County Court house under construction in Atlanta, Ga., are supported on 1220 concrete piles of the pedestal type. The piles are surmounted by concrete caps 4 ft. thick, which support the reinforced floor slabs ranging from 15 to 18 in. in thickness.

Work and Methods of the Concrete Contractor -- XI.

Designing of Beams -- Finding Width and Depth -- Weights of Tile -- Amount of Steel Used

By Ernest McCullough, C.E.

Ordinarily when designing beams the width is fixed and the depth found. It has been stated before that the most economical section is that in which the breadth lies between two-thirds and three-fourths the depth for rectangular beams. In the design of beams of T-section, or T-beams as they are termed, the question of relative depth and breadth depends upon conditions and in small floor joists lying between tile the width is usually fixed and the depth then found.

The tile is generally 12 in. square and the thickness of the concrete joist is commonly fixed by considering shear. Usually the thickness of the joist is 4 in. and the distance, center to center, is 16 in. In the accompanying tables I and II, the flange width is assumed to be 16 in. The weights per square foot of the tile commonly used for this purpose are as follows:

4-ins.	thick,	16	lbs.	per	sq.	ft.
5-ins.	"	18.5	"	"	"	"
6-ins.	"	21	"	"	"	"
7-ins.	"	25	"	"	"	"
8-ins.	"	28	"	"	"	"
9-ins.	"	31	"	"	"	"
10-ins.	"	33	"	"	"	"
11-ins.	"	39	"	"	"	"

and the concrete is assumed to weigh 150 lb. per cubic foot.

In the tables

d = depth from top of flange (slab) to center of steel.

c = depth to neutral axis.

x = depth to center of compression of concrete.

d — x = moment arm.

The width being fixed at 16 in., center to center of concrete rib, or joist, the weight of 1 lin.-ft. of slab

TABLE I.

Flange Width 16-ins. f_s = 18,000 lb., f_c = 700 lb.

d	c	(d-x) in inches				Comp. Value	Area Steel	Mom. ft. lbs.
		t=1.5	t=2.0	t=2.5	t=3.0			
3.5	1.29	3.07	..	..	..	7,200	..	1,850
4.0	1.48	..	3.51	..	..	8,300	..	2,410
4.5	1.66	3.95	..	..	..	9,200	..	3,050
5.0	1.85	..	4.38	..	..	10,400	..	3,800
5.5	2.03	4.90	..	..	..	10,600	..	4,325
6.0	2.22	..	5.28	..	..	12,300	..	5,440
6.5	2.40	5.87	..	..	..	11,600	..	5,700
6.5	2.40	..	..	5.71	..	13,450	..	6,410
7.0	2.59	..	6.22	..	..	13,800	..	7,110
7.0	2.59	..	..	..	6.13	14,600	..	7,420
7.5	2.77	6.84	..	..	..	12,300	..	7,000
7.5	2.77	..	..	6.6	..	15,380	..	8,450
8.0	2.95	..	7.8	..	..	14,850	..	8,850
8.0	2.95	..	..	..	7.0	16,550	..	9,700
8.5	3.14	7.83	..	..	..	12,800	..	8,350
8.5	3.14	..	..	7.53	..	16,850	..	10,550
9.0	3.33	..	8.15	..	..	15,650	..	10,700
9.0	3.33	..	..	..	7.92	18,410	..	12,200

is found as described in the preceding article. The weight of 1 cu. ft. of concrete being taken at 150 lb., multiply this by 1.33, which gives the weight of 1 cu. ft. 16 in. wide. Divide by 12 and multiply by the flange thickness. Add to this the weight of 1 sq. ft. of the tile to be used and then add the weight of the rib, or joist, below the bottom of the flange. This is obtained by multiplying the end area in square inches by 150 and dividing by 144, or, by merely multipling the end area by 1.04 and calling the result pounds. Now multiply the live load per square foot by 1.333 and thus obtain the total load with which to find the bending moment.

The tables each give the bending moment in foot-pounds. The bending moment found may not exactly equal any moment given in the table but as we must deal with stock sizes of tile use the next largest moment. The formulas given in the preceding article were used to compute these tables and the reader can check them for himself, remembering that generally the thin slabs are under Case II and the thick slabs are under Case I. Having found a proper bending moment in the table follow the line horizontally to the left until a value of d—x is found. In this column, at the top, is found the flange thickness, t = 1.5, etc. in inches. At the extreme left is found the depth to the center of the steel. Add to this half the steel thickness plus the amount of concrete under the steel, usually ½ in. and from this sum deduct the flange thickness, which gives the thickness of the tile. Take the nearest commercial size, provided it is not less than the required depth. For example, we find that a certain bending moment in foot-pounds gives d = 5.0 with d — x = 4.38, which corresponds to a flange thickness of 2 in. If we assume that the steel will be ½ in. thick add ¼ in. and to this add ½ in. of concrete, making the total thickness from top of flange to bottom of tile = 5.75. Deducting the flange thickness gives 3.75 in. as the required thickness of tile. It will be necessary to use a 4-in. tile which thus gives a total thickness of 6 in. Subtract half the thickness of the reinforcement and the covering of concrete and we get d = 5.25. The nearest value is d = 5.5, which we will take and the slab thickness for this is 1.5 in. Thus by using the 4-in. tile we get ¼ in. greater depth than the bending moment requires and we save ½ in. of concrete, the net result being an increase in resisting moment to 4,325 ft.-lb. instead of 3,800 ft.-lb. with which we started. The reader is supposed to be using Table I.

TABLE II.

Flange Width 16-ins. f_s = 18,000, f_c = 700.

d	c	(d-x) in inches			Comp. Value	Area Steel	Mom. ft. lbs.
		t=2.0	t=2.5	t=3.0			
9.5	3.51	...	8.48	...	19,000	1.06	14,150
10.0	3.70	9.13	...	...	16,400	.91	12,500
10.0	3.70	...	...	8.84	20,000	1.11	14,750
10.5	3.88	...	9.45	...	18,900	1.05	14,550
11.0	4.07	10.11	...	...	16,850	.937	14,200
11.0	4.07	...	...	9.79	21,200	1.18	17,300
11.5	4.25	...	10.43	...	19,860	1.10	17,300
12.0	4.40	11.10	...	...	17,450	.97	16,100
12.0	4.40	...	...	10.75	22,200	1.23	19,800
12.5	4.62	...	11.40	...	20,400	1.14	19,400
13.0	4.81	12.09	...	...	17,750	.99	17,950
13.0	4.81	...	...	11.73	23,100	1.29	22,650
13.5	5.00	...	12.39	...	21,000	1.17	21,650
14.0	5.18	13.08	...	...	18,100	1.01	19,750
14.0	5.18	...	...	12.7	23,900	1.33	25,950

At this step of the operation comes in the question of the amount of steel to use. The moment in foot-pounds given in the table is the resisting moment of the section. The compressive value refers to the compressive strength of the concrete in the T-beam. If the bending moment in foot-pounds is equal to the resisting moment the steel area is found by dividing the compressive value by the steel fiber stress, in this case 18,000 lb. per square inch. In the present case we are suposed to have found an actual bending moment of less than 3,800 ft.-lb., say 3,760 ft.-lb. Owing to the fact that a section must be used having a compressive value of 4,325 ft.-lb. we can divide the compressive strength by the tensile stress in the steel and get a steel area of 0.59 sq. in. or we can take the exact bending moment in foot-pounds and multiplying by 12 reduce it to inch-pounds, thus, $3{,}760 \times 12 = 45{,}120$ in.-lb. This divided by the moment arm, $d - x = 4.90$, gives the actual total compression required as equal to 9,000 lb. The compression and tension being equal, this divided by 18,000 lb. gives a reinforcing area of 0.5 sq. in. The steel in this beam fixes the strength, whereas if enough steel were used to balance the actual compressive strength, the concrete would determine the strength.

In Table I the steel area is not given but in Table II and Table III the steel areas are given for each combination, the area of steel being sufficient to balance the total compression in the concrete. The user of the tables may, of course, use less steel when the

TABLE III.

Flange width 12 ins. $f_s = 18{,}000$, $f_c = 700$.

d	c	(d-x) in inches t=5	t=6	t=7	Comp. Value	Area Steel	Mom. ft. lbs.
15.5	5.73	13.64	...	...	23,640	1.32	27,100
17.5	6.49	15.52	...	...	25,860	1.44	33,400
17.5	6.49	...	15.36	...	27,070	1.51	34,600
19.5	7.21	17.44	...	...	27,420	1.52	39,900
19.5	7.21	...	17.21	...	29,450	1.64	41,100
19.5	7.21	...	...	17.10	30,240	1.67	42,900
21.5	7.96	19.38	...	...	28,800	1.60	46,500
21.5	7.96	...	19.10	...	31,400	1.75	50,800
21.5	7.96	...	...	18.92	32,830	1.82	51,800

bending moment is less than the resisting moment, using the method just worked out.

The two tables for a flange width of 16 in. are used for floor slabs. The table for a flange width of 12 in. is for beams and girders. The reader should have no trouble in making similar tables for other fiber stresses and for other flange widths. The fiber stresses used in these tables are those permitted under the Chicago Building Ordinance and permissible in the greater number of cities in the United States, the steel stress of 18,000 lb. per square inch being used only for deformed high elastic limit steel.

When designing beams and girders the depth is generally determined first, as questions of head room enter in. Having fixed the depth, the breadth is found by formulas given in a preceding article. If this breadth exceeds 12 in. the table here given is of no service, so the reader might compute tables with the values given here for d and with widths varying by 2 in. up to 24 in. The flange width of 16 in. for the floor beams will seldom be found out of the way. Assuming a value of 60 lb. per square inch for shear as diagonal tension one-half the total load coming on the beam, or joist, divided by 60 should give the area of the rib. Dividing this by 4, the width of the rib, will give the total height from the bottom of the tile to the top of the flange. If this is not sufficient when the beam has been designed to be strong enough to resist the bending moment, a deeper rib can be used, provided the thickness of 4 in. is wanted. In the table a deeper joist may be found with a different flange thickness that will have a moment nearly the same as that used. If the thickness of the rib is increased to give proper area to resist shearing stresses the table, of course, cannot be used. The writer has tables for flange width of 15 in. which gives a rib thickness of 3 in.; 17 in. for 5-in. rib and 18 in. for 6-in. rib, the tile in all cases being 12 in. square.

In designing beams and girders of T-section the rules governing the proportion of width to depth are fixed in building ordinances. The recommendation of the National Association of Cement Users is that the effective width shall not exceed one-sixth the span length of the beam on either side of the beam, measured from the edge of the web. For example assume a T-beam having a clear span of 12 ft. and the stem thickness is 8 in. One-sixth the clear span = 2 ft., so the extreme projection of the flange on either side may be 24 in. and added to the web thickness this gives an extreme flange width of 56 in. An extreme width like this should never be used when possible to avoid it, as the shearing stress between the flange and rib may be excessive. This, however, is given as the maximum allowance. Some building ordinances limit the extreme flange width to one-third the total clear span of the beam. There is a further limitation imposed and that is the projection on either side of the beam shall not exceed six times the flange thickness. Some building ordinances fix as a limitation a width equal to three-quarters of the distance center to center of ribs. This last limitation, it will be seen, permits a space of 12 in. between ribs when the distance center to center = 16 in. Reinforcement should be used to tie the flange and rib, or web, together when the shearing stress approaches the maximum permitted under the ordinance.

It is, of course, necessary when beams are designed as T-beams and when floors are a combination of tile and concrete, that the rib and the flange be poured together. If the rib is poured first and the slab added later, the T-beam action is not obtained, but each rib must be considered as a rectangular beam.

When reinforced concrete girders support reinforced concrete beams there is a section of floor slab at the junction that acts as a flange for the girder and also as a flange for the beam. It is good practice to assume the flange as acting only in compression for the girder and the area thus deducted from the flange area of the intersecting beams should be supplied by putting in steel in compression. Thus local loads on the floors will be transmitted directly to the girders without going through the beams.

Improvised Plumbing in Arabia

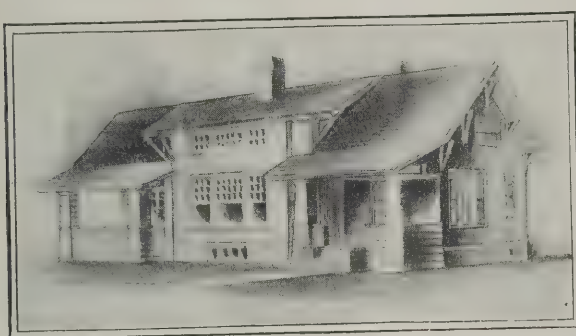
The comforts and conveniences afforded by modern plumbing are coveted above all other things by European and American residents in the city of Aden. Arabia, however, is a primitive country; the climate is hot and the country largely arid. Therefore water for bathing purposes is mostly drawn from the sea, condensed and delivered to residents in wagons at a price of about one-half cent a gallon. The person who wishes to bathe generally uses a washtub and enjoys a shower from an ordinary tin bucket into the bottom of which has been soldered a sprinkler, and which is suspended from the ceiling. Should the project of the British authorities to bring in a water supply from Lahej, a distance of 30 miles, be carried out there will undoubtedly be some considerable demand for fixtures which will give some of the comforts enjoyed by those living in more temperate climates.

Filling the hollow space behind the base board a foot deep with cinders mixed with a little cement and water in the proportion of, say, 10 to 1, makes a good fire stop. Sand mixed with cement in the same way or mineral wool answers an excellent purpose.

A Unique Bungalow Court

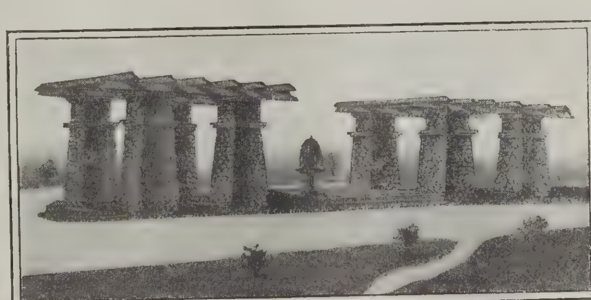
Novel Grouping of the Buildings Which Are Heated from a Central Plant -- Attractive Layout of the Grounds

THE idea of what may be termed a "Bungalow Court" is not altogether new, for they are to be found here and there in certain sections of the country, more especially in the states of the Pacific Slope, but they are sufficiently uncommon in the Eastern states



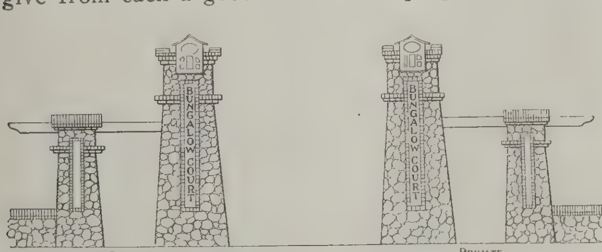
One Style of Bungalow in the Court

to render a short description of one that is now under construction of more than passing interest. The plot plan which is here presented clearly indicates the grouping of the 14 bungalows as well as the general layout of the grounds, the central feature of which is the pergola and fountain so situated as to be readily seen from the front porch of each dwelling. The pictures upon the page represent two styles of bungalow of which the court consists, also an elevation of the main driveway entrance and a perspective ofthe pergola with its fountain in the center. The plot plan also shows the position of the garage at the farther end of the driveway as well as the paths leading from the several bungalows.



View of the Pergola and Fountain

In the planning of this court of bungalows the architect has given special attention to the arrangement of both houses and grounds and, as already intimated, has so grouped the buildings around the court as to give from each a good view of the pergola located in



Ornamental Gateway at the Main Entrance to the Court

Another Style of Bungalow in the Court

A Unique Bungalow Court—F. A. Swingle, Architect

the center of the grounds. The pergola not only enhances the beauty of the court and surroundings, but should prove a very popular gathering place afternoons and evenings, as when fully completed it will be arranged with seats between the massive stone pillars which are covered with heavy timber work. The entire block is surrounded with a cobblestone wall with massive pillars each side of the driveway, these pillars being laid up in cobblestone and interlined with clinker brick.

The garage at the farther end of the driveway is to be built of reinforced concrete of the bungalow style of architecture and will have as many compartments or stalls as there are bungalows, so that each occupant of a bungalow may have a place for his motor car or runabout as the case may be. There will also be provided a wash room and each compartment will have cabinets for tools, etc. There will also be apartments for the janitor or caretaker of the grounds.

The bungalows will each differ in style of architecture from its neighbor, although each will have six large rooms and bath with modern built-in conveniences, laundries in the basements, Dutch kitchens, etc. Each house will have hardwood floors and the three principal rooms in each bungalow will be finished in Philippine mahogany, while the balance of the rooms will be finished in soft wood and enameled. Each house will be heated from a central plant. It will be seen from the plot plan that a tradesmen's entrance is provided extending along the rear of each row of houses.

The bungalow court here illustrated and described is rapidly nearing completion in Portland, Ore., the architect and builder being F. A. Swingle, with offices at 318 Mohawk Building, Portland, Ore.

Advance in Office Building Construction

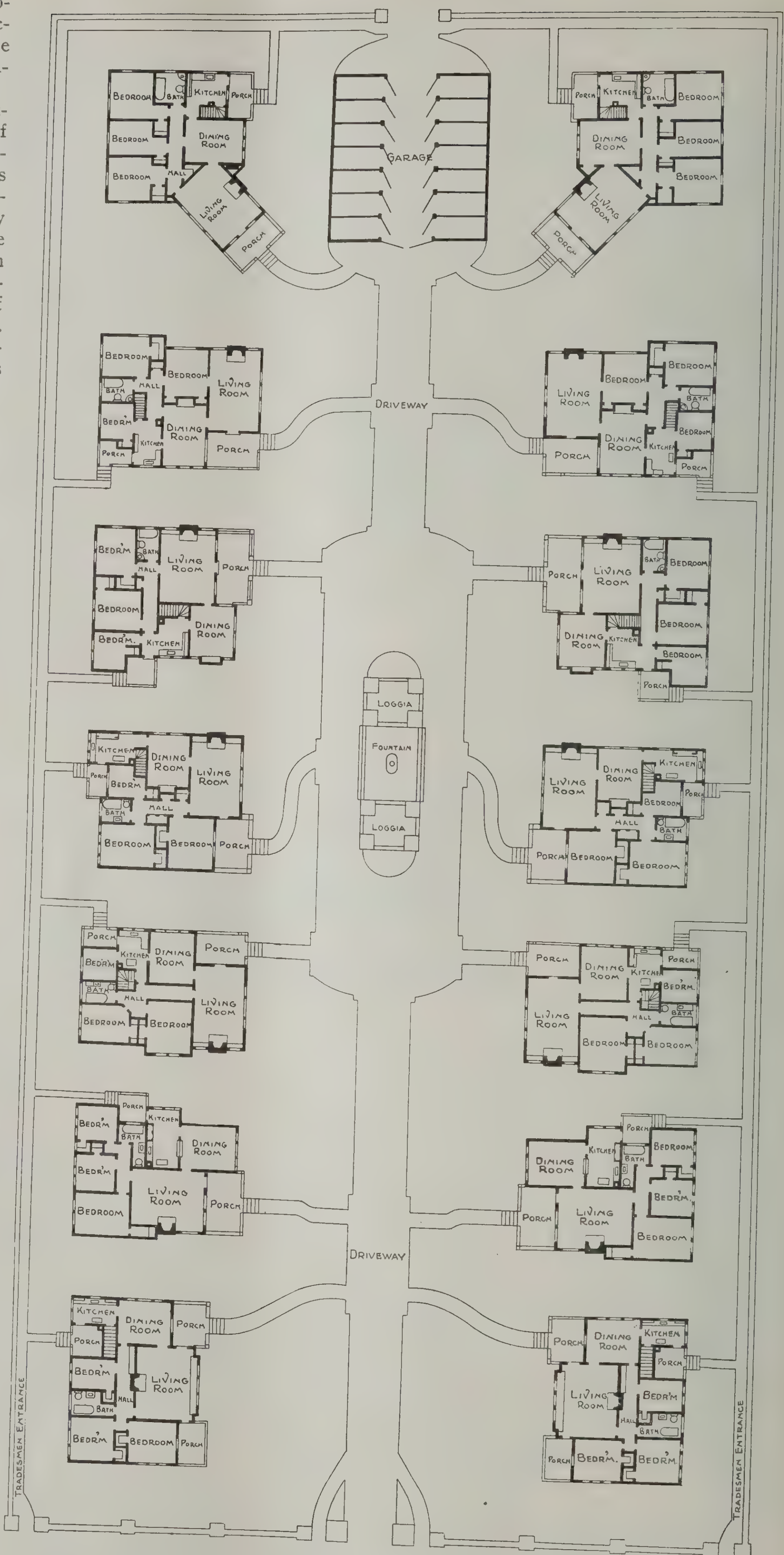
What is known as the Fire Companies Building at 13 to 27 Cedar Street, and running through to Maiden Lane, New York City, has several notable features, which constitute it a decided advance in office building construction and equipment. The approximate area is 130 x 150 ft., and it is 24 stories high, not to mention the basement and sub-basement. The construction is steel skeleton frame with floor panels of reinforced cinder concrete.

One of the special features is the treatment of floor openings, the importance of which does not appear to always receive the attention they should. There are three stairways running from basement to attic, the entire construction being of iron with marble treads. They are enclosed by hollow tile block partitions and the doorways in each story are covered with kalameined doors. The elevator enclosures are of cast iron glazed with polished plate wire glass.

The corridor partitions and those enclosing pipe shafts, etc., are of hollow tile blocks and extend from floor to ceiling. All corridor doors, sash and trim for office space are made of fireproofed quarter sawed red oak. The window frames and exterior sash are of kalamein copper or hollow copper metal, as circumstances seemed to require.

Protection against fire is another important feature of this building and includes about everything that could be consistently installed in an office building. Other features are a vacuum cleaning system with convenient outlets at each story; a ventilating system for the lavatories and halls; filtered drinking water; unusual light and air and hot water available at each floor.

In the planning and erection of this building, of which Burnham & Co. were the architects, a record was established. Contracts were awarded April 13, 1911, at which time the site was partially covered by buildings which were under lease until May 1 of the same year. On March 30, 1912, tenants began to occupy the building and on May 1 of the present year everything was finished.



A Unique Bungalow Court—The Plot Plan Showing Arrangement of the Grounds and the Various Buildings

Comments on "Triangulus" System of Winding Stair Rails

Exceptions Taken to Certain Features -- Superiority of Tangent Systems Demonstrated

By Cymro

IT was a treat to read in the April and May issues of the paper the articles on "Winding Stair Rails," by "Triangulus," the treat being all the greater owing to the fact that the system presented was somewhat different from the general run of those now in vogue among stairbuilders for constructing winding stair rails. The art and science of handrailing, like everything else, has been advancing gradually but surely on the lines of natural laws of progression until they have reached to-day a standard of perfection beyond which one may almost think it impossible to go.

After a careful study of the articles of "Triangulus" I came to the conclusion that his method partakes more of the elements of retrogression than of progression—considering his method from the viewpoint of the stairbuilder. It does not appear logical that the man working at the bench to-day would encumber himself with such an amount of unnecessary drawing as would be entailed in following the method presented by "Triangulus." The idea of projecting the plan joints and radial plan lines to the elevation merely for the purpose of obtaining a picture of what the correspondent calls the "blank" of the portion of the rail to be constructed—which in stairbuilding parlance is known as a wreath squared and twisted ready for molding—is altogether unusual, more especially in view of such a picture being an item in the construction of rails that is of no constructive value in whatever light we may care to consider it.

Even if it is required in accordance with the method explained by "Triangulus" as containing fixed points wherefrom to project the curves of the required face mold and the bevel to twist the wreath, the system as a whole entails too many intricate cross projectors to be of value to the practical man. The face mold and bevel by modern systems may be obtained without using such a multiplicity of lines.

Compared with any "tangent system" the method of "Triangulus" makes a rather indifferent showing; indeed, it should not be considered as a system, but rather as an ingenious attempt on the part of an advanced mechanical draftsman to apply the common method of projecting solid objects to winding rail construction. It is the method that was in use in the eighteenth century when stairbuilders relied upon "falling molds" as their principal factors—not having then the least idea of how the development of tangents would produce correct geometrical "square butt joints" by merely applying a square to the developed tangents and also to the face of the plank. Since this discovery various systems have been produced, and all of them simple, correct and easily grasped by any one of ordinary intelligence, requiring not the least knowledge of geometry as such, but only the trifling knowledge of a few lines that can be arranged on the "job" by means of the compass and square.

I beg to differ with "Triangulus" when he asserts that these systems "form a set of rules that are more or less arbitrary and only approximate." Why not say that they are absolutely arbitrary and absolutely correct geometrically? In all cases of construction they produce correct results such as may or may not be attained by "Triangulus" method of "deluction and drawing of conclusions from given premises, etc."

Such a system savors too strongly of the academy and university to be agreeable to the intellectual palate of the man who makes use of such tools as a

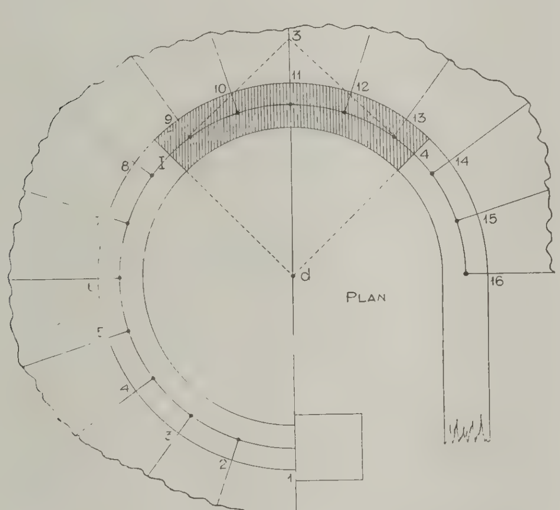


Fig. 1—Plan of a Winding Stair Rail as Described by "Triangulas"

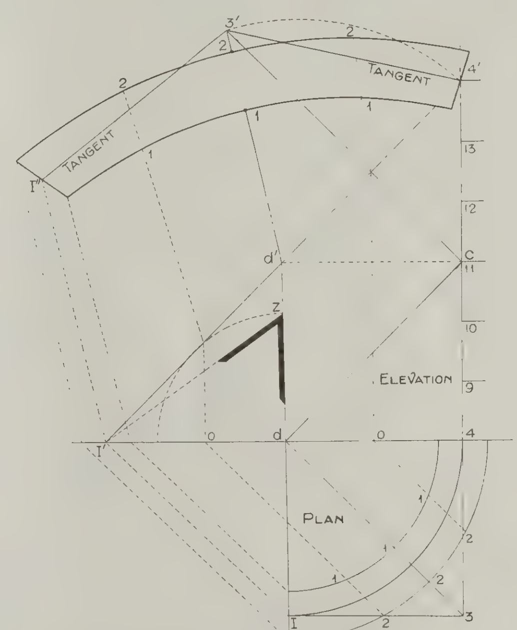


Fig. 2—Diagram Showing Twist and Method of Laying Out the Face Mold

Comments on "Triangulus" System of Winding Stair Rails "jack plane" and "cross-cut saw" for obtaining a living for himself and family. The method most acceptable to a man so situated is the one that by its means will enable him to accurately construct a wreath without being under the necessity of straining his untutored intellect with abstruse mental calculations. In all tangent systems he meets his desires and may proceed to lay out his molds and find his bevels fully confident that with his simple system involving few lines, he will eventually enjoy the satisfaction of having produced a strictly geometrical winding stair rail. I venture to assert that while "Triangulus" would be occupying his time in preliminary deductions and the drawing of conclusions I could by operating any tangent system lay out all the necessary face molds and bevels, and that before he would be through with drawing his intricate projections, all my wreath pieces would have been jointed and twisted ready for the final operation of molding. What asset is there in "Triangulus" method to counterbalance such a saving of time, I fail to discover.

The proper place for his system is the drafting room and its proper function is to illustrate. For such a purpose I have occasionally made use of its principles to project my falling molds, but always with a view to obtaining satisfaction as to the appearance of the finished rails when in position—never as a system of lines to lay out the molds and find the bevels.

The diagrams which accompany these comments nite line square to the pitch line. Now place one leg of the compasses in d' upon the pitch line; open out to $4'$ and turn around to cut the indefinite line drawn from c in the point $3'$. Connect $3'$ with d' and $3'$ with $4'$.

For the operation to be correct the line $3'$-d' should equal in length the diagonal line 3-d of the plan. Now draw any number of lines across the plan curve and parallel to the diagonal 3-d.

Upon o-d-o erect the lines to cut the pitch line as shown and from these points draw lines parallel to d'-$3'$ and make each line equal to its co-relative plan line as indicated. Trace the curve of the face mold through the points 1-1-1 and 2-2-2 as shown. Make the joint at the end I'' square to the tangent I''-$3'$ and at

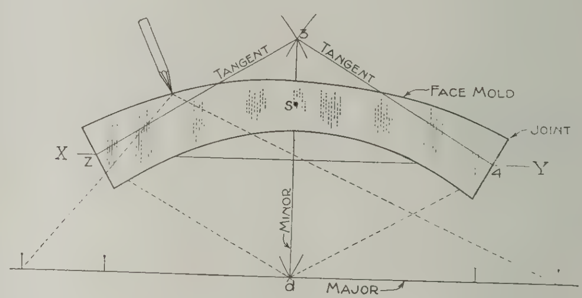


Fig. 4—Completing the Face Mold

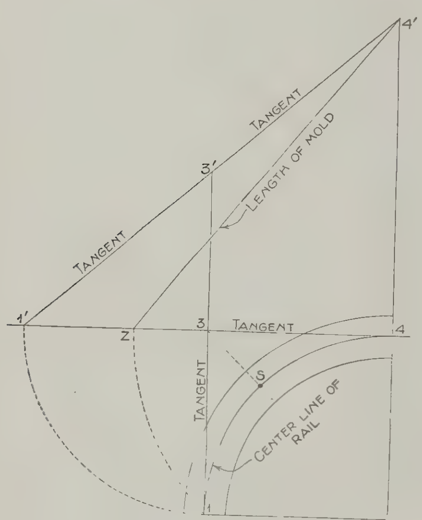


Fig. 3—A Second Method of Laying Out the Face Mold

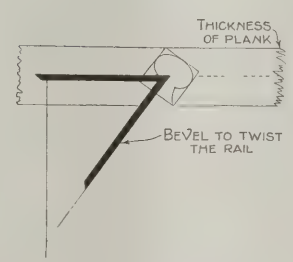


Fig. 5—Showing Application of the Bevel to Twist the Rail

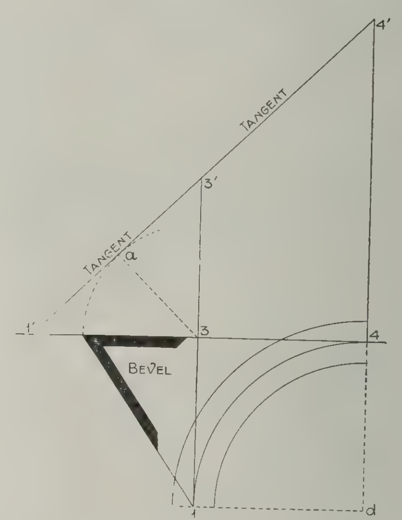


Fig. 6—Plan and Elevation of One Section of the Rail

Comments on "Triangulus" System of Winding Stair Rails

will suffice to show the merits of the tangent systems as compared with that of "Triangulus."

Fig. 1 is a reproduction of the plan of the winding stair rail presented by "Triangulus" on page 205 of the May issue of the *Building Age* and designated as Fig. 4, a portion of which he projected in laying out the wreath.

I will here make use of the same portion to show how by the tangent system to lay out the face mold and how to find the bevel, which comprises all the necessary drawing preliminary to the mechanical construction of the wreath. The portion mentioned is shown shaded in Fig. 1. The first process is to draw the tangents 1-3 and 3-4, also the springing lines 1-d and 4-d, thus forming a square and defining the curve to be a quadrant of a circle.

Now let this quadrant, etc., be reproduced, as in Fig. 2. Upon the point 4 erect the hight of five risers, as shown by 4-$4'$. Now from $4'$ draw the pitch of the tangents as indicated from $4'$ to $1'$ and from d the line d-c parallel to the pitch line. From c draw an indefi- the end $4'$ square to the tangent $3'$-$4'$, thus completing the face mold.

To find the bevel, place one point of the compasses in d, extend the other to touch the pitch line and turn around to z. Connect z with I and the bevel will be as shown at z.

Another simple tangent method to lay out the face mold and find the bevel is illustrated in Fig. 3. Here we find the length of the mold by placing one leg of the compasses in 4, extending diagonally to 1 and turning around to z. Connect z-$4'$. By placing one point of the compasses in 3, opening the other the length of the plan tangent 3-1, turning it around to $1'$ and connecting $1'$ with $4'$ we find the pitch and length of the two tangents.

To complete the face mold draw the horizontal line X-Y of Fig. 4 and make 4-z on this line equal to the length of the mold shown by $4'$-z in Fig. 3. Now open out the compasses the length of the tangent $3'$-$4'$ of Fig. 3. Place one leg in 4 of Fig. 4 and turn around as shown by the arcs at 3 and d. Again place one leg of the dividers in the point *z*, turn around to cut the arcs at 3 and *d* and connect all the points as shown by *z*-3, 3-4, 4-*d* and *d*-*z*. The lines 3-4 and 3-*z* will be the face mold tangents.

Make the joints square to these tangents. The line 3-*d* will be the minor axis and the major axis will be a line drawn at right angles through *d*.

The curves of the mold in this example are drawn by means of pins and string.

The bevel is found as in Fig. 2, and in Fig. 5 it is shown applied to the plank and a profile of the rail is shown twisted by being drawn parallel to it. The thickness of the plank is also indicated in Fig. 5.

A third simple tangent method is illustrated in Fig. 6, differing but very little from the method shown in Figs. 3 and 4. It is so self-evident that explanation is not necessary. The pitch of the tangents as at 1′-*a*-3′-4′ is found the same as in the preceding diagrams.

To lay out the face mold, as shown in Fig. 7, the points 1′-*a*-3′-4′ on the pitch line of the tangents in Fig. 6 are transferred to Fig. 7 and from the point *a* draw a perpendicular line to 1″ and then 1″ is connected to 3′, thus determining the angle between the face mold tangents. The joints at 1″ and at 4′ are made square to the tangents.

The curves may now be drawn as in Fig. 4 by means of pins and strings, or by any other method selected, such as the trammel and straight edge.

In Fig. 8 is shown another simple method and the last to be presented, although many other methods are known, all of which are exceedingly simple. It will be observed that the pitch line of the tangents is found in Fig. 8 as in all the preceding figures. To draw the face mold place one leg of the compasses in 3′ on the pitch line and extend the other to *I*; turn around as shown by the arc to cut the line drawn across the bottom tangent in 5 and connect 5 with 3′, thus forming the correlative position of the face mold tangents.

Now draw the joints square to the tangents and make the bisecting line 3′-2-*o* equal to the line 3-2-*o* drawn across the plan curve. Make the width of the mold at both ends equal the distance between *a* and *o* upon the bevel shown in Fig. 9 and complete the curves as shown by bending a thin straight edge to touch the points found.

In Fig. 10 is shown the bevels applied to the plank to form the twist. The rail in this position appears as it would if laid upon the bench after the twisting, while in its second position it appears as it would, following the pitch of the stairway; thus proving most conclusively the adaptability of the tangent systems to produce, not as "Triangulus" has said, "more or less arbitrary and only approximate," but a most exact geometrical constructive winding hand rail.

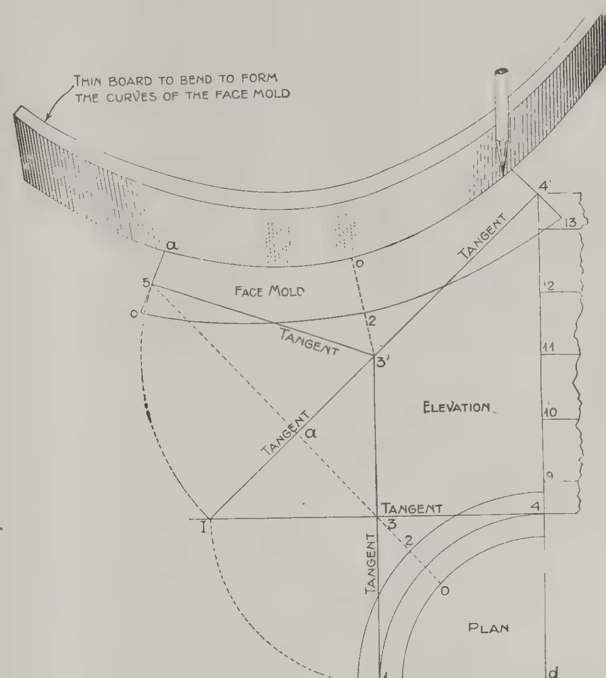


Fig. 8—Still Another Method of Laying Out the Face Mold

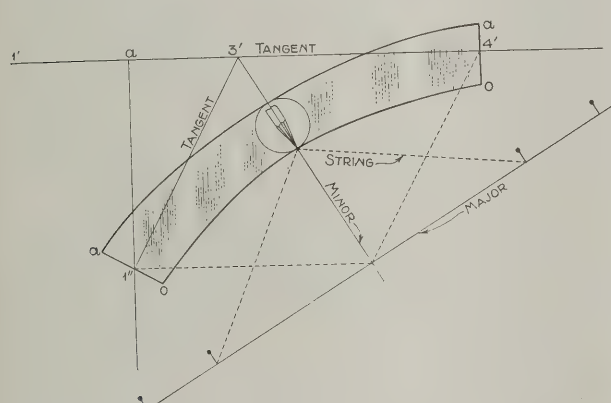


Fig. 7—Showing How to Draw the Face Mold Upon the Plank

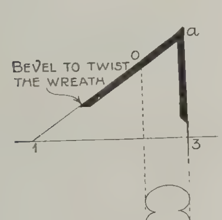


Fig. 9—Section of the Finished Rail

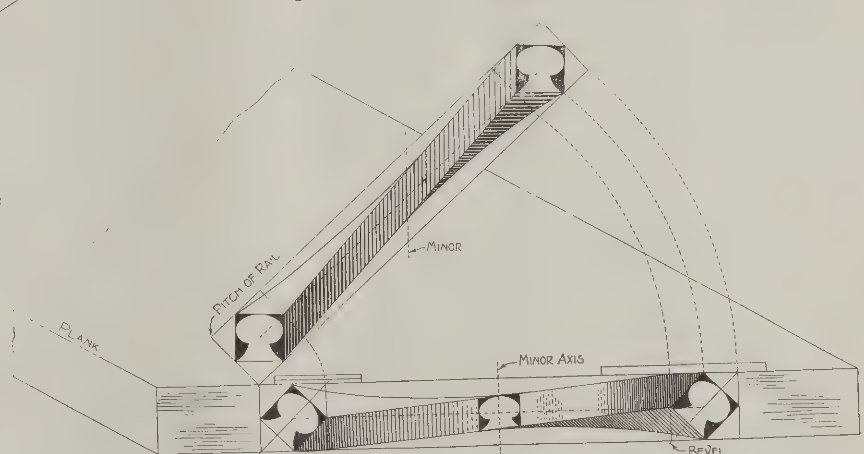


Fig. 10—Showing How the Bevels Are Applied to the Plank and How the Wreath Appears in Position After It Is Twisted

Comments on "Triangulus" System of Winding Stair Rails

The following comments on the same subject have been received from C. C. Grant, Red Deer, Alberta, Canada.

I am enclosing a few remarks on the articles of "Triangulus" which appeared in the issues of the *Building Age* for April and May. At the outset the author states that "every detail of the blank's appearance as seen from any side can be shown upon paper by methods familiar to all mechanical draftsmen in such a manner that the exact dimensions and curves of the necessary blank can be transferred to the plank from which it is to be cut."

At the end of the treatise the author says "art plays an important part when results entirely satisfactory are obtained. There is yet an element as is the case in Fig. 8 that yields to the impulse of the designer. The grand effect of some of the great staircases is due to the fact that the designer had an eye for fine curves."

Why this emphatic contradiction? An expert draftsman could if he had the blank represent it on flat surfaces as claimed in the first statement, but he must *first* have the blank or the lines of the blank. Unfortunately in all such methods the blank and its lines come last. The trouble with railing in the past has been that scientific men have started at the wrong end of the task and each and every one has been forced to admit, as does "Triangulus," that the practical mechanic with his trained eye must do the work and that his science is useless.

It should be clear to one and all who are not blinded by prejudice that the first thing necessary is a line of the blank which curves in two ways and which can never be represented on a flat surface, but which must in the nature of things be placed—if placed at all—on a surface similar to the surface of the well-hole, on which surface it rests when in position.

The trouble is almost wholly confined to the lines next to the well-hole. A drum the size of the well-hole will enable the workman to use all his judgment and artistic sense in securing the lines of the blank before touching the plank at all.

It seems strange that scientific men who work on flat surfaces are unable to see the limitations of flat surfaces and persist in trying in the case of stair rails what each and every one is forced to admit cannot be done.

Now as to details: From the use of the term "mechanical draftsman" and from the fact that little or no attempt is made to deal with easings or irregular rails I conclude that the treatise is not intended for practical use, though in many ways it is vastly in advance of the "tangent system."

Under the heading "Determining the Curve" it is stated that prevailing methods are only approximate, which is quite true. Under the heading "Generating a Cylindrical Surface" it is stated that the moving radius is horizontal, as, for instance, in the thread of a jack screw. This principle is only approximate. With small cylinders and broad rails the results would be ludicrous. A rail should be molded with regard to right sections of the blank as shown at the joints—not with regard to vertical sections. By the method of "Triangulus" the rail would be heavier on the outside and lighter on the inside than the straight rail. Notice his cuts of joint ends. The method is near enough for large cylinders and narrow rails, but in any case is only approximate.

Again, referring to the matter under the heading "Model of Form of Finished Rail," I would say that if the tin profile be rectangular and represents a vertical section the result will be only an approximation as pointed out above. If the tin profile were made to fit a right section, as at a joint, not one of its sides would be straight, but if used as suggested a proper model would result. In that case, however, the entire system of "Triangulus" would have to be remodeled. To make this clear, suppose a rectangular bar were bent to form the blank, its vertical sections would not be rectangles because the vertical line next the well-hole crosses the bar at a more acute angle than does the other.

It is further stated under the heading "Developing a Helix" that the side lines of a joint are curved, which is quite true, and that the top and bottom lines are tapering, from which I infer "Triangulus" means straight, but not parallel. A straight-edge placed on a large thread in the direction of the top and bottom lines will show that they are not straight.

Again, though the author states that the sides of a joint section are curves, he only finds the corners of the joint section and joins these points with straight lines.

It is, however, encouraging to find one man who understands that a wreath of the "tangent system," which climbs irregular as does an ellipse, cannot possibly fit a stair which climbs regularly; that a joint end in a climbing wreath is never square as represented in the tangent system, and that the results of his own and of the tangent systems are mere approximations.

Metal Building Materials Abroad

FOR many years past there has been a brisk demand for sheet metal in South Africa and nearly all for building purposes. According to Consul E. A. Wakefield, writing from Port Elizabeth, South Africa, galvanized iron is used in large towns for fencing small enclosures, for outbuildings, for warehouses, roofs, water tanks and in some instances for dwelling houses. Steel ceilings and side walls are becoming more popular, especially in the inland towns. On the coast the moisture-laden winds are apt to cause rust unless the metal be frequently painted.

There are various kinds of roofings in general use such as pottery tile, galvanized iron, slate, rubber roofing and tar and gravel. So far as known there are no tin roofs. Pottery tile roofing comes from France and England. French tiles sell here at $7.30 per 100 sq. ft. (120 tiles), while English tiles sell for $10.95 per 100 sq. ft. (70 tiles). French tiles, however, require more timber for the roof construction, because of their smaller size, and each tile must be fastened with wire.

While most of the steel ceilings come from England, the American product has a fair market here, with probably slightly increasing proportionate sales. There are no manufacturers of steel ceilings in this district.

Consul S. K. Lupton, writing from Karachi, India, states that, although he has been 3 years in that place he has not seen any stamped metal ceiling or siding. The majority of the houses in Karachi are built of the local products and in the cheapest manner possible. A very poor grade of sand stone is used for the walls. Cases are known where houses less than 30 years old have had to be torn down on account of the deterioration of the lower tiers of stone. Ceilings are of the very cheapest quality of match wood imported chiefly from Hungary. Roofs are covered almost without exception with tiles. A cheap native tile laid in mortar costs about $1.95 per 100 sq. ft. This requires a continuous sheathing and is also very heavy—about 12 lb. to the sq. ft. The best quality of tiling used is manufactured in Karachi and laid without mortar on continuous sheathing. This tile sells for about $13.50 per 100 sq. ft.

In Marseille, France, and vicinity, tiles are practically the only roofing material employed, rubber and metal roofing being used to a very limited extent. The ordinary flat tiles are quoted at the present time (February 12, 1912) at $13.50 to $15.45 per thousand and round tiles $9.65 to $12.95, according to size. Flat tiles laid on roof cost 35 to 40 cents per square meter (10,764 sq. ft.) and round tiles $1.15.

Laying and Finishing Oak Floors

Details of Laying and Nailing -- Scraping and Various Forms of Finishing

By W. L. Claffey

THE laying of oak flooring is not very difficult and any first-class carpenter can make a good job. A sub-floor should be used under both the 13/16-in. and ⅜-in. thicknesses. The sub-floor should be reasonably dry and laid diagonally. Boards of about 6 in. wide are preferred. These boards should not be put down too tight and should be thoroughly dried and cleaned before oak flooring is laid.

It is well to use a damp proof paper between the oak flooring and the sub-floor. Where sound-proof results are desired, a heavy deadening felt is recommended.

Oak flooring should be laid at an angle to the sub-floor. After laying and nailing three or four pieces, use a short piece of hardwood 2 x 4 in. placed against the tongue, and drive it up with a sledge.

The nailing of oak flooring is very important. All tongued and grooved oak flooring should be blind nailed. The best floor made can be spoiled by the use of improper nails. The steel-cut variety is recommended for all blind nailing.

For 13/16 in. use 8-penny steel cut flooring nails. For ⅜ in. use 3-penny wire finishing nails.

The maximum distance between the nails should be:

For 13/16-in. thicknesses.... 16 in.
For ⅜-in. thicknesses.... 10 in.

For even better results, it is recommended the nails be driven closer than indicated.

Scraping Oak Floors

After the oak floor is laid and thoroughly swept, it is best to scrape it in order to get the best results for a nicely polished surface. This scraping process can be done by the ordinary scrapers, such as used by cabinet makers, or by one of the many types of power or hand-scraping machines that are generally used by contractors and carpenters. Always scrape lengthwise of the wood and not across the grain. A floor properly scraped looks very smooth, but still it should be thoroughly gone over with No. 1½ sandpaper to obtain the best results in finishing. After this the floor should be swept clean and the dust removed with a soft cloth. The floor is now ready for the finish.

Finishing Oak Floors

The finishing of an oak floor is a very important feature, upon which authorities fail to agree, but the question resolves itself into a matter of cost, as to the color or brilliancy of finish desired. Personal taste, artistic or decorative effects are the guide for the floor finisher.

The clear grade of oak flooring should have a natural oak filler—color of oak; the select and sap clear grades, a light golden oak filler should be used, and after the floor is filled it should be gone over with a little burnt umber mixed with turpentine to darken light streaks. This will make the select and sap clear grades look like the clear grade, except that it will be slightly darker in color. In filling the No. 1 common grade a dark golden oak filler should be employed, and the light streaks should be darkened in the same manner as the select and sap clear grades. If a little care is used in laying this grade splendid results can be obtained.

Treat the floor with a paste filler of desired tone, to fill up the pores and crevices. To thin the filler for application, one has a choice of using turpentine, benzine, wood alcohol or gasoline to get the right consistency. When the gloss has left the filler, rub off with excelsior or cloth, rubbing against the grain of the wood. This will make a perfectly smooth and level surface. It keeps out dirt and forms a good foundation, which is the keynote for successful treatment of floors. Allow the filler 12 hours to set or dry before applying a wax or varnish finish. Never use a liquid filler on any floor.

A wax or varnish finish can be used. The wax finish is preferred by many, due to economy and ease of renewing places that show the wear. This renewing can be easily applied by housekeeper or servant.

Wax Finish

The best method for applying the wax is to take cheesecloth and double it to get a little more thickness; then make it into a sort of bag. Put a handful of wax inside of this and go over the floor thoroughly. You will find that you can work the wax through the meshes of the cheesecloth to give an even coating over the floor. This prevents too much wax in spots and wasting it. After the floor has been gone over with the wax and allowed to dry, say about 20 minutes, it is ready for polishing. Rub to a polish with a weighted floor brush, first across the grain of the wood, then with it. (A clean, soft cloth can be used in place of the brush if desired); then a piece of woolen felt or carpet should be placed under the brush to give the finishing gloss. After waiting an hour, a second coat of wax should be applied in the same way as the first and rubbed to a polish.

Varnish Finish

This is usually more expensive than the wax finish, but it gives a very hard surface, yet at the same time it is elastic. Two or three coats should be applied after the application of the paste filler. Each coat should be thoroughly rubbed with oil and pumice. Any of the standard hardwood flooring varnishes are recommended.

Floor Oil Finish

When a high-class finish is not desired, a very economical finish can be had by the use of a light flooring oil that is made expressly for this purpose by many paint and varnish houses and oil makers; it serves as a filler as well as a finish and is strongly recommended for oak flooring in public institutions, office buildings and stores. This oil keeps the dust from rising and preserves the floor.

Death of John B. Thatcher

John B. Thatcher, Superintendent of Buildings for Brooklyn, N. Y., was killed June 18 through the collapse of a scaffold while he was inspecting a row of buildings in course of construction in that city. He was born in Egremont, England, May 1, 1853.

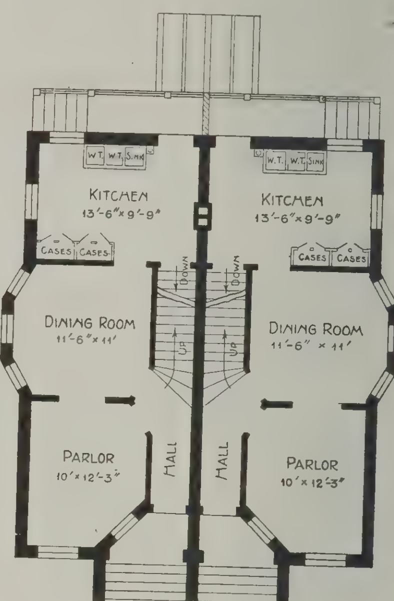
A Two-Family Tile and Brick House

Hollow Tile Laid in the Walls with the Openings Running Horizontally Instead of Vertically

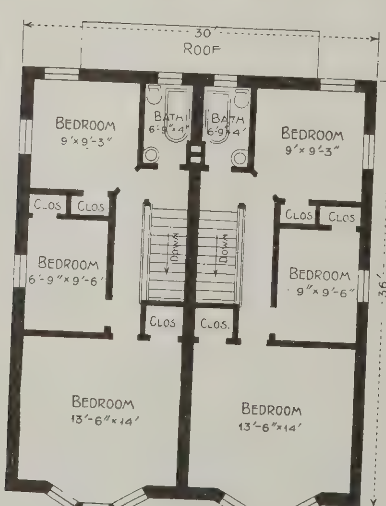
IT is probable that many readers will be interested in the example of "twin" or double house which forms the basis of the present article, as the arrangement of rooms is so compact as to reduce waste space to a minimum. The pictures show the front and rear elevations of the house and clearly indicate the manner in

An examination of the plans shows the hall arrangement to be such as to furnish convenient access to the second floor without disturbing the privacy of the parlor and the dining room. The position of the stairs in the center of the building permits of a bedroom the full width of the house in front, as well as of a good-

A Front and Side View of the Completed House



Main Floor—Scale 1/16 In. to the Foot



Second Floor—Scale 1/16 In. to the Foot

A View at the Rear of the Building

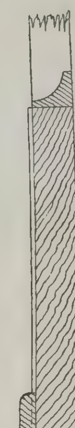
A Two-Family Tile and Brick House—Du Bois Carpenter, Architect, Poughkeepsie, N. Y.

which brick has been used in combination with tile construction, the picture on the next page showing the work before the tile had received its exterior coating of cement.

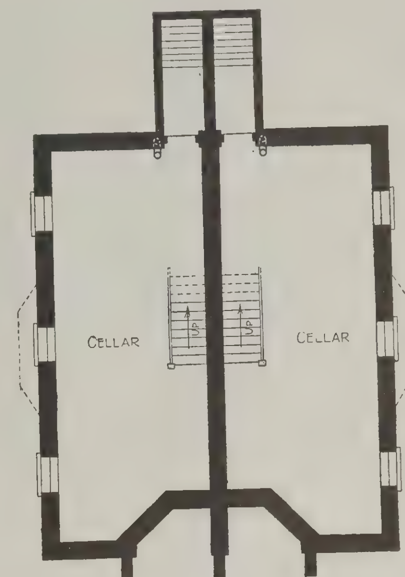
sized closet opening out of it. The position of the bathroom with respect to the chimney is a point worthy of notice, since the warmth from the chimney will prove an important factor in the heating of the room.

The foundations of the house are of stone and the walls and partitions are constructed of Ohio vitrified tile made by the Whittaker Fireproofing Company, Akron, Ohio. A peculiarity of the walls is that the hollow tile are laid on their sides with the openings running horizontally through the wall instead of vertically, as is usually the case. The reason for this is run from front to rear or in the direction of the greatest expansion, this will allow the cement to slide in the corrugations, and while it is not claimed that this will prevent cracking of the stucco or injury to the wall it is felt that it may be a step in the right direction.

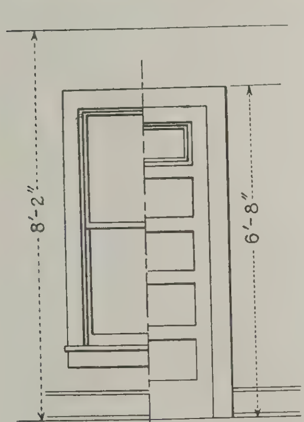
Photographic View of the House in Process of Construction



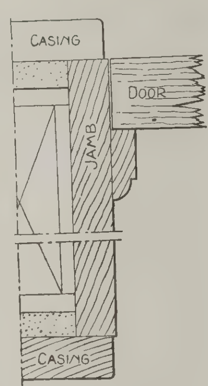
Base—Scale 3 In. to the Foot



Foundation Plan—Scale 1/16 In. to the Foot

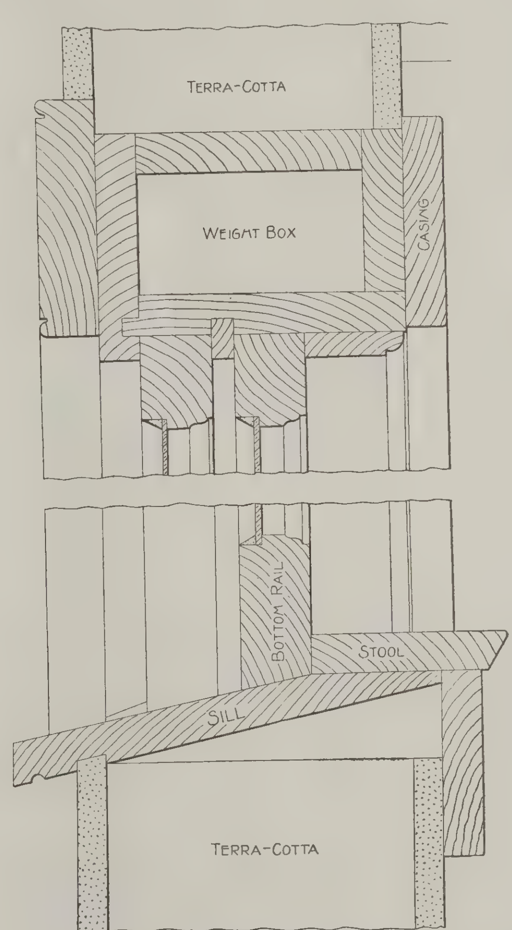


Window and Door Details—Scale ¼ In. to the Foot



Detail of Door Trim—Scale 3 In. to the Foot

Elevation of Kitchen Cases



Vertical and Horizontal Sections Through Window Frame—Scale 3 In. to the Foot

A Two-Family Tile and Brick House

that the builder considered that the longest distance in which expansion of the cement coating would occur would be from front to rear of the building rather than up and down. Since the corrugations on the tile

In a wall of this kind there is considerable strain due to expansion and contraction. When the temperature outside of the wall is below zero and the temperature inside the house is 60 or 70 degrees there is appreciable expansion on the exterior and contraction on the interior of the wall. If the outside coating has a chance to slide in the corrugations instead of pulling against and across them in the direction of the greatest expansion it is thought that the strain on the wall will be somewhat relieved.

Two coats of stucco were applied to the outside surface of the tile walls—a scratch coat and a finish coat, both consisting of one part Portland cement, one part lime putty and three parts sand. The second coat was finished by rubbing in with a wooden float and then coating with Portland cement mixed with sand in the proportion of 1:1.

The front of the first story of the house is constructed of common brick laid up in Flemish bond. The ends of all bricks showing in the wall were painted before being laid with black Hydo-Carbonite made by the Monarch Paint Company, Cleveland, Ohio. The door openings in the front of the building for the two families are arched, which, together with the effects produced by the brickwork, tend to produce a rather attractive exterior.

The second story is of tile and stucco, and each front bedroom has a bay window. The detail of these windows, while simple, is effective, and the whole treatment is of a nature to add to the architecture of the street upon which the building stands. All interior trim is of yellow pine.

The chimney is of hollow cast concrete made by the Lloyd Concrete Block Company, Poughkeepsie, N. Y.

The house here shown, which is one of a series situated on the same street, was recently completed in Matteawan, N. Y., and erected in accordance with plans prepared by DuBois Carpenter, architect, Poughkeepsie, N. Y.

The contract price per house, including plumbing, gas and hot-air heating system, was $3,600, the work being done by the Poughkeepsie Engineering & Contracting Company, Poughkeepsie, N. Y.

Some Thoughts on Furnace Heating

In commenting upon the question as to the necessity of accuracy and of rules to replace the general haphazard methods in vogue, especially in reference to furnace heating, a contractor points out that it must ever be borne in mind that rules and computations will never take the place of brains and experience.

The ratio of loss of heat units from a building as used in computations for steam and hot-water heating will answer just as well for warm-air heating. We might say in passing that the establishment of the average heat unit loss from buildings did not absolutely establish the amount of steam or hot-water radiation required to heat any and every building. There is still a large margin either way left for the good sense and experience of the fitter, engineer or boss plumber to get busy on in order that the plant when put to the actual test may give satisfactory and economical results.

Latitude in Furnace Construction

It may be conceded that in furnaces designed for warm-air heating greater leeway in construction is possible than in a steam heater for the reason that in the latter it resolves itself primarily into a question of evaporation capacity. While in air furnaces heating the air direct, quantity and velocity of air travel have a much larger range of variation with similar grate surface and comparative exposed heating surface than is the case with water, either as water or as transformed into steam. The only rating method therefore that seems practical is the actual test of each furnace as to the number of heat units it will deliver with a given amount of air supplied at a given velocity. From this data it probably would not be difficult to ascertain the figures at varying square inches of air supply and varying velocities. Whether the use of outside air reverses the cooling effect of air leakage or accelerates, it is to my mind an open question, phenomena in support of both contentions having been brought to notice.

In the selection of a furnace I have always confined myself to the two or three makes with which I have become familiar through practice. I have, however, found that in most cases a 36-in. casing furnace (for example) gives better final results than, say, a 42-in. casing furnace of a cheaper output. Unfamiliar makes I have always put up to the owner or architects. "You can have whatever furnace you want! With a No. 16 Tip Top I guarantee results; with the No. 24 Slip Shod, I don't because I don't know anything about it."

Some Causes of Failure

In more than three-quarters of the cases on which I have been called where complaint has been made a handkerchief laid over the register pulled in instead of bulging out with the flow of warm air, showing conclusively that the furnace was hungry for air and naturally robbed the coldest rooms—the castings red hot, the cellar overheated and the rooms cold. Result: The owner condemns the furnace as no good. The first mechanic that comes in says that the house cannot be heated by warm air and plugs for a steam job. And why? Because the steam boiler manufacturers in order to get a market for their goods have been instructing the fitter, the plumber and the hardware man how to install the plant, have been giving them the fundamentals for computing pipe sizes and the requirements of piping. Consequently, the mechanic is on surer ground as to possible results in the case of steam. In the case of warm-air heating, how different! The manufacturer simply puts a furnace on the market, in some cases he will claim that it will heat a certain number of cubic feet, in other cases not. No attention whatever is paid either in instructions or otherwise concerning piping or method of setting. He, the manufacturer, has never before interested himself in the results, and the results have never interested themselves in the manufacturer or his goods further than to condemn them. The furnace, however, is only one part of the job. The installation makes or mars the reputation of the furnace.

Sizes of Pipe

In determining pipe sizes I divide the cubic contents in feet by 30 and the quotient in square inches has been the smallest area of pipe (when not impossible on account of constructional difficulties) for the room. However, I never use smaller warm-air pipe than 8 in. Registers I make 40 per cent. larger in area than that of the warm-air pipe leading to it. This allows the fretwork construction.

I always use a pit under the furnace when possible. If a pit cannot be used the cold-air duct is provided with a deflecting shield to throw the cold air toward the opposite side of the furnace. The cold-air supply must be at least 75 per cent. of the area of the combined warm-air pipes. Due regard is always given to rooms with two or three sides exposed and to long runs by increasing the size of the pipe. Where runs are unusually long the trunk main system is employed. Inside air supply I have only used for its circulating properties, where long halls form a pocket or where air pressure from outside interfered with the flow of warm air from the furnace into the room. The latter condition is often found in flimsily built houses and can usually be ascertained by air currents moving along the floor toward the register.

Forms for Reinforced Concrete*--VI.

Design and Construction of Girder and Slab Forms--Details of Flat Slab Construction

BY FREDERICK W. TAYLOR AND SANFORD E. THOMPSON

THE sides and bottoms of girder forms should be made up in advance, as in column and beam construction already described.

There are two general types of construction: (1) sides made full length of the girder; (2) sides made in sections between beams. If the beams are the same depth as the girder, or only a little bit shallower, say 2 inches less, the first method should not be followed, otherwise it is cheapest to make the sides full length because there is less labor in placing. When the beams are shallower than the girders and the second method is used, a ledger strip may be placed the full length of the girder under the beam form and the sections between the beams placed above it.

Cutting Beam Pockets.—The cost is about the same, it has been found by unit study, whether the beam pockets are cut in the girder sides before or after the forms are erected. In some cases where the design of the floor system changes from story to story, the sides of the girders are remade for each floor and new pockets are cut.

Wall Girders.—Wall girder or lintel forms are more difficult to erect than interiors because of the trouble in bracing the outer side. One plan of doing this is illustrated in Fig. 9, which shows the complete design of the wall girder form with the beam and slab forms connected with it.

It is frequently economical in beam design to provide for haunches at the ends of the beams or girders, so as to increase the depth and provide for the compression due to the negative bending moment. This haunch can be built at very small expense if the form sides are designed for the purpose.

Remaking Girder Forms.—The cost of remaking girder forms is greater than that of beam forms, especially where there is a reduction in size of the beam section. After a beam has been reduced several times it is cheaper to make up the girder sizes entirely new than to try to patch them.

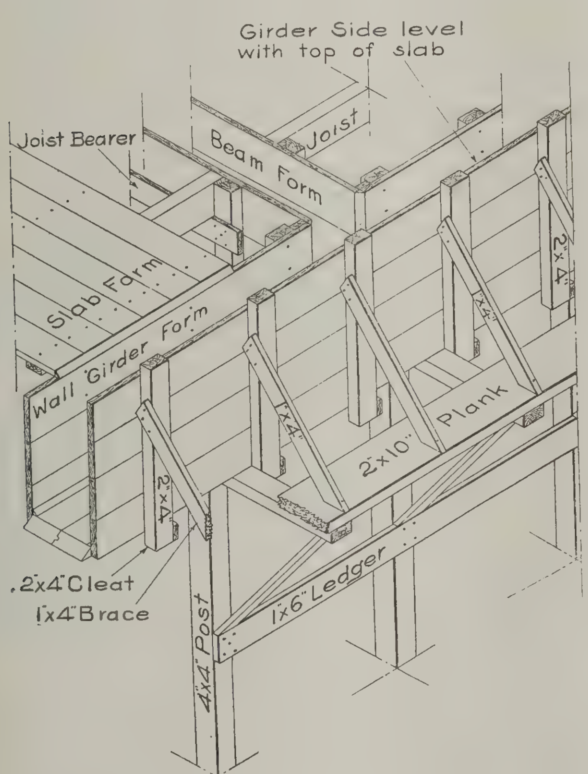


Fig. 11—Design of Wall Girder Form with Connecting Beam

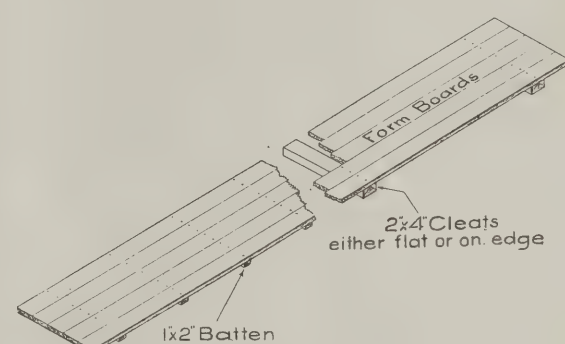


Fig. 12—Panel Forms for Slabs

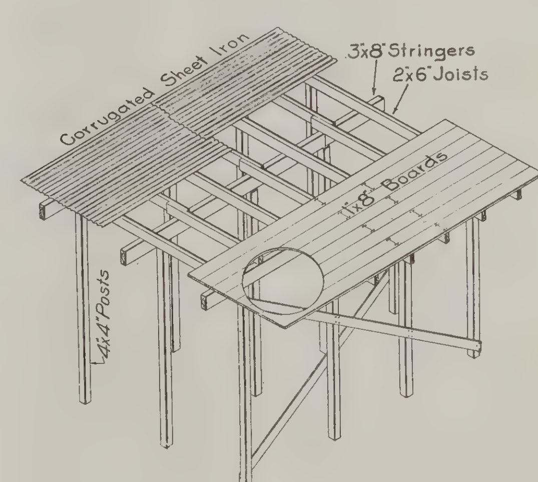


Fig. 13—Forms for Flat Slab; Construction Using Joists and Stringers

Forms for Reinforced Concrete

Slab Forms: Design and Construction

Forms for slabs between beams and girders should be made up in advance into panels of the proper shape and size. This should be done on a bench as described above, according to a carefully prepared design and templet which locate the cleats and specify the number and location of the nails.

Occasionally an exception to this rule may be made if the slab forms are to be used only once, when the

*This article is adapted by the authors for the *Building Age* from a chapter in their forthcoming book, "Concrete Costs."—

boards may be nailed onto the joists in place with only enough toe-nailing to take out the wind. Also, for large flat slabs with no beams this latter method of construction is sometimes used as noted below.

Slab forms are usually made in two, three, or four sections to each panel, depending upon the size and shape of the panel, that is, upon the distances between the beams and between the girders. If made in one section, the form will bind at the sides and ends after having been wet by the concrete so that it is a difficult matter to remove it. Four sections with the joints at right angles is the most convenient arrangement for quick removal. With three sections the middle can be sprung down and then the two end ones drawn.

Flat Slab Construction

Forms for floors of flat slabs resting on columns with no beams or girders are much cheaper than other types of construction because the expensive beam and girder forms are omitted.

The flat slab design for a reinforced concrete floor, from the engineering standpoint, requires the enlargement of the column heads and this considerably increases the cost of the column forms over that of plain columns. This increase in cost, however, is not nearly so much as the saving in the slab form.

Flat slab forms have been designed and erected in various ways, but the type which time studies show to be most economical consists of posts supporting stringers in one direction, upon which are joists spaced the proper distance apart to take the panel sections. Such a design is shown in Fig. 11.

Corrugated Metal Sheathing.—Plain sheet steel for forms tends to warp and dent. To avoid this, corrugated metal has been successfully used for flat slab ceilings in warehouse construction, where the ceiling surface does not have to be absolutely smooth. The corrugated metal is stiffer, holds its shape better, and can be straightened after each removal by running it through rolls.

Removal of Forms

The economy of form removal in building construction depends largely upon the design and method of erection of the forms. If built so as to come down without much prying or removal of nails, the labor is much reduced and the forms are also in better shape to use again.

The column forms are taken down first, and if the beams and slabs are well supported by posts so that no appreciable weight comes upon the columns, the column forms may be removed, in ordinary weather, two or three days after the columns are poured so that they may be used on the floor above. As soon as the concrete of the slabs is hard enough to permit removal of the slab form, the beam sides may also be taken down, leaving in the beam bottoms with the original supports under them for some time longer. In some cases where the weight of the concrete is comparatively light in comparison with the live load which will later come upon it, it is allowable to remove the entire beam form at once and then for safety place a few struts under the concrete. This should not be done, however, unless the stresses in the beam due to dead and construction load are computed to be sure that the elastic limit of the concrete is not nearly reached.

When the whole beam is taken down at once, if the beams in the story above are of the same size, there is no need of taking the sides away from the bottom, that is, the entire form may be taken down and put up without removing the sides. Unless the design on the story above is exactly similar, however, this results in no saving of time.

To make it easy to remove beam sides, the plan has sometimes been adopted of cutting the sides on an angle near both supports so that the center piece will come out easily. When changing the length of the beam, only the ends then have to be rebuilt.

The sides of the girder form are removed after the sides of the connecting beam form are taken down. The girder bottom with its supports should generally be left in place, even if the beam bottom is removed with the sides, because the girder carries a greater dead load of concrete which gives a high compression in the concrete even before any external load comes upon the girder.

Opportunities Offered Young Men by the Building Industry

The building industry offers to the young man who is seeking a vocation in life rare inducements, and opportunities which from the standpoint of doing something worth while as well as from that of profit and ultimate success or, to put it vulgarly, getting rich, is concerned are not surpassed in any business or profession. This statement has often been made in these columns, but it is worth iteration and reiteration, says a writer in a recent issue of *Construction News.* There are many reasons for the supremacy of building over many other lines of industry in which one may embark. There is scarcely a community of any size in the country in which there is not a shortage of dwellings or property for residence uses, look where you will if you please, and you will find this to be true of the larger cities in which the proportion of increase is naturally greater than ever. The creation of something is probably the most interesting thing to a growing, healthy mind that one can engage in.

Good building construction requires close attention, and the man who is ambitious to excel will find an abundance of opportunity to exceed his former attempts to attain perfection. It does not take so much money, but it does require a good clear head, a magnetic personality, integrity, enterprise and ambition to excel in what one undertakes. These qualities make for success in anything, whether it is in a profession or business, but they seem to count for so much more in building operations; that is, buying land, improving it with buildings and selling at a profit. It is a pleasure to watch things grow, to observe the precision with which every detail works into every other detail, to overcome all sorts of obstacles and to have an ambition to attain perfection and to attain it as nearly as it is possible to do. Furthermore, there is scarcely any business or occupation in which one can embark in which there is so much liberty and freedom as there is in the building construction to the man who understands his business. He can begin and construct two or three buildings at the opening of the season and have them rented before they are really finished and at a figure which will pay a good return upon the investment.

If he is so disposed after a while, after his accumulations justify it, to close up his business for a few weeks or a few months, go away and return refreshed and with increased zest go ahead upon a broader scale than ever, success in the past giving him assurance that he will succeed in his future undertaking. In Chicago people have heard the cry so often that the city is overbuilt, that they no longer pay any attention to it. It is believed that Chicago is growing more rapidly now than ever and that this is as good a field as any in which to embark and reap the fruits of careful and intelligent application in the building industry.

When New York City gets its new water supply system in operation the unsightly tanks on the roofs of buildings will begin to disappear and the architectural skyline be greatly improved thereby.

Should an Architect Be Employed for a Small Country Home?

An Affirmative Answer -- Some of the "Don'ts" To Be Observed in Engaging an Architect

By Practical Architect

MUCH has been said about the advantages of building in accordance with plans prepared by an architect, and in contributing to the subject I desire to express the opinion that the person who plans to build a small house ofttimes needs more help than the man who means to erect a palace. The cottager often feels that he cannot afford an architect, so proceeds to give such instructions as he can to his confident builder and goes ahead blindly, saying:

"Why should I employ an architect if the builder can do just as well?"

It is not sufficient to say that a small house must be simple; a small house should in addition to that be unpretentious but picturesque and if possible original. For this last reason especially I would say that an architect should always be employed where possible.

There are many people who look upon the services of an architect as a refinement in building that they can ill afford and can easily do without, and who consider that the commissions paid to an architect would be much more beneficially spent in additional features to the building itself.

A man about to build should to my mind compare the architect with the physician and the builder with the druggist. Just so the doctor writes a prescription and the druggist makes it up, so does the architect his part of the work, which consists of talking the building project over with his client, giving such advice and suggestions as may seem necessary, making preliminary studies (sketches) to give his client a clear idea of the building when completed, and after everything has been arranged to meet the requirements and ideas of the owner, the working drawings are made and the specifications drawn. In other words, the prescription is then finished and the builder is chosen—generally from three or four who have submitted bids—to execute the work.

That the druggist can compound a prescription is no more evidence of his being able to diagnose the case and apply the proper remedy than the ability of a builder to construct a building is evidence of his being able to design one.

The question arises, then, if I am to employ an architect shall I select one who is very successful or one who is in the employ as a designer of one of the larger architectural concerns, and so save considerable on the commission?

Should an Architect Be Employed for a Small Country Home?

This question I would answer with a number of "don'ts."

Don't select a *very* successful architect, as he may turn the job over to one of his draftsmen or even to his junior draftsman and take little or no interest in the work at all, considering his personal attention not furter necessary than to hear the requirements of his client and to explain to his man in the office what is wanted.

Don't select a young designer employed in an architect's office. His ideas are apt to be rather big. Some of these designers think they are the only ones qualified to pass judgment upon style, arrangement, order, proportion, etc., and are of the opinion that even his fellow draftsmen who happen to do the practical part of the work only is not able to pass judgment even upon the simplest kind of a molding. With such ideas he is apt to claim that he be permitted to assume the position of an absolute dictator before whose presence the owner and any one else not doing designing and not being able to draw ornaments shall shrink into proper insignificance. He is apt to say:

"Mr. Owner, just give me an idea of the size of house you wish and leave everything else to me. I will complete the house ready for occupancy in accordance with professional ideas of good taste, style, etc. You don't know anything about proper moldings."

A man of this kind not having the least idea of the practical side of the profession is apt to provide costly things; to change many things already done just because it may not please his artistic (?) eye. He might be very apt to say: "This plaster cornice or this mantel shelf is 1/32 of an inch too low; it does not look well; it will be necessary to take it down," and then he will graciously permit the owner to pay for it.

A man of this kind seems to lose sight of the fact that while doing the designing in the architect's office he received instructions, criticism, etc., upon his design from his employer, who is in this case an educated man with true feeling for art, taste, etc.

It is therefore seen that the one who understands what an architect is and appreciates the advantage of employing one should not select one of these young designers for the sake of saving a part of the commission. The impractical things he may provide will very likely cost us just as much or even more than the saving of the commission.

Select an architect who has had experience in both the artistic and practical side of the profession; who is not over successful, so that he may be able to give you his personal attention. An architect of this kind will not pull in an opposite direction to that of the builder. He will always bear in mind the cost of the house that is wanted and will give to the owner as much comfort, convenience, beauty, etc., for his money as he possibly can get with little or no departure from the original idea of the owner.

Death of Daniel H. Burnham

In the death at Heidelberg, Germany, on June 1, of Daniel Hudson Burnham, of Chicago, the architectural profession of the world lost one of its most valued and honored members. He was conspicuous in the progressive architectural movement looking to the beautification of cities and in the designing of the important buildings of which they are composed. It may truly be said that he was conspicuous as one whose productions combined artistic beauty and the highest utilitarian value.

Mr. Burnham was born in Henderson, N. Y., September 4, 1846, and in 1855 removed with his parents to Chicago. His early education was acquired in that city and he received two years of private instruction in Waltham, Mass. In 1872 he became senior member of the firm of Burnham & Root, which partnership continued until 1891, when on the death of Mr. Root the firm was reorganized as D. H. Burnham & Co.

Mr. Burnham with Mr. Root designed the first skyscrapers, the initial big building being the "Rookery," which was followed by the Temple, the Masonic Temple, the Illinois Trust Bank, the Great Northern Hotel, the First National Bank, the Railway Exchange, Marshall Field's store and others in Chicago. He also designed the Mills Building and First National Bank Building in San Francisco; the Ellicott Square Building in Buffalo; the Society for Savings and the First, Third and Fourth National Bank buildings in Cleveland; the First National Bank in Cincinnati; the Land Title Building in Philadelphia; the Frick Building in Pittsburgh; the Ford Building in Detroit; the Gimbel and Wanamaker stores in New York City, and it was Mr. Burnham who solved the puzzling problem as represented by the Flatiron Building in New York City, which made commercially profitable every inch of space in the lofty triangle which the building occupies.

As the designer of the Columbian Exposition buildings and organizer and controling operator of all forces which carried out that tremendous undertaking, Mr. Burnham achieved an international reputation. He was made chairman of the National Commission for the beautifying of Washington, other members of which were C. F. McKim, Augustus Saint Gaudens and Frederick Law Olmstead, Jr., the new Union Station being one of Mr. Burnham's personal contributions to the scheme. He was also chairman of the commission that has been changing the map of Cleveland, and he devised a heroic plan for a civic center with radiating avenues in San Francisco and adapting it to the steep hills on which most of the city lies. He was also instrumental in planning for the beautifying of other cities and was sent by the United States to Manila to direct the building of the Government's structures at that and other places.

Honorary degrees were conferred upon him by Harvard University, Yale Universty, Northwestern University and the University of Illinois. He was a Fellow and twice president of the American Institute of Architects and a member of the National Institution of Arts and Letters.

Commendation of Automatic Sprinklers

In connection with the sixteenth annual meeting of the National Fire Protection Association in Chicago in May a visit was made to the Underwriters Laboratory where all the various devices which are there tested were inspected. For the benefit of guests tests were made of a metal window glazed with wire glass and of a three-gallon chemical extinguisher, both of which gave satisfactory results.

Considerable discussion was entered into by various visitors, notably a number of fire chiefs, regarding the value of the different appliances on exhibition. It was noteworthy that every one had something commendable to say about the work of automatic sprinklers.

The Bungalow in the Suburbs of New York

The growing popularity of bungalows as residences for the summer months is constantly being demonstrated, more especially in connection with the development of suburban property in the outlying districts of the larger cities of the country. This is particularly noticeable in the neighborhood of Greater New York, where in several sections of Long Island, as well as in the Palisades district of New Jersey and along the water front of other localities, large stretches of land have been opened for residential improvement. In one district on the south shore of Long Island nearly 100 bungalows are about to be erected, these being of varying design and adapted to meet differing requirements. In another section 25 bungalows are being put up and the popularity of this style of cozy cottage habitation is rapidly growing in favor.

William H. McCord, president of Post & McCord, steel construction work, 44 East Twenty-third street, New York City, died suddenly at his home in Greenwich, Conn., June 4, aged 66 years.

A Remarkable Stairway

Constructed of Stone -- Details of the Steps -- The Peculiar Hand Rail -- Thrust of the Arch

WITH the demolition of some of the old Kentucky State buildings following the occupation of the magnificent new capital at Frankfort, there will disappear a stone stairway of unique design and exceptional workmanship. The sketches shown herewith representing the plan and a portion of one flight of stairs were made on the spot by a correspondent of the *Building Age*, who made use of a pocket pen and pocket bottle of ink. They are reproduced direct in order to show what may be accomplished under most adverse circumstances. The position of old furniture was such as to preclude any possibility of taking a satisfactory photograph.

It is stated that only two stairways of this character have ever been erected in the United States. The oldest men of Frankfort say that a stone mason convict dressed the stone from neighborhood ledges and erected the steps which have been in use since 1829.

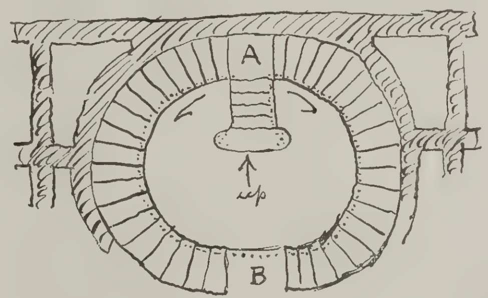
Nearly all of the foundations and walls in Frankfort are of the same material as the steps, all of the material coming from ledges along the banks of the Kentucky River, which flows through the city. Contractors refer to this peculiar hard, close-grained, creamish colored rock as metamorphosed limestone. The delicate keying of the risers and the fact that more than 80 years of constant heavy travel has not produced even perceptible wear on the treads supports the statement that this rock is harder than most specimens of flint. Twenty-five years of less severe use have worn steps of white and blue limestone and some others so badly as to make recutting necessary.

The steps referred to are built in a rather circular lobby and begin with a short straight flight leading up to a platform marked A in Fig. 1, which by the way is a plan of the lobby and the stairway under discussion. At A the steps divide into two flights, each of which rises in semi-circular incline to a keystone platform, marked B, some 20 ft. above the floor level of the lobby, in alignment with and 18 or 20 ft. forward of A and at the level of the second floor hallway. The face of the riser of each step is rabbeted over the back edge of the step below it. The stone A receives the thrust of the two flights and the platform B is a sort of keystone for the helical arch formed by the two flights. The thrust of the arch is divided between the walls and the stone A. The rabbet of the riser faces extends over the tread surface very little—¾ in. or less—but extends down the back of the preceding stone 3 in. or more. The bottom of the flights is smooth; that is, there are no jogs, for the back of each step has been cut away to leave only the rabbet depth.

These joints at the time of writing, says our correspondent, are so perfect that it requires close inspection to detect them.

The handrail shown in Fig. 2, which affords an idea of the stairs in question, is a flat bar bearing a small half-round riveted on top and finishes at the base with a volute having a ball on the turned up end. The volute is supported by four square iron standards of the same size as the balance of the balusters.

Perspective Showing Portion of One Flight of the Stairs



Plan View of the Stairs

A Remarkable Stairway

A gentleman with some knowledge of mechanics traveled these steps many times before noting how they were built. Then, although the steps had seen 75 years of service and been literally jammed with hurrying people, thousands of times, he did not care to again ascend the stairs—not even to fill the honored chair in the State Legislature. The apparent lack of visible means of support has kept many timid people from climbing these stairs oftener than absolutely necessary.

The 25-story Hotel McAlpin on Greeley Square, New York City, contains about 11,000 tons of structural steel.

The Building Age

Formerly Carpentry and Building

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JULY, 1912

Suggestions for the Progressive Builder

It goes without saying that the builder who desires to make a success in his chosen calling must be wide awake and keenly alive to all that is likely to serve in accomplishing his purpose. While no cast-iron rules can be laid down there are many suggestions of which the ambitious builder can avail himself. In the first place it is an excellent idea for him to read the trade papers in his line so that he may keep posted as to what is being done by others and what new things are offering in the way of tools and appliances. When opportunity offers it is a good idea to go round a little and see what other builders are doing, for it often happens that in this way occasional hints and suggestions may be absorbed that will later prove useful. Again, he should send for catalogues and descriptive matter concerning everything in the way of tools and appliances that are likely to be of interest or value to him in connection with the building business. He should study the literature carefully and then file it away for future reference. The builder would also do well to watch the business world around him for suggestions that may be useful in his own work. Now and then from an entirely different line of trade he may be able to obtain an idea that he can advantageously apply in his own work. He should cultivate the initiative; be inventive; strive to develop new ideas in design; new methods of performing work, and new tools and appliances with which to accomplish it. This not only keeps the initiative spirit alive and growing, but develops an individuality that leads to favorable comment and keeps the builder's name and work prominently before the public. Do not be afraid to try experiments, nor to experiment with new ideas. It is better to try a dozen new ideas that are failures than to allow one good one to escape for fear of making mistakes. Every new idea that looks good is worth investigating and the best way to investigate a new idea is to try it out and determine its merits or demerits as the case may be.

Excluding Private Liability Insurance

In its recently enacted workmen's compensation law the State of Massachusetts has created something of an anomalous condition as to insurance against accidents to workmen. As the statute stands the Massachusetts Employees' Insurance Association is created, to be started under the direction of a board of 15 members, to be appointed for one year by the Governor, their successors to be elected by the subscribers, who are the employers. An amendment provides that the liability insurance companies "shall have the same right as the association to insure the liability to pay compensation provided for by the act, and a policy holder of such company shall be regarded as a subscriber." On the other hand, the act legislates out of business the private liability insurance systems which have been established by some of the large industrial companies. The reason given for this discrimination is that it serves to protect the small employers, because it compels owners of large works to join with them in the Massachusetts Association. But as the bars were let down for the liability insurance companies it would appear to be an injustice to discriminate against the owners. In most cases their own systems of compensation and insurance are more liberal to the workmen than those provided by the compensation laws of the various States, including Massachusetts. The law exempts the employer from the payment of damages for the first 14 days of idleness on the part of the victim. A common limit set by owners is 10 days. The amount of compensation is certainly as liberal and the money is distributed as wisely. But so far as the insurance feature is concerned all Massachusetts employees who wish to be insured must either become subscribers of the State Association or go in with the liability companies.

School Ventilation

Laws are valuable only to the extent to which they are enforced and evidence is not wanting that even where there is a good law to compel the ventilation of school buildings installations are frequently accepted which fall far short of legal requirements. In one notable instance three furnaces having 24-in. fire-pots were installed where four furnaces with 34-in. fire-pots should have been used. This plan for heating and ventilating the school was approved by state officials and utterly failed to provide the necessary heat, but certainly supplied the fresh air. The failure to keep the school warm entailed a cost of double what should have been supplied had the state officials been competent. To rectify the primary blunder the heating was supplemented by installing a boiler to supply steam to radiators placed under windows and along outside walls. This instance is cited to show that even a good law must be enforced and supervision by intelligent and competent officials is needed or its provisions are nullified. Already the leaders for better things in law to protect the health of the people are doing the lion's share of the work to secure legislation, but there is work that others must do to make them effective. Every interest affected has a duty to perform in bringing such work to the attention of both the paid officials and the people.

Architects and Their Services

Many people who have the building bee in their bonnet but who are not quite ready to go ahead are afraid to approach an architect and talk the house over for fear he will consider himself definitely engaged, or for fear he may charge for every word of advice given. Now, most architects are pleased to give suggestions and to make rough sketches gratis in the hope of getting the commission. But if these skteches are taken to an inferior man to be worked up or, as is not uncommon, they are given directly to some contractor to build from, the architect naturally resents such treatment and sends a bill. No fair-minded person need be afraid of visiting several architects and frankly stating to them that he came merely to talk the house over and to see some of their work. They will probably all furnish him with rough sketches with the understanding that he is not to be charged for them, says a writer in *Home Beautiful*. In fact, many men in the profession obtain all their work in this way, not only residential but even municipal where the expense of preparing rough drawings may amount to a thousand dollars or more. Those who fail to secure the work simply put it down to profit and loss. But if the successful competitor, after making complete preliminary studies, should be told that the owner is forced to abandon his building project, he expects, nevertheless, to be remunerated for them. The usual charge for completed studies is one per cent. of the estimated cost of the work, while for completed working scale drawings it is not unusual to ask one-half of the total commission that would have been paid had the work proceded.

The Le Brun Traveling Scholarship Competition

We are informed by Egerton Swartwout, secretary of the New York Chapter of the American Institute of Architects, that the jury for the Le Brun Traveling Scholarship Competition has awarded the first prize to Otto R. Eggers and "honorable mention" to the following in the order named: Steward Wagner, Charles H. North, Joseph J. Gander and Oliver B. Raser, Jr.

All of the competition drawings were on exhibition until June 1 at the rooms of the Architectural League, 215 West 57th Street, New York City.

Officers of the Architectural League

At the annual meeting of the Architectural League in New York the following officers were chosen for the ensuing year: President, B. Trowbridge; first vice-president, Robert I. Aitkin; second vice-president, George W. Breck.

Isidore Konti, John A. Tompkins and L. D. Vaillant were elected members of the executive committee for the term ending May, 1913; Birch B. Long, Horace Moran and Stowe Phelps for the term ending May, 1914, and Owen Brainard, Aymar Embury II. and J. H. Hunt for the term ending May, 1915.

Effect of Frost on Water Pipes

The severity of the past winter carried the frost down deeper into the ground than is customary, and much waste of water and inconvenience to people was the result. Reports are being collected and from the facts some further precautions to avoid the effect of frost may be devised. A report made when the weather was coldest by Water Superintendent George A. Glynn, Syracuse, N. Y., with recommendations were presented in a daily paper from which the following is taken:

"With service pipes freezing faster than they can be thawed out in all sections of the city, the superintendent announced that the water bureau would not enforce excess water rates against those who kept the water running a little to prevent freezing. He urged that this precaution be taken, especially in certain sections, which he named, where danger of freezing was greater. In several sections, because of grading and where pipes are not laid so low or the soil is sandy, the danger of freezing is greatest. In such sections especially the water should be allowed to run a little from faucets, and it was pointed out that a thaw did not mean the danger of freezing was over. In fact, it is greater because in a thaw the frost is driven down nearer the pipes. There were cases where it was necessary to thaw out pipes the second time, because the people had ceased to let the water run when the weather moderated. At the time of the report there were nearly 100 frozen service pipes. There were two electrical machines in operation and another was put at work. This trouble was prevalent all over the northern part of the state. Villages asked Syracuse to help them. The water department was then thawing pipes as fast as could be done and was caring for the places where there was sickness first. Besides the electrical machines, six hot water force pump combinations were at work. My experience shows that where pipes are properly installed there should be no trouble. They should be laid below the frost line in exposed places.

Election of Cement Show Officers

At the annual meeting held May 14 of the Cement Products Exhibition Company, under the auspices of which the various Cement Shows have been held during the past few years, the following officers were elected: President, Edward M. Hagar; vice-president, B. F. Affleck, and secretary-treasurer, J. P. Beck, 72 West Adams Street, Chicago, Ill.

It was decided to hold the sixth annual Chicago Cement Show in the Coliseum January 16 to 23 inclusive, 1913, but to hold no exhibition in New York City or Kansas City.

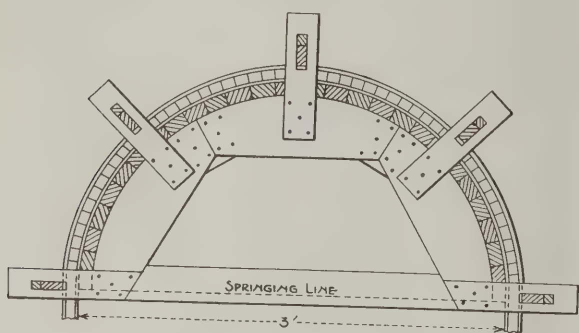
The master painters of Fargo, N. D., have made an agreement with the local union pledging an advance of 2½ cents per hour, the "closed shop" and an eight-hour day after November 1, 1912.

CORRESPONDENCE

A Department Where Those Interested Can Discuss Practical Trade Topics--All Are Invited to Participate

Bending Material for Circular Work

From T. H., New York City.—I am sending herewith a sketch illustrating a method for bending materials for circular sash frame heads, rails in circular framing or for base boards where saw kerfing would not be admissible. It is possible that the scheme which I shall describe may be of interest to a number of the readers of the paper.



Bending Material for Circular Work

It consists of an ordinary drum or center of the required width for the work in hand, with cleats mortised for the folding wedges nailed on each side. The material as here shown is placed next to the drum and then a veneer of ⅞ in. or any other thickness required is saw kerfed on the inside, and when both are well heated and the glue spread on they are placed together between the cleats with the center of the material on the center of the drum. The center folding wedges are put in first and then those next on each side, as shown in the sketch.

This way of bending material gives two faces, and if for panel work it can be plowed in the straight before kerfing. If for a sash frame it makes a strong head, particularly where the frames are built in as the building is put up.

Stop beads for circular head sash frames can be gotten out by taking a plank of the length required and the same thickness as the width of the stop bead. Joint one edge of the plank, then saw off a strip one-third the thickness of the finished bead. Again joint the edge and take off another one-third, then joint the edge of the plank again, run a fine plane over the sawed sides of the other two strips and pin them to the jointed edge of the plank by means of small wooden pegs, keeping them all the same way of the grain. By previously marking across the face of the plank stick the bead or molding, as the case may be; then saw it off at another one-third, making ½ in. or ⅝ in. as required.

Repairing Tar and Gravel Roofs

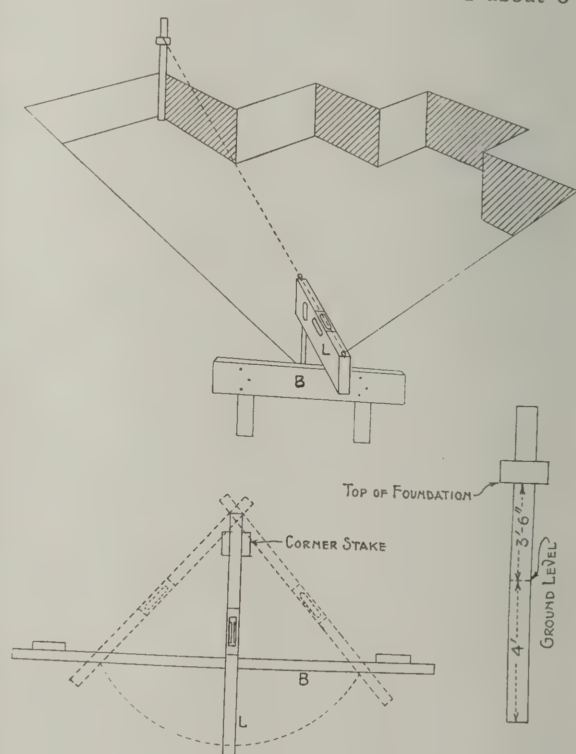
From P. P. Z., Wisconsin.—Will some readers tell me the best way to patch a tar and gravel roof which leaks? I have swept it off clean, heated my pitch, adding a quart of pine tar to 400 lb. of pitch, then throwing on my pitch, I covered with gravel. The gravel is not the best, as it has quite a lot of dirt in it, but I screened it well. This roof was done last October. Now I see it still leaks and in the same spots where the pitch has cracked. Could it be possible that I got the pitch too hot? As I have not had much experience with tar and gravel roofs I would be thankful for information regarding the matter.

Finding Levels for Cellar Excavations and Foundation Walls

From A. S. F., Norwood, Pa.—For the benefit of the readers of the paper I am enclosing sketches showing the method I have used in finding the levels for cellar excavations and the top of foundation walls. To those of us who cannot afford the expensive transit and level this method is simple and the instrument—the ordinary carpenters' level with leveling sights attached—is inexpensive.

An examination of the sketches will show how to arrange the corner stake and batter board. The stake is placed at the corner where the ground is the highest. The top of the stake will be the hight of the foundation wall. Two stakes are then driven as shown and a board nailed to them at the same level as the corner stake. Care must be taken that all points be perfectly level.

For the target use a piece of 2 x 3-in. stuff 8 ft. long and tack to it a piece of white cardboard about 6 in.



Finding Levels for Cellar Excavations and for Foundation Walls

long and the same width as the level. Have the bottom of the cardboard the hight of the foundation wall.

For finding the depth of the excavation proceed as follows: Suppose the wall is to be 7 ft. 6 in. and is to extend 3 ft. 6 in. above the ground at the highest point. Tack the cardboard on the rod so that the bottom edge will be 7 ft. 6 in. from the bottom of the rod. Now have your assistant hold the target at each angle as staked out on the ground and with a piece of cardboard move it up or down until the top of it is on a line with the sights. The difference between it and the bottom of the stationary cardboard will be the depth of the excavation at that point. The depth of all the other angles can be found in the same manner.

This method is quicker and simpler and more accurate than using a straight edge and level.

I have taken your valuable journal for seven years and have obtained from it many practical ideas.

A Fireproof Garage

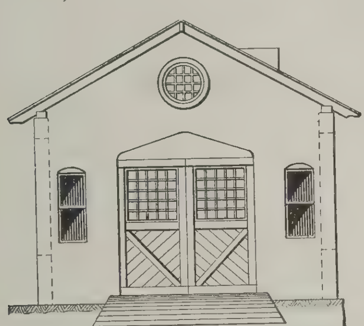
From P. T. Lesher, Steelton, Pa.—The constantly increasing popularity of the automobile has rendered the private garage a common sight at the present day in every section of the country, the designs varying according to the taste and requirements of the owner. A few comments on the subject may not therefore be without interest to many readers of the paper. The best material of which the garage can be constructed is concrete, as the building should be as nearly as possible fireproof, owing to the presence in larger or smaller quantities of oil, gasoline and other combustible materials. A concrete floor should also be used for the reason that a wooden floor soon becomes soaked with oil which tends to rot the tires of the wheels of the automobiles. In order to give ample strength for jacking up parts of a machine the floor should be made very strong.

The garage described herewith has concrete walls 8 in. in thickness and a wooden roof covered with slate. The roof is sealed on the underside with metal lath covered with cement plaster made in the proportions of 1 part Portland cement, 3 parts clean coarse sand and 1 part slacked lime paste, the coat being about ¾ in. thick.

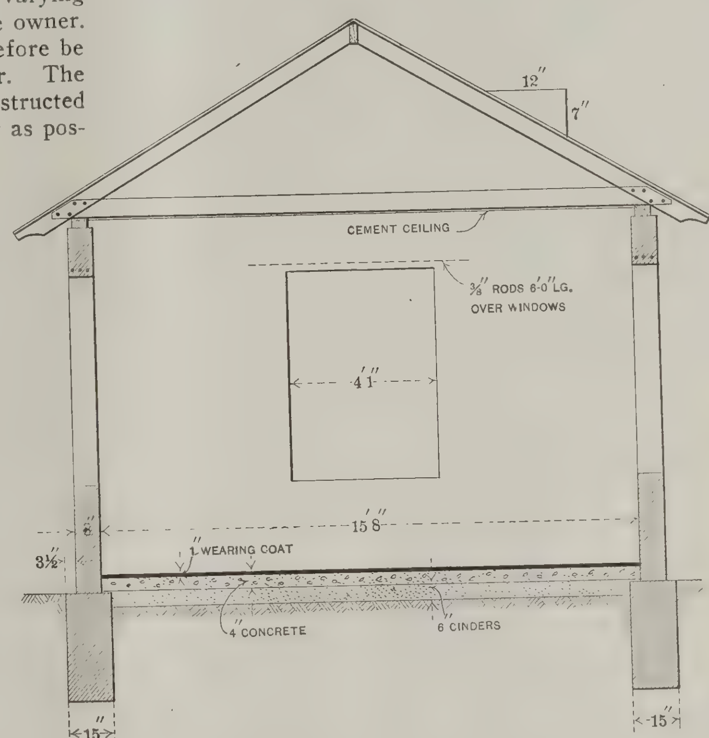
In making the foundations for a garage of this kind a trench 15 in. wide is dug to a depth of 3 ft. below the ground line and filled with concrete consisting of 1 part Portland cement, 3 parts clean coarse sand and 5 parts broken stone or gravel. After the concrete has become hard in the foundation build the wall "forms," as shown in the detail presented herewith. The concrete for the walls should be made of 1 part Portland cement, 2 parts clean coarse sand and 4 parts broken stone or gravel.

When the forms are erected the inner surface should be smeared with crude vaseline, soft soap or other similar material to prevent the concrete from sticking to the wood. In filling the forms with concrete use a flat shovel to work the large aggregate away from the surface, allowing the fine material to go through, thereby securing a smooth finish and a wall of good appearance.

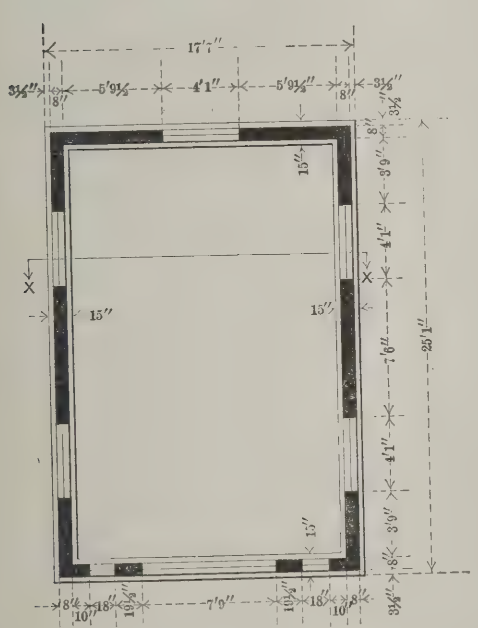
In warm weather the "forms" can be removed in two or three days after the concrete has been placed, and in cold weather four or five days should be al-



Front Elevation—Scale 3/32 in. to the Foot



Sectional Elevation on Line X-X of the Plan—Scale 3/16 in to the Foot



Plan of Foundation—Scale 3/32 in. to the Foot

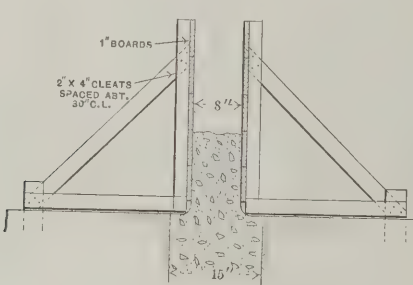
Side (Right) Elevation—Scale 3/32 in. to the Foot

A Fireproof Garage—Elevations and Plan—Contributed by Paul T. Lesher lowed to elapse. After the "forms" are removed the board marks on the outer surface of the walls may be removed by rubbing the surface with a piece of hard sandstone or carborundum brick and then washing down with clean water. The concrete when placed should be of wet, mushy consistency.

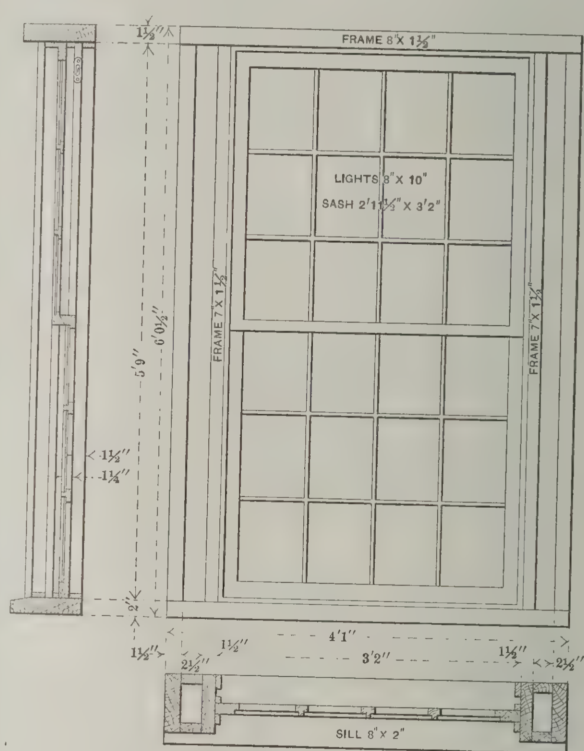
The floor of the garage should be constructed similar to an ordinary sidewalk. First, make a fill of 6 in. of cinders; wet and tamp well so that it will be even and firm. Upon this place a 4-in. layer of concrete made of 1 part Portland cement, 2 parts clean coarse sand and 4 parts broken stone or gravel. As soon as this concrete has set put on a finishing coat 1 in. thick consisting of 1 part Portland cement and 1¾ parts clean coarse sand and smooth with a wooden float. The floor should be graded so as to drain toward one part of the garage, where a drain pipe should be located with outlet at some convenient point.

The rafters should be of 2 by 6-in. timber spaced 18 in. on centers resting on a 4 by 6-in. plate at the walls and nailed to a 2 by 6-in. ridge piece at the apex. The rafters should be covered with 1-in. hemlock sheathing on which the slate roof should be laid with a layer of tar roofing felt between. The slate should be 3/16 of an inch in thickness and laid with a 3-in. lap. The most common sizes of slate vary from 6 by 12 in. to 12 by 18 in. The best quality of slate has a glistening, semi-metallic appearance, but slate with a dull, earthy appearance will absorb water and is liable to be cracked by the frost. The ordinary life of a slate roof is about 30 years. Tile and asbestos roof coverings are sometimes used.

When constructing the front wall of the building the fastenings for the track of the sliding doors may



Section Through Wall Showing Use of Wooden "Forms"—Scale ⅜ in. to the Foot



Details of Window Construction—Scale ½ in. to the Foot

A Fireproof Garage—Various Details of Construction

be embedded in the concrete thus insuring a rigid construction.

In the sketches which are presented herewith will be found front and side elevations of the garage, a vertical cross-section and details of the large windows which are designed to lift instead of swing. There is also a detail showing how the "forms" for the walls should be constructed.

Criticism Of Plank Barn Construction

From L. H. Hand, Palestine, Ill.—The criticism of John L. Shawver, Bellefontaine, Ohio, on "Plank Frame Barn Construction" in the May issue of the *Building Age* is very interesting, but if I may be allowed to say so is, at the same time, unkind. He says the building has "a number of decidedly weak points which may be easily detected by any competent builder." Now I ask is this courteous treatment as between strangers who are mutually working to solve the problem of how to produce from such material as is yet available the best results in modern farm structures?

If the frame as illustrated in the *Building Age* is full of faults, why mention only the end bracing as a weak point in the construction? Of course, the size of the buildings or the number that Messrs. Blue and Giles may desire to erect should not be counted as criticism on my ability as a builder, and when I say I commenced work for Mr. Blue in 1887 and there has hardly been a year since that I have not done more or less work for him, I should consider it fair evidence that my work was satisfactory.

I shall not go into further controversy about the beam brace in the plank frame barn except to say that the support is ample; the brace is doing its work; the building is straight and the structure has stood the supreme test, which my employer told me was the limit to be obtained on all my work when I began to branch out for myself, namely, its giving absolute satisfaction to the owner.

I am glad to see the interest that my little barn has created but I hope we will all get together in a spirit of absolute kindness and investigate the subject to the bottom.

Constructing Spring Floors for Dance Halls

From J. W. P., Salem, Idaho.—Have any of the readers had experience in constructing spring floors for dancing halls? If so, will they kindly furnish the information as to how the work is done through the columns of the Correspondence Department?

Best Method of Placing Sheathing Boards

From W. F. C., Wallingford, Conn.—In reply to "J. C. B.," Dowagiac, Mich., who writes in the May issue of the *Building Age* regarding the best method of placing sheathing boards on frame houses, I would say that in my opinion there is no good reason for sheathing diagonally. As for its forming a brace, this amounts to very little, as nearly all of the boards are cut for window openings.

I think the horizontal boarding where you get a solid course below and between window openings is much better.

Again, if sheathing diagonally and there should be a leak at the second or third story, it may not show until it reaches almost to the sill on the opposite corner. I have also had the experience of a building being twisted out of shape on account of the diagonal sheathing getting wet. I, therefore, find much more satisfaction in horizontal sheathing.

I think it would be interesting to know what some of the other builders have to say on this point and I hope they will give us the benefit of their experience so that we may ascertain the majority opinion.

A Low Cost Summer Home

From W. A. Emery, East Waterford, Me.—As being of possible interest to some of the many readers of the *Building Age* I am sending herewith the floor plan and elevation of a small four-room bungalow which has been designed for a low-cost summer home. An inspection of the plan will show that there is a living room 12 x 18 ft. 6 in. which opens directly from the porch, a kitchen 12 ft. x 11 ft. 6 in. and two bedrooms

Front Elevation—Scale 3/32 in. to the Foot

each having a clothes closet. Between the kitchen and the rear bedroom is the bath room, so placed as to be readily accessible from the other rooms on the main floor.

The living room is of such size that one end of it is to be used for the dining table, thus really combining two rooms in one—a practice much resorted to in connection with small summer homes of this general character.

The foundations and chimney may be of brick, concrete or stone, according to convenience. The walls and roof are to be shingled, also the portion enclosing the porch. The columns are to be cased up plain and painted.

The gable over the porch is to have a glass sash with louvres on either side.

Making Men Work

From Hee H. See, Arbuckle, Calif.—An article likely to be picked up with interest by those of us who have been called upon to make men work, and after careful perusal laid down at the finish with a feeling of dissatisfaction, appeared under the above title in the May issue of *Building Age*. What a fine thing it will be when this item of getting the most out of the workmen can be reduced to simple formulæ, properly tabulated and copied in a card index as this article showed. Then when a fellow comes around looking for a job we will just look up the card index, something after this fashion:

Male; age about 40; red headed; chews tobacco; talks with a Swedish accent.

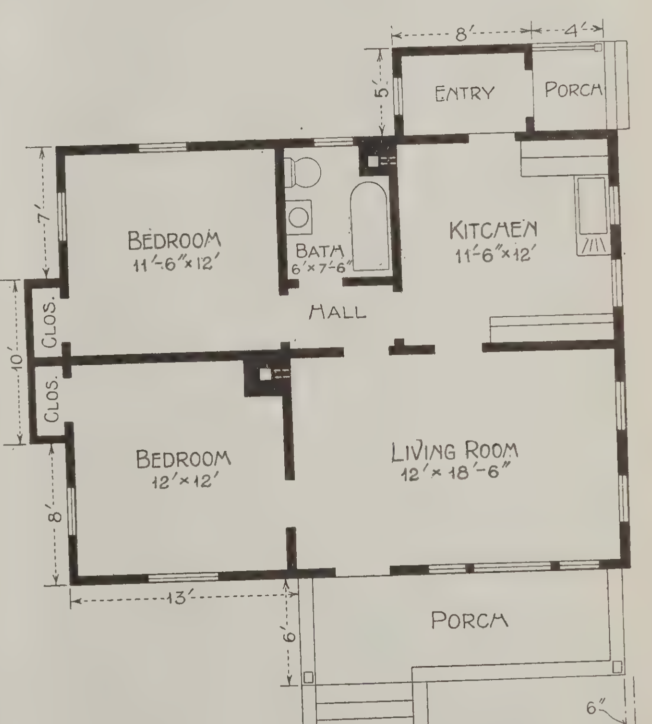
The cards show his efficiency will be 85½ per cent, so as we are a little behind with our work we say: "Yes, Mr. Man, you can bring on your tools in the morning."

And the best of all this will be that those of us who are now getting 2 or 3 cents an hour extra for working Mr. Men up to the limit of their efficiency will no longer be needed and will be able to quit slave-driving and earn our living honestly once more.

"Wages are fixed in advance and every builder of experience knows about how much work he may expect as the result of each day's labor." If he already knows all this, where is the need of his card index?

"One builder discovered that the lengthening of a gangway . . . produced 30 wheelbarrowsful of concrete a day more than formerly." He was a pretty smart builder to drop on to a fact like that, and the question arises where was he when this gangway was first built and why did he leave so important an item to be designed and erected by his workmen without supervision? The inference is, he was busy with his card index, and most of us can easily imagine the talk, gabble and waving of hands that went on as each of these workmen—with poor judgment—expressed his views on the way in which it ought to be done.

Why should the installation of a concrete mixer earn the builder the gratitude of his men? Are we to suppose that the men who originally did the mixing now stand around with their hands in their pockets watching the mixer? If any one thinks keeping a "constant string of wheelbarrowsful of material" running up a gang plank to the mixer, or keeping the same number of wheelbarrowsful running away from the



Floor Plan—Scale 3/32 In. to the Foot

A Low Cost Summer Home

mixer to the "forms" is easier work than turning over the material with a shovel, he has another guess coming.

"It is never a good plan to keep one or two men at work and lay off others of the same gang." This is a statement that needs qualifying. Proper favoritism is one of the competent executive's best assets. The wage scale being fixed by someone else, one of the few ways the foreman can reward loyalty or satisfactory work is by laying off the poorest workmen first. There never yet was a gang in which the workmen were all exactly equal, and unless the better men are going to receive more money or better work or are going to kept on longer, what incentive is there for them to do their best? The foreman can handle his men in this manner and still be quite fair, and all classes of workmen will understand the reason for it without explanation.

The remarks concerning "beer" may be passed by with scant notice. It is pretty safe to say that no present-day firm of any repute would allow beer to be drunk on the work, not even if the owner supplied it.

Now to conclude with a few remarks regarding the constructor who finds that his best foremen are those who have had no previous experience; that surely ought to settle all his trouble, for men without experience are not hard to catch either among the workmen or among the foremen. What a number of us there must be who can look back to the days when we were "short" on experience but "long" on hustling. What a number of times we were able to carry through a bluff by that same system of hustling and how many times the last thing was done first because we had not yet been able to figure out a way of doing the first thing. You may rest assured we hustled; we had to in order to make any showing at all. The boss was on the job most every two hours or so and was always there when anything really needed attention, but that did not take any of the responsibility from our young shoulders, nor deliver us from the need of taking the plans home at night. We each got what we were looking for. The boss got a young hustler of a foreman cheap and we got the experience that would some day enable us to take our services to a more profitable market.

And now that we have the experience and feel that we know a little of the art of inducing men to give up the best that is in them for the man who is paying the wages, is there any part of this knowledge that we can set down on paper for the guidance of others? I am afraid not. The conditions under which work is done and the men doing the work vary too much and each man and condition require different treatment.

Some men can be led; some men may be driven—by a diplomatic driver—and some men put in their best licks when left alone. Most men will work best at the job they like best and it is the business of the man in charge to distribute his men and his work accordingly, being careful meanwhile that this system does not interfere with other portions of the work.

In other words, and to make the story as short as possible, he must do the best he knows how with the material at hand and according to the light that is given him.

Lining Chimney Flues

From Mason, Redford, N. Y.—I would suggest to "U. P. G.," Lewisburg, Pa., whose query appeared on page 209 of the April issue, that he build concrete chimneys, using stove pipe for the inside "form" and let it stay there. This I am sure will give him satisfactory results.

Rendering Cellar Walls Water Tight

From George Connor, Malden, Mass.—If the correspondent writing under the initials "A. J. G.," Needham, Mass., will mix clear Portland cement as thick as heavy cream and brush it thoroughly in all the crevices of the wall and then before it gets dry put about ½ in. of clear cement mortar over it with a trowel, it will stop the trouble of which he complains. I had a foot of water in my cellar and I stopped the in-flow in this way and I know how to feel for him.

Scraping an Old Oak Floor

From O. P. S., Norman, Okla.—I have an old oak floor to scrape and I desire information concerning the proper method. The floor has been filled, waxed and varnished and I wish to remove the coating. I therefore come to the readers of the Correspondence Department for a recipe to remove the coating, as the paint removers are altogether too expensive. I want full directions for applying the remover so as not to stain the wood.

Building a Circular Track in a Gymnasium

From D. P. B., Redford, N. Y.—The correspondent signing himself "E. L. L.," Langdon, N. D., and who asks in the May issue of the *Building Age* how to build a circular track in a gymnasium, is alogether indefinite. Assuming that he wants to know the elevation of the outside of the track a great deal must be assumed.

We will suppose the user of the track weighs 150 lb. and runs 9 ft. per second; that the walk or track is 3 ft. wide and the radius of the curve 15 ft., then we have

$$\frac{81 \times 3}{32.16 \times 15} = .5 \text{ in.}$$

for a 2 degree curve. The degree of the curve is the number of degrees at the center of the circle subtended by the arc, which can be found with a transit or protractor. It is quite likely that he will find 1 in. will do for the highest point on the outside.

Practical Articles Greatly Appreciated

From C. H. J., Indian Head, Md.—The various issues of the *Building Age* are indispensable to me and no doubt would be to a great many other members of the craft if once they would get interested in them. I have followed Mr. Auslander's Lessons in Architectural Drawing, and Mr. McCullough's articles on the Strength of Materials with quite a degree of success. I was very sorry indeed when the Jobbing Carpenter articles were completed by Mr. Crussell because his discussions of various phases of the work which the carpenter is often called upon to execute were very instructive and what he had to say was always read and highly appreciated.

Repairing Shingle Roofs

From D. P. B., Redford, N. Y.—Replying to the query of "Carpenter" who writes in the April issue in regard to repairing shingle roofs or gables where the shingles have been torn off or broken away, I would say that there is only one way to repair a shingle roof. With a long thin cold chisel cut into the nails close to the boards, push it upward and pull down again with a little hook on the side of the chisel made to fit the nails.

The leading builders and contractors at Moose Jaw, Assiniboia West, Canada, recently met and organized a Builders' Exchange, adopting for its guidance the constitution and by-laws of the Builders' Exchange at Regina. The president elected was H. Navin and the treasurer was J. Fidler. A permanent secretary is to be secured and suitable offices will be occupied.

Joint Meeting of Cleveland Architects with Members of Builders' Exchange

The Relations Which Should Exist Between the Owner, the Architect and the Builder

A MEETING of considerable importance to the building industry of Cleveland was held on May 16th when a joint luncheon was conducted by the Builders Exchange of that city and the Cleveland Chapter of American Institute of Architects. Upwards of twenty members of the Chapter were in attendance and about one hundred and forty building contractors also had seats at the tables. The luncheon was the result of conferences between officers of the two organizations who proposed working out some reforms in the dealings of architects and builders with the public and with each other.

The presiding officer was J. C. Skeel, president of the Builders Exchange, who welcomed the architects to the meeting and expressed the hope that good feeling would characterize the discussion. Addresses were made by Benjamin S. Hubbell, former president of the Chapter of Architects; by Albert E. Skeel, the present head of the Chapter, as well as by C. W. Hopkinson, a former president.

The contractors were represented by Henry F. Walker, a mason and general contractor who served recently as president of the City Council of Cleveland.

The outgrowth of the meeting was a decision to establish a Joint Committee on Conference between the architects and the builders, this committee to consist of six members equally divided between the two elements in the building industry.

In his remarks on "The Relation of the Owner, Architect and Builder," Mr. Hubbell said:

We will all agree that the first and most important force that should be considered in the erection of a building is the owner, for without an owner the architect and contractor have no cause for an inspiration on which to work, or if they have, they lack the means with which to carry it forward.

General Classes of Owners

Owners may be divided into two general classes—wise owners and selfish owners. The wise owner is the man who desires to obtain the best possible results; who wishes to improve the surroundings in which he lives and works; who desires to have buildings erected that are appropriate to their use and to their location and for the services of the men who are able to produce these results he is willing to pay a fair price.

The selfish owner is the man who desires to get the cheapest possible building; who cares nothing for the surroundings or for his neighbor's rights; who is willing to sacrifice the higher ideals of life and to make use of every possible means in order to attain the end he has in view.

The first step the wise owner makes is to select an architect of ability, education and experience, and who has surrounded himself with competent assistants. His next step is to present to the architect his idea of the general arrangement, size and style of the structure which he proposes to have erected, and to request of him sketches showing the various methods by which these results may be obtained. When the sketches are presented, a careful comparative study is made of them by the owner and architect, so that the best possible solution be selected. The owner then authorizes the architect to proceed with the working drawings and specifications in accordance with the sketches.

The wise owner places every confidence in his architect. He gives him power not only to dictate all the technical details relating to the selection of materials and workmanship which are to be used in the structure, but he also allows him to select the contractors who are to bid upon the work. The result obtained by this method is shown by all the buildings that meet the approval of educated men.

On the other hand the first step taken by the selfish owner is to select an architect who will submit to him sketches, free of charge, and who will perform the meager architectural services that he requires for less than the amount which competent men after years of study have decided to be the least sum for which adequate service may be rendered. This architect generally lacks ability, education and experience and seldom even professes to have an adequate office force. Such an architect proceeds forthwith to get out the least number of drawings and the most meager specifications that will meet with the requirements of the Building Department, and thus enable him to collect his fee. As soon as the drawings are completed, he or the owner shops around for bids from both contractors and jerry builders, and when the work is finally let, the victim who has secured it proceeds to erect the building with the least possible outlay, often slighting the work to a degree that sometimes endangers life and property.

I am happy to say that the selfish owner is being rapidly supplanted in this country by the wise owner, and that the people in general are beginning to have a much greater appreciation of the merit of an architectural composition and of the quality of material and workmanship used therein. This seems to me to be a cause for rejoicing, inasmuch as the architect and the builder are entirely dependent upon the owner.

Classes of Architects

Architects may be divided into two classes—architects and *archeetects*.

The selection of the architect is of vital importance to the result to be obtained, for if a dishonest architect is selected a first class result cannot be secured. If a capable architect is selected, his procedure is as follows:

First, to give careful study of all of the conditions of the problem, to make numerous sketches, and when he thinks the proper solution has been found, to work out in detail all the necessary drawings and specifications required to thoroughly convey his ideas to the owner and to the prospective bidders. His next step is to select from the list of contractors those names which he knows by experience, or has found by inquiry, to be capable of executing the kind of work he has in charge. Having received the bids from these contractors he usually lets the work to the lowest bidder, who proceeds at once with the execution of the contract in accordance with the conditions set forth therein. The contractor should work with the architect and the architect should work with the contractor, and each should assist the other in every possible way. The idea of some architects that the contractor should be subject to the whim and caprice of the architect is entirely wrong, and is only indulged in by individuals who lack education or who are troubled by dyspepsia.

On every building of importance a superintendent or clerk of works should be employed. In case of buildings costing $50,000 or more, a superintendent should be employed who will give his entire time to the work. He should be selected by the architect and should be paid by the owner. This man should have a thorough understanding of drawings and of all the trades that are used in the erection of the building, and should be a man of experience and business ability.

Owing to the inadequate compensation which architects receive, many of them often fail to provide for adequate superintendance during the erection of their buildings. This results in a distinct loss to the reputation of the architect, and generally is a financial loss to the owners.

This matter seems so important to me that I would suggest that it might be wise for the bodies represented here to-day to take some action in regard to it, for it is undoubtedly to the interest not only of the owner, but of the architect and builder as well, to have a thoroughly capable superintendent in charge of all building operations.

Importance of Drawings and Specifications

The importance of the drawings and specifications provided for the erection of any building cannot be overestimated, and for this reason I would suggest that it might be well for the architects and contractors to appoint a joint committee to formulate some rules in regard to the number and type of drawings and specifications that should be required in the erection of buildings of different kinds.

There are certain conventions which may be consistently used on all drawings made in the various architects' offices, which will not cause the architects any more trouble or expense and which will greatly assist the contractors in understanding the said drawings. To me it does not, for various reasons, seem possible to make such rules mandatory, but if rules relating to this matter were properly formulated by a joint committee so as to suggest a fair and proper method of procedure, there can be no doubt but that all good architects would be glad to conform to them.

Classes of Builders

Builders may be divided into two classes—"builders" and "jerry builders." The great trouble with the contracting business, as with the practice of architecture, is that men too often start in it without any natural aptitude for the work, without sufficient training, and with little or no capital.

In order to be a good builder, a man must have natural adaptability and thorough training in the line of work he is to follow. Besides this, he must be a good business man, and an adept in handling his workmen.

These three are the qualities in a builder which every owner and architect desires:

First—Thorough understanding of the work.

Second—Proper capital or suitable credit.

Third—The desire to do good work.

I often feel sorry for the contractors, owing to the condition in which, as a rule, they are forced to obtain their work, i. e., by open competition. This competitive system often works a hardship on the good contractor, but at the present time there seems to be no better method to suggest.

As a rule when the owner places a commission with the architect, he does so only because he has come to the conclusion that he absolutely needs the building. His lack of experience often leads him to allow his architect insufficient time in which to properly study the problem and to prepare suitable drawings and specifications for the work, while his needs often lead him to demand that bids be taken before the drawings and specifications are entirely finished. Therefore, frequently incomplete drawings and specifications are provided to the contractors and insufficient time allowed them in which to take off their quantities. The result is, that as a rule, the contractors do not really figure the cost of the work—they guess at it. In order that this difficulty may be at least partially overcome, would it not be well for the contractors to take up the matter of having organized in this country a profession which is followed by men, known in England as "The Surveyors of Quantities." These men take the drawings of the engineers and architects, and at the expense of the owners, make detailed tabulated bills of material for each and every trade which is to be employed in the building. These bills for quantities are furnished to each and every bidder, and his proposal is based upon them. This, as you see, reduces the possibility of errors in the contractor's figure, for then, having the exact amount of the materials, he has only to estimate the cost of them and of the labor required to assemble them.

Most of the trouble that arises during the erection of buildings is due to misunderstandings. If these could be avoided, we would have little cause for complaint. In closing I wish to suggest that it is of mutual advantage to have owners, architects and builders co-operate with one another in every way, since it is only by co-operation that the best results can be obtained.

Quality of Hardwood Flooring

In any consideration of the question of hardwood flooring, especially when oak is the material, the point of quality must not be overlooked, for quality in flooring depends to a very considerable extent upon quality in manufacture; that is, on the expert knowledge of handling and matching, which comes only through study and experience at the work. It is generally conceded that almost any man can take good oak and make out of it with a flooring machine and a dry kiln a serviceable flooring, but to obtain the highest quality in appearance and in service necessitates special equipment and expert attention from the time it enters the mill.

In the first place, it must be so thoroughly dried that there is not a vestige of moisture left in it. On its face this appears simple because it is only a matter of applying heat, but in reality it is anything but simple for the very fact that in obtaining the thorough dryness required it must be done without in any way injuring the structure or body of the wood. If it is carelessly dried there is apt to develop what is known as checks or "honeycomb" in the wood until it is neither beautiful nor serviceable after being finished. Therefore, the drying must not only be thorough but great pains and care must be exercised in doing the work.

After the drying has been completed the same painstaking care must be exercised in ripping, preparing and matching the lumber. It is not only a matter of finishing the face and getting it uniform in thickness and width but it must be neatly and carefully matched, so that the joints will not only be smooth but the tongue and groove must fit together snugly so as to give strength at the joints and where the end matching comes. Manufacturers who are experienced in this work are very careful in their measuring and in adjusting their machines, frequently resorting to microscopic measurements so that the flooring will be of uniform width and thickness and will properly match.

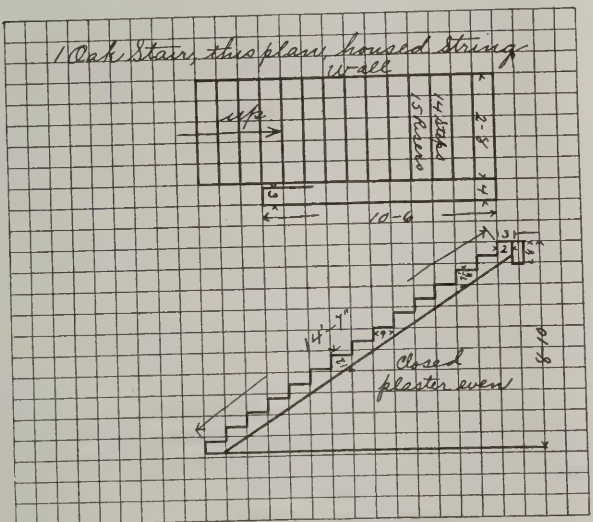
Measuring Interiors for Mill Work

The Carpenter and Builder Capable of Measuring Up a Building Knows Exactly What Is Required of the Millman

WHILE the manufacture of mill work is somewhat outside the field of carpentry, yet the progressive and ambitious carpenter and builder cannot fail to be interested in many of the details which are referred to in the article that follows. If he is capable of accurately measuring up a building he is in a position to know of his own knowledge just what is required of the millman and is not, therefore, altogether dependent upon him for what may be required along this line. In a recent issue of the *Wood-Worker* appeared an article under the above title by John Wavrek, Jr., which we present herewith, together with the diagram that accompanied it:

There are undoubtedly many systems, for each man who measures up the mill work will have a method which differs in some degree from that of another man; but from my experience of the work I have come to the conclusion that the one which is described herein is the most satisfactory—to me at least.

In the first place, the man who takes measurements



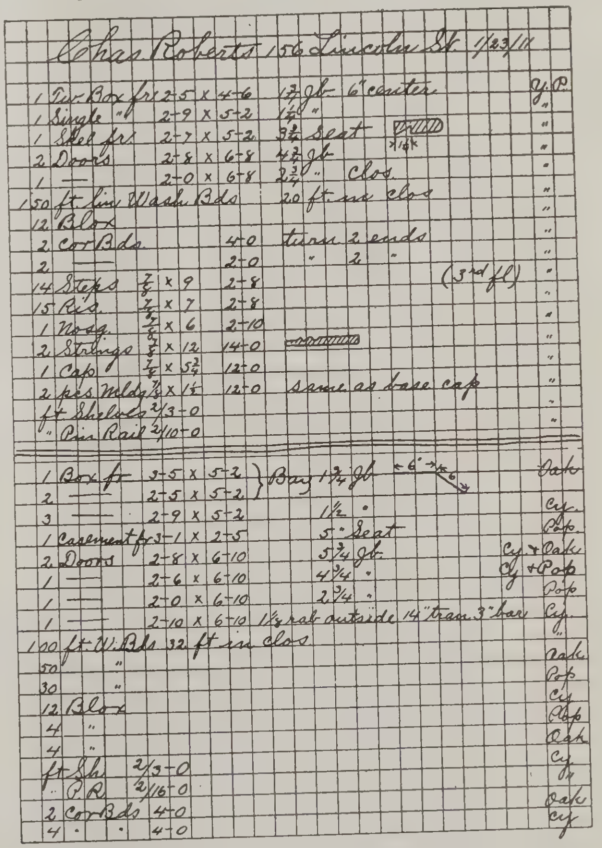
Measurements for an Ordinary Flight of Stairs.

at buildings, it is needless to say, should be thoroughly familiar with every branch and detail of the planing mill; should be a practical mechanic who has had much experience, besides having ideas of his own. Often he will be called upon to make suggestions to people who are building or making alterations, and it would be greatly to his discredit if he were not able to supply them.

The method which I wish to lay out is the result of years of experience and may well be employed by any man who is doing the same kind of work. I have no doubt there are features about it which will not be approved by some, but I trust I shall always be willing and broad-minded enough to learn, and would certainly be much pleased to have suggestions made which will improve on our system.

For an example, we will assume that we are to measure up the interior of an ordinary house three stories in hight. To be thoroughly familiar with the job which we are to work on, it is essential that we read up the specifications thoroughly, also study the plan well. Of course, in most cases there are some changes made either in the plans or the specifications, which should be noted in the estimate or contract sheet. This latter sheet should also be taken along to the job and note taken to see that there are no extras put to the job without being noted on the slips containing the measurements.

A very handy book to use to take data is one which



Facsimile of One of the Pages in Book of Measurements.

Measuring Interiors for Mill Work—By John Wavrek, Jr.

has loose leaves that can be removed upon having completed the measurements, and placed on file. The sheets are in size about 5 by 7 in., and section-ruled. This ruling I find very convenient in making sketches, and especially in taking data for staircases. We will use a 4-ft. rule as the most convenient for our purpose, besides a handy steel tape, for the stair work.

First, then, I go to the uppermost floor, which is the third in this instance, and start by taking the measurements of all the windows first. The handiest and quickest method is to take the sash sizes. Having this, and knowing the construction of the frames, we have a very good basis to work on. There would be one twin box frame, 2 ft. 5 in. by 4 ft. 6 in., 1¾-in. jamb, 6-in. center; one box frame, 2 ft. 9 in. by 5 ft. 2 in., 1¼-in. jamb; one skeleton window frame, 2 ft. 7 in. by 5 ft. 2 in., 3¾-in. seat.

After having taken all the windows, proceed by taking the door sizes next. There may be an opening of 2 ft. 10 in. by 6 ft. 10 in. between the rough studs. This would mean a door of 2 ft. 8 in. by 6 ft. 8 in. The stud, which may be 3 in., would need a jamb of 4¾ in. Whatever the rough opening is, make the door 2 in. less in size and the jamb sizes 1¾ in. wider than the rough stud. However, in cases where plaster boards are used, this would be too wide, but in such case we would make the right allowance for the jamb by finding out the thickness of the wall finish. If an opening for a door should be irregular in width, as, for instance, 2 ft. 9 in., then it is a good plan to mark the studs with the correct size of the door which we intend to furnish, so that there will be no mistake made by the carpenter when placing the jambs.

When taking the size of closet doors be careful to make note of the fact, for in most cases closet doors are only 1⅛ in. thick, while the others will probably be 1⅜ in. Also, very often the trim in a closet is different on the inside in cases where there is a cabinet head finish on the outside. Also measure the openings for switch-box doors, which are usually made the inside size of the box. After having taken the doors, proceed to measure up the baseboards or base, taking the closets separate, because in most cases they are different.

Base Blocks, Corner Beads, Etc.

Next are the base blocks, if any are needed, which is not always the case. Then corner beads, stating how long, for some corners will not allow of a regular 4-ft. stock bead being used. Sometimes it happens that a corner is not at right angles, which must therefore be stated and the correct angle noted.

In most cases there is a plaster railing inclosing the staircase on the top floor. If this wall is 4 in. thick, then furnish a cap of 5¾ in. wide, nosed on both edges, calculating a piece of molding the same kind as the base cap on each side of and under this nosed cap. These moldings should mitre into the base cap. Now measure the closets for shelving and pin rails.

Having taken all the data on this floor, take the steps and risers, nosing and strings for the stairs, which are usually the box kind; also the wall rail. This would bring us to the second floor, with which we proceed in the same manner. It very often happens that this floor has different kinds of wood in the different rooms, the front room being oak or chestnut, the bedroom cypress or pine, and the bathroom and toilet poplar. It is best to mark on the plans the various kinds of finish to be used in the different rooms, so that there is not so much chance to make a mistake, for a door which is to be made up of two different kinds of wood is expensive, as it has to be veneered and cannot very well be kept in stock. These are exceptional cases and should be measured up carefully.

On this floor there may also be a bay window, in which case take note of the width of space between the frames at the angles, for in many cases the regular trim is not wide enough, and a special trim must be made for these angles. If a seat is to be put in this bay window, correct measurement must be taken of all the angles, length and depth, so that the seat will fit when sent to the job.

It is often the case that a door leads onto a rear porch from this floor. Note must be made of this fact, because the door will only need trim on one side; also a threshold will be wanted. If this door has a transom above, take size of same, also width of bar, so that the trim on the inside will be made long enough. In the bath room there will very likely be a medicine closet; take the rough opening size of this, also the depth.

The first floor is usually the hardest to measure up, for very often there is a colonnade which members into the staircase, and must therefore be measured very exact. Then there may be a paneled wainscot in the dining room, in which case the utmost care must be taken to get the figures just right, or there will be "something doing" when the paneling does not fit. A circular bay window is also one of the nightmares which often occurs on this floor. If this should have a paneled base or box seat then your troubles are more than a few. However, be sure what you are about and go ahead.

In the kitchen there is a dresser, which sometimes has to fit into a certain space between the trim of two floors; this must be measured very correctly, also the height of the story taken. The range-placec trim and doors must not be forgotten.

The staircase, which is by no means the easiest part of the job, I usually reserve for the last. This necessitates the making of sketches in order to take down right so that the stair man may readily understand what is meant. Here it is very appropriate to impress the fact that whoever the man that takes the data he should be able to make a tolerably good sketch, both instrumental and free-hand, for often it is required of him to sketch the outlines of some ornamental work which has many curved lines and moldings and which must be duplicated exactly.

Expert Man Required

It is therefore evident that you cannot pick out a man at random from the mill employees and send him out to get data. Also, there is very great responsibility connected with the work which is not always appreciated by the mill owner. If you have the right man it is to your interest to pay him well; his path is not strewn with roses, for if anything goes wrong the man who takes the measurement is blamed first.

The data should be explicit in every respect, so that the man who writes out the cutting list for the mill may understand it thoroughly without asking a lot of questions. It often happens that the measuring man will be out for several days in succession, and if the data is not explicit it will cause great delay in writing out the cutting list.

Accompanying are specimen pages of the method which I employ. It would please me to hear from others on this subject.

Chicago Planning Fire Prevention

In an address welcoming the National Fire Protection Association to Chicago, Mayor Harrison briefly outlined some of the things being done in that city to render life and property safer from fire. Of recent years there has been great improvement in fire-fighting apparatus, and it is proposed to install a separate high pressure fire service system of water supply. A new and comprehensive building code and the equipment of premises with "first aid" appliances are some of the things being taken care of.

The equipment of non-fireproof buildings with automatic sprinklers and the equipment of fireproof buildings with automatic sprinklers when the contents are of a highly inflammable nature, is generally recognized as one of the cardinal features of up-to-date fire prevention engineering. It is, of course, recognized that these sprinklers will not prevent a fire from occurring, but they will prevent a small fire from becoming a large one, and for this reason are considered as one of the strongest and most efficient agents for carrying on the fire prevention campaign.

Septic Tank System of Waste Disposal

Explanation of Process of Sewage Reduction and Suggestion as to the Design of Tanks To Be Used

ONE of the very interesting papers presented at the January meeting of the New England Plumbing Inspectors' Association, held in the city of Boston, was that by F. W. Tower dealing with the above subject. So much interest attaches at the present time to the proper utilization of the septic tank in connection with the disposal of sewage, especially in the case of isolated dwellings, that we present the following extracts for the consideration of our readers:

The septic tank system refers to a system that promotes putrefaction by means of animal bacteria called aerobes, which act upon the contents of a sewage tank or cesspool and change the conditions of the sludge into a less obnoxious matter. The most marked feature of the water carriage system is the great dilution which the organic matter undergoes. The volume of sewage is practically equal to the water consumption. The waste matter received increases the volume very little, 1 lb. in 120 gal. organic matter, to remove and destroy which is the purpose of the disposal plant. This 1 lb. of organic matter with its 120 gal. of water is all carried by the house drain to a suitable place, the distance from the house varying with conditions, and collected in a chamber called a septic tank.

Size of Tanks

The size of the tank should be made so its contents may be changed once every 8 to 12 hours; that is, its size must be such that the quantity of waste delivered into it would fill it if empty in the stated time.

The temperature of the water is preferably not colder than about 55 deg. F. to favor the conditions for bacterial propagation.

Process of Sewage Reduction

In the complete reduction of sewage by the septic tank method two forms of bacteria are developed, anaerobic and aerobic. Air and light retard the multiplication of the first of these. The second requires oxygen (air), and rapidly multiply in the open air. These bacteria attack the solid organic matter which is discharged into the first or grit chamber. After a suitable interval, usually 24 to 36 hours, the matter, which is considerably liquefied, overflows into a second or settling chamber, where light, air and agitation are absent, which rapidly develops the bacteria called anaerobes. These not requiring air or light attack the remaining solids and rapidly remove all gases and purify the liquid mass to a great extent. The more complex of these solids are converted into simpler compounds, the ultimate result of the decomposition being the production of ammonia, carbonic acid gas, hydrogen, etc. The action of the septic tank is bacterial and not chemical.

Anything of a metallic nature will not be affected, and such material will have to be removed occasionally. It takes some time for bacteria to breed in sufficient numbers to do efficient work and the tank contents should be undisturbed.

Both inlet and outlet of the tank should be arranged to be below the surface of the contents when the tank is full, so that the scum which gradually forms on the surface will not be disturbed by the entrance or outflow of matter. This scum, resembling wet ashes, helps to retain heat, and exclude light and air from the mass, all favoring the desired result. The bacteria necessary to the process are always present in abundance in fresh sewage, and no preliminaries are necessary for the operation.

The purification process is somewhat difficult to define, being partly a straining process, but chiefly an oxidizing process of organic matter accomplished through the agency of bacteria. Warm weather increases the action of the anaerobic bacteria.

No septic tank shows good results when first put in operation, as the bacteria have to be cultivated—6 to 12 weeks in large plants.

Construction of Septic Tank

The construction of the septic tank, to be effective, should contain at least three compartments. The first is the grit chamber, in which the most important action takes place and in which the bacteria require the oxygen of the air to perform their functions, acting upon the organic matter in solution and causing oxidization. The second compartment is the settling chamber, in which the bacteria do not need air or light to perform their functions to liquefy still further the matter and also change it into a gaseous condition. The third compartment is the discharge chamber, from which liquids may be disposed of by several methods such as sub-surface drains, irrigation, or filtration into a well specially prepared, from which the contents may be pumped.

All the chambers should be water-tight. The object of these successive purifying operations is simply to get the sludge or solid into the form of pure water which can be discharged on the ground without producing bad results.

The final disposal where made into an underground system of distributing pipes is an entirely satisfactory method where the soil is dry and of a sandy nature. In discharging into sub-soil systems it is well to know that the bacteria existing in the soil and that act upon the sewage are most numerous near the surface and decrease rapidly as the depth increases, and at a depth of 5 ft. bacterial action practically ceases.

When the soil is wet, heavy or of a clay nature, the final disposal of an underground leaching system cannot be employed effectively, as the liquids have no opportuntiy to become purified by filtration through the soil, but are simply deposited to saturate the soil, the result of which grows constantly worse. When these conditions prevail the discharge chamber may have its contents siphoned into a filter constructed below its lowest level, of broken stone and gravel. From this filter the partially purified water is conveyed to another sand filter also located underground below the level of the first filter, and from this point the liquid is pumped on to the surface of the ground. It is necessary to pump the filtered water from the second filter at stated intervals or the water would back up in the first filter, and thus defeat the purpose for which they are used. The filtering material will need removing occasionally, as it will become filled with impurities.

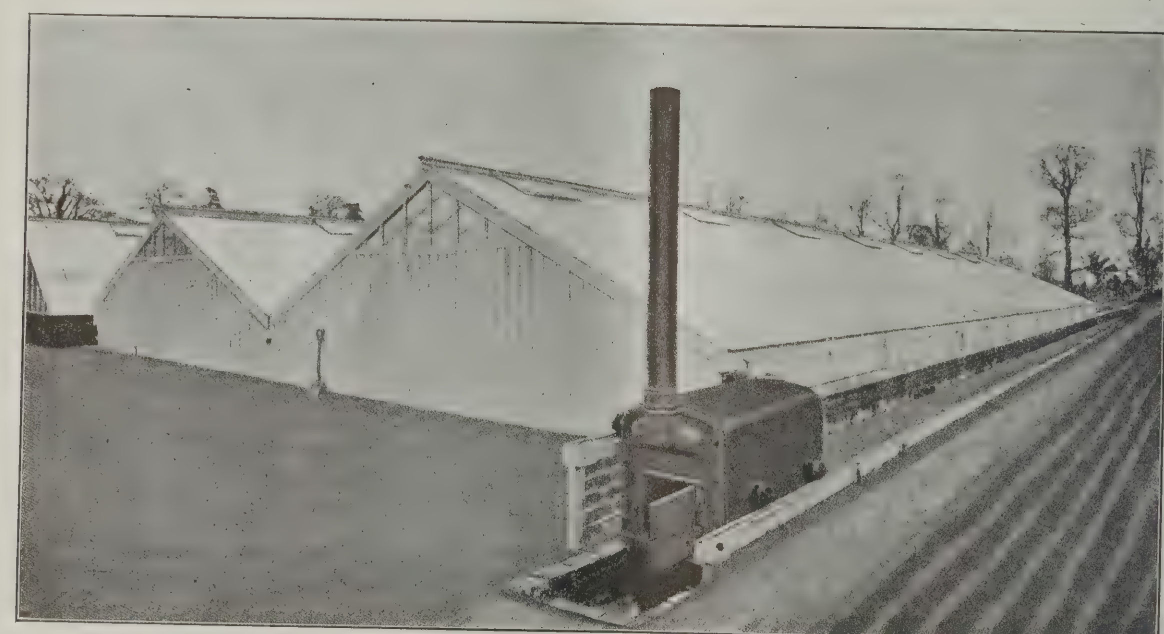
Determining Size of Tanks

By proportioning the size of the tanks of a capacity for, say 36 hours, septic action will take place without odors. The daily amount of sewage may be obtained by multiplying the average number of people housed in the building by 30, thus obtaining the number of gallons discharged daily into the plumbing system. The size of the tank is determined by deciding on the duration of time the liquids are to be allowed to remain in the tank. It should be large enough so that the sewage in passing through it has a slow current. This gives time for the bacteria to multiply at a very high rate and decomposition is thus effected. The product is defined as a harmless, colorless and odorless liquid.

This system provides the means of securing a system of sewage disposal under difficult condition, and while it requires more or less attention, will be a satisfactory method where public sewers are not available.

Heating a Traveling Greenhouse

The traveling greenhouse shown in the accompanying illustration is a recent foreign invention developed to secure the service from one greenhouse which would ordinarily be derived from three stationary buildings of equal size during the season. These houses are mounted on wheels and tracks are provided on which the houses may be moved.



Traveling Greenhouse with Heater Mounted on Wheels

These traveling greenhouses have been put on the market by the Horticultural Traveling Structure Co., London, England, and for which patents have been taken out in different foreign countries and the United States. It is pointed out that it is only necessary to run tracks along the ground on which three different crops are to be raised, one to follow the other, and the greenhouse to be removed from one plot of ground to the other as fast as the crops are harvested.

The greenhouses are made about 100 ft. in length and vary from 25 to 50 ft. in width. As will be seen from the accompanying halftone engraving, the heating boiler is mounted on wheels so that it may be moved at the same time the greenhouse structure is moved from one crop to another.

It is pointed out that the piping for the heating is strongly fixed within the house proper with the flow and return pipes coming out at the corner where the connections are made with the boilers so that the house piping may be disconnected from the boiler while the moving is being done and that the boiler may be moved separately. Where desirable, a movable house may be erected over the boiler.

Seattle's Tallest Skyscraper

What will undoubtedly be the tallest office building in the world to rest upon foundations of concrete piles will be the 44-story structure that is now being erected in the city of Seattle, Wash., for the L. C. Smith Estate. It will be exceeded in hight only by the Metropolitan Tower, the Woolworth and the Singer Buildings, all of which are located in New York City. Caisson foundations of the same type as those sunk in connection with these latter structures were originally considered in the drafting of the preliminary designs of the Seattle building, but after a careful investigation of the soil conditions and of the types of structures that have been built on concrete piles during the past ten years, it was found that piles of this type would constitute a foundation equally as secure as caissons, while at the same time there would be effected an economy of something over $150,000.

The concrete piles will be of the Standard Raymond type, made by driving a tapering sheet steel shell by means of a steel mandrel and withdrawing the mandrel after the desired penetration has been obtained. The shell will then be filled with concrete.

The architects of the Smith office building, as it will be called, are Gaggin & Gaggin, of Syracuse, N. Y., while the general contractors are the Whitney Company, New York City. The contract for placing the concrete piles for the foundations has been awarded to the Raymond Concrete Pile Company, New York City, and Chicago, Ill. Christian J. Jeppesen is the special consulting engineer for the foundations.

The well-known wall paper manufacturer, A. Thibaut, is about erecting a $45,000 residence at Highland Mills, N. Y. The building will be 3½ stories in height and will be constructed of concrete blocks. The outside buildings will consist of a garage and a cottage.

New Publications

Concrete Costs.—By Frederick W. Taylor and Sanford E. Thompson; 709 pages. Size, 5 x 8 in. Numerous illustrations and tables. Bound in board covers. Published by John Wiley & Sons. Price, $5.

One of the phases of concrete construction which has commanded serious attention on the part of the contractor and the builder has been that of determining some satisfactory basis for estimating the time and cost of labor operations in connection with work of this character. In the book under review the authors have gathered together some very valuable information bearing upon this phase of construction and what they have presented is designed especially to meet the needs of the contractor as well as of the architect and the engineer. In the prefatory remarks the authors call attention to the fact that while the application of scientific management to construction work has only barely begun, a marked development is taking place among the more advanced contractors and builders in the direction of better organization and of closer attention to the smaller details of estimating and of management that lead to an increase in efficiency and a consequent reduction in cost. This fact they point out may serve to justify the minute subdivision of the matter of the book to readers who would otherwise think it excessively detailed.

The subject matter is considered in 23 chapters, the first two of which deal with approximate costs of miscellaneous concrete work and cost data taken chiefly from engineering literature. In the third chapter approximate costs of reinforced concrete buildings are given in terms of cost per square foot of floor surface. The tables and diagrams cover a wide range of areas and types of buildings and the values include all miscellaneous details such as windows, stairs, elevators, etc., but exclude interior finish. In this chapter the tables and diagrams afford the architect, the owner and the builder a general idea of the probable cost of a contemplated building, and also a means of comparing the cost of different designs.

Two chapters are given up to a discussion of labor costs in general and to a consideration of practical ways of organizing construction work along lines of scientific management. Another chapter is devoted to the proportioning of concrete, while the seventh and eighth show by means of a series of tables the quantities of materials required for a cubic yard of concrete, also the cost of materials based on definite prices of cement, sand and stone.

In chapters nine to thirteen inclusive, labor costs of the operations of preparing the materials for concrete and of mixing them are treated, these chapters covering the excavating and crushing of stone for concrete, the handling and transporting of the materials, the mixing of concrete by hand, the layout and cost of plant, together with the cost of mixing concrete by machine.

Chapters in which many of our readers will be specially interested are those on "form" construction and copious extracts from which have recently been running in these columns. Some 35 original drawings, most of them in isometric view show the important details of form design as developed by the authors after a thorough study of the methods in use by the best practical builders.

The major portion of the remainder of the volume is devoted to tables for use in preparation of form designs and of estimates. The tables of concrete volumes and of steel are arranged for use in taking off quantities from plans, while other tables give the quantities of lumber required for "forms." These tables will greatly assist in estimating the cost of materials as well as labor and the values are presented in such shape that they can be readily taken off for estimates.

Not the least interesting and valuable features of the volume are the tables showing the length of times it takes to perform different operations as well as the tables of unit times of individual operations, the latter being especially serviceable to those who wish to go into a thorough study of the problems of estimating costs and developing economy in construction.

The concluding chapter is largely devoted to an outline for making up estimates on building construction and includes an example showing the method of using the tables of volumes and the tables of times and costs in practical estimates. This book is by the well known authors of "A Treatise on Concrete—Plain and Reinforced," and as the subject matter is based upon work actually executed the volume constitutes a most valuable contribution to the literature of concrete construction.

Pipe Fitting Charts for Steam and Hot Water.—By William G. Snow; 286 pages. Size, 6 x 9 in.; 232 illustrations. Bound in board covers. Published by David Williams Company, 239 West 39th Street, New York City. Price, $1.50.

This is a work in which the practical steam and hot water fitter will be interested, for it treats of details of piping rather than with general heating layouts, the author assuming that the reader is familiar with the elementary systems of piping for steam and hot water which are illustrated in the many treatises on the general subject of heating. While in no sense complete the charts given within the covers of this work will doubtless suggest methods of piping to accomplish certain ends, and in connection with the appendix relating to piping cannot fail to constitute a useful addition to the literature of the subject.

Inside Finishing.—By Charles A. King; 228 pages. Size, 5¼ x 7½ in.; 79 illustrations and diagrams. Bound in board covers. Published by the American Book Company. Price, 80 cents postpaid.

This is the fourth volume of King's series in Woodwork and Carpentry, three of which have already been referred to in these columns. The volume on inside finishing has been planned with special reference to the students of technical or trade schools, who have passed through the work of the first two volumes or their equivalent, these being "Elements of Woodwork" and "Elements of Construction."

The subject matter of the book under review deals with the fitting up of a house to make it habitable after the framing, covering and outside finishing have been completed. Certain aspects of carpentry of interest to the prospective contractor are also considered and suggestions are offered which will be of assistance to him in placing his business upon a satisfactory basis. There are nine chapters, the first dealing with heating and ventilation, plumbing and the construction of an ice house. In succeeding chapters attention is given to the laying of floors, inside finish, doors, window frames and sash, stair building, painting, hardware and estimating. There is also a chapter on arithmetic which covers many problems similar to those which the mechanic is called upon to solve in his daily work and a thorough drill upon which will add greatly to his equipment as a competent workman.

The last chapter is given over to a variety of tables calculated to be of service in this connection. A comprehensive index alphabetically arranged greatly facilitates reference.

Engineering as a Vocation.—By Ernest McCullough, C.E.; 202 pages. Size, 5¾ x 8¼ in. Illustrated. Bound in board covers. Published by David Williams Company, 239 West 39th Street, New York City. Price, $1.00, postpaid.

One of the problems which confront the wide-awake and ambitious young man of the present day is the choosing of a vocation or means of livelihood, and it is with a view to affording much valuable information on the field of engineering as a vocation that the author has presented the book above referred to. The subject matter has been rearranged from a number of addresses given by Mr. McCullough before technical schools and associations of engineering assistants, and is embraced in six chapters.

The first of these deals largely with the definition of an engineer, the next has to do with the work of the engineer and the third with his education. Home study courses are next taken up, while the fifth tells how to hunt and hold a job. In the concluding chapter the problem "Does it pay to study engineering?" is discussed at considerable length.

Builders School for Girls

The Master Builders Association of New York City will open a school for the training of women who desire to engage in the building business. Ground has been broken at Winfield, Long Island, for the school building and already 36 young women have been enrolled.

The pupils will be taught all branches of the building industry, their first instruction being how to actually do the work with their own hands. The course will cover two years and the price of tuition will be $300 a year. The school will be opened October 15 and it will be in charge of Edward L. Middleton, the architectural engineer, who will have a staff of six instructors.

International Building Exhibition

Plans have been completed for the International Building Exhibition which will be held at Leipzig, Germany, from May to October, 1913. The classification plan for exhibits embraces eight sections, as follows:

(1) Architecture.
(2) Literature of architecture and building; technical educational institutions; office requisites for architects and engineers.
(3) Building materials, their manufacture or preparation and use.
(4) Machines, tools and apparatus used in building.
(5) Sale and purchase of building land; building finance; estate agencies; insurances in connection with dwelling houses; bookkeeping for builders and architects.
(6) Sanitation for dwellings, factories and streets; protection of workers from injury, first aid and other provisions for their health and comfort; precautions against fire; old-age and invalid insurance.
(7) Gymnastics, games and sports.
(8) Testing of building materials, technical demonstrations.

The exhibits in the various groups may include parts or actual buildings or constructions together with demonstrations as well as models, drawings, photographs and other appropriate representations.

Bulletin of State Labor Laws

In a review of labor legislation summarizing the laws enacted at the sessions of the various legislative bodies of the United States it is pointed out that the conspicuous feature of the legislation of 1911 was the movement to substitute for the old rule of employers' liability a system of compensation or insurance by means of which persons suffering from the consequences of industrial accidents should receive a more certain and equitable relief for themselves, or in case of fatal injuries for those dependent upon them. In a Bulletin just issued by the Bureau of Labor, Washington, D. C., it is stated that, including the National Congress, there were 44 legislative bodies in session in 1911, of which 42 passed laws of direct interest to labor. In the review referred to attention is given not only to the contents of the new legislation, but also in some degree to the changes effected by the new laws.

Officers of New York Society of Architects

At the meeting of the New York Society of Architects held at its headquarters, 29 West Thirty-ninth street, the latter part of May, the following officers were elected for the ensuing year: President, Samuel Saas; vice-president, Constantine Schubert; treasurer, Louis Berger, and secretary, William T. Towner.

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What Builders Are Doing

Bird's-Eye View of Building Situation in Leading Cities — Permits Issued and Estimated Value of the Projected Improvements

NOTWITHSTANDING the restraint to general business which is largely attributed to the political situation the amount of new building work planned in May in leading centers of the country was appreciably in excess of that for which permits were taken out in May a year ago. The natural growth of the country calls for constantly increasing housing accommodations as well as additions to the business sections and this condition of affairs is being strongly reflected in the new construction work that is now being projected. Again in some of the largest cities the rapidly increased assessed valuation has caused in numberless instances the demolition of old buildings and the erection of larger and more pretentious structures upon their site in order that an adequate revenue may be returned from the property. This has been especially the case in New York City where the demolition of old buildings has run up into the thousands in the last few years.

Reports which are available show the increase in the estimated cost of new buildings, alterations and repairs for which permits were isued last month to have been a trifle more than 20 per cent as compared with May a year ago, the principal increases being found in Atlanta, Buffalo, Chicago, Cleveland, Columbus, Detroit, Kansas City, Los Angeles, New York City, Omaha, Salt Lake City, San Francisco, Toledo, Hartford, Grand Rapids, Fort Wayne and Evansville. On the other hand the more important decreases are found in Spokane, Wash.; St. Paul, Philadelphia, New Haven, Newark, Oklahoma City, Dallas, Texas; Chattanooga, Baltimore and Cedar Rapids, Iowa.

While differences have existed between employers and employed in the building industry in certain sections of the country, these have not seriously affected the building situation as regards the amount of new work being planned. The outlook is fairly encouraging, all things considered, and the year's work should show a gratifying total.

Atlanta, Ga.

An unusual degree of activity has prevailed in the building line during the month just closed and the figures for May are largely in excess of the corresponding month in 1911. According to the records of the building inspector's office 388 permits were taken out for buildings costing $781,044, while in May last year 387 permits were issued representing an expenditure of $482,882.

For the first five months of the current year the value of the construction work for which permits were issued was $3,032,082, while in the corresponding period of last year the figures were $2,832,279.

In the construction of apartment houses the first five months of this year show a gain of $163,350 over the same five months of last year, but in the erection of business buildings there is a gain of $123,285.

Baltimore, Md.

During the month of May Building Inspector C. E. Stubbs issued from his office permits for new building construction estimated to cost $591,299, also for 104 additions costing $109,600 and 784 alterations costing $70,000 or a total of $770,899. Of this total $304,399 was the estimated cost of 196 two-story brick dwellings; $30,000 the cost of four three-story brick dwellings and $40,400 for 11 two-story frame buildings. There were also 6 warehouses planned to cost $150,500 and a church costing $20,000.

The totals here shown are somewhat less than the figures for April or for May of last year.

Buffalo, N. Y.

Permits issued by the Bureau of Building for the month of May numbered 480 calling for an estimated outlay of $1,889,000. This is a gain of 102 per cent. as compared with May, 1911, when the permits numbered 400, covering an estimated outlay of $934,000.

Mercantile and Industrial structures represent a large amount of the expenditure covered by the month's permits; but the greater proportion of the building activities for the month will be in the construction of dwellings and apartments of various classes.

The more important of the structures in the list for the month include an 18-story, basement and sub-basement bank and office building 780 x 200 ft., for the Marine National Bank; a 7-story store and light manufacturing building from plans of Architects Colson & Hudson, to cost $90,000; a store and loft building on Ellicott street to cost $30,000; a 6-story mercantile building for Allen E. Klopp, on Main street, to cost $100,000; store, office and apartment building on Jefferson street for Thomas Ginther & Son, to cost $30,000; warehouse 100 x 300 ft., on Metcalse street and New York Central R. R., for D Ullman's Sons; warehouse on Maurice street for Elmer E. Harris & Co.; remodeling of the Lyric Theater, to cost $60,000; a 4-story store and warehouse for the Buffalo Glass Company; extensive addition to the warehouse of the Keystone Warehousing Company, to cost $140,000, and a sub-station powerhouse for the International Traction Company, Broadway, to cost $20,000.

There is also a powerhouse for the Buffalo General Electric Company on Swan street, to cost $25,000; an additional factory building for the Hewitt Rubber Company, Kensington avenue and New York Central R. R. Belt Line, to cost $45,000; two receiving stations, bottling works, refrigerating plant, stables and garage for the Queen City Dairy Company, to cost $125,000; storage building for the Webster-Citizens Ice Company; office building for the Buffalo Structural Steel Company; a 9-story flour mill and grain elevator for the Standard Milling Company; an oil refining and compounding plant for the Warren Lubricant Company, Maurice street, and the Buffalo Creek Terminal R. R.; additions to the plants of the Clifton Mfg. Company and the Crosby Company and a factory for the Royal Music Roll Company, Main street and the Erie R. R.

Public edifices include a clubhouse for the Protective Order of the Eagles at Pearl and Huron streets, to cost $150,000, from plans of Esenwein & Johnson; a clubhouse and library building for the Polish Library Association, to cost $25,000; Normal Park Methodist Church from plans of Architect Martin C. Miller, to cost $28,000; church for the Pilgrim English Evangelical Society at Humboldt Parkway and Best street; a rectory for St. Stanislaus Church, Peckham street, to cost $50,000, and a surgical ward annex for the Sisters of Mercy Hospital, Main street.

The apartment and residential list includes: an apartment building for E. T. Fitzpatrick on Linwood avenue, to cost $25,000; a large residence at 1272 Delaware avenue for Albert F. Laub, from plans of Architects Green & Wicks; a fine dwelling on Penhurst Park, from plans of the same architects, for William H. Scott; a large residence on Windsor avenue near Forest avenue for Henry G. Schaefer, of the Schaefer Malting Co., from plans of Architects Lansing, Bley & Lyman, and three large country residences at "Amherst Estates," near the country club, for William H. Crosby, William H. Hill and William B. Colborne, to cost $50,000, $30,000 and $20,000, respectively, the two former being from plans of Architect Robert North. A large number of dwellings are to be erected by the International Home Building Company at Humboldt Parkway and East Ferry street in development of the old "driving park" grounds.

Chicago, Ill.

Building is active in Chicago, the permits issued for May showing a total of $10,750,810, while the record for April was $9,799,450. This volume of building partially makes up for the comparatively low records of January, February and March.

The total for the year up to June 1 is upward of $30,000,000. It is estimated that there are now in course of construction or under contract in the city of Chicago, buildings approximating $40,000,000 in value.

The year 1912 will probably go on record as one of the greatest building years in Chicago since the World's Fair. Marvelous changes have been wrought in the appearance of the business district by the many skyscrapers that have been or are being erected. Many old landmarks are now disappearing to make room for modern structures.

Permits for 1282 buildings with frontage of 37,322 feet were issued in May, while in April permits were issued for 1366 buildings having a total frontage of 34,386 feet.

The South Chicago district is a scene of considerable activity in industrial development. The Commonwealth Edison Company, it is said, will erect an immense power plant on a 20-acre tract in that locality.

Cincinnati, Ohio

The Building Commissioner's report for May, as compared with the corresponding month of 1911, does not show up very well. Including 321 elevator inspection permits, there were 1290 permits issued in May, carrying an estimated valuation of $785,775; while during the same month last year 1155 permits were issued, with improvements valued at $1,009,410. Attention, however, should be called to the fact that last year's record includes $400,000 for the Guilford School building.

A very encouraging feature is the large amount of residence work under construction both in the city proper and in Norwood, Oakley and other suburbs.

The Columbia Cement Shingle & Tile Company, Cincinnati, is a recent incorporation with $10,000 capital stock. Among those interested in the company are John Mueller, M. C. Roth and Arthur Elmlinger.

Shorey & Willis, Second National Bank Building, Cincinnati, is a new firm organized to handle all kinds of building supplies.

The Cincinnati Architectural Club has recently been organized by the draftsmen of Cincinnati with the intimate association of the Cincinnati Chapter of the American Institute of Architects. The object of the club is to afford greater opportunities for education and to establish a closer relationship socially, among the members of the profession. The officers are: *President,* Leonard Willeke; *Vice-President,* Edward Kruckemeyer; *Treasurer,* George Hauser; *Secretary,* Oscar Swartz. A. Lincoln Fechheimer, a graduate of Columbia University and of the *Ecole des Beaux Arts* in Paris, is the patron.

Cleveland, Ohio

With improved weather conditions during May the building activity showed a great improvement over the previous month. There were issued during May 1095 permits for buildings to cost $2,014,207. Of these, 249 permits were for frame buildings to cost $702,480, while 82 were for brick, stone and steel buildings to cost $975,800 and 764 were for additions, the estimated cost of which is $335,027.

While no contracts for large office buildings were placed during the month, a large volume of new work in small and moderate size structures, including mercantile and factory buildings and dwelling houses, came out.

Dallas, Texas

A good record is being made by the building interests of the city as evidenced by the figures compiled by Building Inspector Harry J. Emmins. His report shows that the improvements for which permits were issued in May involve an estimated outlay of $310,923 and for the first five months of the current year, $2,239,956.

Los Angeles, Cal.

Local building is somewhat less active than in April, but there is a great deal more work than was the case a year ago. Permits were issued during May for buildings of an aggregate value of $2,227,861, compared with $2,650,461 for April, and $1,915,529 for May, 1911. In fact, all previous records for May have been eclipsed, and the first week of June has been extremely busy. Contracts are practically assured for at least one building of the largest type this month.

Buildings of medium to large size were a more important item for last month than for April, when individual values were surprisingly low. Dwelling construction is still very active, but the large business and hotel buildings erected in the last year have already given Los Angeles a distinct "sky line," which is rapidly being augmented. However, as an example of wholesale home building, J. H. Marks, of the Southern California Brick Company, has purchased 54 lots, on which he is arranging to erect houses at an aggregate cost of over $150,000.

The Board of Education last month let contracts for two schools, the Lorena street school, $32,773, to Alex. Grant, and the Malabar street school, $36,2?7, to Dawson & Daniels.

The Southwestern Construction Company has the contract for the Postoffice at Riverside, Cal., at $90,394.

Other buildings for which contracts were recently let are: the E. P. Clark building, segregated contracts amounting to $745,000; a hotel at the suburb of Venice, to the F. O. Engstrum Company at $500,000, and a 10-story fireproof addition to the Bullock department store, let to Paul Haupt at about $240,000.

One of the principal structures now being figured is the Billicke-Rowan building at Fifth and Spring streets, 12 stories, Parkinson & Bergstrom, architects. Other important jobs for which plans are about ready are as follows: A $120,000 apartment house at Hope and Twelfth streets for I. Laventhal, of San Francisco; a $100,000 hotel to be built at Arch Beach, Needham & Cline, architects, and an addition to the Leighton Hotel to cost about $200,000, J. C. Austin and W. C. Pennell, architects.

Wm. Mead has had plans drawn by Hudson & Munsell for a large frame and hollow tile residence on Vermont avenue, to cost about $50,000.

The Merchants' National Bank has just purchased a large lot at Sixth and Spring streets, on which they intend to erect a building next year at a cost of about $1,000,000. To make way for this structure it will be necessary to demolish the 4-story Howe block, erected three years ago.

Louisville, Ky.

The month of May was the most active so far as building operations are concerned of any corresponding month in the history of the city building department. There was a total of 274 permits issued for buildings estimated to cost $531,862, the latter figures comparing with $319,340 in May last year.

Thus far during the present fiscal year the estimated cost of buildings for which permits were issued was $4,191,582. In order to exceed the total of the last fiscal year, however, it will be necessary for the building department to issue permits for buildings to cost $1,800,000 in the aggregate during the next three months.

Milwaukee, Wis.

The building industry was somewhat less active in May in this city than was the case a year ago, if one may judge from the records as compiled in the office of the building inspector. Last month there were 1692 permits issued for building improvements costing $3,759,554 as against 1859 permits for construction work involving an estimated outlay of $5,100,781 in May a year ago.

For the first five months of the current year 1692 permits were issued for buildings costing $3,759,554, while in the corresponding period of last year 1859 permits were issued from the office of the building inspector for improvements calling for an estimated outlay of $5,100,781.

Newark, N. J.

The report of Superintendent of Buildings W. P. O'Rourke for May shows 317 permits to have been issued for building operations involving an estimated outlay of $1,290,469, while in the same month a year ago 320 permits were taken out for construction work costing $1,590,748.

June starts in with bright promise of increasing activity and a number of important projects are under way.

New York City

The striking feature of the local building situation for May is the increase in the estimated cost of the building operations for which permits were issued as compared with the corresponding month a year ago. In the Borough of Manhattan this is due largely to the more expensive nature of the busines structures which have been planned for store and loft purposes, office buildings and manufactories and workshops. According to the May report of Rudolph P. Miller, superintendent of buildings for the Borough of Manhattan, plans for 95 buildings were filed, estimated to cost $12,646,375, while in May last year plans were filed for 129 buildings costing $7,774,925. Adding to these figures the estimated cost of the alterations and repairs for which permits were issued the totals for the two periods are respectively $13,750,748 and $9,516,045.

Of the totals for May $6,203,000 was the estimated cost of 19 store and loft buildings, while in May last year $2,570,000 was the estimated cost of the 18 buildings of this class for which permits were taken out. There were 7 office buildings planned last month, costing $1,457,000, as against 8 buildings of this class costing $576,800 in May a year ago. In the way of manufactories and workshops there were 9 planned last month estimated to cost $1,861,000 as against 2 buildings of this class costing $95,000 in May, 1911. There was a slight falling off in the planning of tenement houses last month, permits having been issued for 10 estimated to cost $1,466,000, while in May a year ago plans were filed for 29 costing $3,145,000.

There was also more money involved in the construction of places of amusement, there having been 11 planned last month to cost $681,500 as against 18 in May last year estimated to cost $220,300.

One of the important store and loft buildings planned is the 20-story structure for the site of the old Hotel Victoria, on the south side of 27th Street, between Broadway and Fifth Avenue. It will have a facade of limestone, terra cotta and granite and the architects, Schwartz & Gross, estimate the cost at $1,250,000.

There has been something of an increase in the planning of housing accommodations in the Borough of the Bronx and last month shows a gain of practically 50 per cent. over the same month of 1911. The figures of the Bureau of Building show that in May permits were issued for operations estimated to cost $4,303,269, while in the same month last year the amount involved was $2,882,497. The demand for housing accommodations is constantly growing, and with the excessively high rentals which obtain throughout the greater section of Manhattan, the natural tendency of the population is toward the suburbs and northern sections above the Harlem River.

In Brooklyn the amount of new work planned last month was not quite up to that of this season a year ago, but the total is of fair proportions. Superintendent Thatcher shows by his report for May that permits were issued for building construction estimated to cost $4,682,820, while in the same month last year permits issued call for an estimated outlay of $5,192,300.

Sacramento, Cal.

Building work in the California capital continues to increase, May being the best month since last December, and unusually active for this time of year. Residence work is holding its own, but the principal demand is for business space. San Francisco merchants are using Sacramento as a distributing base for valley towns, and both outside and local concerns are putting in many improvements. Many large business buildings are being remodeled to keep up with growing business requirements.

Building permits for May reached a total of $262,174, compared with $210,685 for April, and $199,868 for May, 1911. The most important job let during the month was the Mohr & Yoerk building, let to T. A. McDougall, Seadler & Hoen, architects. Other buildings planned for construction during the summer are: the Sacramento Apartments at Twelfth and N streets, to cost about $120,000, Cuff & Diggs, architects; a large frame apartment house for the Megowan estate on Ninth street, to cost $20,000, and the new J. L. Flanagan hotel at Fifth and J streets, to cost about $200,000.

The plans of R. A. Herold for the $450,000 Masonic Temple have been adopted, and the same architect has presented plans which will probably be carried out for the new city Hall of Justice, following the general lines of the court house, to cost about $200,000.

Plans have been adopted, and figures are being taken, on several buildings for the State hospital at Agnew, Cal. The principal buildings are: an $80,000 assembly hall, $8,000 concrete dairy house, $40,000 concrete cottage, and a $10,000 staff house for physicians.

San Diego, Cal.

San Diego still experiences something of a boom in building, though May was hardly as busy as April, and a feeling of unrest caused by the Industrial Workers' invasion has probably delayed some work. The Exposition construction, however, is proceeding rapidly, and will form an important part of the summer's business. Large quantities of cement for this work are now being shipped in from Los Angeles.

The total valuation of building permits for last month was $803,984, compared with $1,062,631 for the month preceding, and $378,525 for the corresponding period last year. The gain over former seasons is very gratifying.

Architect Goodhue of Los Angeles has completed plans for the Southern California exhibit building for the local Exposition, which will be the largest on the grounds. It is of Mission and Moorish type, 100 by 240 ft., with two wings 50x50 ft., and will cost about $85,000. Other important buildings for which plans will soon be out are: the Chaffney & Cobb theater and hotel, 5-story steel and concrete, to cost $125,000, Hamilton & Smith, architects; a 10-story building for Nathan Watts at Fifth and E streets, to cost $200,000, Bristow & Lyman, architects; the First Baptist Church at Tenth and E streets, to cost $80,000, Norman F. Marsh, architect, and First Presbyterian Church, to cost $100,000, Robert H. Orr, architect.

San Francisco, Cal.

Building operations in San Francisco continue on a comparatively large scale, the record for May, though hardly equal to that of March, being considerably better than for any month of 1911. The total valuation of buildings for which permits were issued last month was $2,229,423, compared with $1,916,659 for April, and $1,925,847 for May of last year. In May and July, 1910, the total was somewhat higher, and several months of 1909 showed higher valuations. Records so far this year, compared with the two years previous, apparently indicate that the dullest period was passed at the close of 1910, and that conditions are now about normal.

Hotels and apartments are again coming to the front in point of value. There is considerable activity in wooden apartments outside the fire limits, but the most notable movement is in the downtown district, where several contracts have been let for Class A and Class C apartments. There are also a great many manufacturing and wholesale buildings of moderate value, the $50,000 annex, 35x77 ft., of the Standard Biscuit Company, being fairly typical of this class. Dwellings in the western section of the city receive some attention, but San Francisco is essentially a city of business and hotel structures, suburbs in adjacent counties being more attractive for residence. The month has brought out no work of an unusually important nature, but several fine office buildings are being figured.

Contractors complain somewhat of the advancing price of some materials, and there is every indication that values will go still higher. Finish hardware and plumbing goods have advanced materially, and a firmer feeling is noted in all steel products used in building. Fir lumber has again advanced about $1.50, and some lines of redwood are firmer, while lath and redwood shingles are the highest in several years. Common brick is steady at $7.50, with ample supplies, and lime is rather easy, cement, sand and gravel showing little change.

A little uneasiness is noted in labor conditions. Efforts have been made to effect binding agreements to continue through 1915, but some of the unions are holding out for terms which cannot be accepted. The local carpenters have presented a new agreement, providing double pay for overtime, but this has been rejected by the General Contractors' Association. Further efforts will be made to reach a settlement, and it is confidently expected that stable conditions will be established in all the building trades.

To avoid delay in clearing the Exposition grounds at the Harbor View site, the officers of the Exposition Company are selling off the dwellings now on the property at auction, to be removed by the buyers. Two auctions have been held, about 26 buildings being offered for sale.

Those interested in brick building in this city have organized for a publicity campaign, forming the "Brick Builders' Bureau." Support will be given by the manufacturers of brick, terra cotta, etc., the Masons' & Builders' Association, the local bricklayers' union, and the structural steel fabricators, who altogether have contributed $10,000 for the work. Nat Ellery, formerly California State Engineer, has been chosen as manager, and the officers are: Mr. Dennison of the Steiger Terra Cotta Works, president; W. W. Dennis of McNear Brick Company, vice-president; Mr. Lipp of Sacramento Brick Company, treasurer; Mr. Spencer of Western Iron Works, secretary.

The West Coast cement manufacturers also have formed an association for publicity, and the manager, P. W. Rochester, formerly of Seattle, Wash., has opened offices in the Rialto Building, this city.

Among the principal buildings on which contracts have been let recently are the following: Levy Real Estate building, 6-story Class C building on O'Farrell street, segregated contracts amounting to about $80,000; Holbrook building, 6 stories, concrete construction, etc., to Williams Bros. at $71,448; James L. Flood residence, exterior granite and marble work, to McGilvray Stone Company at $150,000; Sierra Investment Company building, segregated contracts amounting to about $60,000; St. Ignatius College, carpentry, millwork and hardware to J. J. Hughes, $88,235, and various contracts for the Regents' building.

Local contractors have the principal jobs on a large hotel at Stockton, Cal., the steel alone amounting to $16,500, and

Robert Trost, this city, has the general contract for a $100,000 school building at Woodland, Cal.

Important buildings now being figured, or to come up shortly, are the following: Geary street municipal carhouse, reinforced concrete, to cost about $225,000; steel and concrete power house for the Union Iron Works, to cost $75,000, C. P. Weeks, architects; Stanwood hotel on Mason street near O'Farrell, 6-story concrete and steel, to cost $100,000, R. W. Hart, architect; a 9-story concrete hotel on Mason street for W. F. Nelson, to cost $100,000, MacDoneld & Applegarth, architects; Levy hotel, 15 stories, on Geary street near Mason, to cost $200,000, MacDonald & Applegarth, architects; Cliff estate hotel, 9-story Class A, to cost $150,000, MacDonald & Applegarth, architects; a 10-story Class A building at Liedesdorf and California streets for the Insurance Exchange, to cost about $500,000, Willis Polk & Co., architects, and a 7-story hotel for E. H. Mitchell on Sixth street, to cost $75,000, C. A. Meussdorfer, architect.

Architects Shea & Lofquist are about to let contracts for a Class A stone and steel Catholic church on Sixteenth street, adjoining the historic Mission Dolores, which was built of unburned brick. It will cost $15,000. Architects Welsh & Carey will let contracts for a 2-story steel and concrete convent at Livermore, Cal., to cost $20,000.

Architects Parker & Kenyon, this city, are drawing plans for an 8-story Class A hotel to be built at Fresno, Cal., at a cost of $200,000.

Two new residences to be built at the fashionable suburb of Hillsborough are: the Hooper home, to cost $10,000, Howard & White, architects, and the Geo. R. Shreve home, to cost $100,000. Structural contracts amounting to $100,000 hav been let for the Joseph Grant home at same place

It has been tentatively agreed that plans for the $1,000,000 municipal auditorium at the Civic Center will be prepared under the supervision of the advisory board of architects of the Exposition, but as yet no arrangements have been made for competitive plans.

St. Louis, Mo.

As regards the value of the new construction work planned in May there is very little change as compared with the corresponding month of last year, the totals being respectively $1,983,853 and $1,994,914. The feature of the month's planning is found in the 101 brick dwellings costing $361,325 and the 96 brick tenements costing $547,422. There were three brick dwellings, each ranging in cost between $20,000 and $50,000, and there were 8 brick tenements costing in excess of $15,000 each and totaling $136,000. There were two churches planned to cost $135,000 and 13 factory buildings costing $104,500.

Seattle, Wash.

While there were less buildings planned in May than in the same month a year ago their estimated cost was nearly $200,000 greater, this being due to a more expensive character of dwellings and warehouses projected. The report of R. H. Ober, Superintendent of the Department of Buildings, shows that in May 875 permits were issued for buildings costing $738,110, while in May last year 942 permits were issued by the department calling for an estimated outlay of $547,040. There were 165 detached residences for which permits were issued costing $248,760, and in May a year ago there were 217 dwellings of this character planned to cost $241,230. Of warehouse and factory buildings there were 7 planned last month costing $264,100 as against 6 in May a year ago costing $26,650.

For the first five months of the current year there were 4256 permits issued for building improvements involving an estimated outlay of $4,071,075 and in the corresponding five months of last year 4,905 permits were issued for building improvements involving an estimated outlay of $3,183,930, these figures showing that while a less number of buildings have been planned this year they were of a more expensive nature than those for which permits were issued the same time a year ago.

Washington, D. C.

The May report of Building Inspector Morris Hacker shows that 652 permits were issued for new construction work and repairs involving an expenditure of $1,599,380. Among the work projected were 221 brick dwellings to cost $667,500 and 50 frame dwellings costing $149,799. There were also two office buildings, to cost $212,000.

Builders' Appliances and Equipment

Some Things of Seasonable Interest to Those Having To Do with the Building Business

Athey Cloth-Lined Metal Weather Strip

A weather strip which embodies some rather interesting features and for which strong claims are made is that turned out by the Athey Sanitary Equipment Company, which is an auxiliary of the Weary & Alford Company, 1907 Michigan Avenue, Chicago, Ill. The product is known as the Athey Cloth-Lined Metal Weather Strip and is made in such a way as to exclude all drafts, dust and dirt. The cloth-lined channel acts in addition as a cushion guide for the sash so that the window operates smoothly and easily. The cloth used is three-ply Windsor cloth—not felt—and is chemically treated after the manner of English sail cloth, and the claim is made that it will last a lifetime. The exclusion of air currents is of course the all-important thing in a weather strip. One-third of the hight of the sash is plowed for the sash cord, but the weather strip is so placed as to provide perfect protection at that point. A section of an upper sash provided with this cloth-lined metal weather strip is shown in Fig. 1 of the engravings. An inspection will show that all possibility of leakage of air is reduced to a minimum. The claim is made that the cloth is rot-proof, rust-proof and damp-proof; that neither water nor ice will affect it; that it will not pull out and will last a lifetime. The company states that it is made and tested by drawing 6000 ft. of the rail through a channel 12 in. long without showing any wear.

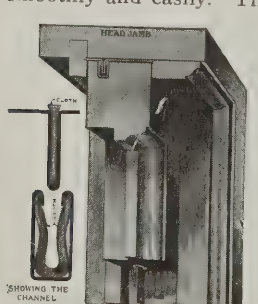


Fig. 1—The Athey Cloth-Lined Metal Weather Strip

The Problem of Damp Walls

Many builders and building owners have been puzzled over the problem of how to avoid the bad effects of dampness on plaster and decorations. Often in the case of a basement room the moisture destroys the plaster, the paint and the varnish in a very short time, and no repairing or redecorating is reasonably lasting. The dampness makes the paint peel and the plaster fall off or stain. In this connection it is interesting to know that many are getting admirable results from the "Utility" wall board, manufactured by the Heppes Company of Chicago. Their product was used to solve just such a problem as has been described in Trinity Church, Toledo. The trouble was in the basement room of the church, pictured in Fig. 2. There

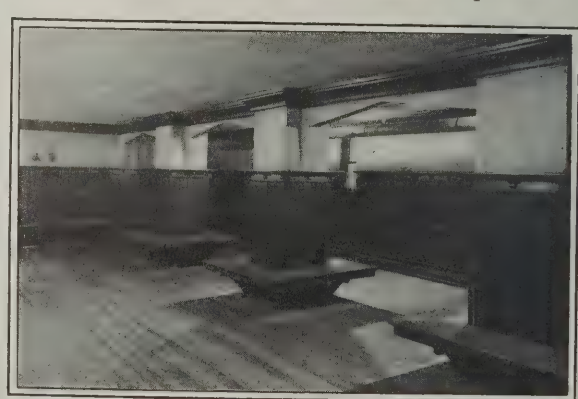


Fig. 2—Use of "Utility" Board in Preventing Damp Walls

are only electric lights in this room. Wet walls caused the paint and varnish of every kind to loosen from the walls. After paneling the walls to a hight of about five feet with utility wall board, as shown in the picture, the difficulty was eliminated. The wall board was left in its original finish, and it makes a very neat room. The Heppes product gets these results because it is moisture proof, being made of several layers of board and asphalt rolled by a special machine with an ingenious series of heavy rollers. It is also a non-conductor of heat and cold and deadens sound. In addition to its general utility and economy, it is very easy to handle, as it is nailed directly on the studding or joists, and can be applied over old plaster if desired. It is neat in its original appearance and also lends itself easily to decorations, no sizing or preparation being necessary.

Stanley's Door Trim Plane

The Stanley Rule & Level Company, New Britain, Conn., has just placed upon the market a new plane which will make mortises for butts, face plates, strike plates, escutcheons, etc., without the use of a butt gauge or chisel.

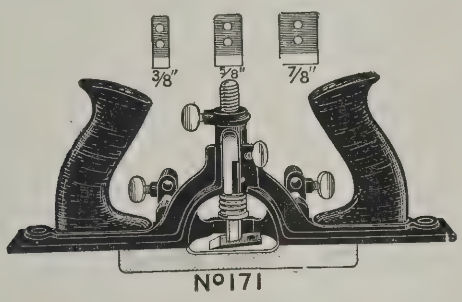
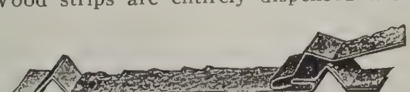


Fig. 3—The Stanley Door Trim Plane

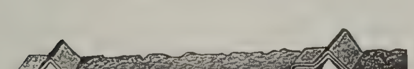
The company states it might very properly be termed a mechanical chisel, an illustration being presented in Fig. 3 of the engravings. The original feature of the plane is the method of mounting the cutter which can be instantly set to work from either end of the plane or across it. In addition the cutter is cushioned by a spring which prevents taking a heavier chip than can easily be carried. A fence regulates the position of the cut and insures its sides being parallel while the depth of the cut is governed by a positive stop. The company points out that the tool is also a superior router plane for surfacing the bottom of grooves or other depressions parallel with the general surface of the work. The plane is japanned, has nickel-plated trimmings, rosewood handles and three forged steel cutters, views of which are clearly shown in the illustration. The tool is known as No. 171, is 11 in. in length and weighs 3 lb. A very attractive folder which the company has issued illustrates the door trim plane and gives explicit directions for its use.

The Annis Patent "Saflok" Metal Roofing

A most important step in the evolution of metal roofing is illustrated in Fig. 4 of the accompanying engravings. It is known as the Annis Patent "Saflok" roofing and has the right edge of each sheet raised V-shape with folded pocket close to the V on the inside. The left edge of the next sheet is similarly raised V-shape with a projecting hook-like flange. This flange catches in the pocket and one V overlaps the other. All nails are completely covered, thus tending to prevent rust and leaks at the nail heads. Wood strips are entirely dispensed with and the



This cut shows Method of Locking Sheets.



This cut shows Sheets Locked.

Fig. 4—The Annis Patent "Saflok" Metal Roofing

claim is made that the greater the strain, such as from wind, the tighter it locks. This form of metal roofing cannot fail to be of interest to architects, builders and owners, because it is as applicable to corrugated roofing and cluster shingles as it is to V-edge roofing. This new form of metal roofing has been devised and patented by the Chattanooga Roofing & Foundry Company, Chattanooga, Tenn., the inventor being J. E. Annis, president of the company, who has had 30 years' experience in the roofing business. The company has recently marketed J. E. A. Cluster shingles of an entirely new design—attractive and artistic as well as inexpensive.

Specifications for Metal Fireproof Windows, Doors, Etc.

We have just received from the Canton Mfg. Company, Canton, Ohio, a set of specifications for metal fireproof windows, doors, ventilators, skylights, metal ceilings and architectural sheet metal products, which it has issued. These contain a great deal of interesting information relative to the subjects mentioned and are illustrated by means of numerous sectional and elevational drawings, all of which cannot fail to interest the architect and the builder. Underwriters' requirements are given in connection with the descriptive matter and there is also a standard price list of all styles of galvanized ventilators. Reference is made to the Canton Continuous Puttyless Skylights for saw tooth roofs, and full-size details accompany the matter.

Universal Woodworker with Band Saw on Wheeled Truck

One of the latest improvements in connection with the Type C Woodworker made by the Tannewitz Works, 316 North Front Street, Grand Rapids, Mich., is mounting it upon a wheeled truck and providing it with band saw attachment, all as clearly indicated in Fig. 5 of the accompanying engravings. The cast base has three wheels, thus permitting the machine to be readily moved about, a convenience which cannot fail to be appreciated by the millman or the carpenter-contractor operating a woodworking shop. The manufacturer calls the attention of the woodworker to the fact that he is not buying one machine and three extra attachments, but four distinct machines, any one of which can be used on ordinary work without setting up. The machine is built entirely of cast iron, thus rendering it very durable and serviceable.

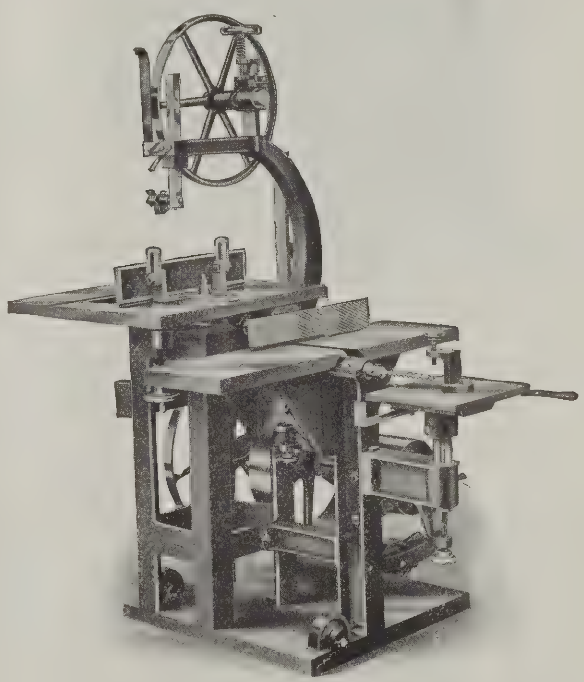


Fig. 5—Universal Woodworker with Band Saw on Wheeled Truck

A feature of special interest in connection with this Universal woodworker with band saw and wheeled truck is that the manufacturer will ship the machine on thirty days' trial and if for any reason at the end of that time the purchaser is not satisfied with the results, the full amount paid will be returned together with any freight charges which may be involved.

The factory of the company is centrally located in the Middle West so that machines can be shipped to any destination at the lowest possible rate. In this connection the manufacturer has issued an illustrated folder setting forth the merits of the machines made and there is also given a table showing the freight charges to leading cities, all of which cannot fail to prove of value to the purchaser.

Catalogue of Sheet Metal Products

The James H. Watson Company, Bradley, Ill., sends us its new general catalogue No. 12 accompanied by the statement that a free copy will be furnished upon request from any legitimate dealer who may be interested in sheet metal work. The catalogue is made up of 166 pages, profusely illustrated and bound in flexible covers. It is referred to by the company as "the last word" on sheet metal products and is arranged in a way to appeal to the architect and the builder as well as to the sheet metal worker. The lines illustrated and described include eave trough fittings and accessories, hip shingles, ridging, cresting, stove pipe elbows, corner beads, steel tanks, roofings of various kinds, flashings, steel awnings, cornices, skylights, finials, etc. Several pages are devoted to galvanized iron and copper building fronts with illustrations showing a number of designs, these being followed by numerous designs for metal ceilings and side walls.

The Brien Heater

One of the interesting problems which the architect and the builder have to consider when planning and building a house is the method by which it shall be heated. This is determined in large measure by the location and size of the house and more or less by the preference of the owner. It is generally conceded by a large class of heating

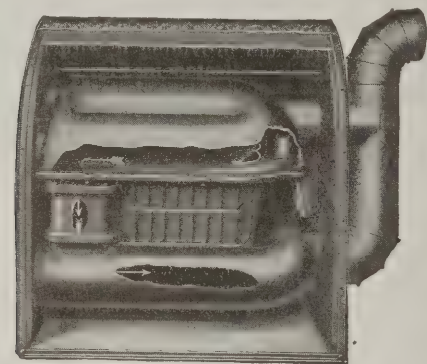


Fig. 6—Sectional View of the Brien Heater

engineers that the plan which approaches nearest to perfection for a dwelling house is a hot-air system with both outside and inside cold-air ducts so arranged that they may be used independently of the other or both at the same time, thus insuring an adequate supply of fresh warm air and perfectly heated rooms irrespective of the direction from which the wind may blow. By this arrangement a good system of ventilation is established and it is well known that ventilation is a prime requisite in every building tenanted by human beings. Some very interesting information along these lines is found in an attractive catalogue sent out by the Brien Heater Company, Westfield, Mass., and within the covers of which are set forth at length the merits of the Brien Hot Air Heater, which, among other features, has sheet asbestos gaskets bolted between the iron flanges, thus forming gas and dust-tight joints. The Brien has four large flues running parallel with the fire pot and ash pit with two perpendicular flues connecting them, all of which are perfectly straight and the inside of which can readily be seen when cleaning. The grates are of the well-known triangular pattern which are used in a square fire pot with rounded corners and perpendicular sides which overhang the sides of the ash pit ¼ of an inch, thus making it impossible for dead ashes to accumulate. In the broken view presented in Fig. 6 we show by means of the arrows the fire travel in the company's Nos. 5 and 6 double radiator furnaces.

Another feature which cannot fail to interest builders and houseowners is that the heater can be used in very low cellars. The statement is made that the Brien is from 15 to 30 in. lower than other furnaces of a corresponding heating capacity, thus giving a great advantage in permitting a proper elevation to the warm-air pipes, more especially where the cellars are low.

A very important feature in connection with the business of the company is that it deals direct with the consumer and furnishes to each purchaser drawings covering the entire installation. These instructions are so plain that any man who is at all handy with tools should have no trouble in doing all the work himself or in getting a local mechanic to install the heater at a great saving over the usual price. The company states that its object in selling its goods in this way is to introduce them in towns where it has no regular agent.

Pike Sharpening Stones

Some very interesting and valuable information regarding sharpening stones of various kinds is contained in a well printed and handsomely illustrated catalogue of 98 pages just issued from the press by the Pike Mfg. Company, Pike, N. H. In the introductory pages reference is made to the fact that "no single sharpening substance can possibly give best results for all kinds of cutting edges" as one type of abrasive must be used for fine work and a radically different type for the fast, coarse work. This is just as true the company points out for all the special cutting edges that lie between these extremes, such as the sharpening of woodworkers' tools, of metal workers' tools of tools for cutting leather, meat, paper, etc. Under the Pike trade-mark it is announced may be found a stone of the right sharpening substance, whether natural or artificial, for any and every kind of cutting edge. In the catalogue under review the various lines of Pike sharpening stones are illustrated and briefly described. Not the least interesting feature is the statement showing the grades of stone to use for sharpening various kinds of tools and for special purposes.

Pike hand and foot power tool grinders are illustrated and described; a repair list is given and an alphabetical index facilitates reference.

Yale Hardware in New Vanderbilt Hotel

The hardware in the Vanderbilt Hotel, recently completed at the corner of Park avenue and 34th street, New York City, was all especially designed and made to order for the building by the Yale & Towne Company, 9 Murray street, New York City. The hardware includes several new and rather interesting features. The locks for the bedroom doors are arranged with an indicator on the corridor side showing when the room is occupied. This device insures the occupant from the too frequent annoyance from the maids rattling knobs and trying the pass keys early in the morning. The knobs are particularly attractive, having a blue and white cameo center with a brass rim all done in the Adam School. This *motif* is carried out in all of the various plates and is in harmony with the furnishings of the rooms. The hinges are of the heaviest cast brass, having a special frictionless washer in the knuckles, which makes them noiseless and practically indestructible. The doors are of metal and very heavy.

The Canton Coal Chute

There are a number of coal chutes on the market, but builders will be interested in the one illustrated in Fig. 7 of the cuts, as it is self-locking and burglar proof. It is neat and attractive in appearance when installed in a building, as may be seen from the pictures, which show the chute in both open and closed position. The chute is strong and substantially made, of the best material, care-

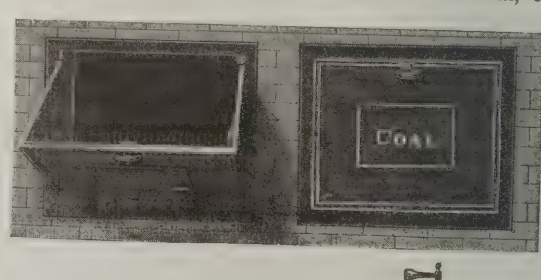


Fig. 7—The Canton Coal Chute Shown Open and Closed

fully fitted and neatly finished. No glass is used in its construction and it is claimed that there is nothing about it to break or get out of order. When the chute is closed it locks automatically and it is impossible to open it from the outside without the use of a special key which is furnished with each chute. It may be opened from either the inside or the outside. By having a chute that can be opened from the outside with a key, access to the cellar may be obtained through the chute and the chute opened without necessitating crawling over a coal pile. The chute is made in three standard sizes by the Canton Foundry & Machine Company, Canton, Ohio.

Ideal Concrete Machinery

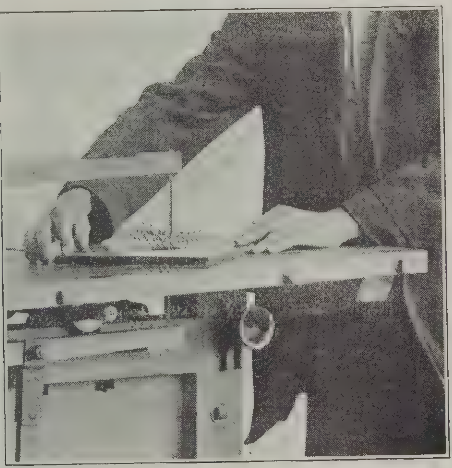
Under the above head the Ideal Concrete Machinery Company, South Bend, Ind., has issued a 160-page catalogue of concrete machinery which cannot fail to hold the attention of every contractor and builder into whose hands a copy may come. The early portion of the catalogue is given up to information regarding the Tycrete Process for waterproofing and hardening the product and also to numerous halftone illustrations of Ideal construction showing the use of concrete blocks. The halftones cover a wide range and include business buildings as well as dwellings, silos, railroad stations, etc.

The bulk of the catalogue, however, is given up to extended reference to the concrete machinery made by the company and to the various forms of blocks which may be produced therewith. In connection with the matter special reference may be made to the company's 16 and 24 in. interchangeable types of block machines together with their attachments and accessories, also brick machines, dimension stone machines, continuous and batch mixers, tampers, conveyors, feeders, etc. There is also valuable information in reference to silos, charts, tables, standard specifications for building blocks, regulations governing their use and manufacture, etc. The matter has been arranged with a great deal of care and the catalogue is of such a nature as to render it a convenient work of reference for builders and contractors.

We understand the book is the most expensive ever issued by the company and represents a cost that makes it impossible to distribute it gratis. The plan of the company is to sell it for $1 and upon receipt of that amount the company sends a coupon good for $2 in merchandise so that the buyer ordering $10 net can use the coupon toward his purchase. In this way it will be seen the company really pays $1 to place the book in the hands of interested people.

Some Attachments of the "Eveready" Saw Rig

A short time ago we illustrated and described the new saw rig which has been placed upon the market by the



Some Attachments of the "Eveready" Saw Rig—Fig. 8—The Jig Saw Attachment

Oshkosh Mfg. Company, Oshkosh, Wis., pointing out the advantages which a machine of this kind possessed for the carpenter-contractor and builder, who may be desirous of doing a goodly portion of the sawing and boring directly at the job. The point was made in connection with this machine that it would rip and cross-cut dimension lumber far more cheaply than the work could be done by

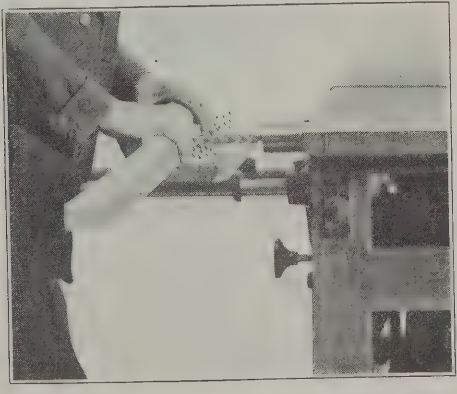


Fig. 9—The Boring Attachment of the "Eveready" Saw Rig

hand and that by means of the various attachments which could be used in connection with it, a great variety of work could be accomplished at a minimum of cost. One of the general features of the machine is a jig saw attachment with 33 in. rock maple arms adjustable by a turnbuckle. A picture of this attachment and the position of the operator as regards the machine is presented in Fig. 8 of the engravings. This jig saw attachment is of a nature to readily appeal to the carpenter who often has occasion to do work in connection with which a jig saw is the most convenient and economical means of executing it. One of the other attachments with which the machine is provided is that for boring, and the manner in which the operator utilizes this feature is clearly indicated in Fig. 9 of the engravings. There is also a sander attachment, reference to which was made in these columns some months ago; a 6½ in. dado or groover head with which is supplied two extra cutter blades for grooving different sizes; an emery wheel equipment with tool sharpener and the regulation rip and cross-cut saws. Considered as a whole the outfit constitutes what may be termed a "portable private planing mill," the various uses of which the practical carpenter and builder can readily appreciate.

A Van Guilder Hollow Wall Silo

Some months ago we called attention in these columns to the concrete hollow wall machine made by the Van Guilder Hollow Wall Company, 712 Chamber of Commerce Building, Rochester, N. Y., pointing out that it was of such a nature as to produce hollow walls ranging in thickness from 8½ to 14½ in. and giving a double wall with an air chamber between the two parts. It was stated that the machine is adjustable so as to make either or both walls from 3 to 6 in. thick and the air space between 2½ in. wide. The construction resulting is such as to give an air chamber extending completely around a building, including the corners, from the bottom of the cellar to the ridge, so that there are no places for dampness to penetrate through the wall. The machine does away with all cumbersome frames and forms usually employed in building concrete walls, thus reducing the cost of construction to a minimum.

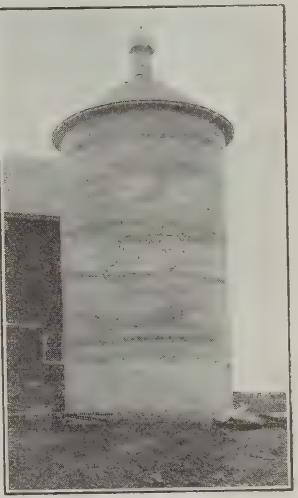


Fig. 10—A Van Guilder Hollow Wall Silo

An interesting example of what may be accomplished with one of the company's hollow wall outfits is shown in Fig. 10 of the illustration, which represents a hollow wall silo erected for W. H. Anderson, a prominent farmer and dairyman at Greece, N. Y. This silo was built on top of the old stone wall foundation on which formerly stood his wooden silo, but which rotted out at the base and blew down. The continuous air chamber concrete silo has stood the test of two winters and Mr. Anderson states that he feels proud of it, more especially as the past winter was an unusually cold one, and the results clearly demonstrate the value of the continuous air chamber for silos in concrete construction.

Catalogue for Sheet Metal Contractors

A comprehensive presentation of the material and manufactured articles used by the sheet metal contractor in his work is made in the anniversary catalogue of the Willis Manufacturing Company, Galesburg, Ill. The first section shows complete store fronts, bay windows and cornices, which are followed by a line of skylights, some protected with woven wire guards.. Ventilators are shown in round, square and oblong varieties with louvers. A section of several pages is devoted to sheet metal windows and fire doors. The next section is devoted to ornamental deck crestings, crestings and crosses and weather vanes. A line of conductor pipes and eaves troughs is shown. Tin plate, V crimped and similar types of sheet metal roofing and siding in the various ornamental forms are followed by awnings. Another section of the catalogue is devoted to metal ties and shingles. These are followed by a complete line of furnace fittings, wall stacks and risers, boots, shoes and register boxes and registers.

The catalogue also presents a comprehensive line of tinners' tools, followed by an equally extensive presentation of stamped metal ornaments, moldings, brackets and similar articles for the embellishment of architectural sheet metal work. The last 33 pages are devoted to full page and half tone engravings of metal ceiling patterns, and the book closes with a conveniently arranged index, thus rendering reference easy and making it of special convenience to the architect and builder.

The Sykes Roofing Company Changes Hands

The works and good will of the Sykes Metal Lath & Roofing Company, Niles, Ohio, have recently been purchased by Ira A. Thomas and Claude R. Thomas, of Youngstown. The Sykes Metal Lath & Roofing Company was founded in 1877 by R. G. Sykes and it was one of the pioneer roofing concerns in the country. It was first known as the Sykes Metal Roofing Company, but when in 1892 the lath department was added the name was changed as above indicated. It is reported that the new owners will considerably enlarge the plant.

Atkins Floor Scraper

The floor scraper No. 5, illustrated in Fig. 11 of the accompanying cuts, has just been placed on the market by E. C. Atkins & Company, Indianapolis, Ind. It is 11 in. long, made of solid metal with handles of easy grip pat-

Fig. 11—Atkins Floor Scraper

tern. Two thumb screws hold the blade securely in place, and the center thumb screw presses it into convex form, so as to hug the lumber closely and make a smooth, even cut. Being made of metal, it does not wear easily and its weight causes it to run more smoothly. The blade, it is said, is made of extra high grade saw steel of the same quality as Atkins Silver Steel saws. While tough and hard, it is not brittle, and will long retain its sharp cutting edge. The parts are interchangeable and both ends of the blade may be used. The finish is a new dull japan.

Joseph Dixon—One of the World Makers

Elbert Hubbard, the sage of East Aurora, compiled a list of the world's 20 greatest men about which he has built an essay. The essay is done into book form by the Roycrofters and the title is "Joseph Dixon, One of the World Makers." Mr. Hubbard refers to Joseph Dixon as "a man whose work has profoundly influenced civilization, yet strangely enough a man of whom the world at large knows little."

This tribute to the founder of the Joseph Dixon Crucible Company is well worth reading, especially by those who may wish to learn more of the character of the man or by those who may admire Mr. Hubbard's vigorous pen. Owing to a limited edition of the booklet copies cannot be distributed except upon request. The Joseph Dixon Crucible Company, Jersey City, N. J., will be glad to honor such requests if made by readers of the *Building Age*.

Dimo-Grit Grinder No. 35

A new grinding machine which is referred to as both compact and powerful and possessing a high efficiency is the Dimo-Grit Grinder No. 35, which is illustrated in general view in Fig. 12 of the engravings. The machine or

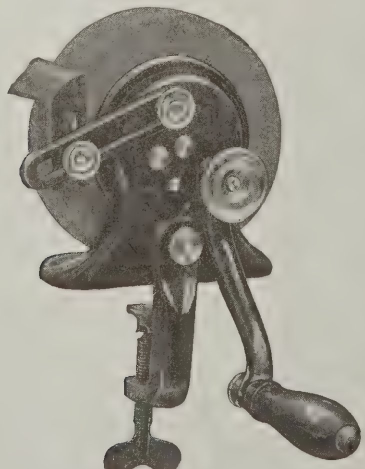


Fig. 12—The Dimo-Grit Grinder No. 35

device is of such a nature as to form an important adjunct of the carpenter's "kit," while at the same time it is especially useful to all who have tools to be sharpened. The gears and driving mechanism are contained within the wheel so that it can be packed into a box scarcely larger than the grinding wheel itself. The mechanism consists of a series of three gears and three pinions cut from solid steel blanks which give a high speed to the grinding wheel. All bearing are long and run in the same casting, which insures long life and perfect alignment. The entire gearing is enclosed and dust-proof. The wheel is 5½ in. in diameter with 1⅜-in. face and is of medium grit. An adjustable tool rest makes exact bevels an easy matter. The device is the Dimo-Grit Grinder No. 35, known also as the "Compacto," and is made by the Luther Grinder Mfg. Company, 717 Michigan Street, Milwaukee, Wis.

The company has just issued a new catalogue of its grinders consisting of 48 pages profusely illustrated and bound in paper covers. In the introductory pages brief reference is made to the organization of the company 17 years ago and to the splendid business which it has built up since that time. Its "selling policy" is clearly outlined and then follows an illustrated description of the company's extensive lines of grinders. The entire make-up is neat and attractive and any one having occasion to make use of a tool grinder will find in it much that is of value.

The Schlueter Stone Surfacer

The latest product of M. L. Schlueter, 101 North Canal Street, Chicago, Ill., is a special stone surfacing machine known as type "G" Schlueter stone surface, and illustrated in Fig 13 of the cuts. In this machine the lower discs are

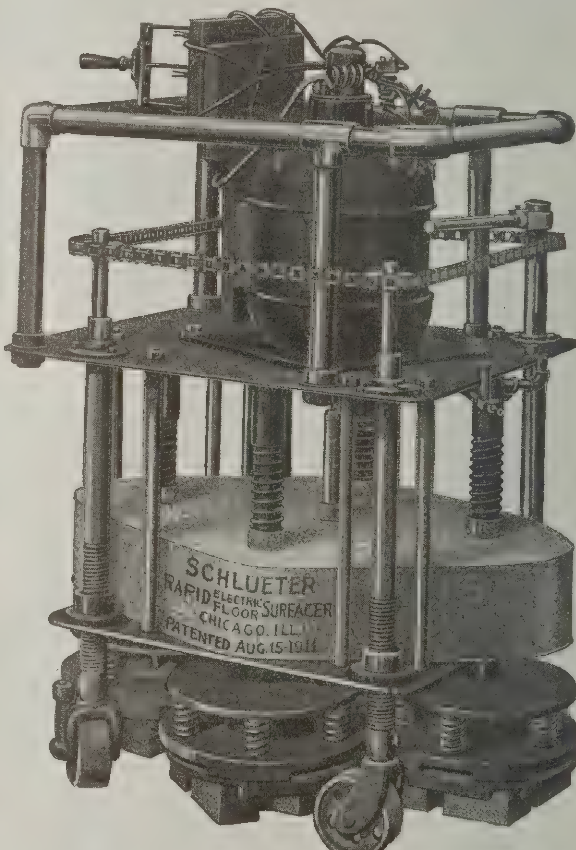


Fig. 13—The Schlueter Stone Surfacer

not fastened to the shafts, but are fitted with a knuckle and allowed free spring play according to the variations of the floor surface to be treated. Furthermore, each disc is independent in its movement and conforms to the irregularities of the floor so that the greatest grinding and smoothing efficiency can be obtained. At the top of the illustration above the frame proper will be seen a ratcheting device by means of which the discs can be raised from the floor at will so as to proportion the load to the character of the surface to be treated. This would be necessary with a floor surface exceedingly irregular, the weight of the machine upon the surface being increased as the grinding proceeds.

The capacity of the machine is 500 sq. ft. per day on a mosaic floor. A 3-h.p. motor is used. The frame of the machine is 22 in. wide and 25 in. long, and its weight 450 lb. M. L. Schlueter also makes a two-disc machine using a 2-h.p. motor, the total weight of the apparatus being 350 lb. The apparatus can easily be manipulated over the floor surface by one man by reason of the broad faced wheels upon which it is mounted.

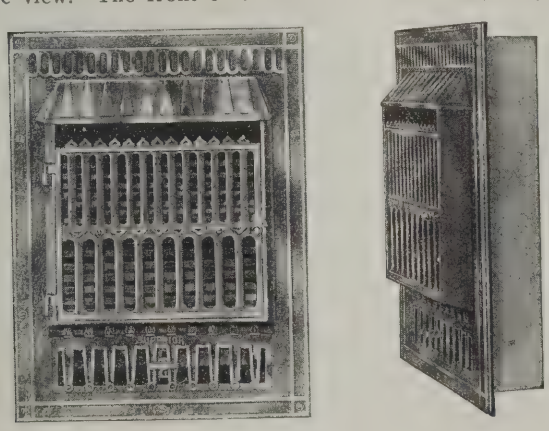
Modern Store Fronts

A catalogue of unusual interest to prospective builders all over the country is that which is being distributed under the above title by the International Steel & Iron Construction Company, Evansville, Ind. It is devoted very largely to the presentation of designs of store fronts of such a nature as to be adapted to a great variety of needs. The live and successful merchant of the present day fully realizes the importance and necessity of an attractive display to business advancement and the public in general is usually more inclined to patronize the modern attractive store than it is those which do not possess these characteristics. In order to meet the requirements of its customers the company in question employs competent architects and engineers who specialize in preparing any designs which may be called for and to meet any conditions or dimensions in regard to attractiveness, durability and strength. In the little work before us 18 pages are devoted to designs of modern store fronts, some large, some small, some having plain and some ornamental brick walls supported by cast iron columns and lintels or steel beam girders and finished with galvanized iron cornices and window caps. The designs are of such a nature too that they can be combined to form single, double or blocks of fronts either one, two, three or four stories high. Several pages are also devoted to designs of galvanized fronts which, with the simplicity of their construction and in connection with the details and description furnished by the company, enables any carpenter or mechanic to make a first-class job when placing the fronts in position. Every care has been given by the company in combining the different galvanized iron pilasters, scrolls and cornices of the designs as shown in the catalogue and no pains have been spared to present store fronts that are modern and attractive in every respect.

In addition to the store fronts are details clearly indicating methods of construction, designs of skylights of various kinds and reference to ready roofing, etc.

Superior Bath Room Heater

A bath room heater which is claimed to be of such a nature as to differ materially from any other method of bath room heating, and known as the "Superior, is illustrated in front view in Fig. 14, while in Fig. 15 is shown a side view. The front of the heater is of Colonial design



Figs. 14 and 15—Front and Side Views of the "Superior" Bath Room Heater

and is made of cast iron heavily plated. A door is provided for convenience in lighting without danger of being burned. It is so constructed as to be used in the regular wood partition, tiled or plastered wall of a bath room and has very much the appearance of a hot-air register set 14 or 18 in. from the floor. The body of the heater is lined both inside and outside wih heavy asbestos, has a large circulating cold-air space around the inner frame, which contains the burner. This inner frame is also covered with heavy asbestos. The burner made with imported lava tips is fitted with an adjustable check for regulating the combustion on the different pressures of gas. No air mixer is used as the gas coming in contact with the air through very small lava tips mixes and purifies itself, thus leaving no odor. It is so made that the heat from the gas jets causes the air furnished to be drawn from the floor through the fender and pass up over the flame, discharging itself back into the room, thus creating a continuous circulation of the air through the room at all times.

The heater is equipped with lower corrugated copper reflectors and an upper corrugated deflector. There is also an upper reflector and baffle plate on the cast door for directing the products of combustion back to the point where they come in direct contact with the air drawn from the floor, which tends to greatly purify it. This form of bath room heater is made by the Central Mantel Company, 1228 Olive Street, St. Louis, Mo. The method of heating is said to be not only convenient, but very economical and safe—doing away with the objectionable bath room stove in houses which are not heated by steam or furnace.

Artistic Effects Produced by the Koll Built-Up Columns

At the present day the porch or veranda constitutes an important feature of the home dwelling whether it be the comparatively inexpensive cottage of the man in moderate circumstances or the pretentious mansion involving

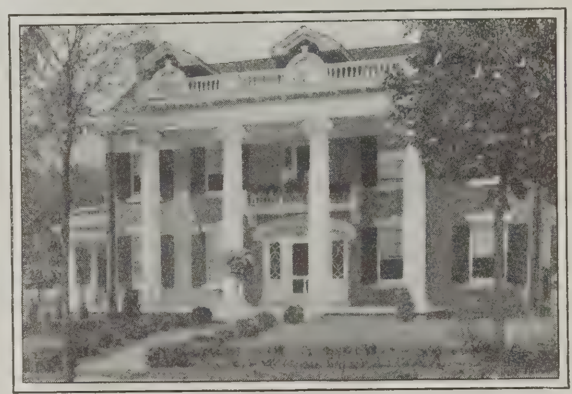


Fig. 16—Showing Use of "Koll" Built-up Columns

a large sum in its construction and located within the city limits or upon the country estate. The architectural effect of the veranda is largely due to the style of columns used in connection with it, these usually being of a type to harmonize with the general character of the building. Varied are the ways in which the columns are utilized and the effects produced; in some cases the columns extending only to the height of a single story, while in other cases, like examples of early Colonial days, they reach to the frieze of the cornice of the second story. The latter was characteristic and is to-day of many of the southern mansions, although much the same treatment is to be found in practically every part of the country. The striking effects which may be produced by well-built columns, extending both to the first and to the second stories of a residence, are illustrated in the picture represented by Fig. 16 of the engravings. Here is shown the Colonial porch of the residence of Grant I. Rosenzweig, located at 3740 Gillham Road West, Kansas City, Mo., the columns being of the "Koll" patent made by the Hartmann-Sanders Company, Elston and Webster avenues, Chicago, Ill.

Supply of White Pine

The Northern Pine Manufacturers' Association of Minneapoils, Minn., realizing that a false impression has been created in the minds of many people, including retailers of lumber as well as users, regarding the production of white pine, has entered upon a very extensive campaign for the purpose of showing the resources in this wood of our forefathers. "White Pine and Plenty of It" is the slogan, and a book giving much useful and instructive information to those about to build as well as those engaged in selling lumber is being sent free to any one making application for it. It is entitled "Why-When-White-Pine," and its contents is designed to set people right on the subject of white and Norway pine.

Fireproof Cement and Brick Stains

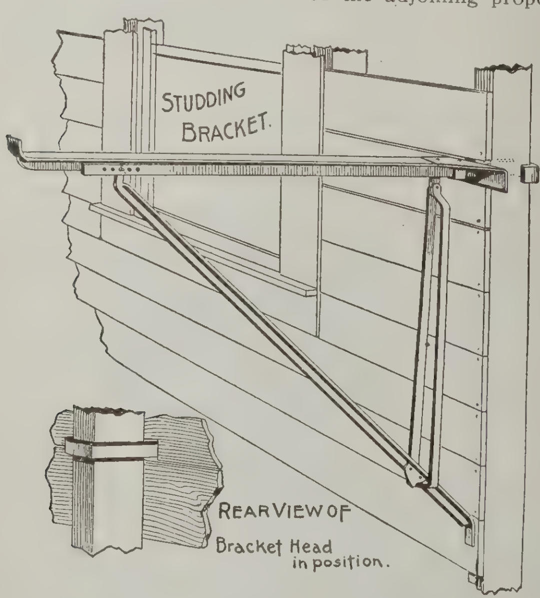
With the growing use of cement in building construction, more especially in its application to the exterior walls of dwellings, the importance of the coloring problem has greatly increased, and with a view to securing satisfactory results along the lines indicated, Samuel Cabot, Inc., 141 Milk street, Boston, Mass., brought out his waterproof cement stains for waterproofing and artistically coloring all exterior cement surfaces. The merits of these stains are entertainingly set forth in a catalogue just issued from the press and a copy of which is before us Reference is made not only to the waterproof cement stains, but also to Cabot's interior plaster stains and to Cabot's waterproof brick stain and preservative for coloring and waterproofing brick work. Scattered through the pages are numerous half tone engravings of buidlings of various kinds in connection with which the stains in question have been used. The waterproof stains are intended for use in connection with all exterior cement work on buildings, whether concrete, plaster, rough cast or stucco, that require coloring or waterproofing or both. They are not intended for interior work because on account of the waterproofing compounds they dry too slowly when not exposed to the out-door air. The stains are applied with a brush like paint and should be kept thoroughly stirred while using so as to get a uniform color. They should also be applied to dry surfaces because if the pores are full of moisture the stain cannot penetrate.

Duplex Post Caps and Hangers

We have before us a copy of a very attractive catalogue of 72 pages relating to the various lines of post caps, joist and wall hangers made by the Duplex Hanger Company, Cleveland, Ohio. In presenting this work it has been the endeavor of the company to render the catalogue a useful handbook of information for the use of architects and builders. A valuable feature is a series of tests on wall hangers and post caps designed for mill construction work. These tests were made by prominent Universities and in connection therewith are reports on tests of material in actual construction, also the report of fire tests made by the Underwriters Laboratories of Chicago. The point is made that rates of insurance are much less where Duplex post caps and wall hangers are used in buildings of the type known as "slow-burning" mill construction. The company states that everv hanger is thoroughly tested and that hangers for heavy loads are all made with test lugs which are bent cold so as to demonstrate the superior quality of the malleable iron used. The product of the company is illustrated and described in a way which cannot fail to interest builders and architects generally and those who so desire can secure a copy of the catalogue on application to the company.

The Detroit Folding Scaffold Bracket

Time was when wooden scaffolds were erected for each job of work whether in connection with the building of new houses or in the repairing of old ones. At the present day, however, the increased cost of lumber, the shorter working hours and the higher wages of workmen render much more advantageous the use of steel scaffold brackets which enable a complete scaffold to be set up in a very short space of time. The successful builder and contractor is the one who takes advantage of every opportunity to reduce cost and it is to these men that brackets of the character indicated are most likely to appeal. It has been shown that the saving effected by the use of them is such that the entire cost of a set of steel brackets may be saved on a single contract. Sometimes when a house is being erected close to the lot line the owner of the adjoining property



The Detroit Folding Scaffold Bracket—Fig. 17—Showing Application of the Studding Bracket

objects to the placing of scaffolding on his premises and in such cases the steel brackets furnish a way out of a possible awkward situation. The construction of the brackets is such that they can be instantly taken down and moved to the next job, thus greatly facilitating the work and enabling the contractor to do it in a most economical way. A folding steel bracket that is claimed to embody several new and attractive features is that which has been brought out by the Folding Scaffold Bracket Company, 57 Fort Street, West, Detroit, Mich., the illustrations of which are presented herewith. In the first place no bolts, screws or nails are required to attach the brackets to buildings as each bracket is provided with a grip to fit over the studding and when the lower brace is brought into position the grip automatically tightens holding it firmly in place. It is adjustable for different sizes and it is also provided with a shoulder against the building so there is absolutely no side motion. In the "Detroit" bracket, as it is called, the feature on which the company bases its claims to superiority is in the distribution of the load strain. The latter is communicated through the brace to a looped steel strap which is attached to the floor of the bracket 3 in. from the building. This arrangement causes the load strain to be downward and not outward as is said to be the case with a rigid bracket. A much greater load can therefore be carried with safety. In Fig. 17 of the accompanying illustration is shown the application of the studding bracket together with a rear view of the bracket head in position. The company also makes a bracket for attaching to the sheathing of a building, as illustrated in Fig. 18, but in other respects the bracket is the same as that for direct application to the studding.

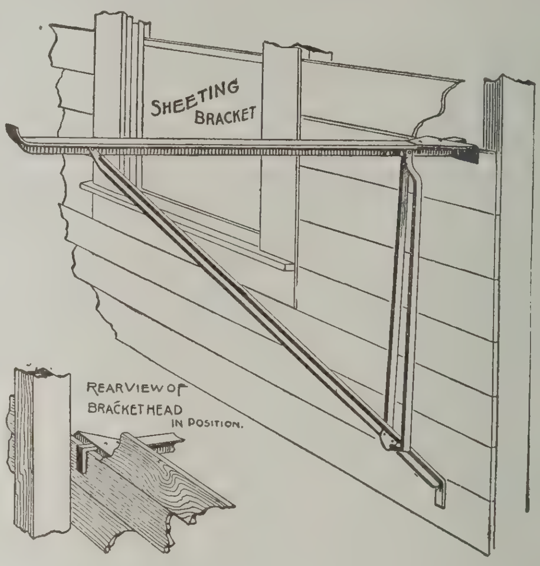


Fig. 18—Showing Application of the "Detroit" Sheathing Bracket

New Plant for Making Lifting Jacks

The Duff Mfg. Company, Pittsburgh, Pa., exclusive manufacturers of Barrett Lifting Jacks, has purchased five acres of ground on Preble Avenue, North Side, Pittsburgh, on the lines of the Pennsylvania and Baltimore & Ohio railroads and will at once commence the erection of a new factory which it is said will be the largest in the world devoted exclusively to the manufacture of lifting jacks. The construction work on the factory and office buildings will commence about July 1. The lifting jacks turned out by the company range in capacity from 1000 lb. to those capable of lifting 500 tons and over.

Pumping Engines and Water Supply Systems for Suburban Homes

The Standard Pump & Engine Company, Cleveland, Ohio, has just issued a very interesting catalogue profusely illustrated relating to Standard pumping engines and water supply systems for suburban homes, greenhouses, isolated institutions, hospitals, infirmaries, etc. The company makes a specialty of pumping units of various sizes and types and the designs shown are adapted to shallow wells, cisterns, lakes or rivers, while others are adapted to pump from deep wells. They are operated with gas or gasoline engines, electric motor or hand power, according to the requirements of the case. An interesting feature is found in the various sectional views showing different types of installation. The entire arrangement is such as to command attention and the letter press includes among other things several tables of useful information. The catalogue in question is known as No. 12 and a copy of it will be mailed to any reader of the *Building Age* on request to the company.

(For Trade Notes see second page following)

The Work of Applying is Quicker and Easier When You Use

NEPONSET WATERPROOF BUILDING PAPERS

Ordinary rosin sized paper soon absorbs moisture, leaving the house unprotected against dampness and cold. Soon the wetting and drying out causes the paper to tear around the nail holes. Often, it slips down between the boarding and siding. Then the house is without protection against draughts.

NEPONSET Building Papers are absolutely waterproof. They keep out dampness and cold as long as the house stands—save a ton of coal each winter. Any home owner will gladly pay $8 or $10 to have his home protected with NEPONSET if you tell him why.

Write for the NEPONSET Proposition.

House of Geo. Hodson, Newark, N. J. Neponset Black Waterproof Building Paper Used.

Branch Offices:
New York
Washington, D. C.
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F. W. Bird & Son
East Walpole, Mass.

Established 1795.
Canadian Plant, Hamilton, Ontario.

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Chicago, Ill.
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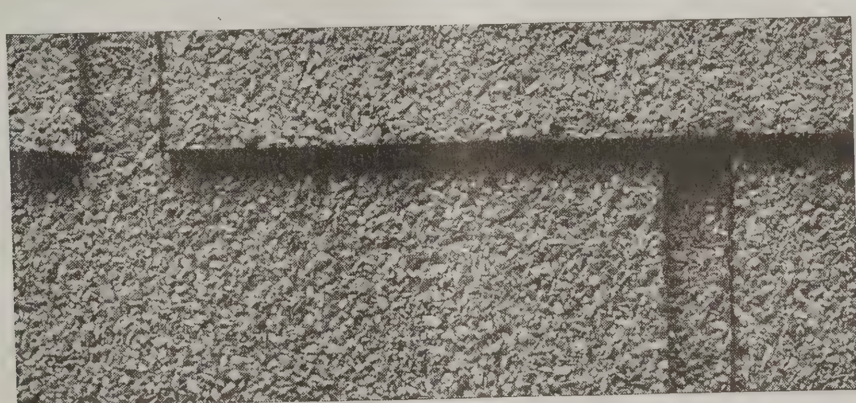


This Cut Shows the Surface of Flex-a-Tile Shingles— Beautiful—Convenient—Durable.

FLEX-A-TILE Asphalt Shingles

A solid asphalt shingle into the surface of which chipped slate or granite are embedded so thoroughly that they are practically one substance.

Do you get the significance of that?

A big generous shingle—8 inches wide—laid in half the time it takes to apply wood shingles. A surface of beautiful texture and of rich color. Absolutely weatherproof—and more durable even than slate.

Flex-a-tile Asphalt Shingles are cheaper than stained wood shingles. The color is simply the natural rich red, silver gray, green gray or brown of the slate or granite used in the surface. It can't fade, or wear off. It is there to last as long as the house stands.

Flex-a-Tile Asphalt Shingles are put up in Rolls as well as Shingle Form.
A Winning Proposition for Any Wide Awake Carpenter and Builder.
Can we Send You a sample—and the Flex-a-tile Book? Write to-day.

THE HEPPES COMPANY, 1011 Forty-Fifth Ave., Chicago, Illinois

TRADE NOTES

S. Cheney & Son, Manlius, N. Y., make announcement of the fact that after July 1 they will manufacture the Zimmerman bases for porch and other columns. The Zimmerman iron base, it will be recalled, has a center bearing and carries the required weight without allowing the corner supports to sink into the floor.

Beautiful original decorative effects may be produced in any home or building to meet existing conditions and to match the woodwork, rugs, etc., by the use of Alabastine. If interested in interior decoration you can procure an original design worked out in Alabastine colors without cost by addressing J. L. Hamilton, manager Alabastine Company, Grand Rapids, Mich., and at the same time mentioning *Building Age*.

George V. K. Greene has just opened an office as architect and engineer at 36 Main Street, Flushing, N. Y., and is desirous of receiving catalogues and price lists from concerns advertising in the *Building Age*, who manufacture goods in which an architect is likely to be interested.

The North Western Expanded Metal Company, 925 to 950 Old Colony Building, Chicago, Ill., has just been sending out with its compliments an exceedingly attractive 16-page pamphlet entitled "Stucco Houses—Full Data for Their Construction." The matter consists of a brief history of stucco construction and leading up to its growing popularity in this country, pointing out that stucco in America has come to be the popular name for frame construction covered with metal lath and Portland cement plaster. This method was first used in building the type of houses known as brick and half timber, but during the last few years it has gradually been extended until the whole exterior of the house is constructed in this manner. Details are given as to the way in which the stucco is applied to expanded metal lath and numerous illustrations are presented showing attractive residences of stucco exterior walls, several of which have been "overcoated"—that is, old frame houses refinished by covering the exterior with stucco on expanded metal lath.

The Berger Mfg. Company, Canton, Ohio, has just arranged for an addition to its extensive plant which will give it a much needed increase in its productive facilities. The new addition will cover an area 200 x 300 ft. in plan and will be four stories high.

"Roof Salad," as served by the Genuine Bangor Slate Company, of Easton, Pa., is a dish calculated to create an appetite for more information on the value of slate as a roofing material and the Genuine Bangor Slate Company goes further and offers to satisfy that appetite by the provision of a number of the booklets which can be had on application and which aim to provide many sound arguments by which the dealer can convince users of the value of this material not only as a fire retarding roofing, but as one that will give indefinite service.

A feature of the June issue of *Graphite*, the well-known organ of the Joseph Dixon Crucible Company, Jersey City, N. J., is a page group of portraits of the San Francisco district sales force of the company named. A brief sketch of each representative is given together with a statement of what the district or territory comprises. Another excellent feature of this issue of *Graphite* is a metric conversion table arranged by C. Hunt of New York City. Going from the serious to the humorous is an article entitled "A Few Leaves from the Diary of a Stomach," by Ruth Cameron. The entire make-up of the paper is fully in keeping with its predecessors and should prove a welcome visitor to every user of graphite.

"A June Bride" is the subject of the illustrated calendar for June sent out by the Richards-Wilcox Mfg. Company, Aurora, Ill. On the back of the card is a view of an interior showing the use of Richards door hangers with ball bearings.

G. & C. Merriam Company, Springfield, Mass., makes announcement of an essentially new dictionary of the English language, the volume consisting of 2700 pages. For the past six years a large staff of editors has been at work, men carefully selected for their individual qualifications, and so grouped as to cover the whole field of practical lexicography, directed by chiefs who have gained experience in previous revisions of Webster's dictionary and reinforced by experts chosen from the highest authorities in literature and science. The general supervision of the work has been under the direction of Dr. W. T. Harris, late United States Commissioner of Education. In the construction of Webster's New International Dictionary, as it is termed, the basal principles have been a fuller application of the historical method to the old words of the language; an enlargement of the vocabulary, representing the new coinage incident to the world's advance in science, art, literature, exploration, politics and the addition of general information concerning things as well as words. In all these respects the aim has been to make the new work in a much higher degree than its predecessors a handbook for all who write or speak the English language.

The Hind Hoisting Machinery Company, Buffalo, N. Y., has just purchased the plant of the Riverview Bronze Company at Gull Street and the New York Central Railroad Belt Line. The plant will be equipped for the manufacture of hoisting machinery and other apparatus equipment for contractors' plants.

The Rochester Asbestos Shingle & Fireproofing Company, Rochester, N. Y., has had plans completed for a brick factory three stories in height and covering an area 80 x 132 ft. The building will be erected at Gates, N. Y., for the manufacture of asbestos shingles, fireproofing material and builders' supplies. The directors of the company, which was recently incorporated, are C. A. Briggs, W. G. Gilbert and W. H. Karnes, all of Rochester.

The Arnold-Creager Company, New London, Ohio, has been sending out some interesting literature relative to the merits of the brick molds which it manufactures in connection with its lines of brick-making machinery. These molds are made of selected cherry and hard maple, are bound with steel which is put on with special screws, threaded the full length so that they cannot come out, and the workmanship is by men and the sons of men who have been making brick molds for 30 years.

Wallace V. Karr, 66 Jefferson Street, Westfield, Mass., would like to receive from manufacturers catalogues and price lists of all kinds of materials and fixtures used in connection with building construction.

The Chamberlain Metal Window Strip Company is about erecting a new factory at Peru, Ill., to replace its plant destroyed by fire at Detroit some months ago.

J. A. Dupuis, of Pendleton, Ore., has just organized a company with a capital of $50,000 for the purpose of erecting a factory in Portland to manufacture what is known as the Simplex Double Slide Inside Swing Window recently invented by him. He claims that the window is dust and waterproof; that it will slide up and down like an ordinary sash and will open inward to facilitate cleaning. When the factory is in operation both metal and wood sash will be manufactured.

The Waterloo Cement Machinery Corporation, Waterloo, Iowa, has issued an attractive pamphlet setting forth the merits of the "Little Wonder" concrete mixer which is referred to as "the small job money maker." The tilting drum principle of the well-known "Polygon" made by the company has been applied to the small mixer in a very simple way and the result is a machine which has attracted widespread attention among contractors and builders having concrete work to do. The drum is of peculiar shape; has a very wide mouth and four immovable blades. The mixer is mounted upon a four-wheeled frame and is readily moved about from job to job. A copy of the pamphlet will be sent to any builder or contractor who may be interested.

Heath & Milligan Mfg. Company, Chicago, Ill., presents in a recent issue of "Co-operation and Expansion" some very interesting comments regarding paints and painting. Emphasis is laid upon the fact that now is the time to make preparations for this season's paint trade, for in the opinion of the company the demand for paints in 1912 is likely to be good. In fact the opinion is expressed that a better season is expected than for several years past, due in some measure to the fact that many jobs of painting which were put off last year and the year before will have to be handled during the coming season.

The Building Age

New York, August, 1912

A South Pasadena Bungalow

Some Details of the Front Cover Design -- Unique Architectural Treatment of the Exterior

OUR readers have doubtless observed with more or less interest the cover designs of the *Building Age* which have appeared from month to month and that among the number have been several of the cozy-cottage type of architecture commonly designated as the Bungalow. The one which illumines the front cover this month is a Southern California specimen of rather unique setting and of novel exterior treatment. The open porch extending entirely across the front of the building and the picturesque pergola on the dining-room side are noticeable features. At first glance of the half-tone engraving upon this page one might naturally suppose that the roofs were covered with snow but this is not the case, as the covering consists of three-ply asbestos roofing. The exterior walls of the Bungalow are covered with No. 1 shakes laid in alternate courses exposed 12 in. and 4 in. to the weather.

An examination of the plan shows on the main floor a commodious living room with open fireplace, a dining-room with built-in buffet, a kitchen equipped with sink, cupboards, "cooler," etc., a breakfast room, two bedrooms, a bathroom and a screened porch on which are located the laundry tubs. An excellent feature of the arrangement of the floor space is the separation, although immediately adjacent to it, of the water closet from the bathroom proper. A flight of stairs leads to the second floor on which is located a "den" and a screened sleeping porch. A novel feature of one of the sleeping rooms on the main floor and also of the "den" and one intended to economize space is a disappearing bed.

View of the Finished Building as Reproduced from a Photograph.

A South Pasadena Bungalow—Henry L. Wilson, Architect, Los Angeles, Cal.

According to the specifications of the architect the mud sills of the Bungalow are 2 x 6 in.; the floor beams are 4 x 6 in.; the first and second floor joists are 2 x 8 in.; the ceiling joists and rafters are 2 x 4 in., the latter being placed 24 in. on centers; the ridge poles are 1 x 6 in.; the collar ties are 2 x 3 in.; the plates and studs are 2 x 4 in., the latter being placed 16 in. on centers, and the shingle lath surfaced one side are 1 x 3 in. The studs at all corners and angles of the frame are doubled and all doors and windows have double headers. The floor joists running lengthwise under partitions are doubled, while all openings of

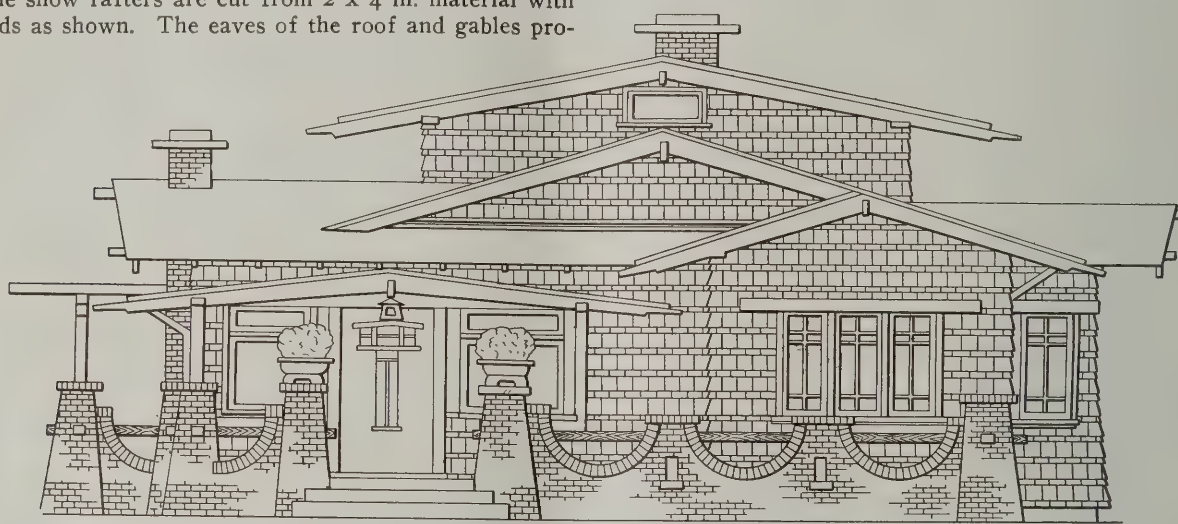
5 ft. and over are trussed. The under pins on the piers rest on 2 x 8 x 8 in. blocks and are braced from the beam above with 2 x 3 in. bracing. In spans of 12 ft. and over the floor joists are braced with 2 x 3 in. bridging.

The rafters have 2 x 3 in. collar braces nailed to them half way between the ceiling joists and ridge line, and the rafters are covered with 1 x 6 in. tongued and grooved flooring nailed to each rafter and this in turn is covered with 3-ply Brooks' asbestos roofing and turned over the edges of the barge boards and eaves. The show rafters are cut from 2 x 4 in. material with ends as shown. The eaves of the roof and gables project as shown in the half-tone engraving, and also in the scale elevations. The gables are finished with 2 x 8 in. barge boards supported by purlins. The roof is finished with battens placed over each joint of asbestos roofing, the edges of the battens being slightly beveled and securely nailed to the roof. Between the rafters and in the gables over shakes at the intersection of roof and walls ⅞ x 4 in. boards are fitted with quarter round in the angle.

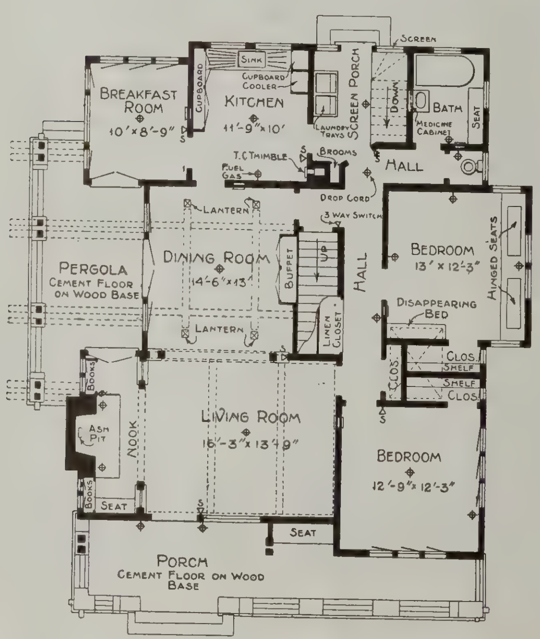
The front porch is built with brick buttresses, cement floor and steps, 8 x 8 in. columns and beams, 6 x 8 in. cross beams and 8 x 8 in. balusters to project through the piers as shown. The balcony has asbestos covered roof and is floored with ⅞ x 6 in. tongued and grooved flooring covered with 2-ply tar coated paper and 14 oz. canvas ducking laid in white lead. After laying, the canvas received 3 heavy coats of linseed oil paint.

The pergola porch on the dining-room side of the Bungalow has a cement floor finished with a top coat composed of one part Portland cement and 2 parts coarse clean sharp sand.

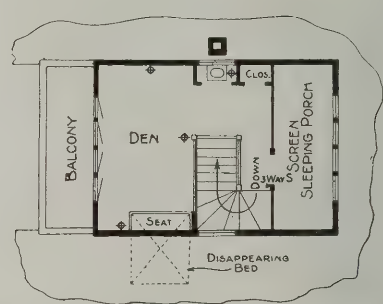
All exterior trim except where otherwise specified is unsurfaced Oregon pine. The ceilings of the porches are ⅞ x 6 in. tongued and grooved boards and a 2 in. bed mold is run in the angle of the porch ceiling with walls and beams. The screened porch is laid with a ⅞ x 4 in. flooring and has ceiled walls and ceiling with mold in the angle.



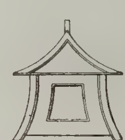
Front Elevation—Scale ⅛ in. to the Foot



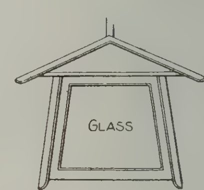
Main Floor Plan—Scale 1/16 in. to the Foot



Second Floor Plan—Scale 1/16 in. to the Foot



Lantern in Dining-Room—Scale ¾ in. to the Foot



Lantern on Front Porch—Scale ¾ in to the Foot

A South Pasadena Bungalow—Plans and Elevation

The sash are 1⅜ in. thick hung with No. 7 Silver Lake sash cord and 1¾ in. steel axle pulleys with dull brass faces and cast iron weights. Pulley stiles in boxing are ⅞ in. thick and the stools for all casement sash are 1⅜ in. thick.

All double hung and hinged windows are fitted with wire screens. Double hung windows have half screens with ⅞ in. frames set on stops to slide up and down, while the hinged windows have hinged screens the full length with ⅞ in. frames. The rear porch is screened with 14 mesh galvanized wire screen fastened in place with ⅝ in. half round stops.

Interior finish except where otherwise specified is selected slash grain Oregon pine. The doors are of the five panel colonial style and that between the dining-room and kitchen is double acting. The front entrance door is 2¼ in. thick of veneered quarter sawed white oak outside and slash grain Oregon pine inside. The inside doors opening in the living room and dining-room are of the one panel variety with square edge stiles. All outside doors have rabbetted jambs and inside ⅞ in. jambs.

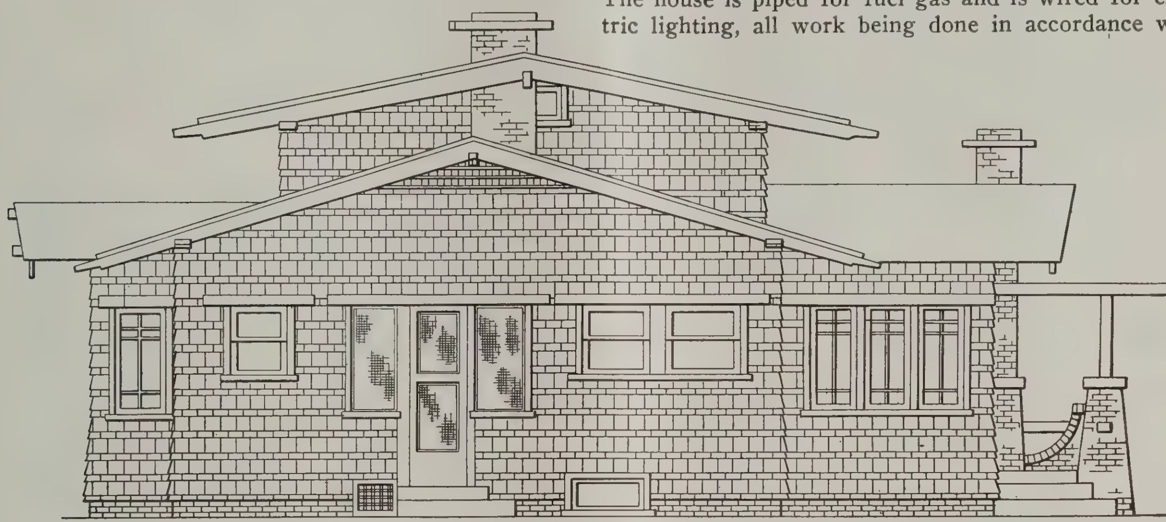
The dining room and living room have white oak floors laid with a ⅞ in. tongued and grooved sub-floor with two-ply Giant building paper between. The white oak floors are composed of ⅜ x 2 in. strips well driven together and nailed with wire nails every 8 in.

In the dining room is a plate rail 4 ft. 3 in. from the floor and with skirting board and brackets as indicated in the details. There is also in the dining room a built-in buffet with glass doors, counter shelf, drawers, etc.

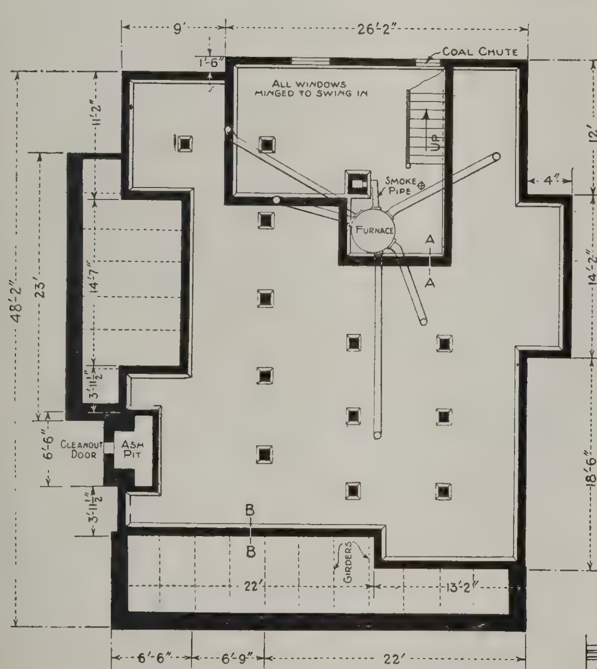
In the living room on either side of the open fireplace are bookcases with movable shelves and glass doors.

The plumbing fixtures consist of a 5½ in. porcelain enameled cast iron bath-tub with 3 in. roll rim supplied with Fuller combination cocks, a porcelain enameled lavatory, and a wash-down closet with quarter sawed golden oak low down copper-lined tank. In the kitchen is a 20 x 30 in. cast iron enameled sink. All fixtures have cut-off on both hot and cold water-supply pipes. The house is piped for fuel gas and is wired for electric lighting, all work being done in accordance with the rules of the National Board of Fire Underwriters.

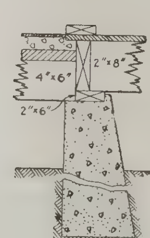
The meter is placed on the screened porch, all wires being brought into the house from the rear. All switches are of the Perkins flush push type, installed at points marked "S" on the plans. The front entrance light is controlled by a switch inside the front door.



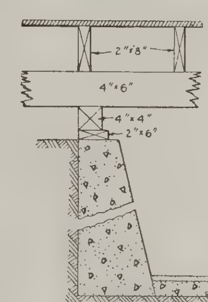
Rear Elevation—Scale ⅛ in to the Foot



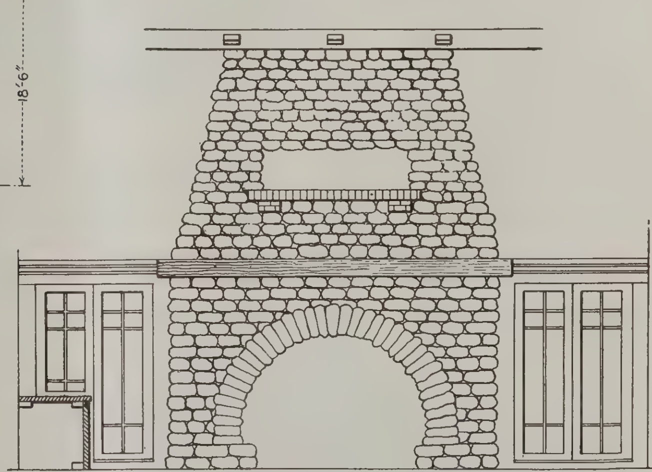
Foundation Plan—Scale 1/16 in. to the Foot



Section on B B of the Foundation Plan—Scale ½ in. to the Foot



Section on A A of the Foundation Plan—Scale ½ in. to the Foot



Elevation of Fireplace and Mantel in Living Room—Scale ¼ in. to the Foot

A South Pasadena Bungalow

All bracket lights are controlled at the fixtures. Gang switches are used where two or more switches come together. The various circuits are run from the screened porch at which place a fusible knife switch is located to control all lights. The front and back door bells are arranged to ring in the kitchen and are provided with two dry batteries.

The chimney is built with cast iron chute and pit and over the latter is a rowlock arch filled in with concrete grouting. The flue for the kitchen is 8 x 8 in. and for the fireplace 8 x 12 in., all flues being plastered inside. The mantel in the living room is built with clinker brick facing laid up in black mortar and fire brick backing laid in fire clay.

All walls and ceilings are lathed and covered with two coats of fibered hard wall plaster, the first coat being floated to an even surface for a sand finish. The kitchen is wainscoted 4 ft. high with smooth hard wall plaster finished perfectly smooth, while the bathroom is wainscoted 5 ft. high with even smooth plaster and ruled off into 3 x 6 in. blocks to represent tiles.

All corners of plastered walls are protected by metal corner beads nailed to the studs before plastering.

All shakes on the exterior walls were treated to two coats of stain applied in such a way as to be of uniform color. All wood of the roofs was treated to one coat of creosote stain. All exposed tin, porch floors and sides, screens and all surfaced material were treated to three coats of linseed oil paint, while the ceiling of the porches had two coats of linseed oil stain.

All woodwork trim in the living room and dining room had one coat of Standard Varnish Works "Mission Finish" and after 24 hours one coat of white shellac was applied and a coat of Flattine cabinet finish.

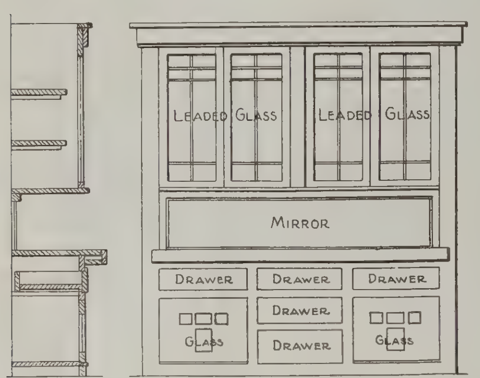
The woodwork of the bathroom, kitchen, bedrooms, hard wall plaster wainscoting in the bathroom and kitchen and the outside of the bath-tub had two coats of white lead and turpentine and two coats of Neal's white enamel rubbed to a dull gloss finish.

The hardwood floors were scraped and sandpapered and given one coat of paste and after 18 hours a first coat of Elastica floor finish was applied. After another interval the second coat of finish was applied.

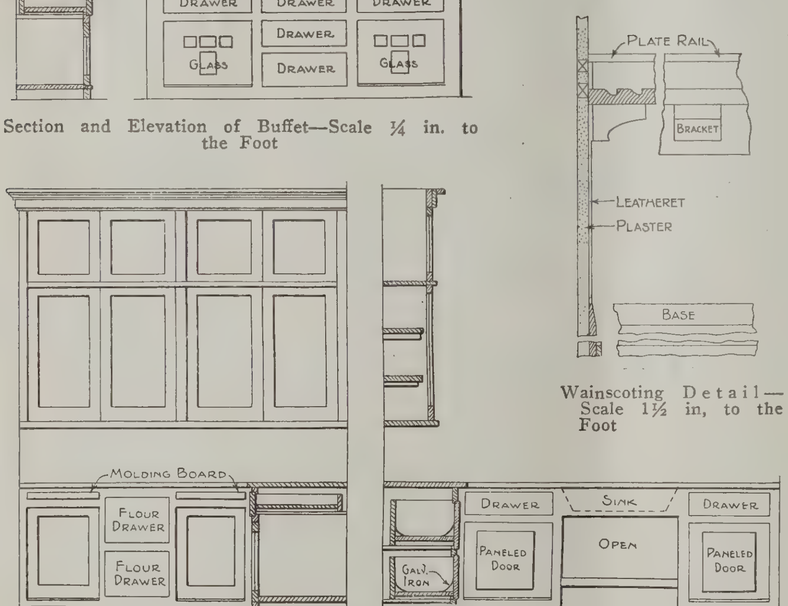
All walls and ceilings are tinted to suit the owner, the living room and dining room having rich colors and other rooms light colors.

The Bungalow here illustrated is located at 1221 Merango Avenue, South Pasadena, Cal., and was built for Fagg & Doublin.

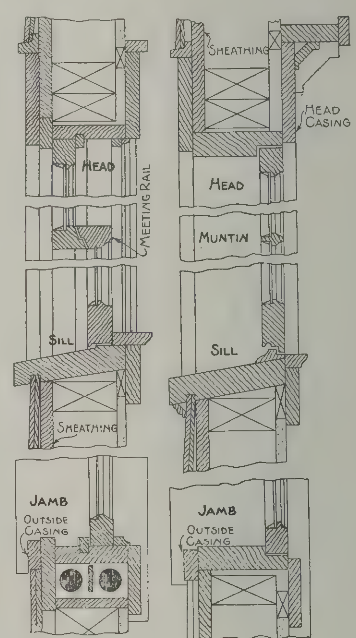
The architect of the Bungalow was Henry L. Wilson, 1129 W. P. Story Building, Los Angeles, Cal., and the contractor was E. A. Wood, of South Pasadena, Cal.



Section and Elevation of Buffet—Scale ¼ in. to the Foot



Wainscoting Detail—Scale 1½ in. to the Foot



Details of Casement Window—Scale 1 in. to the Foot

Details of Double Hung Windows—Scale 1 in to the Foot

Elevation and Section of Cupboard—Scale ¼ in. to the Foot

Miscellaneous Constructive Details of a South Pasadena Bungalow

The New Scribner Building

Plans for the new Scribner Building which is under construction on Fifth Avenue just above 48th Street, Borough of Manhattan, N. Y., calls for the structure to be 10 stories in height with a façade of granite and limestone. It has been designed by Architect Ernest Flagg and is expected to be ready for occupancy next May when the publishing firm after which the building is named will occupy the lower stories for their retail business and publication offices. The retail store with the entrance in the center will be 30 ft. high and an unusual feature will be an exhibition gallery in the rear with broad galleries on either side.

Following the recent resignation of James Knox Taylor, the office of supervising architect of the Treasury Department of the United States has been filled by the appointment of Oscar Wenderoth of the well-known firm of Carrere & Hastings, who assumed his duties on the 15th of July. Mr. Wenderoth was associated with Elliott Woods, superintendent of the capital in the construction of the Senate and House Office Building, and was formerly connected with the supervising architect's office for six years.

Building a Small Greenhouse

Practical Instructions and Plans for Erecting Greenhouses of Moderate Size for Small Country Places

THE subject of greenhouse construction for small country places or for the suburban districts is one of at least incidental interest to the carpenter-contractor and builder, for the occasion may arise when he will be called upon to do work of this nature. The suggestions contained in what follows, therefore, cannot fail to prove of value even though the matter was prepared in the interests of those who grow plants and flowers under glass. The descriptive particulars here given were contributed by Philip S. Sweetser to a late issue of *American Homes and Gardens,* and relates to the manner in which the building of the greenhouse may be done by the amateur.

Building a Small Greenhouse—Fig. 1—The Lean-to Greenhouse

The task of constructing a greenhouse is not a difficult one, but it does require some knowledge of greenhouse design and construction. A house in which plants and flowers can be successfully grown at a minimum cost should be so constructed that the framework will cast the least possible amount of shadow; that the area under the glass can be utilized to the best advantage; that it can be properly heated; and that it can be properly ventilated. The amateur with a little mechanical ability can easily construct such a house, however, if he can obtain the necessary information and data.

At the present time literature on the subject is very meager and it is therefore the purpose of this article to give, in as concise a manner as possible, such information and data as are necessary in order to enable the amateur to properly design and construct a greenhouse. The article is the result not only of an investigation made by the writer, but also of his experience in recently constructing a house for his own use. The details of construction discussed apply to an all-wood structure and in general to the small greenhouse built for private use. The suggestions, however, apply equally well to the large house built for profitable operation, for the dimensions of the framing timbers given and the methods of framing described are exactly the same as those used on a number of the best houses operated by successful florists. A discussion of the purlines, or supports for the roof sash bars, which are necessary on wide roof spans, is the only detail which has been omitted.

The construction of a greenhouse involves a consideration of types of houses—location, foundation, framework, glass, benches, and heating system.

Types of Houses

There are three general types of greenhouses, namely, the lean-to, the even-span, and the three quarter-span house. There are other types, such as side-hill, ridge and furrow, and curvilinear houses, but these are simply modifications or combinations of the three general types. The details of construction are practically the same in all three types. They differ only in the form of construction.

The Lean-to

The simplest type is the lean-to, an example of which is shown in Fig. 1. From the nature of its construction this type of house can be built at a comparatively low cost. As its name indicates, it is built against some structure and therefore requires but three sides and a one-slope roof. It is usually a small house and when heated is generally connected with the heating apparatus in the building to which it is attached. It should, when possible, face the south and, due to its peculiar construction, receives no reflected light whatever from the north. The plants grown in this type of house are, therefore, inclined to be more or less one-sided in their habit of growth.

Fig. 2—The Even-Span Greenhouse

The lean-to is used for forcing various kinds of vegetables and for raising such cool crops as lettuce, violets, etc.

The Even-Span House

The even-span house is the type most commonly used by florists. It can be built at a cost of $8 to $25 per running foot, depending on its width and the amount of labor figured in. As shown in Fig. 2, it is a perfectly symmetrical house, the ridge being in the center of the roof span, the roof slopes being the same, and the sides being of the same height. It is an all-glass house and is constructed of widths varying from 8 to 42 ft. The

Fig. 3—Three-quarter Span Greenhouse

width of the average commercial house is about 24 ft. This type of house usually faces the south—that is, its ridge runs east and west. Some florists consider that the light is more evenly distributed around the plants if the house faces the east, but the majority, however, prefer the southern exposure, for in this case, during the winter months, when the sun falls toward the southern horizon, the shade cast by the ridge and corners of the house is to a large extent eliminated. With either exposure the plants receive light from all directions and this is, therefore, one of the types best adapted for general greenhouse work.

Building a Small Greenhouse—Fig. 4—Corner Framing

The even-span house is used extensively for growing carnations, roses, violets, chrysanthemums, potted plants, and in fact all kinds of flowers and vegetables. An application of this type of house is shown in Fig. 11.

The Three Quarter-Span House

The three quarter-span house, two-thirds, or uneven span, as it is sometimes called, is shown in Fig. 3. This type of house costs about the same as the even span. It is designed for a more even distribution of light over the benches than it is possible to secure with the even span, and it differs from it in the construction of the roof and the north wall, and frequently in the arrangement of the benches. The ridge, instead of being placed in the center of the roof span, as in the even-span house, is placed near enough to the north wall so that its shadow does not fall on the benches. The north wall is constructed two or three feet higher, in this type, than the south wall and is generally built of wood or concrete up to within one or two feet of the eaves.

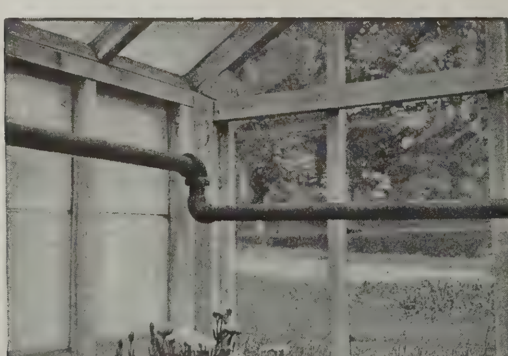


Fig. 5—Corner Framing

The benches, in order to receive the maximum amount of light, are then arranged in tiers.

This type of house, of course, must face the south, and, due to the fact that the plants receive the maximum amount of light evenly distributed, a structure of this sort is often spoken of as a "forcing house."

The two-thirds span house is especially adapted to the growing of roses, and is used most frequently for that purpose. It is, however, an excellent house for all kinds of plants and flowers such as the amateur usually begins with.

Selection of Type

The individual requirements in each case will, of course, determine which of these three types should be selected. Unless extreme low cost is the prime consideration, the amateur should seldom select the lean-to, for the results obtained with the other types will more than justify their greater cost.

Between the even-span and the two thirds-span house it is often difficult to choose. Due to the better distribution of light in the latter, somewhat better results can be obtained than in the even-span, although the difference is slight. Since the even-span house is symmetrical, however, the amount of labor involved in its construction is undoubtedly less than in the three quarter-span house.

In selecting the type which he shall use, the amateur should take into consideration (1) the kinds of plants that are to be grown in the house, (2) the cost of the house, and (3) the amount of labor involved in its construction.

Location

The house should be located on ground which is well drained and far enough from trees or buildings so that no shadows will be cast upon it. If it is located on low ground which receives the drainage from the surroundings, it will be continually damp, and the plants will be liable to have diseases. If possible, it should

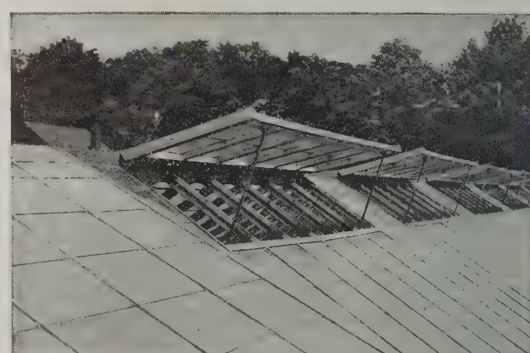


Fig. 6—Ventilator Framing

be so located that it will be more or less protected from the north and west winds.

Foundation

The foundation should be made of concrete. The properties of concrete are so well known that it is hardly necessary to state why this is the most satisfactory and in the end the cheapest foundation. It should be at least six inches wide and, depending on the kind of soil in which it is located, from twelve to thirty inches deep.

A good concrete will be obtained by mixing one part cement with two parts sand and five parts of gravel or broken stone. After the mixture is saturated with water, it should be placed in forms, built of seven-eighths inch or one-inch boards, rammed, and allowed to set at least 24 hours. Square-headed bolts, six or eight inches long, should be embedded about six feet apart in the concrete before it has set, for the purpose of holding the sills firmly in place, as shown in Fig. 9. After the concrete has set and the sills have been put in place the foundation may then be capped with a thin mixture of cement mortar, made of one part cement and two parts sand. The cost of materials varies from $2.50 to $4.00 per cubic yard of concrete, depending on the kind and prices of the ingredients used. A cubic yard of concrete made of the proportions given above will contain 1.29 barrels of cement, 0.45 cubic yards of sand and 0.91 cubic yards of gravel or broken stone. By obtaining the local price of cement, sand and gravel, the cost of the foundation can easily be estimated.

Framework

The framework, as shown in Fig. 8, is simply a skeleton composed of timbers called sills, posts, vertical sash bars, eave-plates, roof sash bars, rafters and ridge. These timbers should be made of cypress, for, on account of its straight grain, strength and durability, this has been found to be the wood best adapted for greenhouse construction. They should be made of such shapes and sizes and put together in such a manner that they will properly hold the glass, support their required weights and yet cast the least possible amount

piece of seven-eighths-inch board as shown at A, and in the photograph.

Two methods of framing at the corner posts are shown in Figs. 4 and 5. Fig. 4 shows the corner of a house about 24 ft. wide, the post being 4 in. square, re-inforced by two pieces of timber 2 in. square. The photograph, Fig. 5, shows the corner of a small house about 10 feet wide, where the corner post consists simply of two pieces of 2 x 4 in. timber, one of them supporting the end rafter and the other the eave plate.

The method of framing at the ventilator opening is indicated in Fig. 6. The header is simply a piece of seven-eighths inch board two or three inches wide, notched to fit over the sash bars (which also are notched and rabbeted to receive the glass). Some carpenters prefer to put in a heavy header and end the sash bars at the header, but such a method entails more work and the header, if very long, is invariably

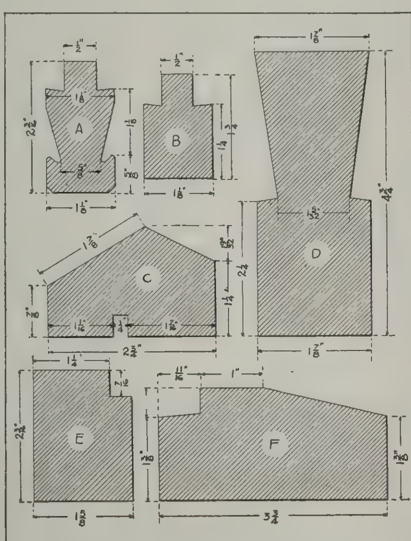


Fig. 7—Diagrams Showing Dimensions of Bars

Fig. 10—Method of Framing

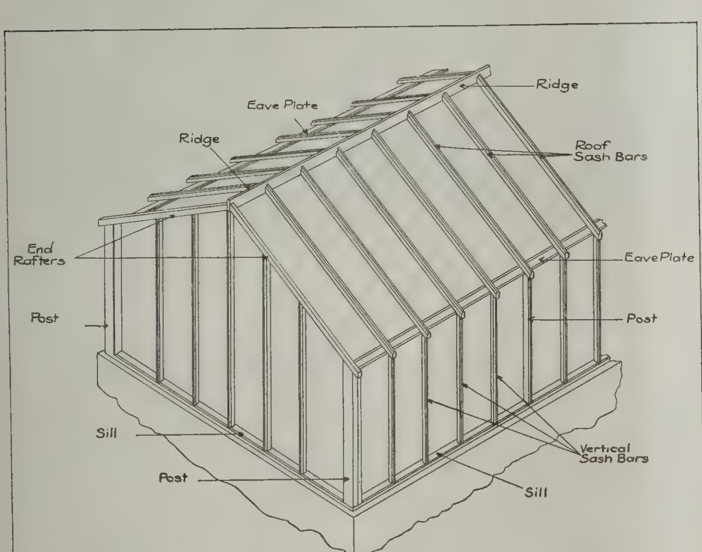


Fig. 8—Framework of Timbers

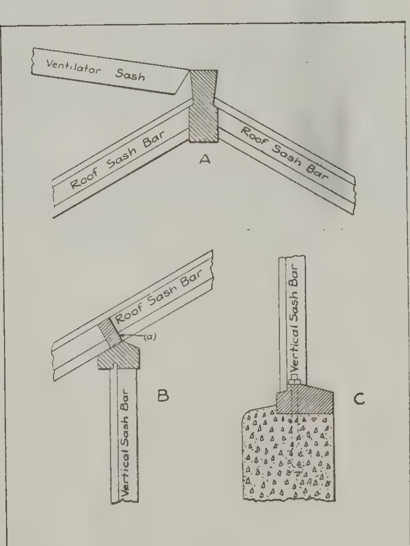


Fig. 9—Details of Framing

Building a Small Greenhouse

of shade. Fig. 7 shows the proper shapes and minimum dimensions (A, roof sash bar; B, vertical sash bar; C, eave plate; D, ridge; E, end rafter; F, sill) which have been determined by greenhouse carpenters after years of experience, and Figs. 4, 5, 6 and 9 show the best methods of framing.

No further comment is necessary on the shape and dimensions, but some of the methods of framing shown require a little explanation.

The method of framing the eaves is shown in Fig. 10 and in detail at B, Fig. 9. The sash bars simply rest on the wide face of the eave plate and the space between the eave plate and the glass is filled in with a

apt to sag and to prove very unsatisfactory.

Glass

The glass used should be "double thick" and of the second or third quality. Third quality glass, which contains a few more imperfections than second quality, costs a little less and is frequently very satisfactory. The panes may be 16 x 20 in., for these have been found to be the economical sizes, and they should be set so that the sash bars are spaced 16½ in. on centers. The cost of this size glass at the present time is $2.28 per box (of 23 panes) for third quality and $2.50 for second quality.

The construction of the benches is comparatively simple. They should be at least two feet in hight and from two to five feet in width, depending on where and how they are located. The supports should be made of 2 x 3-inch or 2 x 4-inch timber, and the bench proper of ⅞ or 1 in. boards. They should be deep enough to contain five inches of earth.

The arrangement of the benches should be such that the plants will at all times be readily accessible. Benches which are placed next to the sides of the house should not be over 3 ft. 3 in. wide. When there is a walk on each side they may be as wide as 5 ft. The walks should be at least 18 in. in width.

Many florists prefer not to place any benches next to the sides of the house, claiming that the plants are more liable to have diseases and more apt to be affected by outside temperature on cold nights. Space can be economized in the small house and very satisfactory results can be obtained if the benches are, however, so arranged.

Heating System

Although it costs about 20 per cent. more to install, the hot-water system should be used for heating the house in preference to the steam-heating system, for two reasons: First, because, particularly in the small house, it is more economical to operate, and second, because, on account of the lower temperature of the heat radiated and the greater amount of radiation required, it produces a milder and more uniform heat.

Fig. 11—Showing How an Even-Span Greenhouse Can be Attractively Arranged as an Extension to a Country Dwelling

Building a Small Greenhouse

The size and arrangement of the pipes and the amount of radiating surface required for the heating system are matters which the amateur should look into before installing his apparatus; but, as they require considerable study and as the installation of the apparatus is difficult work and requires special tools, skill and experience, he will do well to employ a plumber or heating engineer, who will figure the amount of radiation and install the system properly. The extra expense of help from the experts just mentioned will be somewhat offset in the non-purchase of the special tools.

A Modern Swimming Pool

A feature of the building recently completed for the Hamilton Club of Chicago is a swimming pool located in the basement and measuring 21 x 60 ft. in plan. As regards depth it consists of three sections, each 20 ft. in length. One end section has a depth of 4 ft. 6 in., while the other end section slopes from a depth of 7 ft. 6 in. to a depth of 8 ft. and the two sections are connected by an incline running from a depth of 4 ft. 6 in. to 7 ft. 6 in. as the maximum.

The walls and floor of the swimming pool are of reinforced concrete and as it is planned ultimately to place a sub-basement in the building the caissons and columns have been arranged accordingly. The floor of the pool is slightly above the sub-basement level and for this reason the concrete is carried on its own foundation and does not require any structural support. The side walls of the pool are 10 in. wide at the top and 14 in. at the bottom, while the concrete floor is of a uniform thickness of 12 in. The reinforcing material consists for the most part of ¾ in. square twisted bars with a small amount of ⅝ in. round bars at the corners. No special waterproofing was used in connection with the pool, as the walls and the floor were made impervious by means of a thick bed of mortar composed of Portland cement and sand. It was applied in layers about 1 in. thick, each succeeding layer being applied before the one underneath it had been allowed to set.

The finish of the walls and floor of the pool is of mosaic bedded firmly in the cement. In order to secure white joints between the blocks of mosaic Atlas white cement and white sand were used for the top layer of mortar. The tops of the walls are capped with a terra cotta curb in which is found a number of unusual features, since in the one piece is provided curb, scum gutter and hand rail.

The finish of the pool was designed and installed by Charles F. Lorenzen & Co., Chicago, Ill. The old style handrail having been found somewhat dangerous to swimmers, this risk has been eliminated by so shaping the edge of the gutter as to make it serve as a handrail. The gutter has a slight slope and is drained through an opening at one end of the pool. The upper edge of the curb is shaped in such a way as to eliminate so far as may be possible the splashing of the adjacent floor.

Water for the pool is supplied generally from the city mains, but the entire water system of the building is cross connected and water can be taken at any time from the tank on the roof. Hot water is supplied from two hot water tanks in the boiler room which joins the pool room. Drainage of the pool is by means of a 6 in. pipe which discharges into a well 8 ft. in depth below the boiler room floor and from which the water is pumped by a centrifugal pump to the sewer. About four hours are required for filling the pool and a somewhat longer period for emptying it.

During the year 1911 there were 1079 permits issued for the demolition of buildings in the Borough of Manhattan, New York City.

Hollow Clay Blocks for Farm Buildings*

Some Important Points To Be Considered -- Barns and Storage Buildings -- Figures of Cost

THE time, energy and money spent in the design, construction and repair of farm buildings each year is so great that the importance of the problem of farm buildings stands second to none, except perhaps a very few of the most fundamental problems of conservation. The three principal classes of building materials are lumber, metal and masonry. The present prices and lasting qualities of masonry bring it to the front at this time. The inhaustibility of the supply assures the most extensive use of it in the future. The special and remarkable advantage of the use of a small amount of metal combined with masonry brings us to the conclusion that reinforced masonry will be the building material of the future.

Clay products have always been among the most widely distributed and used of masonry materials. The development of hollow clay blocks has reduced the labor of manufacture and laying up, lessened the amount of material used and at the same time improved the quality of the product. For building walls of small to medium sized buildings where permanence, warmth and medium cost are desired the clay block is worthy of more than passing attention.

Construction of Hollow Blocks

In general, hollow clay blocks are made of the same material as building brick. The quality may be judged from considerations similar to those used in the judging of building brick. The clay is forced through dies and is subject to the same danger of stratification as brick.

The most common sizes are 4x4, 4x5, 4x8, 4x12 and 5x8. The length is generally 12 inches, but 16 inches and even greater lengths are common. The air spaces are not generally greater than 4 inches in any cross-sectional dimension. In the heaviest blocks the air space is merely large enough to insure the passing of the fire down through the block while burning. For use in medium sized buildings, however, ½ to ¾ inches is most common and sufficient thickness of the clay.

The strength of clay bricks is remarkable. Tests of medium quality blocks show a strength from 1000 to 6000 lbs. per square inch. Its strength is often equal to that of solid brick on account of the fact that the hollow is burned more uniformly. So far as downward pressure is concerned it would probably be safe to build a wall of this material of uniform thickness to a height of 4000 ft.

A rather unusual, although perfectly safe design in which strength of this material was quite fully utilized, was that of a silo 18 ft. in diameter and 54 ft. in height having a reinforced wall which has for some time successfully supported a 600 bbl. masonry tank.

There is no building material more impervious to water and air than vitrified clay. From absolute dryness to saturation requires an absorption of less than 5 per cent. of its weight of moisture

In regard to its fireproof qualities, the following is quoted from the highest authority:

"Terra cotta will certainly require less reconstruction after a severe fire-and-water test than any building material except possibly the best quality of fire brick." "In Baltimore and San Francisco fires it was demonstrated that for outside walls brick are superior to any other material used in wall construction." In buildings which are to contain large quantities of inflammable material it is undoubtedly better to line the walls with porous furring tile or hollow brick.

A rather interesting test along this line has been going on in the writer's house for the last two winters. We have a fireplace built of 4x8x12 shale clay blocks forming a 1-inch wall. We have burned wood, soft coal, hard coal and coke in this fireplace. The inner walls have often been white hot, yet not one of the blocks has been checked although the expansion of the hot blocks has sheared the mortar loose from the foundation.

Clay block walls thick enough to sustain any downward pressure which comes upon them will often not be rigid enough to safely withstand the side pressure or shearing strains which may be imposed.

In dwellings the principal stresses to consider are due to side pressure of winds, freezing ground in contact with the cellar walls, outward pressure of roof and shear due to unequal settling. In barns and other buildings in which large stock is kept the crowding of the stock should always be considered in addition to the forces already mentioned in dwellings. For storage buildings the different materials to be stored must be considered. There are reliable sources of information concerning the pressure of these materials.

In regard to the danger of stock crowding masonry walls I was interested in finding a clay block blacksmith shop located in the northern part of Iowa. This shop was some 30 feet wide and some 50 feet long. At the front end the walls were 12 feet high, sloping to 9 feet at the back end. They were 8 feet thick and contained no reinforcement. Alongside of this shop and secured to the wall were 13 tie rings. Frequently to all of these rings have been secured horses waiting to be shod. Halter pullers have repeatedly broken ⅝-inch ropes secured to them and the wall has not been injured in any way.

Instead of an 8-inch wall in this shop a 5-inch wall could have been made fully as strong and more cheaply by reinforcing it. In reinforcing a straight wall against flecture there must be side supports. Joists may be utilized for tying walls together. In the absence of other supports reinforced pilasters may be built into the wall. All corners must be thoroughly tied into the wall with good wall ties.

Horizontal reinforcement may generally be placed in the mortar joints to the best advantage, but in some cases, such as over windows and doors, a hole may be broken in each block at the top and steel extending through the blocks may then be secured by pouring the block full of concrete.

The most convenient size of reinforcement to use for mortar joints is No. 3 wire, which is ¼ inch in diameter. Sometimes the greater availability of No. 9 wire may recommend its use, and for reinforcing blocks

*Paper by M. L. King, experimentalist at the Iowa State College, read before the American Society of Agricultural Engineers.

which are filled with steel and concrete any convenient size of steel may be used.

House Construction

Clay blocks have been used to quite an extent in the construction of houses. The usual method is to lay up an 8-inch wall, such as is ordinarily used in cement block house construction. The objection to this method is that while the walls are entirely windproof, there is considerable heat carried out through the walls on account of the mortar and clay extending from the inner to the outer surfaces. Also there is always the probability of a small amount of moisture being conducted across by the mortar. In ordinary house construction 8-inch walls are much thicker than necessary and two 4-inch walls can be built from the same amount of material and slightly greater amount of labor.

For the last two winters the writer has lived in a story and a half house having a 4-inch wall built of these blocks and is at present designing another to be occupied permanently. The whole house will be made of 4x8x12 inch blocks. This will facilitate sorting blocks. The cellar wall will be 8 inches thick, with soft and slightly checked blocks below the frost line and hard, dark blocks above the frost line. Between the frost and grade lines may be used any hard blocks which may be off in color. From the grade to the first floor line dark blocks need only to have one 4-inch surface free from checks. Above the line of the first floor will be two 4-inch walls with a 2-inch air space between. All window and door frames will be rabitted on the back and concrete slugged in between the end of the block and the frame. This insures windproofness around the frames. If it can be conveniently done tar paper will be placed in the mortar joints of the inner wall and hung down full width to a mortar joint in the outer wall. This makes one more dead air space and increases the certainty of the wall being moisture proof. Each wall will be sufficiently reinforced to stand independent of the other. In order, however, to stay the green walls while building, some wall ties will be used but only temporary dependence will be placed in them. The blocks of the outer wall will be of uniform color laid up in mortar of the same color. The inner walls and partitions may be built of blocks not fit for other purposes. Thus it will be seen that kiln run material may be used.

Blocks of Uniform Color

In case blocks cannot be secured of so uniform a color as to give the house a desirable appearance it can be stuccoed or painted. Though appearance is desirable it is not essential, and there is no place where the beauty of utility is so fully appreciated as it is on the farm. Thus the fact that we are unaccustomed to the appearance of the block construction is of less consequence for farm buildings than other. In addition to this I am firmly of the opinion that with a fairly uniform colored block and a colored mortar with a few vines growing up around the corners the longer one lived in such a house the more he would regret leaving it.

Small clay block barns are rather common in town, but large or even medium sized barns economically built are scarce. It is easy to find places where men have squandered fortunes riding an agricultural hobby, but such things have little or no bearing on every-day farming.

In the northern part of Iowa there was during the summer a medium sized dairy barn built of hollow blocks. The walls are 8 inches thick below the hay mow floor and 5 inches thick above. The roof trusses were so designed as to prevent any outward pressure on the walls. The foundation is reinforced so as to prevent any settling cracks. Some steel is also placed in the corners and over the door and window frames. The builder of this barn reports that the cost was fully as low as other dairy barns in the same neighborhood which were sheathed.

Storage Buildings

In storage buildings of any kind the outward pressure of material can be most conveniently provided for if the building is round, as the walls are then in direct tension and the material depended upon to hold it is not so seriously stressed as though the walls were in flexure. In most cases reinforced concrete door frames can be joined to the reinforcement of the walls, thus eliminating all material less permanent in character than concrete and vitrified clay. Silos built of this material have already been in use several years. They have been perfectly satisfactory and are becoming very popular. In the fall of 1908 one silo of this type of construction was built and successfully operated. The following year 12 more were built and a bulletin issued showing their construction. During the past summer about 125 have been built. So far as we can learn they are all in successful operation and none of those built from the bulletin have been more expensive than a good grade of stave silo.

Corn Crib Construction

A few corn cribs of this material are also in use. If built circular it is a very simple matter to lay some steel in the mortar joints and form a reinforced concrete door frame. In building rectangular cribs the reinforced concrete door jambs may extend to the top of the crib and may be tied across the top and bottom to pilasters on the opposite side of the crib. It then becomes a problem of reinforcing the straight walls against flexure due to pressure of the material inside.

For corn cribs the blocks should be laid crosswise in the wall, and the air space should extend from the inner to the outer surface. It seems to me that the best form of material for this purpose will be a special block made as large as possible but cut short and on a bevel so that in laying them up the cut ends may form a smooth vertical wall, but the air spaces slope down and out, thus carrying away a large portion of any rain which would otherwise be driven in by wind.

A few larger elevator bins have been built of this material, and superintendents of wide experience say that they have never had any that kept the grain so thoroughly dry.

For various other small buildings about the farm, such as chicken, hog, smoke or dairy houses, the blocks are cheap, easily laid up, sightly, and easily kept sanitary. They provide no hiding places for insects or pests of any kind.

Figures of Cost

Hollow blocks are generally sold in brick measure, 72 cubic inches allowed for a brick. In manufacturing the amount of material used is very much less than that for brick. The selling price at the factories will range from one-half to two-thirds that of a similar grade of brick. The cost of manufacture is perhaps slightly increased by the fact that a greater variety of dyes and therefore forms of blocks need to be carried in stock than is the case with solid brick. A common price f.o.b cars at plants in Iowa for kiln run is $4.50 to $5 per M brick measure. The cost of buildings will of course vary with labor conditions and local supplies of sand, etc. My experience has been that for medium sized buildings the labor conditions of the rural communities and small towns are better than the cities. The mechanics of these localities must necessarily do a variety of work and the average farm building is not large enough to make advantageous use of specialists. There are so many figures that can be given tending to show the low price of any particular material which is desired to be shown favorably, therefore I will quote but few figures. The following is from a booklet by the Pennsylvania Fireproofing Co., and though catalog material, it is far from common practice.

Hollow tile walls per 100 sq. ft., cement stucco and interior plaster.

6 inches	$23.85
8 "	27.10
10 "	30.85
12 "	32.35
Exterior plain, interior plastered.	
6 inches	$18.35
8 "	21.60
10 "	25.35
12 "	26.85
Exterior plain, interior ready for plaster.	
6 inches	$15.50
8 "	18.75
10 "	22.50
12 "	24.00
Partition walls ready for plaster.	
3 inches	$10.50
4 "	11.00
5 "	12.80
6 "	13.10

In silo construction a reinforced wall neatly painted outside and washed with cement inside will cost from $13.00 to $15.00 per square, $14.25 being very common. A very good comparison of prices of frame, hollow block and concrete construction appeared in *Carpentry and Building* for July, 1908.

A builder in Wilkes-Barre, Pa., recently decided to practically determine the question, and to that end he erected in the same locality three houses of the same size and arrangement. One house was built entirely of wood, the second was of concrete with wooden floors, and the third was of hollow tile blocks and concrete. When the experiment had been completed it was found that the cost of the wooden structure was $6,000, the one of tile and concrete was $6,500, and the one of concrete was $8,900. The builder regarded the tile and concrete house as the cheapest, so far as durability was concerned. He also regarded it as likely to be warmer in winter and cooler in the summer by reason of the air spaces in the hollow blocks being poor conductors of heat and cold.

It is, of course, advantageous to use standard blocks when possible. However, special dies are not very expensive and manufacturers will make anything for which there is a market. In special stuff there is always room for careful consideration. In silos, for instance, a curved block was needed, and after considerable effort and some partial failures the blocks were automatically bent by simply running them out flat on curved instead of straight pellets. The pellets of the cutting table were alternately concave and convex. The column of clay from the die settles of its own weight in the curves, thus causing no extra labor. The ends are cut square so that they are set in the kiln just like any other blocks.

Suggested Treatment of Wall Spaces in Suburban Homes

When Paper Is Preferable for Use and When It Is Better to Make Use of Tinting

THE wall spaces in the average modern suburban home are not of the unbroken type that we used to think it was necessary to have years ago. Except in the bedrooms the wall spaces in most of the rooms in the country house are now relieved with woodwork, but the treatment of them in any room depends largely upon the character of the room itself, says Clara Brown Lyman in discussing improved buildings for the suburban resident. If it is a living room and has simply a plain, unbroken wall, it should be covered either with a good, plain paper in a warm light-giving tone, or tinted. This latter treatment has been used a great deal in modern country homes, and is very effective since the introduction of the stencil frieze, which breaks the monotony and coldness of the otherwise plain wall. Such a wall forms a splendid background for pictures and bric-à-brac, and harmonizes with the furnishings.

If paper is to be used on the walls and one prefers not to have a plain effect in the living room, a striped paper in the self-tone, with a frieze in some harmonizing color is good, but, as the living room is usually the place where pictures and ornaments are abundantly used, avoid figured wall paper. The hall should be wainscoted, if possible, with the upper part tinted; the reception room may be either tinted or papered, and this admits of a much lighter color treatment than any other room on the first floor. A dainty gold and white is very attractive in such a room or any of the pastel shades may be effectively used and here, because such a room should have no pictures on the walls and few ornaments, figured wall paper may be used if desired.

The library may be either wainscoted with the upper part of the wall tinted and a stencil design used or an attractive paper in foliage or landscape design—or it may be papered in place of the wainscoting with papered frieze above.

The dining room should always be done in light, cheerful tones, and many people, for sanitary reasons, believe that this room should be tinted, rather than papered. If wainscoting is not used, the lower part of the wall should be either a plain tint or a perfectly plain paper in a good light color. A plate rail running around the room is a pleasing break in the otherwise too severe wall surface and above this can be used a stencil design in flowers, fruit, or landscape, or a paper that carries out these designs.

The bathroom, kitchen and all service rooms should, for sanitary reasons, be tinted.

The bedrooms in the country home admit of more decoration on the walls than any other room in the house. If tinted they can be made charming in pastel shades of blue, pink and leaf green, with stencil borders in contrasting shades. Variety of color can be obtained in such rooms with gay-colored, figured cretonne curtains at the windows.

Many persons, however, prefer paper for bedrooms, and there are numberless designs that are attractive and appropriate. Two warnings must be heeded in regard to bedroom paper—never select a paper that is so intricate in design that the eye, and so the nerves, are distracted by it, and if your ceilings are high don't use a striped paper, because it will only make them seem higher; if they are low use it to get the effect of hight.

Building a Summer Camp

How Some Members of the Columbus Builders and Traders Exchange Did a Good Piece of Work

BUILDING contractors as a general rule are a good-hearted lot of men, although sometimes they may appear to be uncouth and rough. There are, however many examples which might be cited tending to prove the former statement, and the people of Columbus, Ohio, are willing to testify that the contractors whose names are on the membership roll of the Builders and Traders Exchange of that city have in them the right kind of stuff and are quick to meet an emergency.

It was not long ago that a building located at what is known as the "Baby Camp" burned down, and right here it may be proper to state that the "Baby Camp" is fostered by charitable people of the city of Columbus, who hire nurses to attend to the infants of mothers who are compelled to slave all day over the wash tub in order to keep body and soul together. When the building burned down the "Baby Camp" was, in the vernacular of the day, "up against it."

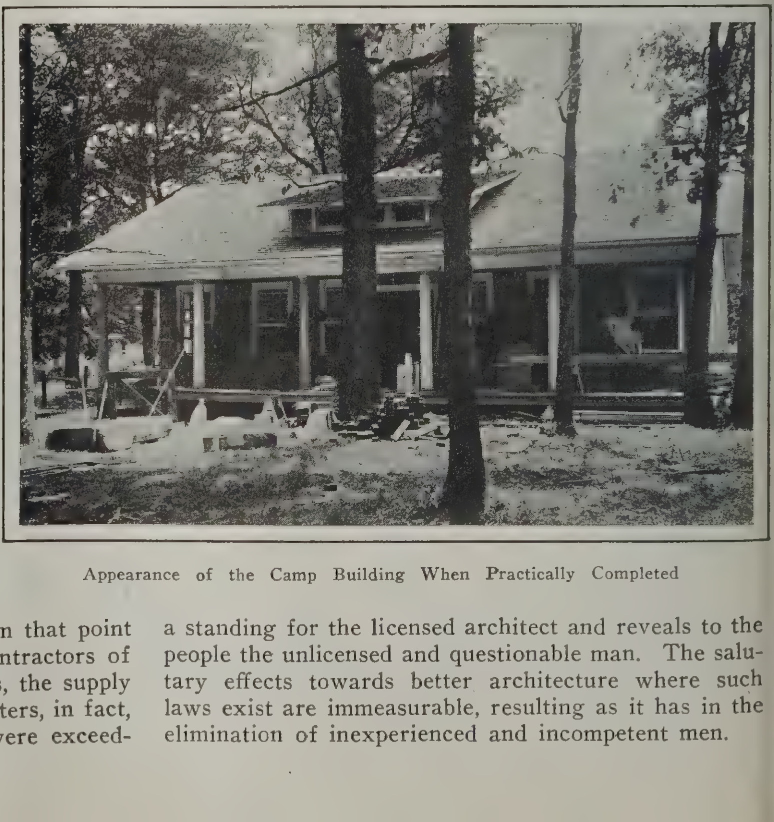
Building a Summer Camp—Members of the Builders' Exchange Laying the Floor

But right here is where the Builders and Traders Exchange came to the front. One bright, hot day in June Secretary John A. Kelley and a dozen of the larger building contractors of Columbus dropped off at the "Baby Camp." They were all prepared for business, and as the lumber, etc., had been previously delivered on the grounds and the foundation blocks laid, they went to work with hammer and saw and, although none of them had done this sort of thing for several years they showed they had not been lacking in early training. When the contractors quit that day the structure—an eight-room bungalow—was almost ready for the roof. The newspapers made a great ado about the "stunt" and had pictures showing the men engaged at the work.

A few days later another gang of contractors drove out to the grounds of the "Baby Camp," and when they left the shingling was practically completed. From that point on it was easy sailing. The plumbing contractors of the Exchange, the roofers, the electricians, the supply dealers, the plastering contractors, the painters, in fact, everybody having to do with the work were exceedingly busy, and just two weeks from the day the first load of contractors arrived on the grounds the building was ready for occupancy; and the "Baby Camp" had been saved hundreds of dollars. Furthermore, no one enjoyed it more than the contractors, who even served as hod carriers while the brick chimney was being erected by one of the contractors who laid the brick himself.

The pictures which are here presented show the completed structure, and also four of the members of the Builders and Traders Exchange busily engaged in laying the floor. Those engaged in this operation are Messrs. John Phillips and D. W. McGrath, while those shown standing are W. E. W. Cherry and F. H. Nichol.

It may be remarked in passing that the building was painted as the work progressed.



Appearance of the Camp Building When Practically Completed

Licensing Architects

From a very carefully selected list of questions submitted to the various examining boards in the states of Illinois, California, New Jersey, Colorado, Louisiana, Utah, as well as Manitoba and Quebec, Canada, the following reasons have been deduced in favor of licensing architects, says *Brickbuilder*. Architects in states where such laws exist are unanimously in favor of it. The law has helped the profession by removing the "architect and contractor," the "architect builder" and the "architect and engineer." Many state universities and technical schools have, since the advent of the architects' license laws, revised their courses to meet the demands. The law has created a higher moral standard, as well as competency in planning and designing. The preparation for a license examination is highly beneficial to the applicant. The law furnishes a standing for the licensed architect and reveals to the people the unlicensed and questionable man. The salutary effects towards better architecture where such laws exist are immeasurable, resulting as it has in the elimination of inexperienced and incompetent men.

Reading Architects' Drawings--IV

A Consideration of the Elevations, the Roofs, Block Plan, and the Use of Colors on Drawings

By Arthur W. Joslin

WE will now look at the attic floor plan shown in Fig. 7 of the illustrations. The sides *A* and *B* are the gable and sides, as you will see if you look at the elevations of these sides, Figs. 10 and 11. Notice that the line representing the inside line of the wall is discontinued shortly after it passes the partitions that intersect it as at *C*, but that the line denoting the outside of the wall is continued to the corner. This is to show that while the studding boards, wall shingles, etc., continue to the outside corners the plastering occurs only when the inside of the wall is in a room or finished part of the attic.

The balance of the outline of the house at attic floor level is shown by a dotted line *D*. The dot and dash lines *E* show the roof plan, those around the outline being the line of the outside of cornices and rakes, and the one through the center being the ridge of the roof.

Everything else necessary to know on this plan can readily be determined by applying the explanations given with the first and second floors and reading the notes.

We will next take up for consideration the various elevations, of which Fig. 8 represents the front, Fig. 9 the rear, Fig. 10 the right side and Fig. 11 the left side elevations. These are all drawn to ¼-in. scale, but are here reproduced one-half that size or to a scale of ⅛ in. equals one foot. An elevation drawing of a building is one in which every part that can be seen, if you were standing directly in front of the center of a side of a building, and at sufficient distance so that all perspective effect was lost, was brought forward into a vertical plane and pictured as though it was a flat surface.

In drawings of this kind true hights, widths and other measurements may be obtained, whereas a perspective drawing cannot be measured in the ordinary way no more than can a photograph. Look at the upper part of Fig. 8 at *A* where the front slope of the roof is shown. As far as this drawing goes it might be a vertical surface. Now look at the right side elevation in Fig. 10 and you will see that it is a sloping surface.

If you scale the vertical distance *A* on both Figs. 8 and 10 you will find that they are the same. As you look at this elevation in Fig. 8 your judgment must tell you that the surface *A* is the main roof, the surface *B* the bay-window roof, and the surface *C* the porch roof. From this drawing you may scale the true vertical hight of these roofs, but to get the pitch or slope of them you must refer to either one or the other of the side elevations which are at right angles to the front. Look at the side elevations, Figs. 10 and 11, where are marked the roofs *B* and *C*. Thus from the elevation drawings you can obtain all information

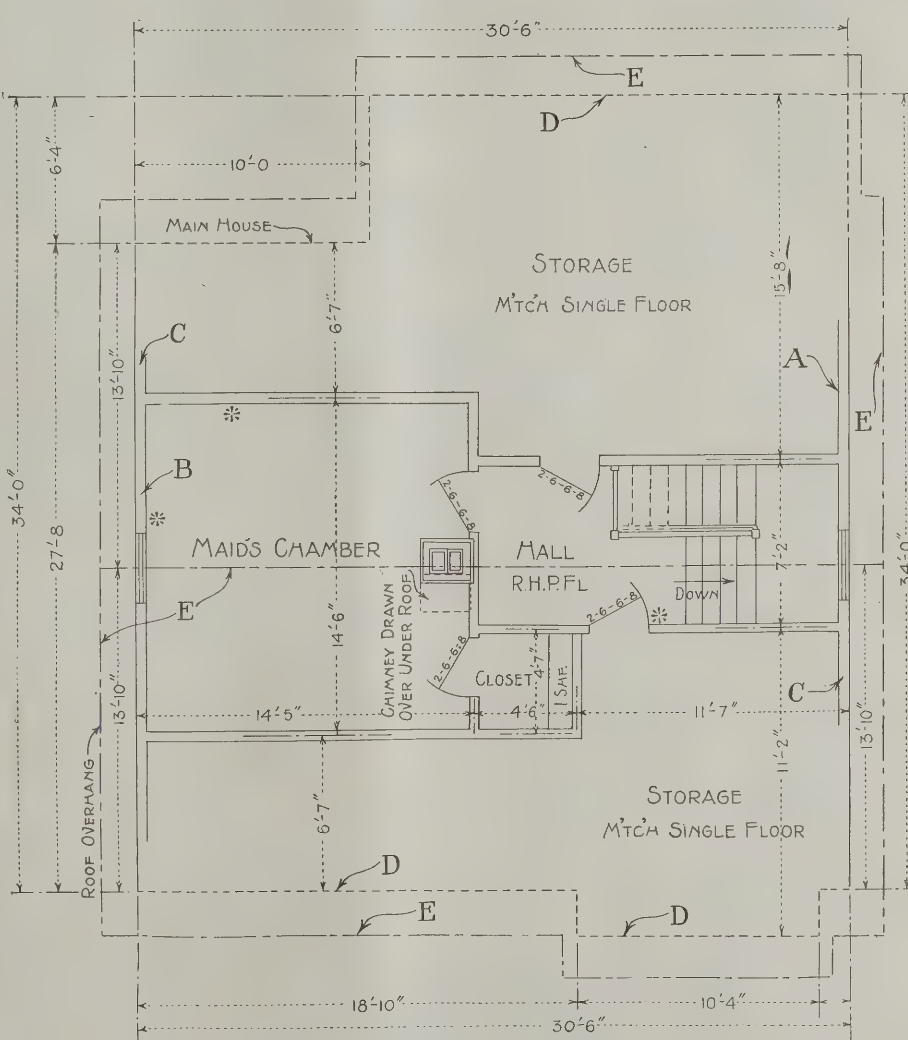


Fig. 7—Attic Plan—Scale ⅛-In. to the Foot

Reading Architect's Drawings—IV

relative to door and window hights, widths, style, etc., size and slope of roofs, style of cornice, porches, balustrades and outside trim generally, so far as such parts may be intelligently shown at such a reduction from the full size. Conventional methods of drawing or notes also make clear what wall and roof coverings are used. When all of the above are taken with the floor plans and specifications a true mental picture of the structure is produced and all of the drawings may be read as figured, or scaled if not figured, for actual

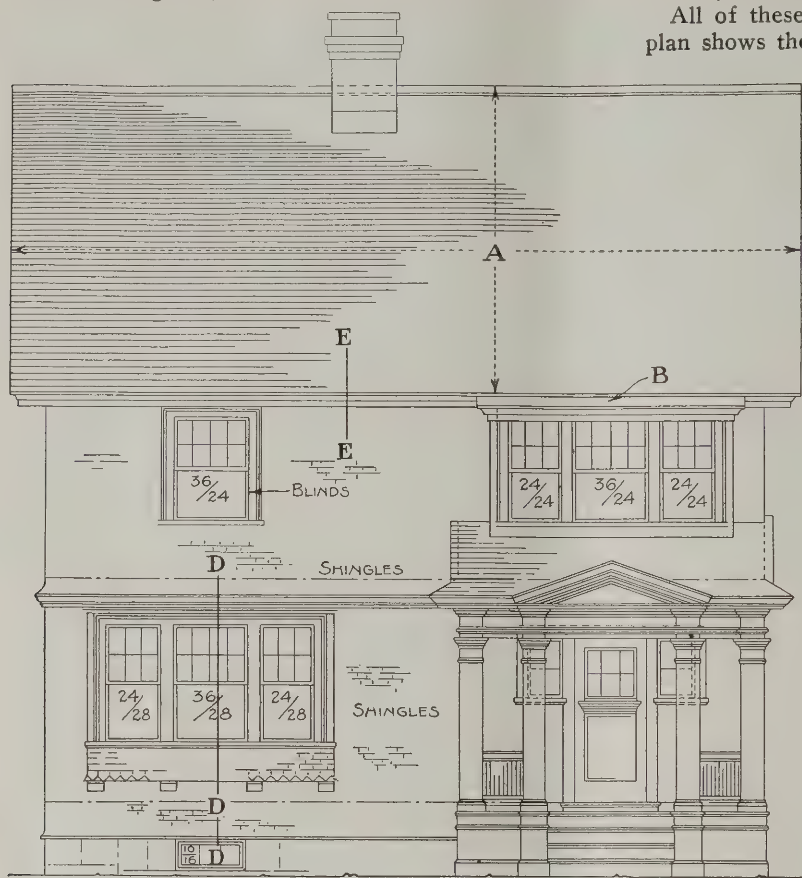


Fig. 8—Front Elevation—Scale ⅛-In. to the Foot

dimensions to use in estimating upon or carrying out the erection of the building.

To make perfectly clear to the estimator or builder the style and construction of cornices, porches, bay windows, etc., large scale drawings are given as follows: ¾-in. scale section and elevations of front porch, Fig. 12; ¾-in. scale section through living room bay, Fig. 13, and 1½-in. scale section through main cornice, Fig. 14. The ¼-in. scale typical section through wall and roof of house from footings to roof provided an opportunity to show size of joists and rafters and hights of stories properly figured, Fig. 15. For purposes of publication these drawings are presented to a scale one-half that mentioned.

There is also shown, at a scale of 20 ft. to the inch, a "block plan," as in Fig. 16. The main purpose of this plan is to show the location of the house on the lot. It should, and usually does, show many other things necessary to know and inconvenient to put on the general plans. Among these things are the following: Dry wells and location; sewer, gas and water mains, their distances from the house and direction in which connections of above take to reach the house; cesspools

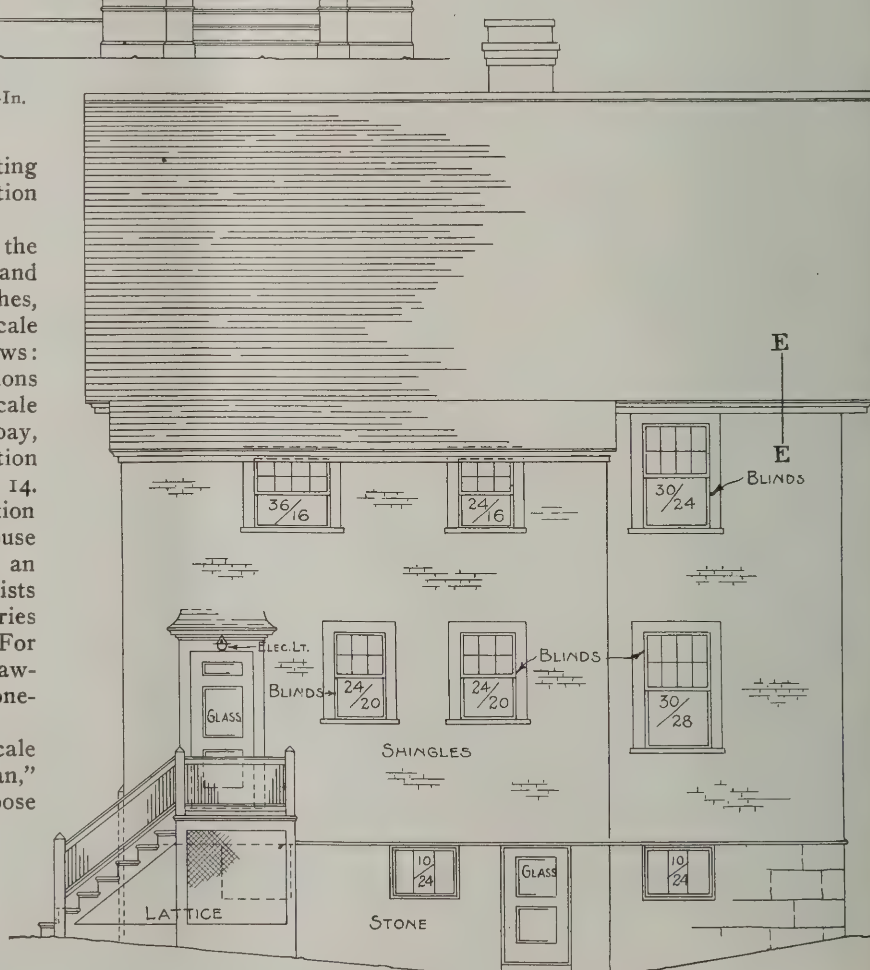


Fig. 9—Rear Elevation—Scale ⅛-In. to the Foot

Reading Architect's Drawings—IV

and locations; walks, retaining walls, driveways and fences; size and shape of lot; points of the compass, etc.

All of these matters must be known, and the block plan shows them and their relation to each other. So much has been offered in explanation of the several floor plans, small sections and elevations that it would seem that further words would only confuse the reader. However, a few words in explanation of some of the large scale drawings may possibly be of assistance in helping the reader to interpret them.

Take Fig. 12, which is drawn to a scale of ¾ in. to the foot but published to a scale of ⅜ in. equal 1 ft. On the left we have an elevation of the porch as seen from the side. On the right is a section through the porch taken about on line *R-R* of Fig. 5, and there is shown by *R-R* on the elevation Fig. 10 about where this section is taken.

You will see, if you look at the porch on this elevation, Fig. 10, that the large scale drawing presents about that part of same to the right of the line *R-R*.

The principal advantage of this large drawing of the porch is that the draughtsman is enabled to show moulding profiles, cornice projections, etc., and give dimensions that, on account of the small scale, could not be made evident on the front or side elevations. The section also enables him to show the construction and size of frame members. These latter points of information cannot be shown on the floor plans or ¼-in. scale elevations.

Fig. 13 is a section through the living room bay and is also drawn ¾ in. to 1 ft. but published one-half this size. It shows the bay as it would look if cut in two on the line *D-D* and the left-hand piece was removed, so that you would see the construction from main sill on the foundation up through to a point a foot or so above the second floor.

Everything revealed by this "autopsy" that is actually cut through is cross-hatched, or in the case of large members like the sill and girt, shown in imitation of a large piece of end wood, the growth rings and checking being simulated. The joists and studding, the sides of which stand revealed, are drawn in imitation of a large piece of timber or plank as seen sideways, the side grain being simulated.

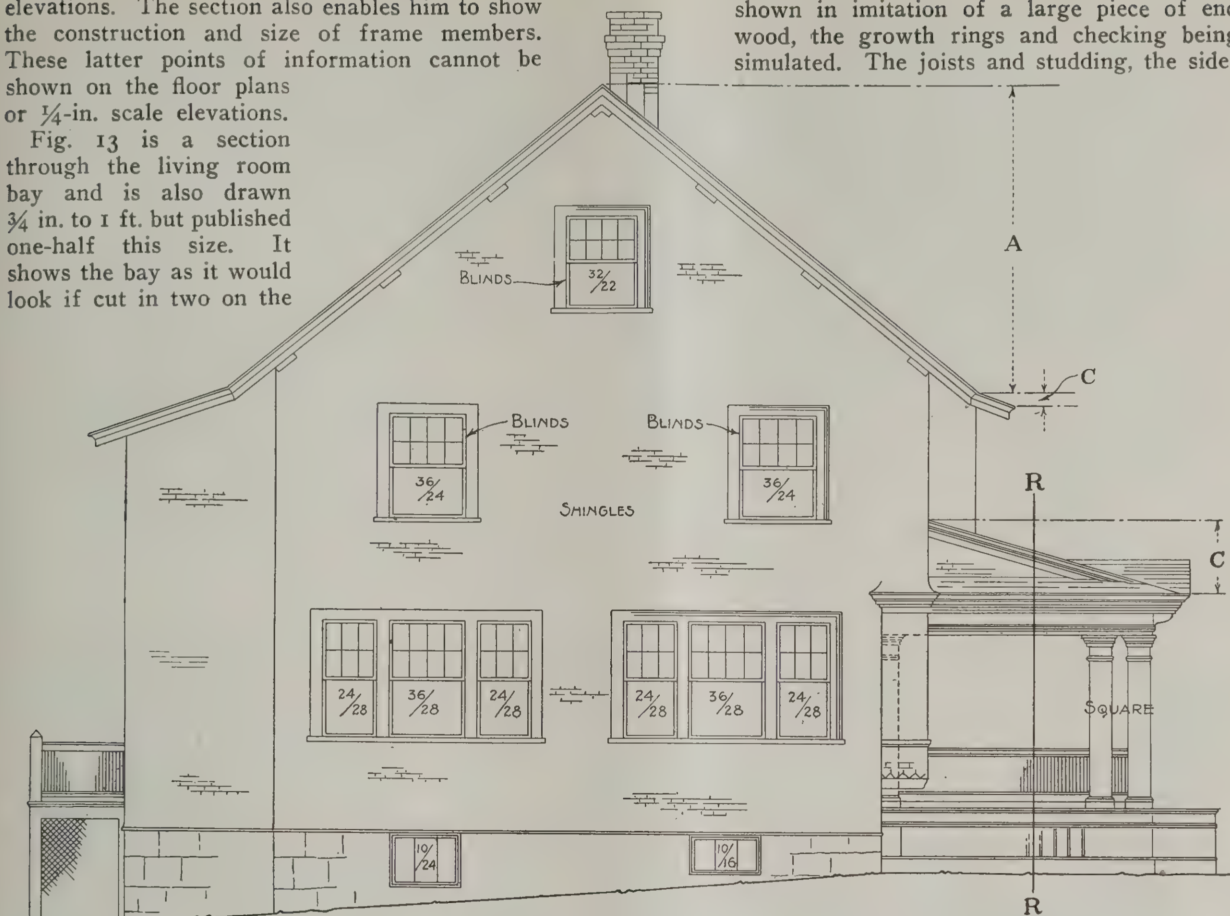


Fig. 10—Left Side or Southeast Elevation—Scale ⅛-In. to the Foot

Fig. 14 shows a section through the main cornice on the front or rear of the building as at *E-E*, as in Figs. 8 and 9. Remarks in explanation of Fig. 13 apply here

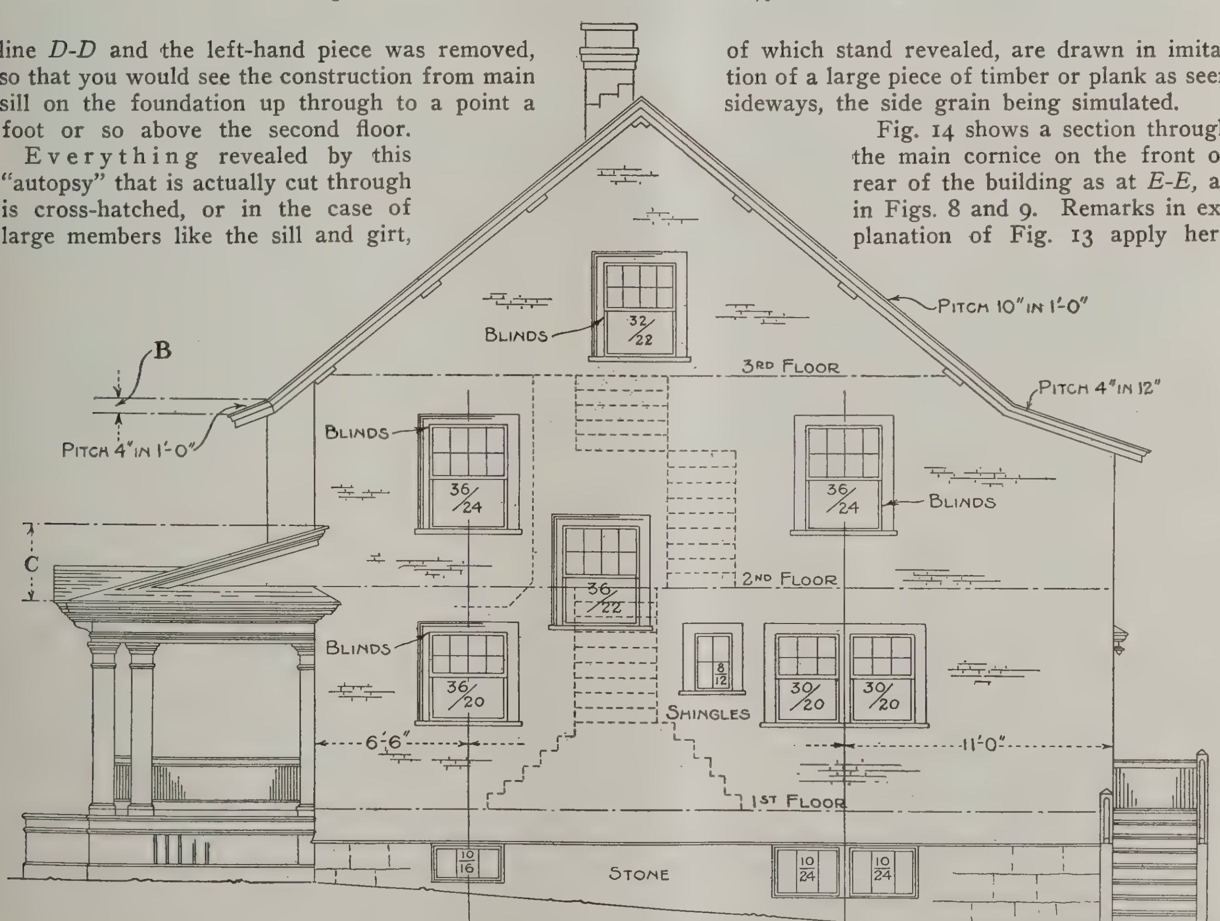


Fig. 11—Right Side or Northwest Elevation—Scale ⅛-In. to the Foot

with equal force. This drawing was made to a scale of 1½ in. to 1 ft. to 0 in., but is here shown one-half this size.

Fig. 15 is a scale section through the house, from footing course to roof, making no attempt to show anything except story hights, joists and rafter sizes, hight of rough window openings, etc.

Many architects and draughtsmen use colors and different types of cross-hatching to show of what materials various parts are constructed. For instance, red is used to show brick in plan or section, yellow to show wood, and blue to show stone, etc. While these different colors and the several types of cross-hatching are frequently used, custom varies as to their use. While an aid to reading plans they are in no sense a necessity.

The proper reading or understanding of plans is a

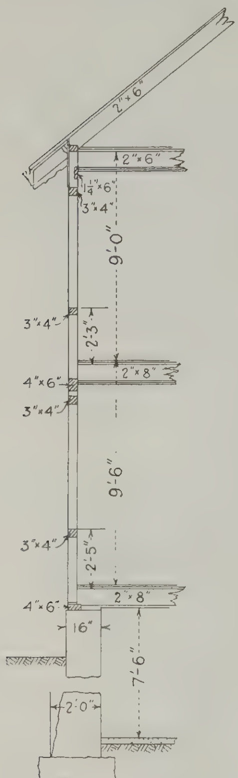


Fig. 15—Section—Scale ⅛-In. to the Foot

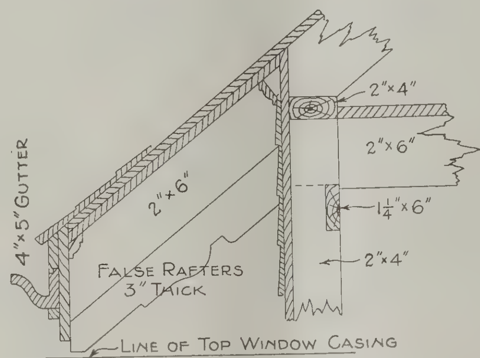


Fig. 14—Detail of Main Cornice—Scale ¾-In. to the Foot

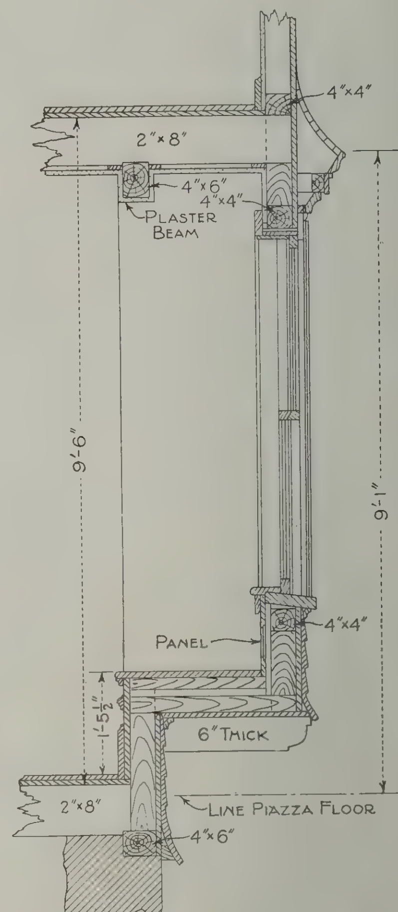


Fig. 13—Section Through Living Room Bay—Scale ⅜-In. to the Foot

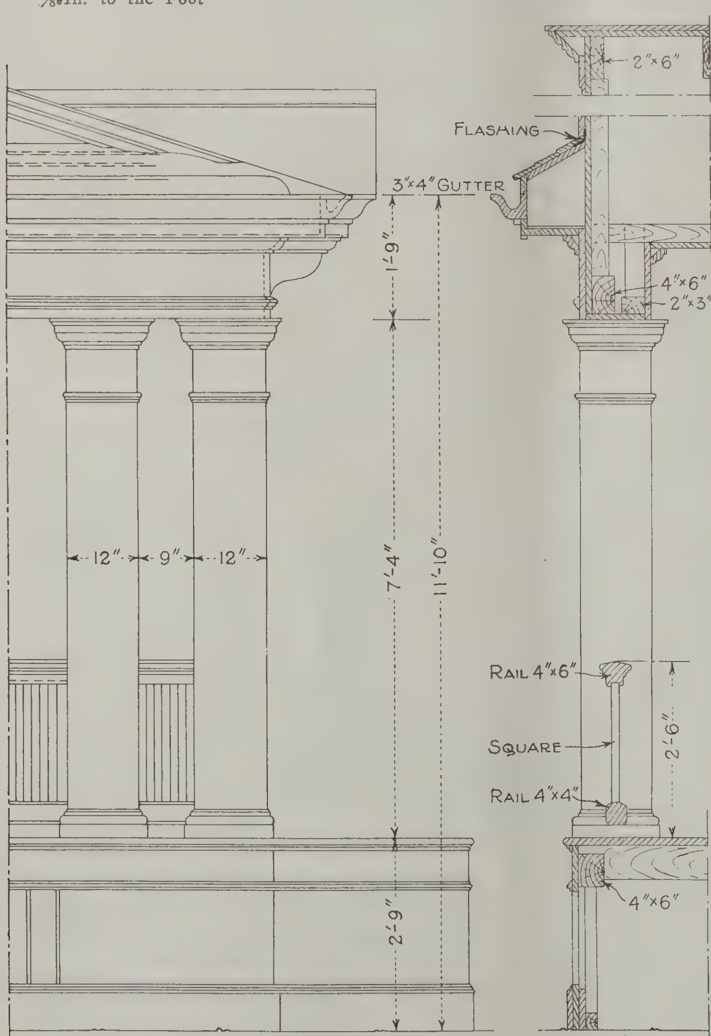


Fig. 12—Elevation and Section of Front Porch—Scale ⅜-In. to the Foot

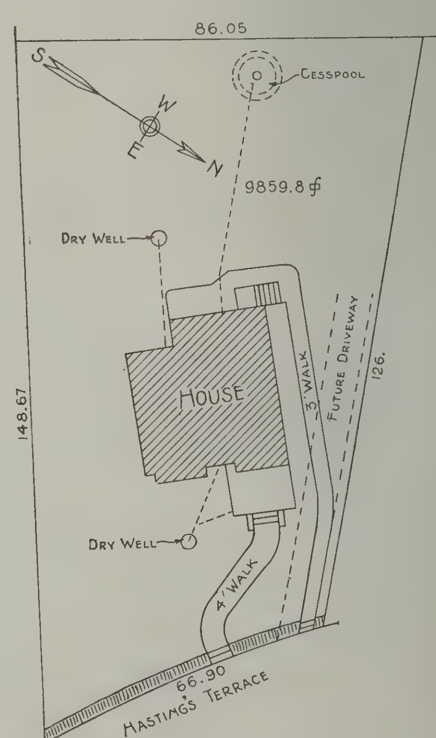


Fig. 16—Block Plan—Scale ½-In. Equals 20 Ft.

Reading Architect's Drawings—IV

progressive study. As you grasp the meaning of one thing shown the meaning of other parts adjacent becomes apparent. As knowledge of actual construction and architecture is acquired the meaning of the lines becomes more and more evident.

Enough has been explained above to start the student on his way, but he must be ever observant of things structural and architectural if progress is to be made.

An Artistic Gateway

A feature of many of the attractive homes scattered throughout the country is found in the wall or fence enclosing the grounds and entrance to which is afforded by means of an artistic gateway. These entrances are of varied types and construction, some being comparatively plain yet exceedingly effective in appearance, while others are of a more elaborate nature and presenting decidedly picturesque effects.

Rear Gateway of Artistic Design Leading to the Grounds of a South Pasadena Residence

These artistic gateways or entrances are frequently found in connection with country estates where the lodgekeeper's cottage stands close by, and they are also to be found as a feature of the grounds of suburban homes. A most interesting example of the latter kind is that which we illustrate in the half-tone picture presented herewith. This is the back gate to a residence in South Pasadena, Cal., and the very charming effect produced by the novel and picturesque construction is well shown in the engraving. The field stone piled on either side of the gateway, the heavily framed roof directly over the gate itself, the quaint paneling of the latter and its long, broad hinges, all tend to create a combination which is not often found in connection with a rear gateway.

The design, it will be seen, has been cleverly handled, and we present it as of suggestive value to architects, builders and homeseekers as well.

Outing of Cleveland Builders' Exchange

The fourteenth annual outing of the Builders' Exchange of Cleveland for members and their families was held at Conneaut Lake, Pa., on June 19, 20 and 21. A party comprising 114 persons made the trip in a special vestibuled train in personal charge of D. Jay Collver, district passenger agent of the New York Central lines.

A program of entertainment was conducted at the resort, including a baseball game on the first afternoon between teams known as the "Tafts" and the "Roosevelts," which broke up in a row in the ninth inning with the score a tie. A feature of this game was the use of a heavy iron roller obtained from a near-by tennis court, which was freely used to quell disturbances.

On the first evening, a musical entertainment, participated in by talent from members of the party, was enjoyed in the hotel parlors, several star performers of the Hermit Club joining in the merriment. On the second morning an old fashioned hay-ride was taken to Exposition Park Farm, where the party inspected the gardens and viewed the cattle and chickens.

In the afternoon a ride was taken on a chartered steamer to various points on the lake, and in the evening a dancing party was held in the ball room adjacent to the hotel.

Boating and fishing occupied the time on the third day until the return trip was made to Cleveland.

The entertainment committee in charge of the affair comprised H. M. Terrell, chairman; F. W. Beach, Bert Graham, F. J. Dresser and R. A. Curry.

A movement is under way in England seeking to make agreements with labor unions equally binding by the deposit of a money guarantee to insure the observance of any agreement which may be entered into for the purpose of ending a strike.

Enforcement of Mechanics' Liens

Property Subject to Lien -- Steps Essential to Relief -- How Rights Are Lost

By A. L. H. Street

GENERAL lack of information among builders and owners concerning the law of Mechanics' Liens is evidenced by an ever continuing large volume of litigation. Every day lawyers are enriched because their clients were not forewarned as to their rights. The following observations are set down with a hope that their perusal will afford service to readers of *Building Age,* both in the solution of existing controversies and in avoiding future misunderstanding as to their rights.

While there are many points upon which the laws are uniform throughout the several states, the entire subject depends upon statutory provisions; mechanics' liens are not recognized at common law. Therefore every builder should make himself conversant with the laws of his state and other states in which he operates, for the statutes of different jurisdictions differ widely on such points as the time within which claims must be filed, what they must contain, etc.

As a general rule, any person, firm or corporation who furnishes work or material in the erection, alteration or repair of a building, whether as contractor or as subcontractor, is entitled to a lien. As pointed out in a previous article, architects are protected by these statutes in some states, but denied relief in others. A corporation cannot enforce a lien for work done or materials unless the service was within the scope of its charter powers. Non-resident persons and corporations are usually accorded the same privilege as residents.

Property Against Which Liens May Be Enforced

A lien may be enforced against private property whether owned by an individual or a private corporation, but such public buildings and structures as asylums, universities, reform schools, court houses, bridges, libraries, school buildings and municipal buildings, including water works plants, are lienable. Churches, private college buildings and homesteads are generally subject to lien, but the contrary has been held as to homesteads in South Dakota and, perhaps, a few other states. In Maine a statute giving a lien against a "house" or "building" has been construed not to give a lien against a Carnegie library.

Judicial decisions in the different states are not uniform as to whether a lien can be enforced for removing or dismantling a building, the question having been answered in the affirmative in California, Oregon and Texas, and in the negative in Illinois, Massachusetts and Pennsylvania. Claims for excavating for buildings and constructing foundations are lienable as a general rule.

In most, if not all, of the states the lien attaches to the land on which the improved building is located as well as the building itself. But in some jurisdictions, including Alabama and Arkansas, the land standing as security is limited to one acre, as to buildings outside cities and towns. In Arizona this limitation is 10 acres.

When distinct buildings are constructed under one general contract a lien may be enforced against all the property, but when the agreement is divisible, and particularly if the structures belong to different owners, the lien must be claimed separately as to each building. Lien against a double house constructed under a single contract may be enforced under a single claim. Usually a contract with the owner or his architect or authorized agent, sustained by substantial compliance therewith on the builder's part, is a prerequisite to a right to a lien. In California contracts involving more than $1,000 must be reduced to writing and must be filed with the county recorder. In Colorado and Louisiana the agreement must be written if more than $500 is involved and in Colorado a memorandum must be filed by the owner in the county recorder's office. In several states the owner's consent to an improvement of his property under agreement made by another is presumed unless he disclaims responsibility within a fixed period varying from three to five days.

In each state a time is fixed within which liens must be filed, varying from one to six months after completion of the work. The period within which proceedings must be brought to enforce the lien usually extends from the date of the filing of the claim and varies from one month to six years.

In New Jersey the contractor must file his contract and specifications before commencing work.

Rank of Liens

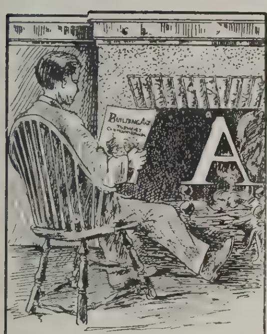
It is a universal rule that a lien properly perfected takes priority over all liens, encumbrances, etc., created after commencement of the work and all prior liens and encumbrances not recorded and of which the lien claimant had no notice. In Alabama, Illinois, Iowa, Montana, Oregon, South Dakota, Texas and Wyoming, a mechanic's lien takes precedence over all encumbrances, etc., whether pre-existent or not, as to the building erected or improved. In Pennsylvania a bona fide conveyance of property for value defeats an unrecorded lien. As a general rule, the liens of original contractors are subordinate to those of subcontractors and material men and those of employees paramount to all claims. As between material men and subcontractors, the former usually take precedence. In Iowa, Florida, Massachusetts and South Dakota mechanics' liens upon the same property take priority according to the time of filing. In Arizona, Arkansas, Indiana, Michigan, Mississippi, Missouri and Wyoming, liens on the same property are on equal footing. In North Carolina priority of liens is determined by the time of filing.

Right to a lien is lost by any provision in the builder's contract inconsistent with existence of a lien. It is waived by agreeing to take something else than money in payment or to take a mortgage on the property. But acceptance of a note from the owner is not a waiver, nor is acceptance by a subcontractor of an order on the owner. The right will be deemed to have been waived only when intent to waive is clearly manifested. Ordinarily a lien is not lost by removal of the building from the land on which it was constructed. As a general rule, a principal contractor's release of a right to lien will not be permitted to prejudice the rights of subcontractors, laborers, etc., especially if the latter have no notice of such release. Bankruptcy of the owner does not ordinarily affect the lienor's rights. Abandonment of the work by the builder forfeits his right to a lien only when he is at fault. In Illinois it has been decided that no liens will be allowed where the contract provides for certain payments as the work progresses and the balance upon completion, but fixes no time for completion.

Influence of Antique Models on Present-Day Furniture

Furnishing the New Home -- Judgment in Selection -- Description of Early Types -- Elizabethan, Jacobean, Queen Anne

By Paul D. Otter



A MAN becomes a responsible factor in life when he engages an interesting side-partner to help and confer with him in his plans and future welfare. The home then becomes a talked-of subject and very soon a reality. The endeavor in this preliminary article will be to consider the subject of furniture as tools and equipment of domestic use, requiring the same intelligent conception and selection of each piece for one's needs in establishing the home as would be given to the selection of some necessary tool.

Following this review the purpose is to later detail by use even to a chair or a table of a poor pattern.

By considering the subject carefully at the time of purchasing, one may secure neat furniture of a plain form and design which will be in harmony with other furniture forms one may desire to make from time to time. To illustrate, compare a quite possible selection of sideboard which you bought ten years ago—say Fig. 1—and then Fig. 2, which you wish to make or buy. Fig. 2 has in its direct lines and quiet surfaces the dignity of service and it will always be in style. Fig. 1—well, it is quite like some overdressed, slangy person, and there will soon come a day when you will cut his acquaintance.

How to know furniture is a leading question to one who is refurnishing or to the home planner. Be he ever so fastidious in matters and correctness of dress, he may feel quite at a loss in furnishing the rooms of

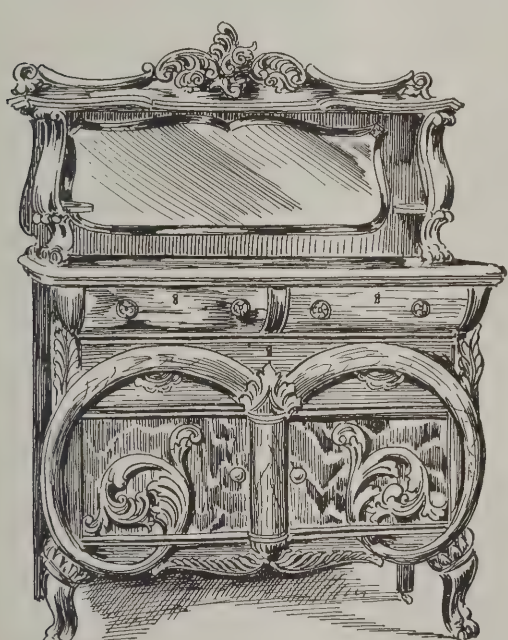


Fig. 1—An Ornamented Sideboard

Fig. 2—A Buffet Sideboard

Influence of Antique Models on Present-Day Furniture

various pieces of furniture in such a manner that those interested may construct them; also to present illustrations of good types of furniture which will enable them to more readily select from dealers such patterns as will prove satisfactory to present needs and future refinement of the home.

As life and the establishment of the home is begun with much sentiment and always with the substantial thought of permanence, so should the selection and gathering together of all things be attended with the same substantial thought of permanence. Too often a home is thoughtlessly established by buying things hurriedly or getting possession of nondescript pieces—this to a lasting regret when loving association attaches a new home. Heretofore insufficient attention has been given to style or architectural type of our exteriors in the selection of furniture. Now we do see evidence of more regard in relation to exterior and interior harmony and in the arrangement as well as purpose of each room.

To more forcibly illustrate my meaning, perhaps, take up a few back numbers of the *Building Age* or any other magazine which so frequently opens the doors of our homes and permits us to look within. Do you not see that this living room or that library contains an odd assortment of mismatched furniture? It is true, such an array does not always indicate absence of a developing taste for good things in furniture; far from it. I should now, while writing, dislike mightily to have a newspaper photographer come in and snapshop some of my furniture, for way back in the early partnership days did not the low income decide the selection of this chair or that table? I guard them as jealously as a dog with his foot over a well-earned bone; they represent much that is hallowed with sentiment. The high chair is fondly tolerated; the old rocker, though it be of a "passé" factory pattern, the daughter would not permit of its banishment, as it pictures in the mind many hours and days of rockaway rides into story and sleepland with the mother. No, do not put them away in the attic, but let us suggest to the newlyweds to appreciate the great opportunity of this period to secure furniture of good outline and plain surfaces. Good furniture is now so prevalent that you will unconsciously know it when you go out to look for it intently. To know it more intimately is the purpose of what follows.

Pictures Rather Than Description

In studying good furniture we will avoid getting into the depth which an antiquarian might lead us in such an extensive subject by resorting, with a brief description, more to pictures, labelling them as we go along. The desire will be to show characteristic prototypes of furniture prevalent during the years gone by, and, as we discuss in detail later on, in a parallel way, an example of a possible or modern treatment of a similar form or article made today.

In surveying the history of furniture as a treatise intended for information and inspiration to many desiring to make furniture, I am inclined to confine our study almost entirely to English styles and periods—not that little merit is to be found in the work of Germany, Italy and France, and particularly France, but that French examples represent much elaborate detailed treatment and extravagance of outline which would carry us far beyond our purpose. French influence, however, should not be discredited and is strongly reflected or worked in, as we shall see in our comparisons.

Beginning with the reign of Queen Elizabeth (1558-1603) we have the "Elizabethan Style," which in its influence extends far into the reign of her successor, James I, and indeed it is hard in many cases to tell "t'other from which"—the Elizabethan from the "Jacobean," as it was called.

Political and social conditions were reflected more in articles of domestic use in those days than they are now. The arts and industries were encouraged and patronized more by the royalty and people of the court, and such patronage continued for a long period during each reign. It is to this royal fostering of the arts and industries of the political divisions and periods of former times that we derive much of our inspiration and influence in matters of art and literature—we draw deeply from these well springs.

Furniture Much Ornamented

The early part of the Elizabethan period was characterized by much ornamentation, principally carving, the frames designed quite with the purpose of having the cabinet work a foundation for elaborate ornament of enriched turnings, carved panels, strap work, bands and borders. Not until well into the period of the "Jacobean" Style—James I (1603-1625)—was there evidence that the carver worked for the joiner instead of the joiner building frames for the carver to decorate.

The cabinet maker was then beginning to work for recognition more in the excellence of his joinery and by the display of molded and mitered panel work, and while the general forms of the overenriched and the plain are quite similar, as the Jacobean Style is reviewed and we sit back and read of the history of the time, we are impressed that political and social conditions do have an influence on the character of the clothes we wear and the furniture we use, for when Cromwell became Protector he and his followers certainly would have none of the things of the court—its grandeur, extravagance, tinsel, carvings and foolishness—and we look into the homes of his time and see that there was considerable modification to conform all things to the simple and useful. Note the severely plain paneled settle in Fig. 3 on the opposite page. By referring to the carved "court cupboard" in Fig. 4, the essential features of the Elizabethan are shown. There are few surfaces of rest. Under analysis, however, the sturdy form of the structure or carcase commands attention when brought into comparison again with Fig. 1, for example.

Figs. 5 and 6 represent the character of carving employed, being much in the nature of bands or squares, the design being cut into the wood much after the manner of type, with the main detail left quite flat.

Fig. 7 is a chair much in vogue during this period and is here used to illustrate how much our village chair makers in Colonial days employed the lathe in producing similar patterns for common use. Figs. 8, 9, 10 and 11 in their order illustrate quite sufficiently the developed features of the Jacobean Style, while Fig. 12, athough Jacobean, is of the time of Charles II., showing considerable French influence, particularly in the full carving and the shape of the legs.

Cost of Fireproof Construction

In discussing the question of "Fireproof Construction" before an audience at Orange, N. J., Philip H. Bevier, C.E., gave the following interesting figures as to the comparative cost, and arguments as to public and private desirability:

"At the present price of building material, fireproof construction can be erected at a cost not to exceed 10 or 15 per cent. more than non-fireproof, and when we consider that a fireproof building deteriorates about one-ninth of 1 per cent. per year as compared to 4 per cent. for ordinary buildings; that they rent better and that money can be borrowed on them on better terms; that they are vermin-proof, cooler in summer and warmer in winter, it would certainly seem a part of wisdom and self-interest to adopt a better method in every case when the building is to be of a permanent character.

"When a man builds a house in the country it may be that he has a right to jeopardize his own life and property and those of his family, and gamble with the insurance companies, but there is no question that the owner of property in a city or town has no right to erect a structure that will be a menace to the safety of the property of the adjacent owner. This principle is clearly recognized in practice, and many of the smaller cities are adopting building codes requiring fireproof construction throughout a certain portion of the business section, and semi-fireproof buildings in less congested districts.

"If one-half of the money spent by American cities for fire losses was spent for better building construction, the annual loss by fire would soon begin to decrease. Improvement along the line of better construction can only come gradually. It can and should be hastened in thickly settled communities by stringent building laws. City officials must be awakened to their responsibilities and the individual shown that his own pecuniary interests lie in lessening the fire waste. Old buildings cannot be torn down at once and rebuilt, but we can see to it that no more fire traps shall be built where they are a menace to other structures."

Fig. 3

Fig. 4

Fig. 6

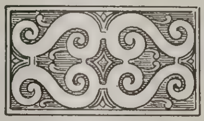


Fig. 5

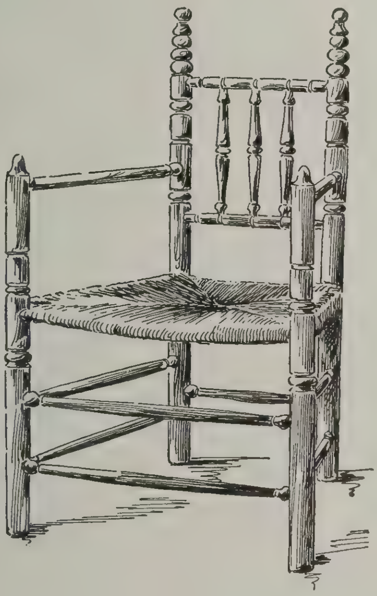


Fig. 7

Fig. 8

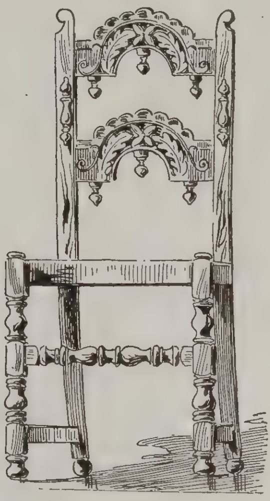


Fig. 9

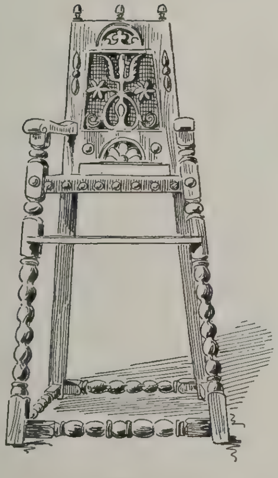


Fig. 10

Fig. 11

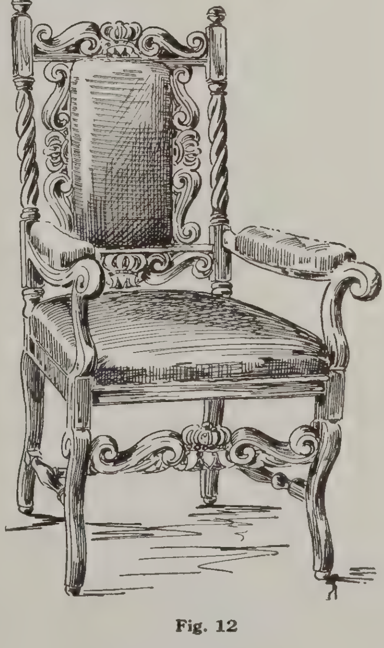


Fig. 12

Influence of Antique Models on Present-Day Furniture—Some Early English Types of Furniture

More About Stucco on Metal Lath

The Question of Corrosion of Metal Lath as Used in Building Construction -- Lime and Cement as Preservatives

By H. B. McMaster

IN the June issue of this paper there is some comment by S. C. Webb on the action of gypsum plaster on metal lath. Anything that may throw further light on the corrosion of iron and steel in buildings is read with great interest these days when it is a vital question in the minds of architects as to what condition gas and water pipe and other corrodible materials may be in at the end of ten, twenty or more years of service. The writer, representing the Metal Lath Manufacturers mentioned in the article referred to, ventures this further comment on the subject, that it may also reach the eyes of your readers.

The article in the June number was called forth by the fact that in "Typical Specifications for Stucco on Metal Lath," recommended by the Associated Metal Lath Manufacturers, which appeared in the *Building Age* for April, 1912, there is a tendency to place dependence upon cement rather than patent plasters for stucco.

Metal Lath on Interior of Buildings

The use of metal lath on the interior of buildings was not thought of in this connection and, in fact, the question of corrosion of metal lath on the interior of buildings is not vital, as it is only under extraordinary circumstances, such as leaks in plumbing, proximity to escaping steam and like conditions creating unusual quantities of moisture that there may be danger.

We know that lime and cement preserve steel if there are not other ingredients of the plaster which stimulate corrosion and tend to destroy or impair the protective quality of the cement and lime. It is our observation during much investigation of examples of metal lath exposed after having been imbedded in plaster for many years that it has required nothing more than a good key of lime or cement plaster to preserve it absolutely. Metal lath under these conditions when exposed is found to have all of its original strength and brightness, leading one to the conclusion that for interior work no protection other than a proper coating of plaster is needed; that is, the expense of galvanizing lath for the inside of a building is uncalled for and painting would be resorted to only to keep the lath in good condition until it receives its covering of protective plaster.

Reverting to our investigations of examples of exposed metal lath, it is our experience that invariably metal lath is preserved by lime and cement mortar on the interior of a building under ordinary conditions and examples have been investigated showing no appreciable corrosion of the lath even when patent plasters were used. The circumstances were consistent with our belief that if conditions are ideal there need be no danger of corrosion of metal lath even though unpainted and not galvanized when used on the interior of buildings in connection with standard commercial patent plasters.

It was the use of metal lath in "Stucco," however, that called forth our observations on the use of plasters. Its use on the interior of a building may be but incidental to the discussion.

The "transition" from the original meaning of "stucco" is a fact as stated so that when the exterior plastering of a building is now referred to, one has but to use the word "stucco" before any architect or contractor in the country and he will be understood, no matter what kind of plaster is used and regardless of whether the stucco is upon brick, wood lath, metal lath or other medium used in this very popular form of construction.

The stucco specification which led to this discussion was built upon information gotten through an analysis of conditions found in reported cases of corrosion of metal lath on stucco walls. There were a number of these—one investigated at Minneapolis in February, 1911, where patent plaster was used side by side with cement plaster under identical conditions, was particularly instructive as the example was in a climate not particularly inimical to metal lath.

The residence had been up six years when the stucco was torn off for alterations and the metal lath under the patent plaster was found badly disintegrated while that under the cement plaster was as bright and tough and rigid apparently as when put in. The analysis of the patent plaster showed 19.82 per cent. calcium sulphate which corresponds to 14.28 per cent. sulphuric acid.

It may take many months of careful scientific investigation such as is being made now at the Bureau of Standards to determine absolutely how far the plasters containing calcium sulphate are stimulative of corrosion and it is even suggested that the experiments may develop a widely distributed and cheap ingredient for patent plasters which will be inhibitive, or may counteract the stimulative tendencies that may have that quality.

Business judgment would dictate to the manufacturers of metal lath that any broadening of the range of materials that can be used in connection with it would do most to popularize the product still more.

Basis for Specifications for Stucco

Our experience taught us that a cement plaster really thrived upon moisture and we felt that if we could devise a construction which would insure reaching the entire surface of the lath with the cement that we need have no fear of moisture and upon this relation the specification for stucco has been built. It was not the purpose to bring into criticism the matter of using patent plasters for interior work, but until more is learned on the subject than is now available, it is felt that to be consistent with the claims of excellence for the construction exploited by the Metal Lath Manufacturers, they will have to continue to confine their recommendations to cement plaster for stucco on metal lath. This is done not with the purpose of excluding any material, for it is but a recommendation at the best, and no one, least of all the writer and his principals, can claim to have uttered the last word on this subject.

It is hoped that information may be developed which will give the same feeling of assurance in using patent plasters on metal lath on the outside of buildings as is now felt in using cement.

Modulation Heating of a Residence

Fractional Control of Steam Supply to Radiators a Feature of Heating System in a Residence

WHILE the use of the modulation system was the one feature which caused the heating of the residence shown in Fig. 1 to be selected for the subject of this article, there are several other unusual details embodied therein, as will be noticed by reference to the views and the isometric drawing of part of the heating plant as reproduced in an illustration on another page. This is the first time in the history of this journal a residence heating system with fractional control of the radiators has been described in these columns, and the application of the fractional valve, therefore, to a residence heating system may be regarded as something not frequently encountered, although this field for its use is receiving greater attention in the country than formerly.

The views presented in the accompanying illustrations have been selected to show the application of the modulation heating system to a residence as well as other features in connection with the selection and placing of the radiators and the manner of making the connections.

This system of heating contemplates the use of the modulation valve on the supply end and the water seal motor valve on the return end of the radiator. The supply valve, as shown in the accompanying illustrations, is usually placed for convenience at the top of the radiator. The valve seat is a hollow cone-shaped piece of material around which is a series of four holes graduated in size so that by turning the handle these holes are brought opposite the supply connection from the valve to the radiator and the steam allowed to enter the radiator in proportion to the size of hole or holes opposite the supply opening. In this way it is intended to allow just sufficient steam to enter the radiator to heat a portion of its entire surface from the top down, according as weather conditions may demand or the temperature at which it is desired to keep the room may require.

On the return end of the radiator, at the bottom, is the Webster automatic water seal motor valve made by Warren Webster & Co., Camden, N. J., and intended to relieve automatically the air and water of condensation without allowing the steam to escape. The use of these valves does not contemplate the use of any air valve of the regular commercial type on the radiator.

The two-pipe method of piping is employed with the modulation system and the steam supply lines are dripped to the boiler, as will be noticed in the accompanying isometric drawing of part of the heating system in the building under consideration. In this illustration, Fig. 5, the larger radiator is connected in the typical manner for the modulation system. No pipe sizes are noted on the plan of the piping, as this illustration has been presented more to show the general scheme of the system than any of the engineering details worked out in proportioning the system.

As is customary in installing such systems, in this instance the return lines carrying the water of condensation and air removed from the radiators, lead to a special trap as shown, from which the air is allowed to escape through a vent pipe to the chimney flue, while the water is returned to the boiler. The method in which the supply and return mains are run, together with the radiator and boiler connections are made, are all shown clearly in Fig. 5. One of the features of the boiler connections which will be noted is the equalizing pipe and the method in which it is connected, and the gate valve is also to be noted.

Fig. 1—Exterior View of Residence at Newton Center, Mass., Heated by System Named

Modulation Heating of a Residence

This heating system is so piped that it may be operated either as a vapor system or under pressure. At the extreme of each supply main a siphon seal will be noted. The supply mains at this point are pitched down and the condensation drips into this siphon seal, passes through it into the dry returns and back to the boiler. Thus these seals permit a partial vacuum to be maintained in the supply mains and radiators.

From the foregoing it will be seen that this system of heating is intended to fulfil the requirements of a flexible system, so that on moderate days when there is necessity for a small amount of heat for a room the supply to the radiator can be regulated so that only a small fraction of the radiator is heated, while on the other hand, on cold days, the full supply may be turned on and the entire surface of the radiator warmed so as to have it emit the maximum amount of heat units available from its surface. Ordinarily, as in this case, the steam pressure in the modulation system is automatically controlled by a low-pressure damper regulator designed to open and close the draft damper with a slight change in pressure. The damper regulator and its connections are shown also in Fig. 5.

While any style of radiator may be used with the modulation heating system, the hot-water type is preferred. The merits claimed for the system include the rapidity and ease with which the temperature may be controlled, that is by the simple turning of one handle of the supply valve a fraction of a turn, the supply of steam to the radiator may be increased so that from but a fraction of the radiator surface being warmed, the entire surface may be heated with a consequent rise in the temperature of the room.

A study of the different interior views present several

Modulation Heating of a Residence. Fig. 2—Radiator with High Legs for Bedroom—Water Seal Motor Valve is in Closet and on Same End as Modulation Valve

important points for the consideration of the steam fitter. In Fig. 6 is shown a radiator under a window in the library of this dwelling in which a modulation valve may be seen on the supply end and the water seal motor on the other end. By comparing this radiator with that shown in the other views it will be seen that no standard type or size of radiator has been used, but the type of radiator installed in the different rooms has been selected to meet the conditions of those rooms. In the illustration just referred to it will be noticed that the radiator is of a suitable height to be placed under the windows in the library, while in Fig. 4 is shown a wall radiator under the window in the dining room. The

Fig. 3—Three-Column Radiator for Limited Space—Water Seal Motor Valve is Under Floor

conditions in this room were such that this type of radiator seemed to be best adapted for the space available, and it will be noticed this particular radiator, too, is equipped with a modulation valve on the supply end and the water seal motor valve on the return end.

In Fig. 2 is shown a radiator in one of the bedrooms with the modulation valve on the same side as the water seal motor, which is in the closet. This particular radiator differs from the others shown in the preceding illustrations, as it is of the high-leg type which is much in vogue at the present time, especially for bedrooms, as it permits of easy cleaning under the radiator and a better pitch to the pipes when the radiators must be located some distance from the riser. In Fig. 7 it will be noticed that the radiator is placed in a corner where space is somewhat limited, and this illustration is an example of the saving that may be made in space by placing both the supply and return valves on the same end of the radiator. In order to get the necessary amount of surface to maintain a comfortable temperature in this room the three-column type of radiator was selected. In Fig. 3 is shown a radiator of the three-column type with the modulation valve on the supply end. In this particular case the water seal motor valve was placed under the floor.

From the foregoing it will be seen that in this residence a careful study was required to secure a satisfactory arrangement of radiators, as it was realized that any haphazard scheme would likely prove disappointing. The location of furniture, doors, windows and the like, had to be carefully considered and the space available measured or scaled from the plan and the space occupied by the valves allowed for. Then the amount of radiation required having been calculated a radiator to fit the space was selected. With the large variety of radiators manufactured to-day the steam fitter under similar circumstances should ex-

Fig. 4—Wall Radiator Under Window Valved for Modulation Heating

perience little difficulty in selecting one to suit the space.

The features emphasized in connection with the modulation system of heating for residences, in addition to maintaining the temperature of the room at the desired point, is the saving in fuel as a result of controlling the temperature of the room in connection with the damper regulator. It is pointed out that the fractional system of heating theoretically allows one to have just the amount of heat one wants without overheating, providing, of course, the system is properly installed and of sufficient capacity to meet the greatest demands on it. In the larger buildings tests to demonstrate the economy of the fractional heating system have been made and the results published in these columns and also in pamphlet form. Inasmuch as this is the initial description of this system as applied to residence heating, no doubt readers will study it with much interest, especially as some features not frequently met with in residence heating are portrayed in the line drawing.

Measuring Galvanized Iron Cornices for Painting

In measuring galvanized iron cornices for estimating the cost of painting the method of procedure is similar to that which is followed in the case of those made of wood; that is, measure the entire length all around the building so far as the cornice extends, using for the purpose a tape line; next measure the width, following panels and moldings, and multiply the length by the width, which will give the number of square feet or square yards.

Add to this 50 per cent. for the trouble of reaching it, and if there are any brackets or other ornaments individual judgment must be used in adding to the estimate. At all events, says the *Painters' Magazine,* it is necessary to use discretion is estimating, as the difficulty of reaching certain work cuts a big figure in the cost of a job. No matter how plain a cornice may be, the rule is to add 50 per cent. after figuring upon the amount of surface to be painted.

Fig. 6—Radiator Selected for Available Space Under Window with Modulation and Water Seal Motor Valves

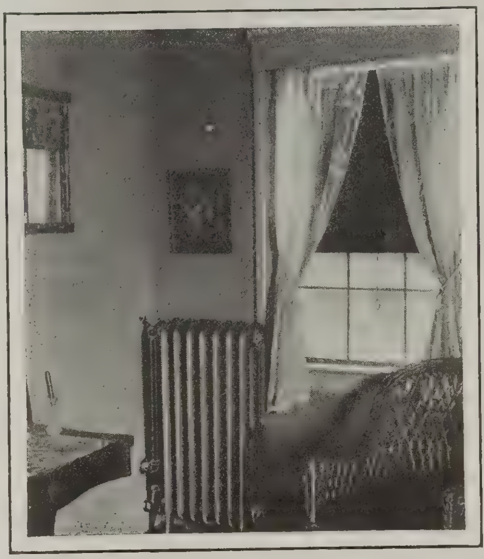
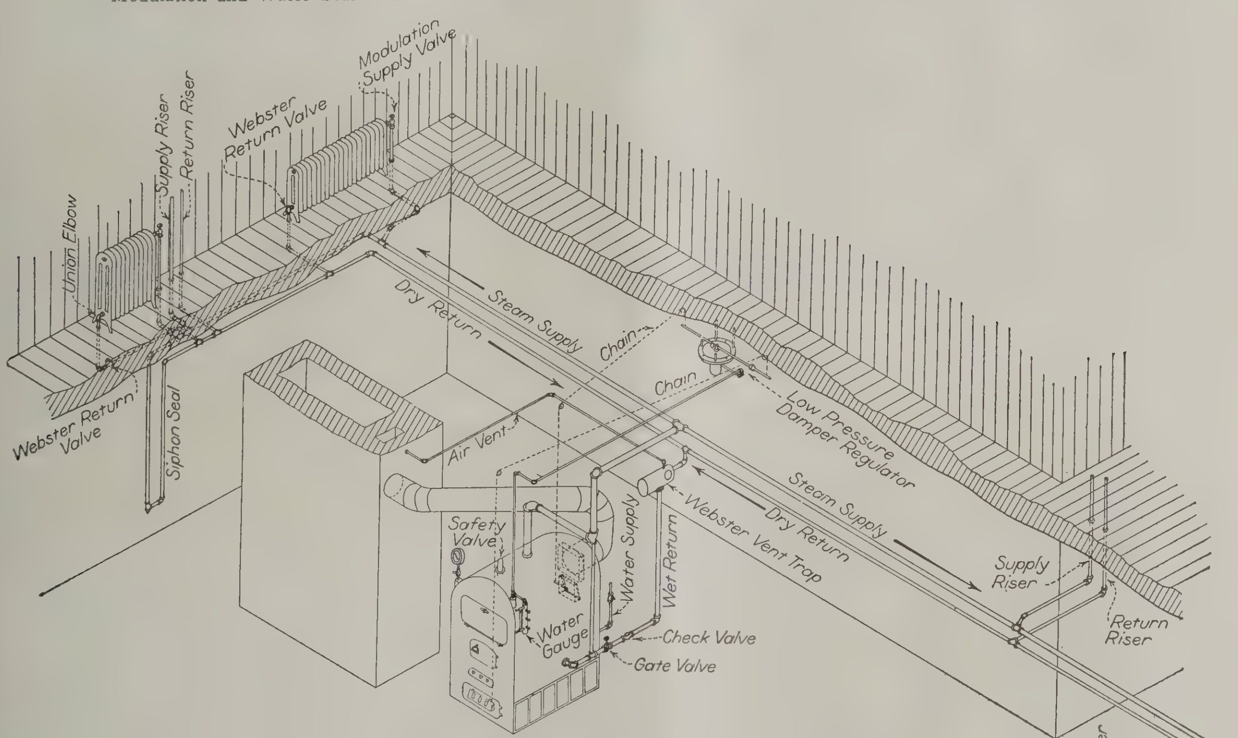
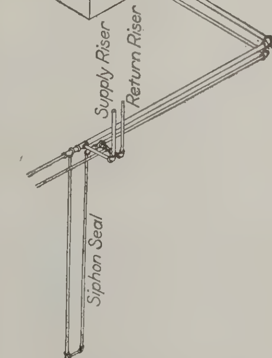


Fig. 7—Three-Column Radiator in Limited Space with Modulation and Water Seal Motor Valves on Same End





Modulation Heating in a Residence—Fig. 5—Isometric View Showing Details of Part of Piping, Radiator and Boiler Connections

A Portable Cement House

One of the latest developments in the way of cement house construction is one which can be put together and taken apart with a screwdriver. The system is intended for houses of a more or less temporary character, or for those that are liable to be moved from place to place, such as a temporary workshop or a private garage.

The system consists of blocks of concrete in which has been buried a wire spiral with an opening in the cement to receive a small bolt. These slabs are bolted in position over a metal or wooden frame and when it is desired to move the structure the bolts may be taken out with a screwdriver and the whole structure transferred without damage to any place desired.

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AUGUST, 1912

Three Months' Local Building Operations

The months of April, May and June usually witness a greater degree of activity in the building line than is the case with any other quarter of the year, for it is in these months that the building season gathers full headway and the filing of plans is conducted upon a most liberal scale. The second quarter of the current year just closed has proven no exception to this tendency and the figures covering the Boroughs of Manhattan and the Bronx indicate a volume of operations appreciably in excess of those which characterized the corresponding quarter of 1911. The noticeable features which an analysis of the figures develop are the great increase in the planning of stores and lofts in Manhattan and of apartment houses in the Bronx. In the Borough of Manhattan there were 68 store and loft buildings planned during the quarter under review estimated to cost $15,272,200, while in the corresponding period of last year there were 60 buildings of this class planned, but involving an estimated outlay of only $8,758,500. Of apartment houses or "tenement houses," as they are designated under the law, there were 47 planned in the second quarter this year, calling for an estimated outlay of $6,889,000, as against 57 such buildings costing $6,713,000 in the same period a year ago. There was a falling off in strictly office building construction in the quarter under review, there having been 17 planned estimated to cost $7,552,000 as compared with 23 costing $11,511,800 in the second quarter of 1911. The totals for the second quarter of this year were 276 buildings planned estimated to cost $38,852,200, while in the second quarter of last year 309 buildings were planned costing $32,048,575. In the Borough of the Bronx there were 192 brick tenements planned estimated to cost $7,987,000, while in the second quarter of last year 189 brick tenements were planned costing $7,311,000. Another feature of the situation in the Bronx is the heavy falling off in the number of dwelling houses planned during the quarter under review as compared with the corresponding quarter of the year before. The figures show that during April, May and June of the current year 57 brick dwellings were planned costing $375,400, while in the corresponding months of last year 134 buildings of this class were projected involving an estimated outlay of $879,000. Taking the totals for the second quarter we find that 439 buildings were planned involving an estimated outlay of $11,699,185, as against 684 buildings estimated to cost $10,541,735 in the second quarter of last year.

An Office Building for Architects

A movement has just been inaugurated among some of the leading architects of the Metropolis, who have formed a co-operative syndicate incorporated as the "Architects Offices," looking to the erection of a building which will provide offices for members of the profession. The idea is to make this structure representative of the profession and for the exclusive occupancy of the building arts. The site which has been selected at the corner of Park avenue and Fortieth street, New York City, was occupied by an apartment house and three private dwellings, and upon it a 16-story office building of the highest type of construction will rise. While the plans, which have been prepared by Ewing & Chappel and LaFarge & Morris, associated architects, call for 16 stories, the foundations and other constructive features have been arranged so that four more stories may be added whenever the occasion calls for the extension. The structure the architects have planned has so interested the building trades that nearly all of the rentable space was taken even before the foundations were started. The building will have unusually high ceilings, the lowest being 12 ft. in the clear, which will bring the structure five floors above the adjoining Terminal Building, which occupies the southeast corner of Park avenue and Forty-first street, and is the pioneer office structure on the avenue between Thirty-fourth and Forty-second streets. The floors towering above the Terminal Building will contain approximately 50,000 sq. ft. of office space, which will give the architects occupying this portion of the building permanent north light—a feature greatly to be desired. The general arrangement, however, is such that those architects to whom the lower floors will be let will have considerable lighter offices than is afforded by most structures where they are now located. In addition to a large court, 30 x 80 ft., at the northeast end of the proposed structure, there is a 32-ft. court of the Terminal Building, with which the court of the architects' structure will be merged. The advantage of the community interest the building holds is reflected in the demand for space that has been received from builders, contractors and concerns which sell high-grade structural materials to contractors. The cost of the building, which will be erected at once, has been estimated at $1,000,000, and the site, which has a frontage of 99 ft. on Park avenue and 151 ft. on Fortieth street, is said to have cost about another million. The plans for the steel work have been completed by Eugene Stern and S. O. Miller, while the heating and plumbing and mechanical features have been designed by Ewing, Bacon & Henry. The general construction contract has been awarded Irons & Todd, and the building is expected to be ready for occupancy by the first of May next year.

Master Builders' Association of Iowa

Leading builders and contractors of the state of Iowa have recently formed an association which has been incorporated and known as the Master Builders' Association of the State of Iowa. The purpose is to further the interests of contractors and help enact an employers' liability law that will be fair to both employer and employee.

The affairs of the association are handled by a board of nine directors who are elected by the members of the association, the meetings being held the third Tuesday of each month at various cities in Iowa. The next board meeting will be held at Davenport, Ia., July 16. The officers of the association are:

President............J. F. Leefers, of Cedar Rapids.
Vice-president........J. F. Nebergall, of Davenport.
Treasurer...........W. H. Brereton, of Des Moines.
Secretary..............H. E. Reimer, of Des Moines.

The by-laws of the association are such that contractors from other states as well as those in Iowa are eligible to membership.

Steel Frame Work of the Woolworth Building

An event of no little interest to builders and one which is worthy of more than passing notice was the completion on Monday, July 1, of the steel frame work of the 55-story Woolworth Building, occupying the block front on Broadway opposite the Post Office and extending from Barclay Street to Park Place, New York City. Our readers have been informed that the building is the tallest commercial structure in the world and clearly typifies America's supremacy in building construction. The main portion of the building is 30 stories high or about 400 ft. above the level of the sidewalk. Above this a tower 85 x 86 ft. in plan rises 25 stories more to a total hight of 755 ft.

The first columns of the building were erected October 20 and the frame work was completed to the street level about the first of December, 1911. The 30-story portion of the building with its 19,000 tons of steel was completed April 6 of the current year. A force of 180 men was required for the steel work, and in the erection of the main building up to the roof four 8-man derrick gangs averaged two tiers per week and established a record of 1153 tons in six consecutive eight-hour days. The schedule called for the structural steel work to be completed July 15, and the record shows the contractors to have been two weeks ahead of time.

The architect of the building is Cass Gilbert, of 11 East Twenty-fourth Street, New York, and the general contractors are the Thompson-Starrett Company, of 51 Wall Street, New York.

Pittsburgh to Have a Cement Show

Announcement has just been made that a cement show will be held in Exposition Hall, Duquesne Way, Pittsburgh, Pa., on December 12 to 18 of the current year. The selection of Pittsburgh for an exposition of cement products and the abandonment of New York City has been based upon the desire of the management to hold a cement show in a new territory. In issuing a statement regarding the show, President Edward M. Hagar, of the Cement Products Exhibition Company, 72 West Adams Street, Chicago, Ill., under whose auspices the shows are held, said that Pittsburgh was chosen for a variety of reasons. In the first place the city is centrally located and readily accessible from all points in a large and important concrete using territory. The facilities for holding a large exhibition and convention in Pittsburgh are excellent and assurance of the hearty co-operation of the people of Pittsburgh has been tendered.

Separate Specifications for Heating and Ventilating Buildings

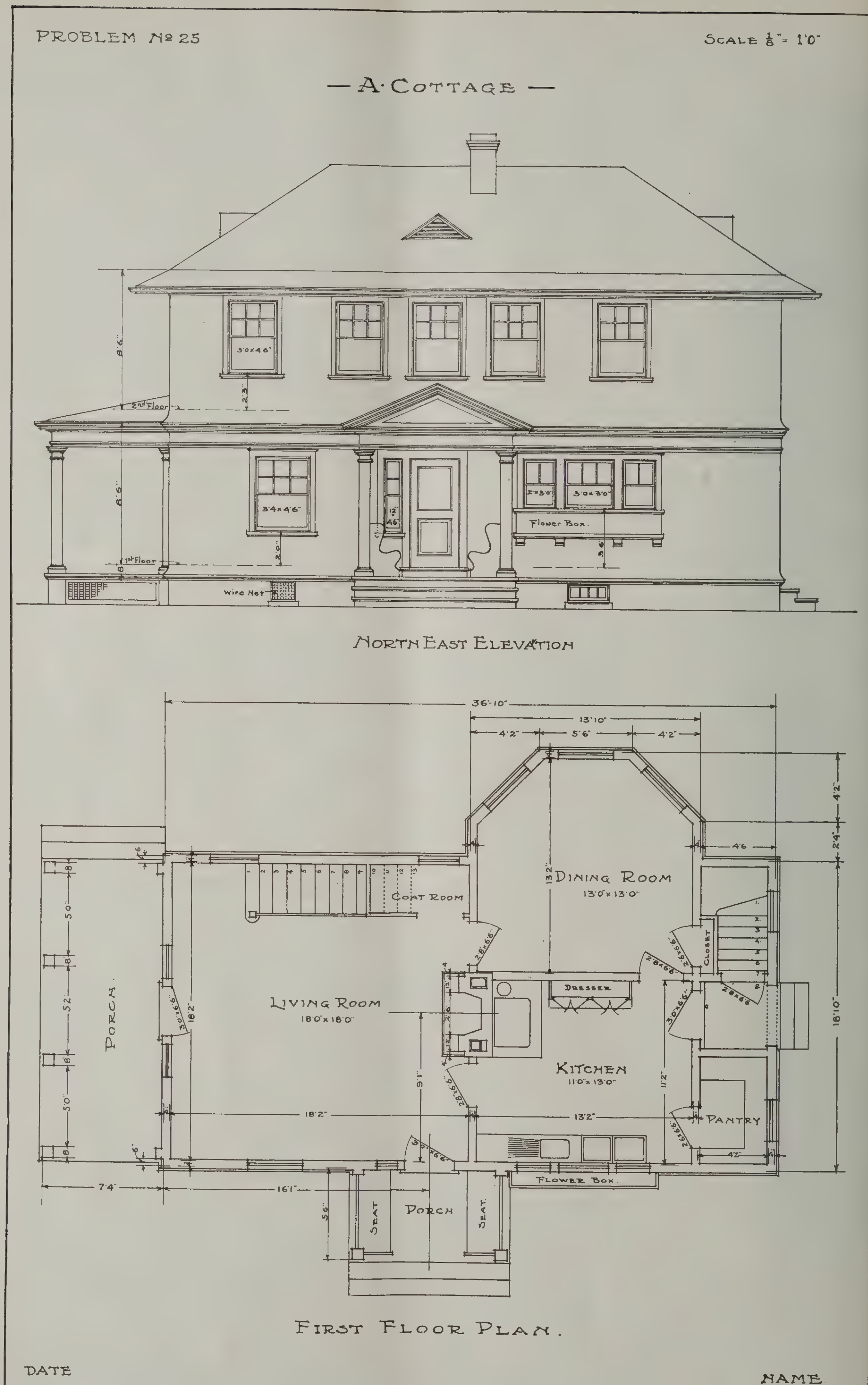
The new state law requiring that specifications for heating and ventilating contracts on all public buildings in the state of New York, and which goes into effect on the first of September, must be drawn so as to permit separate and independent bidding for this class of work, the same as for plumbing and drainage. It applies to county, city or borough, as well as to state buildings hereafter erected.

New Superintendent of Buildings in Brooklyn

Patrick J. Carlin, for some time past president of the P. J. Carlin Construction Company, 16 East Twenty-third street, Borough of Manhattan, was on July 1 appointed superintendent of the Bureau of Buildings for the Borough of Brooklyn to succeed John Thatcher, who was killed several days pervious by the collapsing of a scaffolding in a building he was inspecting. Mr. Carlin resigned his position as president of the P. J. Carlin Construction Company as soon as he decided to accept the appointment.

At the Hygienic Exhibition in Dresden last year there were shown different shapes and constructions of a concrete radiator for steam or hot water heating. The radiators were made by pouring a mixture of cement and sand into special gypsum molds or iron castings. The thickness of the walls was about ⅜ of an inch. The point is made that a concrete radiator costs much less than an iron radiator, will heat more quickly, cool off more slowly and will not rust.

The City Council of Columbus, Ga., recently refused to pass an ordinance providing that no wooden shingles be used in the future in the covering of houses within the city limits.



Lessons in Architectural Drawing for Beginners—Scale of Sheet One-half Original Size

Lessons in Architectural Drawing for Beginners

Location of House as Regards Points of Compass -- Details of Construction -- Drawings to Be Prepared

By Alfred Auslander

OUR twenty-fifth lesson, which is merely a continuation of our last, shows the first-floor plan complete. The elevation called the "northeast elevation" indicates that the kitchen is facing north. In connection with this it does not seem to be out of place to mention to the student how the various rooms should be arranged with regard to points ot compass.

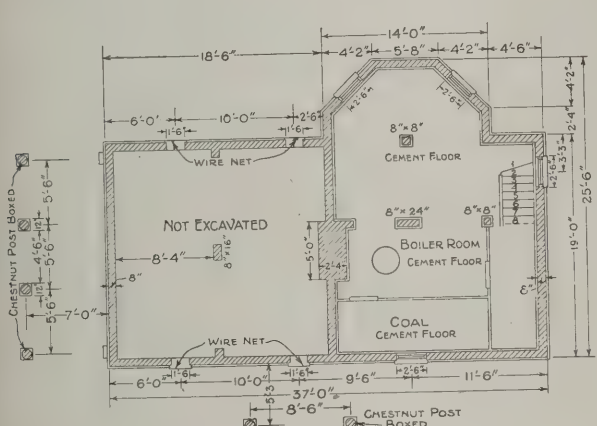
The house should be located so that it faces the southeast or the south. This puts the kitchen to the north; the dining-room to the east, as in our case, which gives it the desirable morning sun, and the living room or parlor to the south and west.

The most important of all the working drawings, especially for country residences, is no doubt the first-floor plan, which shows at a glance the general dimensions of the entire building, the arrangement of the principal rooms of the house, as well as the location of porches, piazzas, stairs, etc.

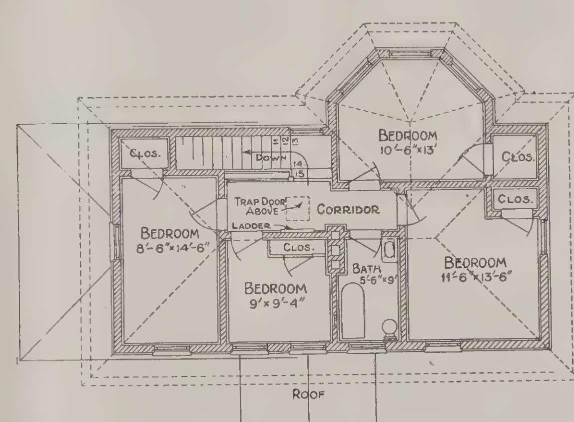
in the foundation wall marked wire netting. This indicates without looking up the foundation plan that in all probability this portion of the building is not excavated and an openng left for ventilation only, the wire netting being a protection to keep cats, rats, etc., out. A glance at the foundation and cellar plan will show that there is no cellar under the living room, it being noted on the plan "not excavated."

The brick wall dividing the cellar from the not-excavated portion is what is known as a "retaining wall," because it retains the earth which is higher than the excavated cellar. From the figures given on this plan the student will see that the outside lines of the brick foundation and cellar walls line up with the sheathing above, or they project 1 in. beyond the studding. This allows room for the water table.

The second-floor plan, which is shown below, has besides the four bedrooms a bathroom 5 ft. 6 in. by



Foundation or cellar plan—Scale 1/16 in. to the foot



Second floor plan—Scale 1/16 in. to the foot

Lessons in Architectural Drawing for Beginners

The front porch located in the front of the house is three steps higher than the grade and one step lower than the finished first-floor level. From this we enter into the living room, being 18 by 18 ft. between finished plaster, which has on open fireplace, the staircase to the second floor and a coat closet under the head of the stairs. A door to the right of the fireplace leads into the kitchen and another to the left of it leads into the dining-room. The north-end wall of the living room has a door leading to the main porch, as well as two side windows.

The description of the dining-room, kitchen and pantry was given in our last lesson and we would only call the attention of the student to the fact that the china closet off the dining-room is fitted with glass shelving and has leaded glass doors.

In the front of the kitchen windows we show a large box which we call the "flower box." The plan shows the projection, and the elevation shows the hight of it.

It is hardly necessary to give a description of the front elevation excepting for the following points: At the left side of the porch we show a small opening

9 ft., which is located above the kitchen. This is done for economy's sake in order to use the same plumbing stack. The low attic over this floor is accessible by a ladder placed in the corridor and a trap door in the ceiling (see Fig. 2). It is ventilated by little louvre windows shown on the elevation.

Suggestions

Make ¾-in. scale detail of the following:
Section through water table and foundation walls.
Section through main cornice.
Section through porch cornice.
Section through seats on porch and flower boxes.
Section through dressers, stairs, mantel.
Answer the following questions:
What is the purpose of the piers shown on cellar and foundation plans? (See Fig. 3.)
Which portion of front elevation is called pediment?

This concludes the lessons in Architectural Drawing For Beginners. In the following lessons we will take up the design and drawing of a modern loft and office building, points to be considered, specifications, etc.

CORRESPONDENCE

A Department Where Those Interested Can Discuss Practical Trade Topics--All Are Invited to Participate

Question in Hopper Bevels

From W. S. W., Pleasant Ridge, Ohio.—I am sending in answer to "B. F. B.," Kirksville, Mo., whose inquiry appeared in the May issue of the *Building Age,* the accompanying sketches and explanation, which I trust he will find satisfactory.

We will first show two boards 1 in. thick standing on edge at such an angle as will make an equilateral triangle, as shown in Fig. 1. In order to have a square cut at *A-B* there is an unknown point under the line *A-C* which must meet the point *B* somewhere on the line *A-B*. The line *A-B* is just twice the length *B-C*.

Referring now to Fig. 2, draw the line *d-a,* also *h-i,* of any length and divide it into three equal parts—one below the line *d-a* as at *v-h* and two above the line as at *v-j* and *j-i*. Place a square so the heel will touch the line *d-a* as at *d* and the sides will pass through the points *h* and *i*. This will give the pitch of the sides.

We will use 1 in. boards 3 in. wide. Lay that off as shown by *d-e-f-g*. Draw *g-t,* which is the width, and *d-u,* the thickness; *g-w* is the run and *w-d* the rise.

Draw the miter line *g-r* and the other two lines *e-r* and *m-n*.

It will be seen that a perpendicular from *b* to *x* is on a line with *a-b,* which shows the cut is square across the edge of the board. The miter cut would be *x-l-a,* and *t-k-g* is the bevel across the face of the board.

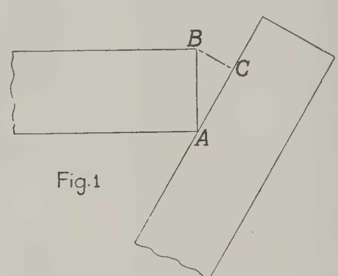
The rest I think is sufficiently clear to be understood without further explanation.

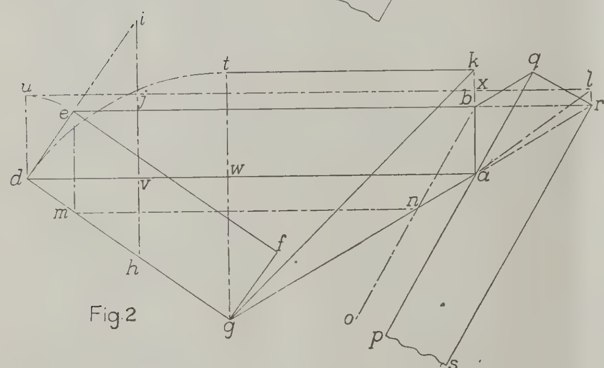
From C. J. M., St. Johns, N. F.—In the May issue of the *Building Age* a correspondent signing himself "B. F. B.," Kirksville, Mo., asks a question the answer to which is so simple that I wonder any carpenter would feel called upon to present it owing to the fact that it almost answers itself.

The question is, What is the pitch of the sides of a three-cornered hopper, the butt joints of which are square cuts? The figure that such a hopper would form in geometry would be the frustrum of a triangular pyramid, the base of which is an equilateral triangle, the sides forming the angle of 90 degrees at the apex.

Referring to the accompanying diagrams, Fig. 3, draw the equilateral triangle *A-B-C* and the bisecting lines *B-E* and *C-D*. Join *D-E* and at right angles to *D-E* draw indefinitely the line *F-G*. Make *D-G* and *D-F* equal to *D-B* and *D-A*. Join *E-F* and *E-G*. Then the triangle *E-F-G* is one side of the triangular pyramid, which may be cut off anywhere, as at *a-b,* to form the side of the hopper.

To understand this more clearly, let the reader take any square box, as, for example, that shown in Fig. 4. Cut off one corner at an angle of 45 degrees and then cut it off again parallel to the first one and the result without further trouble is the three-cornered hopper.





Figs. 1 and 2—Diagrams Submitted by "W. S. W."

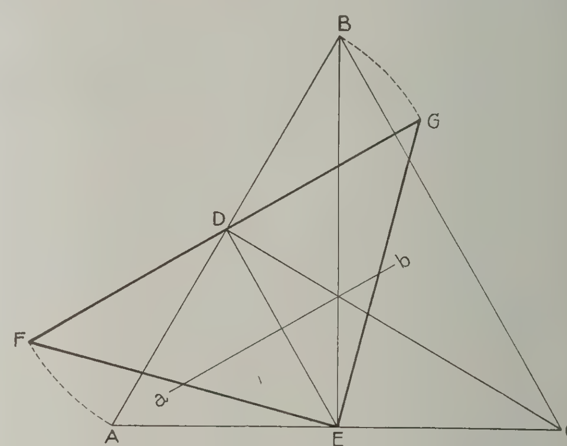


Fig. 3—Diagram for Getting One Side of Triangular Pyramid as Suggested by "C. J. M."

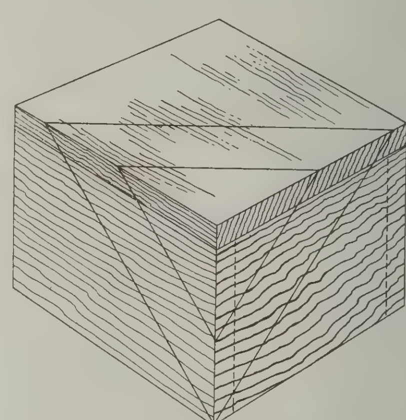


Fig. 4—Showing How Three-Cornered Hopper May be Obtained

Question in Hopper Bevels—Solutions by Two Correspondents

Best Method of Sheathing a Frame House

From J. T. B., Osgood, Ind.—I have noticed with much interest the comments of "W. F. C.," Wallingford, Conn., and "J. C. B.," Dowagiac, Mich., relative to the best method of placing sheathing boards on a frame house. Supplementing what has already been said, I would give it as my opinion that if a man wants a thorough and substantial job the sheathing should be placed diagonally, starting with a 45-degree cut and keeping the same so as to always fit snugly. There should also be kept in mind the openings on the sides of the elevations in which he is working and come up over his openings in a proper way so as to reinforce the entire elevation, thus making a solid job.

Any ordinary carpenter can execute the work if he will exercise his good horse sense and not just pick up a board and nail it on by guess as I have seen "chips" do.

Now "W. F. C." states that if a leak should occur it is hard to trace it. I would say that if a side elevation leaks it is not a hard matter to see it, for a crack in the siding or bad knot should not be left in any building. He also says his sheathing got wet and twisted his house out of plumb or shape. Now, Brother "W. F. C.," be sure you use your plumb correctly before you put on any diagonal sheathing and you will have no trouble.

"J. C. B." says it takes much more material where the sheathing is put on diagonally than it does the other way. That I think is a mistake, for I can cover just as much surface per M as you can when it is placed horizontally, and so can "J. C. B.," if he commences right. He will also be immune from those Michigan cyclones he tells about, for if he puts on diagonal sheathing he can roll his house around like a box and never hurt it. Of course it takes longer to cut a miter than it does a square cut, or, in short, more work to put it on, but if you want a good job put it on diagonally; besides the weatherboarding lays much better and you will have no cracks in the siding to cause any leaks. So get in line and be progressive.

Creosote Stain vs. Paint for a Frame Building

From Down South, N. C.—Will some member of the craft tell me which will prove the more lasting on a frame building, two coats of creosote stain or two coats of reasonably good paint?

What would be a proper color for trimming, the body color being a medium shade of brown? I am aware that white seems to be a popular color for trim, but personally I do not admire it.

Sizes of Dressed Lumber

From C. W. K., Cambridge, Mass.—I am preparing a large number of tables for strength of wooden beams and am in doubt whether to take the nominal sizes or the sizes ¼ to ½ in. less than the material as given by some of the lumber manufacturers' associations.

In this market the lumber is usually less than the nominal size, but not always, for I have seen spruce and hard pine on the same jobs, some of which would be more and some less than the nominal size.

I should like to know how the lumber comes in other parts of the country. Possibly the readers of the *Building Age* will tell me.

Durability of Stucco Finish

From W. D. T., Jersey City, N. J.—Will some of the readers who are experts on stucco finish on metal lath tell me through the Correspondence columns of the *Building Age* the life of stucco finish where exposed to salt air. I own a waterfront on Great South Bay at Amityville, L. I., and in the near future I intend to build a home for myself. I have been told that stucco is not just the thing to use for a house built near the salt water. I intend to use the prepared stucco made in Newark, N. J.

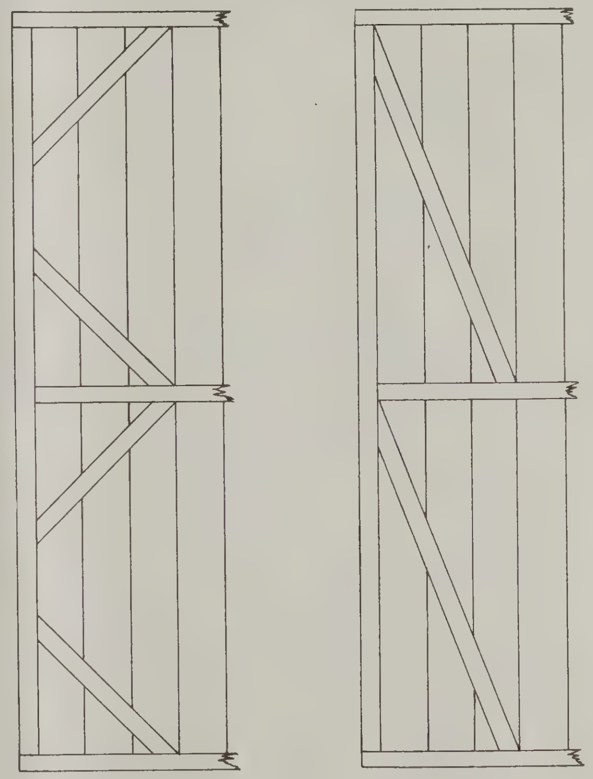
If some of the expert readers will give me this information I will be greatly obliged as I know the *Building Age* is the only book where one can get correct information.

Modern Methods of Bracing Frame Houses

From C. W. K., Cambridge, Mass.—Various books show bracing for outside walls of frame houses arranged as shown in Fig. 1 of the accompanying sketches, the braces being 3 x 4 in. or 4 x 4 in. This was formerly the custom in Massachusetts, but as far as I have noticed has not been in use here for some 20 years, but 2 x 4-in. or 3 x 4-in. braces of the kind indicated in Fig. 2 of the sketches are used, being simply nailed at top and bottom.

I would like to ask the readers of the *Building Age* if the style shown in Fig. 1 is now used anywhere in the United States or Canada and if so how the ends are fastened to sills, girts and plates.

I would also like to ask whether it is found worth while to mortise and tenon the wall studs in braced frame houses. In this locality some men tenon none at all; others tenon studs at the sides of windows and



Modern Methods of Bracing Frame Houses

say that it helps them to set up the frame; others in the most expensive work tenon all studs except those which are cut by corner braces. I doubt whether it is worth while to tenon any studs on account of the labor involved, the possible chance for rotting of sills at the mortises and the fact that the nail studs seem to give a still house. I should like to have the opinions of the readers of the paper on this matter.

Constructing an Underground Water Tank of Concrete

From W. F. L., Portland, Ore.—I would like very much to have some information regarding the required amount of reinforcement in an underground concrete water tank under air pressure for home use.

My house is located on a small rise about 20 ft. above some 20 acres which I have divided into 50 pieces to be used for small home tracts, which I expect to supply with water from a well 85 ft. deep and located 150 ft. away from and 12 ft. lower than the house.

The location for the tank is half way between the house and the well. I wish to place the tank 6 ft. below the surface of the ground and to make it 6 ft. in diameter and 12 ft. long. The air pressure will be about 50 to 75 lb.

I have a good quality of coarse sand from which I made the cement foundations for my house and by screening was able to use it also in the plaster. I think it would be quite suitable for the tank. I would therefor like to know what reinforcement would be required to make the tank air tight.

I have been reading about cement tanks in a trade paper, but am somewhat doubtful about the air being confined in a cement tank, and would therefore be grateful for any information which the practical readers may be able to furnish through the Correspondence Department of the *Building Age*.

Answer.—The above inquiry was submitted to Ernest McCullough, C. E., who furnishes the following comment:

A number of inquiries have come to me of the same nature and I have designed several tanks for the purpose, only two of which were built because steel tanks are much cheaper. The two tanks mentioned gave considerable trouble because it is so difficult to obtain proper workmanship.

The pressure in a circular tank is converted into tension in the circumference, the rule for obtaining this tension being to multiply the radius in inches by the pressure in pounds per square inch. Taking the tank mentioned with a diameter of 6 ft., the radius will be 36 in., and the pressure being 75 lb. per square inch the tension will be 2700 lb. for each inch in length of the tank. We can use a steel stress of 16,000 lb. per square inch, and 2700 divided by this gives an area of 0.169 sq. in. of metal = 11/64 in. thickness of plate. The weight will be $0.169 \times 3.4 = 0.57$ lb. for 1 ft. of circumference, or $18.85 \times 0.57 = 10.75$ lb. per inch length of tank. The steel plate must be riveted, and assuming a joint having an efficiency of 80 per cent., the additional steel and the rivets required for the joint must be added to this weight. Such a tank may be painted inside and out with a good asphaltum paint and placed in the ground without any other protection. It will last a great many years, and if galvanized it will be better than if merely painted. It will add considerably to the life of the tank if a coating of very rich, wet concrete 2 or 3 in. thick is placed on the outside.

In a circular concrete tank all the strength is furnished by the steel, the concrete merely encasing the steel, and as the latter will be in the form of rods or bars spaced some distance apart the concrete must be very rich if it is to be dense enough to prevent leakage of air. When steel is stressed in tension there is some stretch and as concrete adheres to steel a low stress must be used in the steel so it will not stretch enough to crack the concrete. To take care of this item experience has shown that the steel stress should not exceed 10,000 lb. per square inch, which gives an area of 0.27 sq. in. per inch in length $\times 3.4 = 0.92$ lb. per foot of circumference = 17.35 lb. per inch length of tank. The steel will be in the form of rods and bars, and in order that they will not pull out of the concrete they should be lapped about 25 times their thickness or diameter, which will increase the weight, as in the case of the riveted joint. The tensile strength of rich concrete is about 95 lb. per square inch, and as the pull in each inch is equal to 2700 lb., this divided by 95 will give a thickness of 2.83 in. of concrete, with steel embedded in the center, which will thus reduce somewhat the interior diameter of the tank. However, the increase in the steel stress will not be very great if the interior diameter is 6 ft., the thickness of the shell made 4 in. and the steel embedded within an inch of the inner face. The exact stress in the steel will then be nearer $37 \times 75 = 2775$ lb. = 0.2775 sq. in. per inch length of tank. This will call for ⅞-in. square bars spaced 5¼ in. center to center with ¼-in. square bars 12 in. apart longitudinally.

The concrete for this work should be mixed with one part of good Portland cement, two parts of clean, coarse sand, three parts of clean gravel or broken stone, the largest piece being no more than ¾ in. in diameter. The concrete should be mixed very wet and thoroughly tamped. It will be more dense if 3 lb. hydrated lime are added to each bag of cement, counting a bag of cement as 1 cu. ft.

From the above analysis it will be seen that a concrete tank to contain compressed air requires a great deal more steel than a steel tank, and there is danger of leaks caused by poor workmanship, and also danger that unequal settlement in the future may cause the concrete to crack and thus permit air to leak out. There may be satisfactory concrete tanks in use for this purpose, but the writer does not know of any and does not advise their construction. If the correspondent wishes to construct such a tank it would be advisable to make it much thicker than calculated, as it is difficult to obtain perfect workmanship in thin concrete walls built in the ground.

Further Comments on Winding Stair Rails

From C. C. Grant, Red Deer, Alta., Can.—The article of "Cymro" in the July issue of the paper does not in my opinion touch in the remotest way on the fundamental principles of either the system of "Triangulus" or the Tangent System. There are columns of figures and explanations concerning what he does but not one word concerning what he is trying to make or what she should try to make. He states that the system of "Triangulus" is too complicated, but the same can be said of the Tangent System. There is probably not one carpenter—without a knowledge of railing—in 10,000 who could understand either his figures or his explanations, or who could make a blank of any kind out of the chunk of wood he saws out of the plank, even if it had on it all the lines of the system. The fact that railing is a closed profession proves the above statement.

He requests "Triangulus" to admit that the rules of the Tangent System are absolutely correct geometrically. If "Cymro" will answer the following questions fairly and squarely he will, I hope, see fit to withdraw his request:

1. Taking the stairs of which your Fig. 1 is a ground plan as an example, should the rail on that stair climb as does the stair? In other words, should the rail fit the stair?

2. Does the stair in question climb uniformly; that is, without variation in pitch?

3. Does the perimeter of an ellipse climb a cylinder uniformly?

4. If you admit that the stair climbs uniformly and that the ellipse does not, then can a blank or rail which climbs as does an ellipse—that is, irregularly—fit a stair which climbs regularly, as does the one in question?

5. Does your blank, Fig. 10, climb as does an ellipse, or does it climb uniformly?

6. If you maintain that your blank climbs uniformly then is Riddell, the founder of the system, wrong when he states that all such blanks climb as do ellipses (Second Edition, page 33), and is he wrong when he demonstrates (page 66) that the center line of the blank

of the Tangent System is intended to be part of an ellipse?

7. Would not your Fig. 5, dealing with the thickness of plank, practically force your blank to climb as does an ellipse?

8. If you admit that your blank, Fig. 10, climbs as does an ellipse, then would your rail when placed on the stair in question be anything more than a succession of irregularly climbing sticks without a trace of the uniformity and regularity in climbing so characteristic of the stair?

9. Your Fig. 10 is indefinite. You give no information as to what you are trying to make and I am uncertain in some ways as to what you have made. For instance, the horizontal blank of Fig. 10 appears to have joints made on right sections. The blank in position appears to have joints made on vertical sections; therefore, I cannot decide whether you tried to make the concave side of the blank straight on right section as Riddell did or straight on vertical sections as Nicholson did? If you tried to make the sides straight on vertical sections, how can you at the same time make them straight on right sections, as you evidently do at joints and as you unquestionably do at the end of the minor axis when you saw squarely through the plank?

10. Is it possible to make the sides straight on both vertical and cross sections at the same time? If not, then why do you try to do it?

11. If on the other hand you follow Riddell and make the concave side of the blank straight on cross sections—a thing you will be forced to do when you saw squarely through the plank at the end of the minor axis and make your joint ends square—how can your balusters be plumb?

12. Should the balusters be plumb? When these questions have been fairly met I ask you to admit the fact that not one single thing in connection with your blank, Fig. 10, is geometrically correct, so far as fitting the stair is concerned.

I notice you admit when using the Tangent System that it is necessary to employ some other method as that of "Triangulus" in order to find what your blank is going to look like when made. Would it not be better to use some system at the start which would enable you to ascertain what you were going to make and thus save double work? Again, the blank of "Triangulus" climbs uniformly. Yours does not. How can you find from his what your own will look like?

Riddell never claimed to make a blank geometrically correct. He never tried to. He states candidly and frankly at the start that his blanks climb as do ellipses. It is evident that such a method of climbing is not followed by any stair in existence except possibly by accident. He squares his blank on right sections and says so. He candidly admits defeat time and again.

Unfortunately for railing, his methods have been adopted and caricatures instead of rails are the result, provided the mechanic follows the system as far as it goes. If he does he has gone too far to make a blank, for the timber is not there out of which to make it.

From William Reynolds.—I have taken your valuable monthly instructor for the past 25 years and it has at all times been welcome to my home. A quarter of a century ago I had some articles on roofing which were published under the name of "Cymro," Cincinnati, and they were called to mind by seeing in the July issue of the *Building Age* the comments on "Triangulus'" System of Winding Stair Rails by a correspondent signing himself "Cymro."

After reading his presentation of the matter I should say that his remarks are as true as gospel. "Triangulus," no doubt, is a fine draftsman and a mechanic in some line, but to know the value of tangents, ordinates or level lines and bevels it takes a man who makes the rail to understand it. "Triangulus" may be a good bench hand, but his way of getting out the rail is not in accordance with the best practice. The system of "Cymro" or that advocated by Morris Williams, whose many articles have appeared in back numbers of the paper, is as easy and correct as any. Father Riddell's and scores of others are also correct.

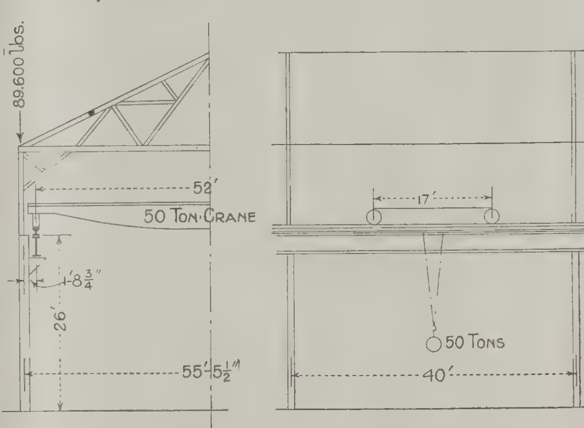
My advice to any young man who wants to master this beautiful art of handrailing is to follow some one system until he knows it by heart. The others will follow in a stream.

There are lots of things on stairbuilding that are kept a secret, such, for example, as how to figure on stairs and rails. I would ask the correspondent to give a problem some time and see if any of the readers versed in stairbuilding can answer it.

Obtaining Bending Moments in Girder Supporting Traveling Crane

From A. B. N., Washington, D. C.—Will someone please explain through the correspondence columns how to obtain the greatest bending moment in a girder supporting a 50-ton traveling crane and also the greatest load that will come on the column. An idea of the conditions may be gathered from an inspection of Fig. 1 of the accompanying sketches.

The roof load is 80 lb. per square feet. With a wheel base of 17 ft. what is the maximum wheel load?



Obtaining Bending Moments in Girder Supporting Traveling Crane—Fig. 1—Diagrams Submitted by "A. B. N."

Answer.—The above was submitted to Ernest McCullough, who comments as follows:

In this case the greatest load on the column will occur when the load on the crane is as close as possible to the column and the wind is blowing against the building. At this time the column will be in the middle between the wheels.

The maximum shear in the girder carrying the traveling crane occurs when both wheels are on one span and a line through the center of one axle coincides with one side of the column; that is, the load is as close as possible to one side of the column.

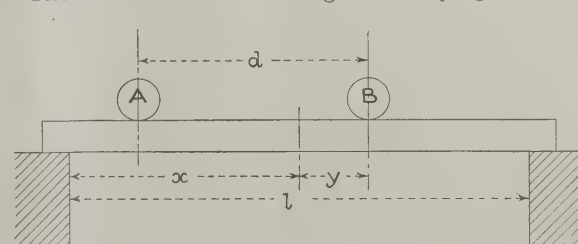


Fig. 2—Diagram Accompanying Comments of Mr. McCullough

The maximum bending moment in the girder is under one wheel when that wheel is as far from one support as the center of gravity of the load is as far from the other support. This is true when both wheels are loaded equally or when one wheel carries a heavier load than the other. The diagram, Fig. 2, will serve to make the formula clear.

w = weight of lighter wheel load. (If loads are equal it represents load on one wheel.)
W = load on both wheels $(A + B)$.
d = distance in feet between wheel axles.
$x = \frac{l}{2}$ = half the girder span in feet.
l = girder span in feet.
y = distance in feet from the heavier load to middle of span.
M = maximum bending moment in foot-pounds.

Then

$$y = \frac{wd}{2\,W}$$

$$M = \frac{W\,(x - y)^2}{l}$$

This is true only when the distance between centers of loads is less than 0.586 the span. When one wheel carries a heavier load the maximum bending moment is under the heavily loaded wheel. When the wheels carry equal loads the maximum bending moment will be obtained twice as the load moves along the girder.

Example: Assume load so close to trolley that each wheel practically carries half the load. This means 50,000 lb. on each wheel. The effect of impact on a column is considerable and in the case of a fast moving crane 100 per cent. increase is not too great. We will add 50 per cent. impact for the girder but double this for the live load effect on the column.

The load then on each wheel will be 75,000 lb. for girder bending moment and 100,000 lb. for column load.

$$y = \frac{75{,}000 \times 17}{2 \times 150{,}000} = 4.25 \text{ ft.}$$

$$M = \frac{150{,}000\,(20 - 4.25)^2}{40} = 930{,}234 \text{ ft.-lb.}$$

The column must be designed for a vertical load due to weight of roof. To this must be added the wind pressure on one side of the building half way to the columns on either side, plus the wind pressure on the roof; the first being uniformly distributed on the column, the second being a concentrated load at the top.

Bending may occur toward the outside or inside according as the wind may blow. In addition to the foregoing the column must be designed for the crane load, plus 100 per cent. impact, acting with an eccentricity measured from the center of the column to the center of the rail. In the above example this is 20¾ in.

I would recommend to your inquirer a new book, "Structural Engineering," by Joseph Husband and William Harby. It is the best on the subject for men not versed in higher mathematics and is practically complete. While British steel shapes are given the principles apply to American shapes, so the student will have no difficulty in using the book as a text.

Practical Value of the "Building Age"

From W. S., Paterson, N. J.—I am glad to note from the various issues of the *Building Age* that it is growing in size and value and I think it deserves the hearty endorsement of every carpenter and builder in the country, as I consider the *Building Age* the most readable and instructive building magazine of them all.

I think Mr. Auslander should continue his Lessons in Drawing so as to include plan drawing and estimating, but perhaps I am asking too much.

From S. V. R., Toronto, Can.—While my interest in building is mostly on the theoretical side, I find the *Building Age* is always full of up-to-date matter which is of more or less value to me, but must be of great value to those actually interested in the practical side of the work.

The present series of articles on Reinforced Concrete are certainly of great worth and the unlearned would do well to study them closely.

I do not bind my volumes of the *Building Age,* but am now preparing a comprehensive cross index to all the matter that may be of use to me in the volumes I possess.

Roof Trusses for Mechanics Hall

From Paul T. Lesher, Harrisburg, Pa.—In investigating the strength and economy of design of the roof truss given for discussion by "X. X. X.," Yonkers, N. Y., in the June number, I have found that the truss is economically designed—in fact, a little too much so, as some of the members figure a little light.

For simplicity in shop details, the writer would have made all the angles (exclusive of the upper chord angles) of the same size, namely, 2½" x 2" x 5/16", thus giving a more uniform-looking truss as well as needed strength to several members while adding very little extra weight. A shearing value of 10,000 lb. per square inch and a bearing value of 20,000 lb. per square inch was used in figuring the rivets, but many engineers use for them a shearing value of 7500 lb. per square inch and a bearing value of 15,000 lb. per square inch. For work of this character, however, the higher values are safe to use.

Table of Stresses in Roof Truss Members

Name of Member	Dead Load Stresses (in Pounds)	Wind Load Stresses (in Pounds)	Total Stresses (in Pounds)
B Z	+19,700	+ 9,500	+29,200
C Y	+18,100	+ 9,500	+27,600
D T	+16,600	+ 9,500	+26,100
E V	+15,100	+ 9,500	+24,600
F R	+15,100	+ 9,500	+24,600
G U	+16,600	+ 9,500	+26,100
H N	+18,100	+ 9,500	+27,600
J L	+19,700	+ 9,500	+29,200
M L	−15,200	−10,100	−25,300
P N	− 2,100	− 3,400	− 5,500
N L	+ 1,600	+ 2,400	+ 4,000
P Q	+ 3,200	+ 4,800	+ 8,000
P M	−13,100	− 6,800	−19,900
U Q	− 2,100	− 3,400	− 5,500
R U	+ 1,600	+ 2,400	+ 4,000
Q S	− 8,200	− 6,800	−15,000
R S	−10,400	−10,100	−20,500
S M	− 6,400	0	− 6,400
S W	− 8,200	− 6,800	−15,000
S V	−10,400	−10,100	−20,500
V T	+ 1,600	+ 2,400	+ 4,000
T W	− 2,100	− 3,400	− 5,500
W X	+ 3,200	+ 4,800	+ 8,000
X Y	− 2,100	− 3,400	− 5,500
X M	−13,100	− 6,800	−19,900
Y Z	+ 1,600	+ 2,400	+ 4,000
Z M	−15,200	−10,100	−25,300

compression. — denotes tension.

All the joints are sufficiently strong with the exception of the wall end of the upper chord anngles, where two more rivets are needed. The writer found that the 8 lb. per square foot of roof surface assumed by "X. X. X." for the weight of the purlins was too great, 3 lb. being ample, thus making the total dead load 33 lb.

per square foot of roof surface instead of 38 lb.

The structural design of the truss is very good, but the truss should have an anchor bolt at each end.

A more economical truss could have been secured if the lower chord was made horizontal instead of cambered, as a lower chord cambered as much as in this case adds considerable to the stresses, thus requiring more steel. However, it no doubt was necessary to do this on account of the architectural requirements, as a chambered lower chord is more pleasing to the eye than the straight chord.

This type of truss is the best that could be used, as the Fink truss has the advantage of short struts, simplicity of details and economy.

Tar roofing felt laid between the slates and the sheathing assists materially in making the roof watertight and tends to eliminate breakage.

The writer has laid out the frame and stress dia-

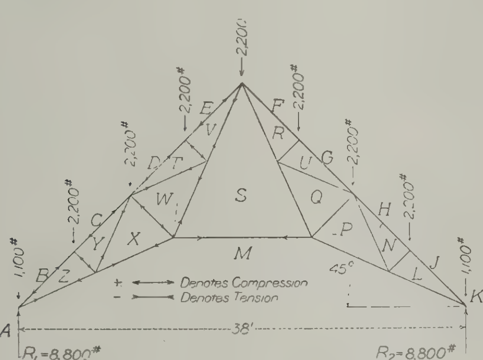


Fig. 1—Frame Diagram for Dead Load—Scale 1/16-In. to the Foot

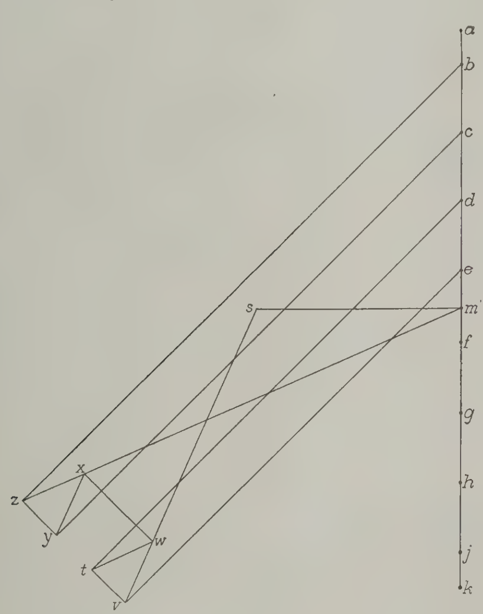


Fig. 2—Stress Diagram for Dead Load—Scale 1/30-In. Equals 2000 Lbs.

of the structure is found by the formula

$$\tan \theta = \sqrt{\frac{C+T}{T}}$$

in which C and T represent the compressive and the tensile strength, respectively, of the material employed. It is applicable to any material.

When the compressive strength equals the tensile strength the angle $\theta = 54\frac{3}{4}°$, which can be applicable to medium steel, for $C = 0.4\,T$ (yellow pine), $\theta = 49\frac{3}{4}°$. For $C = 0.8\,T$ (soft steel), $\theta = 53\frac{1}{4}°$. For $C = 6\,T$ (cast iron), $\theta = 69\frac{1}{4}°$.

From the above it can be seen that as the truss

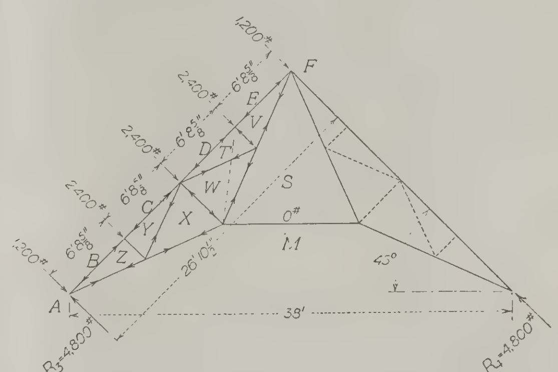


Fig. 3—Frame Diagram for Wind Load—Scale 1/16-In. to the Foot

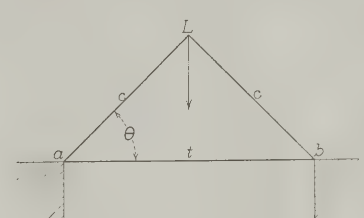


Fig. 5—Diagram Relating to a Structure of Triangular Form

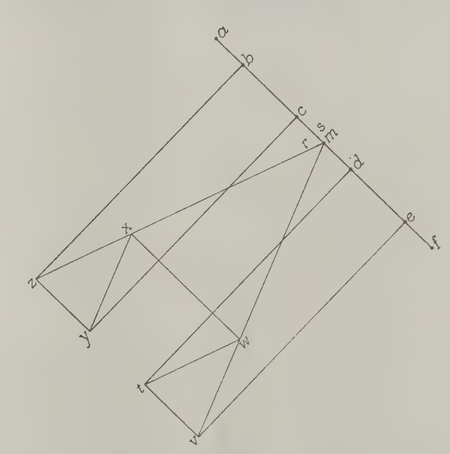


Fig. 4—Stress Diagram for Wind Load—Scale 1/30-In. Equals 2000 Lbs.

Roof Trusses for Mechanics Hall

grams for both the dead and wind loads and the accompanying table gives the resulting stresses.

Fig. 1 is the frame diagram showing the dead loads, while Fig. 2 is the stress diagram for the dead loads. Fig. 3 is the frame diagram showing the wind loads acting normal to the slope of the roof, while Fig. 4 is the stress diagram for the wind loads. The wind load was taken as 36 lb. per square foot acting normal to the slope of the roof.

A structure of triangular form as in Fig. 5 is supported at "a" and "b." It sustains the load L, the sides 'c c" being in compression and "t" in tension.

The angle θ that will give a minimum total weight

under investigation has an angle of 45°, it approaches very closely the economical angle.

When the architectural design of the building is subordinate to the structural design, the trusses can be spaced on an economical basis.

In thorough investigations, in which the material required and the cost of labor in both shop and field were considered, it was found that the most economical spacing of trusses is about ¼ the span.

As the trusses in the Mechanics Hall are spaced 10 ft. centers and the span is 38 ft. from center to center of wall, it can be seen that this conforms very closely to the most economical spacing of trusses.

Fire Tests of Building Partitions

Six Panels of Varied Construction Subjected to High Temperatures, and the Results Noted by Experts

AN interesting test to demonstrate the relative fire-resisting value of six types of partitions was held at the testing laboratory of the Associated Metal Lath Manufacturers, at 7500 Ætna Road, S. E., Cleveland, June 28. The test was conducted under the direction of V. D. Allen, Cleveland inspector of buildings, who appointed as a committee to act as officials at the test L. H. Miller, of the Bethlehem Steel Company, Cleveland; Professor John H. Nelson, of Case School of Applied Science, and W. S. Lougee, architect and former building inspector of Cleveland. The city building department was also represented by A. W. Zesiger, its concrete engineer. The materials tested were those ordinarily used in building construction. The tests were conducted as near as the equipment would permit, in accordance with the specifications for testing fireproof partitions adopted by the American Society for Testing Materials. The test attracted a great deal of interest, and among those in attendance as witnesses were a large number of representatives from city building inspectors' offices, also sheet metal manufacturers and fire insurance men. Owing to trouble with the pump in connection with the oil supply which was used for fuel two of the tests were not completed until the following day. A large amount of technical data was taken by the officials in each of the tests, and this will be embodied in an official report to be prepared as soon as possible. The partitions tested were erected under the direction of the committee between May 2 and May 8.

The partitions were subjected to a two-hour continuous fire test. The specifications provided for an average temperature of 1700 degrees after the end of the first half hour. The maximum temperature attained exceeded this considerably, reaching over 1900 degrees. At the end of each heat test a stream of water was directed for 2½ minutes against the partition through a 1⅛-in. nozzle held within 20 ft. of the partition.

The materials tested and the results of these tests as seen by the observers were as follows:

Panel No. 1—Metal Lath on Wooden Studding

The metal lath was applied to 2x4-in. studding of Norway pine placed 12 in. center to center. Expanded metal lath of 24 gauge and painted on both sides was used. Three coats of plastering were applied according to specifications. The thickness of the panel actual measurement was 5½ inches.

During the heat test a crack appeared on the outside of the panel and some smoke came out from the burning studding. After the test was concluded the studding was found to be burned to charcoal. There was some deflection inward and then outward during the heat test. When the panel was opened it was found that no plaster had fallen off the fire side, but was cracked. After the water was discharged against the panel a large crack appeared on the outside down the center, and some of the plaster on the fire side fell off. However, the most of this was held in place by the lath. The maximum temperature during the test was 1910 degrees.

Panel No. 2—Wood Lath on Wood Studding

The studding was 2x4-in. Norway pine, set 16 in. on centers. No. 1 white pine lath was used. Two coats of plaster were applied. The thickness of the panel was 5⅝ in. This panel began to bulge out near the bottom soon after the fire was lighted. In about an hour cracks appeared on the fire side. The lath gradually burned out and when the panel had been under the heat test about 1½ hours a large crack appeared on the outside. Shortly later a piece of plastering fell out. This was followed shortly by the fall of a larger section. When the panel was swung open only a thin shell remained and the slight jar caused all the plaster to crumble and fall. No water was turned on this panel. Considering the construction it stood up remarkably well. The maximum temperature of 1850 degrees was reached.

Panel No. 3—Two Inch Solid Metal Lath

For the studding ¾-in. channel irons were used, being set 12 in. on centers. The expanded metal lath was 24 gauge. Partition was lathed one side only. The plastering was the same as Panel No. 1, except that it was back plastered to make a solid 2-in. partition. The total thickness was 2⅞ in. Fine cracks appeared on the fire side fifteen minutes after the firing. Shortly afterwards a large piece of plastering was blown from the outside. This was probably due to moisture owing to the plastering not being thoroughly dry. The panel bulged out in the center, the maximum deflection reaching 3½ in. When the panel was opened the inside wall was almost perfect, there being only a few fine cracks. After the water was applied a small amount of plastering peeled off the inside. The maximum temperature reached in firing this panel was 1920 degrees.

Panel No. 4—Stucco Wall According to Typical Specifications of Associated Metal Lath Manufacturers

This partition had 2x4-in. Norway pine studding set 12 in. on centers. The studding was covered with No. 24 gauge expanded metal lath, with three coats of plastering prepared according to the metal lath manufacturers' specifications. This partition was 5 15/16 in. thick. It was fired 57 minutes before the break-down, which necessitated postponing its completion until the following day.

At the conclusion of the partial test the outer coating on the fire side was largely gone and a section of the metal lath about 6 in. square was exposed. This exposed area did not increase after the fire was re-lighted. In about 45 minutes the plaster cracked a little on the fire side, and where the lath was exposed the studding could be seen burning. About ten minutes before the fire was finally turned off a hair crack appeared on the outside, but no fire could be seen through. When the panel was opened the studding was found to be burning in a few places, but the plaster remained almost over the entire surface. The water took the plaster off the lath about one-half of the surface on the fire side, and the lath was found to be hanging loose and bare. The outside remained intact except for a small crack. Ripping off the plaster on the fire side showed that the studding had been charred in some places, but 90 per cent. of it was good. The inside plaster baked around the studding and prevented them from burning. The maximum temperature was 1920 degrees.

Panel No. 5—Four Inch Hollow Metal Lath

In the construction of this panel 2½-in. metal studding was used, and No. 24 gauge expanded metal lath. The plastering was the same as Panel No. 1, the thickness of partition being 4 11/16 in. About a half hour after this panel was fired several cracks appeared on the outside. When the panel was swung open the inside was intact, but considerable plastering fell off the inside when the water was turned on, exposing some of the lath. The outside remained intact after the water was turned on. The maximum deflection of this panel was 4 15/100 in. The maximum temperature attained was 1970 degrees.

Panel No. 6—Plasterboard on Wood Studding

The studding was 2x4-in. Norway pine, set 16 in. on centers. Plasterboard ⅜ in. in thickness was used in addition to the plaster. The panel was 5½ in. thick.

After this panel was under fire 26 minutes the pump gave out and the completion of the test had to be postponed. When the fire was turned off the plasterboard on the fire side was practically burned out, but the outside plastering was not changed perceptably. A maximum temperautre of 1028 degrees had been reached. When the test was resumed a large bulge appeared in a few minutes on the lower part of the outside and fire became visible through a small hair crack. About ten minutes later a piece of plastering dropped out. When the fire was turned off at the expiration of two hours and the panel was opened, about one-fifth of the plastering fell. Only about 5 per cent. remained in place after the water had been turned on.

Convention of National Association of Sheet Metal Contractors

Brief Outline of Eighth Annual Meeting Held in Suburban Park, St. Louis, Mo.

THE sessions of the eighth annual convention of the National Association of Sheet Metal Contractors were held June 10 to 14, inclusive, in Suburban Park, St. Louis, Mo., on the site of the World's Fair of 1904, there being a marked increase in interest and attendance and the delegates and guests had nothing but praise for the delightful hospitality which had been provided by the entertainment committee and others having charge of the convention. It was a gathering purely for business purposes and as soon as routine features had been disposed of serious consideration was given to trade matters. It clearly demonstrated its interest in securing a better condition of affairs in the warm air furnace field and while the report of the furnace committee was very frank as to what is to be desired by the furnace dealers there was equal candor on the part of the furnace manufacturers that there had been little co-operation from furnace contractors to increase the sale of furnaces or to discriminate in favor of the better grades of heaters and those made by manufacturers who have labored to uplift the furnace trade.

In opening the convention President John H. Hussie presented his annual address in which he reviewed the general work of the year, touched upon the relations existing with employers and manufacturers, briefly outlined the work of the convention and spoke of the outlook for the coming year.

Secretary Seabrook presented a most interesting report of the work of his office, after which President Hussie appointed committees on resolutions, auditing and by-laws.

A paper on "Practical Results of Association Work" by Edwin L. Seabrook was read and the discusison which followed brought out the fact that associations tended to establish confidence and prevent misunderstandings.

On the evening of June 11 the exhibition hall was the scene of great interest when Follansbee Brothers Company, Pittsburgh, Pa., showed by means of moving pictures the processes of making tin plate. This was followed by a stereopticon lecture on "Merits and Uses of Tin Roofing" by W. W. Justice of the N. & G. Taylor Company, Philadelphia, Pa. This talk was strictly along missionary lines for the benefit of the sheet metal roofing trade in general. The durability of a tin roof was demonstrated by excellent views of the roofs of the Doughton residence, Moorestown, N. J., which were covered with tin in 1853; a roof in Ohio laid in 1878; one on a depot at Monroe, N. Y., laid in 1847, and another at Wilmington, N. C., in 1868. All these roofs are said to be in good condition to-day. Fire protection qualities of tin were shown by lantern slides, these being carefully selected to prove not only the insulation afforded from fire attack from within and without but also the action of a falling roof as a blanket to the burning débris.

A paper on the "Cost of Conducting Business" was presented by B. F. John and then the secretary read the report of W. R. Taylor, chairman of the warm air furnace committee. This brought out a most interesting discussion which seemed to show that the falling off in the furnace business of the country has been due in large measure to the failure of the dealer to co-operate with the manufacturers.

On the last day of the convention the Committee on By-Laws reported a series of new by-laws for the operation and management of the National Association and provided for a state association. It was arranged that a committee of five should revise the by-laws and place copies in the hands of the members. Discussion on prices for different kinds of work occupied the balance of the morning session of that day.

Exhibit of Articles Entered in Prize Contest as Examples of Workmanship to Show Proficiency of Trade School Pupils, Apprentices and Journeymen

Election of Officers

In the afternoon an executive session was held with the trade press present. President Hussie appointed a committee on a revision of by-laws and then the election of officers for the ensuing year occurred, resulting in the following choice:

President—John H. Hussie, Omaha, Neb.

First Vice-Pres.—Robert G. Braley, Providence, R. I.

Second Vice-Pres.—Christian Specht, Los Angeles, Cal.

Third Vice-Pres.—Julius Gerock, St. Louis, Mo.

Fourth Vice-Pres.—W. C. Torbett, Waco, Texas.

Secretary—Edwin L. Seabrook, Philadelphia, Pa.

Treasurer—W. A. Fingles, Baltimore.

Trustees

A. Holtman, Kansas City; August Bock, Syracuse, and B. F. John, Philadelphia.

It was decided to hold the next convention of the association in Washington, D. C., and after the newly elected officers were installed the convention adjourned. Immediately thereafter the new board of officers met and organized.

The banquet was held at the Planters Hotel on the evening of June 13 when 350 were present.

Exhibition of Articles Entered in Prize Contest

A new feature of the gathering of sheet metal contractors was the exhibition of articles entered in the contest for prizes as examples of workmanship to show the efficiency of trade school pupils, apprentices and journeymen. The exhibits included many articles that required both skillful handicraft and a mastery of the principles of pattern drafting in their production. The delegates made a careful inspection of the work and recognized in it promise of capable workmen for the future. The largest number of the exhibits came from Philadelphia, where special encouragement has been given to apprentices to attend the trade school and naturally the largest number of prize winners are in the city of Brotherly Love. In the half-tone engraving is shown the prizes donated in the handicraft and pattern drafting contests.

There were upward of 40 exhibits of furnaces, tin plate, sheet metal and manufactured goods in the well-lighted hall in Suburban Park and much of the pleasure enjoyed at the convention was through social and business reunions held among the exhibits.

Some of the Exhibits

Some of special interest to the readers of the *Building Age* include the following:

The Keasbey & Mattison Company, Ambler, Pa., had for its representatives F. E. Craig, manager St. Louis branch, and R. V. Aycock, sales department. The exhibit consisted of asbestos "Century" shingles and corrugated roofing. Other specialties of many asbestos lines were shown and samples of asbestos in the rough.

The Richards-Wilcox Manufacturing Company, Aurora, Ill., was represented by A. S. Fullers, of the Seidel Manufacturing Company, St. Louis, the agents for the first company. The exhibit consisted of a firedoor hanger equipment, samples of pulleys for metal frames and models of parlor and barn door sliding hangers.

The Standard Ventilator Company, Lewisburg, Pa., exhibited its "Standard" rotary ventilator in the space devoted to its St. Louis distributors—the Stockhoff Supply Company. The construction of the ventilator consists of a cone and hood. The ventilator rotates on a vertical pointed stem, claimed to be more sensitive in its action than any roller bearing. The hood, by wind action, is always facing away from the wind and affords a greater capacity than that obtained at the base of the cone.

The Wheeling Corrugating Company, Wheeling, W. Va., had a most imposing exhibit—a regular rest room properly roofed and metal-covered inside and out. Chairs à la Rockaway gave asylum to aches and tables afforded a place on which to write orders.

A. Friedley, of the Friedley-Voschardt Company, 735 South Halsted street, Chicago, Ill., was greeted by many buyers of the stamped metal ornaments and ceilings made by the company.

The Braden Manufacturing Company, Terre Haute, Ind., made an exhibit of galvanized roofings and crestings and miters. Four specialties were shown. 1. An improved multi-V lap-steam roofing, leak proof in any pitch of the side seams owing to its extended V construction. 2. A lock-seam leak-proof roofing. 3. A reinforced double-seam two-piece miter. 4. An adjustable ridge-roll. Nos. 3 and 4 are claimed to be unique. All four have been recently patented.

The Brock Bros. Manufacturing Company, 6342 Audrey avenue, St. Louis, Mo., exhibited a compact cement roofing-tile machine in operation and a part of a roof with the products in place. Special literature on costs of operation and qualities of the products was distributed.

The Hammond Sheet Metal Company, Second and Cass avenue, St. Louis, Mo., had an exhibit made of American Ingot iron built up of square corrugated conductors and elbows.

The Hart & Cooley Company, New Britain, Conn., exhibited steel lockers, steel floor and side-wall registers.

The Stark Rolling Mill Company, Canton, Ohio, had an exhibit consisting of a lecture room in which an excellent stereopticon talk was given at regular intervals, the subject being evolution of "Toncan" metal from "ore to store."

The Symonds Register Company, St. Louis, Mo., had a distinctive and select appearance. The chief talking points of the Symonds exponent were greatest capacity, simplest and most minute adjustment, elasticity of adaptation to all building conditions, labor-saving in installation and artistic appearance. Special interest was displayed in the Symonds bolt and screw attachment for register installation.

The N. & G. Taylor Company, Philadelphia, Pa., made what may be termed a quality display, which focused on the three leading brands of roofing ternes—"Target and Arrow," "Taylor's Special 40-lb. Coating" and "Columbia Extra Coated." These were shown to advantage against a dark green background brilliantly illuminated by a projecting reflector on art-gallery display lines.

The Excelsior Steel Furnace Company, Chicago, lived its convention life in a bungalow built of rectangular heater pipes in such a manner as to show the self-locking qualities of the product. A. G. Scherer, the superintendent of the factory, and Charles E. Glessner, secretary of the company, were able expositors of "Excelsior" values. A new stud-strap was shown that caught the eye and buying favor of many practical men.

The Allith-Prouty Company, Danville, Ill., exhibited firedoor hardware, "Reliable" hangers, refrigerator latches and trolley-door hangers. Many of the conventioners were interested in these lines as suitable for application in special work available to them.

W. D. Elliott attended the convention on behalf of the National Paint & Varnish Company, Cleveland, Ohio. This firm makes a specialty of sheet metal and structural paint.

The Star Heating & American Fire Escape Company, 294 Forest Park Boulevard, St. Louis, Mo., made a display of three "Star" furnaces in three different sizes.

F. O. Schoedinger, Columbus, Ohio, exhibited fireproof metal windows and metal ceilings. He called attention to the Universal lock-joint construction. The panels and plates are tongued and grooved on all four sides, concealing all nailing. Stress was laid on economies in erection and furring secured by use of "Universal" products.

The Haynes-Lagenberg Manufacturing Company, St. Louis, Mo., exhibited a schoolhouse heater and a furnace, both of the well-known Front Rank brand.

Enclosed Metal Buildings

A Bulletin recently issued by Rudolph P. Miller, Superintendent of Buildings, makes announcement that one-story structures not exceeding 15 ft. in hight or 2000 sq. ft. in area may be erected in the Borough of Manhattan, New York, provided the frame work is entirely of steel and the material of the walls and roofs is of sheet metal or other approved incombustible material. Before such structures are erected, however, the proper application and plans must be filed with the Bureau in accordance with Section No. 4 of the Building Code.

New Publications

Principles of Heating.—By William G. Snow; 224 pages. Size, 6¼ x 9¼ in. Many illustrations. Bound in board covers. Published by David Williams Company, 239 West 39th Street, New York City. Price, $2.00 postpaid.

The matter contained within the covers of this book consists largely of a collection of articles by the author which have appeared from time to time during recent years in the *Metal Worker, Plumber and Steam Fitter*—a journal published from the same office as the *Building Age*. These contributions have been supplemented by reprints of articles relating to heating prepared by other writers and included in the work are the results of tests made by the author on heating apparatus and systems, together with numerous tables and charts which he has found to be of practical use in the solution of heating problems. Considerable space is devoted to vacuum and vapor systems of heating and special stress has been laid on the application of the heat unit to the solving of heating problems. The work is one which the heating engineer, architect and the ambitious builder will find valuable for study and also as a book of reference.

Economics of Contracting.—By Daniel J. Hauer; 270 pages. Size, 6 x 8¾ in. Illustrated. Bound in board covers. Published by E. H. Baumgartner. Price, $2.50, postpaid.

Those who are engaged in doing contract work are likely to find within the covers of this volume much that is of interest and suggestive value. The matter consists essentially of a treatise for contractors, engineers, superintendents and foremen engaged in engineering contracting work, and it is comprised in ten chapters. The information given is based entirely on the author's personal experience and on knowledge gleaned from others—in many cases from men younger rather than older than himself.

At the outset the subject of contracting as a profession is discussed, reference being made to partnerships, to the advantages of sub-contracting, payments on contracts, ownership of construction materials, etc. Various forms of contract constitute the basis of the second chapter, these covering also percentage contracts, cost plus a fixed sum contract, assessment contracts, legal features of contracts, etc. The business and clerical ends of contracting require two chapters for their consideration, while contractors' workmen absorb the attention of the reader through another chapter.

In connection with all large work, more especially where it is located away from a city, construction camps are necessary, and how these are selected and maintained is described in attractive style. The management of contracts and contractors' outfit and plant come next in order, while the concluding chapter is devoted to personal information for the contractor. The work is one which the enterprising and progressive contractor will find a valuable addition to his library of technical books.

Inexpensive Bungalows.—96 pages; oblong in shape. Size 10½ x 7¼ in. Bound in illuminated paper covers. Price 50 cents.

This is the eighth edition of an attractive little work carrying a series of inexpensive designs of Bungalows ranging in cost on the Pacific Slope from $1000 to $2250. The plans presented have been used in building many times, but as is well known the cost of executing a design varies greatly with the location and the prevailing conditions of labor and cost of materials. The designs represent typical California homes and have been prepared and executed by the Los Angeles Investment Company, who, however, do not build outside the immediate vicinity of Los Angeles. In connection with each design a photo-reproduction of the exterior is presented together with floor plans and brief description.

Death of Superintendent John Thatcher

Supplementing the very brief announcement which appeared in our last issue of the death of John Thatcher, superintendent of the Bureau of Building for Brooklyn, N. Y., it may be stated that Mr. Thatcher with a young Italian apprentice stood on a narrow scaffolding on the third floor of a building and near an open well to be filled by a stairway. He was inspecting the construction work of a row of buildings on New Lots Avenue near Snediker Avenue, when the scaffolding suddenly gave way and the two men were precipitated into the cellar, a fall of some 40 feet. The superintendent suffered a fracture of the spine and hemorrhage of the brain and died a few hours later at the Bradford Street Hospital, where he had been carried.

Mr. Thatcher was born in Egremont, England, 59 years ago and came to this country with his parents when he was ten years old. He was well known as a builder in Brooklyn and was a member of the contracting firm of John Thatcher & Son, but withdrew from the firm after being appointed Superintendent of the Bureau of Building. He erected the Brooklyn Academy of Music, the Hebrew Orphan Asylum of Brooklyn, the new Dime Savings Bank, Erasmus Hall, the Polhemus Clynic and many school buildings.

The funeral services were held in the afternoon of June 21 at his late residence, 590 Flatbush Avenue, Brooklyn. Employees of the Bureau of Building marched in a body to the house, led by Borough President Alfred E. Steers and escorted the body to St. Marks Episcopal Church. Services were conducted by Rev. E. Humphries, pastor of the First Primitive Methodist Church, of which Mr. Thatcher was one of the founders. The interment was in the family plot in Greenwood Cemetery. Representatives of the Mechanics and Traders' Exchange; the Brooklyn League, the Builders' Association and the Master Plumbers' Association attended the services.

Use of Paper Under Tin Roof

Supplementing the discussion which has appeared in these columns on the use of building paper under a tin roof we present the following views as contributed by the N. & G. Taylor Company, Philadelphia, Pa.

Regarding the use of paper under tin roofing, we would say that inquiry made among the sheet metal roofing trade shows that opinion is divided upon this question. We think it unnecessary to use any paper at all under the tin unless the roof covers a power house, boiler house, laundry, kitchen, bakery, stable or similar building where moisture, smoke or fumes are likely to reach the underside of the tin. In such cases we recommend a layer of neutral waterproof paper, well lapped, under the tin. We understand on good authority that waterproof black Neponset paper contains nothing injurious to the surface of the metal. Tar paper should never be used. It contains free acids. sulphur and corrosive substances. Rosin-sized sheathing paper is an old favorite, but we can see little if any advantage in using it except to give additional warmth, or to deaden the noise of rain.

We think it preferable to lay the tin directly on the sheathing boards, assuming that these are of well seasoned, matched lumber of even thickness, with close joints, or better still, tongued and grooved or splined.

We cannot recommend the use of tar paper even with neutral paper on top to keep it from contact with the tin. Under the heat of the sun the corrosive elements may be drawn out of the tar and soak into the paper above, or condense on the underside of the tin, with injurious results.

Death of Henry R. Braunsdorf

Henry R. Braunsdorf, president of the Braunsdorf-Mueller Company, manufacturer of mechanics' tools, Elizabeth, N. J., died at his home in that city June 18 in his fifty-first year after an extended illness. Mr. Braunsdorf began his business career as a stock boy with Hammacher, Schlemmer & Company, of New York, in 1882, rising eventually to the responsible position of buyer in this representative house, which deals largely in mechanics' tools and general hardware. In 1898 Mr. Braunsdorf associated himself with Charles F. Mueller, who was then conducting a tool manufacturing business under the name of the Charles F. Mueller Company. Mr. Braunsdorf became at that time one of the firm and later the business was incorporated under its present title.

For ten years Mr. Braunsdorf had been president of the Braunsdorf-Mueller Company, but for the past two years, owing to illness, he was unable to take an active part in the affairs of the company, although he still remained as its head. Mr. Braunsdorf was a brother of the men who constitute the firm of Braunsdorf Brothers, hardware merchants at Broadway and 139th street, New York.

Melbourne Workingmen's College

The prospectus for 1912 of the Workingmen's College at Melbourne, Australia, shows in comprehensive manner the courses of study in various branches, together with other information pertaining thereto. The course in building construction covers three years, during the first of which problems in carpentry, brickwork, joinery, masonry, plumbing, etc., are all carefully worked out to scale by the student. In the second year attention is given to work in the higher stages throughout all the trades, and there are lectures on the nature, properties and application of materials with special attention to new methods of construction. In the third year the arrangement and construction of buildings in relation to health are taught; also construction in iron and steel, shoring, underpinning, etc., together with specifications, quantities and estimating.

There is a three years' course in architecture and architectural drawing; a one year's course in architectural perspective and a one year's course in practical plane geometry.

Instruction is given in manual training, and there are trade classes in a great variety of branches, including carpentry and handrailing, plumbing and gas fitting, pattern making, painting, etc., etc.

Mammoth Entrance to an Apartment House

The new apartment house which is approaching completion at the corner of Park Avenue and 78th Street, and which was designed by Architects George and Edward Blum, has an entrance hall of unusual dimensions. It comprises a vestibule 16 ft. wide and 21 ft. long leading to a corridor 12 ft. wide and 86 ft. long, and from which opens the hall proper 24 x 32 ft. All this is treated in marble and cut stone in the Renaissance style of architecture with ornamental pilasters and beamed ceiling.

A Large Steel Girder

In connection with the erection of the Empress Theater, Portland, Ore., the girder which is employed as the balcony truss and having a span of 90 ft., with a total depth of 11 ft. 6 in., is one of the largest ever used in building construction in that section. It is designed to carry a maximum load of 750 tons, including its own weight of 61 tons. The truss supports the entire balcony floor and part of the third floor, which is arranged for offices and the ground foyer.

A Master Builders' Exchange has been organized in the city of Camden, N. J., with offices in the Goff Building, 23 and 25 Broadway, that city. The objects of the Exchange are the encouragement and protection of building interests in Camden.

At a meeting of the State Board of Architects recently held in Jersey City, N. J., Charles P. Baldwin, of Newark, was made president and William A. Klemann, of Trenton, secretary-treasurer.

CONTENTS.

What Builders Are Doing

Bird's-Eye View of Building Situation in Leading Cities -- Permits Issued and Estimated Value of the Projected Improvements

BUILDING operations continue to show a fair degree of activity as the season progresses, although the gain in June over the same month last year is not quite half the increase which building operations in May showed over May, 1911. This bears out the general tendency manifest from year to year, which is that the bulk of the plans for new buildings are generally filed in April and May, from which time forward there is a gradual lessening of activity so far as the planning of new work is concerned. Reports from various sections of the country for June indicate that here and there building is being conducted upon a scale greater than ever before in the history of that particular locality, but in the case of important cities the number showing decreases is fully equal to the number showing increases over June a year ago. Taking the entire country June indicates a gain of something less than 10 per cent. over the same period last year, and in view of the generally conservative attitude of business and the uncertainties involved in the political outlook the showing may be regarded as gratifying.

Some of the more important cities showing an increase over June last year in the estimated cost of the building improvements for which permits were issued are Chicago, Detroit, Kansas City, Milwaukee, Los Angeles, Salt Lake City, Buffalo, Rochester, N. Y.; Spokane, Wash.; Worcester, Mass.; Hartford, Harrisburg and Indianapolis. On the other hand decreases are shown in Baltimore, Cincinnati, Cleveland, Columbus, Dallas, Texas; Des Moines, Iowa; Minneapolis, Nashville, New Orleans, New York City, Pittsburgh, Portland, Ore.; San Antonio and Chattanooga.

For the first half of the current year the gain in building activity as compared with the first half of last year is a trifle more than 10 per cent. Here comparatively few of the large cities show a lessened activity, these including Cincinnati, Baltimore, Dallas, Texas; Indianapolis, Memphis, Minneapolis, Philadelphia, Portland, Ore., and Spokane, Wash.

Baltimore, Md.

The noticeable feature of current building operations is the number of two-story dwellings for which permits are being issued from the office of Building Inspector Stubbs. During June there were more than 100 permits for buildings of this character and for the first half of the year the number runs up to 1334. According to the figures for June building improvements were projected estimated to cost $505,000, which with the alterations for which plans were filed gives a total for the month of $703,620.

Of the total of new improvements $256,050 was the estimated cost of 102 brick dwellings and $56,200 was for 13 frame dwellings. There were 6 warehouse buildings planned costing $63,250, an office building costing $50,000 and two apartment houses costing $61,000.

For the first half of the year plans were filed for 1274 two-story brick dwellings costing $2,021,839 and for 60 two-story frame dwellings costing $292,100. There were also 38 brick dwellings three stories in hight for which permits were issued estimated to cost $189,500. There were six apartment houses planned costing $127,000 and 45 warehouse buildings costing $806,398. The total for the first half of the year was $3,686,872, adding to this the estimated cost of the 4115 alterations and 848 additions for which permits were issued gives a grand total for the first half of $4,653,292.

Buffalo, N. Y.

The number of permits issued by the Bureau of Building for June and the investment value represented in them was above the average, the monthly report showing 444 permits estimated to cost $2,226,000. This is a gain of 130 per cent. over June, 1911, when the permits numbered 363 and the valuation totaled $968,000, and a gain of 18 per cent. over May, 1912, when the valuation was $1,889,000.

One reason for the large figures for June was that they included municipal work aggregating over $900,000 for the new technical high school and two large school buildings.

Among other important structures included in the June permits are the following: Store, loft and light manufacturing building, located at South Division and Oak Streets, from plans of Colson & Hudson, to cost $100,000; Curtiss store and loft building on Franklin Street, to cost $150,000, from plans of Architects Waterbury & Mann. There were also permits issued for a warehouse and freight terminal building for the Buffalo Terminal Warehouse Company, 130 x 300 ft. and 180 x 300 ft. respectively, on Buffalo River, to cost $300,000; four-story factory, 125 x 180 ft. for the Crosby Company, from plans of Architect Robert J. Reidpath.

There were also included two additional one-story factory buildings, each 150 x 200 ft., for the Beaver Company, Military Road, Beaver Road and New York Central Railroad; a three-story factory, 50 x 210 ft., for the United States Home Company, Tonawanda Street and New York Central Railroad, from plans of Architect G. Morton Wolfe; a church edifice of stone at West Ferst Street and Elmwood Avenue from plans of Architect George C. Gould, to cost $70,000 for the Church of the Redeemer, Lutheran; Cedar Street Mission Chapel for the Lafayette Avenue Presbyterian Church, to cost $15,000; church and Sunday school room for the Evangelical Christ Church, Baitz Avenue, and a chapel for the United Brethren Society on Northrop Street. A good showing of dwellings and small apartment houses is also made.

Canton, Ohio.

During the month of June there were 56 permits issued for buildings of all kinds with a valuation of $131,050. Comparison for this half of the year with the first half of 1911 shows some advancement in favor of 1912. The permits issued in 1911 were 376, with a valuation of $699,650, while the permits for the first half of 1912 were 341, with a valuation of $792,783.

The trend in the building business seems to be for a better class of structure than in the past. Brick is being used more extensively and it seems that the home brick manufacturers are getting the preference in the way of manufactured products. While things are rather quiet just at present, yet indications are for a general resumption of building operations during the next few months.

Considerable good work is in prospect and while not far enough advanced for estimating, yet builders will not be idle much during the fall months, if all reports are true.

There is some talk of building another large theater with an expenditure of $200,000, also a clubhouse for the Young Men's Catholic Club, with an approximate expenditure of $60,000.

The city is preparing to erect one or two engine houses for auto apparatus, and is also considering the erection of a pumping station.

Judging from the work already begun and the amount in prospect, it is believed that the building operations for July will show an increase both in number and in valuation over the reports of 1911.

Chicago, Ill.

All records for building construction in the city of Chicago were broken during the first six months of 1912. In this period 5468 permits were issued, with a total frontage of 147,508 ft. and a total valuation of $40,892,500.

A conspicuous feature of this year's remarkable record is the fact that since the first of January not a single permit has been issued for the construction of a large downtown building. Permits for the many large structures that are now going up in the business district were taken out prior to September 1, 1911, when the ordinance limiting the height of building to 200 ft. became effective.

In view of these circumstances the records for this year show an astounding growth in outside Chicago. The South Side has led in the development of the outlying sections of the city. During the month of June 431 permits were issued for buildings on the South Side, which will have a valuation of $4,234,700.

June, 1912, shows a record of 1271 permits issued, with a frontage of 35,441 ft. and a valuation of $10,653,900. June, 1911, held a record of 1081 permits issued, with total frontage of 28,460 ft. and a valuation of $7,126,100.

As already stated, 1912, up to July 1, shows a building record of upwards of $40,000,000. The record for the same period last year was $37,391,100, representing 5172 permits and a frontage of 138,877 ft.

An unusual degree of activity prevails in all branches of the building business and the work for which permits were issued in June shows an advance of practically 50 per cent. over the same month a year ago. A noticeable feature of the situation is the difficulty which builders have been experiencing in securing excavators—a phase of building operation which would seem to be the least complicated of any and therefore involving only ordinary labor in its execution. Capital appears to be plentiful for building operations, but there are no notable concessions in prices of materials.

Cincinnati, Ohio.

While there was some improvement in building operations in the city during June there is not the desired activity. There were 1325 permits issued for building improvements in that month valued at $814,346, while June, 1911, held a record of 1056 permits, with an estimated valuation of $2,271,480. However, it must not be overlooked that the excellent showing for last year is attributable to the new city hospital buildings, valued at more than $1,500,000.

There has been considerable uneasiness in building circles over threatened and existing labor troubles. Skilled labor is scarce, and the demands made on a number of contractors for higher wages are excessive.

Residence building in Oakley and Norwood suburbs, which are separate municipalities, is very brisk and there are also two manufacturing plants planned.

The contract for the proposed twelve-story Gibson Hotel has been let to the Wells Bros. Construction Company, of Chicago, Ill., and work on tearing down the old structure will be commenced at an early date.

Cleveland, Ohio.

The building activity is holding up in a satisfactory manner. The amount of new work that came out during the first six months of the year was about the same as during the corresponding period of 1911. The number of permits issued during the first half of this year exceeded those of the first half of 1911, but the first six months of the present year falls slightly behind in the total estimated cost of new buildings. During the first half of this year there were 4346 permits issued for new buildings to cost $7,203,702, while during the first six months of 1911 there were 4153 permits for buildings to cost $7,687,179.

During June 949 permits were issued for buildings to cost $1,669,379; of these 237 were for frame buildings to cost $691,760; 62 permits were for brick, stone and steel buildings to cost $711,825, and 650 permits were for additions to cost $265,794. The June figures show a slight falling, both in the number of permits and the estimated cost as compared with May.

Denver, Colo.

While there has been no perceptible let up as regards the number of new buildings planned during the month just closed as compared with June last year, there has been an appreciable falling off in the individual cost. According to the figures of the Bureau of Building Inspection 209 buildings were planned for June estimated to cost $356,355 and in June a year ago 208 buildings were planned calling for an estimated outlay of $587,500.

Jacksonville, Fla.

The work of building construction goes forward with increased vigor and the month of June showed a marked improvement over the building operations which were planned in May. The report of the Building Commissioner shows that permits were issued in June for 93 frame buildings to cost $148,819 and 17 brick buildings to cost $103,650 or a total of $252,469. In May the total was $190,652.

Since the great fire which practically destroyed the city 11,596 frame buildings have been planned and 925 brick and stone structures, giving a total of 12,521.

Los Angeles, Cal.

The report of Chief Building Inspector J. J. Backus for the fiscal year just closed shows the greatest record of building in the history of Los Angeles. Permits issued during the year numbered 14,593, with a valuation of $26,161,886, compared with 10,960, with a valuation of $21,499,424 for 1910-11. The department collected fees amounting to $62,386.05, a balance over expenditures of $13,652.26. Mr. Backus reports little difficulty in enforcing the building laws, but recommends more publicity concerning the requirements.

During the past month 1392 permits were issued for buildings with an aggregate value of $3,488,337, compared with 933 permits with a value of $2,790,521 for June of last year, and a valuation of $2,227,861 for May of this year. The previous high record was in April, 1910, when 930 permits were issued, with a value of $3,360,577.

Analysis of the record shows 592 permits for dwellings, with a value of over a third of the total; another third being made up of reinforced concrete and Class C buildings. Only five buildings of the total averaged over $100,000 each in value, including the one steel frame and four of concrete.

This remarkable record was made in the face of a strike in the building trades, 1500 men affiliated with the building trades council, who were working on open shop jobs, being called out June 13, stopping work on half a dozen buildings. The trouble affected only jobs on which non-union men were employed, and the places of the strikers were filled with little difficulty.

Plans of the following buildings will soon be ready for figuring: a 13-story structure on Broadway near Seventh street to cost about $750,000, Train & Williams, architects; a 13-story Class A store and loft building on Seventh street near Grand avenue, J. C. Austin and W. C. Pennell, architects; a 12-story office building for the Merchants' Fireproof Building Company at Sixth and Spring streets, Wm. Curlett & Son of San Francisco, architects, and the Westlake Hospital at Alvarado and Orange streets, to cost $200,000, Frank L. Stiff, architect.

Eight Architects submitted plans for the new East Side high school, that of E. H. Cline being accepted. The estimated cost is $150,000, the building being of brick.

At the annual election of the Builders Exchange the following officers were selected for the ensuing year:

President..........................John H. Bean.
First Vice-President.................P. J. Bolin.
Second Vice-President..............John Hayes.
Third Vice-President............B. D. Kronnick.
Treasurer...........................John Griffin.

During the year a large number of new members have been added to the organization and the total is now rapidly approaching the 200 mark.

Louisville, Ky.

The building situation has shown a greater degree of activity during the month just closed than has any corresponding period in the history of the city. According to the report of Building Inspector Tilford for the month of June permits were issued for improvements which will involve an estimated expenditure of $810,000. In June last year the figures were $365,200 and in June, 1910, they were $438,000. From present indications the operations for 1912 will establish a record in the building line.

New York City, N. Y.

The local building situation shows the estimated cost of the work planned last month to have been slightly more in the Boroughs of Manhattan and the Bronx than was the case in June a year ago, while in Brooklyn the situation was the reverse of this. The increase in the Borough of Manhattan has been due largely to the greater cost of apartment house construction, an increase in the number and cost of places of amusement; a slight gain in the cost of store and loft buildings, as well as a greater expenditure in the way of hotel construction. The report of Rudolph P. Miller for June shows 80 buildings to have been planned calling for an estimated outlay of $12,110,650, while in June last year 94 buildings were planned to cost $11,257,550.

From this report it is learned that there were 12 apartment houses planned costing $3,185,000 as against 15 buildings of this class planned in June last year calling for an cost $3,450.000 for which permits were issued in June a outlay of $2,413,000. There was a slight falling off in office building construction, four having been planned last month to cost $2,975,000 as against 9 office buildings to year ago. Of places of amusement 14 were planned to cost $1,115,000 and in June a year ago 7 were planned involving an estimated outlay of $441,000. To these totals must be added the cost of alterations which for the two periods named was $1,048,978 and $1,353,118 respectively.

Some of the more important improvements for which permits were issued in June are the 12-story addition to the Hotel Prince George, having a frontage of 75½ ft. and a depth of 88 ft., estimated to cost $450,000; an 11-story store and loft building at the northwest corner of Fifth avenue and 36th street, covering an area 31 x 124 ft. and costing $250,000; and a 3-story theatre in 46th street, 200 ft. east of Eighth avenue, having a frontage of 107 ft. and a depth of 82 ft., estimated to cost $130,000. The theatre building will have a façade of terra cotta with a massive arched entrance, at the apex of which will be a large bust of Shakespeare. The total seating capacity will be about 1000 people. Thomas W. Lamb is the architect.

In the Borough of the Bronx the proportionate increase has been about the same, the figures being $3,670,947 for June this year and $2,774,735 for June a year ago. Here the feature of the operations has been the planning and erection of tenement houses as contrasted with a falling off in the number of detached dwellings.

A comparison of figures for the Borough of Manhattan and the Bronx for the second quarter of this year as compared with the corresponding three months of last year will be found upon our editorial page.

In Brooklyn the shrinkage in the planning of buildings in June as contrasted with the same month a year ago is very appreciable, permits having been taken out last month for 1000 buildings costing $3,065,600, while in June a year ago permits were issued for 1330 buildings to cost $5,167,200.

There has been a decided revival of activity in the building line in the Borough of Queens, more especially in Long Island City and vicinity. An unusual number of apartment houses have been planned and these together with the detached dwellings which are projected in various sections of the borough bring the total up to very fair figures. For the second quarter of the year there were 1,450 buildings planned involving an outlay of $5,340,897. July started out with increased operations as compared with the same period last year and there is every indication of the rapid growth of this borough.

Oakland, Cal.

While the month of May was one of the most active ever experienced by the building trades in this city, the official valuation being $1,304,734, the volume of new work coming out in June has fallen back to about the same figures as for March and April, the record being $758,430 as compared with $759,392 for April. The total for June, 1911, was $656,791, showing a good balance in favor of this year, and the record of the half-year as a whole is far above the same period of last year.

The number of permits is also smaller than for May, being 294 as compared with 387, and of the total number 115 were for alterations, etc. Of the remainder, 120 were for dwellings, with a value of $273,953. The highest single valuation for the month was on a 5-story brick and steel lodge building, to cost $100,000, the remainder being made up of miscellaneous frame and Class C buildings.

Among the principal buildings planned for early construction are the following: a 7-story office building at San Pablo avenue and 20th street, to cost about $100,000, Wollett & Wollett, architects; a 7-story Class A building for P. J. Walker, contractor, on Franklin street near Twelfth; a physicians' and dentists' building, 7 stories, to cost $125,000, C. W. Dickey, architect; and a 4-story brick and steel building for the Little Sisters of the Poor on E. 14th street near 26th avenue, to cost $150,000.

Plans for the new manual training and commercial high school, to be erected on Broadway between 42d and 45th streets, at a cost of about $600,000, have been presented by Supervising Architect J. J. Donovan and approved by the Board of Education. The main building will be of steel and concrete, with accommodations for 2,500 students. The plans show a curved-wing building fronting on Broadway, with separate laboratories, shops, foundry and gymnasium in the rear, connected by covered passages.

On recommendation of Wm. J. Baccus, commissioner of streets, the city council has adopted the following amendment to the building ordinance:

"Walls of concrete blocks or brick may be built of a thickness of not less than 8 in., provided that vertical steel rods of not less than ½-in. diameter and spaced not less than 24 in. apart be used in reinforcing the walls. No walls exceeding a hight of 14 ft. in each story may be constructed under this amendment."

This amendment is intended to permit cheaper and supposedly more efficient construction than the former regulation regarding walls.

Portland, Ore.

After a short period of activity something of a slump has occurred in building operations, the record for June being the lowest since January. In April the total valuation of permits reached $2,046,785, while the June total was only $1,176,605, compared with $1,622,276 for May and $1,850,000 for June of last year. The record for the first half-year is hardly as good in value as in 1911, though there has been a gain of nearly 40 per cent in dwellings, and the number of permits for the six months is 1,000 higher than for the same period last year.

The outlook, on the whole, is encouraging. There has been some delay in taking figures on the numerous business buildings for which plans have been drawn, but several business houses will now build immediately.

One of the finest buildings planned for the immediate future is the new public library, Doyle, Patterson & Beach, architects. It will contain 3 stories and basement and be 156 x 172 ft. in plan. The exterior will be of brick, with limestone trimmings, and aside from a little marble stair work little expense will be placed on decorative details, the style being simple Georgian. The cost is estimated at $450,000, and figures are now being taken.

The finest apartment house yet planned for Portland will be built by the Wauna Land Company on Davis street near 21st. It will be 7 stories high, of fireproof construction, and will cost about $350,000. Whitehouse & Fouilhoux are the architects.

Plans have been completed for the 2-story Ainsworth School, of reinforced concrete with pressed brick facing, to cost about $75,000.

Other important buildings to be figured shortly are a 10-story reinforced concrete building for the Multnomah Security Company at Seventh and Morrison streets, to cost $170,000, McNaughton & Ray, architects; and a large factory building for the Ford Motor Car Company, for which Doyle, Patterson & Beach are architects.

Philadelphia, Pa.

Records available show the volume of new business undertaken during the first half of 1912 to have been smaller by $3,642,555 in estimated cost than that during the same period in 1911. While the entire loss cannot be attributed to the falling off in dwelling operations alone, the decline in two story houses represents more than the total decrease between the aggregate totals for the two half yearly periods. The slow movement in the disposition of the smaller dwelling houses in some sections of the city has been a strong factor in retarding aggressive building work in the smaller houses during the past spring and owing to the same conditions builders have had more difficulty in financing such operations. In certain districts in which the development has heretofore been somewhat restricted fairly large building operations have been undertaken.

Heavy operations in hotel and office buildings in the central section of the city have brought statistics up to a considerable figure, without which the showing for the first half would have been rather meagre. From statistics compiled by the Bureau of Building Inspection it is shown that during the past six months work was begun on 7,892 operations, costing approximately $19,349,205, as compared to 9,762 operations costing $22,991,760 in the first half of 1911. Comparative figures for dwelling house operations show the following: First six months, 1911, operations in two story dwellings 5,003, approximate cost, $10,019,375; three story dwellings 697, costing $3,181,755, while during the first half of the current year two story dwelling operations numbered 2,962 at an estimated cost of $6,335,495; three story dwellings 273, costing $1,641,640, representing a falling off this year in this class of work alone of $5,223,995 in approximate cost. From these statistics it is to be noted, however, that the character of the work is on a somewhat higher plane. In average cost there has been an increase of over $125 per house, the building of the smaller so-called "cheap house" being less in evidence.

In tenement or apartment house construction a slight gain is shown in favor of the past six months. The total expenditure, $502,000 in the first half of 1911, as compared to $532,000 during the past six months, should they be included in the dwelling house statistics, would have had but little bearing as far as the general total is concerned.

During June the Bureau of Building Inspection issued permits for 1,406 operations at an estimated cost of $3,877,535, slightly less than was shown for the previous month. The largest single operation was that of the new Hotel Vendig, the approximate cost of which is given at $500,000. Manufacturing buildings contributed $437,000, while two story dwelling operations showed a slight gain with an estimated cost of $1,272,775.

Doyle & Company have the contract for the addition to the building of the Curtis Publishing Company. It will adjoin the present building and have a frontage on Sixth, Walnut and Seventh streets. Frank C. Roberts & Company and Edgar V. Seeler are the architects and engineers. The building will be ten stories and conform with the present structure. Its cost is estimated at $1,250,000.

Plans have been sent out by Horace Trumbauer, architect, for proposals for the erection of a building for the West Philadelphia Young Men's Christian Association at Fifty-second and Sansom streets. It will be four stories high and the cost is estimated at $250,000.

Melody & Keating have the contract for the erection of a parochial school building, to cost $160,000, for the Cathedral Parish, at 18th and Wood streets. Plans are by E. F. Durang & Sons. It will be three stories in height and measure 83 x 185 ft. on the ground plan.

Work is about to be started on a new hotel building at 13th and Chestnut streets, for the Bingham Hotel Company. The new hotel, 20 stories high, will be known as the Adelphia. Doak & Company have the contract, and the architect is Horace Trumbauer.

E. Allen Wilson, architect, is preparing plans and specifications for 56 2-story houses to be erected at 57th and Catherine streets. The sizes of the houses vary from 15 x 32 ft. to 16 x 43 ft. and will cost about $100,000.

The Girard Estate has taken out a permit for an operation of 36 2-story porch front houses to be erected at 2500 to 2534 and 2501 to 2535 South Lambert street. Each will measure 22 ft. 6 in. x 52 ft. 4 in. Heat and light will be supplied by the Girard Estate Private Power Plant.

Pittsburgh, Pa.

There is a little less building in progress in this city and vicinity than was the case in June a year ago, but the difference is more marked in the number of new buildings planned than it is in the estimated cost of the improvements. The June report of the Bureau of Building Inspection shows permits to have been issued for 159 new buildings costing $848,370, while in June last year 167 permits were issued for new buildings costing $925,853. The permits issued for additions and alterations were less this last month than was the case a year ago, and the grand total of permits for June was 379, calling for an estimated outlay of $1,109,528, as against 415, calling for an estimated outlay of $1,179,563 in June last year.

Sacramento, Cal.

A period of summer dullness has arrived with the warm weather, and while there is a considerable amount of planning and figuring for construction during the fall, current building operations are confined mainly to small jobs. Coditions, however, are good in comparison with former years at this season, the valuation of buildings for which permits were issued last month being $157,107, compared with $123,787 for June, 1911, and $88,047 for the same month of 1910. The drop from $262,174 in May is, however, rather abrupt.

The contract for the Ed. Dalton residence, Seadler & Hoen, architects, goes to T. A. McDougall, at $28,385.

Four architects have submitted designs for the projected hotel at Fifth and J streets, to be built by A. Heilbron and others at a cost of about $250,000.

An ordinance has been passed to issue $218,000 bonds for the construction of a new city hall.

San Diego, Cal.

Building contractors are still well occupied, both on Exposition work and large buildings in the city itself, but comparatively little new work has come out in the last few weeks. Building permits issued in June reached a total valuation of $669,163, compared with $803,984 for May and $645,400 for June, 1910. Thus, though there has been quite a drop from the April value, there is much more work in progress than a year ago, and the improvement is more obvious when comparison is made with the record for June, 1910, when the total was $318,520, a very good record for that time. The possibilities of San Diego, both as a business center and a residence city, are just beginning to be realized, and builders feel no anxiety as to the future.

John Hart has taken a contract to construct a concrete building on Second street, near C, for V. E. Shaw, of Los Angeles, to cost about $30,000. J. S. Siebert, architect.

San Francisco, Cal.

The local building trades have enjoyed another month of great activity. A slight reduction is noted in official valued at $2,054,542, compared with $2,229,423 for May and each month of this year shows a marked increase over the corresponding period of 1911. A slight lull may occur during the midsummer season, but fall activities will doubtless be increased by municipal and Exposition work.

Buildings for which permits were issued in June were valued at $2,054,542, compared with $2,229,423 for May, and $1,954,501 for June, 1911, the total being slightly below the same month of 1910. The total is still made up very largely of fireproof hotels, apartments and business buildings, though there is more work on office buildings than for some time past. Small apartments and dwellings in outlying districts form an increasing portion of the total value, as some large operators are building solid blocks of houses in Sunset and Richmond districts, and a few fine residences are under way. Much land is still available for this purpose within the city, and the area will be increased by the projected removal of the cemeteries and opening of Sutro Forest.

The prospect of public work is the matter of most interest to large contractors. One contract, that for the Geary street carhouse, to be of reinforced concrete, has been let to F. Rolandi at $210,000, while new figures have been called for on the State armory job, the lowest bid of $250,000, exclusive of marble facing, being considered too high. Seventy designs were presented for the $4,000,000 city hall, and the design of Bakewell & Brown, local architects, on approval of the jury of award, was formally accepted by the Board of Public Works. According to this design the dome, rising 245 ft., will be the center of circulation, in which eight elevators will be located. The style is based on the Roman Renaissance. It will be built on Van Ness avenue between Grove and McAllister streets. Detail plans will be completed as soon as possible. Local architects urge that a competition be held for plans for the other civic center buildings, including the Auditorium, but the matter has not been decided.

Prices of materials show some fluctuation, cement being about the weakest article on the list, with values very unsettled. Brick is steady as before, while lumber and steel still tend upward, both being higher than a month ago. The demand for lime, both for brick and plaster work, has increased greatly, and the market is stronger and more active than for several years. Leading dealers say that lime is still preferred to hard wall plaster by many owners and architects, and is being used in some of the finest buildings. Some large orders have been placed for marble, granite and architectural terra cotta. No serious labor trouble has occurred, and most people are willing to leave matters in *statu quo*.

The local Masons and Builders' Association held its annual election of officers July 1 at the Builders' Exchange. Those elected were: President, Thomas W. Butcher; vice-presidents, Jas. S. Fennell and M. J. Mealey; secretary, W. S. Scott; treasurer, Walter Reed.

Among the buildings on which figures will be taken shortly are a 9-story steel frame apartment, faced with cement plaster, to be built at Pine and Powell streets, at a cost of $90,000, Hladik & Thayer, architects; a 6-story reinforced concrete apartment house at Larkin and Turk streets, to cost $75,000, M. Mattanovich, architect; a 5-story brick and steel hotel and business building on Mission street, near Seventh, to cost $70,000, Henry Shermund, architect; a 6-story brick and steel hotel at Fourth and Mission streets, containing 150 rooms, to cost about $140,000, Miller & Colmesnil, architects; and a 7-story brick and steel hotel for the Sharon estate, at New Montgomery and Jessie streets, Geo. W. Kelham, architect.

Several local contractors are figuring on seven large buildings for the Indian Refining Company at Martinez, Cal. The buildings will be of steel frame, covered with corrugated iron, with concrete floors and foundations.

John Galen Howard, F. H. Meyer and John Reid, Jr., the committee of consulting architects appointed by the Mayor to report on municipal buildings under construction, have submitted a report in which it is asserted that much faulty work has been disclosed, and that estimates and expenditures have been so loosely made as to cause heavy deficits when final settlements are made.

Gallo Emil, who has been in Siam as special counselor of the king and in active charge as architect and civil engineer of the erection of a $10,000 palace for his majesty at Bangkok, arrived in San Francisco June 17. He says the interior of the palace will be palatially furnished in costly marbles and rare woods. It has been under course of construction two years, and Gallo expects to complete it in three years. Two thousand men are engaged in the work, including all the skilled artisans of the kingdom.

St. Louis, Mo.

According to the June statement of Building Commissioner J. N. McKelvey, issued on the first of July, permits were issued for new buildings and alterations calling for an expenditure of $1,931,076, which figures contrast with $1,786,176 in June last year.

The principal items last month were 96 brick dwellings estimated to cost $301,500 and 55 brick tenements costing $402,036. There were 27 store buildings planned, to cost $164,840, and two schoolhouses involving an estimated outlay of $233,500.

Seattle, Wash.

There was very little difference between last month and June a year ago in the value of the building improvements for which permits were issued from the office of R. H. Ober, superintendent of the Department of Buildings, although last month saw a slight falling off in the number of permits. According to the figures compiled in the office of the superintendent there were 809 permits taken out last month for new buildings, alterations and additions, estimated to cost \$781,915, while in June a year ago 884 permits were taken out for building improvements costing \$788,405.

A noticeable feature of the situation is the falling off in the number of detached residences planned last month as compared with a year ago, the permits being 159 and 177 respectively, while the estimated cost of the dwellings planned in the two periods was \$250,850 and \$279,425 respectively. Of warehouse and factory buildings there were seven planned last month, to cost \$296,000, and in June last year a similar number was planned, but involving an expenditure of only \$30,850. Two semi-fireproof structures planned last month call for an outlay of \$51,000, while the two which were planned in June last year involved an estimated outlay of \$210,000.

For the first half of the current year 5065 permits were issued by the department, calling for an estimated expenditure of \$4,852,990, while in the first six months of last year 5789 permits were issued, involving an estimated outlay of \$3,972,335.

Washington, D. C.

The amount of construction work planned during June was in excess of that of any corresponding month in the history of the Bureau of Building Inspection. Permits were issued for new buildings estimated to cost \$4,334,361, while in June last year the total was \$2,143,817. One reason for the large total last month was the permit for the new Arlington Hotel, which is estimated to involve an outlay of at least \$3,000,000. Eliminating this from the situation, the general run of construction work, it will be seen, is hardly up to the figures of a year ago. However, the figures make the record, and the record therefore for value of new private building commenced in any one month in the District of Columbia was established in June.

Builders' Appliances and Equipment

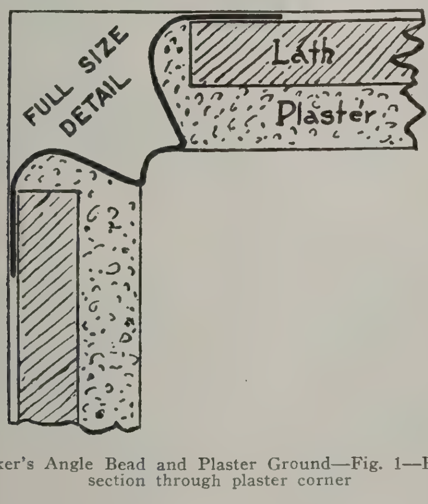
Some Things of Seasonable Interest to Those Having To Do with the Building Business

Modern Method of Finishing Walls

We have before us a copy of an exceedingly attractive *brochure* illustrating by means of color schemes the interior decoration of some of the more important rooms in a modern dwelling, also a modern school room and an attractive and dignified banking room. The prime requisite in work of this kind is "Pee Gee Flatkoatt," which is manufactured by Peaslee-Gaulbert Company, Inc., Louisville, Ky. Directions are given for properly applying this wall finish, which is a "durable hygienic interior decorative oil paint that imparts that flat, velvety-like effect so much desired in wall decoration." Not the least interesting feature of this attractive publication is two pages to which are pasted small squares of color effects as suggested for walls and ceilings of various rooms. Directions are given for selecting color schemes and a table is presented showing color harmonies of contrast and analogy. The work concludes with a short chapter on china enamel —the interior finish for woodwork.

Wittbecker's Angle Bead and Plaster Ground

The attention of architects, builders and contractors is being directed to an angle bead and plaster ground that has just been placed upon the market by W. A. Wittbecker, P. O. Box 46, St. Paul, Minn., and illustrated in Figs. 1 and 2 of the accompanying engravings. It is a well-known fact that the appearance of the interior finish of a building



Wittbecker's Angle Bead and Plaster Ground—Fig. 1—Horizontal section through plaster corner

is often rendered anything but attractive by reason of the unsanitary cracks which frequently develop in the plastered corners. They are usually of such a nature that they cannot be properly repaired, and the result is a very unsatisfactory condition as regards the appearance of the rooms. It is pointed out, however, that the objectionable cracks might have been prevented by the use of the angle bead shown herewith. The claim is made that it forms a sanitary, flexible corner and possesses sufficient elasticity to overcome the shrinkage of the greenest lumber without showing a crack. It is cold pressed between steel dies, thus rendering it absolutely true, and its use will result in a true angle in the plaster. It is said to be inexpensive and sufficiently durable to last the lifetime of the building in

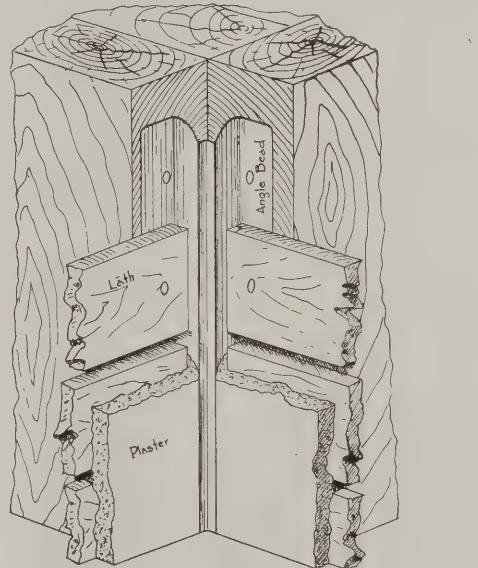


Fig. 2—View Showing Application of the Bead

connection with which it is used. In Fig. 1 is shown a horizontal section through a plaster corner provided with the Wittbecker angle bead and plaster ground, while in Fig. 2 is shown the application of the bead. The maker states that the device should be used in the angles of the ceiling of a room as well as the walls. Calcimine, paint or paper will adhere to the bead, so that it may be finished in conformity with the rest of the room.

Cabot's Protective Paint

An illustrated folder just issued by Samuel Cabot, Inc., Boston, Mass., sets forth the merits of Cabot's Protective Paint, which is intended for use in protecting iron and steel from corrosion, electrolysis and injurious chemical action. This paint has been manufactured for some little time, but it is only recently that it has been decided to add it to the maker's list of specialties under his own name. Cabot's Protective Paint is claimed to form an impervious, non-porous coating over the iron or steel to which it may be applied that entirely excludes moisture and air. It is referred to as tenacious, elastic and chemically inert, and will not decompose or disintegrate. Directions for applying the paint are given and the statement is made that one gallon will cover about 300 sq. ft., two coats.

The manufacturer has also sent out a folder relating to Cabot's Damp-proofing for direct plastering on brick and concrete, and which is said to save space, time and labor. It is said to form a perfect and permanent bond between the concrete or brick wall to which it is applied and the interior plaster, which is applied over it. It also forms a moisture-proof sheet which prevents the penetration of dampness through to the plaster. These two things are accomplished by making a compound which penetrates into the pores of the concrete or brick wall yet leaves the surface in an adhesive, "tacky" condition, so that when the plaster is laid up over it the damp-proofing is sucked deeply into its pores by the strong capillary attraction created by the drying out of the plaster. It is said to make furring and lathing unnecessary, thus giving larger rooms in a given ground area; saves time by permitting interiors to be finished at once without waiting for carpenters to fur and lath, and saves material and labor in this operation. It can be rapidly applied with a brush, and one gallon will cover from 80 to 100 sq. ft. two coats, depending upon the porosity of the surface.

Improved Level for Architects and Builders

An instrument which has been designed especially for the use of builders, architects and contractors for obtaining lines and levels for buildings, laying out angles, leveling walls, grading streets, etc., is that which we illustrate in Fig. 3 of the engravings and which is being offered by the David White Company, 419 and 421 East Water street, Milwaukee, Wis. The instrument is mounted with a telescope 12 in. in length and adjustable in the same manner as the larger levels. The lenses have a magnifying power of about 25 diameters; the object glass is 1¼ in. and is provided with four leveling screws and clamp to the spindle. It also has a horizontal circle 4½ in. in diameter fitted to the upper end of the socket and turning readily upon it. This circle is graduated from 0 to 90 each way and has a Vernier to read to 5 minutes which is screwed to the flange of the center. The eyepiece of the telescope turns in a screw-like manner, so as to enable accurate focusing of the cross-hairs.

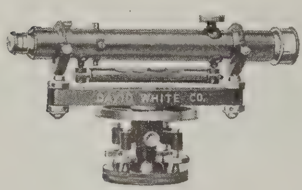


Fig. 3—Improved Level for Architects and Builders

The instrument is placed either upon a tripod or a small triangular plate called a Trivet, having three sharp steel points by which it may be firmly placed upon any surface of wood or stone. Both tripod and Trivet are furnished with the level. The company points out in connection with the instrument that the Y's have an improved locking arrangement, thus dispensing with the pin bolts. A small piece of tube called a sun-shade is furnished with each instrument, to be placed over the object glass in order to protect it from the glare of the sun.

The Stanley Shoot-Board and Plane

A tool which constitutes an important adjunct of the "kit" of tools of woodworkers generally is the combination of plane and shoot-board, sometimes called a "jack-board," shown herewith. The board is made of special iron, is of ribbed construction, and has an adjustable runway accurately machined for the plane. The swivel is indexed at 45 and 90 degrees for planing a miter or square, but it can be securely locked by means of a clamping screw at any angle desired between zero and 90 degrees, as the quadrant is graduated between these points. The swivel is also fitted with a sliding back that can be adjusted close to the plane, thus supporting the work to the edge and preventing it from splintering. It is further provided with a heavy back clamp which is designed to hold any shaped work in position to be planed. The plane, it may be stated, is especially constructed for the board and has rosewood handle and knob. The cutter is fitted with the regular Bailey adjustment for depth of cut and also has a lateral adjustment so that a cut giving any ordinary draft to a pattern can be made. As it is set on a skew it makes a very smooth, clean cut. The tool shown in general view in Fig. 4 of the engravings is made by the Stanley Rule & Level Company, New Britain, Conn., and it is pointed out that for nicety of adjustment, accuracy with which all parts are made, combined with the general solid construction, it is particularly valuable for cabinet-makers, pattern-makers, picture framers and others. The plane is 15 in. long and the cutter 2⅜ in. The entire device is 22 in. in length and weighs 17½ lb.

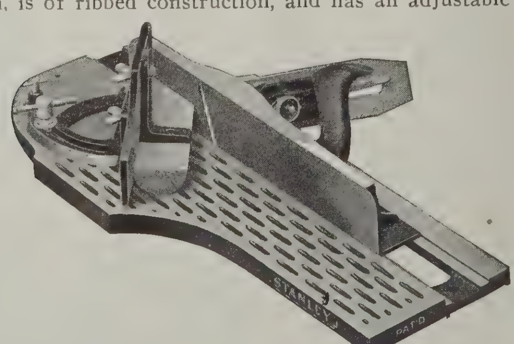


Fig. 4—The Stanley Shoot-Board and Plane

Steel Barn Door Bumper

The National Mfg. Company, Sterling, Ill., is making the steel barn door bumper, No. 16, as illustrated in Fig. 5 of the cuts. It is formed from 5/32 x 1½ in. steel, and should be attached to the building 3 in. above the center of the door by means of two 7/16 x 2 in. lag screws. It has a hinged joint which permits of easily inserting and tightening the first lag screw. The bumpers are packed 12 in a box, with necessary lag screws for applying them.

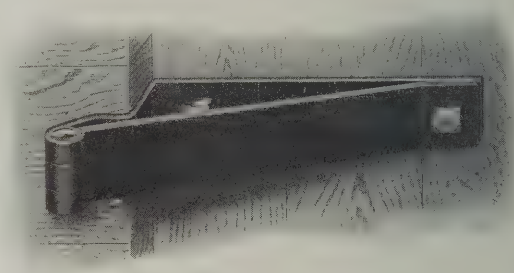


Fig. 5—Steel Barn Door Bumper, No. 16

Canton Sidewalk Doors

An attractive line of sidewalk doors the frames of which are made of a fine quality of grey iron cast in one piece and the tops are of either steel diamond plate or illuminated is being placed on the market by the Canton Foundry & Machine Company, Canton, Ohio. The solid checkered doors, shown in Fig. 6, are equipped with stay rods and chains to protect pedestrians when the doors are open, and the illuminated sidewalk door has ratchet attachments. Both types of doors are flush with the sidewalk, and there are no obstructions to trip persons walking over them. It is claimed that the diamond steel tops do not become slippery in wet or wintry weather. They are grooved to permit water to drain to the curbing and can be opened from either the inside or the outside. They can only be opened from the outside by the use of a key. The doors are of wrought steel. It is claimed that they are as near waterproof as they possibly can be made. The ratchet attachment on the illuminated doors renders them self-locking. The surface between the glass and the doors is concrete. Buyers are given a choice of several different kinds of glass. Either style of door can be had in fifty sizes.

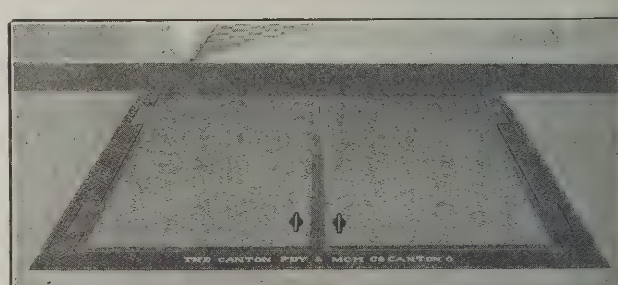


Fig. 6—The Canton Sidewalk Doors

The Perfection Concrete Mixer

The constantly growing demand for good mixers by builders doing concrete work renders more than ordinarily interesting and valuable the attractive catalogue illustrating and describing the Perfection Concrete Mixer which has just been issued by the Cement Tile Machinery Company, 1524 Rath street, Waterloo, Iowa, and with Canadian factory at Chatham, Ont. Within the covers of this catalogue the merits of the Perfection Mixer are set forth in a way to command more than passing attention, while the illustrations which are included afford an excellent idea of the appearance of the various styles which are offered. The point is made that in the Perfection the company has incorporated the results of its long experience in the field and has produced a mechanical device for the proper proportioning and mixing of sand, cement and crushed stone or gravel and discharging the whole in a thoroughly mixed and uniform mass. The machine is made in two sizes, the No. 1 having a capacity of from 30 to 40 yards per day and is especially adapted to meet the requirements of the small contractor or the man doing light concrete work, while the No. 2 machine has a capacity ranging from 50 to 75 cu. yds. per day. Both sizes are mounted on trucks and equipped with gasoline engine, thus enabling the mixers to be readily moved about from place to place. The No. 2 machine is also mounted on skids and is intended more especially to meet the requirements of a brick, block and tile plant and operated by power connected to a drive shaft. Accompanying the catalogue are several loose sheets illustrating and describing the Contractors' Helper Mixer, intended more especially for the small contractor, the builder, the farmer, or the small block or brick manufacturer. It can also be used by the large contractor who desires a machine to take care of the little odd jobs in connection with large contract work or where he desires an auxiliary machine to take care of small jobs when he is using his heavy machinery on the large jobs. The mixer has a capacity of 1/8 yard, or from 3 to 4 cu. ft., and under ordinary conditions it will mix a batch of concrete every minute, giving it a capacity of from 20 to 35 yd. per day. The Simplicity Batch Mixer is also illustrated and described, as well as the S & S Elevating Batch Mixer. A price list is also given, together with an illustrated folder calling attention to a ten days' free trial of the Contractors' Helper Mixer.

Metal Spanish Tile Roofing

Miller & Doing, 83 to 87 Washington street, Brooklyn, N. Y., have just added to their already extensive line of

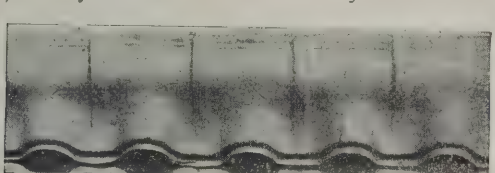


Fig. 7—Ridge Cresting

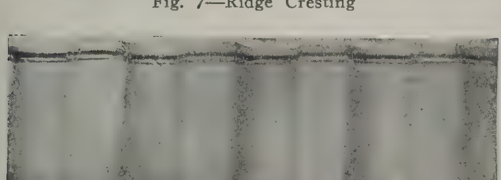


Fig. 8—The Starting Plate

Fig. 9—Finial for Ridge and Hips

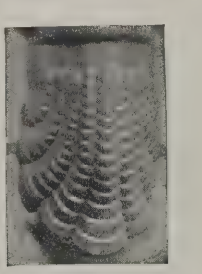


Fig. 10—Hip Molding Terminal

Metal Spanish Tile Roofing

sheet metal products a metal Spanish tile with the necessary starters, finials, hip and ridge rolls. The tile is made up in sheets and sections and is claimed to have many advantages over the single tile plan of this style of roofing. In the accompanying illustrations we show salient features of this roofing, Fig. 7 representing the ridge cresting, Fig. 8 the starting plate, Fig. 9 is the finial for the ridge and hips, while Fig. 10 represents the hip molding terminal. The roofing is very easily applied, as it is made of sheets 24 x 96 in. The claim is made that the tiling can be applied on a roof in less than one-third the time required to place the single tile, and again it makes a more desirable roof because of the less number of seams. The roof is said to be not only storm and waterproof but is of such a nature as to make a very attractive effect, thus adding much to the appearance and value of any building to which it may be applied.

Stanley's Automatic Door Bolt

One of the latest productions of the Stanley Works, New Britain, Conn., is the No. 1070 "Dickey" Bolt, shown in Fig. 11 of the cuts. It is an automatic door bolt with a variety of uses; in fact, it can be used in practically every position possible for a bolt. It is useful on the outside or inside of a door; on the right-hand or left-hand

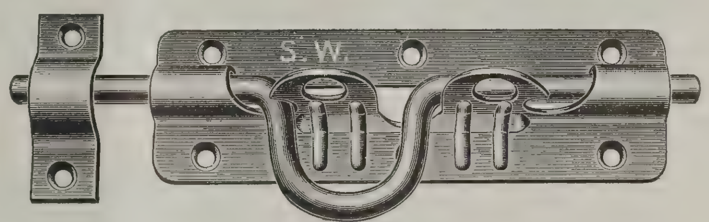


Fig. 11—Stanley's Automatic Door Bolt

side, as well as at the top or bottom. On the outside a padlock is used to lock the bolt, by passing the lock bar through the loop of the bolt and the hole in the plate, and on the inside the bolt as it is shot into place it locks itself automatically. These bolts are made of best quality wrought steel. The design is simple but very strong, the plate reinforced by corrugations. The bolt can be furnished japanned, plain steel and sherardized finishes as may be preferred.

A Text Book of Metal Lumber

The Berger Mfg. Company, Canton, Ohio, has recently issued a somewhat elaborate treatise on the subject of metal lumber—a substitute for wood. The matter presented is of special interest and value to the architect, the builder and the contractor. The illustrations consist of isometric drawings and sectional views showing the application, installation and erection of different types of buildings. The material which is referred to in this book and which utilizes a goodly number of its pages is a sheet metal product which, while not replacing structural steel, does serve as a substitute for wood. The material is lighter in character than structural steel and has prongs which take the place of nails. Those readers of the *Building Age* who are interested in metal lumber can obtain a copy of the book free of charge by writing to the company at the address above given.

Green Book of Hardware Specialties

We have received from the Smith & Hemenway Company, 150-152 Chambers street, New York City, a copy of the sixth edition of the "Green Book of Hardware Specialties and 'Red Devil' Tools." In presenting this to the attention of the trade the company states that its facilities have been materially improved and increased and that this loose-leaf "Green Book" will be added to from time to time as new tools and specialties are placed upon the market. The goods cover a wide range, and in connection with the illustrations brief descriptive particulars are given, although in some cases the data consists merely of styles of finish, sizes and prices. Among the "Red Devil" goods are hack saw frames and blades, auger bits, "Red Devil" improved miter boxes, wood carvers' knives, stirrup loop sash chain, glass cutters, wall scrapers, levels, hollow-handle tool sets, steel try squares, etc., etc.

Aladdin Houses

Within the covers of a very attractively printed 68-page catalogue known as No. 23 and intended for the season of 1912 is found a varied and interesting assortment of designs of Aladdin Houses, the material for which all ready to be put together is furnished by the North American Construction Company, Bay City, Mich. The company is said to have originated the "Readi-Cut" system of house construction, the houses being designed so that mill-run lengths are used almost throughout, thus rendering it unnecessary to cut good lumber to waste. The Aladdin house is said to be exactly like any other well constructed house when it is erected, and it cannot be taken apart except as one would demolish any other building. A saw is practically unnecessary in any part of the erection of one of the houses, as all the measuring, sawing and fitting is done at the mills by automatic machinery and skilled labor. Huron pine is used for framing and sheathing and clear yellow pine for inside finish. Aladdin plaster board is used on the walls, is easily and quickly put on and is said to be a sound deadener. The board comes in sheets 32 x 36 in. in size and is nailed directly to the studding. The catalogue is illustrated by means of half tone reproductions from photographs of the finished buildings, and accompanying them are the floor plans and a brief specification. Bungalow designs are included, as well as those of automobile garages and summer cottages.

Accompanying the catalogue is a special pamphlet devoted to buildings for the farm and containing photographs of farm houses, barns, corn cribs, hog houses and other structures, together with floor plans, specifications, prices etc.

The "Standard" Low-Charging Concrete Mixer

Having found by experience that the concrete mixer which it has been making under the name "Eclipse" is largely recognized by customers and the public in general as the "Standard" and that there has also been some confusion resulting when those interested have been trying to locate the Eclipse mixer but could not readily recall the name of the maker, it has been decided by the Standard Scale & Supply Company, 244 Water street, Pittsburgh, Pa., to call the mixer above by the name "Standard," so that it will readily be associated with the name of the company. The Standard Low-Charging Concrete Mixer is referred to as being simple of construction and of a nature to readily commend itself to all experienced contractors who are familiar with the difficulties of keeping complicated machinery in operation on the contractors' plant. The mixer is charged directly from a low-charging platform and the entire batch is in view while it is being mixed. This feature, it is pointed out, is important, especially for reinforced work, where it is often necessary to be very particular as to the mix before discharging. The discharging arrangement on the "Standard" is simple and semi-automatic, requiring the men in charge to throw the discharge lever only past the center in either direction, when a strong spring completes the motion of the lever and the discharge door. The machine is built in all sizes from 2 or 3 cu. ft. capacity up to 40 cu. ft., and can be used with steam, gasoline or electric power, according to requirements.

Improved Variety Saw No 3

A machine which the carpenter-contractor, as well as the builder operating his own woodworking shop is likely

Fig. 12—Improved Variety Saw No. 3

to find of special value is the Improved Variety Saw which we illustrate in Fig. 12 of the engravings. The machine, as its name indicates, is adapted to the execution of different kinds of work, and the claim is made that it can be operated at a minimum of expense. The removable plates with which it is fitted permit the substitution of planing, jointing, grooving, rabbetting, tenoning, gaining and dado heads, etc., in the place of the saw. In addition the machine is provided with fences for angle and bevel work and there is also a boring attachment conveniently placed for the operator. This variety saw is known as No. 3, and is being manufactured by the J. A. Fay & Egan Company, 221 to 241 West Front street, Cincinnati, Ohio.

Parks' Complete Woodworker

The Parks Ball Bearing Machine Company, Cincinnati, Ohio, is constantly making improvements in its extensive line of single and combination foot, hand and belt-power

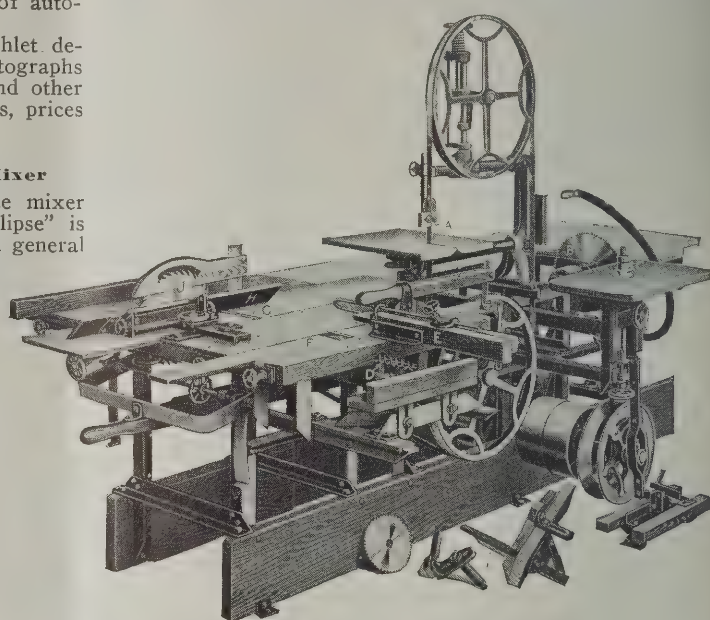


Fig. 13—Parks' Complete Woodworker

machinery, the latest addition to its circular saw-band saw-jointer combination being a swing cut-off saw on the same base with the saw machine, making a most practical combination woodworking machine especially adapted for mounting motor or gasoline engine for portable use. There are in reality eight machines incorporated in the combination, these being designated in Fig. 13 of the illustrations, which represents a general view, by the letters A, B, C, D, E, F, G and J. The swing cut-off saw can be operated also by foot lever, and swings back below the table surface when not in use. One of the strongest points made by the company regarding its combination machines is the fact that all are ready for instant use and that there is no bolting and unbolting of parts to be done, which is a great waste of time. The company has made portable outfits for many years and has just gotten out a circular which fully describes the latest designs. It shows clearly that any of the machines can easily be transformed into most compact portable outfits, thus in no way limiting the selection of machine or motive power.

Reinforced Bar Seats

The Reinforced Bar Seat Company, 912 to 914 South Eighth street, Louisville, Ky., has placed on the market a bar seat which it is claimed fills all requirements for holding reinforcing bars in proper position in the "forms" for reinforced concrete work. These seats not only hold the bars up the specified hight in order to insure satisfactory results, but the company has provided a tie for fastening the bars together where they cross one another at right angles. The point is made that the seat and tie does not involve any extra expense as compared with the method of tying the bars as heretofore practised, and that the use of the bar seat insures the proper spacing of the steel, and thus more satisfactory results in actual work. The claim has been made that some of the reinforced buildings which have failed was due to the fact that the steel was improperly spaced, and this can now be eliminated by the use of the bar seat. A folder which the company has issued shows the appearance of the bar seats for small rods and also their application with the bars in position. The device is one which should interest the architect, the building contractor, the engineer and the owner.

(For Trade Notes see second page following)

TRADE NOTES

The Alabastine Company, Grand Rapids, Mich., calls the attention of the readers of the *Building Age* who are interested in beautifying or decorating interior surfaces to its special literature, color charts, etc., copies of which can be obtained by writing to the company and mentioning the *Building Age*.

In commenting in our last issue upon Waterproofing Cement Stains for Waterproofing and artistically coloring of exterior cement surfaces just brought out by Samuel Cabot, Inc., 141 Milk Street, Boston, Mass., an annoying error occurred in the title of the article, the word "Fireproof" having been used instead of "Waterproof." The body of the article, however, so clearly stated the subject matter that we are quite sure none of the readers were mislead by the inadvertence in the title.

Among makers of plumbers' brass goods few enjoy a more enviable reputation than the Haydenville Company of Haydenville, Mass. Continuously engaged in the manufacture of such goods since 1845 this company has become well known to two generations of architects as makers of a thoroughly reliable line. We have just been informed that the company is about to open a new department of sales promotion at their New York office, 150 Nassau Street, to be conducted by William R. Pertak, who has been in close touch with New York building interests for some years. Mr. Pertak states that he will primarily aim at closer relations between his firm and the various factors in the building trades, whose interests demand the installation of reliable brass goods.

The incombustible floor composition manufactured by the Troegerlith Tile Company, 11 Broadway, New York City, has been approved by the Superintendent of Buildings for use as flooring and interior trim in buildings exceeding 150 ft. in height.

The fifth number of "The Disston Crucible," an interesting little magazine published monthly for the advancement of the interests of millmen by Henry Disston & Sons, Philadelphia, Pa., contains some valuable information relative to the history of the saw. It also tells how a crosscut saw is made, the illustrations being half-tone engravings showing various stages in the work of making a saw. There are some helpful hints from the school of experience and more or less paragraphs of a humorous nature, all tending to render the little pamphlet attractive to the general reader as well as to the millman.

Henry S. Pitts has opened offices in the Industrial Trust Building, Providence, R. I., for the practice of architecture and will be glad to receive manufacturers' catalogues.

"A Subject to Admire" is the title of the July picture-calendar sent out by Richards-Wilcox Mfg. Company, Aurora, Ill. The young lady of the picture is admiring a full blown rose, but the suggestion intended to be conveyed by the text is to admire the "Royal" Trolley House Door Hanger and other hardware specialties.

The Flintkote Mfg. Company, 88 Pearl Street, Boston, Mass., and with New York offices at 66 Beaver Street, reports a large demand for the composition rubber matting for all classes of buildings and which it is offering under the trade name of Adamat Flooring. It is composed of a felt mat base with a gum surfacing on both sides thus making both sides useable as a walking surface. It is claimed to have no odor, is water-proof and acid-proof, is an insulator and has the advantage of a non-slipping surface without being corrugated. The claim is also made that it will not harden or oxidize and that it is absolutely sanitary. It is furnished in lengths up to 90 ft. and its cost is said to be 1-7 that of rubber mat.

In speaking of various classes of buildings which of necessity should be fireproof the fifth number of the *Bulletin* issued by the North Western Expanded Metal Company, 930-970 Old Colony Building, Chicago, Ill., points out that one of these classes is the public libraries of the country. On the front cover of the *Bulletin* in question one of the recent additions to the libraries of St. Louis is illustrated and the point made that "Kno-Burn" Metal Lath is not only valuable for its fireproof qualities but is best adapted for supporting cornices and all forms of ornamental plastering work, allowing as it does the construction of these portions of a building in the lightest and most economical manner. This class of plastering is mostly found in public buildings, libraries, museums, etc., or in semi-public buildings, such as hotels, railway stations, etc. The *Bulletin* in question is illustrated by means of numerous half-tone engravings showing buildings in which vast amounts of expanded metal lath was used in connection with the plaster work. One page is devoted to facts worth considering in regard to metal lath while another gives a list of dealers who carry Kno-Burn XXth Century Expanded Metal Lath in stock.

Millers Falls Company, 28 Warren street, New York, has issued catalogue No. 32, illustrating and describing in 154 pages a comprehensive line of mechanics' tools, including braces, hand, breast and combination drills, drill presses, combination anvil vise and drill boring tools and machines, gauges, screwdrivers, chucks, Star hacksaws and frames, the Goodell saw and lathe, fret saws and numerous other tools, large and small. A page engraving shows the various buildings of the large plant, together with a picture of the plant as it appeared in 1873.

"Concrete in Grain Elevator Construction" is the title of a pamphlet just issued by the Universal Portland Cement Company, Chicago, Ill., the little work being illustrated by views of a number of grain elevators and warehouses constructed of the material named. The text is devoted to a discussion of various matters of interest in connection with work of this kind, including first cost, depreciation, insurance (building and contents), fire protection, business insurance, etc.

Guy Smith has just opened an office as architect and engineer at 301½ Main Street, Jonesboro, Ark., and is desirous of receiving catalogues and price lists from advertisers of the *Building Age* who manufacture goods in which an architect is likely to be interested.

The Oak Flooring Bureau, 822 Hammond Building, Detroit, Mich., has just issued the second edition of an interesting booklet entitled "Oak Flooring." Within its covers the reader is told the use of the different grades of oak flooring and how to arrive at the amount of flooring required. Comments are also presented touching the laying, scraping, finishing and care of oak flooring. Any reader of the *Building Age* interested can secure a copy of the booklet on application to the address given.

"Don't tinker with your roof. It's like wearing a wig. After you have started to use it to cover a small bald spot you find you must make it bigger and bigger to cover the whole head. Put on a Cortright Tinker-Proof Metal Shingle roof at once and save the cost of piecing." These are some of the suggestions found in the latest issue of the *Advocate* published by the Cortright Metal Roofing Company, 50 North 23d Street, Philadelphia, Pa. Among the features of this issue is a pertinent article on the durability of roofs, and a number of half-tone illustrations showing buildings covered with Cortright metal slates and shingles. The statement is made that roofs put on 26 years are as good as new and have never needed repairs—never need attention of any kind except an occasional coat of paint.

The Standard Varnish Works, for many years located at 29 Broadway, New York City, have taken possession of their new building at Elm Park, Port Richmond, S. I.

At the annual meeting of the stockholders of the Plymouth Seam Face Granite Company, 6 Beacon street, Boston, Mass., held on June 19, William McCarroll, of New York, was elected president for the ensuing year; George C. Treadwell of Albany, was chosen vice-president; H. G. Chatfield of Boston, treasurer, and Robert S. Bickford, of Boston, secretary, and P. M. Crossett of New York, managing director. The company's quarries are at Hingham and Weymouth, Mass., and the New York office is in the Builders Exchange, 30 West Thirty-third street.

Hollow concrete blocks made by the Garden City Company, Garden, N. Y., have been approved by the Superintendent of Buildings for use in exterior walls of buildings in New York City not exceeding 36 ft. in height, in accordance with the requirements of Bulletin No. 30, issued last year.

The Building Age

NEW YORK, SEPTEMBER, 1912

A Frame House at Worcester, Mass.

A Seven Room Dwelling Embodying a Number of Interesting Features of Arrangement and Construction

THE design of a frame house which we here bring to the attention of our readers is one well adapted for execution upon a suburban site and embodies features which render it well calculated to meet modern requirements. The exterior is treated with a combination of clapboard and shingle effects, while the roof lines are broken in such a way as to avoid the monotony of a plain pitch roof. The halftone engraving which adorns this page will afford the readers a very good idea of the appearance of the finished dwelling, while the plans and details on the pages following show the interior arrangement and general style of trim and finish.

According to the specifications of the architect the foundations are of field stone with footings well bedded 6 in. below the cellar bottom. The foundation walls are 24 in. thick at the bottom and 18 in. at the top. Above the foundation walls the exposed underpinning is of brick 9 in. thick and gives the finished cellar a hight of 7 ft. 6 in. in the clear.

The house is of the usual balloon frame, the timbers being of spruce. The sills are 4 x 7 in., well pointed up each side with mortar. The girders in the cellar are 7 x 8 in., supported on 3½-in. pipe with 6 x 6 cap; the first-floor joist is 2 x 8 in.; the second-floor joist 2 x 7 in., and the third-floor joist 2 x 6 in. The exterior wall studs are 2 x 4 in.; the partition studs are 2 x 3 and 4 in., all placed 16 in. on centers; the furring for the ceiling is ⅞ x 2½ in.; the side rafters are 2 x 4 in., placed 16 in. on centers; the top rafters are 2 x 5 in., placed 24 in. on centers, and the hips and valleys are 2 x 8 in. All door openings are trussed at right angles to the joist and under all cross partitions on the first floor is a 5 x 8 joist. The floor joists are bridged between bearings with ⅞-in. x 2½-in. stock.

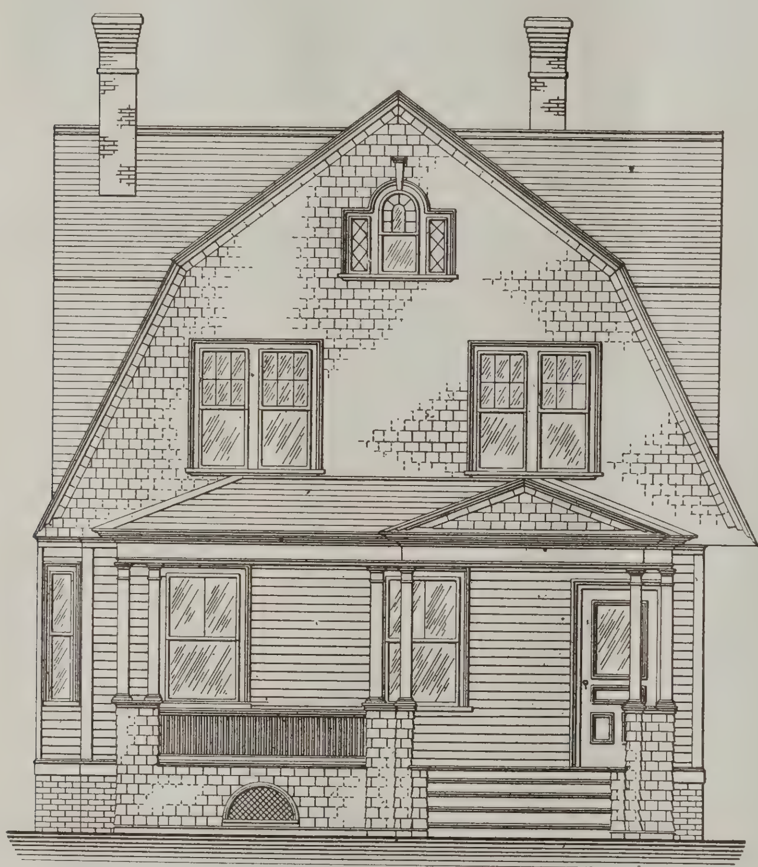
Photographic View of the House Which Sets Back from the Street and Occupies a Commanding Position

A Frame House at Worcester, Mass.—John P. Kingston, Architect

The exterior walls, gables and roofs are covered with ⅞-in. matched hemlock boards. The roof boards for the gambrel part of the house are laid close together, while those for the upper parts are laid open about 2½ in. Over the sheathing or enclosing boards are layers of Chapman & Soden Beaver rosin-sized sheathing paper laid with 2-in. laps. There is also a strip of the paper under the base of sheathing around all outside walls extending up on to the walls and out on to the floor at least 5 in.

The first story of the house where shown is clapboard, while the remaining portions, including gables, dormers, etc., are covered with 16-in. cedar shingles laid not more than 5 in. to the weather. The principal roofs are also covered with extra dry sawed 16-in. Eastern cedar shingles laid not more than 4¾ in. to the weather. The hips are covered with a braided course about 4½ in. wide. The valleys in the upper part are laid open about 5 in. at the top and 6 in. at the bottom and in elastic cement over tin 14 in. wide soldered in one continuous piece with the edges turned over and laid flat. The valleys in the steep parts of the roof are laid close with 7 x 9-in. pieces of tin on each course. A strip of tar paper the full width was laid in each valley before the tin or shingles were put on. The chimney is double flashed; that is, the shingles have a tin flashing built in and then the lead flashing turned over the tin, thus insuring a tight job and allowing for shrinkage and settling.

The exterior finish is of cypress. The front and rear piazzas have floors of 1⅛-in. matched spruce, while the ceiling is of even colored North Carolina pine with 2-in. bed molding. The front door is of cypress 1¾ in. thick, flush molded with No. 1 double thick glass in the top portion. The rear and cellar doors are also 1¾ in. thick.



Front Elevation—Scale ⅛-In. to the Foot

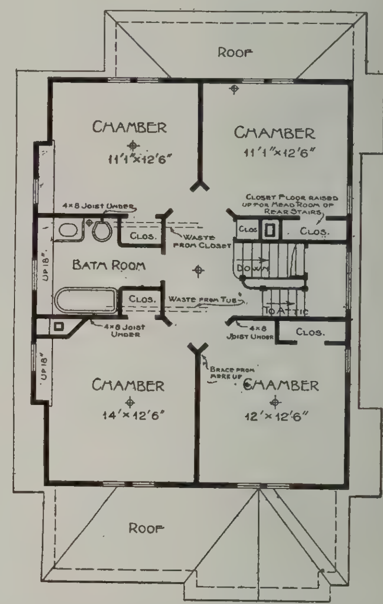
A Frame House at Worcester, Mass.

The finish or top floor in the rooms of the first story, as well as the hall and bath room of the second story, are birch or maple with not more than 2½-in. face, driven close together, blind nailed and laid running joints in long lengths crosswise of the lining floor. Under all finish floors is a layer of Chapman & Soden Beaver deadening felt of a weight of 1 lb. per yard.

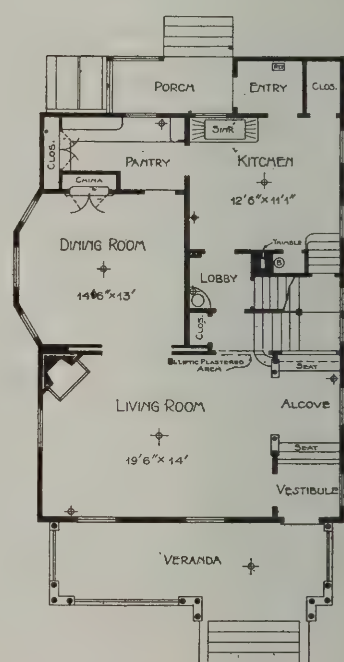
The finish or top floors in the sleeping rooms in the second story, as well as all closets, are of slash grain North Carolina pine, with not more than 4-in. face closely laid and blind nailed. All floors have a ¾-in. quarter-round in each angle between the base and the floor, thus avoiding making perfect joints against or scratching the base.

The finish of the entire first-story is in even colored North Carolina hard pine, while the whole of the second story is done with a good quality of whitewood painted. The bath room and hall are finished natural. The closets are finished in a good quality of native pine.

The kitchen and rear entry are wainscoted 3 ft. 4 in. high, the pantry 2 ft. 8 in. high, and the bath room 4 ft. high with narrow beaded sheathing put on vertical.



Second Floor—Scale 1/16 In. to the Foot



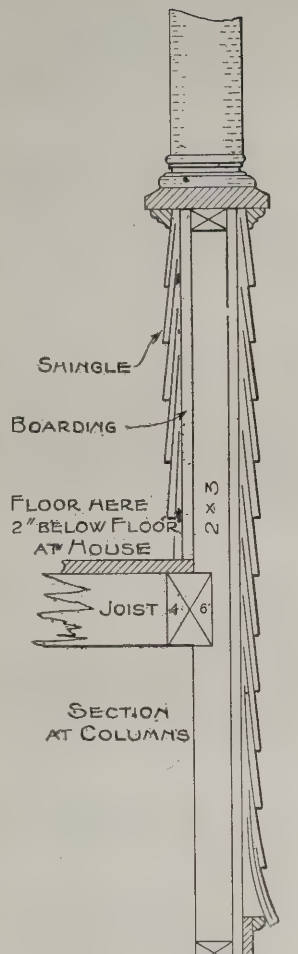
First Floor—Scale 1/16-In. to the Foot

The pantry has a broad countershelf 2 ft. 9 in. from the floor with a case of three drawers underneath, the remaining parts are closed in with beaded sheathing with three cleat doors hung with small hinges.

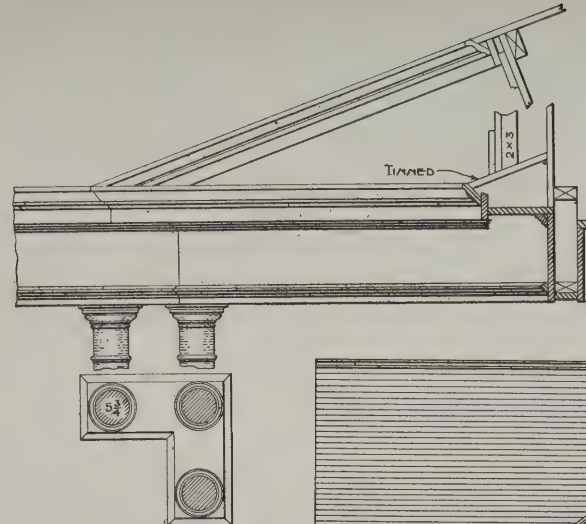
Over the broad shelf are four shelves 12 in. wide, the one at the top extending all around the room. The china closet has a case of four drawers with molded panel face under the broad shelf and three shelves over.

In the bath room is a medicine closet, the bottom of which is 2 ft. 4 in. from the floor and the top even with the other door. It is fitted with four 12-in. shelves. The door is 2 ft. wide and 1¼ in. thick.

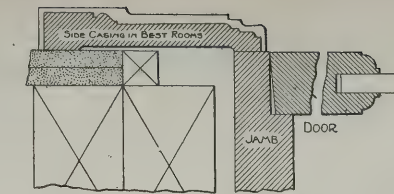
The seats in the alcove open underneath and are



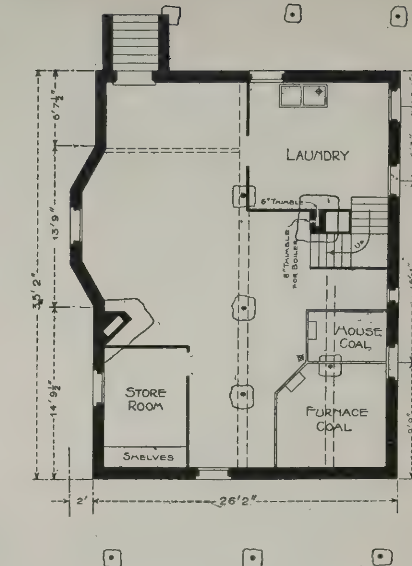
Section Through Front Veranda —Scale ¾-In. to the Foot



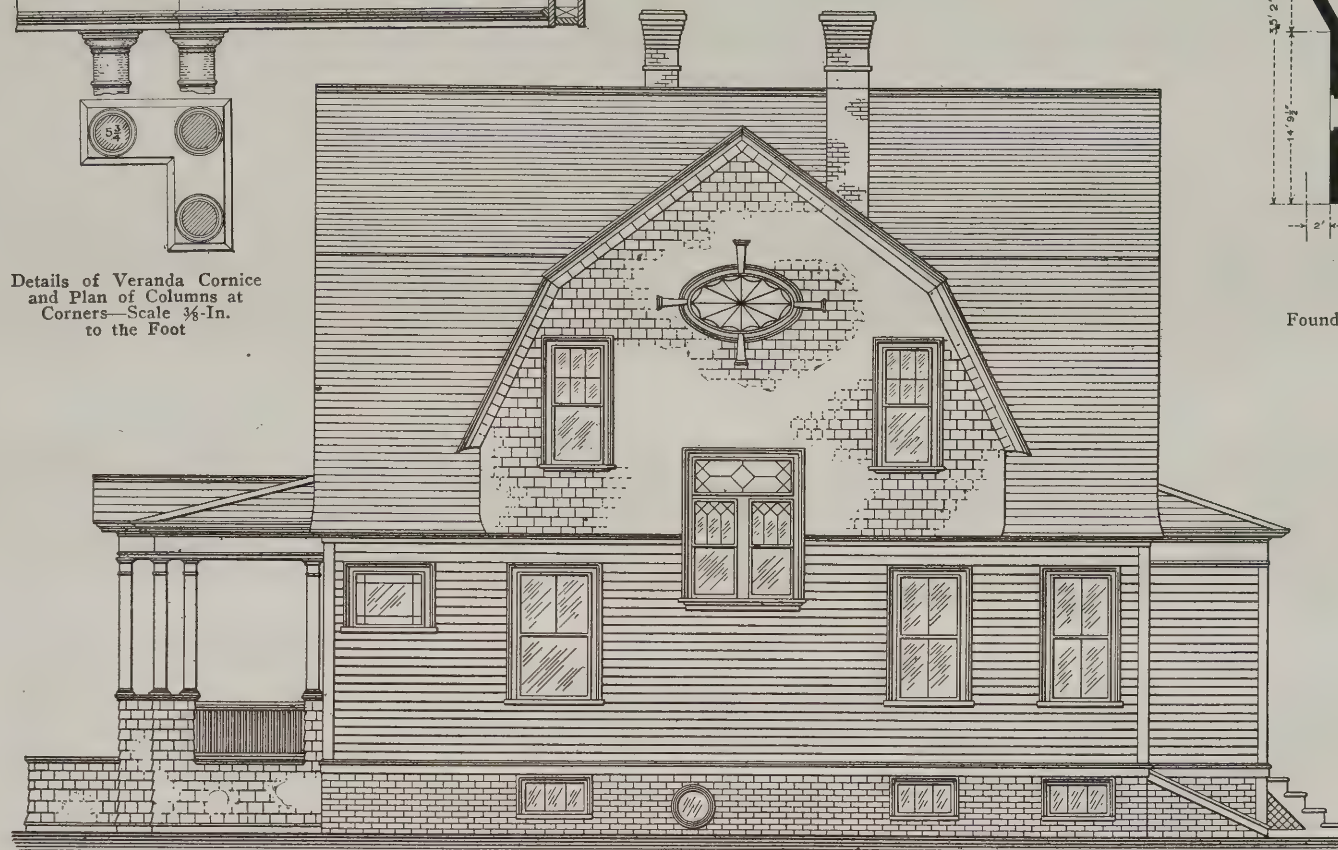
Details of Veranda Cornice and Plan of Columns at Corners—Scale ⅜-In. to the Foot



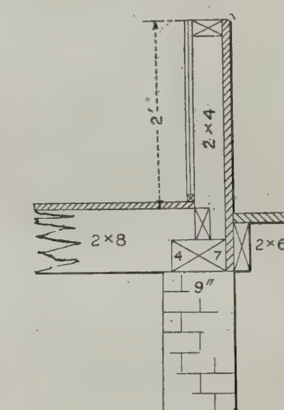
Horizontal Section Through Door Frame and Casing—Scale 3-In. to the Foot



Foundation—Scale 1/16-In. to the Foot



Side (Right) Elevation—Scale ⅛-In. to the Foot



Section of Wall Between House and Veranda—Scale ½-In. to the Foot

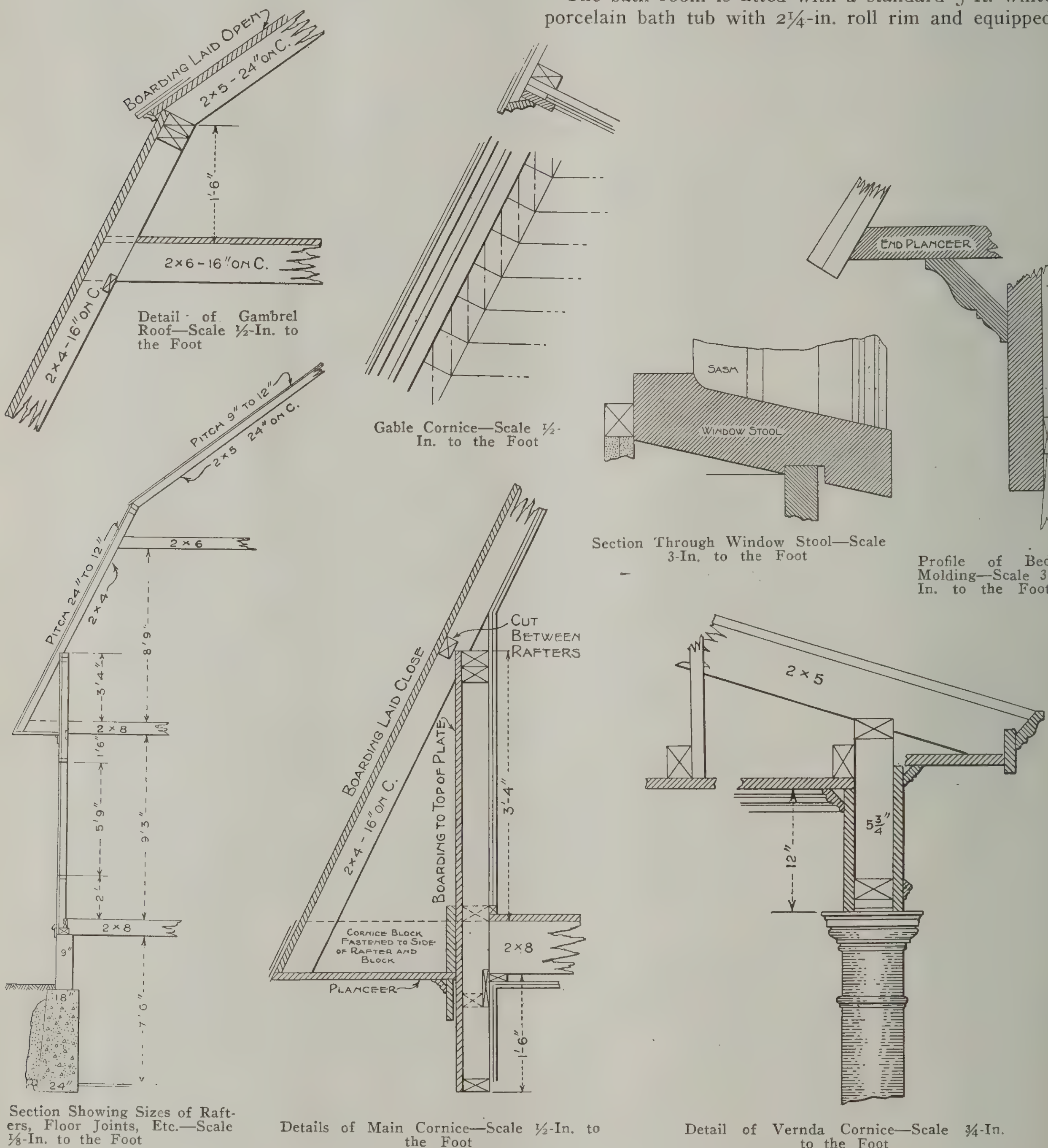
A Frame House at Worcester, Mass.—Elevation and Miscellaneous Constructive Details made of 1⅛ in. stuff with molded edge resting on ⅞ x 3-in. cleats. The ends are made of 1¾-in. plank cut to the shape shown with base around the bottom and small molding at the top. Each seat is about 16 in. high. The seat in the sleeping room is formed by allowing the studding, plaster and finish to continue across the front. The top is about 16 in. high, covered over with a 1⅛-in. board with rounded edge. On top of the seat is a ½ x 3½-in. base with molded edge, the molding returning down on the ends to set the board.

The stairs are built on 2 x 10-in. plank stringers guard rail at the side.

The kitchen is fitted with a 24 x 36 x 8-in. soapstone sink with brass cesspool outlets and having drip shelf at each end. The back and ends are 12 in. high. The two-part soapstone wash tubs are located in the laundry, as shown on the basement plan. In the closet next to the chimney is a 30-gal. hot-water boiler.

In the attic is a 30-gal. tank constructed of 1½-in. pine plank lined with 16-oz. tinned copper and supplied with water through ½-in. water pipes with ball cock and float and with shut-off in the cellar.

The bath room is fitted with a standard 5-ft. white porcelain bath tub with 2¼-in. roll rim and equipped

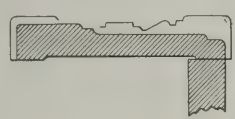


Miscellaneous Constructive Details of a Frame House at Worcester, Mass.

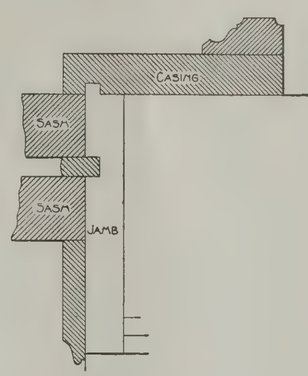
with 1⅛-in. treads, ⅞-in. risers and scotia, the risers and treads being grooved together. The front stairs are birch with 6½ x 6½-in. paneled newel post, 4¼ x 4¼-in. angle post; 1½-in. turned balusters, square bottom and top, 3½ in. on centers and surmounted by a 2½ x 3¾-in. hand railing. The attic stairs are a closed flight built of North Carolina pine and around the attic well hole is a railing. The cellar stairs are of hard pine closed in with door at the head of the stairs and a with Fuller No. 4½ compression double bath cocks. There is a syphon action water closet and a standard 20 x 24-in. oval wash bowl with back 10 in. high and fitted with compression china Index faucets.

All exterior work of wood, iron, tin and galvanized iron is painted with two coats lead and oil. The outside of the exterior doors have three coats of paint and the floors of the verandas are also painted. The shingles on the side walls, gables, etc., have one coat of linseed oil stain, this being mixed part raw and part boiled oil. This is put on with a brush, thoroughly filling and covering all the exposed parts and then followed with a coat of linseed oil. The roofs of the building and verandas have a heavy coat of linseed oil stain.

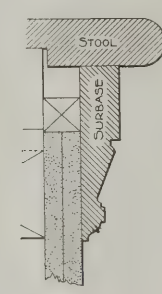
The hardwood floors of the hall, parlor and dining room have a coat of shellac rubbed lightly with sandpaper and then treated to two coats of S. C. Johnson & Son's floor wax rubbed and polished. The hardwood floors of the rear portions, as well as the upper hall, the sleeping rooms and bath room have two coats of Nassau's Quaker City floor dressing, while the closet floors have one coat of dressing.



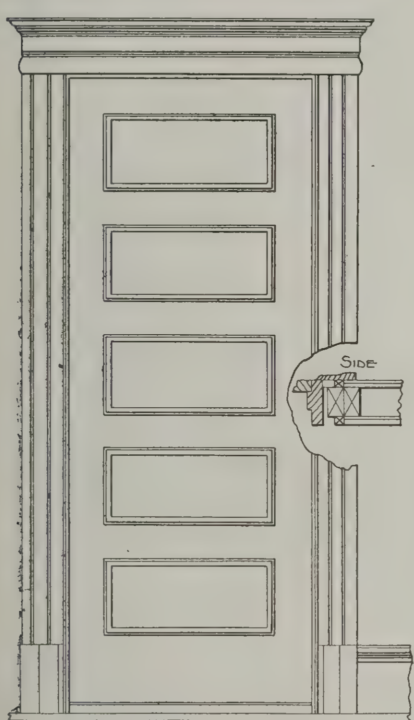
Side Casing in Second Story, also Kitchen, Pantry, Entry, Etc.—Scale 3-In. to the Foot.



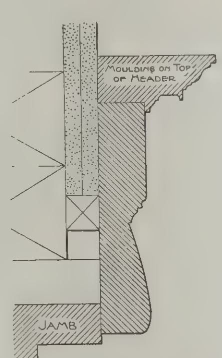
Section Through Window Jamb and Casing



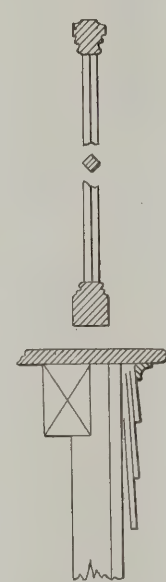
Detail of Window Stool—Scale 3-In. to the Foot



Elevation and Section of First Story Doors—Scale ½-In. to the Foot

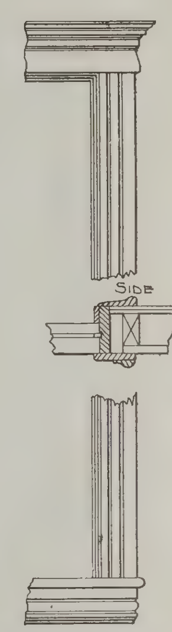


Section Through Head Casing — Scale 3-In. to the Foot



Section at Veranda Balustrade — Scale ¾-In. to the Foot

Section of Base—Scale 6-In. to the Foot



Details of Window Frame — Scale ½-In. to the Foot

Miscellaneous Constructive Details of a Frame House at Worcester, Mass.

The hard pine finish in the front hall, including the stairs, also in parlor and dining room, has a coat of alcohol shellac and two coats of Heath's No. 40 preservative rubbed to an egg shellac gloss. The hard pine work in the rear portion of the house has two coats of No. 40 preservative, while the sleeping rooms are painted three coats best lead and oil paint left with a gloss.

The walls of pantry, china closet, kitchen, rear entry and bath room have a coat of oil sizing and two coats of paint.

The house is piped for gas and is heated by means of furnace, the location of the various registers being clearly indicated on the plans.

The frame dwelling here shown was erected in Worcester in accordance with drawings prepared by John P. Kingston, architect, 518 Main Street, Worcester, Mass.

Redwood lumber produced in California in 1910 was 543,493,000 feet.

Time of Removal of Forms in Concrete Work

It is safe to say that the majority of failures of reinforced concrete structures has been due to the premature removal of "forms." It is not sufficient for an architect or engineer to state that the forms shall not be removed until the concrete has hardened sufficiently to permit of their removal with safety. The time which should elapse before removal should be stated.

In drawing specifications for reinforced concrete structures, Lockwood, Greene & Co., Boston, state in very plain terms the time that forms should remain in place, and an idea of just how their specifications read may be obtained from the following extracts covering work of this kind:

Removal of Forms: Under no consideration shall forms be removed until the concrete has hardened sufficiently to permit of their removal with safety.

Slabs and Beams: Forms shall not be removed from floor and roof slabs in less than seven days. Sides of beams may be removed at the same time as the floor slabs, provided original supports under beams and girders are left in place.

Columns: Where original supports remain under beams and girders coming to columns, the forms shall not be removed from the columns in less than four days.

Supports: The original supports for all beams and girders must remain in place at least ten days, but all beams and girders having more than 30-foot span from center to center of support shall be considered as special cases, and subject to inspection of superintendents of construction before removed.

The length of time before removal of forms shall be increased on all cases, and additional time allowed for each day the thermometer registers at any time during the day or night below 35 deg. Fahr.

Tallest Office Building in the World

The 55-Story Woolworth Building in New York City -- The Work of Construction -- Its Foundations

By J. F. Springer

THE rest of the world may wonder at the tendency in New York City to erect buildings of enormous hight. There are a number of contributing factors which when combined constitute an irresistible cause. First, I may mention the factors which make such buildings possible. Under the old-time methods of construction, in accordance with which it was necessary to erect a wall supporting itself and the various floors, and extending from the foundation to the roof, it would probably have been inadvisable to build such a structure as the Woolworth Building. The wall would have had to be so thick through the region of the lower stories as to encroach seriously on the interior space. The modern method, in accordance with which the steel framework is the real supporting element, and the wall instead of affording support is carried in sections—story by story—by the framework, makes possible the enormous hights with great economy of space. In fact, the wonderful structures in New York and Chicago are possible because of the great strength and compactness of steel structural work.

The 55-Story Woolworth Building, New York City, as It Will Appear When Completed

The Tallest Office Building in the World

Another large permissive factor is the development of the modern passenger elevator. What the tenant of the tall building wants, needs and must have is great accessibility. This the elevator supplies. It is somewhat extravagant of space; but this is regarded as a necessary part of the investment. The space requirements probably set a limit to the hight of buildings; but that limit has not yet been reached. Nor has the limit of the lift of an elevator been determined; one elevator in the Woolworth Building will serve fifty stories.

Upper Floors More Desirable

Other factors enter besides those of a permissive character. The value of land in the extreme downtown district is probably one of the most urgent. It is necessary that the fundamental investment in the land shall be productive. And the only way yet discovered of getting great returns is to carry the buildings up. But perhaps the greatest present factor of an urgent character is the indisputable success of the tall building. So pronounced is this success that the higher floors command just as high rents as the lower ones. In fact, it is probable that the majority of tenants prefer the upper floors—those reached by the express elevators. The accessibility of the various floors is so nearly equal that it probably plays but a small part. The upper floors have a superiority in respect to light, air, view and, consequently, general cheerfulness.

The erection of such structures as those of recent years has imposed a very great problem in respect to the foundations. Not only were the loads enormous, but the far downtown of New York has peculiar difficulties of its own. Manhattan Island is, indeed, a rocky ridge. This is probably, from a geologic point of view, the reason why it exists at all. In the northern part of the island the ridge of rock is either exposed or else it lies near the surface. On the southern end, however, the rock dips below the general surface. There is, in fact, within a few feet of the street level, a permanent water line. In some cases the solid rock lies far below, and is only to be reached by the penetration of formidable beds of quicksand.

Use of Pneumatic Caisson

If the problem were concerned only in getting through, it would not be so great; it is complicated by the fact that pumping is a dangerous expedient because of the effect on surrounding buildings involved in the withdrawal of water. To meet all the conditions, the best method is probably the one now usually selected; that is, to employ the pneumatic caisson. By the use of this device the water does not need to be excluded from any but a very small region. The pressure of compressed air is exerted to restrain the water from the caisson or working chamber. As this chamber, open at the bottom, finds its way to lower and lower levels, the soil being dug away continually by the men within it, concrete is added on above.

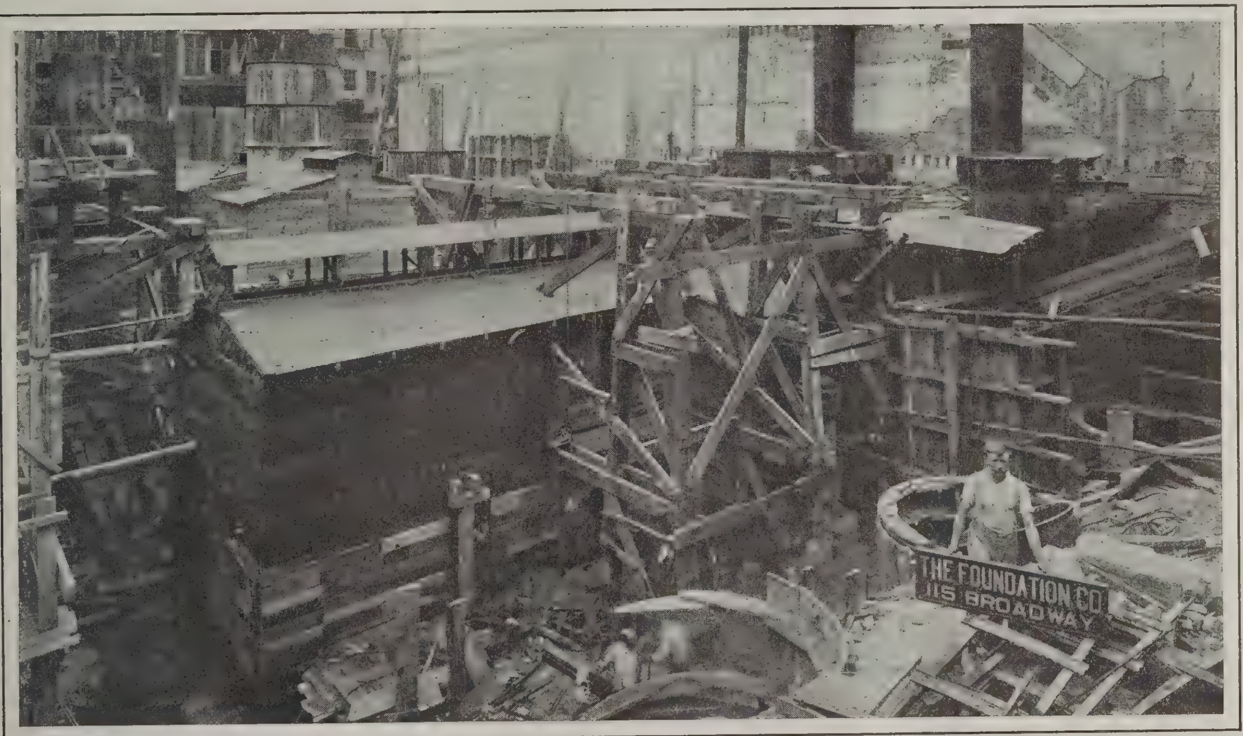
When the caisson at last reaches the solid rock there is a hollow column of concrete extending from the roof of the caisson, on which it has been built, up to and above the water level. The caisson itself and the internal hollow of the concrete column are now filled up with fresh concrete, with the result that a solid concrete footing or pier has been constructed. This rests on solid rock and extends upward to the point where it is desired to use it as a support. Sometimes the caissons are sunk, oblong in form, all around the perimeter of the site, and are then united to form a single continuous inclosing wall or cofferdam. This method was pursued at the Bankers Trust Company Building at the northwest corner of Wall and Nassau streets.

The greatest of all skyscrapers, either completed or in course of construction, is the Woolworth Building, fronting on Broadway and extending from Barclay street to Park place. The main portion of the building is 30 stories high; the great tower, centrally located on the Broadway front, will have a hight of 55 stories from the street. The top of the tower will be 800 ft. above the curb on Broadway. The weight of the building and contents has been estimated at about 125,000 tons. This load will be distributed over 60 main columns. The greatest load for a single column will be about 9,500,000 pounds.

The Foundations

The foundations of this building were constructed by the pneumatic method. Solid rock lies about 115 ft. below the street level. The water line is perhaps 15 ft. from the surface. The piers, which stand upon the rock and support the great loads, are of reinforced concrete and 66 in number. Most of them are cylinders, but a few have a plan section of rectangular form. The frontage on Broadway is about 155 ft.; the depth of the building is about 200 ft. This area is considerably larger than the original plan contemplated. At first it was proposed to locate the tower at or near the corner of Broadway and Park place. But after some of the foundation work was already completed, or well under way, the site was enlarged and the tower relocated. This change has caused some irregularity in the distribution of the piers, for the reason that it was desired to utilize foundation work already done. Certain steel columns have their footings, consequently, not directly on piers but on steel girders which derive their support from two piers.

In one case a column load of 9,387,000 pounds will be carried by a great steel girder 8 ft. deep, 6¾ ft. wide and 23 ft. long. This girder rests on two piers 16¼ ft. apart (center to center). It is built up with three webs, each of which has reinforcement sufficient to bring its total thickness up to 4 in. The weight is about 130,000 pounds. This girder was delivered one Sunday last fall and required 42 horses to draw it up from the water front on a 100-ton truck. These details are to be taken as typical of the construction everywhere. The riveting was done by Chicago Pneumatic Tool Company's hammers, operated by air from two of the company's compressors. Four steel guy derricks, 15 tons each, with 30-ton capacity, and one wooden guy derrick of 15-ton capacity were engaged in the steel work. They were operated by double drawn 80-horsepower Lidgerwood electric hoisting engines. Broderick & Bascom yellow strand wire rope was used throughout.



View of the Site of the Woolworth Building as it Appeared on July 12, 1911, and Showing Preparations for Sinking the Caissons

The Tallest Office Building in the World

Greatest of All Skyscrapers

The Woolworth Building is opposite the Post Office and is located just across from City Hall Park. Along one side of this parked space are the World Building and the Tribune Building—once thought to be skyscrapers indeed. The Park Row Building with its 26 stories is another nearby tall building. But the Woolworth Building will dominate them all—not only in hight, but by its considerable frontage as well. In fact this cream-colored pile will eclipse everything near enough to be compared with it. It is the greatest—and by far the greatest—of all New York's array of tall buildings.

Light and air are well provided for; this will be realized upon considering the fact that there is frontage on three streets, all of considerable width; in addition a wide court occupies the main axis of the building from the rear halfway to Broadway. Twenty to 24 passenger elevators of the Otis traction type will occupy space in the main structure. On a typical floor in the lower part of the building, where 24 passenger elevator cars are located, the disposition is made along the arms of a cross. That is to say, there is a cruciform elevator corridor. On such a floor five offices front on Broadway. The corner offices look out likewise on the cross streets. Eight offices, in addition, front on Barclay street and eight on Park place. Ten offices front on the court, five on each side. These are all the offices—31—on the floor. It will thus be seen that every office fronts on a lighted space.

Certain elevators are removed on higher floors, thus permitting a large aditional office to be located at the inner end of the court. In the tower portion and in the sections between the thirtieth and fortieth floors, six offices look out on Broadway, these offices being,

Showing a Caisson Being Sunk for a Foundation Pier.

The Tallest Office Building in the World

of course, narrower than the five having a total frontage of the full width of the main building. However, the average frontage of these tower offices is about 13 ft. On the opposite side of the floor six other offices look westward and away from Broadway. On the Barclay street side two additional offices are arranged between the two rows just mentioned. In all such a floor has 14 offices. Six elevators front on its elevator corridor. From at least the fortieth floor down there are two sets of stairways. At the rear of the main building two freight elevators are arranged.

Such a structure as the Woolworth Building will contain in itself a small city. The street floor will have stores fronting on the main streets, besides an arcade opening on these same streets. Altogether the ground floor will contain 18 stores and booths. Hot and cold water is supplied the various offices. There are in the building safety deposit vaults, shower baths and a swimming pool. The plumbing contract was in the hands of the W. G. Cornell Company.

Instead of the upper floors commanding a less rental than the lower ones, they command a higher. The rates for certain space run up as high as $4 per square foot per year, and even higher.

Tenants paying the prices demanded are of course rather severe in their requirements. It is essential that pretty much every detail be cared for in the most up-to-date manner. Of course the owner desires not only to satisfy his critical tenants but to use materials involving a minimum expenditure for upkeep and replacements. The selections made in connection with the highest class buildings may well be regarded as at least representative of the best obtainable, all conditions being considered. The quantities of single articles used to construct and equip such a monster building are surprising.

Hardware Equipment

There are more than 1000 office doors opening on corridors. Each has to be fitted with a Yale door check and a letter-drop. The hinges used in the building have Yale long-service bearings and are of extra heavy solid cast bronze. More than two carloads of hinges are required. That a heavy pattern was desirable will be understood when it is considered that the metal doors weigh about 150 lb. each. The locks are of the Yale cylinder type, manufactured by the Yale & Towne Manufacturing Company, 9 Murray street, New York City. The locks and hinges had to be supplied far in advance of use, for the reason that the maker of the metal doors was under the necessity of having them at his service before he could complete his work. The knobs and escutcheon are special designs, conformable to architectural details. A "W" is worked into the design, its reference being, of course, to the name of the building. The working parts of the locks, the bolts, window fastenings, lifts and the like, are of especially heavy weight. The highest quality of metal has been employed. It will be of interest to learn that the locks belonging to the various floors are commanded by a floor master-key in the hands of the janitor. The owner and the superintendent have an emergency master-key admitting to all rooms.

The foundation piers for the Woolworth Building were sunk by the Foundation Company, and the general contractors are the Thompson-Starrett Company, both of New York City.

The architect is Cass Gilbert, of 11 East Twenty-fourth street, New York City.

Hard Finish for Soft Wood

Those of our readers who are called upon to give a hard and smooth finish to soft wood are likely to be interested in a suggestion published in a late issue of the *Woodworker and Art Craftsman* and reading as follows:

"When only a thin surface is required, a few coats of zinc will make the surface of wood almost as hard as zinc itself. The coating will be a very thin one, and it will yield to light blows on account of the very soft wood underneath the coating of zinc. To give wood a thick and very hard surface, cover it with a paste made up of: Putty powder, 1 lb.; powdered oxalic acid, 1/4 lb.; and powdered gum, 1 oz. Use just enough water to make the paste stiff, then spread upon the wood surface and place aside to harden. If any trouble is experienced in making the coating adhere to the surface of the wood, give the surface a coating of thin glue sizing or mix a small amount with the ingredients while making the paste. The coated surface should be allowed to remain undisturbed for several days until the paste has hardened to a degree which will stand any usage it is likely to get.

Rules for Measuring Masons' Work

What Is Known as the Omaha Masons' Measurement — Some Interesting Features

WE take pleasure in presenting herewith the rules governing the measurements of material and labor of masons' work which have been issued and approved by the Builders Exchange, of Omaha Neb. The rules are known as "the Omaha Masons' Measurement" and represent the practice which prevails in that section of the country.

Number of Bricks

Each superficial foot of ½ brick wall shall count 7½ bricks.
Each superficial foot of 1 brick wall shall count 15 bricks.
Each superficial foot of 1½ brick wall shall count 22½ bricks.
Each superficial foot of 2 brick wall shall count 30 bricks.
Each superficial foot of 2½ brick wall shall count 37½ bricks.
Each superficial foot of 3 brick wall shall count 45 bricks.
And 7½ bricks for every half brick additional in thickness of wall.

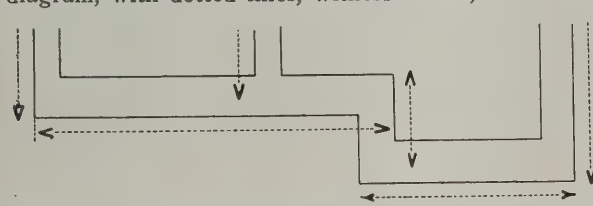
Hollow Walls

All hollow walls to measure as solid wall in same ratal as above up to 4-in. hollow space, and all above that measure to deduct one-half up to 8 inches and deduct all above 8 inches and measure both sides only as wall.

Heights

The heights of all walls, piers, chimneys, breasts, etc., to be their net measurements.

The lineal measurements of all walls to be taken over their longest points, as shown by the following diagram, with dotted lines, witness marks, etc.



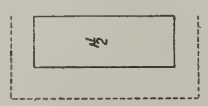
Rules for Measuring Masons' Work

All cross or partition walls to measure one-half way through the wall against which they come in contact.

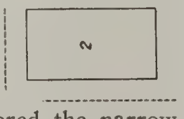
All cross or partition walls to measure one-half way through the wall against which they come in contact.

Piers

All 1½ brick piers and under to measure two ends and one side for lineal measure, thus:



and all piers over 1½ bricks thick to measure one end and one side for lineal measure, thus:



The thickness of a pier to be governed by the wall joining or above it, but where they are beneath columns and not in conjunction with any walls, thir thickness is to be considered the narrowest way.

Pilasters, Chimney Breasts, Fireplaces, Etc.

Pilasters, chimney breasts, fireplaces, etc., of one brick projection from walls, or less, to measure both ends and their face for lineal measure; and more than one brick projection to measure one end and their face, and to be counted as wall their projection from the wall, but in no case to count less than one-half brick wall.

Ledgings

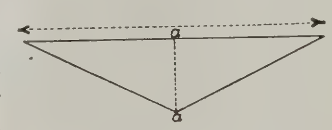
Ledgings for joists, etc., to be measured square, their height and projection from wall to be counted as wall the amount of their projection, but in no case to count as less than one-half brick.

Copings

Coping course projections of one or more courses each side of wall to be allowed, same as ledgings.

Chimneys

Chimneys above walls to be measured same as piers, and as solid work. The projection of caps of chimneys to be measured same as ledgings and coping courses, according to their styles. The measurements for lengths of chimney caps girth the chimney on the projection of the cap, and the bases and chimneys to be governed by the same rules that govern caps.



Angle chimneys to measure across their longest sides for lineal measure, and from *a* to *a* for thickness of wall, as illustrated.

Foundations, Footings, Etc.

Foundation walls, footings, etc., to be measured from out to out, same as walls of superstructures, and of their average thickness.

Foundations of footings of partition walls to measure one-half way through their cross walls, same as partitions.

Every two courses in height of footings to measure 6 inches in height.

Foundations of piers, pilasters, etc., to be governed by the same general rules of measurement that govern their superstructures.

Cornices

Brick cornices to be measured their height and projection as solid wall, and in no case to be less than one-half brick wall, and all over one brick to count as one and one-half, and so on.

Circular and octagonal smokestacks, chimneys, etc., to be counted square at their mean diameter, and counted as solid wall.

Cisterns, Etc.

Cisterns, catch-basins, wells and circular privy vaults, etc., to be measured on outside girth and of their mean heights.

Corbellings

In places where corbellings occur, the additional thickness of walls to measure from the bottom of corbells.

Openings

No deductions to be made for any openings measuring less than 100 square feet; and for all openings of more than 100 square feet and less than 150 square feet, one-half of all over 100 square feet will be deducted; and for all openings of more than 150 square feet and less than 200 square feet, two-thirds of all over 100 square feet will be deducted; and for all over 250 square feet the entire opening will be deducted; but the return of the jambs will be allowed as lineal measure to the wall. In openings where deductions are made, the measurements will be taken from jamb to jamb and from sill or bottom of opening to the springing of the arch.

Store Fronts

Nothing will be allowed to measurement for store fronts, and all measurements of brick work above store fronts to be taken from the bottom of the lintels.

In store fronts where isolated brick piers occur, they will be measured under the head of piers. But when a pier occurs in a store front on the end of a longitudinal wall, the face of the pier will be allowed to the lineal measure of the wall; if the pier breaks out on the side of the wall it will be measured as under the head of piers, and the lineal measure of the wall will cease at the back of pier.

When return store front windows occur, with iron columns on the corner, the lineal measure of the side wall will stop off at the window, but the return jamb will be allowed to the lineal measure of wall, and when there is a brick pier on the corner, the wall and the face of the pier will be allowed to the lineal measure of the wall, and the opening will be governed as under the head of openings.

Where the ends of walls are faced with iron pilasters the lineal measure will be the net length of the wall.

Vaults

The walls of vaults to be governed by the same general rules above specified, except the arches, which will be measured solid from the springing to their crowns, and from the inside of the walls, and all grating, concreting, etc., to be measured as solid brick work.

No deductions to be made for any lintels, ends of timbers or joists, bond-timbers cut-stone boxing for window or door frames. etc.

Church Buttress

Buttresses in church work, etc., to be measured as under the head of piers, the height of the buttresses to be measured net from bottom of piers to top of each coping.

Plastering

Plastering to be measured by the square yard, and no deductions to be made for any opening of less than 150 square feet.

All walls to measure from floor to ceiling, and no deductions to be made for any base casings, except wainscoting not plastered behind, and all ceilings to be measured from wall to wall. Attic rooms to be measured square.

When quarter circles, cornices, etc., occur, the plain plastering to measure same as square angles, and where there is an offset below or above the quarter circle, the amount of the offset to be added to the wall or ceiling, as the case may be.

Cornices to be measured by the running foot, the measure to be taken on the wall, and to girth all chimney breasts, etc., that the cornice breaks around, and one foot of measurement to be added for each and every angle and circle made by the cornice.

Scale of Architects' Fees in Canada

A new schedule of minimum fees for the Province of Quebec Association of Architects has been approved as the outcome of recent representations to the Provincial Government. It appears that the Association asked for a flat commission of 5 per cent. in place of 5 per cent. up to $50,000; 4 per cent. from $50,000 to $150,000, and 3 per cent. over that amount. The following is the new list of commission for services rendered by members of the Association:

No. 1.—The architect bases his professional charges upon the entire cost to the owner of the building, when completed, including all the fixtures necessary to render it fit for occupation, and is entitled to extra compensation for furniture and other articles designed or purchased by the architect.

No. 2.—If any of the material or work used in the construction of the building be already upon the ground, or come into the possession of the owner, the value of said material or work is to be added to the sum actually expended upon the building before the architect's commission is computed.

No. 3.—Traveling expenses are to be paid by the client.

No. 4.—The charge per day to be made by an architect shall depend on his professional standing, but the minimum charges shall be $15 per day.

No. 5.—In all cases where an architect is subpœnaed professionally as a witness in court he shall be entitled to a fee of $4 per day of attendance.

No. 6.—Drawings and specifications, as instruments of service, are the property of the architect.

No. 7.—In consideration of the charges mentioned hereafter, the architect shall prepare drawings and specifications, as originals, and provide copies of these drawings and specifications for the use of the contractors, but he shall be entitled to have all the originals and copies returned to him when the work shall be completed.

No. 8.—For professional services in connection with all buildings, comprising preliminary studies, complete plans, specifications, details and superintendence, the architect shall be entitled, except as hereinafter provided, to a commission of five per cent. on the total cost of the building when completed.

No. 9.—For all works of addition, alteration, or restoration, the architect shall be entitled to a commission of seven and one-half per cent. on the cost of the works.

No. 10.—For all other works of special character, viz.: For monumental work, fittings and furniture, and for decorative work, stained glass and such like, the architect shall be entitled to a commission of ten per cent on the total cost of the work.

No. 11.—Partial charges, in the case of sub-division or discontinuation of the work, shall be as follows:

For preliminary studies (sketches), one-fifth of the above charges.

For complete plans and specifications, including the preliminary studies, one-half of the above charges.

For details, one-fifth of the above charges.

For superintendence of the work, when drawings are not furnished, two and one-half per cent. on the cost of the works.

No. 12.—Where engineers or other experts are employed by the owner to co-operate with the architect for certain works (as for heating, ventilation, electric work, etc.), the architect shall receive for his commission two and one-half per cent. of the cost of such work.

No. 13.—For valuation of property requiring measurement and detail estimate, where the value shall not exceed $5,000, the commission shall be one and one-half per cent. Where the value exceeds $5,000, the commission shall be one and one-half per cent. on the first $5,000 and one per cent. on the remainder.

No. 14.—In case the owner of the building should require the services of the architect to prepare quantities, or for measurement of the work done or to be done, such service shall be paid (outside of the regular commission) at the rate of two per cent. on the valuation of the cost of the work.

No. 15.—Should the owner desire to have a clerk of the works in the building the said clerk of work shall be engaged and be under the direction of the architect and shall be paid by the owner.

A Historic Site

It is probable that few among the throngs of people who daily pass the 31-story building recently completed at the northwest corner of Wall and Nassau streets, opposite the Sub-Treasury in New York City, realize that its site is one of the most interesting historical spots in the country. A portion of it was occupied more than a century ago by a Presbyterian church which was used as a military hospital during the occupation of the city by the British.

In front of this lot there was a demonstration over the news of the battle of Lexington and the seizure of the City Hall by the Sons of Liberty in 1775. In the tavern of John Simmons, which was subsequently erected on the site of the church, a banquet was held in 1783 to celebrate the evacuation of the city by the British and the triumphal entry of the American army at which Washington, his officers and leading citizens were present. One year later in the same tavern James Duane, the first Mayor of New York, was inaugurated.

A carpenter working under an independent contractor of an electric light company, injured by coming in contact with an uninsulated electric wire in a room where the danger from the wires was obvious, assumed the risk of the employment.

Remodeling a Business Building in Stucco

How An Old Brick Structure Was Transformed Into a Modern Hotel Having a Stucco Exterior

By James F. Hobart

A MOST interesting example of the transformation into a modern business structure of a building fifty years old has recently been successfully carried out in South Bend, Indiana, in connection with the old St. Joseph Hotel, which, though originally erected for farming purposes, was made into a hotel before it was fairly completed owing to the destruction by fire of a nearby hostelry of the same name. Originally, the structure was of rough brick, the roof of the gable variety, and there were four dormer windows projecting streetward from the red-painted shingles. Fig. 2, represents the old building as it appeared for many years previous to the recent transformation. The dormer windows had disappeared long ago but the rough bricks and the street-projecting eave-cornice were still in evidence.

Fig. 1—Appearance of the Front of the Building After it Has Been Remodeled

The "cast-iron front" which was regarded as a marvel of show-window construction when this building was erected gave place to new cast iron supporting columns at the corners of the building and on either side of the main entrance. A combination beam was placed above the windows, this being made up of an I-beam and a channel, each 15 inches, placed side by side, and a 4 x 4-inch angle riveted to the outside of the channel, which in turn was placed on the outside of the combination beam.

The effect obtained by the rearrangement of the building is shown in Fig. 1, and it also reveals the manner in which the posts were disguised and converted by Austin & Chamblau, architects, of South Bend, Ind., into apparently massive monolithic concrete. The manner in which the pitch roof was hidden is also plainly to be seen in this picture. The erection of a parapet wall and the addition of a red-tiled balcony roof not only effectually concealed the hideous roof, but gives a touch of color to the execution, besides effectually breaking the monotony of the large "pebble-dash" area of front. The design of the architects calls for additional relief of the front by an iron balcony, supported upon brackets bolted to the wall between the second and third story windows.

A wide awning, extending the entire length of the building, which faces to the south, gives a very imposing and harmonious effect in connection with the "pebble-dash" wall finish and the awning and the balcony roof give just the right amount of relief color.

The window frames, sash and the door frames are made of dark planished copper and present a very pleasing appearance, leading the beholder to wonder how wood could ever have been considered the proper material for sash and window trim. The front elevation and section, Fig. 3, represents the architects' conception of the remodeled building and shows the manner of adding the parapet wall to hide the eaves. It also shows that the old end or gable roof projection was removed, and the rearrangement of the windows by moving two to bring them central with the rooms from the inside of the building. The disposition of the cast iron columns and steel beams are shown by this engraving, also the manner in which these shapes were hidden in the walls and kept out of the way of the front trim.

Fig. 2—The Building Before the Remodeling was Effected

Remodeling a Business Building in Stucco

The disposition of the new gutter and its water conductor as shown by Fig. 3 is very ingenious—a conductor being made of galvanized iron and attached to either end of the building. These conductors had not been attached at the time the photograph reproduced in Fig. 1 was taken.

In Fig. 4, are details of the new cornice. One of the most striking, original arrangements the writer has ever seen is the arrangement of electric globes as a part of the new cornice. The lamps are plainly visible in the picture, Fig. 1, and as shown upon the detail in Fig. 4, an enclosed incandescent arc light is suspended close underneath each cornice bracket, while small incandescent globes are spaced between the brackets, forming a dentil lamp arrangement which is very effective at night and pleasing by day. The arrangement of lamps as a means of architectural ornamentation is entirely new and novel in this (Indiana) section of the country and to the writer, and the method can certainly be used to advantage in very many instances. For certain conditions, it is capable of elaboration with correspondingly greater results.

The massive doorway was built up to give a most impressive effect by the use of wire lath on common 2 x 4 in. studding, the inner angles being well nailed to the studs and the outer angles reinforced with metallic corner beads which effectually prevent the possible flaking off of corners or their damage by any ordinary blow from passing people or implements. The studding was set on top of the stones which form the base of the several doorways, corner-posts, columns, etc., and the upper end of each stud terminated against a similar stone, thus forming, when covered with stucco, a very solid and lasting piece of work which presented all the characteristics of solid sandstone, when finished.

The corner posts were treated in a similar manner, also four interior columns which were necessarily located in the center of the show room. These posts, under the skillful treatment of the architects, were transformed into artistic columns of imposing appearance which added to the appearance of the room instead of detracting from it as before they were treated. These columns are indispensable, as they sustain the entire central portion of the building. But grouped symmetrically with the entrance, the columns become a part of the effect as though they were designed for that purpose instead of arranged in that manner to get rid of them. This is where true architectural skill manifests itself, blended with artistic instinct of a high order on the part of the architect and designer.

The interior columns had a plaster molding placed upon the square stone which formed a base; plaster

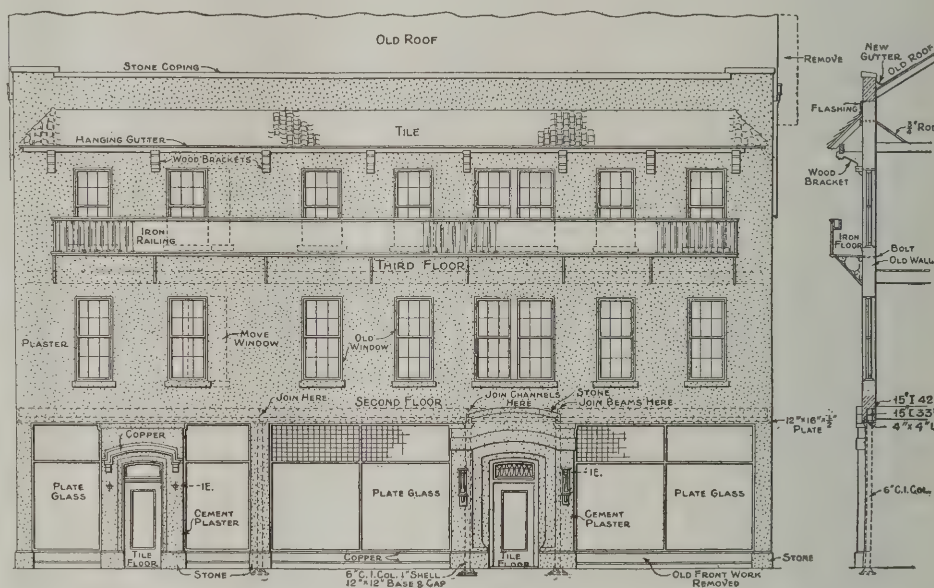


Fig. 3—Front Elevation and Section Showing the Important Changes—Scale 1/16-in. to the Foot

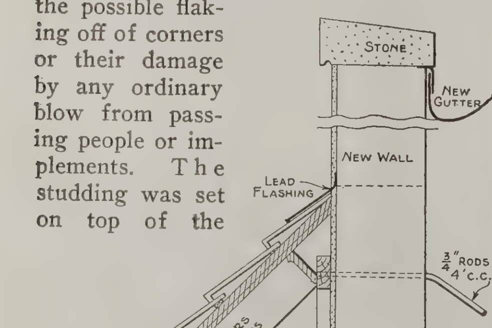


Fig. 4—Detail of the Main Cornice—Scale ½-in. to the Foot

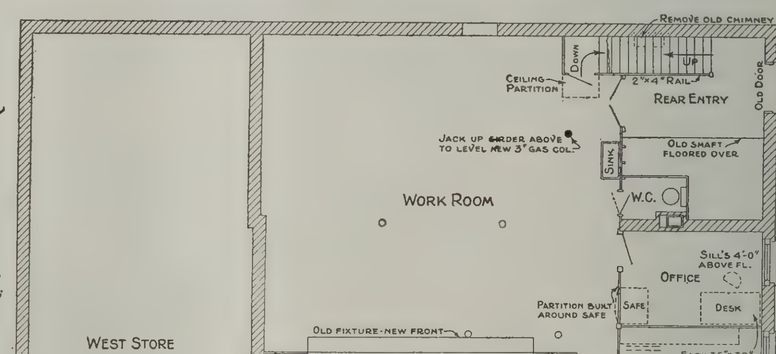


Fig. 5—Main Floor Plan—Scale 1/16-in. to the Foot

Remodeling a Business Building in Stucco was spread upon the expanded metal lath with which the sides of the columns were covered, while a composition cap interposed between the column and the large girder which supported the beams in the show room ceiling, complete the column business in a very pleasing manner.

Fig. 5, which represents the main floor plan, is so clearly self-explanatory that little description is necessary. The basement plan is interesting on account of the method pursued in arranging for the large show room, it being necessary to group the central posts as described elsewhere, to put in new piers and footings, to lower girders and the show room floor, and to put in lines 2 x 4 in. studding in the basement to support the ends of the first floor joists.

The second floor plan is interesting from the fact that there is a room adjacent to the stairway and convenient to the second floor toilet, which was cut off from the rest of the second story space by means of a fireproof partition which was executed with gypsinite studs covered with Sacket boards and plastered.

The third floor of the building was also fitted up, a suite of business offices being finished in the west end, above the "West Store," and the entire remaining portion of the third floor made into a work-shop for the repair and rebuilding of electrical machinery.

House Building--Past and Present

An English Lecturer's Comments on the Subject

DURING the past winter there has been a series of lectures on the Arts Connected with Building delivered at Carpenters Hall, Londonwall, England, and the sixth of the series was on "House Building Past and Present," by H. M. Baillie Scott. In the course of the lecture he stated that any comparison between the methods of the past and present in building disclosed all the differences between a living art and a dead formula. "Take, for example," he said, "the treatment of a floor in an old cottage. The joists would be full of character. Their outlines would have the slight undulations suggested by the grain. They would not be exactly straight or exactly level. You might go in a dozen cottages and each would vary in treatment. There would also be pleasant undulations in the plaster, and nowhere would we find the brutally rigid, mechanical outlines of the modern room. Turn to any modern text-book on building, and you would find no hint conveyed to the student that construction was anything else but a dead and trite formula. Joists—mere scantlings without any possible kind of interest—were shown there placed 15 in. apart from center to center, and below these the inevitable plaster ceiling with its badly-designed moulded cornice and so on. There was no suggestion that the whole art of building begins in the placing and shaping of its materials in such ways that the characteristic beauties of each are drawn out. You would not find a line to suggest that building was an art at all, but it was presented as a peculiarly dismal science. Building thus being made a dead letter, our architects were reduced to conceal the poverty of essential building by all kinds of superficial adornment.

"As to the planning of old houses in the earliest times, the house consisted of one room. It was unicellular, and its development consisted in the formation of secondary specialized cells or rooms grouped round the central apartment. In the old English manor house this development proceeded in two opposite directions from a central axis. This axis was the passage which went right across the house at the lower end of the hall or main apartment. On the one side of this were developed the apartments for service, while at the opposite (or dais) end of the hall the withdrawing-rooms and all that part of the house which was devoted to the elegancies of life were added. As these accessory apartments increased the functions of the hall were gradually absorbed by the special apartments, and so it gradually shrank to the dimensions of a mere passage with a staircase in it. It still retained its old central position as the axis of the house, and in this condition we find it in the XVIIIth and XIXth centuries in the plans of the majority of houses, with the difference that on restricted town sites the kitchens have been pushed from their positions on the side of the hall to the back.

"In the planning of the modern house let us imitate the old house mainly in this: That its plan should be the outcome of our requirements, and, while so satisfying material needs, it should also minister to something more than those. Let us design it from within outwards, and let its outward aspect be the natural expression of its inward grace.

The New Equitable Building

The shell of the old Equitable Life Assurance Society's building, destroyed by fire on January 9, is being rapidly demolished and upon the site will rise a structure 36 stories above the street level with basement and sub-basement and which when completed will be the largest office building in the world. It will be called the "Equitable" Building and will occupy the entire block, having a frontage of 168 ft. on Broadway; 152.3 ft. on Nassau Street, 310 ft. on Cedar Street and 305½ ft. on Pine Street. On the ground floor will be an arcade two stories in hight extending from Broadway to Nassau Street and beneath this will be a thoroughfare leading from the Broadway subway to Wall Street and the adjacent district. At right angles to the arcade will be one leading from Pine to Cedar Street.

Special attention will be given to accommodations for institutions requiring large areas of floor space or a series of floors. The building will in fact consist of a series of independent units, each unit being provided with an equipment of private elevator service and other conveniences. It is understood that the syndicate purchasing the site paid in the neighborhood of $14,-000,000 dollars for it and the office building will cost several millions more.

F. M. Andrews & Co., New York City, are the architects in charge of the work and Ernest Graham, of Chicago, will be consulting architect. The contractors are Thompson-Starrett Company, New York City.

The Equitable Company will have offices in the new building but no financial interest in the structure.

Omaha's Cement Show

The directors of the Nebraska Cement Users Association have announced that the next Cement Show will be held at the Auditorium, February 6 to 12, inclusive. The Auditorium will be arranged practically the same as last year and Secretary Frank Whipperman states that the outlook for a prosperous Show is gratifying.

Influence of Antique Models on Present Day Furniture*

William and Mary and Dutch Influence -- Chippendale -- Hepplewhite -- Sheraton -- Colonial -- Mission

By Paul D. Otter

BY the use of illustrations Figs. 8, 9, 10, 11 and 12 in the preceding article, indicating the character of the Jacobean period, which includes the reign of James II, Charles I, the Commonwealth period, Charles II and James II, and also embracing what is called the Stuart and Tudor style, we immediately note a change in style when William, the Dutch Stadtholder, comes over from Holland with his wife Mary and possesses himself of his father-in-law's throne (1689-1702).

He was a man of decided ideas and a determined way of putting them into motion. The period of "William and Mary" presents a study in furniture very different to preceding forms. Here again the illustrations will more quickly show the distinction, and it hardly needs the attention to be called to note the difference in the leg of chair, Fig. 13. This pattern denotes particularly the Flemish or Dutch influence, which in turn was borrowed by them from the French.

There are many modifications of this, the cabriole leg, as it is called. The reader will note that the upper part of the chair indicates it is quite a different type in the transition still of the former Jacobean, for it must be appreciated that while we are quickly reviewing this subject and are now stopping at a particular period that possesses many imported features to a marked degree, yet during all these periods the impressions and suggestions of former styles in point of fact require a number of years to be eliminated. For the accepted classification we must know the style under discussion as "Queen Anne"—however little she had anything to do with the change of art brought over by her Dutch brother-in-law, William.

The "William and Mary," however, or "Queen Anne," as we will call it, must necessarily strongly attract our attention, for with the constant preference for the "Colonial" in our present day furnishings we have in it the results of an early king's fostering care of his home arts in cabinet making, as seen when considering the furnishings of an early colony home.

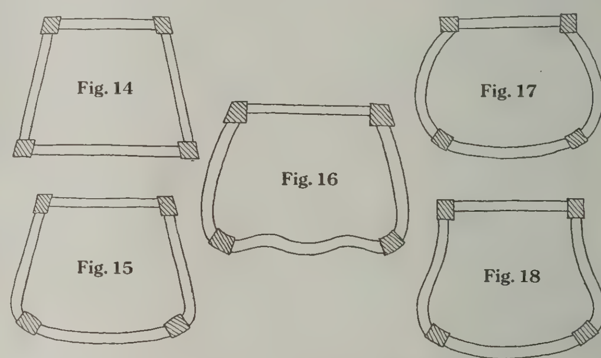


Fig. 14 to 18—Forms of Chair Seats

Fig. 13—A Queen Anne Chair

Fig. 19—Queen Anne Splatback Chair

Fig. 20—Windsor Type of Arm Chair

Influence of Antique Models on Present-Day Furniture

Another marked feature of the "Queen Anne" style was a change from a square or rectangular outline to a rounded or curvilinear form in the shape of the seat frames, as indicated in Figs. 14, 15, 16, 17 and 18. Also the chair backs were of a baluster or "splat" like character instead of solid panels as in Figs. 13 and 19.

The "Windsor" type of arm chair brought out at that time shows such baluster or splat in the center. This form of chair, Fig. 20, is greatly identified with Colonial homes.

With the introduction of the arm chair, formalism and stiffness gave way and the upholsterer developed his craft more. In Fig. 21 is shown a "Queen Anne" settee which is very popular to-day, the picture indi-

*Continued from the August issue, page 423.

cating the peculiar scroll roll arm which in those days had their purpose of accommodating the full or hoop skirt of the ladies. Cane came into considerable use about this time for filling backs and seats to chairs.

The toilet mirror and writing desk in Fig. 22 and what was then special furniture also came into favor. Men of prominence and writers had furniture or chairs built to meet personal whims or needs, just as one

and after a period of two hundred years the modern designer is holding up the work of Chippendale, Hepplewhite and Sheraton as masters unexcelled.

More is known to-day of "Chippendale style" than is known of the man Thomas Chippendale, who was born in 1708 and died in 1779. With little knowledge of his private life and personality, we can, however, arrive at an estimate of the man when we review the

Fig. 21

Fig. 22.

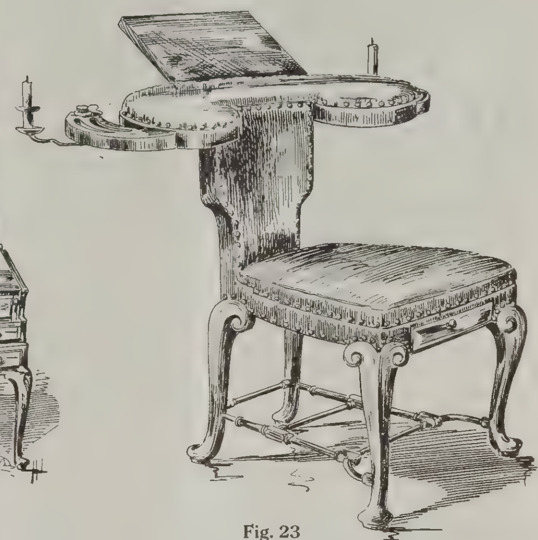


Fig. 23

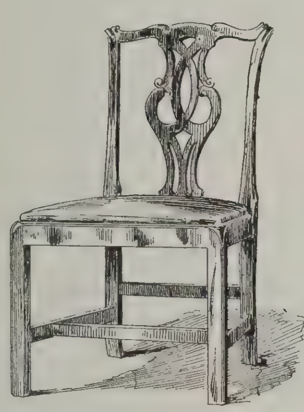


Fig. 24

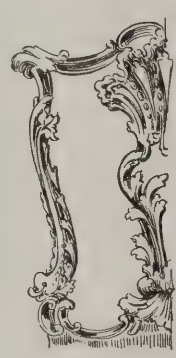


Fig. 26

Fig. 27

Fig. 28

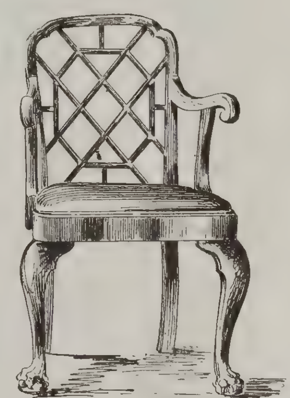


Fig. 25

Fig. 30

Fig. 29

Fig. 31

Influence of Antique Models on Present-Day Furniture—Various Types and Details

would order a suit from his tailor. Fig. 23 illustrates such a chair made for the poet Gay. Note the cabriole leg, a French shape but cut in a more restrained manner than the carved leg shown on the chair in Fig. 13.

And so we come along in the years and enter the "Georgian period," so-called, properly beginning with the reigns of the four Georges from 1714 to 1830. In this century much of the very best work was executed,

years in which he lived and accomplished so much that found favor among his wealthy patrons, which leads us to believe that he would be a rare success to-day; for while not especially original, he possessed great ability to put "this and that" together with results which produced a style that has carried his name along through the years. While a clever adapter of parts and pieces we like to think that the product of his brain and hands still bears his name rather than that of a patron king. He must have shown some executive ability to bring this about—some might call it egotism, but why should not a man be known by the chests and tables he makes—particularly if he makes good chests and tables—just as much as a good painter is recognized by his signed painting? This man and his contemporaries lived mind, body and soul in their work, and we suspect their enduring work was greatly stimulated by personal praises and substantial patronage; they lived in a period when men of mental ability were also equally capable with their hands.

In Fig. 24 is shown a plain type of Chippendale chair which is considered quite characteristic, although it is not his favorite form, for the leg which he delighted in using was the French leg, but treated less elaborate and more suggestive of the "Queen Anne" cabriole type as in Fig. 25, which terminates in a ball and claw.

While Chippendale showed great preference for French detail, he used it in many cases in a very skilled and restrained manner on his cabinet work, the forms of which were usually plain and well proportioned. In a condensed treatise of this kind, chairs are pictured to show the character of a period as they naturally offered a more frequent medium of expression on the part of the designer for his particular tendency. A clearer impression of Chippendale ornament may be obtained by referring to Figs. 26, 27, 28 and the group 29. The detail in the first chair back is quite of the Louis XIV and Louis XV order, and again in the back, Fig. 27, he uses in a simple way certain French *motifs* as shown in the group Fig. 29 in clever union with an original Gothic treatment of the open banister, and then in Fig. 28 he combines this French influence with the Chinese lattice treatment, and so in pilaster, rails and panels of other furniture forms he utilized these fragments, leafage, scrolls, shells and scalloping with rare grace and skill.

As with all who become enamored with French ornament, particularly the excessive overladen character of Louis XV style and "Roccoco," so Chippendale left behind him many drawings and examples of his work which we would now consider decidedly erratic and overdone, but we have evidence in drawings and examples of so much of his better work that we readily overlook his fancy flying to questionable hights, and his contemporaries were undoubtedly influenced by the versatility of this man. Figs. 30, 31 and 32 show other forms of this designer's work.

Men following Chippendale a little later no doubt were more under the spell of the Louis XVI style, which was considerable restrained in form and detail to that of Louis XV, and in considering Hepplewhite and Sheraton we find little to criticize in extravagance of outline and surface embellishment.

Hepplewhite and Sheraton

From certain glib usage by novelist and salesman, Chippendale is thought to be quite the "entire show," when as a fact two other men occupied the stage and played well their parts, at least in the last act of the Chippendale setting. How well the three have played, copied or vied with each other our present day furniture stores will show. It is truly Chippendale, Hepplewhite or Sheraton which the manufacturer aims to reproduce with all their characteristic features.

The market and individualizing feature of the Hepplewhite style in contrast to Chippendale is in lighter parts, graceful outline and delicate ornament, and to be just, very little pirating from the work of his own countryman, yet dominated much by French work and *motifs*. To arrive at a quick comprehension of the difference, Fig. 33 serves as full evidence of general form, and this designer's work may be recognized by the shield form of back; rarely if ever was the back imbedded in the back seat rail. See Figs. 34, 35 and 36.

Contrast these forms with those of Sheraton, shown in Figs. 37, 38, 39 and 40, whose tendency was more to straight lines and tapering members.

As regards the identification of furniture forms, Hepplewhite may always be recignized by his use of the concave corners in writing desks and sideboards, as indicated in Fig. 41, while Sheraton used the convex shape as shown in Fig. 42. It has been the endeavor to sort over the work of these three great English cabinet makers and show the salient features of each.

Colonial

The "Colonial" as a term applied to furnishing and furniture would make an interesting story. In description it is traceable to the influences of three recognized periods—the Greek "Classic," which inspired the French "Empire" style, to in turn undergo still greater elimination and refinement during the "Georgian" period in England, when it finally developed into its present known characteristics of simple form and plain surface, and as time passes the term "Colonial" is given greater recognition in the list of the world's creative or architectural periods. The open museums and the private collection show a goodly harvest of many early examples in which there are the genuine work of the best English designers imported by the colonists, as well as the work of the early American cabinet makers.

To have proper conception of the "Colonial" we must dismiss from our minds Chippendale, Hepplewhite, Sheraton, Adam and other English workers and gradually draw together the composite type of these workers and the work of our own colony craftsmen who were locally handicapped and otherwise unable to work in any but a restricted manner. We will find that the type resolves itself into a most satisfactory form in which the simple elemental forms of base, pediment, column and scroll are marked in constant consideration given to the "Colonial" as the prevalent style.

The simple outlines of the table in Fig. 43 and workstand, Fig. 44, are used as examples of distinctly American Colonial.

The "sleigh" bed in Fig. 45 is another type, yet showing an "Empire" influence. Fig. 46 shows the inventive tendency when the early colony chair maker devised the rocker, yet was under the spell of Chippendale in the design of the back. Fig. 47, however, is quite independent of mother country suggestion except that it indicates slightly the "Windsor" type, yet it is so pronouncedly rural colonial that it and its variations hold our patriotic attention.

In articles following it is the purpose to take up more in detail the goodly influences of the eighteenth century designers and to be more at home with our "Colonial."

Mission

Our theme would not be brought up to the present day should no mention be given to the unquestionable influence of the very few furniture forms found about the early American missions. We are all living to experience the marked transforming tendency of what we now call the "mission style." Owing to its refreshing simplicity and to the sparcity of architectural types and interior detail, architects and designers have in many recent instances overstepped and "gone to Spain" for much the old friars either did not intend to bring with them or have on or within their community buildings, or for good reasons were unable to skilfully execute conventional forms.

Figs. 48 and 49 show the original inspiration for what we term "Mission," and any decided departure from the direct constructive character ceases to be "Mission." From the restlessness of our day we are developing a modified interpretation familiarly known as the "Arts and Crafts," of which more will be written later.

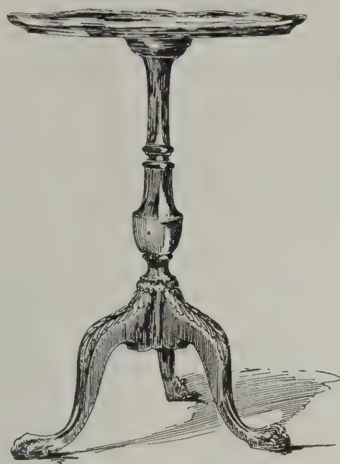


Fig. 32

Fig. 34

Fig. 35

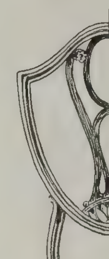


Fig. 36

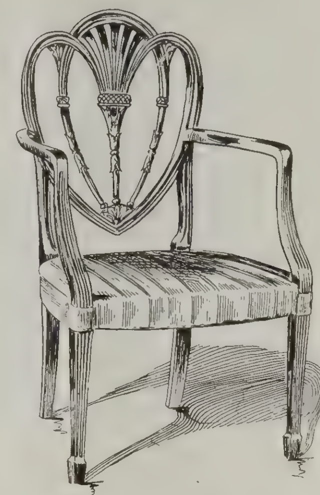


Fig. 33

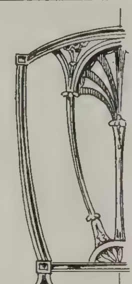


Fig. 37

Fig. 38

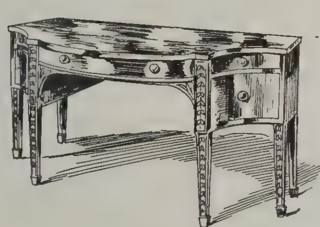


Fig. 41

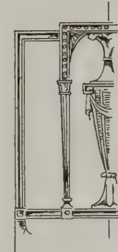


Fig. 39

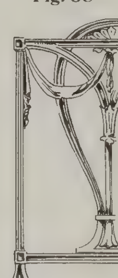


Fig. 40

Fig. 42

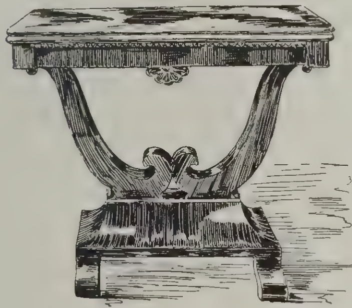


Fig. 43

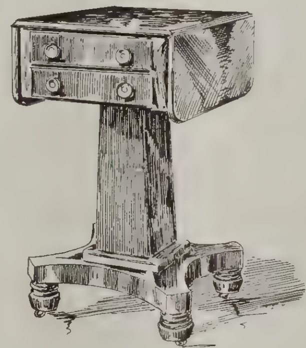


Fig. 44

Fig. 45

Fig. 46

Fig. 47

Fig. 48

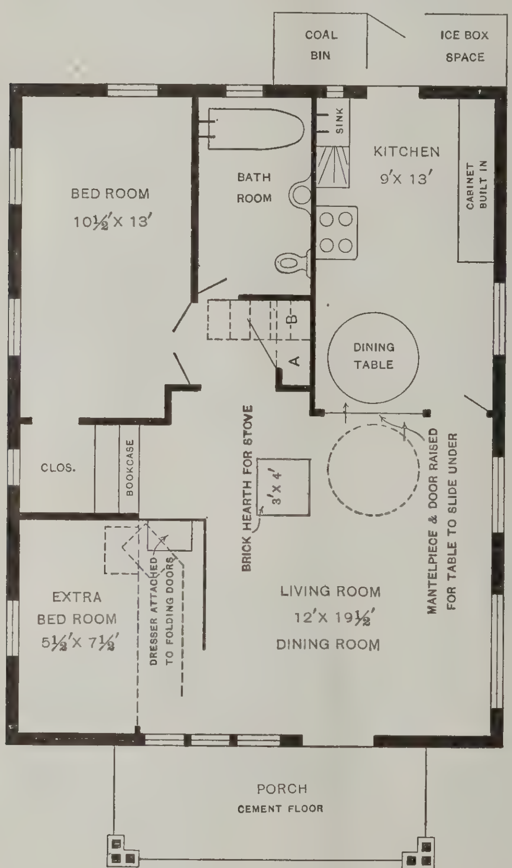
Fig. 49

Influence of Antique Models on Present-Day Furniture—Various Types and Details

A Cottage of Unique Arrangement

A Prominent Feature Is the Transformation of Rooms

MANY have been the instances of unique arrangement of rooms in a cottage designed to meet particular tastes or requirements, but one of the most quaint constructions along this line which has come to our notice is that of a cottage erected by a young chemist in Evanston, Ill. The builder is a native of Holland and he planned the house unrestricted in everything except that he provide adequate closet space. Although the house is small in plan it contains on one floor a large living room which may be transformed almost instantly into a dining room or a spare bed room, a kitchen, bath room, china closet, sleeping



A Cottage of Unique Arrangement—The Foor Plan

room, etc. A stairway to the attic folds into a space 2½ by 3 ft., and the stairs form drawers.

The following particulars relating to the cottage may not be without interest: There is a living room 19½ ft. long by 12 ft. wide; a bedroom, 13 ft. by 10½ ft.; a bathroom, 8½ by 5½ ft.; a kitchen, 13 ft. by 9 ft.; a spare bedroom, 7½ ft. by 5½ ft., and a closet, 5 ft. by 3 ft., just outside the bathroom.

The closet is divided into halves, each 3 ft. by 2½ ft. One half is a coat closet and the other half, extraordinary as it may seem, contains the staircase leading to the attic.

The other radical and interesting features of the house are the means by which the small spare bedroom becomes a larger one, the manner in which, in a few moments of time, the living-room is converted into a dining-room, and the folding staircase. There are, however, many other features, one of which is the arrangement of the bathroom fixtures and the kitchen sink so that the one set of pipes does for both. This constitutes one of the many ways by which the expense of building was kept down. One coal stove heats the whole house, and does it effectively even in zero weather.

The house is located on a corner site, 53 ft. wide by 180 ft. long. When a visitor approaches, his first idea is that the house is hardly large enough to contain more than one good-sized room, and he continues to think so until he is ushered inside, then the idea is quickly shattered.

On entering, he sees a prettily decorated and furnished living-room of a size that would do justice to a big house. The walls are covered with burlap and considerable stained wood is showing. The beams across the ceiling are the scantlings that form a foundation for the floor of the loft. Not only does this arrangement add to the decorative scheme of the room, but it provides several inches more of hight than it would have if the ceiling were as low as the under sides of the scantlings.

If the visitor stays to dinner, the first transformation within this room occurs. When the meal is ready, the lady of the house touches a section of wall under the mantel, which slides silently and easily up behind it, and she draws the dining-room table, completely set and with the meal upon it, into the living-room. When the meal is over, the table as quickly disappears again into the kitchen.

At one of the ends of the living-room is a settee, and bookshelves in the wall, and the stove that heats the whole house. When the spare bedroom is required, the settee is swung around under the windows, and the wall behind is pulled out a couple of feet into the living-room. The wall is in two sections, and is pulled out about as far as the edge of the rug. Then a curtain is hung across the 2½-ft. opening and the room is ready. In the morning the wall is pushed back again, and the living-room resumes its normal size.

The staircase leading to the loft room above is an ingenious device, answering the purpose of a chest of drawers in an upright position when not in use as stairs. Each step is provided with a lid and the interior is utilized for various purposes—soiled linen, hat box, etc. All that is required to convert this seeming pile of boxes into a practical set of stairs is to pull the two sections forward. The attic to which the staircase leads is a large room which provides 19 ft. by 8 ft. of standing space.

The cottage has attracted widespread attention and on Sundays such crowds have visited it that the owner was forced to close the house on that day and go away. After two months of this the interest on the part of visitors showed no decrease, and in despair the owner sold the cottage and went to another suburb, where he built again, embodying in the new cottage some additional features suggested by the first.

A reinforced concrete Army Club building to cost $50,000 is to be erected at Baguio, and will be when completed the finest club in any army post of the Philippines.

Making Estimates for Metal Ceilings

Figuring Amounts Required for Regular and Irregular Shaped Rooms—Allowance for "Extras"

IN many parts of the country, especially in sections remote from any large city or town, it is often the custom for the local carpenter-contractor or builder to install metal ceilings as a part of his calling, and in order to do this intelligently it is necessary for him to be able to correctly estimate the amount of ceiling required for any particular job. Ofttimes the rooms are of irregular outline and this involves more or less confusion in figuring unless the operator making the estimate is well posted on all the details of the work. As a general proposition, however, there is nothing unduly complicated about measuring and estimating on ceilings for the average run of rooms and after the country builder or sheet metal worker—if there be one in the community—has looked into the matter a little he will soon be able to measure and make up an intelligent estimate if he is supplied with one or more of the manufacturers' catalogues and discounts on the materials illustrated therein.

Taking Measurements From the Building

The first step after one has been asked to give an estimate on a metal ceiling is to get the proper measurements from the building or from the plans in case the building is not completed. In making up an estimate from plans it will be necessary to note to what scale the plans are drawn, after which the proper sizes can readily be figured. The majority of plans are drawn to a scale of ¼ in. to the ft. but now and then will be found a plan, especially on large public work, that is drawn to a scale of ⅛ in. equals one foot, which of course means that each ⅛ in. on the plan or blue print represents one foot on the ceiling.

Ordinarily metal ceilings are sold at a specific price per 100 sq. ft. called a "square." This price usually covers the different parts of the ceiling, including the centerpiece, plates, moldings, fillers, cornices, etc. The average metal ceiling catalogue as issued by the regular makers of metal ceilings, such as the catalogue sent out by the Edwards Manufacturing Co., Cincinnati, Ohio, is usually complete in its information relative to the different designs; that is, it ordinarily shows the design of field plates and then gives explicitly just what molding cornices, centerpieces, fillers, etc., are included in the price of that particular design of field plate. In case there are exceptions and the centerpiece and any other part of the ceiling is extra, the catalogue usually so specifies and there is little chance for the builder or sheet metal man to make an error on this point.

Calculating Sq. Ft. Required For a Room

If the rule hereafter given is closely followed there will be little difficulty in calculating the number of square feet required for a room of regular dimensions. Suppose, for example, that an estimate is required for a metal ceiling for a room 25 x 40 ft. in size, and similar to that indicated in Fig. 1, but without a bay window. Assuming that a 16 in. cornice is to be selected, it will mean that in addition to the area of the ceiling, a strip extending entirely around the room 16 in. wide, or deep, as one may choose to call it, will have to be covered, or in other words instead of the area to be covered being 25 x 40 ft. there must be added to these dimensions 16 in. on one end of the room and 16 in. on to the dimensions of the other end of the room. It is customary to add 2 in. on each side and end for variation and the filler. Thus for a room similar to that indicated by the diagram Fig. 1, without a bay window, the simplest method for calculating the area of ceiling required would be as given in the table presented herewith:

METHOD OF FIGURING METAL CEILINGS FOR ORDINARY RECTANGULAR ROOM

Size of room	25 ft. 0 in. x 40 ft. 0 in.
16-in. cornice will add	2 ft. 8 in. x 2 ft. 8 in.
Variation and filler	0 ft. 4 in. x 0 ft. 4 in.
Total dimensions to be covered by metal	28 ft. 0 in. x 43 ft. 0 in.

Thus it will be seen that the total girth of metal employed in the covering of a room of this size is 28 ft. x 43 ft. and that by multiplying these dimensions it will be found that there are 1204 sq. ft. of metal in the room. For the ordinary type of ceilings, say, worth $3 per square, the cost will be $36.12. This will ordinarily include the cornice, the filler, the mold and all the plates necessary to make up the ceiling. If there are any extras the catalogue will so specify in the reading matter in connection with the description of the plates.

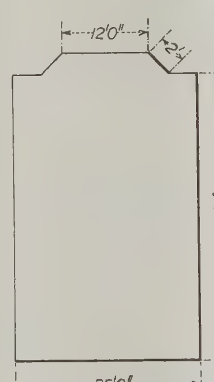


Fig. 1—Diagram of a Regular Shaped Room

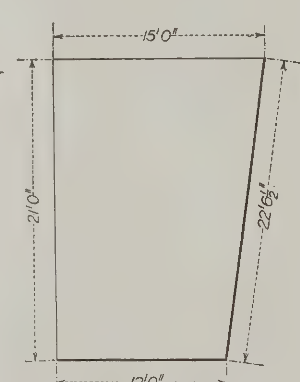


Fig. 2—Diagram of An Irregular Shaped Room

Making Estimates for Metal Ceilings

If, for instance, the room is regular in shape and has a bay window like that in Fig. 1 and the dimensions of the window are as shown, namely, 2 ft. x 12 ft., it will answer every requirement to add the product of 2 x 12, which is 24, or, in other words, to add 24 sq. ft. to the 1204 sq. ft. Of course, this is not the exact figure for the bay window, but is near enough for all practical purposes. Furthermore, it is customary to send in with the order a sketch of the room giving the dimensions, similar to those marked on Fig. 1. It will readily be seen in cases of this kind that the sketch is necessary so that the proper amount of cornice, filler and molding may be shipped with the order.

When an irregular shaped room like that in Fig. 2 is encountered, the area may be obtained by adding together the two irregular dimensions; that is, the 15-ft. dimension on one end and the 12-ft. dimension on the other, making 27 ft., and dividing this by 2. This gives an average width of 13 ft. 6 in. for the room. If the room is 21 ft. long the approximate total number of square feet in the surface of the ceiling can be arrived at by multiplying 13 ft. 6 in. by 21.

In other words, an irregular shaped room like that shown in Fig. 2 may be treated as a rectangular room 21 ft. x 13½ ft., and the rule as per the table in the foregoing applied.

Cornice all Around the Room

In measuring a building, particular care should be taken to notice whether or not the cornice can be used all around the room. This should be noted on the sketch sent in to the manufacturer and in case the cornice cannot be used all around the room, information should be given as to what width molding can be used across the finish so that the manufacturer will then know where to use the flat molding on the ceiling. Wherever there are centerpieces to be placed in the ceiling, those should also be noted on the drawing. In making these drawings for the side walls it is best to mark the position and size of any openings, such as doors and windows, as otherwise the manufacturer will ship enough side wall to cover solid in spaces of that description.

Now and then the builder or sheet metal contractor will come across rooms in which there are small beams or steel girders projecting down from the ceiling through the center of the room. It will be necessary to figure, of course, on covering the surfaces of these regardless of how many there may be. For instance, if a ceiling beam 15 in. deep extends down into a room in the center, there will be two sides of it to be covered, which would add 30 in. to the size of the room; also 2 in. to each side for variation and filler, which would add 4 in. extra.

Working Out the Pattern to Advantage

After the room has been measured, the builder or sheet metal man should get his customer to select the ceiling design which he wishes. The next step is to determine if the pattern will work out to advantage in such a room. In this connection it might be well to state that it is not advisable to use ceilings in small rooms that take a large cornice and large expanse of border and filler. This can probably be better explained by referring to design No. 2148 in the catalogue issued by the Edwards Manufacturing Co. for 1911.

A case recently came to the attention of that company where a ceiling had been sold of that design for a hall 3 ft. wide and 14 ft. long. When the order came in the company, on checking it up, found that there was only room enough in the hall to put in the two cornices, one on each side of the room, and a small strip of filler throughout the center. When such cases come up and a selection of that kind is made, it will be necessary to explain to the customer that such a pattern is not suitable. The sheet metal man will readily be able to figure out whether a design will work out in a room by counting the multiples of the plates shown in the design. For instance, take design No. 2144 in the Edwards Company catalogue, page 37; there is to be allowed 18 in. for cornice, 14 in. for filler and 21 in. for border before any calculation is made for the field. If calculations are made on this it will be seen that this design would not work out for a room 8 ft. x 20 ft., as it could not be put in without spoiling the whole effect.

The price quoted for metal ceilings in the ordinary run of catalogues does not include the furring strips. Therefore, in case it should be necessary to ask for a price on a metal ceiling for a particular room, it should be specified in the inquiry whether or not the price wanted is to include the furring strips. It is found that in most territories, however, the furring strips may be procured locally at a lower rate than they can be shipped by the sheet metal manufacturers. Ordinarily the sheet metal man can get a price locally per 100 lin. ft. on ⅞-in. x 1¼-in. soft poplar or cypress furring strips. It takes about 150 lin. ft. of ⅞-in. x 1¼-in. furring strips to apply 100 sq. ft. of metal ceiling, according to the drawings which are prepared by the Edwards Manufacturing Company, Cincinnati, O., for the erection of metal ceiling. The cost in the Cincinnati territory is about 50c. per square extra for these strips.

When the country builder or sheet metal man takes a contract for the metal ceilings erected, he should, of course, remember that the prices quoted in the catalogue do not include the painting, and the contractor should have it understood with his customer that his price does not cover the cost of painting the ceilings after they are in place, but that the price does include one priming coat of paint on the material before it leaves the factory.

The sheet metal man will soon be able to estimate on the cost of labor for erecting. In practically all cases he can get an approximate figure from the manufacturer for any particular design. He will understand, of course, that the price on erection work varies considerably, especially when the designs are worked out with molding and the labor has to be increased.

In a future issue we will have something to say about the proper method of erecting metal ceilings from working drawings.

An Imposing Private Dwelling

One of the most pretentious residences erected in New York City in many years is that which is being put up in West 54th Street next to the corner of Fifth Avenue for John D. Rockefeller, Jr., in accordance with designs prepared by Architect William Welles Bosworth, 527 Fifth Avenue, New York City. The mansion is of steel frame construction with masonry walls and when completed it will be 8 stories in height finished in granite and limestone. In style of architecture it will be suggestive of Italian Renaissance.

On the ground floor will be a large vestibule entrance, a staircase hall, office, reception and breakfast rooms. On the second floor will be the drawing room music room, dining room and pantry; on the third floor the library and the owner's suite with dressing rooms, while the floors above will be devoted to the accommodations of the family and servants' quarters. On the roof will be playgrounds and pergolas.

An interesting feature is the space which has been made available by the removal of the building which formerly stood in the rear on West 53d Street, the intention being to convert this space into a formal garden with gates giving access to the street. The enclosing walls have been finished in stucco with a slight architectural treatment with cornices, quoins and belt courses. To the east of the new building there is a large open garden space extending to the home of Mr. Rockefeller's father at 4 West 54th Street.

The favorite type of dwelling in Plauen, the capital of Voightland, situated in the mountainous section of Saxony, about 79 miles southwest of Dresden, seems to be the apartment or suite consisting of sitting room, kitchen and bedroom. The place now has twelve grammar schools, two high schools and two gymnasiums, and a brisk building season is predicted for 1912.

The University of Kansas, Lawrence, Kan., has instituted a five-year course in architecture.

Scale of Wages in the Building Trades

Some Interesting Comparisons of Figures in Three Groups of Cities of the Country

AFTER the various scales of wages in the different branches of the building trades have been adjusted—usually in the spring of the year—and a compilation of the figures has been made, it is interesting to note how wages in one section of the country compare with those which prevail in remote cities, as for example, how the wages in leading centers on the Atlantic seaboard may compare with those which obtain in the principal cities on the Pacific slope. It is our privilege this month to present to the attention of our readers the scales of wages in three groups of cities of the country taken from the official schedule of 66 cities in the United States and Canada, compiled and issued by E. M. Craig, secretary of the Builders' Association, 808 Chamber of Commerce Building, Chicago, Ill., and corrected up to July 1 of the current year. The cities which we have selected are some of the more important ones of the extreme east, a few extending north and south through the central portion of the United States, and finally a few of the more important ones on the Pacific slope.

A study of these figures shows that most of the trades operate under a scale of so much per hour, while in a few cases the rate is a stated sum per day. It will be noticed that the highest paid mechanics are the masons and bricklayers, the rate in San Francisco running as high as 87½ cents per hour. The wages for carpenters run all the way from 30 cents per hour in Atlanta, Ga., up to 65 cents in Chicago, with 62½ cents per hour the ruling rate in New York City, St. Louis, Salt Lake City and San Francisco. In the case of the plumbers the scale varies from 43¾ cents per hour in Philadelphia up to 75 cents per hour in Chicago.

In other lines the variation is equally noticeable and the table as a whole affords a most interesting comparison.

Rates of Wages, Per Hour, Paid in Various Branches of the Building Trades

Name of City	Masons and Bricklayers	Structural Iron Setters	Plasterers	Lathers	Plumbers	Steam Fitters	Carpenters	Painters	Sheet Metal Workers	Electrical Workers	Roofers	Laborers Hod Carriers
Albany, N. Y.	60c	50c	60c	60c	50c	50c	45c	40⅒c	50c	37½c	50c	L. 25c H.C. 32c
Boston	M. 60c B.L. 60-65c	50 56¼c	65c	55–60c $3-$4 per M.	60c	55c	50c	41-50c	30-52½c	37½-50c	Gravel 37½-43¾c Slate 50-52½c	L. 25-35c H. C. 30-35c
New York	M. 57½c B. L. 70c	62½c	68¾c	62½c	62½c	68¾c	62½c	43¾c	59⅜c	56¼c	Metal 59⅜c Comp. 40⅝c	L. 33c H. C. 37½c
Philadelphia	M. 50c B. L. 62½c	60c	62½c	43¾c	43¾c	43¾c	50c	40c	45c	45c	45c	L. 25-30c H. C. 30-35c
Richmond, Va.	M. 43¾-62½c B. L. 62½ 70c	35-50c	33⅓c	$1.70 per M.	45-50c	45-50c	33⅓–37½c	33⅓-35c	40c	33⅓c	44c	L. 15-20c H. C. 25c
Atlanta, Ga.	45c	50c	45c	30c	50c	45c	30c	30c	40c	40c	35c	15c
Milwaukee, Wis.	65c	56¼c	65c	$4.25 per day	$5 per day	50c	45c	47½c	42½c	45c	....	32½c
Chicago	72½c	68c	75c	71⅞c	75c	72c	65c	60c	62½c	75c	60c	40c
Cincinnati	M. 54c B. L. 65c	60c	62½c	56¼c	56¼c	52½c	50c	45c	37½-45c	52½c	35c	L. 17½--25c
St. Louis	M. 60c B. L. 70c	65c	75c	62½c	66¼c	68¾c	62½c	55c	60c	65c	55c	L 20-37½c H.C. 42½-45c
Denver, Col.	M. 62½c B. L. 75c	56¼c	68¾c	50-56¼c	62½c	62½c	60c	50c	56¼c	37½-50c	37½c	37½–40⅝c
Salt Lake City	M. 62½c B. L. 75c	62½c	75c	62½c	70c	70c	62½c	56¼c	57½c	56¼c	50c	L. 31½c H. C. 50
New Orleans	62½c	50c	50c	45c	56½c	56½c	24-45c	47½c	40c	45c	30c	L. 15c H. C. 32½c
Seattle, Wash.	M. 62½c B. L. 75c	50c	70c	60c	60-75c	40-50c	45-56¼c	50c	45-62½c	40-50c	40-50c	L. 25-31¼c H. C. 50c
Portland, Ore.	M. 70c B. L. 75c	75c	75c	62½c	75c	75c	50c	50c	56¼c	50 and 62½c	37½c	L. $2.50-$3 H. C. 50c
San Francisco	87½c	62½c	87½c	62½–87½c	75c	75c	62½c	56¼c	68¾c	62½c	75c	L. 31½c H. C. 50 & 56¼c
Los Angeles, Cal.	75c	38⅝c	62½c	50c	56¼c	56¼c	43¾c	37½c	50c	43¾c	40⅝c	L. 31½c H. C. 50c
San Antonio, Texas	M. 62½c B.L. 75c	31¼–43¾c	75c	55c	56¼c	56¼c	43¾c	50c	43¾c	40⅝c	43¾c	21⅞c

Design for a Simple Water Supply

Methods of Providing Storage and Pumping Facilities for a Small Country Residence

A VALUED correspondent, in discussing the subject indicated by the above title, points out that to supply water to a house by the simplest means on account of the location being far away from the nearest place where a water supply under pressure is available and the services of the plumber may be dfficult to secure, he would suggest the two schemes indiated in Figs. 1 and 2 of the illustratons.

Without information in regard to the elevation of the water supply relative to the house, it is impossible to say if the pumps can be placed in the house as shown, or if they would have to be placed down the well shaft to get within suction distance.

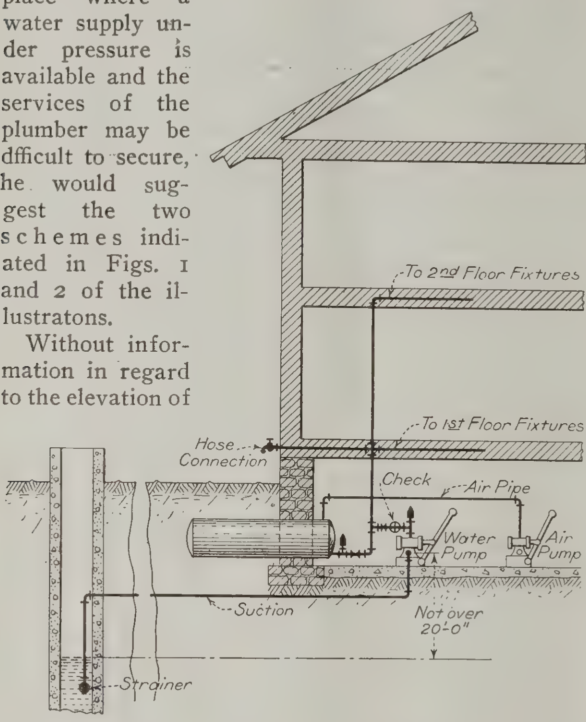


Fig. 1—Supply to Country Home by Pneumatic System

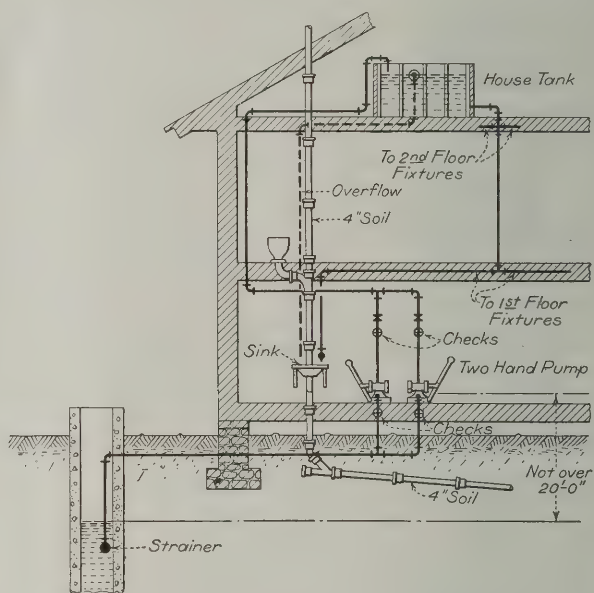


Fig. 2—Overhead Tank Supply for Farm House

Design for a Simple Water Supply

In the scheme shown in Fig. 1 the water is pumped by a hand pump into a storage or pressure tank of steel, which compresses the air above the water and produces a pressure. The air thus compressed is not usually enough to force the water up to the higher points in the house for any length of time, so that a supplementary air pump is required to raise the air pressure after the tank has been filled with water to the proper degree, or about 65 or 70 lbs. This system has the advantage of supplying cool water owing to the underground storage at a pressure sufficient for fire purposes, and will throw a stream entirely over the top of the roof for a time. The pressure tank, however, must be of steel and very strongly built. The use of two pumps doubles the liability of failure from the pump, and there is no substitute in case of either of the pumps breaking down. A stopping of the air pump would badly cripple the system in a very short time, and of course the water pump is absolutely necessary to refill the tank.

The scheme shown in Fig. 2 is probably cheaper and much more dependable. The water is supplied in this case by gravity from an ordinary house tank in the attic into which it is forced by hand pumping. Hand pumps are comparatively cheap, and the installation of two, as here shown, will make the system's going out of commission one chance in ten thousand. If anything happens to one pump it can be shut off and the other used until repairs can be made.

This stystem will give poor fire protection, however, on the upper floors and none on the roof, besides which there is the danger of water coming down through the house from leaks in the tank, and the fact that all summer the water supply will be warm owing to the water absorbing the attic heat.

The danger of leakage can be overcome by placing the house tank in a wooden drip pan lined with copper or lead and running a waste pipe from the pan to the overflow. This will give prompt notice of leaks and will carry off the leakage from all moderate-sized openings. The lack of fire protection and the warmth of the water are impossible to overcome and should be explained to the owner before installing.

If conditions permit, the use of a water ram in combination with the house tank would come very close to satisfying all the requirements, but this, of course, requires a point of discharge where the ram is located, being at a level far below the water supply, besides being very wasteful of the water.

A Fire Exposition and International Conference of Fire Prevention, Protection and Extinguishment is to be held in Madison Square Garden, New York City, instead of the Seventy-first Regiment Armory, as originally scheduled, beginning October 2 and extending through the next ten days of the present year. Fireproof building construction in the city and suburbs will be exploited at this Exposition, which is expected to command a large attendance of architects, builders and engineers, as well as fire chiefs of various cities and insurance representatives.

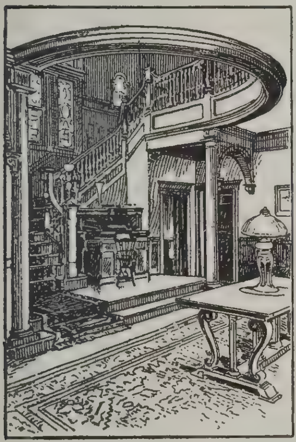
"Triangulus" Replies to His Critics

States Motives That Led to Preparation of His Articles on Winding Stair Rails and Elucidates Points Criticised

By Triangulus

I AM glad to find that there are others besides myself who have given the matter of winding stair rails serious—I may say scientific—consideration.

Before replying to the criticisms of "Cymro" and "C. C. Grant" allow me to first state the motives which actuated me in the preparation of the articles appearing in the April and May issues of the *Building Age*. It has been my privilege to see almost everything that has been published on the subject of handrails which has appeared in its columns since it was begun more than thirty-three years ago as *Carpentry and Building*, and it has always seemed to me that the methods generally set forth were inaccurate in several respects—at fault in regard to warp or twist and thickness of plank, and also in some other respects, which I shall endeavor to explain. I therefore determined to find, if possible, a method whereby the relative position of all points could be located with certainty and to see if it were not possible to apply it to the wood. It is needless to say that the operations of descriptive geometry, which have been understood for many hundreds of years, appealed to me as a means whereby this could be accomplished and the result of my labors is what has been published.



In undertaking this work my first effort was to convey to the mind of the mechanic a correct idea of the form to be produced; i.e., to assist the imagination to conceive a mental picture of the "squared wreath" and of its geometrical character. To accomplish this I have gone into an explanation of the geometrical generation of the form and have then shown a true orthographic projection of the same which is given in my Fig. 4 in the April number. This having been correctly done, the two lines marked J K and G H, having been drawn as described, show the exact thickness of the plank from which this wreath is to be cut. I see no better way of obtaining it.

Answer to "Cymro"

Referring now to "Cymro," who claims accuracy for his method, he would have his readers believe (by reference to his Figs. 5 and 10) that the vertical distance between opposite corners of the profile, or the rectangle of the wreath piece after it has been turned to the required bevel, gives the thickness of the plank. This is by no means true, as more thickness will be required to give the piece the necessary amount of curve—the additional thickness being shown in my Fig. 4 by J b.

This statement is made upon the supposition that one piece of the wreath is made to cover a quarter circle of the plan. If it should include more, the thickness of the plank must necessarily be increased since the twisted wreath is, as I have explained, a spiral or helix. This can be easily understood by a careful inspection of any screw thread; a segment of a few degrees will require material only a trifle thicker than the thread, and the thickness of the material required will increase as the segment is made to include a greater number of degrees.

It will be of little use for him to try to prove anything by his drawings, for in attempting to transfer measurements from one part to another as directed I find them extremely inaccurate. I refer particularly to his Fig. 2, in which also lines said to be parallel are not parallel. Referring to this drawing, he says "upon the point 4 erect the height of five risers." The drawing plainly shows six. The point 13 indicates the height of five risers, in which case the pitch of the tangents would be represented by a line drawn from 1″ to 13, and when the subsequent directions have been followed and the reference letters moved to their new and correct location, the line d′ 3′ could not then by any possible means be equal to d 3 of the plan, as he states it should be, if the work is correctly done.

Width of the Rail

Furthermore, if the measurements to which he refers as co-relative were correctly transferred, the face mold would be narrower in the middle than at the ends, as he has shown it in his Fig. 7. I see no reason for this, for the plan plainly shows that the rail is of the same width throughout. If he means by this that the profile, being turned or twisted near the ends, requires more material, he virtually says that the plank is first sawed squarely through and then that the sides are afterwards slanted or beveled as need be. This, then, makes his method an approximate one instead of an accurate one.

I can only refer him again to the top view of the plank near the upper part of my Fig. 4. In this view the distances from *r, s, t* and *u* to the curve have been made equal to the corresponding distances on the plan. This gives the elliptical curve without seeking centers or using the string. The curve for the opposite side of the plank is found in the same manner, all as fully explained and indicated by the dotted lines. The plank must of course be so sawed that the saw will follow the curves on both sides at once, as explained in connection with my Fig. 6, concerning which I do not wish it understood that the method there shown is recommended, as it would no doubt be very impracticable. This matter I leave to the mechanic. The description distinctly says that the geometrical character of the piece could be realized if it were so cut.

The most glaring error which I find in "Cymro's" illustrations, however, is shown in his Fig. 10, which is a sort of perspective view of a plank, into the front edge of which he has drawn what appears to be the twisted wreath. In this drawing both ends of the wreath appear to be in one and the same plane; that is, on the same edge of the plank, which is clearly not the case, since in his Fig. 4 the two ends, shown by Z and 4, lie in planes almost at right angles to each other.

I have just one more point to mention, and about which he is silent. The end of the plank upon which the profile is to be drawn is not square to the top and bottom—a point to which he has evidently given no thought. The end of the plank, according to what I have shown, is first cut to the angle indicated in my Fig. 4 by the line J G, which is the plane in which the line $b\ k$ is found; afterward the corner is cut off, as explained, beginning on $b\ k$ and following along the line $k\ d\ l$ on the bottom of the plank, which thus shows it to have a slight undercut. It is brought finally square with the axis at the end by cutting away the wood upon the upper side along the lines from b to r and from d, following the parallel curve of lower side.

In the earlier part of his criticism "Cymro" says, "Why not say they (his methods) are * * absolutely correct geometrically?" What I have said above is "why?"

I hope my critics will understand that I am not advancing a system by which the ordinary mechanic can turn out the greatest amount of work with the least effort. My object has been rather to first stimulate the imagination to a proper conception of the true character of the shape to be produced, and second, to show how results can be obtained which cannot be gainsaid, thus using the methods of projection as a test upon any system. In other words, I have undertaken to explain a principle rather than to advance a method. There are times when there is important work to be done which must be accurately and perfectly done. Had the workman who carved the marble rail shown in my Fig. 10 known how, he would not have made the hump shown. The wooden rail shown in Fig. 9 is undoubtedly the product of a factory where skilled labor and good mechanical draftsmen are employed.

Reply to Criticism of C. C. Grant

Referring now to the criticism of "C. C. Grant," I notice that he has fallen upon many points in reading my articles which arose in my mind while preparing them. It is only necessary to say that had I gone so deeply into a discussion of this matter, the columns could not have contained all that should have been said.

One of the important points which I refer to, and which caused me no little thought as to how I should treat it, is that in which he refers to the right and also the vertical sections of the rail and to the fact that he says the lines of the sides of the right section would be curved instead of straight. This is, of course, true. I found at this point of the treatise that I had reached a condition, a full explanation of which would not only take a great many words and perhaps a few diagrams, but that the average reader would not care to devote the necessary time and thought to the reading and consideration of points too fine to be of any practical value. So I concluded to be brief and await criticisms.

At the beginning of his letter he seems to find me emphatically contradicting myself. Not at all. While it is true that science must and does lie at the bottom of all art, because there is admittedly a reason for everything, it is yet a matter of the greatest difficulty to make the great artist think of this. It is not that it is not true, but that he refuses to think about it, feeling (and quite truly) that if he stops to find the reason for everything his genius or his grand impulses will be hampered and that he will thus fail in accomplishing what he has set out to do. For instance, art plays a part in winding rails in the matter of easements. It is at the pleasure of the designer—that is, at the impulse of the artist—to say where one shall begin and where it shall end; it may be long or it may be short; and the determining of these points may have much to do with the appearance of the finished product. In all branches of art instinct sometimes supersedes all reason or method, just as there are great musicians who do not know one note on the score from another. This does not, however, render it impossible that the playing of such artists cannot be recorded and written so that others may play it from the score. A few artisans will accomplish their results without knowing the reason why. My articles were written for those who must work by rule.

I shall have to disagree with him when he says that the draftsman (to follow my method) "must first have the blank or the lines of the blank. Unfortunately, in all such methods the blank and its lines comes last." I still adhere to my statement which he quotes at the outset that every detail of the blank's appearance, as seen from any side, can be shown upon paper. If he will read again and follow carefully the description of the method used in making the elevation, and, let me add, if he understands the operations of projection, he will see how every point of the subject can be located upon paper with accuracy. It was my object to show that the methods of projection can be employed to find upon the plank any number of points in any wreath piece that can be conceived, whether its pitch remains the same throughout or whether its rise be irregular. To this end I showed in my Fig. 7 how the method could be applied to a piece having at its upper end the easement to bring it into a level rail.

Helical Character Explained

In reference to what has appeared in the August number, let me say that the particular in which the tangent, or, in fact, any other system, is lacking is embodied in "C. C. Grant's" question No. 4. Neither the writings of "Cymro," nor in fact those of any other author, have said anything about the spiral or helical nature of the rail which follows a regular climbing stair, or how it is to be obtained. The determination of this part of the work is one of the causes which led me to write my article.

To begin with, the wreath must be cut from a plank. This plank must occupy such a position, whatever it be, with reference to the cylinder or well of the stair as to cut to the best advantage. In any position its upper or lower surface becomes geometrically that of a plane cutting a cylinder, which must invariably result in an ellipse. Thus any system must first find the curve of an ellipse upon one face of the plank by any means advisable. When this curve has been drawn upon both top and bottom of the plank and for outer and inner faces of the wreath, and when the material outside and inside has been cut away, the sides of the unfinished wreath have been made. Now comes the finding of means whereby to cut the top and bottom surfaces. From what is this to be determined if not from a correctly projected elevation? I glean from all that I have seen on the subject—I might better say from what I have not seen—that this matter is left entirely to the eye of the mechanic. But before the mechanic can act he must know what depth of material is required. If the plank is only thick enough to contain the profile of the wreath in its twisted position, then surely it must follow a general elliptical course. It has not room to do otherwise.

The only conclusion that can be reached is that the plank must have sufficient thickness to permit of its being cut into a spiral instead of an ellipse, which will be less or more, according as the extent or length assumed for the portion of the spiral to be cut in one piece is less or more. I have accomplished this by means of the ordinates drawn vertically on the sides of the plank; that is, when the plank is placed in its inclined position, but really at the angle to the face of the plank shown in the elevation, from the points marked r, s, t and u. For convenience lines can first be drawn squarely across the top and bottom of the plank from the points mentioned, and when the wood at the sides has been cut away in the manner suggested by my Fig. 6 the vertical ordinates can be drawn from the points where the saw has cut the lines, when measurements taken from the elevation can be transferred to these lines. It must be remembered, however, to take the measurements from the surface of the plank to the outer helical curve, as given in the elevation and transfer them to the outer or convex side of the now partially cut wreath, and to measure from the surface of the plank to the inner helical curve and transfer them to the concave side of the wreath.

By now cutting through the plank from the points thus obtained on the outer side to the corresponding points on the inner side, say by sawing down to these points, we shall thus arrive at the helical surface. When this surface has been developed the rail will climb with regularity.

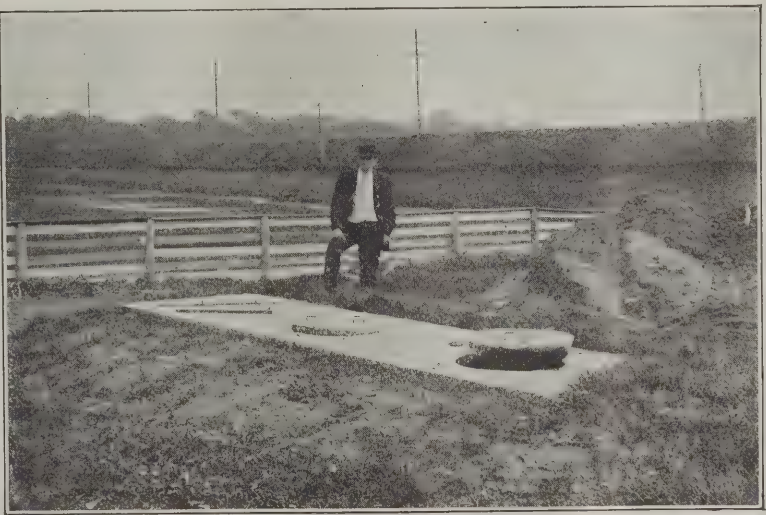
Possibly I did not make this quite plain enough in my first article, but said enough that this could be inferred.

Let me add a word regarding "intricate cross projectors" and academic methods referred to by "Cymro." It is the part of any mechanic or artisan whose work is of a scientific nature to understand the branch of science required in his work to the last degree possible. He cannot know too much, and everything he has learned will sometime be to his advantage.

Sewage Disposal for Country Houses

Telling How the Septic Tank May Be Used to Make Modern Conveniences Possible

THE general use in country houses of the modern conveniences of the bath and toilet has made necessary some effective and inexpensive means of disposing of the sewage. Otherwise the drinking water may in time become polluted and the health of the family seriously endangered. One method of remedying the difficulty and one which has given great satisfaction is by the use of the septic tank, which is nothing but a long water-tight cistern through which the sewage passes very slowly and evenly. Located underground, it is warm and dark—ideal conditions for the development of bacteria, little germs which eat up the sewage and render it harmless in much the same manner as another kind causes cider to ferment. The purified sewage, then merely clear water, may be discharged into an ordinary farm drain tile.



Appearance of Finished Concrete Septic Tank

Sewage Disposal for Country Houses

Although the odor from a small septic tank is practically unnoticeable, yet it is best to locate it at least 150 ft. away from the house. Choose a spot where it can be sunk to ground level and will be out of danger of flood waters. The tank should be large enough to hold the entire sewage for one day. For a family of eight to ten, plan a concrete tank of two compartments each 4 x 4 x 5 ft. long. Since the top and bottom are each 4 in. thick and the division and sidewalls 8 in., dig the pit 4 ft. 8 in. deep, 5 ft. 4 in. wide and 12 ft. long.

If the ground stands firm, only inside forms will be needed. Make two, each 4 x 4 x 5 ft. long. Old 1-in. lumber will do for the siding. The compartment into which the sewage first enters is called the "charge tank." In each end of the wooden form for this tank cut openings for a 5-in. tile with the lower edge of the hole 16 in. above the bottom of the form. Through each of the sidewalls of this same form, 18 in. from the inlet end and 1½ and 2 ft. above bottom, bore 1-in. holes and insert in them greased wooden pegs extending 4 in. into the future sidewalls. Likewise, in the other form for the discharge tank, cut openings for a 5-in. tile, this time with the lower edge of the hole 2 ft. above the bottom.

Mix the concrete one part Portland cement to two parts sand to four parts crushed rock, or one part cement to four parts pit gravel. Place the 4 in. of concrete in the bottom and trowel to an even surface. Immediately set the forms in place so as to leave room for 8-in. division and sidewalls. Fill the forms with mushy wet concrete. At the proper heights insert the 5-in. drain tile through the holes in the forms. Be careful that the outside end of the inlet tile to the charge tank is 2 ft. and its other end 16 in. above tank bottom. The pipe leading from the charge tank is also set at the same sharp slope. The outlet tile from the discharge tank is 2 ft. above bottom and with both ends level. By this arrangement of pipes the sewage is kept in the tank to the depth of 2 ft. and the ends of the tile in the charge tank are trapped or air-sealed, which aids the activity of a certain kind of bacteria. Likewise, other bacteria are developed in the discharge tank by means of the free circulation of air through the discharge drain tile and holes in the manhole cover.

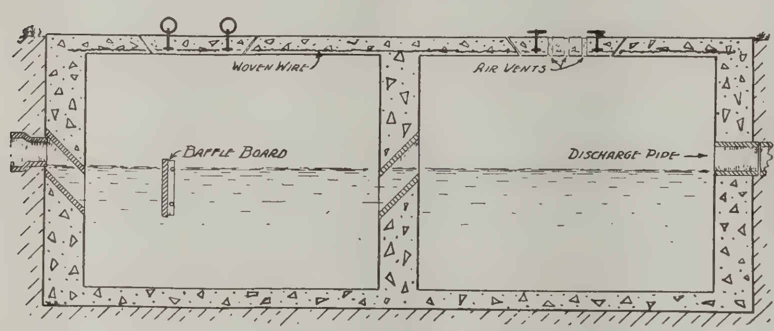
After the sidewalls are three days old, floor over the top of the forms and prepare to lay the 4-in. concrete top. As molds for the manhole covers, have the tinner make two round bottomless dishpans, 18 in. in diameter at the bottom and 24 in. at the top. Grease these tin molds and set one on the wooden floor over each compartment. Bore six 1-in. holes in the floor inside the one manhole mold over the discharge tank and insert in them greased pegs projecting upward six inches.

Place one inch of concrete over the entire floor and at once lay on it, crosswise the tank, strips of heavy woven-wire fencing 5 ft. 2 in. long, or ⅜-in. rods running in both directions and spaced one ft. Likewise reinforce the manhole covers. Immediately place the remaining 3 in. of concrete and do not stop until the tank top and manhole covers are finished. Provide two lifting-rings for each cover by setting in them halves of old bridle-bits, or hitching-post rings, fitted with knobs of wire or with nuts and large washers. If a square wooden manhole mold is used, the concrete cover cannot be cast at once. In such case, carefully remove the wooden manhole form five hours after the top has been finished. Three days later mold the cover the same as for the tin form with this important exception—place heavy paper or cardboard around the edges of the opening to prevent the fresh concrete of the cover from setting to the old concrete.

When the top of the tank is ten days old, lift off the manhole covers, saw openings in the wooden top and remove the forms. In the holes made in the sidewall by the greased wooden pegs, insert ½-in. bolts and set them with mortar. To these bolts fasten the 1 x 12-in. wooden baffle-board which extends across the tank and breaks up the current of the inflowing sewage. To carry the sewage from the house to the tank, use 4-in. sewer pipe laid with tight mortar joints. Connect the discharge end of the tank with a string of drain tile.

According to information furnished by the Association of American Portland Cement Manufacturers the materials required for the tank described above are 5½ cubic yards of crushed rock, 2¾ cubic yards of sand and 9 barrels of Portland cement. If good pit gravel is used, no additional sand will be required.

When the septic tank is two weeks old it may be put



Longitudinal Section Through Septic Tank

Sewage Disposal for Country Houses

to use. It will need cleaning at intervals of two to three years. By its use the health of the family will be protected and life in the country home will be made much more comfortable.

Woods for Making Patterns

In an investigation with a view to determining the relative merits of the different woods employed for pattern making purposes it was discovered that three kinds are chiefly employed—white pine, cherry and mahogany. White pine has always been used primarily in the manufacture of patterns and still furnishes the principal supply of material for this purpose. Owing to the high price of No. 1 shop and better white pine, which are the grades employed for pattern making, says Hardwood Record, California sugar pine is substituted to a considerable extent in pattern making shops where large castings are made.

Sugar pine is regarded as the best substitute there is for white pine, but it is not as satisfactory for the reason that the tiny "sugar streaks" in this wood are prone to ooze resin even through the varnish finish, which often results in a rough casting. However, by the employment of a heavy coat of varnish, this deficiency of the wood is not difficult to eliminate. While both white pine and sugar pine are inferior to cherry and mahogany, their lower price makes them more generally employed for pattern making purposes. It has been estimated that patterns made in cherry and mahogany can be used several thousand times, whereas a softwood pattern would endure only about one-quarter as long a period. Constant use will gradually wear off the sharp edges that are all-important in the forming of an accurate mold. When this occurs the usual remedy is to chamfer down the blunted corners and set in duplicates of cherry or mahogany. In core boxes, it is a common practice to glue a hardwood veneer over the pine. Only small or delicate patterns that are liable to be subjected to unusual wear are always made of hardwoods. The larger patterns, such as gear wheels, have their teeth made of hardwood, and the framework of pine.

Generally speaking, any wood that tends to either shrink or swell is poor material for pattern making. Experience has shown that pine will shrink considerably in width, and will also expand materially when placed in contact with the moist core-sand. This latter objection, however, has largely been overcome by varnishing.

Interesting Features of a Skyscraper

An interesting feature in connection with the new home of the Bankers Trust Company at the corner of Wall and Nassau streets is that the building constitutes one of the few built in New York City the façade of which is of granite. More than 150,000 cubic feet of this material were used, requiring the output of four quarries and the labor of 1200 stone cutters, not counting machine men and quarry hands.

The structural steel used weighed more than 8000 tons. Four large trusses weighing about 50 tons each and about 12 ft. high were used at the second and fifth floors so as to leave the main banking room free of columns.

The steam and electric generating equipment is arranged so that the entire engine and boiler rooms are separated from the rest of the building, thus preventing the heat from the power plant to become objectionable.

The absence of a hydraulic plant, which has until recently been required to operate elevators in a tall office building, has made it possible to concentrate the power plant in a relatively small space.

The building is 31 stories in hight and in making measurements at the completion of the exterior walls the architects found that the greatest variation from mathematical vertical lines, base to cornice, was only ⅝ of an inch at one corner, while two of the corners were exact. In plumbing the steel columns the greatest variation from top to bottom was found to be about ⅜ of an inch, while in a large number of cases there was no variation at all. This is such a remarkable achievement in construction that the architects, Trowbridge & Livingston, declare that it deserves notice, particularly when considered in connection with the great speed of erection. The first stone was laid February 1, 1911, and the stone work was completed September 15—thirty stories in eight months.

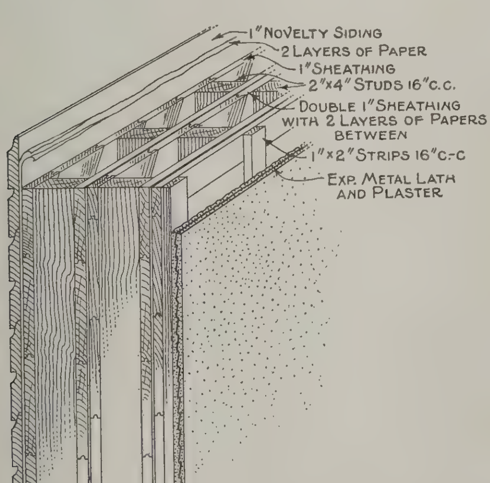
Regulations covering reinforced concrete construction have just been adopted in Constantinople, and architects undertaking this system of construction are required to exhibit their qualifications in the shape of certificates of capacity in this branch of building.

Insulating Walls in Frame and Brick Buildings

Two Methods of Accomplishing the Desired Results and the Materials Used for the Purpose

THE extent to which cold storage rooms are being utilized at the present day and the inquiries that are constantly arising as to a scheme for properly insulating the walls of them, renders interesting the following suggestions covering two methods of accomplishing the desired results. The first case to which we shall refer relates to the walls of a frame building and the manner is clearly indicated in Fig. 1 of the accompanying illustrations. It will be noticed from careful inspection of the sketch that on the outside of the 2 x 4-in. studs which are placed 16 in. on centers is nailed 1-in. sheathing boards. Over these are placed two layers of building paper, which in turn is covered with 1-in. Novelty siding, this furnishing the finish for the outside.

On the inside there is first a double layer of 1-in. sheathing boards with two layers of heavy building paper between them. Against these another row of 2 x 4 studs is placed and to them is nailed another double thickness of sheathing boards with building paper between. To this double row of sheathing and opposite the double row of studding are 1 x 2-in. furring strips, to which expanded metal lath is attached.



Insulating Walls in Frame and Brick Buildings—Fig. 1—Showing How to Insulate the Walls of a Frame Building

The plaster is then applied, giving the finish for the inside of the room.

It will be seen that this method of insulation gives three air spaces throughout the depth of the wall. In one of the 4-in. spaces the cells between the studding are filled with mineral wool, so that in these the air is dead. The inner air space is only 1 in. deep, but the combination tends to prevent the transmission of heat from the outside to within, or the cold air from within the room to the outside.

In Fig. 2 of the sketches is clearly shown the method of insulating walls of brick, stone or concrete, as the case may be. Here the inside of the wall is treated with two coats of pitch, asphalt or tar. After the pitch is applied 1 x 2-in. furring strips are nailed to

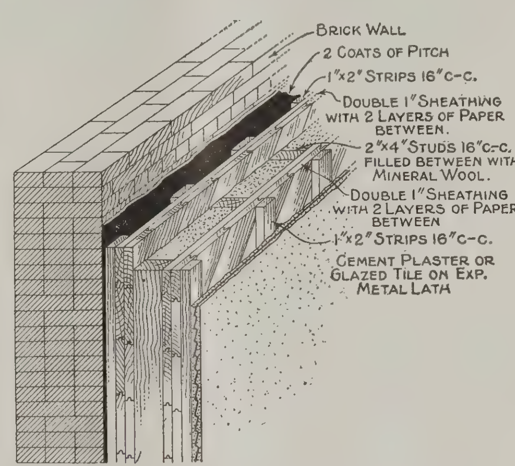


Fig. 2—Insulating the Walls of a Brick Structure

the wall, being spaced 16 in. on centers. A horizontal course of ⅞-in. sheathing is then nailed to the furring strips, a double layer of heavy building paper is placed over the sheathing and then another course of sheathing boards is laid diagonally on top of the paper and nailed to the furring strips through the first course of sheathing. The next step is to set up a row of 2 x 4-in. studding, space them 16-in. on centers and nail to the sheathing. The face of the studding is covered with a double course of sheathing boards with building paper between as in the first instance. The space between these studs is filled with mineral wool or some other insulator of heat and cold. Furring strips 1 x 2 in. and placed 16 in. on centers are then nailed to the surface of the last course of sheathing and expanded metal lathing fastened to the strips. A three-coat layer of cement plaster is then applied as a finish or glazed tile may be imbedded in the cement as an inside finish, according to preference.

If the masonry wall is thick or is otherwise well insulated the inner layer of sheathing may be omitted and the expanded metal lath attached directly to the face of the 2 x 4-in. studding.

Experience has shown these two methods of construction to admirably serve their purpose and although somewhat expensive the first cost is more than compensated for by the satisfactory results which are accomplished.

Charles A. Bowen, secretary of the Builders' & Traders' Exchange, Detroit, has been appointed State Commissioner for Michigan by the National Building Trades' and Employers' Association, which is a reorganization of the National Association of Builders' Exchanges. The commissioner has supervision under the National Association of all exchange work in his state.

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SEPTEMBER, 1912

American vs. Foreign Fire Losses

An explanation of the fact that fire losses in the United States are about ten times what they are in Germany, can be found in the much greater responsibility for fires fixed upon tenants, builders and owners of property abroad. An American gentleman, temporarily living in Berlin, was awakened by smoke and found that a fire originating in a room over him was eating its way through the ceiling of his dining room. The blaze was extinguished with chemical apparatus without any water damage and without needless destruction of walls and furniture. Meantime a careful investigation was made by officials, and the next morning the man who turned in the alarm was sent for and taken before a fire marshal with inquisitorial powers. The examination of all involved showed that the fire started in a hot coal which had dropped from a laundry stove in the attic and rolled upon an unprotected wooden floor. The tenant proved that the stove was an appointment of the building, provided by the landlord, and that it was neither his duty nor his privilege to change it. The landlord proved that he had recently purchased the building under the usual guarantee that all laws and ordinances had been complied with in construction and appointment; that this stove had not been changed and that his attention had not been called to any condition involving a fire risk. The builder from whom the owner purchased was then called, and had to admit that he was responsible for the setting of the stove as the police had found it, and that he had violated the law in neglecting to provide a suitable metallic hearth of the required kind and dimensions between it and the floor. This responsibility was brought home to him by the assessment against him of the damage to the furniture and property of the tenants, together with the estimated cost to the city of responding to the alarm and extinguishing the fire, rounded out by an exemplary fine of 500 marks as a reminder that German laws are intended to be observed. The builder was not required to pay for the damage to the building, it being held that, while the owner had not committed the violation of law which caused the fire, he had been neglectful in not discovering and correcting it, and for that reason should pay for his own repairs. He was informed that only the fact that he had owned the building for a short time saved him from a fine in addition. Such laws and such enforcement explain the per capita fire loss of 30 cents in Berlin and $3 in Chicago. American "freedom" is not yet ready for such restrictions, but it pays for its independence in a fire waste of a quarter of a billion dollars a year, to say nothing of the loss of life and the high taxes made necessary by the existence of such conditions. If the person responsible for fire in this country were made to defray the cost of extinguishing the blaze, the criminal carelessness which now exists would be greatly reduced, as would the taxes necessary for the support of the fire departments.

Steam Boilers in School Buildings

The action of the Board of Education in San Francisco in a resolution prohibiting the use of heating systems which require the installation of a steam boiler in all school buildings to be hereafter erected will be looked upon as drastic and unnecessary. The information at hand does not give any explanation for this radical departure. It is not always possible to secure the necessary ground for a building in which the toilet rooms and the heating system can be installed adjacent to the school building proper, as desirable as some sanitarians might think such an arrangement would prove. With steam boilers used extensively in private residences and public buildings of various kinds, there seems to be no necessity to prohibit their use in school buildings on the ground of safety. There is an intimation that architects who plan school buildings in future will be requested to make provision for some system of warm air heating and for a large building. Even this would result in the use of a boiler in connection with a blower system of steam heating which seems to be best adapted to the use of air washers and humidifiers, which are destined to be used in the best school heating systems of the future. The safety of the children in schools is of paramount importance and it can and will be secured without the general abolishment of the apparatus best adapted to the larger modern school buildings.

Meeting of Secretaries of Builders' Exchanges

Announcement is made of a meeting of secretaries of Builders' Exchanges of the United States and Canada, to be held in the City of Detroit, Mich., on September 10, 11 and 12, under the auspices of the Builders and Traders Exchange of the city named. The matter has been considerably agitated for some little time past, and it has taken tangible shape in the meeting to be held the second week in September. The original idea was to have a meeting of secretaries of exchanges which were within easy radius of Detroit, but after suggestions from others and giving the matter mature consideration it was decided to extend the invitation to all the Builders Exchanges in the United States and Canada who had paid or permanent secretaries.

Matters of importance will be discussed at the forthcoming meeting; papers will be read and general reports called for to the end that each secretary and his Exchange may profit thereby. Among the principal speakers will be William H. Sayward, for many years past secretary of the Boston Master Builders Association.

Much enthusiasm has developed in regard to the matter and a fairly large attendance is anticipated. It is felt that the results will be far reaching and that there will not be many Boards of Directors, if any, who will fail to have their secretary take advantage of this opportunity of meeting secretaries from other Builders' Exchanges throughout the country.

Pittsburgh's Coming Cement Show

In our last issue we made brief announcement of the fact that it had been decided to hold a Cement Show in the city of Pittsburgh, December 12 to 18 of the present year. The idea of the management in abandoning a show in New York City and holding one in Pittsburgh is to cover new territory. The show will be held in Exposition Hall, which is said to have even more floor space than the Coliseum in Chicago, where the Cement Shows in that city have been held during the past few years. The building is conveniently located in reference to the principal hotels and central business district of Pittsburgh and the selection of December as the time for holding the show is at a season of the year when architects, builders, contractors and dealers in building materials have more time to visit such a show than would be the case if it were held at any other period of the year. Building operations are practically at a standstill at that time and there is little of interest in the building material line to hold the attention of the trade. Experience has shown that when the exhibitions are held late in the spring construction plans have advanced too far and builders are too much engaged in active operations to allow them to visit Cement Shows.

Again, many exhibitors state it is necessary that some time should intervene between the close of a Cement Show and the opening of the building season in which to follow up prospects for sales developed at the show.

In one instance an exhibitor at the Chicago show last year produced evidence that at the exhibition he was put in touch with over 400 good prospects, practically all of which would have probably resulted in business had there been time to send out his salesmen to interview the people interested. The time after the show proved so short, however, that it was impossible to properly cover the ground. Others report similar experiences.

The date for the Chicago show has been set for January 16 to 23, 1913, in the hope that this early date will tend to solve the problem in question. A great many inquiries for space at the Pittsburgh and Chicago shows have already been received by the Cement Products Exhibition Company, 72 West Adams Street, Chicago, Ill., and all indications point to a gratifying success. The coming shows will be more widely advertised than ever and will embrace all articles and appliances connected with the use of concrete.

President Humphrey of the National Association of Cement Users makes announcement that the ninth annual convention of that organization will be held in Pittsburgh in December in connection with the Cement Show in that city. Efforts, we understand, are being made to secure papers from not only the best authorities in this country, but from experts abroad as well. The entire field of concrete construction will be touched upon by subjects as outlined by President Humphrey.

Strength of Walls in Tile Houses

The hollow tile and brick house which constituted a feature of our July issue has attracted no little attention on the part of builders and tile manufacturers by reason largely of the placing of the hollow tile on its side instead of vertically in the construction of the walls as is usually the custom. In regard to this point the National Fire Proofing Co. advises that it is one to which it has given a great deal of thought and study and furnishes us with the results of a test conducted by Robert W. Hunt & Co., the well-known engineers, showing the relative strength of a wall built of hollow tile laid on the side and one built with tile on end.

In each case a section of wall consisting of 12 courses and measuring 12 ft. 4 in. high by approximately 3 ft. long was used in the test. The wall with hollow tile placed on end failed under a load of 154,000 lbs. by crushing and spalling at the fifth, seventh, ninth and tenth course from the bottom, while the wall built with hollow tile placed on the side, as referred to in our July article, failed under a load of 80,000 lbs. by crushing the full width of the third course from the bottom.

This matter of the placing of the tile in wall construction seems to be one that a great many builders do not take seriously, but the figures of the test above referred to clearly demonstrate which is the more satisfactory and substantial method.

Convention of Carpenters and Joiners

Announcement is made that the seventeenth biennial convention of the United Brotherhood of Carpenters and Joiners of America will be held in the National Rifles' Armory at Washington, D. C., on September 16. The headquarters for the general officers, committees and delegates will be at the Metropolitan Hotel, Pennsylvania avenue and Sixth street.

In the Carpenter Shop

"Life's a hard grind," said the emery wheel.
"It's a perfect bore," returned the auger.
"It means nothing but hard knocks for me," sighed the nail.
"You haven't as much to go through as I have," put in the saw.
"I can barely scrape along," complained the plane.
"And I am constantly being sat up," added the bench.
"Let's strike," said the hammer.
"Cut it out," cried the chisel, "here comes the boss."
And all was silence. —*Scissors Beaudin.*

CORRESPONDENCE

A Department Where Those Interested Can Discuss Practical Trade Topics -- All Are Invited to Participate

Problem in Scroll Stairway Construction

From "Tangent," New Orleans, La.—Will Morris Williams shows through the Correspondence columns of the *Building Age* how to lay out the wreath piece for the stairs shown in Figs. 1 and 2 of the enclosed drawing. I have read the articles on scroll railings which appeared in the issues of the paper for June, July and August, 1909, when it was known as *Carpentry and Building*, but I failed to get the information which I am seeking. The drawings which I send show one tangent inclining from step 6 to step 4 or 14 in., whereas the others incline one riser or 7 in. Now will this difference make an uneven appearance in the easing of the wreath?

Answer.—We have reproduced the correspondent's sketches as shown in Fig. 1, which represents a plan of the stairway and scroll, and Fig. 2, which shows the elevation of the steps and handrail. The problem was submitted to Morris Williams as suggested and the following is furnished in reply.

In the accompanying diagrams "Tangent" will find two different methods to lay out the wreath rails over and above the scroll curve as represented in Figs. 1 and 2. Handling the scroll tangents in this case does not present any unusual difficulty, as will be observed from a careful examination of Figs. 4 and 6.

The first requirement is to ascertain the exact length of each plan tangent and for this purpose the centers wherefrom the scroll is struck must be found. One of the easiest methods known of drawing a handrail scroll is shown in Fig. 3. Draw a line a-b to equal the exact width desired for the scroll—in this case 18 in. Divide it into 8 divisions; bisect the fourth

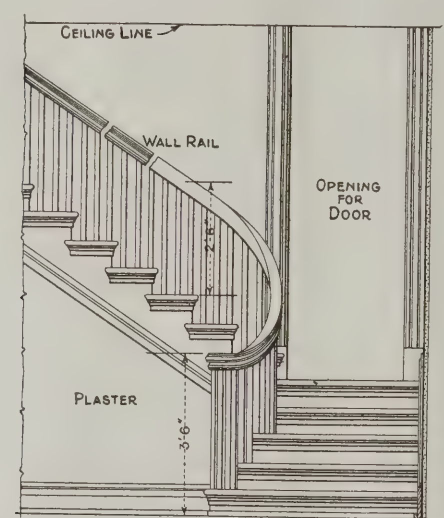


Fig. 2—Elevation of Stairs as Furnished by "Tangent"

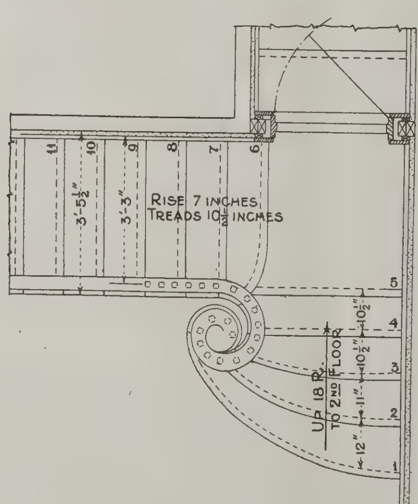


Fig. 1—Plan of Stairs Furnished by "Tangent"

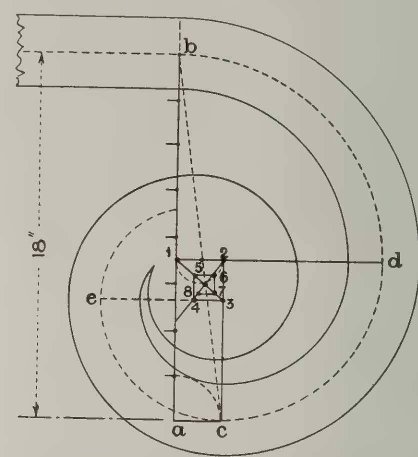


Fig. 3—Diagram Showing How to Draw a Handrail Scroll

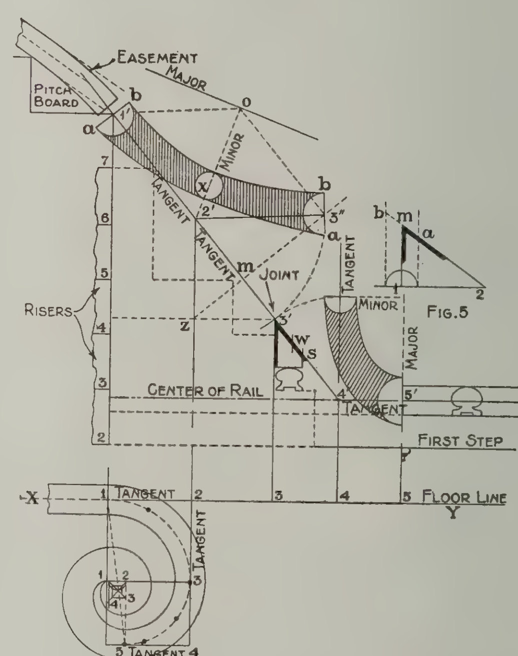


Fig. 4—Showing How to Handle the Tangents and Draw Face Molds Over Plan Fig. 1

Fig. 5—Bevel for the Top Face Mold of Fig. 4

Problem in Scroll Stairway Construction division from a as shown at 1 and draw a perpendicular line as indicated from 1 to d. The point 1 will be the center from which to draw the first quarter turn from b to d. Make 1-2 equal one of the eight divisions on the line a-b. Then point 2 will be the second center from which to draw the quarter turn from d to c.

Draw the slant line from c to b and the semi-circle upon the space 1-2 as shown.

From 1 draw a line to 3 through the point of contact between the slant line c-b and the semi-circle. Draw another line through the same point of contact from 2.

Point 3 will be the third center from which to draw the quarter turn from c to e.

To find the remaining centers draw a line from 3 to 4; from 4 to 5; from 5 to 6; from 6 to 7, etc., which will be the centers required to draw the scroll curve shown in this figure.

In Fig. 4 is presented one method of laying out

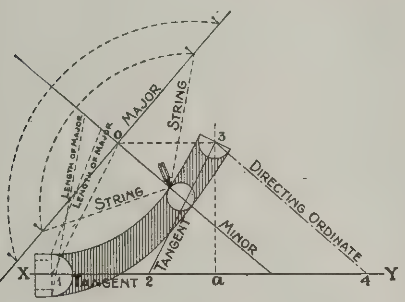


Fig. 8—Showing How Stairbuilders Generally Draw a Face Mold with String and Pins

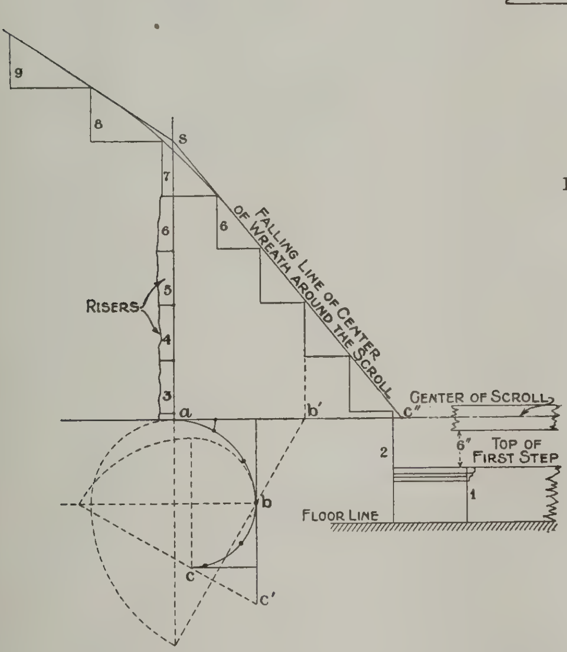


Fig. 10—Method of Developing the Center Line of Wreath Around the Scroll and Determining the Width of the Treads

the wreaths over and above the scroll curve. First draw the floor line X-Y and transfer to it the plan tangents as shown at 1, 2, 3, 4, 5, and upon each point erect lines and divide the one drawn upon 1 into 7 equal parts to represent the 7 risers contained in the scroll curve. From the top of the seventh riser draw the pitch of the straight steps as clearly indicated by the pitch board and from the same point draw the pitch line of the tangents as indicated from 1′ to 4′. The bottom tangent 4′-5′ is drawn level to align with the level portion of the scroll.

To lay out the face mold for the top wreath draw a line from z square to the tangents to 3″ and connect 3″ with 2′. Now draw a line parallel to 3″-2′ from 1′ and another line parallel to 2′-1′ from 3″ intersecting in the point o. Connect o with 2′, which will be the minor axis. Make o-x upon the minor axis equal the radius of the plan curve 1-3 and upon x draw the circle equal to the width of the plain rail. Make the width of the mold at each end equal a-b shown cutting the bevel in Fig. 5. Now trace the curves of the mold through these various widths as shown from b to b for the inside and from a to a for the outside.

The face mold for the bottom wreath piece is laid

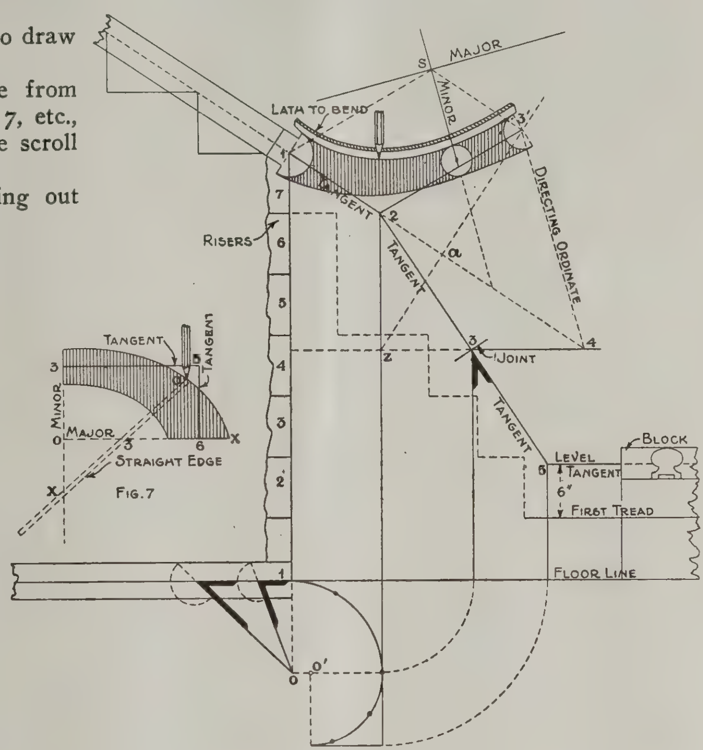


Fig. 6—Another Method of Handling Molds Over Plan, Fig. 1

Fig. 7—Method of Drawing Face Mold with Straight Edge

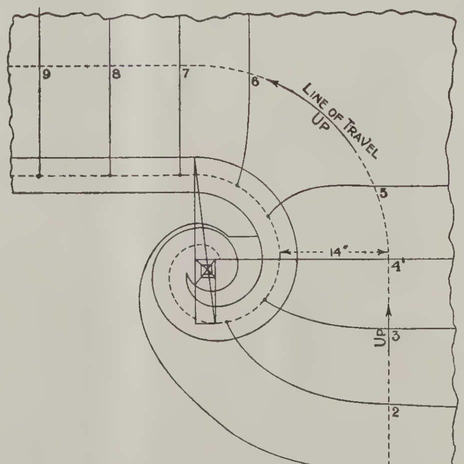


Fig. 9—Improved and Correct Plan of Steps for a Scroll Curve

Problem in Scroll Stairway Construction

out by merely finding the minor and major axes, making its width on the minor axis equal the plain rail and its width at the end 5 equal 3′-s shown upon the bevel.

Another method to handle the tangents and lay out the wreaths is shown in Fig. 6. The pitch of the top tangent in this figure is made to align with the pitch of the straight steps adjoining as shown from 1 to 2, thus dispensing with the ramp shown in Fig. 4 upon the straight rail.

The method of laying out the face mold is shown to be precisely the same as in Fig. 4.

In Fig. 8 we show how stairbuilders generally draw the top face mold in practice. The points 1, 2, a, 4 are reproduced from the pitch line shown from 1 to 4 in Fig. 6, and upon it the face mold is drawn by the same process as is shown in Fig. 6, differing only in having the curves drawn by means of string and pins instead of scribing around a bent straight edge.

In Fig. 7 we show the method generally used in laying out the face mold for the bottom wreath where one tangent is level and the other inclined. The tangents in this figure are taken from Fig. 6 and the curves are drawn by means of a straight edge upon which the lengths of the axes are fixed, as at 3-o for the minor axis and x-o for the major axis. By placing 3 of the straight edge on the major and x of the straight edge on the minor, a point at o on the curve is fixed. By changing the position of the straight edge other points are found which by being traced will form the curve of the mold.

We would here state that the arrangement of the tangents as exemplified in Figs. 4 and 6 will not cause an uneven appearance in the easing of the finished wreath as the correspondent suggests, because the wreath when in position will not follow the uneven pitch of the steps as arranged in the plan, Fig. 1, where the steps 5 and 6 stand plumb over one another and the remaining steps around the scroll curve vary in width. The steps around a scroll curve should be of equal width, otherwise the balusters will be of unequal lengths.

Fig. 9 represents an improved plan of the steps, where it is shown that all the steps around the scroll curve are of equal width, and in Fig. 10 is presented the development of the falling line of the center of the scroll curve and its relation to the steps to be of uniform pitch—as it should be where it possibly can be arranged. The method of operation relative to these figures is as follows:

Referring to Fig. 10, draw a-b′-c″ equal in length to the stretch out of the plan curve a-b-c. Upon a erect the line a-s equal to the hight and from s draw the falling line to c″. Place the pitch board at s and draw the pitch of the straight steps as shown, also draw the easement.

Now from the risers shown divided upon the line a-s draw lines to cut the falling line and the easement, thus determining the width of all the treads within the curve as shown in plan, Fig. 9. The tangents for this new arrangement of the steps will be handled precisely the same as shown in either Fig. 4 or Fig. 6 and that because the rearrangement of the steps does not affect the tangents. It simply changes the relation of the finished wreath to the steps by producing uniform pitch and therefore equal length for all the balusters.

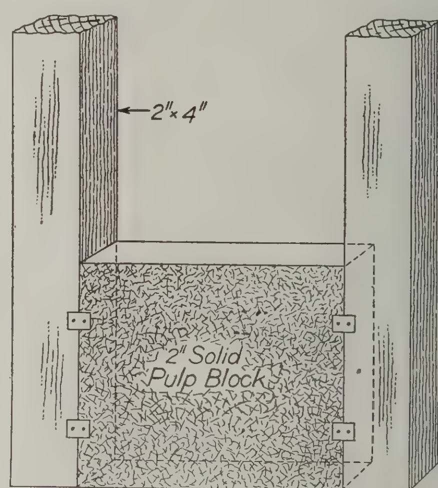
Formula for Making Pulp Lumber

From J. A. S., Cleveland, Ohio.—I am sending herewith a formula for making pulp lumber, thinking that possibly it may be of interest to some of the many readers of the Correspondence columns. At the outset it may be stated that a mixture of say 10 lb. of dry sawdust or sawdust and shavings with 100 lb. of "Stucco" or unsanded and unfibered plaster will make 3 sq. yd. of pulp lumber 1 in. thick. By mixing a little of the material and pouring into a cigar box and allowing it to dry, which it will readily do, the results will be surprising. When dry it can be sawed and it holds nails well.

In this connection it may not be amiss to mention that "stucco" is simply calcined gypsum before any sand and fiber is added and it is the material shipped from the gypsum mine to dealers throughout the country. The dealers mix a small amount of fiber and about double the weight of sand with the stucco and it is then called plaster. The term "stucco" is often badly used, and I am inclined to think the term "unsanded and unfibered plaster" would be more generally understood. This stucco is very cheap and sells at the mines at about $3 per ton.

The pulp lumber can be made at a labor cost of 3 cents per square yard in wood molds having adjustable sides and ends and a rubber covered bottom to keep the plaster from adhering to the mold. Any carpenter can make the mold and any labor can make the lumber.

It is an inexpensive material to make an air-tight vermin-proof partition wall, for it can be made almost as cheaply as one may desire. I am sending herewith a sketch showing a 2-in. block of the consistency used in a 3-in. solid partition where wood studs are essential for weight purposes. This is not recommended for use in fireproof buildings, but there are so many cheap



Illustrating Use of Pulp Lumber as Suggested by "J. A. S."

hotels, apartment houses, office buildings and residences where it would be better than any lath plastered because it is a better sound-resistor, less expensive, more fire-resisting, and there would be no cracks from warping lath; neither would there be any lath stains. It should be given a skim coat of plaster and then papered, making the wall very cheap.

The lumber is made 2 in. thick and placed between the studs as shown, giving each side a coat of plaster ½ in. thick. It erects very rapidly, for the tile or blocks can be made in large units and right on the job if desired. There are various ways of attaching the tile in place. It can be nailed in position, or small pieces of galvanized strips can be nailed on the studs to hold the tile in place.

This material would prove of great utility in every home, and it would be well that all persons disposed to work should know how to make it. Then we would have more comfortable homes and many unused attics could be converted into comfortable, sanitary rooms. It is a material that cannot be commercialized by a few to the disadvantage of the public, for it is too easily and economically made.

Further Comments on Winding Stair Rails

From "Cymro."—After reading the comments of C. C. Grant, Red Deer, Alberta, Canada, in last month's issue, on my endeavor in the June number to show that the Tangent System of hand railing is more simple and practical than the system explained by "Triangulus" in the May issue, I fail to find any cause for him to work himself into such a mental strain.

When a subject becomes a matter of controversy in a trade paper the prime object of every participant should be to do his part in propagating instruction. If C. C. Grant really thinks that the method of "Triangulus" is not practical, and that the Tangent System is not perfect, why does he not produce a system that is satisfactory? I am sure that a large number of readers of the *Building Age* would greatly appreciate such an endeavor. I thought I was helping a little bit, in the July issue, by presenting the different methods at present in use among practical hand railers to construct winding rails. C. C. Grant in his comment says that they are all too complicated, that he does not understand them, and that neither does one out of a thousand carpenters throughout the country.

Possibly it is true, but who is to blame for it? Not I, for I have done my part; the figures are there clear and correct, and it needs but very little study to understand each one thoroughly.

I would suggest that C. C. Grant try his hand at producing figures less complicated and not waste time in criticising and condemning the Tangent System, which he admits himself, after all his condemnations, to be the system at present manipulated by stair railers in constructing winding stairs.

I consider that "C. C. G." wasted time in commenting on my Fig. 10. My purpose in presenting it was to show how the twist in the wreath is produced by the application of the bevels to the plank. The wreath in its second position in the figure is shown twisted in its inclined position over and above its plan.

I did not mean it to show the joints as "C. C. G." intimates, but the twist only, and it serves the purpose admirably. The bevels take care of the joints in every Tangent method, and in all cases will produce, by correct application, a true "square butt" joint.

The plumb "butt joint" has been discarded since the advent of the Tangent System, and this fact alone should have guided "C. C. G.' to determine with which of the two I was dealing in my July diagrams.

By the way, what made "C. C. G." assert that Mr. Riddell was the founder of the Tangent System? That his endeavors greatly simplify the system is all that can be said of Mr. Riddell; so did the endeavors of many others before and after him.

To-day his method is seldom used and most of the present day stair builders do not know the least thing about it. I am sure Mr. Riddell would be greatly pleased to have "C. C. G.," as his champion, furnish the readers of *Building Age* with a few examples of Mr. Riddell's method. By so doing he would benefit his fellow craftsmen considerably more effectually than by propounding a string of questions for "Cymro" to answer and most of which are plainly of the same nature, but differing only in phraseology, while the remainder quite as plainly are based on false hypotheses. He demands a "fair and square" answer to each question or a withdrawal of my request to "Triangulus" to admit that the rules of the Tangent System are absolutely correct geometrically.

His first eight questions may be summed up and phrased as follows: Does the development of the center line of the wreath deviate from the development of the nosing line of the steps? I "fairly and squarely" answer that it does, and that the rules of the Tangent System take account of such deviation and are necessary to overcome it by either making the stair to fit the rail or the rail to fit the stair.

The first may be accomplished by rearranging the risers and the other by developing the falling molds.

The worst that can be said against the Tangent System is that it is not absolutely perfect. I would ask what is?

In its favor it can be said that it is at present the most simple and practical system of stair lines known. Consequently, it is the system in use all over the world. This could not possibly happen if its fundamental constructive rules or principles were not correct geometrically.

The "caricatures instead of rails" that "C. C. G." attributes to the system are, as all stair builders know, the best that could be made by the "By Gosh and By Guess" class of mechanics.

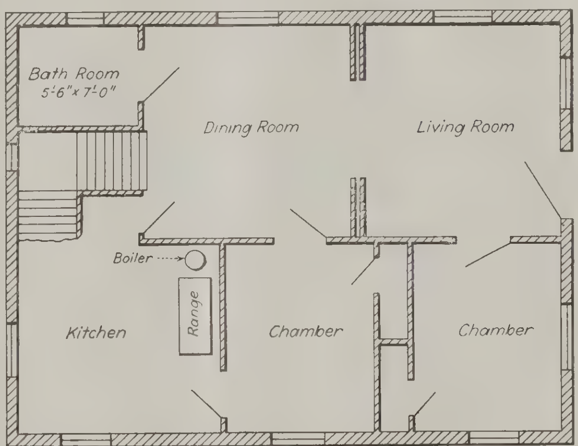
It would be very interesting to have "C. C. G." take up the figures I used in the July issue and show in a "fair and square" manner the geometrical incorrectness of the operations as indicated in those figures to produce the face mold and find the bevels.

We have already had his opinion regarding my Fig. 10, wherein he makes the blunder of considering it a constructive geometrical figure, whereas it is merely an illustrative sketch.

Heating a Bath Room from Water Back

From W. A. M., Pennsylvania.—Please let me know how I can heat a bath room from a kitchen range boiler, the bath room and the kitchen being, as shown in the plan herewith, on the same floor of a bungalow.

Answer.—The first thing to be determined is whether or not the water back in the range has a water heating capacity to supply hot water, both for domestic purposes and for heating the radiator that would be required in the bath room. The next thing then is to use



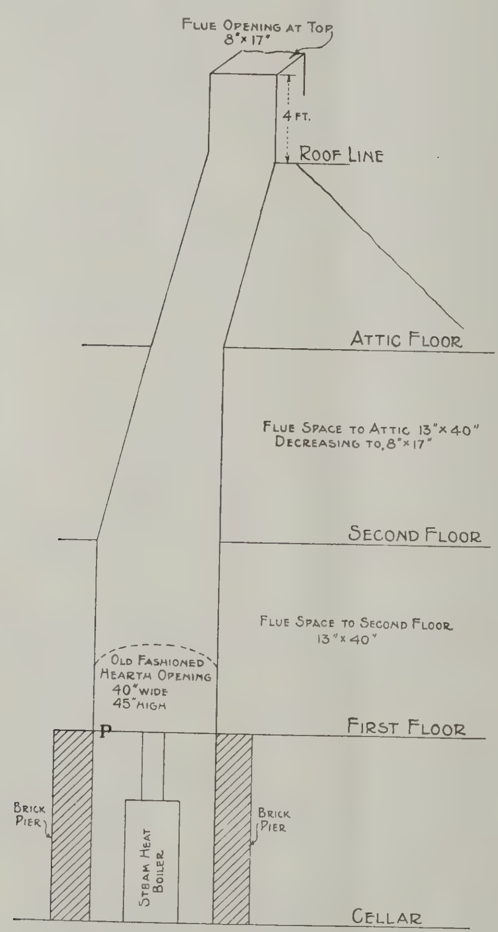
Floor Plan Showing Position of Bath Room and Kitchen

pipes large enough to keep up a free circulation and then another important point comes in keeping them free from air. In a case like this 1-in. iron or brass pipe should be used for connecting the water back with the range boiler. The brass couplings should be taken out of the top and bottom of the boiler so that 1-in. pipe can be carried from the boiler over to the bath room, running along the ceiling either above or below, as is most convenient, and dropping down at the point where the radiator is located and connecting with it. The return pipe should be connected from the bottom of the radiator and run along under the floor until it is underneath the boiler in the kitchen where it should rise and connect with it. At the lowest point there should be a draw-off cock so that in the winter season when the bungalow is not in use the entire system may be emptied of water to prevent freezing. If a branch is taken out of the top of the pipe leading to the radiator and is used to supply hot water to the bath room fixtures it will afford an outlet for whatever air that would otherwise collect in this pipe to make it air bound and stop circulation.

From the plan it can readily be seen that the pipe carrying hot water from the top of the boiler to the bath room would have to run somewhat indirectly, which would interfere in a measure with the circulation, but if a 1-in. pipe is used and a radiator having about 15 sq. ft. of surface is used, there should be no difficulty in getting a sufficient circulation through it to maintain a comfortable temperature in the bath room at all times, always providing that the fire chamber of the range is large enough to furnish the necessary heat for the various purposes for which it is used and that the family keeps the fire going in such a way that it will do the work required. No expansion tank will be needed when a radiator is connected with the hot water service as in this case.

A Problem in Chimney Construction

From G. E., Metuchen, N. J.—I want some advice concerning a chimney problem in my house, and I am enclosing herewith as being of possible assistance to the expert readers a rough diagram which pretty clearly explains the situation. The chimney is an old-fashioned one rising from two brick piers in the cellar. On the first floor is an old hearth opening 40 in. wide, 45 in. high and 17 in. deep.



A Problem in Chimney Construction

When steam heat was installed in the house several years ago this hearth, which had been used to set an old stove in, was closed and the flue from the steam heat boiler was vented into the center of the bottom of the old hearth, as indicated in the diagram, thus using the entire flue space in the chimney. The heater people advised me that this particular heater requires an 8 x 8 in. flue. Now what I want to do is to move the boiler vent to one side of the hearth bottom as at P, and thus have about 26 or 28 in. to build an open fireplace, the hight of which will be about 2 ft. and requiring for a flue space about 64 sq. in. The fireplace is to be built along lines noted in earlier issues of *Building Age*.

Now I would like to have the readers who are expert in chimney construction tell me if I need to put up inside of the chimney two separate flues extending through to the roof? Will one flue, say 8 x 8 in. of tile or metal pipe, serve for the steam boiler, if carried half way up the chimney? If this will not answer will some one suggest a way out of the difficulty, avoiding as much as possible the tearing out of a side of the chimney throughout the house?

Appropriate Mantel for Fireplace

From John R. Bell, Huntingdon, Pa.—The drawings of a brick mantel and fireplace, with a vertical cross section and the hardware accessories, relate to an appropriate mantel for the fireplace concerning which "A. G.," Duluth, Minn., made inquiry in the March number of the *Building Age*. The living room to be finished in craftsman oak is not sufficiently descriptive for one to understand the exact shade to design the mantel so that the colors will harmonize, as craftsman oak finish may be one of a number of shades varying from light golden to Flemish oak, including brown, green, etc. However, I have designed a mantel in light gray mottled brick, as this particular brick with the ⅝-in. smooth raked joints of red mortar and struck with a jointer—a tool made for the purpose—will harmonize with any shade of craftsman oak finish.

Considering the hypotenuse of the corner 4-ft. 4-in. stone is not appropriate; cement to be successfully used in mantel work requires an artist; a cabinet mantel is not the most appropriate for a corner, and at the best it looks cheap as compared with brick at the same cost. I conclude from the size of the house that cost is a factor; therefore, brick lend themselves to an artistic treatment that cannot be attained by the use of any other material at the same cost in the average locality and under the usual circumstances.

The origin of the bond shown is original and I have designated it the "Checker" bond. The original mantel in which this bond was first used I showed on a lantern slide before the convention of the National Brick Manufacturers' Association in Louisville, February, 1911, while illustrating a lecture on "Trade Schools."

It will be noticed that there is not an ornamental brick in this mantel—all headers and stretchers. The brick in the ornamental designs are cut with a set or blocking-out chisel. The corner effect of mottled brick in the design above the shelf is carried out by the application of white mortar, so that the color effect will be unbroken and giving the L effect.

The height of the mantel is 9 ft., but can be increased by adding more courses of brick between the fireplace arch and the shelf. The arch of the fireplace can also be raised by the addition of the desired height in courses below the arch. The capstone on the hearth, pilaster and mantel shelves can be made of cement if desired, and the molding effect on the two last mentioned may be omitted and left plain if preferred; in fact, the brick will suffice without the cap.

The trimmer arch shown in the vertical cross section, Fig. 2, is built as usual with a diagonal strip as a hypotenuse across the corner, and the floor is cut the same segment as the hearth and nailed to the strips. The floor should be laid before the hearth and the brick laid against but not on the floor. The raised hearth is very pleasing, and the segmental effect is accomplished by the use of three shades of brick, namely, red, white and buff. The bond must be laid with cement gauged mortar with only enough lime to make the mortar work easy and enough mineral red color to make a dark mortar that will not fade to a pink. Plenty of wall ties should be used with this bond.

As indicated in Fig. 2 the two wing walls should be 9 in. thick, 4 in. of which will be rough work. The latter forming part of the partition and should be flush with the lath in the pantry and dining room. At least every course should be a header course.

All measurements can be taken from the drawing allowing for each course of brick 2¼ in. and ⅝ in. for the mortar joints.

For comfort and utility in this as well as all fireplaces it must be borne in mind that the draft of a fireplace can be controlled so that it will serve the same usefulness as a stove. The reader should note in Fig. 2 the construction of the trimmer arch and foundation for the hearth as well as the proper placing of the ash trap; also note the placing of the ash door in the front of the bottom of the ash pit as well as the place indicated for the damper in the throat of the fireplace. If the damper is used the wind brake should be three or four courses higher than indicated on the drawing. The size of the flue should be 8 x 8-in. and lined with 8-in. flue lining—round lining is preferable, as smoke travels in a rotary movement and assumes the diameter of its rotations from the narrowest dimension of the flue. Hence in a 4 x 12-in. flue the rotary movement is 4 x 4 in., allowing an air space for a down draft, which results in the smoke being blown out in the room. This is especially true when there is a heavy humidity and a strong wind.

In Fig. 3 we have an ash door 12 x 16 in. with a draft damper which should be closed when the ashes are dumped in the ash pit. If this is not observed the cellar will be filled with dust. At all other times it should be kept open. In Fig. 4 is shown an ash trap 9 x 11 in. with a draft or ventilator damper, and this damper should also be closed after the ashes are dropped into the ash pit. The damper in the ash door being open, additional draft from the cellar can be regulated by the damper in the ash trap.

In Fig. 5 is shown a dome damper 36 x 13 in. in size, which also serves as an arch-bar. The entire dome is a damper with another sliding damper in the dome damper which is easily regulated without soiling the hands. There are various styles of these dampers, but the dome type will always give good results, being easy and clean to operate. Another important feature of this damper is that the casting being of the proper shape for good draft compensates for the carelessness often shown by bricklayers in drawing the throat to its proper size. The idea of the damper in the ash-pit door is a new feature and contributes to perfect the draft of a fireplace.

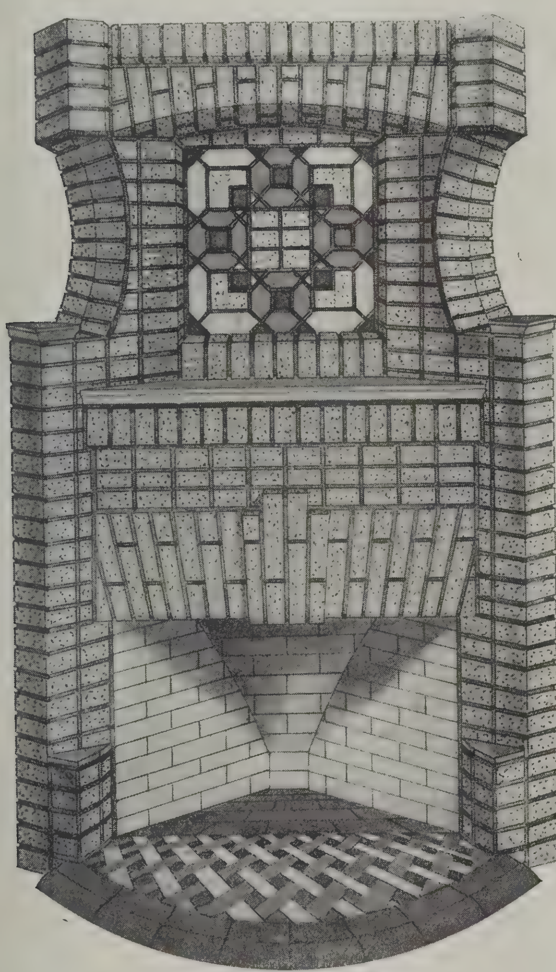


Fig. 1—Front Elevation of the Finished Work

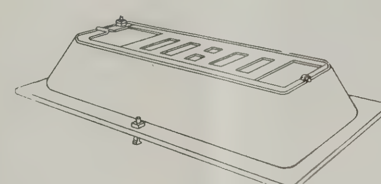


Fig. 5—Dome Damper

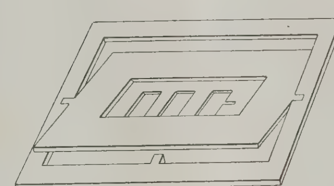


Fig. 4—Ash Trap with Ventilator

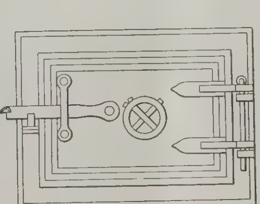


Fig. 3—Latched Door

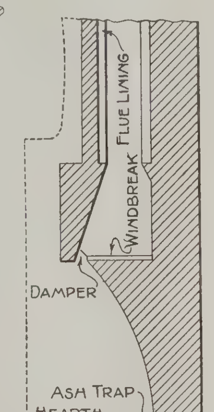
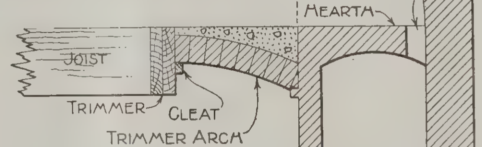
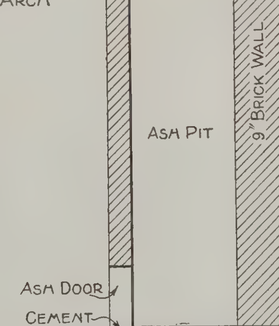




Fig. 2—Vertical Section

Appropriate Mantel for Fireplace

Details Wanted for French Window and Door

From F. F. W., Pottsville, Pa.—Will some of the architectural readers of *Building Age* kindly submit through this paper detailed designs for a French door and French window, giving outside and inside finish, also section?

The Lien Law in Ohio*

Proposal Adopted at the Recent Constitutional Convention in Columbus -- Good and Bad Features of Present Law

THE building interests of the State of Ohio have recently been very active in an effort to secure the passage of a mechanics lien law which will protect the mechanic as well as the dealer in building materials. At the recent Constitutional Convention held in Columbus the following proposal was adopted, and it will be submitted to the people of the State in September:

Sec. 33—Laws may be passed to secure to mechanics, artisans, laborers, sub-contractors and material men, their just dues by direct lien upon the property upon which they have bestowed labor or for which they have furnished material. No other provision of the constitution shall impair or limit this power.

Since 1894, which was in fact the year the first real lien in Ohio was enacted, that State has been without a proper statute. In the year of its enactment it was attacked upon constitutional grounds in the cases of Palmer and Crawford vs. Tingle, Putnam County, and Young vs. The Lion Hardware Company from Clarke County, both of which were decided as unconstitutional in an opinion delivered by Judge Burket of the Ohio Supreme Court. On the other hand, in a case between a resident of Ohio and a non-resident which went to the Supreme Court of the United States in regard to the same lien law (Jones vs. the Great Southern Fireproof Hotel Company, 86 Fed. Rep., 162), this tribunal refused to recognize the interpretation which the Supreme Court of Ohio had put upon it and held that the law was constitutional.

As a consequence the lumber dealers and supply associations, the Builders Exchanges and all building interests in the State reached the conclusion that the time was opportune for securing the addition of a few words to the bill of rights which will make it certain that said bill of rights does not nor will not in any way interfere with the preparation of a proper law being enacted by the Legislature. The attorney of the Ohio Lumbermen's Credit Association expresses the opinion that Judge Burket's ruling settles the matter so far as the law is concerned unless the constitution be changed. The only escape from the losses which material men and sub-contractors suffer under the present system is an amendment to the constitution.

Losses Sustained By Building Material Dealers

The losses in the State of Ohio sustained by the dealers of building material during 1911 were easily one-quarter of a million dollars and perhaps a great deal more. When raw material was cheap and the sources near at hand those losses, while serious, were not disastrous, but now with the increased values of building materials they can but result, if continued, in the elimination of a large percentage of the dealers, the passing of the contracting business in the hands of a few and more highly capitalized contracting firms and a continual increasing number of obstacles in the path of the family struggling to own its own home. Even the hardware men are interested in the movement to amend the constitution and the Master Painters Association are in entire sympathy with the undertaking. At the last session of the State Association of Builders Exchanges it was unanimously agreed that a new lien law was necessary for the building interests. The Lumbermen's Credit Association, however, has taken the lead in the matter throughout.

One good feature of the present law in Ohio which was secured a couple of years ago through the efforts of the Supply Dealers Association is that which provides that notice may be served on the owner by registered letter instead of personal service, which worked so unsatisfactorily. This amendment to the lien law as it now stands is good only insofar as the law goes in Ohio and is as follows:

Amendment to Present Lien Law

"Any sub-contractor, material man, laborer or mechanic who has performed labor or furnished material, fuel or machinery, or is about to perform labor, or furnish material, fuel or machinery for the construction, alteration, removal or repair of any property, appurtenances or structure, described in sections 8300 and 8316, or for the construction, improvement or repair of any turnpike, road, improvement, sewer, street or other public improvement, or public buildings, provided for in a contract between the owner or any board, officer or public authority and a principal contractor, and under a contract between such sub-contractor, material man, laborer or mechanic and a principal contractor, or sub-contractor, at the time of beginning to perform such labor or the delivery of the fuel or machinery, or at any time, not to exceed four months from the performance of the labor or the delivery of the machinery, fuel or material, may file with the owner, board or officer, or the authorized clerk or agent thereof, a sworn and itemized statement of the amount and value of such labor performed and to be performed, material, fuel or machinery furnished, containing a description of any promissory note or notes that have been given by the principal contractor or sub-contractor on account of labor, machinery or material, or any part thereof with all credits and setoffs thereon and proof that the sworn and itemized statement above provided for was mailed by registered letter to the address of the owner, board or officer, shall be taken as prima facie evidence of the filing thereof, with the owner, board or officer, as herein provided."

*Contributed by John A. Kelley, Secretary of the Builders and Traders Exchange, Columbus, Ohio.

According to a special report of the Census Bureau machine woodworking gives employment to a greater number of wage earners than any other industry. During the census year it is stated that there was employed in the manufacture of lumber and other direct timber products an average of 695,019 wage earners, the largest number employed at any time being 739,160 in the month of November. The above figures do not include furniture factories, car shops and other woodworking industries.

An old Boston landmark in Dock Square and erected in 1690 is about being demolished to make room for a modern brick building.

Exhibits of Building Materials at the Detroit Builders' Exchange

Part Played by the Organization in the City's Building Activities and Its Exhibits of Constructive Materials

WITH the rapid growth of the city and the great activity which has prevailed in the building business in Detroit, it is well to note the part played in this industry by the Builders' and Traders' Exchange of that city—an organization which is primarily for the builders' and supply dealers' interests, but is also of a quasi-public nature. During the past few years the Exchange has had a large, rapid and substantial growth, springing from a small and obscure organization to a place among the foremost of its kind in the country, not only in point of membership, but also as to its efficiency.

Exhibits of Building Materials at Detroit Builders' Exchange—View Near Entrance to Rooms of the Builders' Exchange

The organization stands for the very best in the building business, not only in the matter of construction, but in that of fair business dealings, whether it be through the contractor, the material supply dealer, the architect or the owner. It endeavors to establish and maintain a uniformity in commercial usages among its members and to put the contracting business on a somewhat higher plane than it is sometimes wont to assume. It takes a strong stand for fair business dealing, not only among its members, but among those outside the organization with whom business is conducted.

It has been instrumental in securing the best state and city building regulations that have so far prevailed in that section, having in view fairness to the builder and the owner alike.

Its membership is made up of the leading contractors, material supply dealers and others affiliated in any way with the building business in the entire city—membership in the organization being now generally understood to be an assurance to the public of skill, honorable reputation and probity.

The organization has a large space in one of the best and most commodious office buildings in the city, having as its quarters the east half of the third floor of the Penobscot Building, which is in the heart of the commercial section of the city. This floor area of 4800 square feet is well taken up with office spaces of its members, building material exhibits, figuring rooms, soundproof telephone booths, writing tables, reading room, etc., etc. With a membership of about 350, the average daily attendance in the rooms is about 150, and the telephone calls in and out over seven trunk lines average from 600 to 700 daily.

One of the strong features of the organization is the *Bulletin* of building news which is gathered from architects' offices and other sources for the members' use. It is an excellent record of building operations in the city of Detroit, and one of the best building news bulletins of its kind in the country. A large number of plans are always kept on file in the Exchange rooms by architects and others who wish Exchange members to figure on doing the work. Any messages intended for contractors who are members of the organization are usually left at the Exchange rooms.

A great many visitors come in, not only to meet and confer with the contractors, but to view the exhibits, etc., and great use is found for the organization and its quarters by members and the general public.

Some of the more important exhibits in the rooms of the Exchange which are of special interest to readers of the *Building Age* include the following:

Detroit Decorative Supply Company has an exhibit made up of statues and samples of all sorts of ornamental plaster work arranged in a way to clearly show what can be accomplished in this line.

View at the Side of the Rooms Showing Some of the Exhibits

Detroit Show Case Company has on display its "Silent Salesman" show case, together with samples of its store front bars which are being used very largely in equipping show windows for retail concerns in the city and throughout the state.

Detroit Roofing Tile Company has a very attractive exhibit of its various colored roofing tiles, these being displayed in a way to invite attention on the part of visiting architects, builders and contractors.

Michigan Ornamental Glass Company and the Art Glass Company both have comprehensive displays of their ornamental and art glass.

United States Gypsum Company has a fine exhibit of its plaster board and other materials, all displayed in a way to serve the intended purpose.

Detroit Steel Products Company has an exhibit consisting of several sections of its "Fenestra" window sash which is proving very popular at the present time and which commands the attention of visiting architects and builders.

Chamberlain Metal Weather Strip Company makes use of two windows in its exhibit, one window being equipped with the company's weather strip, while the other window is without it.

Trussed Concrete Steel Company shows among other things its steel window sash, also steel bars for the "Kahn" System of reinforcing concrete, hollow tile, etc.

Venetian Marble & Mosaic Art Company exhibits a great variety of samples of mosaic work in the center of which is a fine portrait of the late President McKinley, all made of marble mosaic.

Gregg Hardware Company shows samples of builders' hardware, all of which are enclosed in a large glass case with effective trimmings.

National Fireproofing Company, Pittsburgh, Pa., has an attractive display of "Natco" tile.

Sandusky Portland Cement Company, Sandusky, Ohio, has an interesting display in the shape of urns, settees, blocks, etc., made of its cement.

There are also exhibits by the Wyandotte Portland Cement Company, the Huron Portland Cement Company, and the New Ætna Portland Cement Company.

Building Operations in Western Canada

One of the most striking indications of the development of a section of country is the extent of its legitimate building operations, and a notable example of this is found in the astonishing growth of the cities of western Canada. It is probable that there never was a year when so much building activity was in evidence as at the present time, and the *Canadian Builder* has compiled some figures to show the progress that has been made since 1907 in this line. The table here presented tells the story in compact form:

Value of Buildings for which permits were issued

	1907	1908	1909	1910	1911	*1912
Vancouver	5,632,744	5,950,883	7,258,565	13,150,365	17,652,642	8,132,720
Winnipeg	6,309,950	5,513,700	9,226,325	15,116,450	17,550,000	11,205,600
Calgary	2,094,264	1,004,520	2,420,450	5,589,594	12,709,478	8,540,670
Regina	1,177,840	516,656	744,479	2,416,288	5,088,110	2,549,770
Saskatoon	377,211	1,115,625	1,002,055	2,817,771	4,920,000	4,634,685
Edmonton	2,280,210	2,549,847	2,128,161	2,161,356	3,797,525	2,725,622
Moose Jaw	546,424	430,925	512,440	1,071,090	2,475,736	2,776,090
Brandon	704,290	293,047	350,120	1,224,385	1,108,129	339,952
Lethbridge	205,000	369,145	1,268,215	1,211,310	1,033,980	719,343
Prince Albert	300,000	200,000	141,810	662,475	921,145	1,008,300
Medicine Hat	150,000	138,072	228,168	427,140	450,000	1,000,114
Yorkton	....	100,000	150,000	185,000	300,000	328,006

*Six months ending June 30, 1912.

From the above figures it will be seen that the value of the building improvements for which permits were issued in the first six months of 1912 is in excess of that for the entire twelve months of some of the previous years.

Comparative Cost of Frame and Brick Dwelling Houses

Some very interesting figures on the comparative cost of frame and brick dwelling houses are presented in the recent report of the Committee on Fire Protection of the Chamber of Commerce of the city of Boston. The conclusion of the committee was that the slightly greater cost of brick, which averaged a little less than 10 per cent more than frame construction, was fully offset in a few years by the reduced cost of maintenance and insurance, as well as by the greater comfort and durability of the house. The report states that when lumber was cheap and brick more expensive than it is at the present day, the idea became general that the cost of brick as compared with frame was almost prohibitive and this continues, although the conditions have changed so radically that the cost is now but little more, while the ultimate cost is less.

The purpose of the investigation was to encourage the use of brick and non-combustible interior construction for the purposes of fire protection, and this form of building was very strongly urged by the report. Bona fide bids were secured from five different contractors of good reputation on the cost of the construction of dwellings of brick, wood, cement and hollow blocks, the houses to be the same in every particular except the outer walls. Bids were secured on a modern, eight-room house, of good design and excellent arrangement, such as is frequently built in and about large cities, and on these the bids of the five contractors varied comparatively little, and so the average was taken as a fair test of the practical cost, the contractors including their profits in all cases. The average paid for the various types was as follows, the second column showing the percentage of excess cost of each type over the clapboard type:

Clapboard	$6,759.95	.0
Shingle	6,868.80	1.6
10-inch brick wall, hollow	7,372.48	9.1
12-inch brick wall, solid	7,641.00	13.0
Stucco on hollow block	7,187.65	6.3
Brick veneer on hollow block	7,483.16	10.7
Stucco on frame	6,952.90	2.9
Brick veneer on boarding	7,226.44	6.9
Brick veneer on studding	7,153.98	5.8

The committee corresponded with contractors in various parts of the country in making up its report, and found from them that brick buildings were commonly estimated to cost 10 per cent. more than frame, while brick veneered buildings could be put up in many sections for 5 per cent. more than the cost of frame buildings, the difference in cost being usually more than offset by the lessened insurance premium. In the same way estimates were secured on annual cost of maintenance, including depreciation, for frame and brick dwellings, and it was found that the frame dwellings cost 26 per cent. more for maintenance and depreciation than the brick dwellings.

These figures would have been doubly interesting if bids had been invited on concrete construction; thus including all material for low-priced construction.

New Publications

Hendricks Commercial Register of the United States; 1574 pages. Size 8 x 10¼ in. Bound in board covers. Published by S. E. Hendricks Company, and supplied by the *Building Age* Book Department, 239 West 39th Street, New York City. Price, expressage paid, $10.

This is the twenty-first annual revised edition of a most important work for buyers and sellers. Its aim is to furnish complete classified lists of manufacturers in the leading lines named and covers the architectural, engineering, electrical, mechanical, railroad, mining, manufacturing and kindred trades and professions. It establishes a direct link between the buyer and the seller and will be found of special value to architects, contractors, builders, etc., who are readers of the *Building Age*. In the present edition is a total of 385 pages of new matter, the whole representing upwards of 385,000 names and addresses. The total number of classifications is over 50,000. Some idea of the magnitude of the edition may be gathered from the statement that the index to its contents requires 122 pages.

Among the lists of names of special interest to the readers of the *Building Age* are those of architects, including decorative, landscape, horticultural, naval, theater and mill, and which require 26 pages of the volume; a list of building contractors which requires 44 pages; brick makers, 8 pages; lumber manufacturers and wholesale dealers, 21 pages; mason's and builder's materials, 13 pages; sash, door and blind makers, 8 pages; roofing material manufacturers, 8 pages; while several pages each are devoted to manufacturers of architectural iron work, galvanized iron cornices, derricks, manufacturers of cement, carpenter's tools, concrete steel construction, etc., etc.

The classifications throughout are so arranged that the book can be used for either purchasing or mailing purposes and in addition the work gives much information following the names of thousands of firms that is of great assistance to the buyer and saves the expense of writing to a number of firms for the particular article required. There is also included the trade names of the articles classified in the book so far as it has been possible to secure them. These trade names appear in parentheses between the names and addresses under the classifications where they appear.

Electrical Blue Book for 1912; 206 pages. Size 9 x 12 in. Profusely illustrated. Bound in board covers. Compiled by Electric Review Publishing Company. Price $2.00.

The builder and contractor is more or less directly interested in the electrical installation of buildings he may be erecting, and it is therefore more or less essential that he keep posted on electrical material of all kinds. The work under review is in effect a buyer's guide of electrical material, and contains a comprehensive exhibit of officially approved electrical supplies to which is added an illustrated list of other representative lines of electrical material. A feature which makes this book especially valuable to every user of electrical material is the National Electrical Code, the rules and requirements of the National Board of Fire Underwriters for electrical wiring and apparatus as recommended by the National Fire Protection Association.

The Code rules are explained in detail and the many illustrations bring out in most comprehensive manner the correct interpretation of the installation rules. A complete index makes each rule and section easy to find. The list of approved fittings is unusually comprehensive and is brought up to the first of May, 1912.

The illustrated exhibits of the manufacturers of electrical material, together with the other essentially valuable contents of the work made it of unique value to the prospective purchaser of electrical apparatus and supplies.

Modern Illumination.—By Henry C. Horstmann and Victor H. Tousley; 274 pages. Size 4¾ x 7 in. Illustrated. Bound in flexible covers. Published by Frederick J. Drake & Co. Price $2.00.

This volume is intended to furnish the workman, the contractor and the architect a reliable working basis for the installation and planning of correct illuminating systems and to so thoroughly inform the users of light, such as those operating stores, theaters, shop and factories, that they can correctly decide on the proper kind of lighting for any building or outdoor use and deal intelligently with salesmen and electricians.

The characteristics and specific uses of the various illuminants from the oldest form of arc lamp to the Moore tube and Neon lamp are described in a comprehensive manner. The authors have not stopped with furnishing mere general rules, but have illustrated their points with specific examples of successful work which may be used as guides in other cases. For instance, in the discussion of the scientific placing of lights they take up in alphabetical order practically every type of building, room and place requiring lights and by illustrations and description show the most effective way of illuminating them. Special attention is given to the proper lighting of stores, halls, bedrooms, bath rooms, dining rooms, parlors, laundries, art gallerics, banks, ball rooms, shops, etc., etc. Accurate directions for drawing up plans and specifications are given so that any one thoroughly absorbing the contents of the book may become competent to direct others in the work of installation.

The Natco House.—72 pages. Size, 8 x 10½ in. Bound in illuminated paper covers. Published for the National Fireproofing Company. Price 50 cents.

The first portion of this very interesting book is devoted to the presentation of a series of designs for a small house to be built of Natco hollow tile at a cost approximating $6,000. The designs were submitted in competition by well-known architectural draftsmen, the competition being given primarily to encourage the building of a better class of small houses. The second portion of the book is devoted to the presentation of a series of houses which have been built of Natco hollow tile, the examples being chosen from many hundreds which have been completed during the past year. The illustrations are half tone engravings accompanied by floor plans and brief descriptive particulars.

Southern Building Operations and Bank Clearings

Southern cities show a very wide difference in the degree of increase in building activities this summer compared with a year ago. Birmingham reports an increase in June of 60.2 per cent., compared with June last year, while Fort Worth on the other hand reports a decrease of 75.3 per cent. and Oklahoma 72.9 per cent. Building operations west of the Mississippi are not showing that rate of expansion which is usual elsewhere at this season. Compared with the bank clearings, says the *Wall Street Journal,* the dullness of building is partly reflected in the decrease of clearings in Oklahoma City by 15.1 per cent. for the week ending July 18, compared with a like week a year ago. Fort Worth on the other hand against the decrease in building operations shows an increase of 12.3 per cent. in bank clearings. The explanation is probably found in the changed conditions this season in contrast with those of 1911.

Below are the figures in which are compared the two operations:

	Building June	P. C.	Clearings July 18	P. C.
Atlanta	$586,138	Dec. 4.2	$10,905,000	Inc. 42.1
Birmingham	359,235	Inc. 60.2	2,470,000	Inc. 6.4
Fort Worth	117,483	Dec. 75.3	5,667,000	Inc. 12.3
Louisville	809,731	Inc. 6.8	12,531,000	Dec. 10.1
Memphis	702,326	Inc. 3.3	7,992,000	Inc. 48.0
Nashville	92,027	Dec. 30.1	4,233,000	Inc. 9.7
Oklahoma	44,069	Dec. 72.9	1,530,000	Dec. 15.1
Richmond	735,453	Dec. 29.1	8,915,000	Inc. 3.5

Throughout the South, especially the western portion of the cotton belt, people are economizing in the endeavor to reduce the cost of putting out the crop and to lessen the borrowing of money. That accounts for Fort Worth's low building record. But that very quarter has enhanced its banking operations probably by the vegetable and the fruit trades, furnishing a considerable volume of business the second quarter of the current summer. Memphis is especially marked by conservative building activities and by the increase in business incident to the crops.

The trucking industries have come to make a vast difference in bank clearings in the earlier half of the calendar year throughout southern territory. But the vast income thus derived is not as yet going into buildings. It will take the income of the second half of the year to show in that respect. St. Louis lumber people are already predicting a car shortage for handling their orders and are urging builders and retailers to provide for deliveries as early as practicable, at least to have them on the way by September 15.

Officers of Building Owners and Managers' Association

At the recent convention of the National Association of Building Owners and Managers the following officers were elected:

President......Charles E. Horton, of Seattle.
Vice-President......W. M. Ellis, of Chicago.
Secretary........C. A. Patterson, of Chicago.
Treasurer....Frank C. Haupt, of Milwaukee.

It was decided to hold the convention next year in the city of Cincinnati, Ohio.

Six Months' Fire Losses

The fire loss of the United States and Canada for June, as compiled from the records of the *Journal of Commerce and Commercial Bulletin*, shows a total of $16,103,450, as compared with $20,691,950 in June, 1911, which was unusually heavy, and with $13,183,600 in June, 1910, which was about a normal record for the sixth month of the year.

The losses for the first half of this year reach a total of $134,417,750, as compared with $129,691,750 for the first six months of 1911 and $99,228,850 for the same time in 1910.

The David Ranken, Jr., School of Mechanical Trades, St. Louis, Mo., completed its third full year the third week in July by graduating 49 students who had taken full courses. The graduates included eight in carpentry, two in painting, two in steam engineering, five in pattern making, eight in plumbing, one in bricklaying and 23 as metal trades apprentices. The school, which is endowed sufficiently to enable independent work on a much larger scale, is constructing additional buildings which will be completed in time for the new school year. At present it maintains a waiting list in most of its divisions. The faculty for the coming year will consist of 16 thoroughly qualified teachers. The certificates of graduation state that the holder is a fully equipped mechanic in the line specified and capable of doing all work required of a master at the trade.

The Artisan is the name of an interesting publication issued by the workers of the Trade School of Bridgeport established by the state of Connecticut in the interests of teaching "anybody any trade any time." The first number consists of 16 pages and it is announced that each issue will contain one article written by a local man of note regarding special phases of industrial production. It is issued each month in the year except July and August and in the interests of the trades taught. The editor-in-chief is Frank C. Russell and the publication office is 222 John Street, Bridgeport, Conn.

A somewhat unusual feat in the way of church construction was recently performed in Spartanburg, S. C., where a neat edifice with a seating capacity for 800 persons was built between sunrise and sunset. There were 120 workmen engaged in the task of erecting the church building and it was painted, papered, furnished with pews and altar and equipped with plumbing and electrical fixtures in a single day.

CONTENTS.

What Builders Are Doing

Bird's-Eye View of Building Situation in Leading Cities -- Permits Issued and Estimated Value of the Projected Improvements

THE aggregate volume of building operations continues to show a steady though small increase each month as compared with the corresponding period a year ago, and July has proven no exception to this tendency. Reports from leading centers of the country indicate a gain in July of a trifle less than 10 per cent. in the estimated cost of building improvements, for which permits were issued as compared with July, 1911. The figures available show that the increased activity is not confined to any particular section of the country, but is widely distributed. In some of the larger centers of population there has been a falling off as compared with a year ago, but out of a large number of cities reporting 66 per cent. show an increase in the amount of capital that is going into building construction as compared with this period last year. In some instances, due to special causes, the percentage of increase last month was two, three and four times what it was a year ago.

One gratifying feature of the building situation the country over is the lack of serious labor disturbances which so often interrupt what would otherwise prove a profitable building season.

Baltimore, Md.

The volume of building operations in July showed a marked increase over the corresponding month a year ago and the outlook for the fall is regarded as unusually promising. Since the first of the year only two months, March and April, have exceeded the figures for the month just closed. Building Inspector Stubbs shows in his report for July that the value of the operations for which permits were issued was $907,367, while the new work projected in July last year was estimated to cost $434,865. The feature of the month was the number of two-story brick dwellings planned, these being 229 and calling for an estimated expenditure of $262,500. There were two office buildings planned estimated to cost $180,000 and 11 manufactories and warehouses costing $132,200.

In the first seven months of the current year the new improvements planned called for an outlay of $4,398,839, and adding to these the amounts expended for alterations and additions brings the total to $5,560,659. Of this total 1,503 new two-story brick dwellings were planned costing $2,304,339. There were also 68 two-story frame buildings, 40 three-story brick dwellings.

The twenty-fourth annual meeting and dinner of the Builders' Exchange held in June was a very interesting occasion, the reports showing the organization to be in a flourishing condition both financially and as regards membership. The following officers were elected for the ensuing year:

President........................W. H. Morrow
First Vice-President.............William D. Gill
Second Vice-President.................H. J. West
Third Vice-President..............A. J. Dietrich
Secretary...........................I. H. Scates
Treasurer.........................B. F. Bennett

Following the meeting the members and their friends adjourned to the roof garden and partook of the dinner provided by the Hotel Emerson, covers being laid for 175. At the close of the dinner the secretary read the annual address of the president.

Buffalo, N. Y.

Buffalo is second among the cities of the country in gain in building operations from January 1st to August 1st over the same months of last year, Buffalo's total for these seven months being $8,443,000 and the gain 49 per cent. The total for July, however, shows a loss of 18 per cent, there having been 429 permits issued representing an estimated valuation of $1,318,000 as against 287 permits with a valuation of $1,626,000 in July last year.

There is a large amount of building going on in the city this summer—probably greater than any previous season in its history and covering all lines—commercial, industrial, municipal and residential. Some of the more important of the building improvements which might be mentioned covered by the July permits include an eight-story office building for the Iroquois National Gas Company to cost $200,000; wholesale grocery warehouse for the S. Lipowicz Company to cost $45,000; warehouse for the American News Company, West Mohawk Street, to cost $20,000; storage warehouse for the Philadelphia Wrecking Company, Niagara Street, estimated to cost $28,000.

There were also included in the building operations a five-story store and loft building for the Underwood Typewriter Company to cost $40,000; commercial building for the John H. Kamman Company to cost $30,000; Berrick & Meyer building for stores and lofts on Main Street to cost $60,000; a five-story store and manufacturing loft building for the Main Street Realty Company to cost $50,000; the Buffalo-Overland Company's building on Main and St. Paul Streets to cost $40,000; laboratory and office building for the Foster-Milburn Company to cost $75,000.

Permits were also issued for the "Strand Theatre" for the Mark Amusement Company to cost $100,000; the "Hippodrome Theatre" for the Shea Amusement Company to cost $150,000; remodeling the Lyric Theatre to cost $60,000; Grand Trunk Railway Station at Black Rock to cost $75,000; rebuilding the Water Works Pumping Station to cost $147,000; remodeling the Washington Street Market building to cost $105,000 and rebuilding the Masten Park High School, destroyed by fire last winter—entirely new plans will be used in its construction.

A large number of fine residences are being erected in the Penhurst Park, Nye Park, Central Park and "Amherst Estates" districts, besides many of moderate price in all residential sections of the city.

Canton, Ohio

The number of building permits issued during the month of July was 65 with a valuation of $205,900 as against 82 permits for July, 1911, with a valuation of $163,010, showing a decrease in the number of permits of 17, but an increase in valuation of $42,890.

The number of permits for the first seven months of 1912 was 406, with a valuation of $998,683 as against 458 permits for the first seven months of 1911, with a valuation of $862,660, which is a decrease of 52 permits, but an increase in valuation of $136,023.

At the present time building operations are rather slow, but considerable good work is being planned and will probably be started within the month.

Chicago, Ill.

A total of 1202 permits, with a frontage of 34,651 ft. and a valuation of $10,265,800, were issued in July this year as compared with 1041 permits, with a frontage of 28,251 ft. and a valuation of $11,300,000 for July, 1911.

Up to August 1 the year shows a total of 6670 permits issued, a total frontage of 182,158 ft. and a total valuation of $51,158,300. This is ahead of the same seven months in 1911, which showed the following record: Permits, 6213; frontage, 165,092 ft.; valuation, $48,691,000.

In the July record the permits are divided among the four sections of the city as follows:

	No. of Permits.	Valuation.
Northwest	405	$3,623,800
Southwest	216	2,335,700
South	404	3,009,700
North	177	1,296,600

Information received from the Builders & Traders' Exchange of Chicago is that the great building activity has produced a shortage of bricklayers and carpenters. Work on many buildings is delayed owing to scarcity of men.

Cincinnati, Ohio

Including elevator permits there were a total of 1194 issued during the month of July, having an estimated valuation for improvements of $971,214. This is considerably over June, which had $814,346 to its credit. July last year had a showing of $709,300.

The above figures do not include the suburbs of Norwood and Oakley, where there is a great deal of residence building under way.

Althoug skilled labor is very scarce, and there is some trouble in getting common labor at the end of the summer season, residence construction is expected to exceed any similar period, in spite of the late start in the spring.

The proposed 34-story office building for the Union Central Life Insurance Company is now well under way, and the contractors for the 12-story hotel building for the Gibson House Company have commenced tearing down the old structure to make room for the new building. There are also quite a number of additions to factories going up in this section of the country.

The Norwood Sash & Door Company, Norwood, Ohio, will soon have plans completed for a large addition to its plant, and for which will be required considerable woodworking machinery and other equipment. Harry Hake, Cincinnati, is designing plans for the proposed structure, which will be 80 x 300 ft., five stories high.

Cleveland, Ohio

Building operations are continuing in a very satisfactory volume. While no contracts were placed during the month for particularly large structures a great deal of small and moderately sized work is coming out in practically all classes of building operations. Steel fabricating shops are crowded with work and have some trouble in getting material as fast as needed. The outlook for a very busy season until close to the end of the year is promising.

The number of permits issued during July shows a falling off as compared with the previous month but the total estimated cost exceeds those of the June permits by nearly $200,000. During the month there were 775 permits issued for buildings to cost $1,828,201. Of these 179 were for frame structures to cost $472,560, 78 were for brick and stone buildings to cost $902,900 and 498 were for additions and alterations to cost $450,651.

Columbus, Ohio

The Builders' and Traders' Exchange of this city, through its President, E. K. Hibbs, has extended a cordial invitation to the members of brother exchanges throughout the country to attend the centennial celebration to be held in Ohio's capital city August 26 to September 1, and at this time the Exchange will keep "open house" at its headquarters in the Brunson Building.

The amount of capital going into building construction in July was not quite up to July, last year, although the difference is not significant. Last month permits were issued for building construction to cost $423,883, and in July, last year, $483,315. For the seven months of this year the cost of building operations was $3,025,005, as against $2,829,236 in the first seven months of last year.

Dayton, Ohio

At the second annual meeting and banquet of the Builders' Exchange, and at which fully 100 members were present, directors for the ensuing year were chosen and the board organized by electing the following officers:

President, John W. Boren.
Vice-President, John C. Gohn.
Treasurer, H. B. Arnold.
Secretary, F. O. Kemlein.

Elizabeth, N. J.

Owing to the fact that in July last year permits were issued for the new shops of the Central Railroad of New Jersey, the figures for July of the current year make anything but a favorable comparison. They are, however, well ahead of June and in fact of every other month of this year excepting April and May.

According to the report of Building Inspector Edward A. Brennan the value of the building improvements for which permits were issued last month was $167,985.75, while in July last year the total was $515,986.

Of the buildings planned last month 23 were of frame construction estimated to cost $81,000, while 5 of the permits were for brick buildings to cost $53,000. There was one permit for a hollow tile building to cost $17,000.

For the first seven months of the current year the total is $983,556.55, while in the corresponding months of last year the total was $1,289,383, this increase being altogether due to the Jersey Central Railroad shops planned in July, 1911. Eliminating this factor the total for 1912 is considerably in excess of last year.

During the fiscal year ending June 30, 1912, there were 517 permits issued for building work costing $2,206,-624.52, while in the previous fiscal year there were 548 permits issued for buildings and additions estimated to cost $1,609,131.93.

Los Angeles, Cal.

Building operations have again broken all previous records; permits issued in July were valued at $3,585,014. The former record for any month in the history of the city was made in June, with $3,488,337, while the total for July of last year was only $1,823,104. Except for a somewhat higher valuation for steel frame buildings, the character of the work in hand shows little change from June.

The permit for the Clark hotel, amounting to $700,000, was taken out at the end of the month, in addition to a permit issued earlier for the $500,000 steel Hollingsworth building, compared with one permit for a $400,000 building of this class issued in June. The total number of permits was hardly as large as the previous month, though the number and value of dwellings remain about the same. The principal decrease was in reinforced concrete and Class C buildings, for which there were less than 50 permits altogether, with a valuation of about $700,000.

Conditions are favorable for continued activity, though it doubtful whether the past month's record will be equaled again this season. Labor conditions in the building trades have settled down into fairly stable equilibrium, while most building materials tend upward. Lumber retailers in Los Angeles and vicinity have advanced prices sharply, owing to higher shipping rates and advances at the mills. There is nothing to indicate a let up of present activity in dwelling construction, which has been steady for many months, but the outlook for larger buildings is not easy to forecast.

Louisville, Ky.

The members of the Builders Exchange will hold their annual outing at Hikes Point on Labor Day, September 2, and in anticipation of that event the committee on picnic issued "Plans and Specifications" of the affair in the shape of a blue print outlining in architectural terms the leading features of the affair.

Building is very active in the city and some of the permits issued involve a considerable expenditure. Last month there were 214 permits issued for buildings costing $1,075,910, while in July, last year, 195 buildings were projected, to cost $615,670.

Memphis, Tenn.

The present building situation in and about the city is such that officials of the Builders' Exchange are very optimistic as regards the outlook and they freely express the opinion that 1912 will be one of the largest building years in the history of the city. Large contracting firms are busy and there is considerable business in their line in sight. Residence construction is breaking all records, several recent instances having occurred where single contracts have been let for 20 and 25 houses to be erected in sub-divisions of the city. The new houses are of the seven, eight and ten-room type and have an individuality of their own. Among the features are the breakfast room and the sleeping porch.

Building materials which several months ago were in short supply, owing to the high water and unlooked for activities, have again resumed their normal trend. The scarcity of brick is over and practically the only shortage felt is in lumber. This, however, is said to be largely due to the fact that contractors not looking for such unprecedented business did not place their orders until late.

In July the value of the building improvements for which permits were issued was $680,629, while in July last year the value of the construction work was $316,680.

The showing for the first seven months of the current year is slightly below that of the corresponding period in 1911, but the changes are not significant, the figures being $3,702,256 and $3,965,665 respectively.

Minneapolis, Minn.

Some 300 or more members and guests of the Builders' Exchange enjoyed their annual "Outing" or "Funday" on Saturday, August 10, by a 50-mile trip down the Mississippi River and a two hours' stop at Grey Cloud Island on the return trip. It was a regular frolic and the oldest members of the Exchange declared that "in all their lives they never saw anything like it." The feature in the way of amusement were the games of railroad baseball in which young men and old men, fat men and thin engaged in the elimination contests to see which side should be crowned with victory and incidentally win a box of cigars. The ten men captained by E. H. Norblom were declared victorious. The losing team was captained by Tony Hedberg.

There was a 50-yard dash and a ball-throwing contest for women; O. H. Deckert was declared to be the fastest fat man and James H. Brown the fleetest grandfather. On board the boat music was furnished for dancing by the Pillsbury House Band.

H. M. Gardner, president of the Exchange, and Eugene Young, secretary, were the busiest men on the boat and on the picnic grounds. In arranging the picnic they were assisted by O. E. Deckert, E. H. Norblom, J. W. Helm, J. H. Ziegler, Arthur Brin, H. E. Berreau and Henry Doeltz.

Building is a trifle less active than a year ago at this time, but the estimated cost of the building improvements for which permits have been issued aggregate a fair total. In July new construction work was planned estimated to cost $879,965 as against $1,416,670 in July a year ago.

For the first seven months of the current year the estimated expenditure for new construction work was $7,178,905 and in the first seven months of last year the amount involved was $9,911,055.

Newark, N. J.

Permits for several important building operations were issued during the month just closed and the showing is very appreciably in excess of that for July a year ago. According to the report of Superintendent W. P. O'Rourke there were 249 permits issued last month for new buildings, alterations, additions, etc., estimated to cost $1,994,236. In July a year ago there were 246 permits issued, but the estimated cost of the improvements was only $718,105.

The increase last month over a year ago is due largely to the filing of permits for the 12-story Kinney office building to cost $660,000; the Goerke department store building to cost $110,000, and the Miller Street Public School to cost $131,000. It will be seen that these three permits alone call for $901,000.

Permits for new work are being issued upon a scale which seems to indicate plenty of work for mechanics in all branches of the building trades. In Montclair the building department issued permits for new work in July to cost $136,000, which is an increase of $44,000 over the same month last year, and the Bayonne building department issued permits calling for an outlay of $129,735, most of the plans being for two-family houses.

New York City

The local building situation has developed no special feature of interest during the month under review and the amount of vested capital involved in the operations for which permits were issued is in Manhattan and the Bronx, a trifle less than was the case in July last year.

The slight shrinkage as regards the figures for Manhattan has been due to the lessened planning of no one class of building but is distributed among several. There were a few less store and loft buildings projected last month than was the case a year ago and there was also a falling off in the cost of churches, stables and garages, apartment houses and manufactories and workshops, while a slight increase was noted in the cost of office buildings planned; in the school houses for which permits were issued and in the cost of public buildings.

The report of Superintendent Rudolph P. Miller, of the Borough of Manhattan, shows the estimated cost of new construction work, alterations, additions, etc., to have been $7,149,339 in July and $7,650,353 in July last year.

Superintendent Miller has just issued an interesting diagram showing the number of buildings in course of construction or under alteration each month for the past 10 years, including the period within which the records of the bureau of buildings of Manhattan have been kept independent of those of the other boroughs. Several features of the diagram are decidedly striking. The sudden rise of new building operations in 1905 and the falling off again the latter part of 1906 is safely attributable to the subway, which was completed about the end of 1904. Previous to 1907 the new building operations exceeding the alterations, which condition was reversed in May of that year, but since that time the alterations have exceeded the new buildings in number. The chief reason for this is no doubt due to the fact that in latter years the tendency has been to erect much larger buildings than before, but a less number of them. This is borne out by other figures which show that for the year following 1907 the average estimated cost of the individual new building—$123,488—was double that cost—$61,682—for the five years preceding 1907, the year 1907 itself as the transition year being left out of consideration.

A gratifying increase in the number of buildings planned in July as compared with the same month last year is shown in the figures compiled by Superintendent P. J. Carlin, of the Bureau of Building for the Borough of Brooklyn. According to this authority there were 458 new buildings planned last month estimated to cost $3,225,285 and 606 alterations costing $737,249, making a total for the month of 1064 buildings involving an estimated outlay of $3,962,534. In July last year permits were taken out for 364 new buildings and 625 alterations estimated to cost $2,262,955 and $1,442,295 respectively. This gives a grand total of 989 buildings estimated to cost $3,705,250.

The semi-annual report of the Brooklyn superintendent shows 2795 new buildings to have been planned involving an estimated outlay of $20,182,087, to which must be added the cost of alterations and repairs during the period named, which brings the grand total to $22,079,284 for the first six months of 1911. The bureau has adopted for the first time this year a new form of classification which shows in concise form the character and cost of the various kinds of new structures.

In the Borough of Queens plans were approved for 406 new buildings to cost $1,743,907 and for 109 alterations to cost $71,544.

Philadelphia, Pa.

For several months past the decreased volume of two-story building operations, as compared with like periods last year, has had a marked effect on the monthly statistics, and has also been the factor in decreased total operations during the year. From statistics compiled by the Bureau of Building Inspection it is shown that 902 permits for 1257 operations, at a cost of approximately $3,456,800, were issued in July, which represents a decline of $832,270 in value as compared to July last year.

The total expenditure authorized during the past seven months was $22,806,005, as compared to $27,281,830 during the same period in 1911. This shows a total decrease of $4,475,825, while it may be noted that during the past seven months the falling off in two-story dwelling operations alone was $4,592,181. On the same comparative basis the decline in three-story dwelling operations this year was $1,586,525, indicating that while dwelling operation work decreased there was a gain in other classes of work, not sufficient, however, to cover the loss in dwelling work alone. Tenement house construction, which should be classed as dwelling houses, was of small importance during July, aggregate work begun totalling but $20,000. Office and industrial buildings still contribute a good share of new work, aggregating over $750,000 in July. Notwithstanding the apparent decrease in local building operations builders and contractors have been quite busy. There has been a large amount of suburban work undertaken and some contractors have closed for quite good-sized contracts in nearby towns. Building costs are steadily advancing, materials in a number of cases command higher prices, and common labor is scarce and wages high.

The volume of business in prospect is large; considerable dwelling work is planned in some districts, but it is hardly likely that the totals of 1911 will be reached this year. Ballinger & Perrot, architects, are asking bids for the construction of 66 workingmen's homes, to be the first unit of a workingmen's village, to be erected for the American Viscose Company, manufacturers of artificial silk, at Marcus Hook, Pa., near this city. The houses will be laid out on streets radiating from a central semicircular plaza and will vary in construction and size. No house will have less than three bedrooms on the second floor. Sewers will be installed and every phase of the sanitary housing feature has been considered. It is expected that the village will ultimately embrace 255 houses.

Preliminary plans for a large elementary school building at Third, McKean and Mifflin Streets, have been completed and will be presented to the Board of Education of the city at its September meeting. The building will be 300 x 200 ft. and accommodate forty-two classrooms, representing a total of 2200 children.

R. C. Ballinger has, it is stated, the contract for the erection of an eight-story building at 15th and Cherry Streets, from plans by Bunting & Shirley, for the Philadelphia Young Friends' Association. It will be 51 x 84 ft. and of fireproof construction.

A contract to erect a four-story apartment house, 48 x 89 ft., at Fifty-first and Locust Streets, for H. S. Anders, has been awarded Alexander Chambley. The structure will cost approximately $100,000.

Contractors are estimating on the construction of the Thomas W. Evans Memorial Museum & Dental Institute, to be erected at 40th and Spruce Streets, from plans by J. T. Windrim, architect. Plans provide for a three-story brick fireproof building, 161 x 242 ft.

Among recent dwelling house operations on which work has been begun may be mentioned one of 27 two-story, two-family flat houses, building by W. K. Hunter at 45th and Woodland Avenue. Each will measure 16 x 67 ft. E. F. Gorman is considering the erection of 56 two-story brick buildings at 57th and Catherine Streets from private plans. It is understood that hot water and steam heating plants will be installed.

Portland, Ore.

The building situation is looking up a little, and while the warm weather usually tends to retard operations at this season, last month made a fairly good showing. There is no indication that any records will be broken this year, but the outlook for large individual buildings is better than for several months, and the advancing price of lumber has hastened the letting of many dwelling contracts, which still comprise the greater part of the values.

Buildings for which permits were issued in July were valued at $1,494,921, compared with $1,176,605 for June, and $1,373,819 for July, 1911, while for the same month of 1910 the total was only $908,080. There were 676 permits issued during the month, compared with 613 for the same month last year. The largest building planned was the new public library, the stated value being $460,000.

One of the principal contracts let recently was for the new Failing Grammar School, a fireproof structure designed by Architects Whitehouse & Fouilhoux, to cost $134,000. Other contracts were: The American laundry building, of brick and mill construction, two stories and basement on a lot 122 x 125 ft., A. H. Gould architect, and a five-story mill construction warehouse for the Portland Seed Company, costing $60,000. The contract for the library went to the Pearson Construction Company at $336,305.

Reading, Pa.

There was a large increase in the amount of new work planned in July as compared with previous months, the figures being practically double what they were in June. Building Inspector C. E. Stubbs reports that last month the value of the new construction work for which permits were issued was $711,967, to which must be added 880 alterations and additions bringing the total up to $907,367. It is the custom to add 20 per cent for undervaluation when the plans are filed so that the grand total for the month is $1,088,840, which compares with $505,000 in June. A feature of the month was the number of two-story dwellings planned. There were 229 houses of brick construction involving an estimated outlay of $282,500 and there were 8 two-story frame buildings planned to cost $32,000. Two office buildings for which permits were issued will cost $180,000.

For the seven months of the year the new improvements planned are estimated to cost $4,398,839, and adding the alterations, etc., brings the total to $5,560,659; then addding the 20 per cent for undervaluation makes the grand total $6,672,790.

Sacramento, Cal.

After a little slump at the beginning of summer the building business has picked up rapidly, and there is more activity at present than at any time since the first of the year. Permits were issued last month for buildings valued at $286,681, compared with $157,107 for the previous month and $83,480 for July, 1911.

The principal contract let in the last month was for the state arsenal and armory at Twelfth and W Streets, which went to the Rasome Concrete Company at $92,000.

Bids will be received about the middle of the month for the new Y. M. C. A. building, a 5-story structure at Fifth and K Streets, to cost $160,000. E. C. Hemmings, architect.

A lively fight has started between the local Contractors' and Dealers' Association, a branch of a state organization, and contractors or material dealers who refuse to submit to its rules. The matter has been brought to a head by the letting of a contract on the new County Court House to an independent contractor, and it is believed that the association has selected this job as a good opportunity to test its strength.

Salt Lake City, Utah

While the total value of the building construction work for which permits were issued in July was $423,885, being little more than half what it was in June, yet the figures show an increase over July, 1911, of $176,485. Last month the largest permit involved an expenditure of $128 000 and the second largest was for $100,000, covering the new home of a business concern on East Third, South, Street.

For the seven months of the current year the total estimated cost of building operations in the city was $2,315,875. The largest total was in June, when the figures were $785,150.

San Diego, Cal.

Local building activity is again on the increase, more good-sized contracts having been let lately than for some months past. The building record for July reached $898,977, slightly lower than for last April, but well above the general average. For the same month last year the total was $267,250, while that for June was $669,163. Among the principal permits issued were those for the following buildings: Crane Bros.' apartment house on West Ninth street, to cost $80,000; the West & Finkle hotel on Fourth street, to cost $32,000, W. S. Hebbard, architect; a 4-story concrete hotel for H. Peters at Seventh and E streets, to cost $100,000, Pacific Building Co., contractor, and the L. J. Wilde bank building at Second and D streets, to cost $25,000.

San Francisco, Cal.

The midsummer season finds the volume of work contracted and the number of men employed in the building trades far above those of last summer. July shows the official valuation of building permits issued to be $2,452,725, compared with $2,054,542 for June, and $2,134,479 for July, 1911. Reviewing the records of the last three years, that for March, 1912, is the only one reaching a higher figure.

This total includes no single buildings of unusually high valuation, very few amounting to over $200,000, and few private structures immediately in prospect will pass the quarter million mark. The principal part of the value is made up of stores and apartments of modern types, running from $50,000 to $100,000 in cost. The Class C type of construction is very largely used, though reinforced concrete is popular in certain classes of work, especially warehouses and low structures for public use. Wooden buildings other than dwellings and small apartments are relatively few, and dwellings are an item of less importance than in many cities. Fine residences are more numerous at exclusive suburbs than in the city itself.

Most materials stand about as before, though steel products are still advancing. The local lumber market is rather heavy, notwithstanding the firmness at Northern mills. Cement is still easy, some of the mills being closed and ordinary grades of lime are quiet, though there is a strong market for favored brands of plastering lime and hard wall plaster. Brick is steady, with an increasing demand for both common and pressed brick, as well as terra cotta.

Arrangements for the exposition construction are rapidly taking shape. The preliminary layout is practically complete for the sewer, water supply and fire protection systems, as well as for wharves and ferry slips, but further work in these matters awaits the approval of the architectural commission. The second meeting of the full commission will be held here Aug. 13, when drawings and studies prepared by various members for individual buildings assigned them will be presented.

The largest building which has come up for figures lately is the St. Francis Hotel annex at Post and Powell Streets, which will take at least 2,000 tons of steel. Next to this is the Tivoli Theatre, a "Class A" construction, 9 stories high, costing nearly $250,000. O'Brien & Werner are the architects.

Other buildings to be figured shortly are: a steel frame, 6-story apartment house at California and Stockton Streets, to cost $100,000, Welsh & Carey, architects; a 7-story reinforced concrete hotel at Ellis and Larkin Streets, to cost about $100,000, Righetti & Headman, architects; a 7-story brick and steel hotel at Gearey and Mason Streets, to cost $80,000, C. W. Dickey, architect; a 6-story brick and steel apartment at Bush and Leavenworth Streets, to cost $80,000, D. C. Coleman, architect; and a 5-story brick and steel hotel on Fillmore Street, to cost $140,000, Miller & Colmesnil, architects.

The excavation contract has been let for the new Grace Episcopal Cathedral, which will cost, altogether, about $1,000,000. The original plans were drawn by architects C. S. Hall and G. F. Bodley of London, and adapted by L. P. Hobart of this city.

Architect Geo. W. Kelkham, this city, is preparing plans for an 8-story Class A store and office building, to be built at Fresno, Cal., at a cost of $250,000. The contract for the Sequoia Hotel annex at Fresno has been let to the Lindgren Company at $88,500.

St. Louis, Mo.

The estimated cost of the new work for which building permits were issued in July is somewhat in excess of that for the corresponding month a year ago, and the present outlook is for the activity in all branches of the trade to continue throughout the year. Building Commissioner J. N. McKelvey reports that last month permits were taken out for 594 new buildings and 412 alterations calling for an estimated outlay of $1,724,665, while in July last year the total was $1,363,066.

The feature of the month was the number of brick dwellings planned, estimated to cost less than $20,000 each. There were 125 of these estimated to cost $394,250, and there were three others planned which called for an estimated outlay of $93,000. Of brick tenements 59 were planned to cost $339,450. There were seven hotels to cost $218,000 and nine manufactories to cost $120,150.

Seattle, Wash.

The average cost of buildings for which permits were issued during the month of July from the office of R. H. Ober, Superintendent of the Department of Buildings, was a trifle greater than was the case in July a year ago. This is more especially noticeable in the case of the private dwellings which were planned and for which there seems to be a growing demand by reason of the steady growth of the city. According to the authority in question there were 748 permits issued last month calling for an expenditure of $645,325, while in July last year 869 permits were taken out for construction work estimated to cost $541,600. Of these totals 141 permits were for detached dwelling houses to cost $235,715, while in July a year ago 159 such plans were planned calling for an expenditure of $212,375. Last month 6 store and office buildings were planned costing $92,400, as against the same number in July last year involving an expenditure of $49,200.

For the seven months ending July 31 there were 5,813 permits issued for building improvements estimated to cost $5,498,315. In the corresponding seven months of last year there were 6,658 permits issued for construction work involving an estimated expenditure of $4,513,935.

The Red Cedar Shingles Manufacturers Association recently held its annual meeting at its headquarters in Seattle, when the following officers were elected: President, S. C. Willcox, of Aberdeen; vice-president, C. A. Johnson, of Seattle; secretary, H. M. White, of Bellingham, and treasurer, F. A. Trail, of Seattle.

Worcester, Mass.

The amount of new construction work now being planned is very much ahead as regards the amount of capital involved for the corresponding period a year ago, a feature of current operations being a number of apartment houses and private dwellings. Among the apartment houses was one having accommodations for 22 families, but the majority were for two and three families each. Superintendent of Public Buildings G. C. Halcott issued 149 permits in July calling for an estimated outlay of $652,192, 98 permits being for new buildings to cost $552,302.

In July last year there were 142 permits issued for building improvements estimated to cost $389,417, and of these 82 permits were for new buildings to cost $332,771.

For the seven months of the current year the 1,003 permits issued for building improvements called for an estimated expenditure of $2,969,880, whereas in the first seven months of last year the 905 permits issued called for an estimated outlay of $2,805,565.

Builders' Appliances and Equipment

Some Things of Seasonable Interest to Those Having To Do with the Building Business

Sand's New Model Aluminum Level

A recent addition to the already extensive line of levels made by J. Sand & Sons, 1025 Rivard street, Detroit, Mich., is the new model aluminum level illustrated in Fig. 1 of the engravings. This tool is offered as the first metal level made that will not warp. All the glasses in the new aluminum level are put in the same way as in the

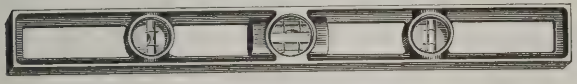


Fig. 1—Sand's New Model Aluminum Level

company's wooden level and are covered by heavy lenses, thus making those parts dust, dirt and water proof. The tool is made in four styles, No. 24 being 24 in. long and provided with two plumb glasses and two level glasses; No. 30 being 30 in. in length and having four plumb glasses and two levels; No. 42 being 42 in. in length and having four plumb glasses and two levels, and No. 45 being 45 in. in length and having four separate plumbs and two levels. All of these are of double construction so that no matter in what way the tool may be picked up it is always in position for use.

Adjustable Bit Gauge

The Millers Falls Company, 28 Warren street, New York, has recently put on the market the bit gauge known

Fig. 2.—Adjustable Bit Gauge

as No. 36 and illustrated in Fig. 2 of the cuts. It is a convenient, compact tool, and, as shown by the illustration, the gauge may be instantly set at any point on the auger bit twist by means of clamp which is actuated by two thumb nuts. The entire tool is nickel plated and the goods are packed six in a box.

Another New Luther Grinder.

The latest addition to the already extensive line of tool grinders which are being introduced to the attention of the trade by the Luther Grinder Mfg. Company, 917 Michigan Street, Milwaukee, Wis., is illustrated in Fig. 3 of the accompanying engravings. In connection with most of the new abrasives on the market the speed of the grinding wheel has much to do with its efficiency. High speed adds to its rapid cutting quality, length of life and the smoothness of the finished work. No matter how desirable may be a sharpening substance it cannot be expected

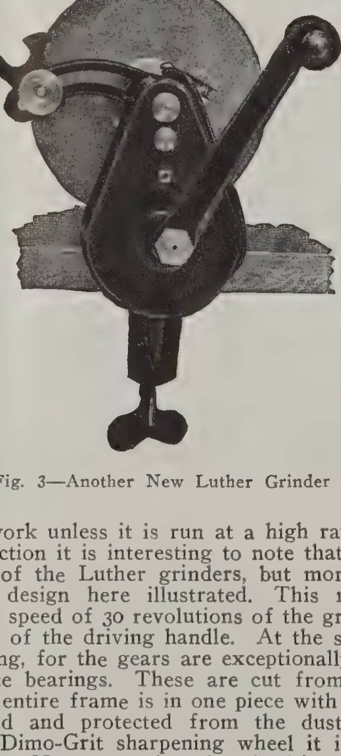


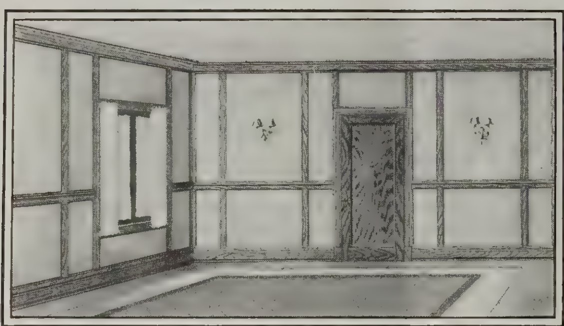
Fig. 3—Another New Luther Grinder

to do good work unless it is run at a high rate of speed. In this connection it is interesting to note that high speed is a feature of the Luther grinders, but more especially of the new design here illustrated. This new Luther grinder has a speed of 30 revolutions of the grinder wheel to every turn of the driving handle. At the same time it is easy running, for the gears are exceptionally wide with long one-piece bearings. These are cut from solid steel blanks. The entire frame is in one piece with all machine parts enclosed and protected from the dust. Equipped with a 4-in. Dimo-Grit sharpening wheel it is known as Luther Grinder No. 104, and equipped with a 5-in. Dimo-

Grit sharpening wheel it is known as No. 105. It also has Luther's patented chisel guide and tool rest, by which a true and even bevel can be given to any edged tool.

The "Bestwall" Wall Board

The latest candidate for popular favor in the way of a wall board which may be used as a substitute for lath and plaster is the product of the Bestwall Mfg. Company, with offices in the First National Bank Building, Chicago, Ill. The object of wall board is to supply an improved construction that will make better walls. In the first place the wall must be rigid to be permanent; it must be a non-conductor of sound and an insulator for heat and cold, while at the same time it must be of such a nature



The "Bestwall" Wall Board—Fig. 4—Showing Panel Effect

that when erected various forms of decoration may be applied. The company's product, which is offered under the name of "Bestwall," is claimed to not only possess these qualities, but that it is fireproof, having been subjected to a fire test of 1700 degrees Fahrenheit for 30 minutes. While the outside coating of paper will char it is impossible for the board to ignite owing to the fact that it is made of a rock gypsum composition with a surface of heavy fiber paper on either side. In the composition wood fiber and other ingredients are used in order to add strength. The result is a tough material which can be nailed to the studding without cracking, and it can be nailed close to the edge as if it were wood without splitting. Another advantage claimed for "Bestwall" is that it being a mineral substance there is no expansion and contraction. Wall paper can be applied directly on the surface the same as on a plastered wall. Its use is general, this being made possible from the fact that it is unnecessary to use strips over the joints unless so placed for decorative or panel effects. The company states that by laboratory test "Bestwall" is equivalent to 1½ in. of wood lath and plaster in sound-deadening properties. In Fig. 4 of the accompanying illustrations we show the application of the board in panel effect as for example for a dining room treatment, while in Fig. 5 is shown the plain effect such as would be appropriate in a bedroom. The board is made in various sizes ranging from 32 x 36 in. up to 48 x 72 in., and weighs approximately 1¼ lb. per square foot when crated. It cuts with an ordinary saw or it can

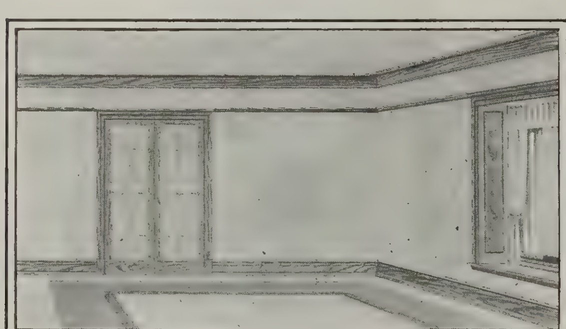


Fig. 5—The Plain Effect as in a Bedroom

be scored on opposite sides with a knife and broken off with a clean edge. Its use is said to result in a great saving of labor and material and obviates the necessity of waiting for a house to dry out before occupancy or the risk of health to occupation before thorough drying is effected. It insures ability to carry out interior finish without delay. The claim is made that nails driven for hanging pictures will hold better than in plaster and will leave a clean small hole when withdrawn instead of the cavity so often noticeable in plastered walls. Another claim is that contractors can save about one-third of the cost by the use of the wall board, the economy varying according to the locality and price of labor and materials. "Bestwall" is being extensively used for the construction of drying rooms for all kinds of products, the fireproof quality appealing especially to the users. The company's Chicago plant is at Clearing and the Pacific Coast plant is at Alameda.

Large Sale of Reinforced Concrete Lighting Standards

We are advised by the Pettyjohn Company, 616 North Sixth Street, Terre Haute, Ind., that they have just received an order for 300 reinforced concrete lighting standards similar to that which was illustrated and described in these columns not long since. Of this number 220 of the standards are to be used in Washington and Lincoln Parks, Springfield, Ill., while the remainder are to be used in the boulevard system. Springfield has unusually large and handsome parks which are the pride of the city, but previously they have been inadequately lighted by lights on iron poles. The order is therefore especially gratifying to the company as well as of interest to all cement users in view of the fact that Springfield has previously used standards made of a combination of cast-iron base and sheet metal shaft, while neighboring cities have been using concrete. The Pettyjohn Company also announces that it has received orders for installations for as far west as Dubuque, Iowa, and numerous orders from cities on the Atlantic Coast.

Canton Adjustable Metal Window

Several new features are contained in the Canton adjustable metal window that is being placed on the market by the Canton Mfg. Company, Canton, Ohio, and illustrated in Fig. 6 of the cuts. An adjustable section is

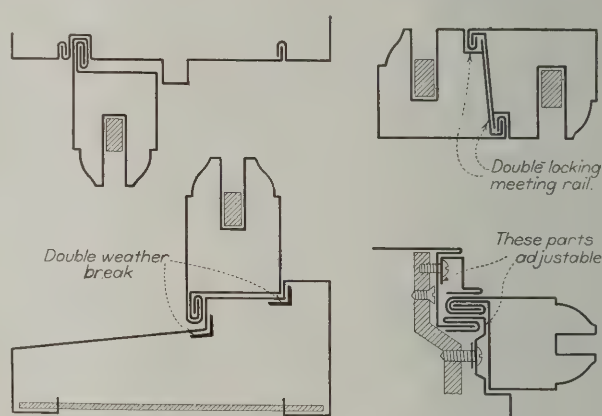


Fig. 6—Various Details of the Canton Adjustable Metal Window

provided between the jamb and the back and side of the stile so that if the sash after being erected fits too tightly or too loosely adjustment can be made to secure the easy operation of the window. This adjustment is quickly made by screwing up or loosening bolts in the adjustable strip. The details of this construction are shown in one of the accompanying sectional views. Another important feature is that the sash has double lock meeting rails. These rails are designed to draw up snugly so as to leave no air space between them, and it is claimed that it is impossible for fire to work between the rails. This form of construction, together with the double weather break at the head and the sill, is claimed to render the window air proof and dust proof. The top and bottom rails of the sash are reinforced with ⅜ x ¾-in. steel bars which run the entire width of the sash. These bars are bolted at the ends where the stiles and the rails meet with ¼ x 1-in. bolts. This construction was adopted to strengthen the sash at the four corners, and cash chains are fastened to these bars. In this way the strain of sash weights is taken off the sash when the window is raised or lowered. The interior frame is accessible from the head and the jamb, so that the sash weights, sash chain, pulley, braces, etc., can readily be unfastened and the interior of the frame can be painted at any time. Another feature is that any kind of special staff bead can be put on the frame, so that individual ideas of architects and owners as to ornamentation can be carried out. Both the sash and frame are made of 24-gauge galvanized steel. The hardware, including pulley housings, pulley, sash fasteners, sash lifts and braces, are made of malleable iron from the company's own patterns. The same features of adjustment are embodied in the company's standard pivoted windows. The pivoted window is held open by the chain with a fusible link so that it closes automatically in case of fire. The company is also making a line of metallic fire doors, including tin-clad with wooden core, asbestos filled, pressed steel, corrugated sheet, covered with angle iron frames and sheet iron doors.

Blaw House "Forms"

One of the important factors in connection with concrete construction is the "forms" which are used to retain the concrete in place until it has "set" sufficiently to permit of their removal. While wood is used to a large extent, it is necessary to cut it to fit each time it is erected and consequently can be used only a few times. In the case of metal "forms", however, they can be used over and over again. They are practical indestructible and the contractor instead of making wood forms for every new job he secures, has steel forms conveniently available. This in itself is a great saving but the principal economy to the contractor is found in the small labor cost with which the forms can be handled compared to wood forms. The steel forms which constitute the basis of this article and made by the Blaw Steel Construction Company, Pittsburgh, Pa., are automatically spaced and self-aligned and can be handled by common labor. They are adapted to build light concrete walls either a few feet in hight at one time or the entire hight of the wall. The forms are practically waterproof and the best part of the concrete cannot leak away as is often the case with wood forms. In Fig. — we show the use of the steel molds or forms in preparing the foundations of a building. The company states that the forms can be used in the construction of concrete cottages, garages, residences, foundations and light wall work of any type. The Blaw forms are used in outfits ranging from 200 sq. ft. to 20,000 sq. ft. and were designed by the same core of engineers who designed forms for the most important projects of our times. The company has issued some very interesting literature bearing upon the Blaw system of construction, copies of which will be sent to any architect, contractor or builder who may make application for it.

Fig. 7—The Blaw System of House Molds or "Forms"

The Richmond Concealed Transom Lift

The Concealed Transom Lift Company, 437 Fifth Avenue, New York City, has recently taken over from the McCrum-Howell Company the selling rights to the Richmond Concealed Transom Lift, which it will be remembered was specified by Cass Gilbert for the 55-story Woolworth Building. The former company was the original owners of the transom lift in question, but selling rights were taken over by the McCrum-Howell Company, but who now turn them back to the Concealed Transom Lift Company. The main feature of the concealed transom lift is that it provides easy leverage for operating the transom, because it does not throw the weight of the transom upon the arm of the transom controlling it. There is provided an absolute lock at any transom angle desired, this being accomplished by installing the equipment back of the facing, attached to the door jamb, within the wall. The only thing visible is the artistic "T" handle, the turning of which absolutely controls the working of the transoms.

Hurley Electric Laundry Equipment

The Hurley Machine Company, South Clinton and Monroe Streets, Chicago, has just issued from the press the sixth edition of its catalogue illustrating and describing its line of "Thor" electric laundry equipment for installation in private houses, apartment buildings, country clubs, hotels, cafés, hospitals, sanitariums and other institutions. The private home and institution demand a satisfactory solution of the laundry problem and how well the Thor Electric Equipment has accomplished this is evidenced by the fact the company states that there is not a city in the United States using electricity where its machines are not in use. Within the covers of this catalogue will be found a general description of the different sizes and styles of electric laundry machines, ironing machines and clothes driers manufactured by the company. The engravings illustrating the machines are of a high order of merit, the printing being of such a nature as to resemble as closely as may be the actual color of the various materials used in their construction. Not the least interesting feature of the catalogue is found in the facsimiles of blueprints showing different arrangements of laundry room for high-class homes, medium-sized houses and apartment buildings.

The progressive architect has recognized the demand for practical devices of the kind indicated and in planning the laundries of up-to-date dwellings provision is made for permanent installation of these devices. The building contractor is also interested in machines such as those shown in the catalogue, as he can readily secure a copy of the publication upon request to the company.

Combined Katz Door Guard and Night Bolt

A device which is likely to be appreciated by builders as well as house owners is a door guard and night bolt just placed upon the market by the Lawson Mfg. Company, 215 West Huron Street, Chicago, Ill., and which is shown in Fig. 8 as it appears when not in use and applied to the jamb of a door. The device is offered under the trade name "Katz" and is referred to as very simple to operate, there being no lever to be moved into place, but merely giving a half turn to the knob which is fitted into the stile of the door a little distance above the lock. The guard is made of sheet steel neatly finished and when not in use is entirely out of the way, as it folds down between the door frame and the face of the door. When in use the guard locks the door open, thereby avoiding any movement of the door by gust of wind. In order to use the device as a night bolt it is simply necessary to turn the knob in the stile of the door the full limit, which shoots the bolt into the hole shown in the upper portion of the illustration. The device in planished steel is offered in ten finishes and in polished steel in nine finishes. The door guard and night bolt is packed half dozen in a box complete with screws.

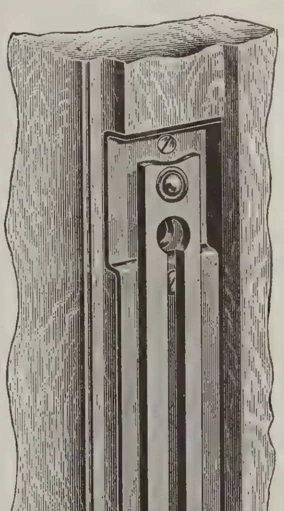


Fig. 8—The Combined Katz Door Guard and Night Bolt

Fine Tools Packed in Moisture Proof Envelopes

C. E. Jennings & Co., 42 Murray Street, New York City, has just adopted a new method of putting up its Arrow Head brand auger bits and L'Hommedieu ship augers. Recognizing the waste of time by the retail merchant in taking out a tool and wrapping it when busy, the concern is putting up each one of these tools in a neat moisture-proof envelope with flap. This envelope bears on its face the number of the article and some information as to the purposes for which the various types of auger bits are designed. There is sufficient space on the face of the envelope for the dealer to stamp his name and address if desired, which will be of service to him as an advertisement. On the back of the envelope are cuts of the Arrow Head expansion bit, Arrow Head take-down square and Arrow Head folding drawing knife.

Van Guilder System of Hollow Wall Construction

It is generally recognized that a building having walls with dead air spaces is somewhat cooler in summer and warmer in winter than is the case where the walls lack this feature of construction. As a consequence a house built in this way requires a reduced consumption of fuel to maintain within it a comfortable temperature with a corresponding decrease in the cost of heating. This feature of comfort and construction is still further emphasized in the case of outside walls constructed with a continuous air space extending entirely around the building and from foundation to roof. An interesting example of this character is the dwelling represented in process of erection which we illustrate herewith. It is constructed by what may be designated as the Van Guilder System of Double Concrete Walls with continuous air chamber, use being made of the machines manufactured by the Van Guilder Hollow Wall Company, 712 Chamber of Commerce Building, Rochester, N. Y. The residence is that of F. J. Wagner, at Smithtown, Long Island, N. Y., and the contractor is Joseph Mulvey, 395 North Avenue, New Rochelle, N. Y. In constructing the foundations, the inner wall was made 4 in. and the outer wall 6 in. in thickness, while above the grade line each wall is 4 in. thick. Usually in building a house like that here shown use is made of a 5-ft. machine and a 2-ft. machine, there being two men to operate the 5-ft. machine. On a dry day three courses of walls can be constructed, although usually two courses in a day is the average. The mixture used in preparing the concrete was in the proportion of 4½ gravel and sand to one of Bath Portland cement. It will be noted from an examination of the pictures that Fig. 1 represents the building enclosed and that the rafters are in place ready for the roof. In Fig. 2 the roof is shown practically completed. The projection at the gable end of the house is a sun parlor and in constructing the small piers for it as well as for the porch the Van Guilder machines are used on a rough floor for making the blocks and after the latter have set for a couple of days they can be placed in position the same as hollow tile or brick, leaving an air space the same as in the rest of the building. It will also be noticed that the door and several of the window openings are unusually wide and over these each course of concrete is reinforced with 1-in. iron rods, these being used in both inner and outer walls. The corners are reinforced with ¼-in. wire. The wall plates supporting the rafters are bolted to the main wall, and then the rafters are put on in the usual way. The Van Guilder machine is adjustable so that from 3 to 9 in. double walls can be built with it. The inner and outer walls are fastened together by means of No. 6 galvanized ties laid across the air chamber about 2 ft. apart on every 9⅓-in. course, which is the height of a concrete course produced by the Van Guilder machine. The company states that 1 cu. yd. of bank sand and gravel and one barrel of Portland cement makes 43 running feet 9⅓ in. high of double wall, each wall 4 in. thick and equal to 32 in. square or surface feet, and this is the amount of wall which the company points out can be built in one hour, making use of one machine. The cost of this amount of wall is given as 12 cents per square or surface foot of double 4-in. walls ready to plaster, these figures being for a 1:6 mix; that is, one part cement and 6 parts sand and gravel. The cost of reinforcing for ordinary houses is given as about one cent per square foot. Builders can usually purchase second-hand wire for reinforcing and for the ties, which is said to answer the purpose just as well as new wire. The figures of cost for material and labor can, outside of the cities, doubtless be reduced materially where the natural resources of sand and gravel can be obtained for the hauling and where labor is cheaper and where 10 hours constitute a day's work. In the case of the house here shown under construction Mr. Mulvey states that the mixing machine used was a "Kent Precision," made by the Kent Machine Company, Kent, Ohio. It may not be out of place to state that this method of constructing hollow concrete walls is attracting widespread interest among contractors and builders, and the company has received from those who have used the method in building houses numerous letters expressing the satisfaction which it has given not only to the contractors doing the work, but also to the owners for whom the dwellings were erected.

Van Guilder System of Hollow Wall Construction—Fig. 9—Showing a Machine in Use at Top of End Gable

Fig. 10—Dwelling House Nearly Completed by the Van Guilder System

Export Orders for Metal Ceilings

Among notable export orders for metal ceilings shipped by the S. Keighley Metal Ceiling & Mfg. Company, Pittsburgh, Pa., during the past few months was one which included the necessary plates for a hall in Bombay, India, 75 x 30 ft. in size and divided in three sections by means of two arches which were used for supporting the roof. There was a 16-ft. section at each end and a 40-ft section in the middle. The company furnished the necessary center pieces, field plates, moulding, border and cornice of an appropriate design for the work, and have heard that the work of erecting was so simple that a splendid appearance was produced by native workmen.

The company has recently established an agency in Buenos Ayres, Argentine Republic.

(For Trade Notes See Second Page Following)

TRADE NOTES

The latest "Handshake"—which, by the way, is No. 23—sent out by the Genuine Bangor Slate Company, Easton, Pa., is devoted to the usual amount of interesting comment on slate roofs and the merits of Genuine Bangor Slate. There is also more or less matter of a humorous yet pointed nature, and the entire make-up is well calculated to invite perusal.

A very attractive booklet which reaches our desk carries a series of excellent views of the Chicago store at 17 North Jefferson street, of the L. S. Starrett Company, makers of fine mechanical tools, Athol, Mass. The Chicago store is equipped with the latest labor-saving devices and in the stock room is carried a large and complete assortment of Starrett tools, so that all orders may promptly be filled. Dealers save the freight charges from Athol, Mass., to Chicago by dealing direct with the Chicago store. The manager of the Western establishment is Al. T. Fletcher.

The Bluffton Building Company, Bluffton, Ind., is a new firm organized to do general contracting work, making a specialty of fine residences, store and office buildings. The new company will also engage in architectural and engineering work, and requests catalogues from manufacturers and dealers in building supplies of all kinds. E. E. Morrow, J. S. Fouts and S. Shively compose the new partnership.

The Russell & Erwin Mfg. Company, New Britain, Conn., has been sending out several sample folders called the "Russwin Monographs," dealing with Russwin unit night latches, door holders, sectional door handles, shutter workers, double-acting floor spring hinges, door checks, etc.

The North Western Expanded Metal Company, 930 Old Colony Building, Chicago, Ill., is distributing for the convenience of architects and builders a series of figures in tabular form relating to expanded metal for reinforcing concrete floors and to expanded metal lath for plastering. A heavy piece of cardboard is arranged to slide in and out of a cardboard case with the figures so distributed that by moving the slide the size of expanded metal required for different loads per square foot and various span of slabs is readily found for reinforcing concrete floors. Another arrangement of figures gives the number of yards of expanded metal required for plastering varying surfaces. The gauges to use are indicated and there is a table giving stock sizes. The matter is arranged in compact form and the device can readily be carried in the vest pocket.

The August number of the "Lightning Line," issued by the J. A. Fay & Egan Company, 221 to 241 West Front Street, Cincinnati, Ohio, contains the usual amount of interesting information relative to some of the leading lines of woodworking machinery which it manufactures. One of the conspicuous articles relates to "Cost Systems for Woodworking Factories," which was continued from the July issue. A group photograph shows 45 students of the Biltmore School of Forestry in front of the general offices of the J. A. Fay & Egan Company just previous to their trip through the plant on June 19. The members of this school have studied lumbering, forestry and manufacturing methods all over the United States and were much interested in what they saw in going through the extensive plant of the company named. The company has a new catalogue just about ready for distribution and known as No. 86. It is made up of 352 pages, which describe a complete line of woodworking machinery, including all of the many improved features brought out during the past year.

Klein & Koen, architects and engineers, have just occupied new offices at No. 9 Debevoise Street, between Broadway and Graham Avenue, Brooklyn, N. Y.

"Fire Proofing Service" is the title of an exceedingly neat and attractive pamphlet sent out by the National Fire Proofing Company, Pittsburgh, Pa. The matter relates largely to the testing station maintained by the company for the purpose of testing their own and other products to determine their efficiency as fire-resisting materials. Old-time methods which proved inadequate have been abandoned and modern ones substituted. At the station a department is set aside for the testing machines, where sample blocks of the company's own make are tested for resistance, crushing, permeability and general workmanship. The illustrations, which are numerous, are finely executed half-tone engravings from photographs, showing various interiors of the testing, storage, laboratory and mixing rooms.

The Whittaker Paper Company, Cincinnati, Ohio, is sending out a four-page illustrated folder setting forth the merits of the "Paragon Wall Board," which can be supplied 32 and 48 inches wide by 6, 7, 8 or 9 feet in length, according to requirements. The board is adapted to a great variety of purposes, more especially to the interior finish of rooms. The claim is made that it is a non-conductor of heat and cold and can be applied by any carpenter of average ability. Architects and builders who are interested can secure samples of the Paragon Board by writing to the company.

The Chattanooga Roofing & Foundry Company, Chattanooga, Tenn., is meeting with a very gratifying demand for its Annis "Saflok" Galvanized Roofing, which it has recently placed upon the market and reference to which was made in these columns a short time ago. It has attracted widespread interest among contractors, roofers and lumber dealers, and included in the shipments recently made was a full car of "Saflok" corrugated to a large lumber company in Arkansas for a new mill.

The Interior Hardwood Company, Indianapolis, Ind., has adopted an excellent scheme for directing the attention of house owners to the advantages of fine hardwood floors as a feature of the inside finish of the home. The company has gotten out a series of four-page folders, each illustrated by means of a large half-tone engraving of the interior of a room and accompanied by pertinent comments relating to hardwood floors. The rooms illustrated include the reception hall, dining room, the "den," living room, parlor and sleeping room, all treated in a way to command more than passing attention. Reference is made to the construction of hardwood floors, their features of superiority, their economy and to the fact that any old floor can be covered with the company's thin oak, making it dust and insect-proof. There are also comments as to the care of polished floors. The company suggests to those interested that they send for a copy of its book of designs and colored floor plates.

Concrete has been used to some extent in the construction of farmers silos. The widespread use of the material for silos, however, has been greatly retarded by the lack of contractors ready to build them and to the high cost of building forms. An inexpensive wooden form has been placed upon the market by the McCoy Silo Form Company, 1301 Berger Building, Pittsburgh, Pa. This form promises to remove some of the obstacles that have interfered with the rapid building of concrete silos all over the country. The McCoy Company have been engaged in silo and in silo form construction for a number of years. The form which they are now offering has been used extensively by the state of Wisconsin and by the U. S. Department of Agriculture in demonstration work in various states.

One of the specialties of the Berger Mfg. Company, Canton, Ohio, is its "20th Century" style of pumps, which is said to be so made that it will not break from freezing. In the construction 20-gauge corrugated galvanized steel is used and when the water freezes the corrugations are said to give sufficiently to take care of any expansion thus caused. Other important points are that the pump will not rot, warp, crack or become water-soaked, is absolutely sanitary and cannot taint the water from absorption or decay.

It would seem to be the part of consistency for a cement company to construct its own factories and office building of concrete, and in this respect at least the Universal Portland Cement Company, 72 West Adams Street, Chicago, Ill., has been consistent. The company is now erecting a new sack house at its South Chicago plant and several storage and factory buildings at its Buffington plant of concrete blocks, not so much because of the fact that consistency requires it as the fact that this material, as the company puts it, was "tried out and found to be the most satisfactory and economical."

The Duplex Hanger Company, Cleveland, Ohio, points out that the best method for sustaining joists and girders at the walls is by the use of Duplex hangers which are self-releasing in case of fire and allow a reduced rate of insurance. The claim is made that these are approved by the National Board of Fire Underwriters. A catalogue of pocket size which the company has just issued gives interesting information in regard to its specialties.

The Building Age

New York, October, 1912

A Bungalow of Quaint Design

Economical Construction Combined with Compact Arrangement -- Central Hall a Feature -- Unique Shingle Effects

A BUNGALOW which embodies in its construction and arrangement a number of rather unique architectural features and which has been designed for occupancy as a home the year round is illustrated by means of the half-tone engravings presented upon this and the following pages. One of the features to immediately command the attention of the architect and the builder is the treatment of the roof at the eaves. Here it will be observed a rounded effect is produced, this being accomplished by having boiled the shingles before they were bent and then they were put on hot. The roof rafters are continuous for lookouts, except at the gable ends, and were merely cut round and sheathed tight with narrow ceiling. The sides of the bungalow as well as the roof are entirely covered with Star "A" Star cedar shingles. The ridge of the roof is of sheet metal.

The outside frame is not covered with sheathing—neither boards nor paper—because this is not considered necessary in the very mild climate of southern California, where the bungalow was erected.

The floor plan presented herewith shows a living room, dining room, kitchen, three bedrooms, a sleeping porch and a screened porch which is used as a laundry. Beyond the living room and running through the center of the house toward the rear is a hall which gives access to the kitchen, the bathroom and sleeping rooms.

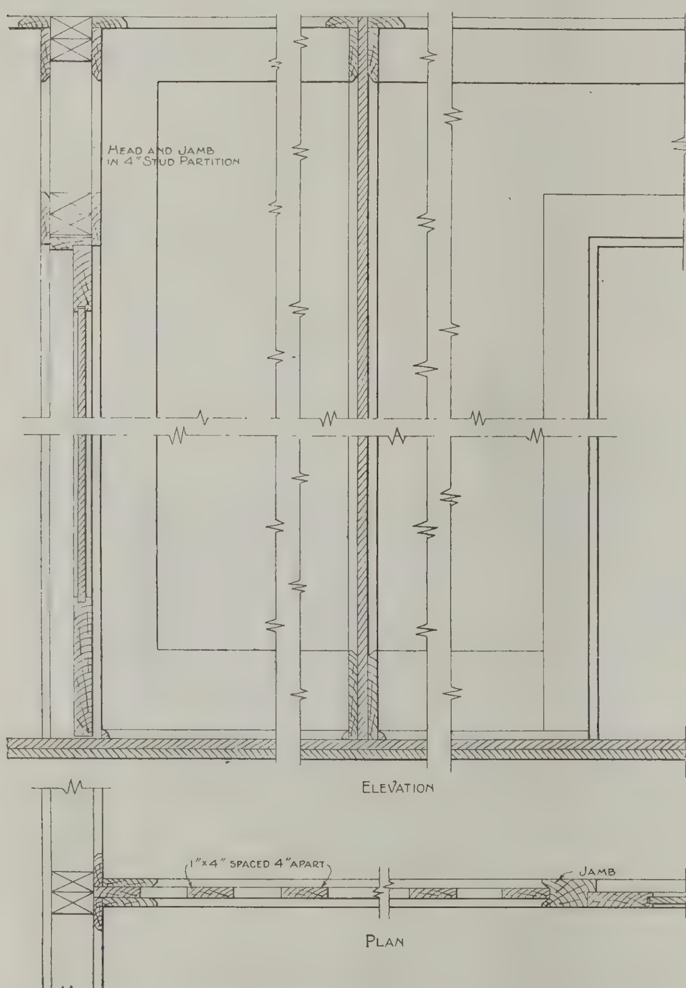
Photographic View Showing Main Approach and Clever Architectural Treatment of the Exterior

A Bungalow of Quaint Design—Walter S. Keller, Architect, San Diego, Cal.

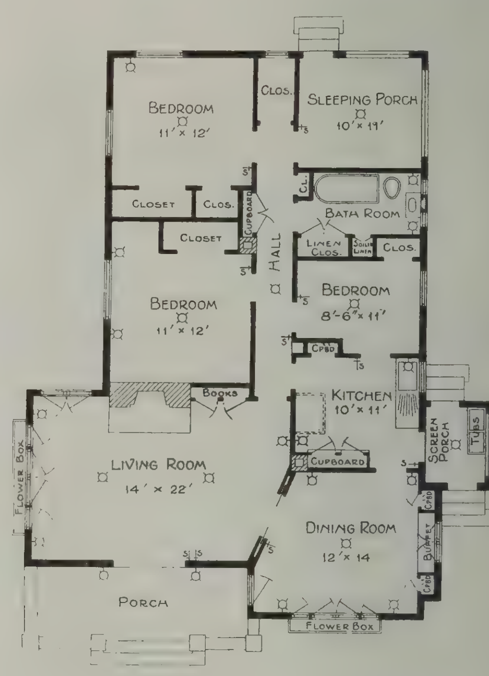
In the living room is a large brick mantel with open fireplace, the interior treatment of the room being shown by means of one of the half-tone interiors on another page. Entrance to the living room is directly from the front porch, which is open and provided with a brick balustrade. A door to the right leads directly into the dining room, which is amply lighted by a quadruple window in front and a broad window directly over the buffet. At the right and left of the buffet are convenient cupboards, all as clearly shown in one of the half-tone illustrations.

The kitchen is equipped with sink and drain board placed directly under a window where it has plenty of light. A cupboard with double doors and drawers underneath occupies one side of the room, while on the opposite side is a smaller cupboard. In the bathroom is a linen closet, also one for soiled linen. There is a commodious closet at the end of the central hall of the house, another opposite the bathroom door, while each bedroom has a large clothes closet and in some cases there are two.

The sleeping porch at the rear is 10 x 11 ft. in size and has a door leading to a short flight of outside steps.



Details Showing Construction of Flush Finish—Scale ¾-In. to the Foot



Floor Plan—Scale 1/16-In. to the Foot

A Bungalow of Quaint Design—Plan and Details

The plumbing fixtures clearly shown on the plan are of the Standard Mfg. Company's make.

The first floor joists are 2 x 6 in. placed 20 in. on centers. The girders are 4 x 6 in. and the posts are 4 x 4 in. The studs are 2 x 4 in. for bearing partitions and 2 x 3 in. for minor partitions. The studs for the closets are made of 1 x 4-in. boards set 4 in. apart. All the closet partitions and in all the bedrooms, kitchen and bathroom the trim is so placed as to come flush with the finish plaster. The detail presented on another page clearly shows the method which was followed. The ceiling joists are 2 x 4 in. placed 16 in. on centers and the rafters are 2 x 6 in. placed 32 in. on centers.

In the rear portion of the attic 2 x 6 in. joists are placed so that the space can be used for storage and the ladder leading to the attic is concealed in the little closet adjoining the bathroom.

The floors are double with building paper between, the finish floors being ⅞-in. oak throughout the house. Two rooms are finished in birch and the balance in Oregon pine.

The house was built last year for Mr. B. H. Vreeland, secretary and auditor of the Panama-California Exposition, at San Diego, Cal., and the plans were prepared by Architect Walter S. Keller, 401 Timken Building, San Diego, Cal.

The builder executing the contract was Charles A. Gaines, also of San Diego.

The architect states that when the proposition was presented to him he was told by Mr. Vreeland what was wanted inside of the house and fixed the cost at $3,500. The house was finished, including all fixtures, for $3,440, a fact of which the architect is justly proud.

Measurement of Crushed Stone

It has been found that the measurement of wagon loads of broken stone after loading from chutes and again after it has been hauled a half a mile or more, shows a shaking down, or settling, resulting in an average reduction in volume of about 10 per cent. Therefore, if crushed stone for macadam or ballast is purchased by the cubic yard, it is necessary that it be stated where the measurement is to be taken.

In buying stone for concrete, it is equally necessary that there be a clear understanding as to how the size of the stone is to be measured, says a writer in an exchange.

If the specification requires that the largest permissible stone shall pass in *every direction* through a ring, say 2½ in. in diameter, it means that the opening of the screen must be considerably smaller than 2½ in., for the reason that in screening stone in a rotary screen, long narrow fragments will drop through a 2½-in. hole, yet many of these will not pass in every direction through a 2½-in. hole.

There are two ways of designating the size of stone after screening. One is to designate it according to the diameter of the screen hole through which it has passed. Another very common way is to designate it by the "average size" of the stone. The latter is obtained by taking the diameter of the screen hole through which *the stone did pass,* adding to it the diameter of the hole through which it *did not* pass and dividing the sum by two.

A Bungalow of Quaint Design—View in Living Room Looking Toward the Mantel and Fireplace

For example, suppose a stone crusher plant were provided with a rotary screen having three sections of perforated metal, the holes of the first section being of ¾ in. diameter, the holes of the second being 1½ in. and in the third section 2½ in. Then assuming that the stone that passes a ¾-in. hole runs from dust to ¾ in., the average size would be ⅜ in. The average size of stone that passes the 1½-in. hole but does not pass the ¾-in. holes is $(1\frac{1}{2} + \frac{3}{4}) \div 2$, or 1⅛ in., and it may be called 1⅛-in. stone. In like manner, the stone between 1½ in. and 2½ in. may be called 2-in. stone.

This rule, however, is not strictly followed by manufacturers of crushed stone, so that it is always necessary to inquire exactly what they mean when speaking of stone of a certain size.

Workingmen's Compensation Law in Illinois

An illustration of the operations of the Workingmen's Compensation Law in the State of Illinois recently developed in Chicago, where a carpenter collected from the company by whom he was employed the sum of $193 for injuries to his thumb and right arm while working for the corporation. The settlement as made at the direction of the Superior Court was as follows:

Sixty-one days' lost time	$122
Hospital bill	63
Physicians' bill	8
Total	$193

The carpenter, John J. Faust by name, was hurt by the slipping of a ladder, which caused him to fall. He continued to work until May 13, when his condition became such that the physician whom he consulted ordered him taken to the hospital. He was there for some time and was told that he ought not to work until August 1. He then filed in the Superior Court a petition in which he signified his willingness to settle with the company under the workingmen's compensation law and the company accepted his proposition.

Ventilation of School Houses

The proper ventilation of school rooms is now considered as fully as important as the heating of them, and in the states of Massachusetts, New Jersey, New York, Pennsylvania, South Dakota, Utah and Virginia the law relating to the matter calls for 30 cu. ft. of air per minute per pupil.

Maine, Montana, North Carolina and Vermont require the approval of school house plans, and South Carolina, Minnesota and Wisconsin will make no State appropriation to school districts unless they submit plans which are approved by the Board of Education, all of which goes to show that the various States are falling into line and adopting the standard set by Massachusetts, requiring 30 cu. ft. of air per pupil per minute.

View in Dining Room Looking Toward Buffet, with Door to the Kitchen Seen at the Left

Discrepancies in Plans and Specifications

Legal Rights of Contractors -- Allowance for Extra Work -- Extent of Architect's Responsibility

By A. L. H. Street

FREQUENT occurrence of material discrepancies in architects' plans and specifications being complained of by a reader of the *Building Age*, the following legal principles may be found of interest.

It may be stated as a general rule, subject to the qualifications hereinafter appearing, that where correction of such discrepancies involves reconstruction on their discovery, with resulting extra cost to the contracting builder, he is entitled to reimbursement from the owner for the added expense necessarily incurred, on the theory of the architect's agency for the owner. Accordingly, where it was found in erecting a dwelling house that a mistake had been made in the plans and specifications, involving extra work at increased expense in constructing a bay-window, the Nebraska Supreme Court held that the owner was liable to the contractor for the extra cost.

The court said: "As between the architect and him [the owner] no doubt the architect would be liable for any mistake in the plans and specifications which increased the cost of the building, but as between the architect, who has the sole supervision of the work, and the contractor, the architect will be so far the agent of the owner as to bind him for alterations made necessary by the mistakes of such architect, in order to complete the building according to the contract, as where the plans and specifications call for windows which are too large or too small, whereby loss is occasioned to the contractor."

A Few Cases in Point

Under a contract to erect a booth at the St. Louis World's Fair it was held by the St. Louis Court of Appeals that the contractor was not liable for a delay caused by a pitch of the floor of the building in which the booth was to be erected, not discovered until the parts of the booth were ready to be assembled, and that the contractor was entitled to recover for extra expense incurred in attempting to follow the erroneous plans. The court overruled a contention that the contractor was bound to take the level of the floor before going to work and notify the owner that the plans of the architect would have to be remodeled.

In a California case, where work collapsed through insufficiency of specifications the contractor was permitted to recover for repair work rendered necessary thereby. In another case, a Pennsylvania court held that a builder was entitled to recover for extra work rendered necessary by the architect's negligence, even though the architect issued no certificate for such work, and was not authorized to determine amounts due for work outside the contract.

When a discrepancy arises, the contractor should ascertain whether his contract provides for correction of such mistakes in a particular manner, as by reference to the supervising architect, and carefully follow any such provision. Thus it has been held by a Pennsylvania court that, under a contract which provided that errors in the plans should be referred to the architect before the work should be proceeded with, the builder had no right to rescind the contract on the ground that errors made construction impossible, unless he first called for a correction of the plans. This is the safer course to follow in any case.

Unambiguous provision in a building contract will be given effect over inconsistent clauses in the specifications. This rule was applied by the Minnesota Supreme Court where there was inconsistency in provisions for allowance for extras. In a Massachusetts case, a contract to construct an armory required that the work be done according to plans and specifications, one clause of which required "all walls to be vaulted." The plans showed a wall 16 in. wide without any vault or space therein. The Massachusetts Supreme Judicial Court held that the contract required construction of a wall 16 in. wide, including the vault, and that testimony was not admissible to show that in the opinion of witness, an architect and builder, the contract called for a 16-in. wall exclusive of vault or 18 in. including it, and that it would be impracticable and unsafe to build a 16-in. wall with a vault. Again, where the contract and specifications did not agree with the working plans, the contractor was upheld in following the architect's directions to do the work according to the plans.

Contractor Should Protect Himself

Ordinarily, however, when a discrepancy in plans and specifications develops, the contractor should protect himself from any claim that he has departed from the contract, by procuring a correction sanctioned by the owner. Where a flue, after being constructed, was found not to be watertight, the Appellate Division of the New York Supreme Court decided that the contractor was not required to reconstruct it according to altered plans and specifications, without additional compensation, though the specifications contained the following provisions: "Such details on a large scale or full size as may be necessary to more fully explain the general drawings will be furnished to the contractor at the proper time during the progress of the work. * * * The various drawings and this specification are intended to cover a complete job. Anything omitted in this specification and shown in the drawings, or vice versa, is to be done by the contractor without extra charge or expense."

Usually the questions here treated arise on a claim by the contractor for extra compensation, but discrepancies in plans and specifications are equally available as an excuse for the builder's delay in performance, so far as the delay can be clearly attributed to that cause. Thus, one who agreed to furnish cut stone for a building was exempted by the Illinois Supreme Court from responsibility for delay resulting from mistakes in the drawings and specifications furnished.

The fact that there are but very few reported cases on the question of the contractor's right to abandon work on the owner or his representative refusing to furnish corrections, and claim recovery for work already done, and the further fact that an adjustment of mistakes in plans and specifications ought to be readily reached to mutual satisfaction, render that question of little practical importance; but there is judicial authority for stating that such right exists. It is probable that in addition to recovering for work done, the aggrieved contractor would be entitled to recover for profits lost through being prevented from completing the work, where the owner's refusal to give corrections tends to prevent further prosecution of the work.

Rustic or Field-Stone Masonry

Some Examples Showing Good and Bad Construction — Finishing Joints — Faults in Rustic Stone Work

By Lawrence S. Keir

AT the present day we have seemingly an endless variety of building materials, some very old, others new or comparatively so, and every now and then we see still another material added to the list until we hardly know which to choose, for each has its many good points. With all our new materials and new methods, however, we still have with us one of the oldest materials used by man—one that has stood the test of time and that has in one shape or another been used alike on the humblest dwellings, the grandest palaces and the most artistic and elaborate cathedrals of ancient and modern times.

Attempts at artistic effects by cutting or carving stone appear to be nearly as old as the human race. What we wish to consider now, however, is the stone in its rough state—just as man must first have used it and as he still often uses it even to the present day. In all his mechanical attempts, however, man has never been able to surpass it in beauty, for what is more handsome than a properly built piece of field-stone masonry? It increases in beauty every year and is not only artistic, but "romantic," too, when after long years of usefulness it stands at last an ivy-clad ruin of some old home and a monument to the builders as well as to those who lived within its shelter.

Some of the most beautiful country buildings are constructed of stones just as picked up in the fields. Other houses have the foundations, the porch columns and perhaps a fireplace built on the outside, all of rough stone. These stones may also be used to advantage for light retaining walls; garden or line walls, for gate posts and in numerous other ways.

The fact is this material, although one of the oldest and most beautiful as well as most durable, is not nearly so well understood as it should be. It is, therefore, with the idea of getting better acquainted with this line of work that the writer has prepared this article. He does not pretend to "know it all," as the saying is, but does believe that each one of us views the subject from a different angle than the other fellow and that if each were to express his opinion a most interesting and valuable discussion would result. The writer also believes that when we cease to see the faults in our own work we have ceased to progress in that line, so we will start out with finding them and the more fault we find the better. Many of the faults in rustic stone work will be pointed out, and while some of them are so glaring that many readers of the *Building Age* will hardly believe they are possible, still all are faults that have actually been seen.

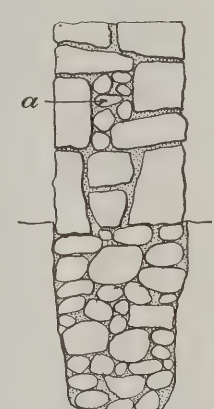


Fig. 5 — Incorrect Method of Building a Wall on a Trench Foundation.

Fig. 2 — Incorrect Location of Tile Drain.

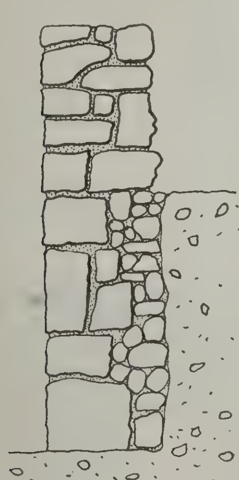


Fig. 1—Improper Construction of Cellar Wall

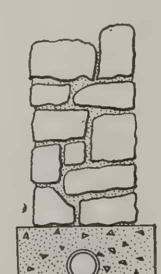


Fig. 3—Proper Place for Tile Drain When Carried Under a Wall.

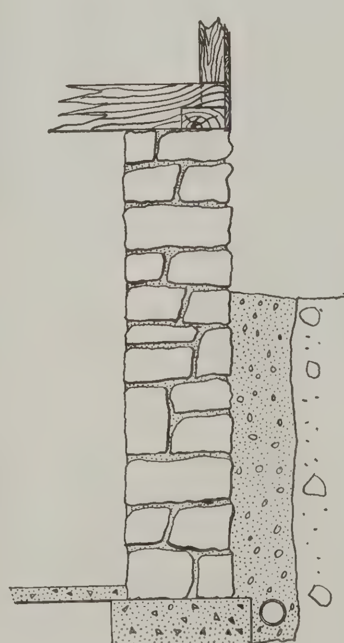


Fig. 4—Tile Drain Shown Outside the Wall.

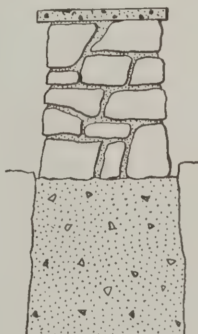


Fig. 6 — Section Showing the Way the Wall Should Be Built.

Rustic or Field-Stone Masonry

We will start with the foundation and first consider the cellar wall, using drawings as much as possible, as they show more plainly than words what is meant. Fig. 1 represents an evil often encountered, more especially in out of town sections. The cellar wall, instead of being faced both sides, is faced on the inside only and filled back to the bank with small or mis-shapen stones. This filling is carried to within a few inches of the ground level and from here up the wall is two faced. A wall built in this manner cannot be expected to stand solid, as the filling is in time bound to settle and in cold climates the frost will not only move the filling, but will work its way into the body of the wall

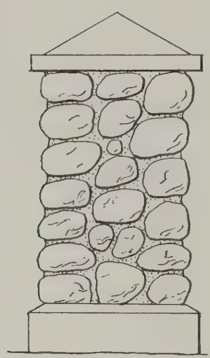


Fig. 7—Improper Method of Building Stone Piers or Ends of Walls

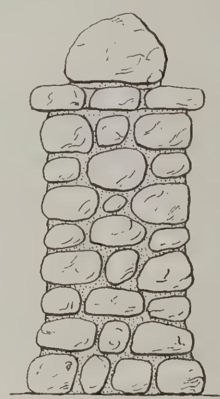


Fig. 8—The Proper Method

and there do serious damage. Another serious fault is that the very side of the wall that carries the weight of the building above is the weakest side.

In Fig. 2 is shown something most masons have encountered at one time or another. The tile drain is carried directly on the ground and under the wall so that it is necessary to start the wall with two narrow edges of stone work for a bearing and which are nearly always certain to settle unevenly and cause ugly cracks in the wall. Right here it is well to remember that, because a wall does not show cracks the first year, there is no reason to suppose it is not going to, and that the wall is therefore properly built. It often happens that several years pass before a wall shows up badly, and in such cases the whole fault usually lies with the builder, who carelessly overlooks small details which he did not think worth while at the time of building.

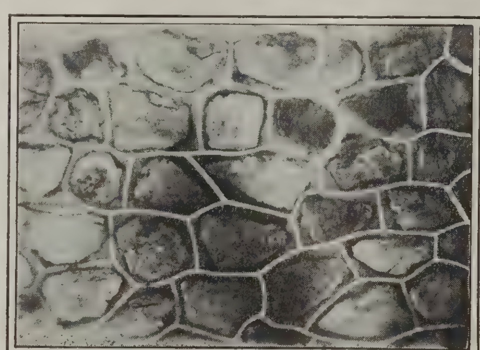


Fig. 10—A Good Example of What is Known as "Ribbon" Pointing

Where actually necessary to carry a drain under the wall it should be done as shown in Fig. 3. Here the tile is covered with concrete, which also forms the footing for the wall. The amount of concrete above the top of the tile depends upon the weight of wall to be carried and the kind of soil below it, but in no case should less than 4 in. be considered.

While this method is usually satisfactory and often necessary, still because of the difficulty in getting at the drain it is best where possible to build the wall as shown in Fig. 4. Here the drain is shown outside the wall. It will be noticed that the excavation was dug considerably beyond the outside face of the wall, thus giving the mason room to make a tight job of the outside wall, and also allows a filling of coarse sand or gravel against the wall so as to allow water to leak down to the drain, thus greatly lessening the danger of water being forced through the wall.

Let us next consider Fig. 5, which represents a section of wall built on a trench foundation. If there is anything that is not wrong with this wall it would be difficult to find it. In the first place the trench is dug narrower at the bottom than at the top, thus giving the frost a chance to lift on the sides of the foundation. Then again the wall is started with large stones set on edge. There is a great temptation to do this owing to the fact that a mason can lay much more wall in this manner; further, the wall is not cross-bonded and in this class of work it usually happens that the mason will fill in places like that at *a*, for example, with almost anything and smooth it over the top with a trowel of cement. There is no objection to using a few small chips and stones for filling if enough cement is used with them to form a good concrete, but it requires constant watchfulness to get it done properly.

In Fig. 6 we have pictured the wall as it should be built. Note that the trench is wider at the bottom than at the top, also slightly wider than the wall above. The wall is battered but could have been plumbed if preferred. The stones are well bonded and very little "fill" is used. This trench is represented as being filled with concrete, but for a light garden wall on well drained ground where the trench is also properly drained satisfactory results may be gained by filling to within 6 in. of the top of the trench with dry stone well fitted together and packed solid.

It often happens that a piece of stone work is built of smooth or nearly round cobbles. These stones allow of very little bond and yet we see piers or ends of walls laid as shown in Fig. 7, where the corner stones are so nearly of a size that they are merely piled one on another without even the semblance of bonding and depending almost entirely on the mortar to hold them in place. Walls laid of these round stones are not very strong at best and it is well to save out those which are the flattest for corner stones, using alternately a large stone and then a small one as indicated in Fig. 8.

In Fig. 9 the picture illustrates a small pumping station built of smooth brook stones. There are several methods of finishing the joints in rustic stone work and this picture shows what is known as the "raked" joint. The joints are first scraped out deeply with a stick and then brushed smooth with a wire brush. Care should be taken to keep the mortar well back from the face in laying the stone and the mortar must be fairly dry before being swept out or the stones will be badly stained and the work appear sloppy.

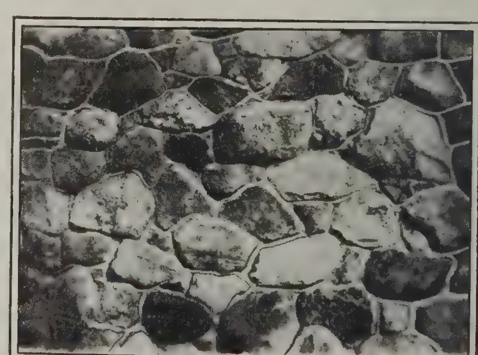


Fig. 11—An Excellent Example of "Weather" Pointing

Rustic or Field-Stone Masonry

The picture in Fig. 10 affords an example of "ribbon pointing" which is very popular with some masons. This method of pointing makes the stone work appear rather flat, but the mason likes it for this very reason. He says the wall looks straight and even, but that is just the reason we do not like it at all. Why have the rustic work if it is not to be rustic?

Fig. 11 shows a specimen of "weather pointing." This method should be used more often as it brings out the roughness of the stone and makes the wall appear rugged and much more solid than with raked cornice.

The picture which constitutes the initial illustration of this article is a rather novel gateway consisting as it does of a combination of entrance arch and pigeon house. Such a construction is suitable for a variety of places, but probably its most impressive location would be at the entrance to some country estate or private park.

(*To be continued.*)

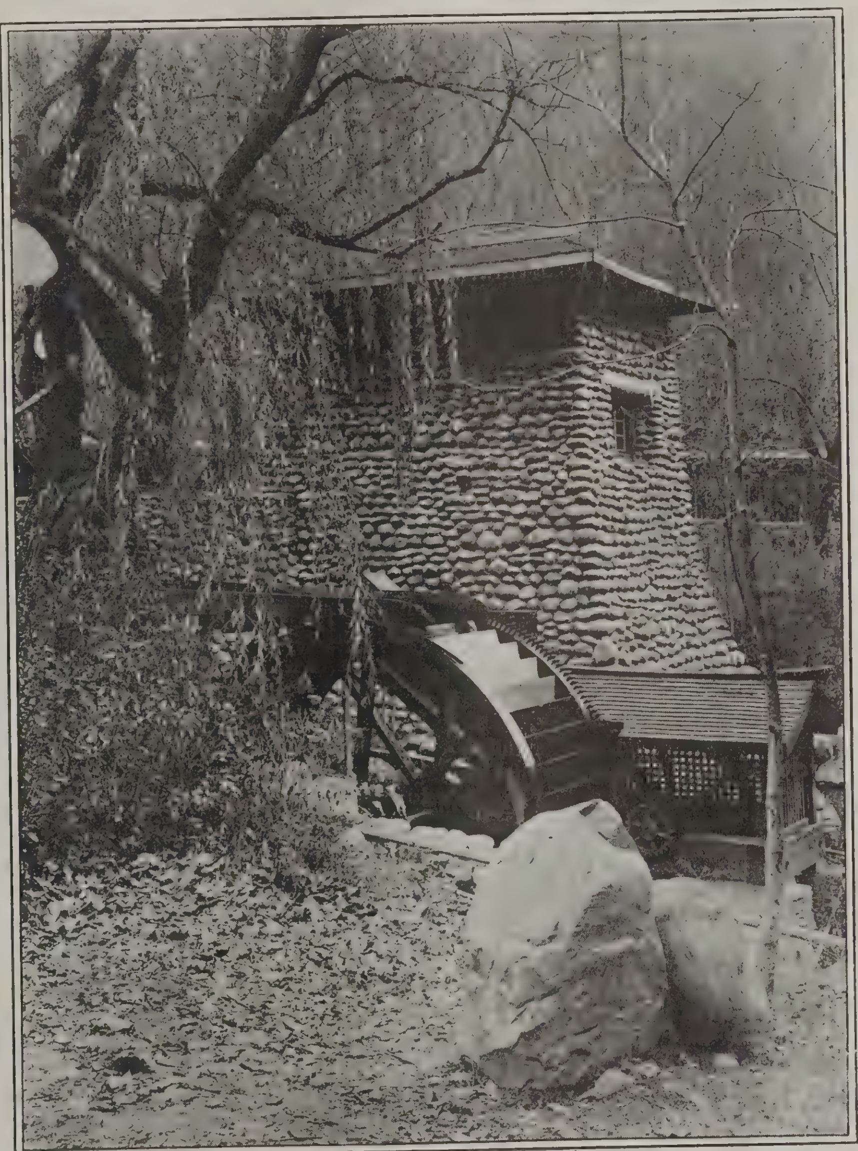


Fig. 9—A Small Pumping Station Built of Smooth Brook Stones, Making Use of What is Known as the "Raked" Joint.

Rustic or Field-Stone Masonry

The Medieval Joiner

The joiner held no very conspicuous position in the Middle Ages. A certain number of references to him and his work occur in the account books of medieval builders, but such references are very few in comparison with the constantly recurring entries referring to carpenters. From these facts we may very safely draw the conclusion that no very great number of joiners were employed in the Middle Ages, the work proper to the joiner being then commonly executed by the carpenter, says a writer in one of our London exchanges.

In a manuscript in the Record Office (Exch. Acc. 474-12) some particulars of work done by joiners at the Tower of London in the time of Henry VIII. are set down. Among other details we read of work having been done on "dyuers pressys which Master lieutenant hathe to ley his harneys in . . . More wrought by the said Joynours, lxxviii. monyalles (mullions for windows) of tymber in the Kynges gallery and in the counsell chambre, redy wrought, as also the mendyng of the rabettes of the wyndowes."

The joiner sometimes executed work in "fretyng and panelyng." (MS. 465-20.) Sometimes, as in MS. 474-5, he was called in to work on "losyng the bed," which perhaps may have been a readjustment of mortise and tenon. Bedsteads were commonly made by carpenters. Instances of joiners working on the wooden framework of the ceiling may be seen in MSS. 474-12 and 499-19. In the former we read, "Taken downe by the saide joynours, the olde selynges of my lady the Kynges grandmother"; in the latter a "joynour" is paid for "selyng" a small chamber.

The wage commonly paid to the medieval joiner we are unable to discover, the references to his labors consisting for the most part of entries of the payment of a lump sum for the execution of a specified job.

In "The Records of a London City Church," published by the Early English Text Society, we read of a joiner in 1483 occupying a house at a rent of 20s. a year, the house being situated in the churchyard of St. Mary-at-Hill, near London Bridge.

Two curious notes referring to somewhat too exuberant London joiners may be seen in the Acts of the Privy Council, 1543 (Roll Series). The notes are of sufficient interest to warrant insertion in this little notice. The joiners seem to have been acting in some play, and may perhaps have been apprehended in the dress of their respective parts. On April 10, 1543, "Certayne joyners to the number of XX, having made a disguising upon the Sunday morning without respect ether off the day or the ordre which was known openlye the Kinges Highness intended to take for the repressing off playes, wer therfore committed to warde and bestowed, summe in the Tower, summe in Neugate, and summe in the Gatehows."

On April 13 the joiners were set at liberty:

"Certayne joyners which wer committed to warde for theyre unlawful disguising upon the Sonday before, wer this day, after a good lesson, restored to theyre libertie."

Building Methods in Egypt

The Original Building Material -- Wall Construction -- Condition of Mortar in Demolished Buildings

AT a recent meeting of the Royal Institute of British Architects a paper on the above subject was read by Ernest Richmond, a member, from which we extract the following: The original building material in Egypt was without doubt mud brick, and is still used to a very large extent, although for important work it has been replaced by stone and burnt brick. Rubble stone is also employed, but is used principally in Cairo and Alexandria owing to the existence near these towns of conveniently situated quarries.

The tendency of an Egyptian mason, if left to himself, when using rubble stone is to break it into small pieces approaching the size of bricks. The native burnt brick is usually very rough; made of a mixture of mud and chopped straw cast in molds, then built into clamps and burnt.

In demolishing Egyptian buildings it is found that the mortar in the heart of the walls is almost all turned to dust, unless, of course, gypsum has been used, but this is very rare, owing to the expense. To build a 9-in. wall with such materials, and on such a soil, would be out of the question; and a 14-in. wall would be somewhat risky.

When Rubble Stone is Used

If rubble stone is used the masons work in pairs, one man on one side of the wall and his colleague on the other. Except that each proceeds at more or less the same pace, there is little connection between their work. There is no thorough bond. Practically two thin walls are constructed independently, and the space between is filled with smaller stones and large masses of mortar. The mortar, if it is of mud, kosremil and fat lime, and if it keeps fairly damp, hardens rather than sets. On the hardening of the mortar, more especially on the outside of the joints, does the stability of the wall to a large extent depend; and, in order to fortify the outer joints and to render them as capable as possible of fulfilling their functions of small retaining walls, to any inferior mortar which may have turned to powder instead of hardening, it is a common custom to bed in the surface joints small pieces of stone.

If the wall is constructed of brick hardly any more attention is paid to bond than in the case of the rubble-stone wall. The same mortars are used as those already described, the object of their use being solely to provide beds on which to place successive courses of brick. A more or less systematic appearance of bond is given to the face of a wall, but the application of the principle is not extended to the interior. Each course is constructed by laying bricks side by side about one centimeter apart; the vertical joints between the bricks are purposely left open; such as are not left open are only accidentally filled during the process of laying the horizontal beds. Native-built brick walls, like those in rubble, are rarely, if ever, less than half a meter in thickness.

Walls, whether of brick or rubble, and standing upon a foundation bed liable to frequent movements, would, of course, soon collapse unless the entire absence of bond in the masonry itself were not by some means supplemented. The bond necessary for giving some degree of stability is provided by means of horizontal pieces of timber placed over and under all openings and forming lintels and sills. Ranges of these timbers are carried round the building, and similar ranges are bedded in the walls at the levels of floors and roofs, where they form plates to receive the joints, and other timbers are placed, apparently promiscuously, in any position independent of opening or levels of floors and roofs. The amount of timber judged necessary depends on the nature of the land built upon, more being used in building upon "made" soil, or in soil with an admixture of sand, than in those constructed on the black alluvium.

The surface of the wall is, when finished, provided with a rendering very generally composed of fat lime and sand. The object in view is not only to improve the appearance of the building, but to protect the outer joints of the masonry from the destructive influence of the sun and wind. The joints would, in the absence of the protective rendering, become cracked and gradually destroyed.

Main Characteristics of a Wall

The main characteristics of a wall, such as that described, appear to be its elasticity and the capacity it possesses to adapt itself, in a certain measure, to movements, both those in the foundation bed caused by the rise and fall of the subsoil water and those in the superstructure itself caused by stresses set up by changes of temperature. The function of the timbers is to assist the bond; under openings they resist shearing stresses, acting as sills and taking up the effects of unequal pressures which, without them, would in these positions be apt to cause cracks.

In the case of a threatened settlement in the foundation bed or in the masonry itself, between any two points in a length of wall, their action tends to be that of beams, and, in the case of a threatened corner settlement, that of cantilevers. In both cases they help to transmit pressures to more solid portions of walling or foundation bed, and thus provide to some extent for the gradual automatic adjustment and distribution of pressures.

Up till a few years ago it was a common practice to excavate the whole of the area to be covered by a building and to lay down a thick raft of concrete. The concrete was deposited in layers and well rammed and watered. The ground was flooded before the concrete was laid, in order that any weak spots might show themselves.

The raft of concrete has of late years been largely replaced by concrete piles. Holes about 75 centimeters across are punched in the ground by means of pointed weights dropped from a hight. This results in forming a hollow shaft in the ground into which the concrete to form the pile is rammed and in compressing the whole of the area built over. The ramming of the concrete into these hollow shafts causes the weight of the building to be distributed laterally as well as vertically. The tops of the concrete piles, which are spaced about 3 meters apart, are connected by beams in reinforced concrete, and on these beams the walls are raised.

This method has given, on the whole, satisfactory results. Broad-spreading foundations of reinforced concrete have also given good results. How far time will confirm the wisdom of choosing such methods of construction is a matter for conjecture and speculation.

A House in Wichita, Kansas

A Frame Dwelling with Stucco Exterior and Brick Trimmings — Some Details of Construction

THE popularity of the frame dwelling with an exterior coating of cement applied to metal lath and carrying a finish which may be variously designated as "Slap Dash," "Pebble Dash," "Stucco," etc., is strikingly illustrated in the multitude of houses of this character which are to be found throughout the country and which are constantly being erected during the building season. An excellent example of this kind and one showing the effects which may be produced by a judicious combination of stucco and brick in the exterior treatment of a residence constitutes the subject of the present article. The sides and gables have a coating of cement applied to wire lath; the piers, pilasters, corners and underpinning are of brick, while the roofs are covered with cedar shingles laid 5 in. to the weather and stained a dark red color. While the halftone pictures given upon this and a following page do not adequately convey to the reader the very pleasing contrasts afforded by the cement and the brick, yet the pictures carry a general idea of the appearance of the finished structure.

An examination of the floor plans shows a commodiously arranged interior, a feature of the main floor being the living room, which extends entirely across the end of the building and has at the center of the wall against the driveway an open fireplace of liberal proportions. Another feature to attract the attention of the reader is the wide hall which extends from front to rear through the central portion of the building. At the right and left as one enters the hall is a cased opening giving access to the dining room on the one hand and to the living room on the other. From the hall rises the main flight of stairs which land in the center of the second floor. There is a landing part way up with a broad seat and lighted by a large double window. Under the main flight of stairs on the first floor is a coat closet, and, lighted by a window which gives out on the rear porch, is a lavatory.

Front Approach to the House Showing Main Entrance, with Porte-Cochere and Balcony at the Left

A House in Wichita, Kansas—H. S. Conrow, Architect

Between the dining room and the kitchen is a commodious pantry equipped with double cupboards, etc., and lighted by an outside window. The door from the kitchen into the pantry and from the pantry into the dining room insures freedom from cooking odors in the latter room.

There is direct communication also between the kitchen and the front hall, and from the passage just outside the kitchen is a flight of stairs leading to the cellar and over it a flight leading to the second floor.

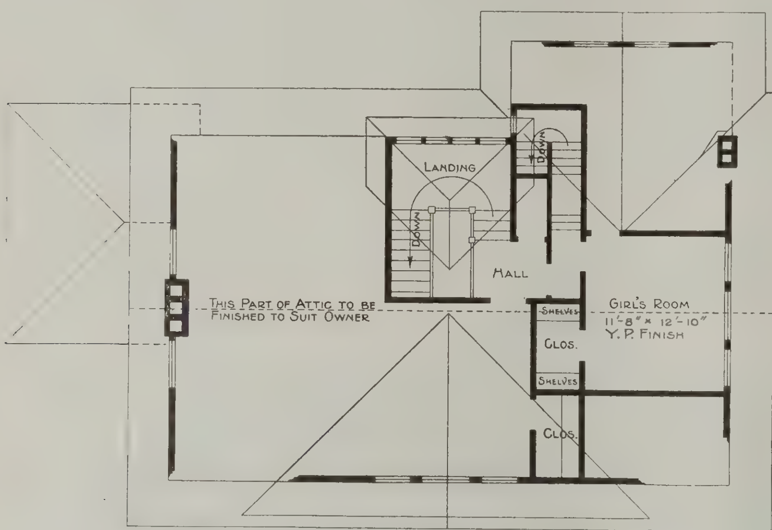
Opening from the kitchen at the rear and occupying what would be a portion of the rear porch is the space for the refrigerator, the latter being so placed as to be iced from the outside.

The feature of the second floor arrangement is the owner's room with an alcove 10 ft. 10 in. by 11 ft. in size and communicating with a private bath room. From the alcove is reached the sleeping porch, measuring 14 ft. by 10 ft. 9 in. and located directly over the *porte-cochere*. At the front of the house is a sewing room and a bedroom, while beyond is the bath room and beyond this in turn another bedroom. A clothes chute accessible from the stair hall leads down to the basement, where is located the laundry with a set of two-part tubs, a toilet, a gun room and a room for the heating apparatus.

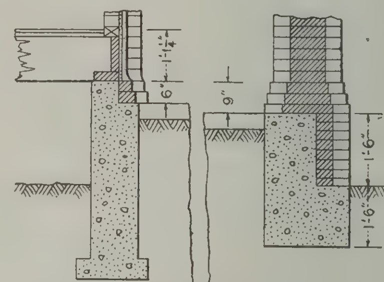
Portland cement, three parts sand and four parts broken stone, with approved water-proofing mixed in accordance with manufacturer's directions. The floor is 5 in. in thickness and has a finishing coat half an inch thick consisting of one part Portland cement and two parts sand.

Completely around the outside of the cellar wall and with the highest point 6 in. below the cellar bottom, there is run a drain of 4 in. porous tile with a fall of ¼ in. to the foot to a point 6 ft. outside of the cellar wall.

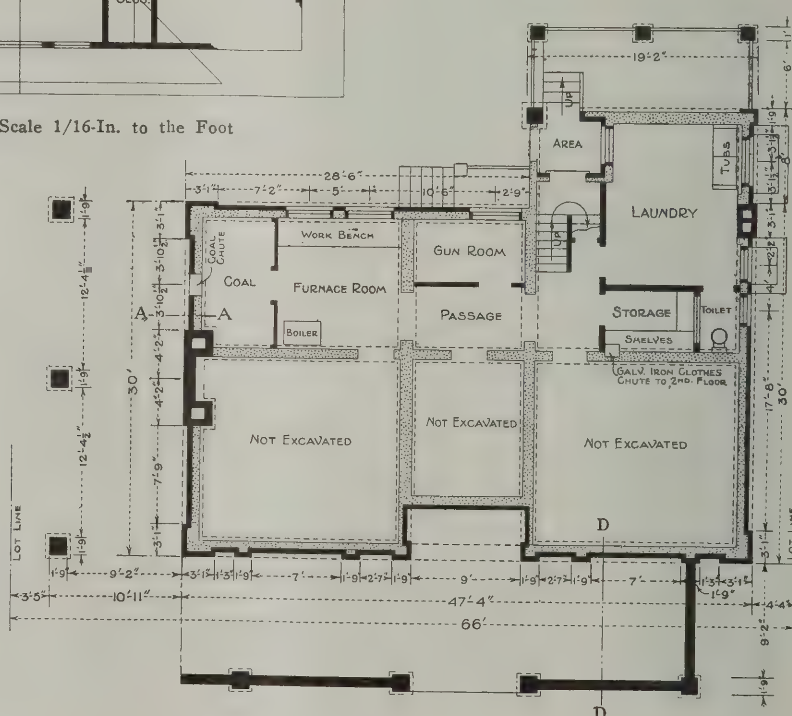
The frame of the house has 2 x 8 in. box sills laid on the foundation walls with a 2 x 10 in. on edge thoroughly spiked to the sills. The joists under partitions are doubled and all openings 4 ft. or more in width are trussed. The first and second floor joists are 2 x 12

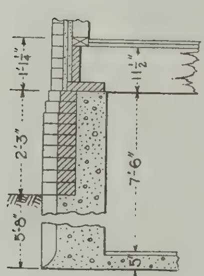


Attic Plan with Outline of Roof—Scale 1/16-In. to the Foot



Section Through Foundation Walls on Line D-D of the Plan—Scale ¼-In. to the Foot





Vertical Section Through Foundation Wall on Line A-A of the Plan—Scale ¼-In. to the Foot

Foundation Plan—Scale 1/16-In. to the Foot

A House in Wichita, Kansas

In the attic is a servant's room, and there is also space which can be used for storage purposes if desired.

The foundation walls are of concrete mixed in the proportion of one part Portland cement to three parts of sand and five parts crushed stone of a size small enough to pass through a 1½-in. ring. After the basement walls were reasonably dry they were treated with a heavy coat of asphalt put on hot and well swabbed on from the extreme bottom to the grade line.

The cellar floor is of concrete consisting of one part

in. placed 16 in. centers. The studs are 2 x 4 in. placed 16 in. on centers; the hip and valley rafters are 2 x 10 in., while the common and jack rafters are 2 x 6 in. and 2 x 4 in. placed 2 ft. on centers.

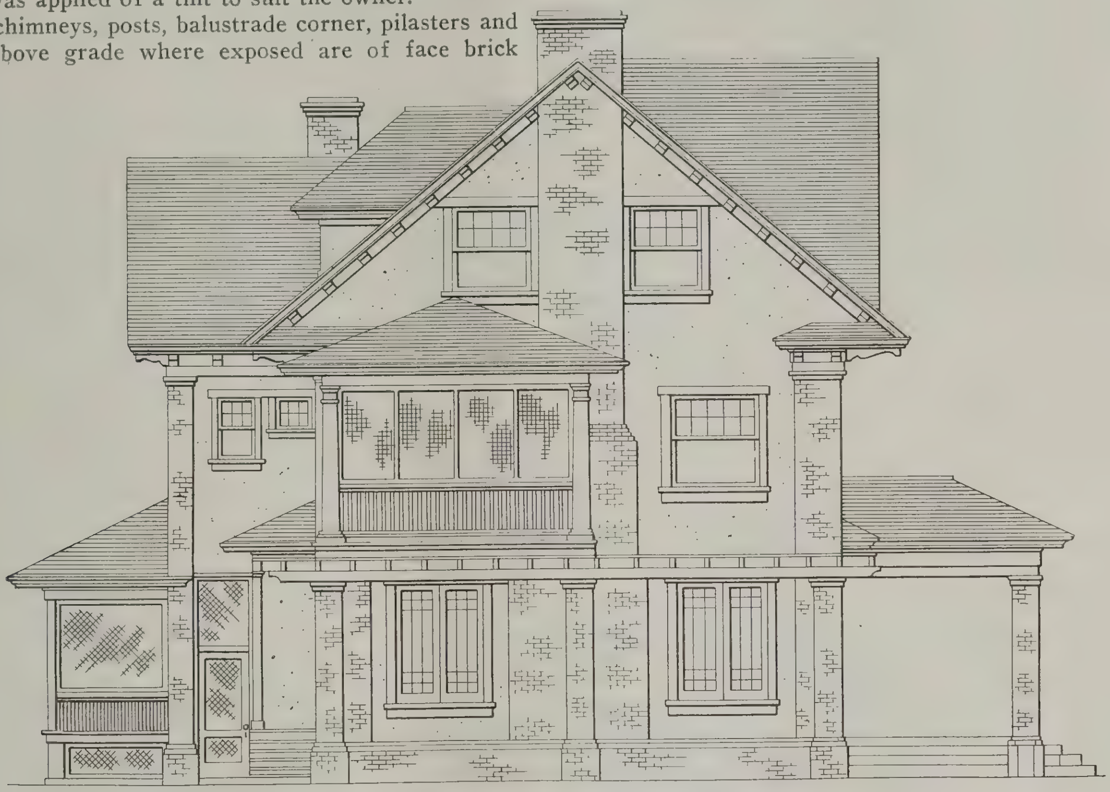
Where the second story projects over the first story the frame is lined up with rough lumber under the second story joist and filled to a depth of 3 in. with mineral wool, well packed in place.

The entire frame of the building including roofs and gables is covered with ⅞ in. No. 2 boxing laid horizontally, over which is placed a layer of tarred felt sheatihing paper with 3 in. laps. Those portions of the exterior showing cement stucco finish are covered with Clinton Wire Cloth Company's V stiffened and galvanized cloth 2½ in. mesh, 20 gauge, fastened with 4 galvanized staples to each rib, and then the stucco finish was applied of a tint to suit the owner.

The chimneys, posts, balustrade corner, pilasters and walls above grade where exposed are of face brick

2 x 6 in. tile. Above this the walls are regular white coat work.

The bath room floors are covered with hexagon vitrified tile laid in cement mortar. A feature of the bath room arrangement is that the tub fits to the floor and



The South or Left Side Elevation—Scale 3/32-In. to the Foot.

The Front or East Elevation—Scale 3/32-In. to the Foot

A House in Wichita, Kansas

laid in colored cement mortar with ⅜ in. joints. The porch and terrace floors are also of brick.

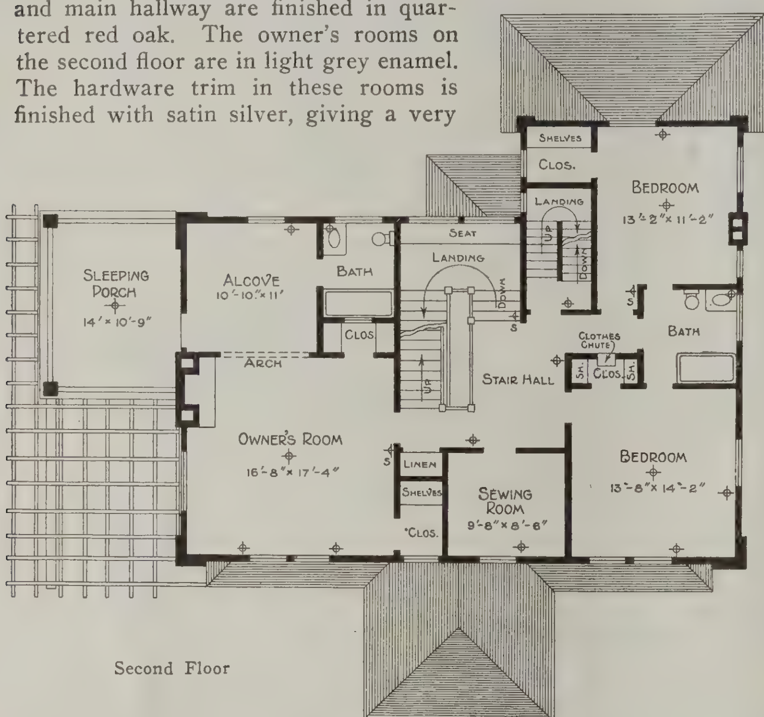
All walls and ceilings are lathed and plastered. The kitchen and bath rooms have a finish coat of Keene's cement to a hight of 4 ft. 6 in., marked off to represent the tile are fitted up to its base.

The pergola rafters are of solid cypress and shaped as clearly indicated in the half-tone engravings.

The sleeping porch, which extends over the *porte-cochere,* has a floor of tongued and grooved flooring pitched to outlets and covered with "Poradus" canvas painted three coats of white lead.

The first and second stories are laid with double floors, the sub-floor being of ⅞ in. yellow pine laid diagonally on the joist, while the finish floors are of 2¼-in. oak, except in the service portion of the house and the third floor, which are laid with edge grain yellow pine.

The front door of the house is 2¼ in. thick. The doors in the main portion of the house are of the two-panel variety, while those in the service portion are of the four-panel type. The living room, dining room and main hallway are finished in quartered red oak. The owner's rooms on the second floor are in light grey enamel. The hardware trim in these rooms is finished with satin silver, giving a very pleasing effect to this part of the house.



Second Floor

The hardware throughout the house is cast bronze with sand blast finish.

The woodwork in the kitchen is finished natural and has a coat of liquid filler and two coats of Standard Varnish Company's "Elastica No. 2."

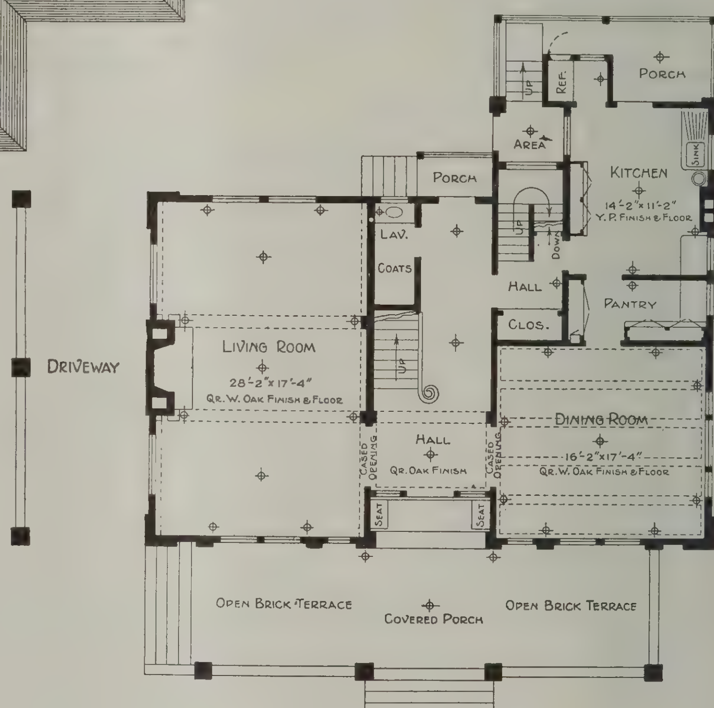
The linen closet has a chest of three drawers and doors over, with shelves. All closets in the bedrooms have two shelves and two rows of hooks.

The main stairs have 1⅛-in. treads and ⅞-in. risers of birch, the treads and risers being gained into the strings.

The house is wired for electric lighting, all work being done in accordance with the rules and regulations of the National Board of Fire Underwriters. The house is also piped for gas.

The kitchen sink is of solid porcelain 24 x 56 in. in size and has hinged drain board. The laundry tray is of the two-part type and has nickel plated waste. The bath tubs and lavatories are vitreous china, the lavatories being of champagne glass pattern. The closets in basement and on the third floor are of the syphon jet type with high tank and nickel plated flush and supply.

The water supply to baths, laundry tray, basins and sinks comes from a 200 barrel cistern, the water being lifted by an electric pump made by the Dayton Mfg. Company, Dayton, Ohio. All basins, baths, laundry trays and sinks have soft hot and cold water and the basins have city water supplied by a separate Fuller Swing Shampoo cock over the fixture.



Main Floor

A House in Wichita, Kansas—Floor Plans—Scale 1/16 in. to the Foot

The water is heated by a No. 4 Pittsburgh automatic gas heater.

The exterior woodwork was treated to two coats of creosote stain in colors.

The house is heated by a No. 131 Ideal boiler made by the American Radiator Company. The radiators are of Rococo pattern, ornamental design. A No. 2 Honeywell generator is connected with the heating system.

N. W. Brown & Co., Wichita, Kansas, installed the heating and plumbing systems throughout the house.

The residence here illustrated was erected for Mr. Harry Mead on East Douglas Avenue, College Hill, Wichita, Kansas, in accordance with drawings prepared by Architect Henry S. Conrow, 2828 East Douglas Avenue, that city, while the builder and superintendent of construction was H. B. Damon, 711 South Seneca Street, Wichita, Kansas.

It may not be without interest to state that the excavation for this dwelling was commenced on March 26, 1911, and the building was completed October 26 of that year.

Cypress and Redwood for Interior Finish of Houses

In discussing the use of cypress for exterior and interior finish in connection with building construction, Bulletin 95, recently issued by the Forest Service, offers the following comment:

Cypress is put to almost every use as an interior trim for houses. It may be finished in natural color or stained. The wood contains little resin, and thus affords a good surface for paint, which it holds well. It is much used for door frames, window frames, transoms, ceiling, wainscoting, panels, doors, sash, balusters, inside blinds, brackets, newel posts, grilles, mantels and to some extent for flooring. It is a popular wood for kitchens, where it is subjected to dampness and heat. It shrinks, swells or warps but little, and is used for drainboards, sinks, kitchen and pantry tables, cupboards, and kitchen cabinets. For the same reason it is used for breadboards and wooden implements about the pantry, ironing boards, and clothes driers.

For the parts of houses exposed to the weather it serves equally well. As siding it practically wears out before it decays. When made into porch and portico columns it retains its shape, holds paint, and has sufficient strenth to sustain necessary loads. It is placed as cornice, gutters, outside blinds, pilasters and railing, and is much used for porch floors and steps.

In regard to the use of California redwood for interior finish the same authority states that it meets almost every use and requirement. Floors and ceilings are made of it, and wainscoting, panels, moldings, chair boards, brackets, shelves, railing, stair work, spindles, balustrades and mantels. Formerly such work was often painted, and the grain of the wood was concealed, but the practice is now less common since the natural beauty of the wood is better appreciated. Its colors are rich and varied, and the finisher who understands the art of bringing out their best qualities can please almost any taste. It is a beautiful wood for carving, and is often so employed. The wood of all redwood trees is not of the same color, nor are different parts of the same tree alike. The soil and situation where the tree grows have much to do with it. Shades range from light cherry to deep mahogany. Where the soil is light the wood resembles Spanish cedar. Some grains are so straight that boards may be split 2 in. thick, 12 in. wide and 10 or 12 in. long. There are buildings in the redwood districts constructed of split boards and so evenly is the splitting sometimes done that a rather close examination is necessary to discover that the lumber is not the product of a sawmill. Miles of roads through the redwoods are corduroyed with split planks of this wood.

In other cases the texture is so complicated and involved that all semblance to orderly wood is lost. Such wide extremes in grain and color give the carpenter and finisher their opportunity to make combinations to harmonize with nearly any kind of surroundings. Perfect boards of such width and length may be had that panels, shelves and counter tops of nearly any desired size may be made from a single piece. A panel of that kind has an added value because the wood warps practically not at all, shrinks little and disfiguration from swelling need not be feared. If it is deemed desirable to darken the natural color of the wood, it can be done with oils. By well-known methods of treatment imitation of rosewood and mahogany may be produced.

The making of redwood doors has been an important business. They are handsome, light, strong and hold their shape well under changes of climate. Swelling and shrinkage, which give much trouble with doors of various other woods, are reduced to a minimum with redwood.

Photographic View Showing the Rear and End of the House; also the Enclosed Porch

A House in Wichita, Kansas

An Example of the Advantages of Arbitration

In an article discussing the advantages of arbitration in conection with the disposition of commercial disputes a recent *Bulletin* of the American Association of Commerce and Trade presented the following as an illustration of what frequently happens when a dispute is not referred to arbitration:

John Jones was an arcitect who was hired to make plans and construct a building for Robert Smith. Smith abandoned the plans before giving Jones an opportunity to complete. Smith thought that Jones' bill for services was too large. Jones thought that Smith was trying to evade his honorable obligations. Jones got a lawyer. Smith got a lawyer. They went to court. Jones' lawyer said he had a good case. He sent for Jones and Jones' witnesses and spent four or five days preparing the case for suit. He then drew up a formidable document called a "Complaint" which was served upon Smith; and then Smith sent for his lawyer. Smith's lawyer likewise spent four or five days in going over the case with Smith and Smith's witnesses, and then drew up a formidable document called an "Answer."

After the answer was served the case was put upon the calendar and comfortably slumbered there for a year or so awaiting its turn. Presently it emerges from the darkness and Jones' lawyer and Smith's lawyer become active. Having forgotten the facts by this time, all of the witnesses must again come to the offices of the respective lawyers, their testimony must be gone over and then they must attend in court. For the first few days they are ready upon the telephone to answer when needed; after that, since the case may be reached at any moment, they attend in court—experts, working people, architects, etc., etc.

The Case Ready for Trial

Finally the case is at the top of the calendar and a jury is impaneled. The jury consists of the owner of a delicatessen shop on Columbus avenue as a foreman, two east-side bakers, a real-estate operator in the Bronx, a civil engineer, a musician and some clerks. Solemnly the court listens to the opening of the case and to the fine legal points urged by both sides. After a week, the court, having reflected upon the legal points, dismisses the case. Jones pays his lawyer's bill. Smith pays his lawyer's bill. Jones is dissatisfied. His lawyer said the court was wrong. An appeal is taken. All that has gone before is carefully printed in book-form —of course, at the expense of Jones. Briefs are printed and five judges sit on the case on appeal. Each one of these judges must carefully review the printed record and the printed briefs, deliberate upon the case and arrive at some conclusion. They announce their decision, reversing the judgment of the court below, and directing a new trial.

Again the same process is gone through with. After the same kind of delay the case is finally reached for trial. Another set of jurors is impaneled; another judge sits; Jones' lawyer and Smith's lawyer now find that the opinions of the Appellate Court furnish excellent opportunity for further discussion and debate. At last the case goes to the jury. After retiring and deliberating for three or four hours they come in with a verdict for Jones for $500! The jury is satisfied that the architect was entitled to be paid for his services, and they are forbidden by their oaths to award him more than they regard as a fair compensation. To most of them $500 is a small fortune. It represents nearly the whole capital of one or two members of the jury.

The Net Result

When Jones balances his account he finds he paid his lawyer $150 the first time for preparing the case for trial and trying it; that he paid him $100 for the appeal; and that his disbursements for printing the records and briefs amount to $100. The lawyer was most generous and considerate and sent him no bill until after the verdict; and realizing that the loss of his client was serious, he made a minimum charge. The printing was paid back to Jones, as he was allowed $100 in the bill of costs in the case. So that after deducting his expenses and calculating the forced neglect of business, and the valuable time and energy spent in court, Jones was out of pocket several hundred dollars.

This leaves out of account the witnesses' time spent in court, the judges' time, the jurors' time, the stenographer's time and the time of the attendants in court. Smith had to pay his lawyer, too. When he got through the litigation cost him nearly $1,500 in actual disbursements.

Now, if both Smith and Jones had gone to a business man with some sanity and foresight, what recommendation would the business man have made as to the course they should pursue?

You, Jones, believe you are right; you, Smith, believe you are right. Why waste your energies in a court of law? Submit your case to a judge in whom you both have confidence, and abide by his decision. Here is the Chamber of Commerce with an official list of arbitrators. Choose one of them; sign an agreement to abide by his decision. You, Jones, go down and tell your story. You, Smith, go down and tell your story. Take your witnesses with you. You do not need any lawyers on either side; and when the arbitration is finished you will at least be sure that an impartial third party has heard you both and tried to get at the jurstice of the case.

The total expenses, say of an average of two days' hearing, may be $50 to $60, and the entire case is disposed of in a week or two. Is not this the more economical method of disposing of such disputes? And Smith and Jones remain good friends.

Competition for a Hollow Tile Bungalow

The jury selected to award the prizes in the *Brickbuilder* competition for a small house of the Bungalow type to be built of Natco hollow tile at a cost not to exceed $4000 has rendered its decision with the following results:

First prize—William Boyd, Jr., Pittsburgh, Pa.
Second prize—C. A. Nilson, Boston, Mass.
Third prize—Wilhelm Berg, New York City.
Fourth prize—William J. Mooney, Jamaica Plain, Mass.

The jury, which was made up of five architects from different sections of the country, was called upon to examine 267 designs, and in reaching its decision it is interesting to note what it regarded as "essentials to good design." These were "plain wall surface with all ornament flat, cornices of slight projection and types of roofs which include no pockets liable to damage the walls." In addition to the designs awarded prizes the jury gave a number of others "honorable mention."

Wages in Building Trades of Canada

In view of the table of builders' wages in leading cities of the United States published in our last issue the following rates of maximum wages per hour being paid in Saskatchewan, as agreed by the Builders' Exchanges of Regina, Saskatoon, Moose Jaw and Prince Albert, cannot fail to prove of more than usual interest:

Bricklayers	67½ cents
Stonemasons	67½ cents
Stonecutters	65 cents
Plasterers	60 cents
Carpenters	45 cents
Electrical workers	45 cents
Painters	40 cents
Factory hands	40 cents
Paper hangers	42½ cents
Plumbers and steamfitters	60 cents

First-class labor is reported as scarce, particularly carpenters.

Specifications for Setting Tile

Expert Instructions for Setting Tile on Floors and Walls—Bringing the Standard to a More Uniform Basis

A SHORT time ago a correspondent presented in these columns a series of questions as to the proper setting of tile for floors and walls, and with a view to affording some information on the subject we give in what follows the general specifications and instructions for setting tile as officially compiled by the Associated Tile Manufacturers. The specifications and instructions are made for the purpose of improving tile work and bringing the standard up to a more uniform basis, thus giving to those in sections of the country where tile is not in general use the necessary information to secure first-class work.

Foundation for Floors.—A good foundation is always necessary, and should be solid and perfectly level, free from spring or vibration. Tile must always be laid upon a concrete foundation, prepared from the best quality Portland cement and clean, sharp, washed sand and gravel.

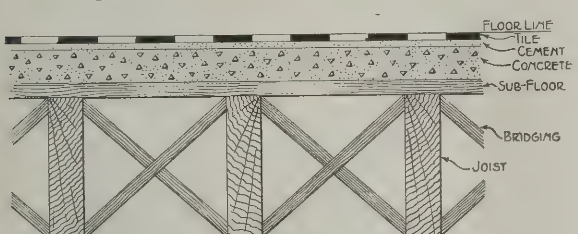
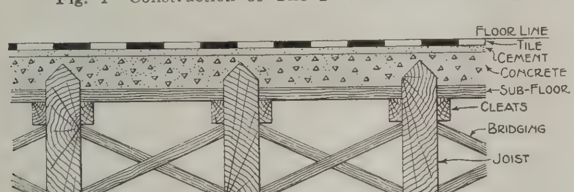


Fig. 1—Construction of Tile Floor in New Building



Fg. 2—Constructing Floors in Old Building

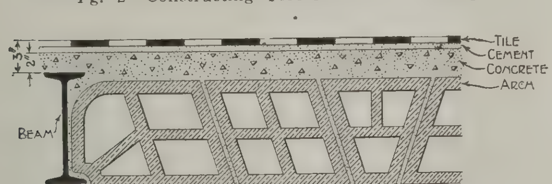


Fig. 3—Tile Floors in Fire Proof Construction

solid mass when well beaten to a bed. Bed should be not less than three inches thick. Surface of concrete must be level and finished to within one inch of finished floor line (when tile ½ inch thick is used), which will leave space of ½ inch for cement mortar.

Cement Mortar should consist of one part best quality Portland cement, two parts clean, washed, sharp sand, thoroughly mixed as directed for concrete. All mortar should be used fresh, before it has its initial setting.

Reinforcing.—Place on top of the concrete an open metal lath and spread the cement mortar over it. This will prevent the tendency to contraction of the cement mortar and separation of the tile into floor cracks.

Before laying Tile sprinkle with fine hand screen a little dry cement over floor on top of cement mortar

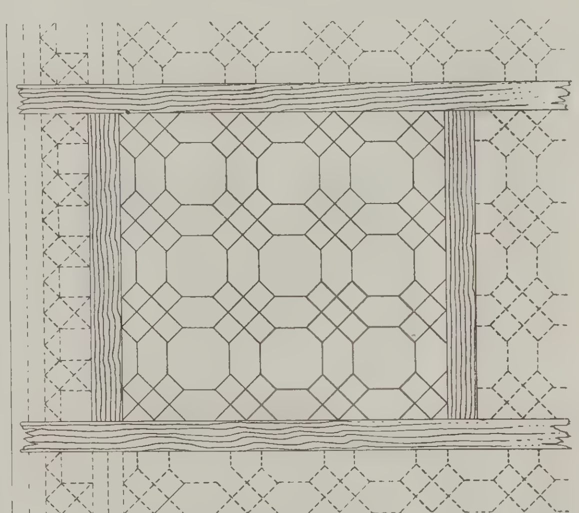


Fig. 4—Method of Laying Floor Tile

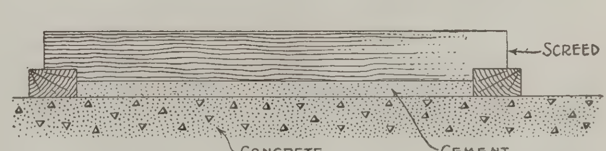


Fig. 5—Method of Beveling the Mortar with a Screed

Specifications for Setting Tile

Cinders shouuld never be used, as they tend to destroy the life of cement, but if used all ashes must be screened out and the vitrified cinder or clinker thoroughly washed. (The sulphur in cinders will destroy reinforcing in concrete.)

Concrete should be allowed to thoroughly harden before laying floor; thoroughly brushed to remove all dust; well-soaked with water, dusting on concrete thin coat pure Portland cement before applying cement mortar for laying tile.

Concrete should never be allowed to stand more than three or four days before laying the tile.

Lime Mortar should never be mixed with concrete.

Concrete should consist of one part Portland cement, two parts clean, washed, sharp sand, four parts clean gravel.

Mix cement and sand thoroughly dry, add gravel and mix, adding sufficient water to form, when laid, a hard,

Grouting.—Joints to be grouted with pure Portland cement, mixed with clear water, cleaned soon as grouting is done, leaving no cement scum on surface.

Floors in New Buildings.—When tiles are laid on joists in new buildings, if possible, joists should be set five inches below intended finished floor line, spaced 12 inches on centers, thoroughly bridged, to make stiff floor, covered with 1-inch rough boards not over 6 inches wide (3 inches preferred), thoroughly nailed, and joints ⅛ inch apart to allow for swelling, all as shown in Fig. 1.

A layer of roofing paper on top of rough floor will protect boards from moisture of concrete, and prevent moisture from dripping through to ceiling below.

Floors in Old Buildings.—Cleats are nailed to joists 5 inches below intended finished floor line, and short pieces of boards (not over 6 inches wide), ⅛ inch apart, fitted in between joists upon cleats and well nailed. Joists must be thoroughly bridged. Place roof paper as above directed. Corners on the upper edge of joists should be chamfered off to sharp point, Fig. 2, as flat surface of joists will give uneven foundation. When strength of joists will permit, cut an inch or more off top. Where joists are too weak, strengthen by thoroughly nailing cleats 6 inches wide full length of joists.

When solid sub-foundation is thus prepared, concrete is placed upon it as above directed.

Iron Beams.—Where iron beams and hollow tile arches are used, frequently very little space is left for preparing proper foundation for setting tile. The rough coat is usually put in by hollow tile contractor to protect his work. This cover should always conform to requirements for a solid foundation. Should this not be the case, the tile contractor must remove sufficient of covering to allow him to put down a foundation that will insure a satisfactory tile floor. Cinders, lime, mortar or inferior material must never be used.

The tops of iron beams should be 3 inches below the finished floor line to prevent floors showing lines on the beams, as in Fig. 3.

Method of Laying Floor Tile.—Semi-Vitreous or Vitreous Tiles for floors are first laid out to ascertain if they are all right, and compared with plan provided for laying floors. Strips are then set, beginning at one end of and in center of room, and level with intended finished floor line. Two sets of guide strips running parallel about 18 to 30 inches apart should be set first, as shown in Fig. 4. Mortar is then spread between them for 6 to 10 feet at a time, and leveled with screed notched at each end to allow for thickness of tiles, as in Fig. 5. Tiles are placed upon mortar, which must be stiff enough not to work up between the joints. Ties are firmly pressed into mortar and tamped down with block and hammer until exactly level with strips. When space between strips is completed, strips on one side of tile are moved out 18 to 30 inches and placed in proper position for laying another section of tile, using tiles which have been laid for one end of screed, and laying of tile continued in same manner until floor is finished.

Figs. 4 and 5 are given to show one approved method of installing floor tile. In some cities different methods have been worked up by mechanics, which are just as satisfactory as those shown.

When cement is sufficiently set, which should be in about two days, floor should be well scrubbed with clean water and broom, and joints thoroughly grouted with pure cement, mixed with water to consistency of cream. As soon as this begins to stiffen, it must be carefully rubbed off with sawdust or fine shavings and floor left perfectly clean.

Method of Laying Ceramic Mosaic Tile

Ceramic Mosaic Tiles are first examined to ascertain if design is right, and laid as directed above. Cement mortar is spread evenly and leveled with screed. Sheets of papered Ceramic Mosaic are laid carefully on mortar with paper side up. After space is covered, the tile setter should press tile into mortar, gently at first, firmly afterwards, using block and hammer, leveling tile as correctly as possible.

In large areas of floor work every third or fourth row of sheets should be laid to a chalk line to avoid bad kinks in line of tiling after floor is finished.

Tile should be beaten down until mortar is visible in joints through paper, however without breaking it.

Paper is then moistened, and, after well soaked, can be easily removed. It is pulled off backwards, starting from a corner. After removing paper, tile should be sprinkled with white sand before finishing the beating, so that tiles will not adhere to beater owing to paste which is used in mounting them. Corrections of surface are then made by leveling with block and hammer. The filling of joints and cleaning of surface is a delicate operation, as the looks of this work depends largely upon it. Joints are to be filled with clean Portland cement, mixed with water. This mixture is forced into joints with a flat trowel (not with a broom, which often scrapes out the joints). After joints are filled, surplus cement is removed from surface by drawing a wet piece of canton flannel over it. This cloth must be washed frequently with clean water. After the floor is cleaned, it should be allowed to stand for a day or two, when whole floor is to be rubbed with sharp sand and a board of soft lumber. This treatment removes the last traces of cement. In laying tile sheets on cement, care should be taken to have width of joints spaced same as tile on sheets to prevent floor having a block appearance.

Cleaning Floor Tile.—Remove with sawdust, and afterwards with flannel cloth and water, all traces of cement left on surface of tile, as it is hard to remove after it is set. After thoroughly cleaning floor, cover with sawdust and boards placed on floor for several days where there is walking upon it.

A white scum sometimes appears on surface of tile, caused by the cement. This can generally be removed by washing frequently with plenty of soap and water. If scum or dirt cannot be removed by washing, then use a solution of muriatic acid and water (six ounces

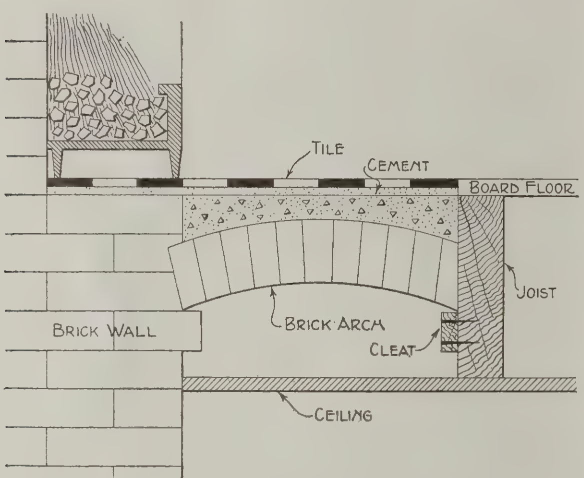


Fig. 6—One Method of Constructing Foundation for Tile Hearth

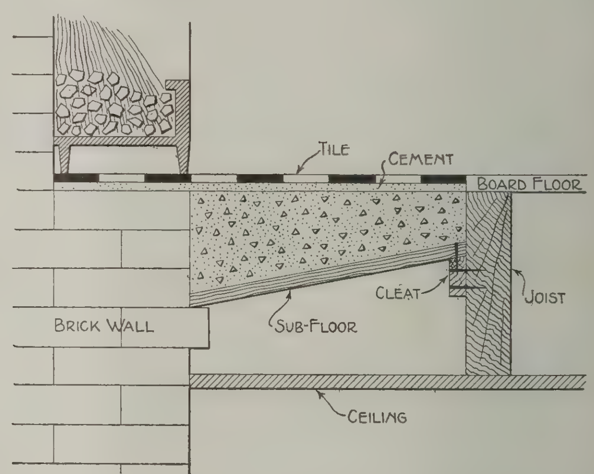


Fig. 7—Another Method of Constructing Foundations for Tile Hearth

Specifications for Setting Tile

of acid to a bucket of water), applied with scrubbing brush. Allow acid to remain on floor for a few minutes only, then thoroughly wash off.

Foundation for Hearths should be placed upon brick arch if possible, to insure perfect fire protection, then covered with concrete in same manner as directed for tile floors, as in Fig. 6.

If placed upon sub-foundation of wood, concrete should be at least 6 inches thick, as in Fig. 7.

Hearth and Facing Tile are set in the same manner as for floors and walls.

Foundation for Walls.—A good foundation is absolutely necessary, and should be solid and perfectly plumb, free from any spring or vibration before applying scratch coat, to prevent tile coming loose.

Scratch Coat.—The Scratch Coat should consist of

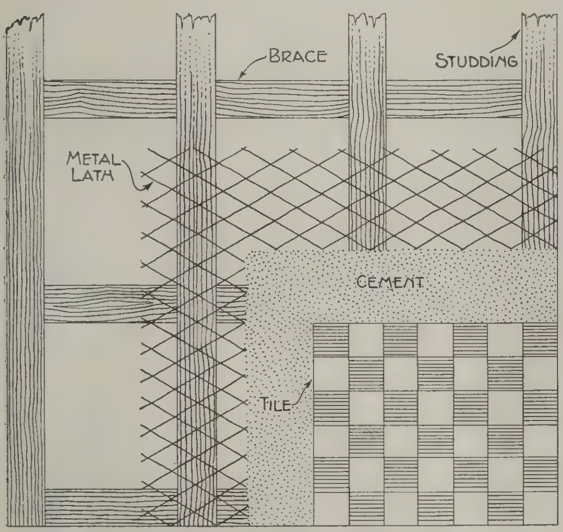


Fig. 8—Showing How Tile Are Placed on Studding

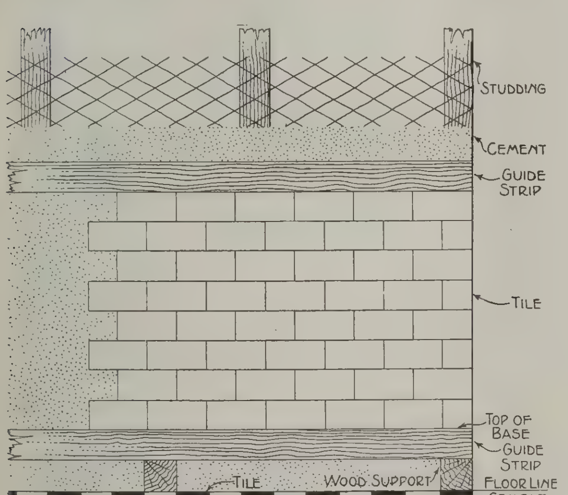


Fig. 9—Method of Setting Tile for Wall or Wainscoting

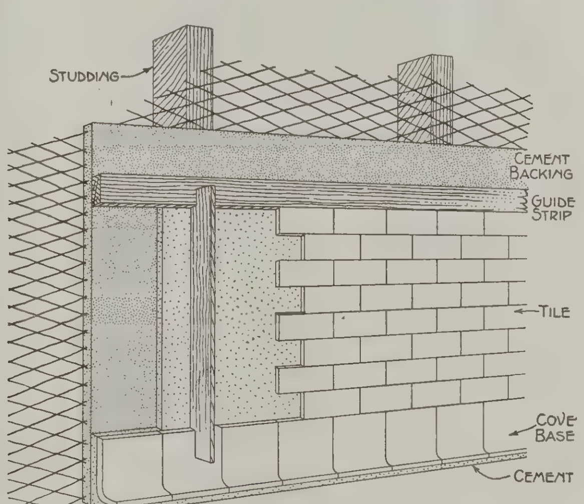


Fig. 10—Showing Method of Placing Cove Base

Specifications for Setting Tile

one part best quality Portland cement, two parts clean, washed, sharp sand. Mix the cement and sand thoroughly dry and add sufficient water to form a thick mortar.

The Scratch Coat should be allowed to harden for at least one day before commencing to set tile, thoroughly brushed to remove all dust, and well wet, brushing on thin coat of pure liquid Portland cement before putting on cement mortar for setting tile.

Tiles Placed on Studding.—When Tiles are placed on studding, the studding should be placed 15-inch centers, thoroughly braced to prevent vibration, and covered with expanded metal lath, as shown in Fig. 8.

Scratch coat on metal lath should be ½ inch thick, or sufficient to make even and true surface to within ⅞ inch of intended finished surface of tile when tile ⅜ inch thick are used. Scratch coat should be roughly scratched.

Tile Placed on Brick Walls.—When Tiles are placed on brick walls, mortar must be raked out of joints of brick work before using to form key for scratch coat.

Never Place on Wood or Plaster.—Tile must never be placed on wood lath or on plaster. If placed on plaster blocks, they should be driven full of nails, or wire lath placed over them. Plaster block material does not form a good bond with cement and in a short time tile tend to come loose and drop off.

Cement Mortar should consist of one part best quality Portland cement, two parts clean, washed, sharp sand, thoroughly mixed, as directed for floors.

If any lime is mixed with cement mortar to prevent it setting too quickly, it should never exceed 10 per cent., and great care must be used to have lime well slaked and made free from all lumps by passing through a fine sieve to guard against "heaving" or "swelling" and thus "loosening" or "lifting" tiles. White rock finish can be used as above in place of lime. Before setting tile and after carefully placing last coat of cement mortar to receive tile, place over it with a plasterer's trowel a very light coat of pure cement mixed to a consistency of thick cream.

Grouting.—Joints should be grouted with Keene's white cement or with pure light gray Portland cement if more character is desired to tile work.

Soaking Tile.—All tiles should be thoroughly soaked in clean water before placing on the wall. Dirty water or water off of cement will stain tile, causing variation in shade and making an unsatisfactory job.

Method of Setting Tile for Wall or Wainscoting.—Tiles are first laid out and compared with plan provided for setting them. Guide strips are then placed on wall, parallel, and about two feet apart, bottom one being arranged to allow base to be set after body is in place, all as indicated in Fig. 9.

When a cove base is used, it may be necessary to set it first, but in all cases it must be well supported on the concrete, as shown in Fig. 10. The strips must be placed plumb and even with intended finished wall line.

The method of setting wall tile is governed to some extent by conditions of wall on which they are to be set, and mechanic must decide at time which process he will use, whether buttering or floating, as equally good work can be done by either by following instructions as stated below.

Floating Wall Tile.—Mortar is spread between guide trips about 5 feet at a time, and leveled with screed notched at each end to allow for thickness of tile, as in Fig. 5. Tiles are placed in position and tamped until firmly united to cement and level with strips. When space between strips is completed on one side of room, strips are removed and work continued in same manner until completed. When tiles are all set, joints must be carefully washed out and neatly filled with thinly mixed pure light gray Portland cement or Keene's cement. All cement remaining on tile must be carefully wiped off.

Buttering Wall Tile.—Cement mortar is spread on back of each tile, and tile placed on wall and tamped gently until firmly united and plumb with guide strips. When tiles are all set, joints must be carefully washed out and filled with cement, and tiles cleaned as directed above.

Fixtures.—When Fixtures of any kind are to be placed on tile work, such as plumbing in bath-room, provision should be made for them by fastening wood strips on wall before rough or first coating of cement mortar is put on, strips to be same thickness as rough coating. Tiles can be placed over strips by covering them with cement mortar, and, when thoroughly set, holes can be bored in tiles for fastening fixtures without injuring tiling.

Constructing a Louvre Ventilator

Designed for Use on the Ridge of a Peak Roof -- Some Details of Construction

MUCH interest has been manifested in the recent past in the construction of louvre ventilators and thinking that some of our readers may perhaps find features of suggestive value in the louvre ventilator which a correspondent described in one of our London contemporaries, we present the matter forthwith.

The ventilator is intended for use on the ridge of a peak roof, its dimensions being altogether governed by the size of the building to be ventilated. In the case here illustrated the frame work is of 3 x 4½ in. posts; 3 x 6 in. sills and 3 x 4½ in. beads, the ends being

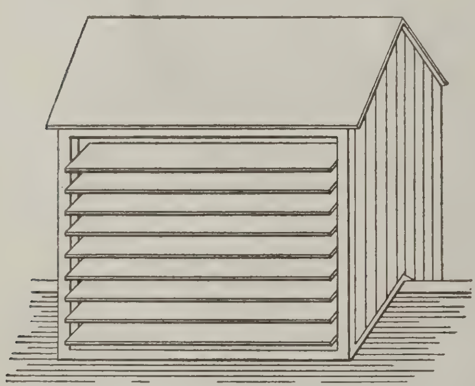


Fig. 1—General Appearance of the Finished Ventilator

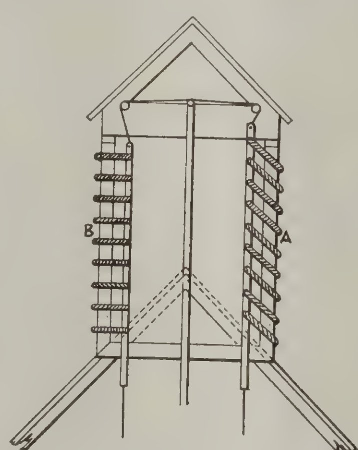


Fig. 2—Vertical Cross Section

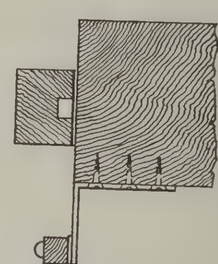


Fig. 4—Plan of Louvre

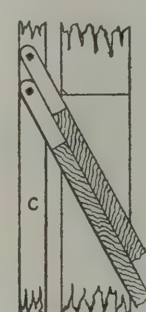


Fig. 3—Manner of Framing Louvres to Exclude Ventilation

Constructing a Louvre Ventilator

boarded on the outside. The roof is similarly covered and both are covered with zinc or sheet lead. The general appearance of the louvre ventilator is shown in Fig. 1, while Fig. 2 is a vertical cross section showing the louvres A closed, while those on the side B are open to the full extent. When the louvres are required to exclude ventilation they are framed as illustrated in Fig. 3. In Fig. 4 is shown a plan of the louvre.

On the edge at the end of the inside of the louvre boards angle iron brackets are fixed, the projecting ends being drilled to receive a small bolt by which each is secured to the operating rod C of Fig. 3. This rod is of hardwood.

To work the louvres a cord is attached to each end and on the inside top end rail are fixed pulleys to receive the cords. In the center is a double sheave lazy pulley, over which the two cords are passed, so that both sets of louvres are controlled over the same pulley.

The position of the louvres being determined, the cords are secured to a cleat hook fixed at a convenient hight from the floor. A cord fixed to the lower end of the operating rod enables the louvres to be easily opened.

Moving Buildings in Winter

In previous volumes of this journal we have described various methods of moving buildings both large and small and involving many novel expedients in connection with the moving operation, but all of these have snow on the ground. In one section of the country at least most of the work of this character is purposely left until the winter season when the ground is covered had to do with a season of the year when there was no with snow so that the house or other structure may be placed upon runners and drawn to its new destination by means of yokes of oxen or team of horses.

It is stated that a building weighing as much as 10 tons has been placed on sleds and moved for a distance of 10 miles, the motive power being a single yoke of oxen. In another case a three-story hotel, 150 ft. in length was moved half a mile on sled runners. The point is made that there is a great saving in hauling buildings in this manner in the winter time, as the work can be done much faster and much more economically.

A Garden or Tea House

How a Portion of a Greenhouse Was Remodeled to Serve as a Tea House

A FEATURE of the extensive grounds of many of the costly summer homes and country estates is the cozy little garden house often used as a place for serving tea and of a style to be in keeping with the surroundings. While as a general thing these little houses are not of an elaborate or extensive character, yet they are such as to permit of sufficient architectural treatment to render them important factors in the specific scheme of landscape gardening in connection with which they are to be found. Sometimes the garden or tea house springs into existence as the result of the remodeling of a building previously used for an altogether different purpose, which happens to be the case with the example shown in the half-tone engraving here presented.

This tea house, so picturesquely situated with its deep foliage background and floral approach, is a small frame affair shingled and stained a gray color. The house in question was originally the "head" house of a greenhouse built some years before the grounds were planned. In the execution of the garden plans the greenhouse itself was removed and the head house was left for use as a tool house. About one-third of it, or the part toward the greenhouse side, was partitioned off and arranged with sink, shelving, etc., for convenience in tea making. The new porch of Colonial treatment giving access to this side of the house, was designed by Miss Lois L. Howe, architect, of 717 Tremont Building, Boston, Mass. The additions embraced besides the porch, the windows on each side of the entrance which open into a pantry and a toliet room.

The Front or West Elevation Showing the Heavy Foliage Serving as an Excellent Frame Work for the Picture

A Garden or Tea House with Picturesque Surroundings

These arrangements were made by reason of the fact that the garden is a very long way from the house and it was inconvenient to carry the tea things so great a distance. The larger part of the garden house therefore was left for a potting and tool house, and is entered by the old door at the top of the steps, while the portion entered from the new porch was arranged as a convenience for keeping the tea things and serving tea. The tea was usually served in the pergola at a little distance away.

The long flight of steps shown at the right in the picture is a part of the old design and lead from the lower level of the garden. It may be remarked in passing that the garden is a large one and runs from a high level into a hollow and up again in a series of wide, shallow terraces. The pergola is at the extreme end and is paved with brick.

This tea house is on the grounds of Miss W. A. Tower, near Lexington, Mass.

Prevention of Sap Stain in Lumber

When freshly cut sap lumber is piled in the open air to season it frequently becomes discolored in a comparatively few days, stain being different in both cause and appearance from the change of color due to weathering and accumulations of dirt and soot on the boards. It occurs in the sap part of the wood only and for that reason is called sap stain. It is considered a defect, and lumber attacked by it is reduced in value partly on account of its unpleasing appearance but chiefly because many believe that such lumber is not as sound as it was before the stain developed. The discoloration cannot be washed off or otherwise removed, for it is not a surface deposit. It lies deep in the underlying cellular structure of the wood and when once there it remains.

Reduction in Value of Stained Lumber

In Circular No. 192, issued by the Forest Service of the United States Department of Agriculture, it is pointed out that the reduction in value of stained lumber results in enormous loss, ranging all the way from $2 per thousand feet down to 50 cents or less. Perhaps one-fourth of the annual mill cut of the United States is attacked but with different degrees of intensity in different regions and at different seasons of the year. The south suffers most because climatic conditions—dampness and heat—facilitate the development and spread of the organisms which cause the stain. The loss occurs chiefly in low grade lumber, because such lumber in long leaf pine is more largely sap wood than are the higher grades, and therefore most susceptible to infection and because lower grades of lumber are not often kiln dried but are stacked in the yard to air season, there to be exposed to attack during the first two or three months of the drying process.

Different Kinds of Stain

There are different kinds of stain, at least all are not alike in appearance. That commonly called blue stain is most prevalent and causes greatest loss. Fungus spores, which are very small and powderlike bodies corresponding to the seeds of flowering plants, are carried by the air and find lodgment on all exposed surfaces. Freshly sawed lumber presents ideal conditions for their development. They cling tenaciously and quickly sprout fine threads, called mycelia, which they send into the wood in search of food. This they find in the wood cells, hollow tubes too small to be seen except with a microscope, but which in the aggregate make up much of the wood structure. When greatly magnified they bear considerable resemblance to honeycomb, and, like honeycomb, they are more or less filled with food substances. The discoloration of the wood by which the presence of the fungus is detected is believed to be due to an optical effect produced by the brown fungus threads when seen through the yellowish cell walls.

To prevent the sap staining of lumber it is necessary either to attack the fungus before it has time to infect the wood or else to render the wood proof against infection. As a means of doing these things the surface of the wood might be so poisoned that spores of fungus lodging there would be killed, or the contents of the wood cells might be made unfit for the nourishment of the mycelia which penetrated them.

The department made experiments and tests with a number of chemicals to determine whether they might be applied to lumber in a way to render it immune from attacks of fungus between cutting time at the mill and the time when the wood has sufficiently air seasoned in the yard to place it out of danger. The following conclusions are drawn from the tests which were made at the Forest Products Laboratory:

Conclusions Drawn from Tests

1. Freshly cut sap lumber when stacked in the yard to dry should be stacked in open piles to permit the free circulation of air. Boards so piled season in about half the time required for those piled in close piles. Open piles, moreover, are not so severely attacked by insects and are more effectively protected against sap stain.

2. In commercial work sap stain can be most effectively prevented by dipping boards in solutions of sodium bicarbonate. Such solutions, though they give fairly good results, leave much to be desired. The strength of the solution should be determined by the severity of the conditions under which the boards are to season, but in general it will require from 5 to 10 per cent. Care should be taken that the chemical used is not mixed with adulterants.

3. The best results in preventing sap stain were secured with mercuric chloride solutions, but on account of their poisonous nature they are not recommended for general use.

4. The solution made by mixing sodium carbonate and lime was not as effective as one of sodium bicarbonate alone. Moreover, it had a greater tendency to streak the surface of the boards with a white precipitate.

5. Solutions of magnesium chloride, calcium chloride, sodium hydroxide, phenol, copper sulphate and zinc chloride did not prevent sap stain; nor did sprinkling the boards with naphthalene flakes give satisfactory results.

6. On account of cheapness and facility in operation it is recommended that sap-stain solutions be applied to the boards by machinery. If this is done the cost of treating lumber with solutions of sodium bicarbonate will amount to from 7 to 10 cents per 1000 board feet.

7. The indications are that shavings planed from soda-dipped boards do not burn as readily as those from untreated boards, but the difference in inflammability is so slight that for commercial purposes it may be neglected.

8. At the same moisture content sap-stained boards are slightly weaker than those free from stain, but the difference is so small as to be of no practical importance.

9. Soda-dipped lumber is a little stronger, stiffer, tougher, and has a greater surface hardness than natural lumber, but these differences are exceedingly small and for practical purposes may be neglected.

While few building operations in the borough of Manhattan, New York, consist of the construction of more than one building at a time, the average cost has risen in the case of apartment houses to $177,000. The average cost of all the buildings erected in the borough in 1910 exceeded $115,000 each. In 1880 the average building was erected for $12,400; ten years later the average cost had risen to $21,200, and in 1900 it was about $49,000.

Book Racks and Desk Tops

Variety of Designs -- Single and Combination Affairs -- Details of Construction -- Best Woods for the Purpose

By George E. Walsh

BOOK racks, desk tops and ornamental tops for old book-cases make suitable presents for friends as well as desirable articles for ones' own use. There is considerable variety in such useful articles, and one may use ingenuity in designing them to fit any special need. Sometimes it is an old desk with merely a flat top which could be greatly improved by designing an ornamental book rack with pigeon-holes on the side for papers, or it may be an entirely new top is needed. Such a new top was designed and made for an old desk after the pattern in Fig. 1. The legs and sides of the desk were in good condition, but the book-cases, desks and mantel-pieces or side tables. If artistic in design and execution they will finish off many old pieces of furniture better than can be accomplished in any other way. The two designs shown in Figs. 2 and 4 will clearly indicate their purpose. In one we have either side of the article finished off with small letter file arrangements, with lids to cover them and a center space for books, magazines or other articles. The shallow drawer furnishes room for small articles such as paper, pens, letters and envelopes. Placed on top of an old book-case, it occupies a conspicuous place and adds greatly to the ornament of the room. In Fig. 4 rather more space is given to books, which are placed on either side and in the center, but two drawers are provided for small articles.

In Fig. 6 an attempt is made to build up a series of shallow drawers, with a side space for bills and letters

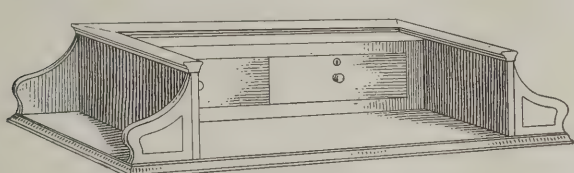


Fig. 1—One Style of Desk Top

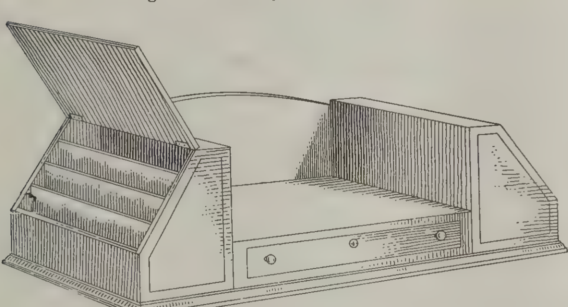


Fig. 2—A Book Rack and Letter File

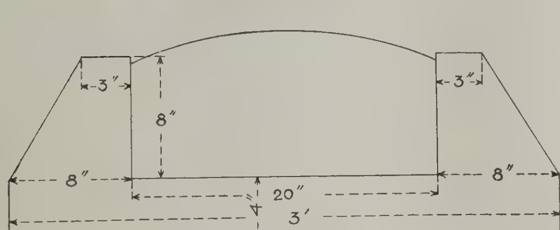


Fig. 3—Dimension Diagram for Book Rack and Letter File

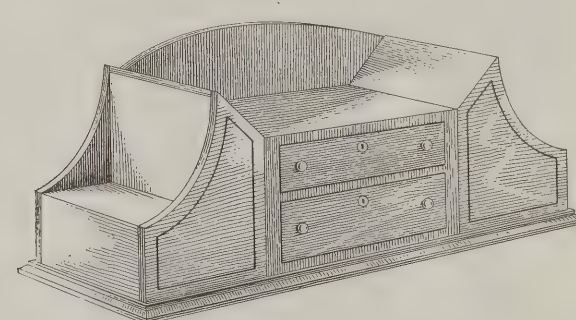


Fig. 4—Another Style of Combination Book Rack and Letter File

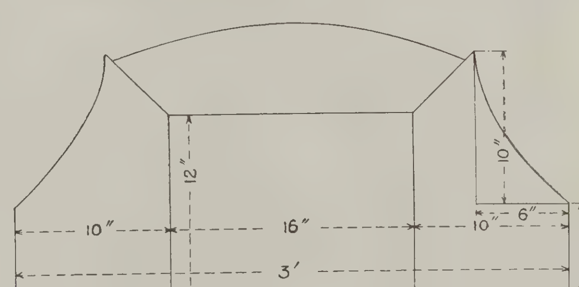


Fig. 5—Dimension Diagram for Previous Figure

Book Racks and Desk Tops

top had been split and badly used, and it never was very pretty or ornamental.

The dimensions of the top of the desk were taken and the design drawn to fit snugly on it. When finished sufficient room was left between the side book-racks for writing purposes and two small desk drawers were provided for pens and papers. The lid of the old desk lifted up, but this was screwed down, and a drawer fitted in front to take the place of the old space. No space was lost by this operation, and much was gained in the way of an ornamental article of furniture. The book spaces on either side of the desk top were found to be of invaluable aid, for in them were kept all books needed for ready reference.

Combination book racks, drawers and letter files are among the most useful of ornaments for topping off that opens and closes on hinges, and the top space finished off as an ordinary book rack. Such a generally useful article may be made in almost any suitable hight desired for special purposes. If to fit on the top of a desk, table, book-case or mantel-piece it should not exceed two feet from the base to the book rest on top. In that case the number of drawers should be cut down to about three. A tier of five is more suitable for a case three or four feet high and designed to rest on some low article. This combination piece of furniture makes an excellent finish between two windows where seats are provided under each window. Place a two-tier book-case on the floor between the windows, and fit the design to rest snugly on top. The door which holds the letter file arrangement need not swing more than half way open, for in that position anything in it can be reached.

In Fig. 8 we have another combination book-rack and a letter file. The top of the case is devoted entirely to spaces for letters and papers, divided off in compartments as one desires. Some of these spaces are quite shallow and others quite deep. The doors swing on hinges from the top center and fall down snugly on the sides to finish off the top. If one found it difficult to make doors with curves in them, the top could be made flat or sloping with a peak at the top. That is merely a matter of individual taste and capacity. The designs are intended more as a guide than to follow absolutely in every particular. The lower part of the case is made entirely for books which are placed in the four compartments.

The design can be made on the plan of the ordinary revolving book-case, or with the compartments simply

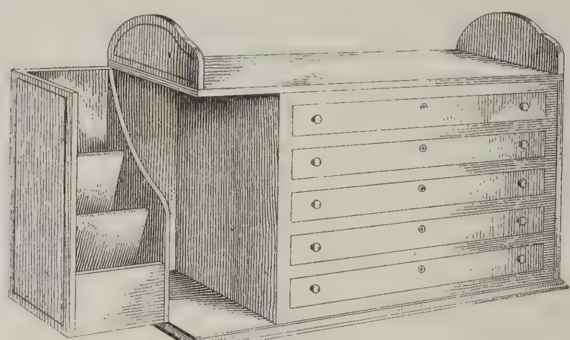


Fig. 6—A Combination of Drawers and a Book Case

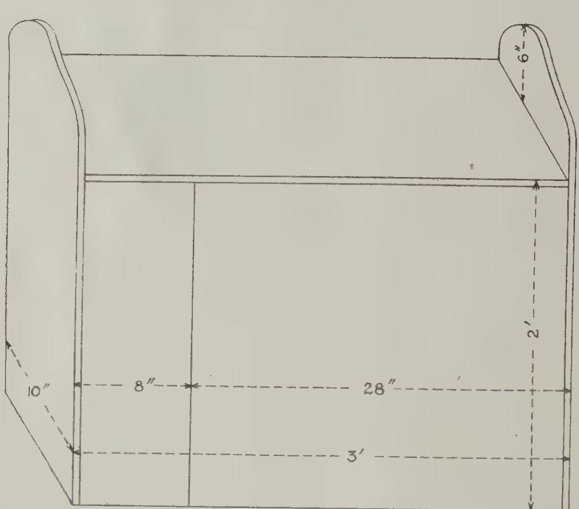


Fig. 7—Dimension Diagram for Article Shown in Previous Figure

Most soft woods when cut as thin as a quarter of an inch are too fragile to be of much use and a very slight pressure will split them. But good basswood is not so easily ruined. All inside partitions should be glued in position and not nailed. If one is deft enough with tools to fit them together with groove and tongue all the better, but it is easier to glue the small pieces in. Only the best furniture glue should be used for this purpose, and that means it must be prepared for the purpose. Self-prepared glues are hardly strong enough. Get a pot of glue and keep it hot while working, and when a piece is glued in position it must be kept there under pressure for at least 24 hours.

All the designs, with the exception of the book-case with a curved top, are made in simple straight lines, and any one who can saw out and fit a square box together accurately should be able to make any or all of these useful ornaments. A scroll saw may be necessary for cutting out some of the pieces to advantage, but they can all be made without it. Besides the lumber mentioned above a few feet of molding should be purchased at the mill. This is to finish off the base of each article. The sides and upper part can be decorated with a few strips of beaded millwork which can be bought at a mill or carpenter's shop.

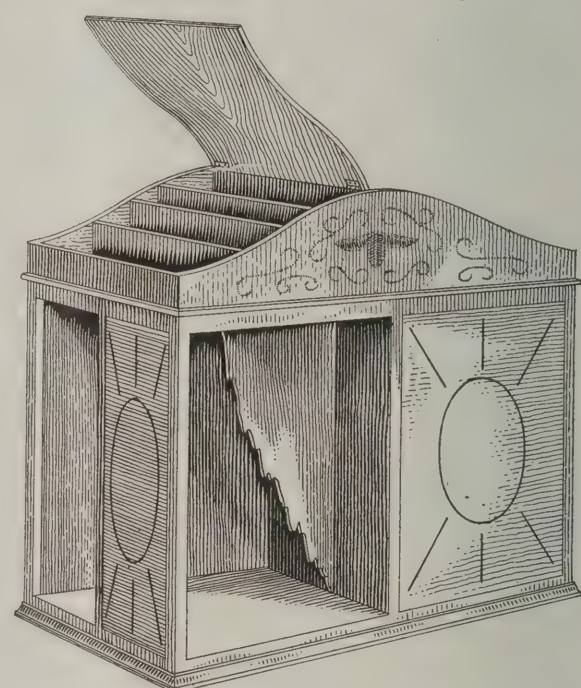


Fig. 8—Another Style of Combination Book Case and Letter File

Book Racks and Desk Tops

divided by upright posts at the corners. In the illustration the design has every alternate space panelled, which can be done in any way desirable. A design may be burnt on the panel or it can be finished off with strips of wood, following some simple drawing.

The wood for making any of these ornamental tops should preferably be birch or maple. There is no better wood for the work than birch. It should be obtained from the mill in two thicknesses—one-quarter of an inch and three-quarters. The thin boards are used for making the partitions between letter compartments, filing arrangements, pigeon-holes and shallow drawers. The thick boards are for the rest of the work. The thin pieces of wood finished off in the natural colors of the wood will contrast beautifully with a mahogany stain given to the outside part.

If the articles are to be decorated by burning the best wood to select is good basswood. This is nearly grainless and does not split easily for a soft wood, and it takes pyrographic work better than almost any other.

After the different parts have been cut out and put together, the edges should all be sandpapered down to a very smooth finish. Then the surface should be rubbed with some good filler so that all the open grain and pores can absorb it.

When the filler has dried properly the stain should be applied, rubbing it in and wiping it off carefully. This in turn must dry before oil or varnish is applied.

Owing to the fact that there is something of a dearth of comfortable and convenient houses for the working classes in Merthyr-Tydfil, Wales, the house committee of the Town Council, having heard of the cheapness with which concrete cottages could be erected, proposed to build an experimental one with a view to demonstrating the idea. Once it became known, there was a protest from a section of the Labor Party to the effect that "cheap houses at a low rental will perpetuate low wages."

Erecting Sheet Metal Ceilings from Working Drawings

Systematic Method of Erecting Metal Ceilings from Plans Furnished by the Manufacturer

THE increasing extent to which metal ceilings are being used at the present day, not alone in buildings intended for business purposes, but also in private dwellings, school houses, chapels, etc., has tended to greatly quicken the practical interest of the carpenter-contractor and builder doing work in sections remote to the larger cities and towns of the country concerning the best plan to be followed in the installation of jobs of this nature. While sheet metal ceilings are likely to be erected by the local tinsmith or sheet metal contractor, if there be one in the community, the country builder as well as the carpenter-contractor desires to know the details of the operation as a matter of personal satisfaction, for frequently there arise circumstances under which he is called upon to do the work himself. It is therefore in an attempt to explain a systematic method of erecting a metal ceiling with the aid of an erection drawing furnished by the manufacturer that we present what here follows.

At the very outset it should be remembered that when an order is sent to the factory for the material it should be accompanied by a rough sketch of the room or rooms to be ceiled, with dimensions marked thereon, so that the manufacturer may prepare the erection drawing for the guidance of the builder or sheet metal man in putting up the ceiling.

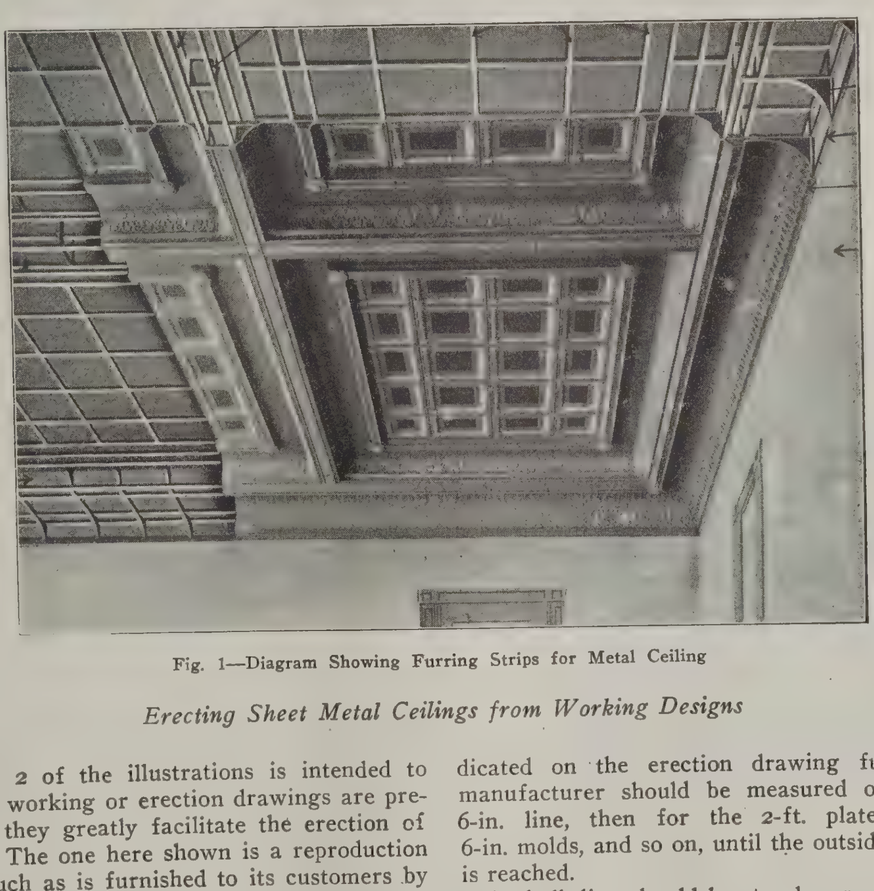


Fig. 1—Diagram Showing Furring Strips for Metal Ceiling

Erecting Sheet Metal Ceilings from Working Designs

The line drawing indicated by Fig. 2 of the illustrations is intended to show how these working or erection drawings are prepared and how they greatly facilitate the erection of metal ceilings. The one here shown is a reproduction of a drawing such as is furnished to its customers by the Edwards Manufacturing Co., 423 Eggleston avenue, Cincinnati, Ohio. In the illustration Fig. 1 we show how the furring strips are attached, to which the ceiling plates are fastened. The first arrow dimly seen at the lower left-hand corner of this illustration shows the construction of the work for a small cornice at the top of the large cove. Just above or about the center of the illustration on the left-hand margin is another arrow which shows the construction of the strip for a false beam. The first two arrows from left to right on the top margin of the illustration show the construction of a false beam of the form. The next three arrows at the top margin of Fig. 1, reading from left to right, show the furring strips for the ceiling, and are made of ⅞-in. x 1¼-in. soft wood.

The first arrow reading from the top to the bottom in the right-hand margin shows a cornice bracket. The next arrow shows a furring strip at the bottom of the cornice or cove, while the next arrow points to the cove and the lower arrow indicates the side wall.

The first operation in erecting a ceiling is to find the center of the room at each end and strike a chalk line on the ceiling throughout the entire length. After this chalk line has been struck a line should be laid off parallel to the center line on each side of it and 3 in. from it. Then each way from the center line another line should be laid off 2 ft. from the 3-in .line, then another 6 in. from the last line, then another 2 ft. farther on, then 6 in. and so on from wall to wall. A chalk line should be struck on these lines the entire length of the room, and the furring strips should be applied so that the chalk line will be directly in the center of them.

After the furring strips have been applied the ceiling should be squared off from the center of the room, the 30-ft. way—the length of the room in this particular case—with a large carpenter's framing square, and on these furring strips the distances as indicated on the erection drawing furnished by the manufacturer should be measured off, first for the 6-in. line, then for the 2-ft. plate, then for the 6-in. molds, and so on, until the outside or last molding is reached.

A chalk line should be struck across the surfaces of these furring strips on a line laid off, and short pieces of furring or headers should be cut and securely toe-nailed between the long strips.

About 6 in. from the side wall around the outer edge another furring strip should be applied and 3 in. toward the center another. These strips should be applied entirely around the side walls to catch the top of the cornice and also the 3½-in molds, No. 1678, shown in Fig. 2, which is to be applied on the outside of the cornice. Headers should be dropped in between the furring strips to catch the outside of mold No. 1653, surrounding the field plate, and the mold No. 1678 to catch the end laps of the filler pieces. These are usually placed every 4 ft., where the miters are to be made in the corners of the filler and a piece laid in diagonally from the corner of the field molding to the corner of the cornice to catch this joint.

When a center piece is put in the furring strips should be applied 18 in. from the centers, as shown in Fig. 2, and 6 in. from this one, to catch the outside of the molding.

When putting up the ceiling the operator should begin at the center and apply molds No. 1661 as indicated on Fig. 2, then the plates, then the molding and so on, working from the center line toward the wall in all instances. In applying the metal it should be only tacked in when started, so that it may readily be taken down in case the work should come out of line. After the material is all in position the operator can go over it and nail it securely.

After the outside molding around the field is put up, the cornice No. 1647 in Fig. 2 should be applied by starting in the corners by special stamped miters which are ordinarily furnished by the manufacturer. The first operation is to nail the miter securely in its place, after which the operator should start each way from the miter and work toward the next corner, where it is finished by cutting it off square against the next miter. It is advisable, although not absolutely necessary, to

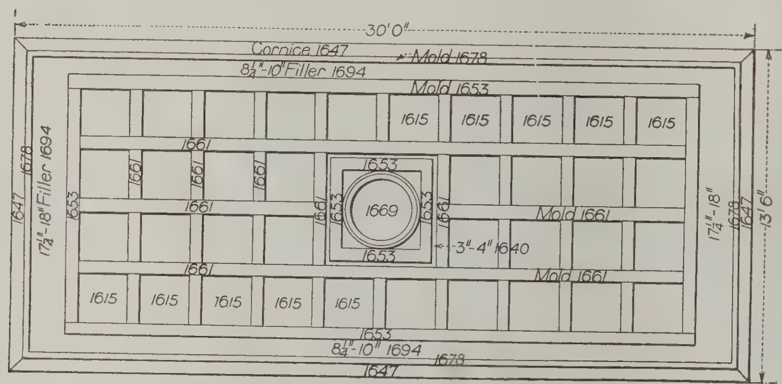


Fig. 2—Working or Erection Drawing for Metal Ceiling

Erecting Metal Ceilings from Working Drawings

run a furring strip along the side wall at the bottom of the cornice, and nail it securely to the side wall so that the bottom of the cornice can be nailed up tight against the plaster.

For each corner miter two wood brackets are furnished; these may be tacked into the miter before it is put into position in the corner. Then for every 4 ft. of cornice one bracket should be applied to catch the end lap. These may also be tacked into the ends of the cornice before they are put on. This method of applying cornices simplifies matters very largely and it can be put up more rapidly, as the bottom strips will hold the bottom pieces and the top strips will hold the top.

Next to this the operator should apply the small mold, No. 1678, as indicated in Fig. 2, which comes next to the top cornice, and he should nail it on to the nailing joint. He should next apply filler No. 1694. The actual width of this filler from center of bead on the mold to center of bead on the small mold is 8¼ in., but is ordinarily furnished 10 in. wide in order to take up any variation that may occur in the room. The extra amount of material can be lapped under mold No. 1653, which is left loose for this purpose. After the entire amount of filler has been applied this molding can be nailed down tightly and all joints are thrown toward the wall.

In applying the center piece shown on the drawing the operator may lay off the furring strips according to the plan, as the center strip is made in four pieces, each 18 in. x 18 in., having a wood bracket for the joint. After these four pieces are applied he should apply filler No. 1640 around the outside molding and after that apply mold 1653, which is to finish the center piece on top of the filler. He, of course, should nail this securely.

After the ceiling has all been applied and nailed thoroughly the operator should go over all joints with a calking tool or rivet set and close up all joints that are to liable to be open. Then special care should be taken to close up all joints where the molding laps and also where the cornices lap. The Edwards company ordinarily furnishes tees and crosses for all center junctions for mold No. 1661 and also elbows for 1653 and 1678, while the wood brackets for mold 1653 will be found with the shipment. All of these brackets may be placed under each lapping joint of the mold in order to nail it down tight.

The prices ordinarily quoted for metal ceilings in catalogues include all wood brackets for the cornices and moldings and the 1-in. nails for applying the metal. These prices ordinarily do not include any 8d. or 10d. nails for applying the furring strips, as these nails can usually be bought much cheaper locally than they can be shipped from the factory.

Another important point to be explained in this connection is that ordinarily the manufacturers cannot make up metal ceilings to suit any gas outlets or electric outlets that are already in place, unless they are placed absolutely on even foot centers. The customer, when such is not the case, should be made to understand that he will have to have them moved over, and at his own expense. Such an understanding will save any chance of dispute when the time comes to make the final settlement. Metal ceilings always take the fourth-class rate of freight, and the weight is approximately 70 lb. per 100 sq. ft. when crated ready for shipment. The freight rates can ordinarily be obtained from the local freight agent and an estimate made on the freight charges.

The sheet metal contractor who is contemplating adding a metal ceiling department to his business will find that the manufacturers are ready to give him liberal assistance.

Work for the Editor

'Most any one can be an editor. All an editor has to do is to sit at his desk six days in the week, four weeks of the month and twelve months in the year and "edit" such stuff as this:

"Mrs. Jones of Lost Creek let a can opener slip last week and cut herself in the pantry."

"A mischievous lad of Matherton threw a stone and struck a companion in the alley last Tuesday."

"John Doe climbed on the roof of his house last week looking for a leak and fell, striking himself on the back porch."

"While Harold Green was escorting Miss Violet Wise home from a church social last Saturday night a savage dog attacked them and bit Mr. Green on the public square."

"Isaiah Trimmer of Lebanon was playing with a cat Friday when it scratched him on the veranda."

"Mr. White, while harnessing a bronco last Saturday, was kicked just south of the corn crib."—*Boston Globe.*

Industrial Education by the State

Methods of Instruction and Equipment Used by the State of Connecticut at Its New Britain Trade School

THOUGHTFUL men in all the mechanical trades have recognized the difficulty that the changed conditions of modern manufacturing and commercial pursuits have developed in the training of young mechanics. Such institutions as trade guilds, even such institutions as the indentured apprenticeship system of 30 or 40 years ago, are almost impossible to-day. On the one hand the economic necessity of having each individual employee of the master tradesmen earn a profit on his wages, and on the other the natural desire to maintain wages at the most remunerative figure by restricting the number of entrants to the skilled trades through organization has rendered the teaching of a young man a trade practically impossible on the part of the employer and difficult to secure, even if possible, on the part of the employee.

Industrial Education by the State—Boys at Work in the Drafting Room

The ever-increasing demand for help—skilled help, not raw material—that must be trained, has therefore forced the evolution of the trade school. It is an economic necessity, destined to establish the necessary balance between the supply and demand. That it may supply the demand in an efficient manner has already been well demonstrated. The pioneer work of producing mechanics by a system of training more or less closely approaching that which would have been received by the old-time apprentice has been left to philanthropic institutions and individuals. Only recently has the state found it incumbent to take up the work, and even yet only a few of the states in the Union have entered on it in other than a tentative manner. Chief among those few in respect to the thorough fashion in which it has approached the work, assuming not only the burden of cost but that of direct control, is Connecticut.

In addition to public industrial schools which have been established in various parts of the state, supported in part by state funds, schools devoted solely to the training of young men in the mechanical arts have been established. As the result of an investigation of the subject covering a period of several years a law providing for the establishment of two schools for free instruction in the arts and practice of trades was passed by the State Legislature in June, 1909. This measure carries an annual appropriation of $50,000 for the support of the schools.

One of these, located at New Britain, has been notably successful in meeting the high standard of efficiency that those responsible for the movement set. The reason for the success probably lies in the close approximation to actual working conditions that has been possible through the location and equipment of the buildings and also to the fact that a faculty of highly practical instructors efficiently directed by an executive with wide academic experience has been provided.

The scope of the school is not too wide, therefore its force is concentrated. It aims to provide Connecticut manufacturing and building industries with men trained as those industries require. That is not to say that the practice obtaining in cities or towns outside the bounds of the state is ignored, but emphasis is laid, even if it is not made evident, upon the instruction in branches of trade that are carried on as staples in the state.

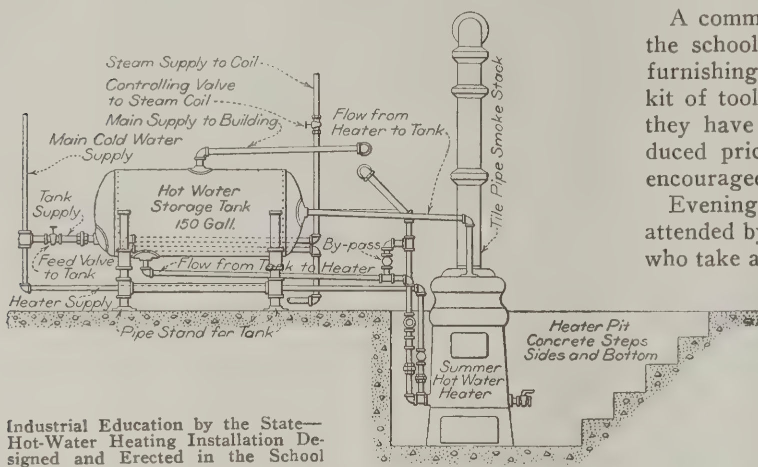
The carpentry and plumbing student is taught first of all the requirements of the types of buildings commonly erected in the towns in which he will be most likely to work. He becomes proficient in the design and installation of work in bungalows and cottages of the type found in every summer resort in the state. He builds and equips houses of the two and three-tenement type, common in the cities, but he also understands the construction of the modern business or factory building.

The pattern maker is taught to make just such patterns as he would be asked to produce for the foundries of any of the automobile, tool or machine building establishments for which the State of Connecticut is renowned.

Stair Building by Members of the Carpentry Class

While the aim of the principal and instructors is to develop men who will be first of all efficient workmen in the grades of work that the state most needs, the grounding given in theory and its practical application is thorough. This is easily shown by a study of the courses laid down. These cover a period of two years, the working hours being 49 each week.

A certain number of hours is allotted to each branch of work according to its importance or difficulty of accomplishment. The plan on which the time is allotted has been founded on the comparative time occupied in erecting the corresponding work in actual practice. In the plumbing of bungalows, for example, the student spends in all 144 hours on soil-pipe erection, 72 hours in back venting, 16 hours on local venting, 56 hours on the lead wastes, 72 hours on the cold-water supply, 60 hours on the hot-water supply, 72 hours on setting fixtures, 18 hours in testing the soil and waste pipes, and so on. Thus instead of the usual method of allotting so many hours to indiscriminate practice in joint wiping or any of the other branches into which plumbing is ordinarily divided, the time is allotted in a



Industrial Education by the State—Hot-Water Heating Installation Designed and Erected in the School

systematic way calculated to get the best out of it for the student.

The same methods, with application to fit the different conditions, are followed in the other departments. Every student spends a certain proportion of the time in the drafting room according to the course he is taking. The plumbing student is required to take four hours' instruction in the preparation of plans and general drawing each week. He is expected after completing his course of instruction to be able to prepare a plan of any work he may propose to install and to prepare a schedule of the material required to complete it. Thus he has acquired the principal elements which go to the making of an accurate and successful estimator.

The theory of the trade is presented to him in a series of talks. These are given from instruction sheets prepared especially for the school by the instructors of each department, and are illustrated when necessary by chalk drawings or blueprints, which the boys prepare. These topics cover, as may be supposed, all phases of the trade.

In one of the illustrations is shown a cottage bath room fitted up by students of the school. In another the students are shown at work in the drafting room.

Some valuable practice is afforded the students in the erection of work in the various lines in which they are engaged. The staircase shown in one of the interior views is an excellent example of the training for efficiency which is aimed at in special classes of work. Here members of the class in carpentry are shown at work building a flight of stairs of a design likely to be found in a large majority of the houses on which the boys will eventually be employed. They will be able to build them from the raw lumber to the finished article if necessary.

The carpentry and building course is most complete and embraces the preparation of plans and estimates, a knowledge of lumber and lumber values, its application to the best advantage, the strains and stresses it will be able to endure, and in fact the rudiments of a thorough technical training, besides a comprehensive, practical education.

In another illustration is shown the heating connections and boiler of a plant designed for the school by an instructor. As the work includes both steam and hot-water connections, opportunity is afforded the students to become acquainted with good practice in this line.

That the boys may have the recreation necessary to keep them fit, a large and well-lighted room has been equipped for the playing of basket ball and other games. The sanitary conveniences are good, and as the buildings are of the saw-tooth roof type the light is ample and well diffused.

A commendable feature which will be enjoyed when the school has been established a little longer is the furnishing of the boys on graduation with a complete kit of tools free of cost to them. At the present time they have the opportunity of purchasing tools at reduced prices, and the boys in the machine shop are encouraged to make whatever it is possible in this line.

Evening classes are also held, these being mostly attended by those working at the trades during the day who take advantage of the excellent facilities the school offers to improve their practical and theoretical knowledge.

Some Facts About Slate Roofing

A short time ago there appeared in these columns a rather interesting discussion pertaining to certain phases of slate roofing, and in connection therewith reference was made among other things to the strength of the framework required for slate as a roofing material as compared with that where shingles were used. There appeared to be some diversity of opinion regarding certain points and supplementing what was there presented we take pleasure in bringing to the attention of our readers a few condensed facts pertaining not only to the strength of a building where slate is used, but also to the pitch of roofs, the method of measuring them and some suggestions regarding the laying of the slate in a way to prevent the roof from leaking. These particulars are gleaned from a booklet

Cottage Bath Room Fitted by Students of the School

issued by the American Sea Green Slate Company, Granville, N. Y., and cannot fail to prove of interest along the lines indicated.

At the very outset attention is called to the prevailing opinion of people not familiar with the use of slate for roofing purposes that a building should be constructed very much stronger for slate than for other roofing materials. This it is pointed out is a great mistake, as any building strong enough for shingles, tin or iron is strong enough for slate, for the following reasons: The weak points of any roof are the valleys or other breaks in the roof where snow drifts in and lodges and when the snow melts with rain the weight at points where the snow has drifted is much heavier than any two slate roofs. It is well known that snow will not stick on a slate roof as it will on shingles or on a metal roof, as the slate being of a warmer nature causes the snow to melt and slide off; while with shingles or metal it freezes on, causing greater weight than a slate roof is ever called on to bear. Two by six rafters, eighteen feet long, two feet from centers, give a roof all the strength necessary for a slate roof. The writer has seen hundreds of houses roofed with slate where the rafters were two by four, two feet from centers, sixteen feet long, with collar beam nailed across one-third of the way down from the top.

Pitch of Roofs

Slate can be depended upon to make a roof perfectly water tight on any pitch down to one-fifth. Half pitch or steeper makes the best roof both for looks and strength, as it throws the weight on the walls more than on the rafters, and causes the snow to slide off clean, thereby never overloading any one part of the roof.

Measuring Roofs

It is very desirable that a slater should be able to understand and measure architects' drawings, as many of the largest and best jobs of slate roofing are let by contract from the architects' office. The greatest advantage derived by the slater in being able to measure drawings is the fact that his competitor does not know every job he bids on; just how much per square he figures at, as the variation in prices may be caused by measure and not price. Where the competition bidding is all by the square, the result is generally to run the price down gradually but surely until there is no profit, and often an actual loss in many of the jobs done. Some roofers adopt the mistaken plan of not measuring hips and valleys extra; this is wrong, for while it may give a small margin of profits on a plain roof, at the same price per square it will cause considerable actual loss on a roof badly cut up by hips and valleys. There is no more reason or sense in leaving off the measure of hips and valleys than there would be to leave off the measure of the porches, as both take a great amount of extra time and material, which the owner gets the benefit of, and should pay for, as he does for windows, doors or any other part of his house.

Rules for Measuring Slate Roofs

The following are the standard rules for measuring slate work. These rules are recognized and followed by roofers, architects and engineers wherever slate roofing is used and in all standard works on the subject:

For Plain Roof.—Measure the length of the roof and multiply by the length of the rafter.

For Roof with Hips, Valleys, Gables, Dormers, etc.—Measure each section through the center and multiply by length of rafters; and in addition to the actual surface of roof measure the length of all hips and valleys by one foot wide, also what the first, or eave course, shows to the weather by the length of eaves. In some localities this rule is not adhered to strictly, but hips and valleys are always measured wherever slate is used. The extra measure on eave course is to compensate for lost time in starting and laying the under-eave course, which does not show or count in the surface measure. The extra measure on hips and valleys is intended to compensate for extra labor and loss of material in cutting, fitting and laying same. No deduction is made for dormer windows, skylights, chimneys, etc., unless they measure more than four feet square. If more than four feet square and less than eight feet square, one-half is to be deducted. If more than eight feet square, deduct the whole. The reason for not deducting the whole of all openings is the extra work in cutting and fitting the slate and putting in the finishings. Hips and valleys on spires are measured extra, same as above. If hips are mitred and flashed they should be charged for extra. If ridge-roll is put on it is charged extra. Gutters, valleys and all flashings are charged extra.

It should always be remembered, in measuring roofs, that if the pitch of the roof is the same, size of building and projections the same, the mere fact that there are hips and valleys does not add to the surface of roof. As an example: Two buildings of the same size may be roofed—one with plain pitch and gable roof (that is, two plain sides), and the other may have four hips, four gables and eight valleys. If both roofs are the same pitch, the roofs will measure exactly the same, and two measures is all that is necessary in measuring either—that is, the length of one eave and the length over both rafters, except that the extra measure on hips and valleys would have to be added on the cut up roof.

Laying Slate and Felt

Before starting the slater should be sure the roof is ready. The carpenter should put on a cant strip about one-quarter inch thick, nailed about two inches above the eave line of the slate. Carpenters often refuse to do this, saying it is the slater's work. This is not true. It is as much a part of the carpenter work as the sheathing. There should be cant boards put in behind all chimneys before the chimney back or gutter is put in. The cant board should fall to each end so that no water will stand in the gutter, as is the case where no cant board is used. This is the cause of more bad leaks on slate roofs than any other one thing; it is worse than broken slate, as the water will, where the end of the chimney gutter is higher than in the center, run over and follow along the under side of the tin to the lowest point, then drop off and run down, often allowing gallons of water to run into the building in a few hours.

When chimneys require braces they should be put on where practicable, so that the end that is fastened to the roof will be higher than the end fastened to the chimney; this will prevent water from following the iron rod down through the slate.

The lap is the amount the tail of the third course laps over the head of the first course.

In slating, as in shingling, we commence at the bottom and work up. By referring to diagram it will be noted that the course marked "undereaves" is short. These should be made long enough to be overlapped by the second course, two or three inches, according to the lap given the rest of the roof. On a road where a 3 inch lap is given, the undereaves should always be 1½ inches longer than one-half the length of the slate. The slate in the first course is put on over the undereaves, the lower end even with the lower end of the undereaves and the slate in the second course should overlap the undereaves two or three inches, as the job may require. The third course should overlap the first course the required lap and the balance so on throughout the roof, but as the work approaches the ridge the proper width for the last course may require a little variation in the lap to finish in good shape.

A residence in St. Paul, Minn., has in the basement a swimming pool 50 x 30 ft. in size. The water is warmed with steam in winter. At one end of the pool is a basking platform and at the other a large fireplace with benches on either side.

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OCTOBER, 1912

Good Foremanship

Success in building ofttimes depends as much on the qualifications of a man as foreman—the ability to handle his workmen to the best advantage—as it does upon a knowledge of building construction. It matters not whether the man be a carpenter, a building contractor or what be his special line, when he comes to the work of building and employing men so as to meet competition and make a successful job with a reasonable profit he must obtain the best men available for the different kinds of work and know how to secure the best results from them. We hear much in these days of what is called "good team work," which is a splendid idea provided the foreman grasps the proper conception of it. One view is that it means inspiring each individual making up the working crew with a desire to help not only himself but his fellow workmen, so that the crew or team may make a good showing. Another view is that it means to beget pride or enthusiasm in the men under his employ. This is good, but it does not go far enough. A foreman might have the most enthusiastic team in the world, but if the men were not properly distributed over the work so that the peculiar fitness or qualification each possessed be brought into play, the men would not produce the best results. Good foremanship consists in large measure in being able to determine clearly the qualifications of each man for a given kind of work and then to round out and distribute the crew so that the best men will be doing the work for which they are best adapted. In order to obtain good work from his men a foreman should first figure out just how much there is of each kind of work to do and divide and distribute his crew accordingly. Obviously he cannot always do this to perfection because there is not always every kind of a man standing around waiting for the job, but to a certain extent he can exercise judgment in these things and by this means obtain better results with more profit and with less worry than to go at it blindly, depending on force and enterprise alone.

Picking Up Valuable Points

From studying the different traits of certain well-known and successful contractors one is able to pick up valuable points. A contracting firm which became famous the country over illustrates this point. It had methods that seemed peculiar and begot a certain amount of criticism. For example, if it had a job requiring 10 good carpenters it would advertise for 100 and if the hundred came the firm would probably try out the entire number, say 10 each day, giving every man a fair chance long enough to demonstrate his ability. Then only the very best were kept and given steady employment, while the others were allowed to go. The men thus selected were paid the highest wages of any in their calling. In return the firm was not only able to conduct a profitable business but established a world-wide reputation and was often called upon when some very difficult work was to be undertaken and finished within a limited time. It would be rather hard on the average man as well as upon the slower men in the trade if all building contracting firms pursued these methods, yet the purpose here is not to defend or apologize, but simply to point out traits that characterize the concern. There are many kinds of work calling for a high degree of skill and not for a great rush. Here men can be used who have no record for speed yet are steady and reliable, but of course would not command the same rate of wages as the man of higher skill.

Good Men at Good Wages

It is often figured that it is just as cheap to put a good man at any work and pay him good money as it is to use indifferent men at lower wages. While this may frequently be true it is not always the case. It takes, however, a discerning foreman to understand just when it is best to employ a cheap man and when a good one. There are instances when rough work like putting up fencing and small buildings about a place has actually cost more money by engaging cheap men to do the work than would have been the case had the best carpenter and one drawing the most money been put on the job, because he would have done it in much less time and in a much more satisfactory manner.

There is, however, a difference in cheap men. There are some who are quick but rough—men who will make time on the rough job but are not satisfactory in handling finish or in work requiring the exercise of care and skill. What is true of carpenters is probably true of mechanics in other branches of the building trades. That is why the statement was made in the beginning that success in business consists largely in knowing how to handle and place the men as well as in knowing how to do the work. Therefore, either the builder himself must understand these qualifications for selecting and handling men or else he should have with him in charge of the work a foreman possessing these qualifications to the end that the greatest measure of success in building may result.

Some Features of New York's Latest Skyscraper

The latest addition to the colony of towering office buildings in the financial district of New York City is the 20-story structure which is about being erected on Broad Street running through to New Street and midway between Exchange Place and Beaver Street. The building will have two street courts similar to the scheme adopted in modern apartment houses. The projected building will have a frontage of 80.3 ft. on Broad Street; an average depth of 170 ft. and a New Street frontage of 64½ ft. The cost will be about $1,500,000 and the architects are Willauer, Shape & Bready, 156 Fifth Avenue, New York City. As there are no inside courts every office will overlook the street, and as the entire lighting will come from the streets no office can have its daylight affected by future operations on the adjacent properties. To intensify and reflect the light the building will be of white matt glaze terra cotta, the base of stone, marble and granite and the side walls of light colored face brick.

The Way to Place Figures on a Drawing

At a recent meeting of the American Society of Engineer Draftsmen held in the Engineering Societies Building in West 39th Street, New York City, Professor Charles W. Weick, of Columbia University, gave a most interesting lecture on "Practical Perspective" which aroused much interest and drew out many subsequent questions.

One of the questions asked through the "Question Box" was, Which is the better way to place figures on a drawing—perpendicular to the bottom of the drawing, or perpendicular to the dimension line?

This created considerable discussion and the consensus of opinion seemed to carry the view that perpendicular to the dimension line is the popular method of placing the figures.

Difficult Foundation Work

Without doubt one of the most interesting and complex problems in foundation work ever attempted in this or any other city is that in connection with the new building to be erected for the Western Union Telegraph Company at Broadway and Dey street, New York City.

The foundations will consist of pneumatic caissons sunk to bed rock which at this point is a trifle over 70 ft. below the level of the street. The floor of the basement of the building will be 62 ft. below the street level or something like 30 ft. below the water line. The surrounding buildings are heavy, massive stone structures, some of which are 11 stories high, and the foundations of them are supported on what are known as "spread footings" which rest on the soil not more than 20 ft. below the street level. It will therefore be seen that in order to excavate so far below the level of the street and through water bearing strata, with foundations of neighboring buildings so much above the depth to which the foundations of the new buildings are to be sunk, the Foundation Company having the contract will be forced to exercise very great care in order to successfully accomplish the task imposed.

Magnificent Entrance to an Office Building

According to the details and drawings of Cass Gilbert, who is architect of the 55-story Woolworth Building in course of erection in lower Broadway, New York City, that structure will have when completed one of the most magnificent entrances and corridors probably ever planned for an office building. The details call for a treatment in marble, mosaic and decorative iron with a lighting system which will make this portion of the building notable. In the first place the entrance on Broadway will be 35 ft. high and 14 ft. wide and will have a tracery and ornamentation in carved Indiana stone. The design is an adaptation of the Gothic and follows the general style of the building. The bases are of granite, polished, 6½ ft. high. The entrance is deeply recessed and access to the building is through two sets of doors, above the outside set of which is to be a heavy glass screen.

Considerable care was given by the architect to the selection of the material with which to line the walls of the main hall, which will have a hight equal to the first three stories of the building. The material to be used is a Greek marble called "Skyross Alpha," a white marble with a pronounced pinkish hue and beautifully veined with a buff yellow. The cornices are to be of Eastman Sienna marble, a native stone which closely matches the Greek. The base and floor border adjacent will be of Bassville marble from France, a very light buff, while the body of the floor will be in light Tennessee marble laid in a geometric pattern.

Probably the greatest feature of the entrance hall will be the ceiling, which will be of the vaulted type with an immense dome at the point where the transverse corridors intersect. The entire ceiling is to be finished in an ornamental mosaic of a specially prepared design to conform to the general style of the building.

Unusual Elevator Shaft Construction

An unusual feature in the new building of the Bankers Trust Company at 14 Wall Street, New York City, is the manner in which the elevator shafts are constructed. Those in which express cars are operated have no doors below the sixteenth floor, thus saving a great deal of rentable space which would otherwise have to be given up to hallways. Each car is provided with a grillwork door in the side, so that in the event of one car getting out of order between the main and sixteenth floors the elevator in the shaft alongside the stalled car can be brought to its level and the lateral doors opened, thus permitting the passengers to step from one car to the other and be carried to their destination.

A report from an American consul in Turkey states that asbestos roofing and siding are little known in his district. Tiles, after the French style, locally manufactured, are in universal demand. The opening for asbestos roofing would depend largely on its ability to compete in price with the materials now in use.

CORRESPONDENCE

A Department Where Those Interested Can Discuss Practical Trade Topics -- All Are Invited to Participate

Problem in Handrailing From South Africa

From A. H., Johannesburg, South Africa.—I have been pursuing with great interest the instructive articles on handrailing and stairbuilding which have appeared in recent numbers of the *Building Age,* for it is a branch of joinery I would like to master but in connection with which I have had very little practice. In Scotland, where I belong, it is a distinct trade by itself. I have been studying for some time Mowat's "Treatise on Handrailing," but find it pretty difficult, as there are so many lines connected with it. I have been assisting in handrailing lately, but I find that the shop foreman seems to know very little about the subject and we have to make the best of it.

I have observed that the late articles in the *Building Age* have the same underlying principles as I have been studying, but the problems are demonstrated with fewer lines. I would like very much if some reader who is expert on the subject will give me an answer to the problem indicated by the accompanying sketches.

The steps are very awkwardly placed owing to the fact that it was originally intended to make use of newel posts instead of a continuous rail. One of the sketches very much resembles a diagram in an article by Morris Williams, which appeared in the issue of the *Building Age* for December last, but the easing is on the straight rail, which causes an extra joint.

The sketches which I send relate to a concrete stair and the carpenters or whoever did the casing work do not seem to have any idea of where the steps should be placed.

I desire to know how to get out the wreath for this rail with the easing on the wreath, the wreath being wanted for a quarter landing. This is the flight which was intended originally to have newel posts, but afterward the architect decided on a continuous rail.

Answer.—The request of our South African correspondent was referred to Morris Williams for attention, who furnishes the following in reply: The sketch Fig. 1 represents the plan of stairs submitted by the correspondent, but to which I have added plan tangents *a-b* and *b-c*. The first operation in the construction of a wreath to stand over and above the plan is to determine the pitch of the tangents, and for this purpose it will be necessary to draw the elevation of the steps, which has been done in Fig. 2.

Draw a line to represent the floor as *a-d* and upon it mark the distances *a-b* and *c-d* which are shown along plan tangents in Fig. 1. Upon each point erect lines

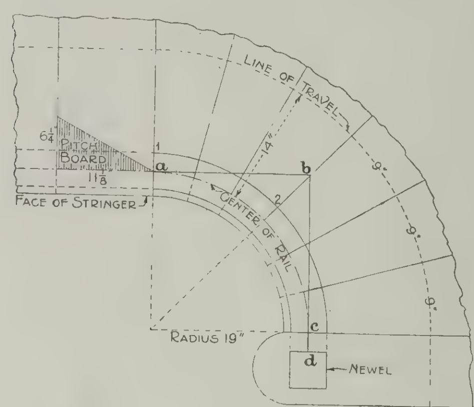


Fig. 1—Partial Plan of Stairs Showing Quarter Turn at the Starting

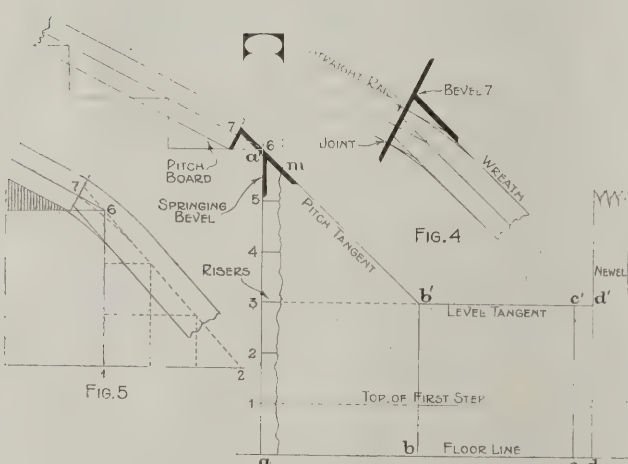


Fig. 2—Elevation of Steps and Pitch of Tangents Over the Plan, Fig. 1

Fig. 4—Laying Out the Easement in the Wreath

Fig. 5—Laying Out the Falling Mold for the Outside Curve of the Wreath

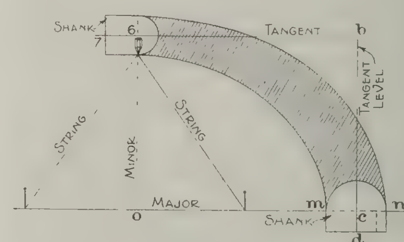


Fig. 3—Laying Out Face Mold for Wreath Over Fig. 1

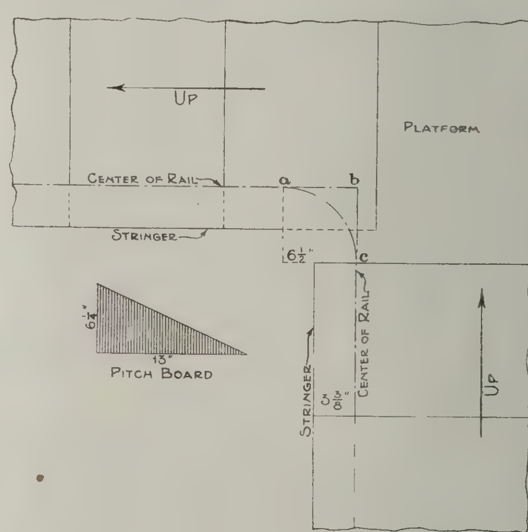


Fig. 6—Plan of Quarter Turn Between the Two Flights

Problem in Handrailing from South Africa as a-a', b-b' and c-c'. This process is what is meant by the term unfolding the plan tangents. Upon a mark the height of six risers to represent those risers that are shown in the plan, Fig. 1, to be contained within the plan curve.

Place the pitch board at point 6 and draw the pitch of the straight steps as shown. Draw the level line c'-b' at any height desired for the wreath to be above the floor. In the elevation Fig. 2 it is shown to be the height of 3 risers. Now connect 6 with b', which will represent the pitch of the tangent over and above the plan tangent a-b.

The tangent above the plan tangents b-c is shown at b'-c' to be level.

We are now ready to lay out the face mold, and the manner of doing this is clearly shown in Fig. 3. Draw the line 7-6-b the same length as the pitch tangent 7-6-b' shown in Fig. 2 and draw a perpendicular line from b the same length as the level tangent b-c-d in Fig. 2. Draw parallel lines to these tangents intersecting at o. Make the joints at 7 and d square to the tangents. Make the width of the mold at 6 equal the

square to the pitch of the straight rail and that it does not butt square with the pitch of the tangent 6-b', owing to the two pitches being different.

After applying bevel 7 to the wreath and working the easement upon it the joint will form, as indicated in Fig. 4, a true butt joint.

To facilitate the squaring of a wreath containing an easement like the one here shown it is the custom to use falling molds, both for the inside and outside. In Fig. 5 is shown how to lay out the falling mold for the outside. Make 1-2 in Fig. 5 equal the stretch-out length of the curve 1-2 shown upon the outside plan curve of Fig. 1. Make 1-6 equal the height of three risers which represents the height of the pitch tangent as shown from riser 3 to riser 6 in Fig. 2.

Connect 6-2 and on each side draw parallel lines to represent the thickness of the plain rail. From 6 draw the pitch and thickness of the flight rail. Fix the joint at 7 and draw the easement as shown. Apply this mold to the outside of the wreath to mark the easement curves for the top and bottom.

It will be noticed that much more labor and skill are required to work an easement in the wreath than is necessary to work it on the straight rail, which no doubt is the reason for the custom generally followed of adhering to the latter method.

In Fig. 6 is shown the plan of the quarter turn between the two flights and which is based upon the second sketch furnished by the South African correspondent. In Fig. 7 is presented the elevation of the steps and pitch of the tangents. The pitch of the top tangent a'-b' is shown to align with the pitch of the

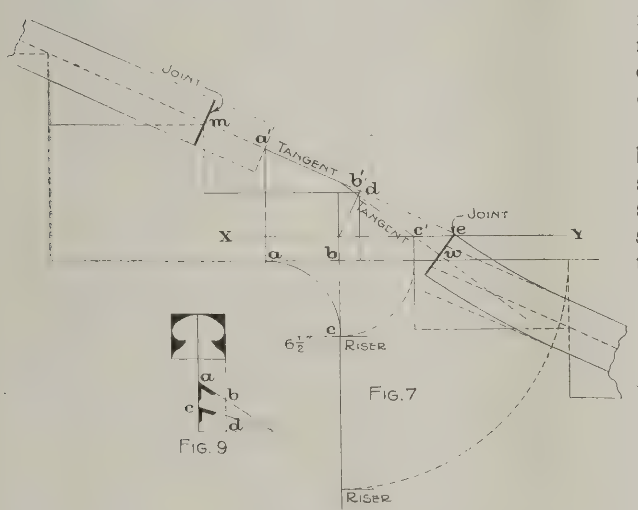


Fig. 7—Elevation and Pitch of Tangents Over the Plan, Fig. 6

Fig. 9—Springing Bevels for Fig. 7

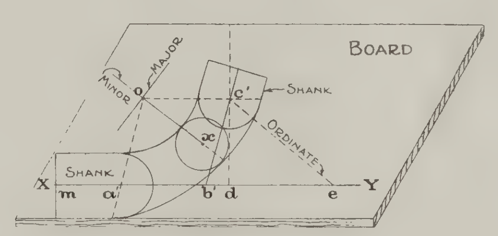


Fig. 8—Showing How to Draw the Face Mold Over Plan, Fig. 6

Problem in Handrailing from South Africa

width of the plain rail and at c equal to twice the length of 6-m shown upon the bevel in Fig. 2.

To find the point upon the major axis to fix the pins, open out the compasses the length of o-m upon the major axis. Fix one point where the pencil is shown upon the minor axis and turn around to cut the major where the pins are fixed. Now tie the string to the pins; stretch it out to where the pencil is shown and sweep around to m for the inside curve.

To draw the outside curve repeat the same process, using the outside dimensions of the minor and major axes to find where to fix the pins upon the major axis.

Cut out the material for the wreath to the shape of this mold and square to the face of the plank. Then apply the bevel shown at 6 in Fig. 2 to the joint d, holding the stock parallel with the joint and the blade toward the inside.

No bevel will be required for the end 7 of the wreath because it is upon the minor axis, which is a level line and therefore requires no springing. It is, however, required in this case to have the easement in the wreath instead of in the straight rail, and the bevel shown at 7 in Fig. 2 will have to be applied at the end 7. The manner of applying this bevel to the wreath is indicated in Fig. 2. Its purpose is to secure a square butt joint at 7 after the wreath is finished.

It is shown in Fig. 2 that the joint at 7 is made

top rail, and therefore the joint at m will be a true butt without an easement. It is otherwise with the joint at w, owing to the pitch of the bottom tangent b'-c' being steeper than the pitch over the bottom straight flight.

The easement shown at w is made in the straight rail, and the joint is made square to the pitch of the tangent b'-c', all as shown. The joints of the wreath by this method will be square to the tangents and face of the plank.

A simple method of laying out the face mold is illustrated in Fig. 8. Procure a piece of board large enough to contain the mold; gauge the line X-Y from the edge at a distance equal to half the width of the wreath. Place upon it the points m, a', b', d, e taken from the pitch tangents in Fig. 7. Upon d erect a perpendicular line. Place in the compass the length of the bottom tangent b'-c' shown in Fig. 7; fix one point in d; turn around to cut the perpendicular line in c' and connect c' with b' as shown.

This line will be the bottom tangent as required upon the face mold. The top tangent will be the line a'-b'.

Now draw parallel lines to these tangents intersecting in o, and from o draw the minor axis parallel to the ordinate c'-e. Upon the minor axis mark the point x at a distance from o equal to the radius (6½ in.) of the plan curve. Take x for a center and draw the circle shown to represent the width of the plain rail.

Now take the point a' for a center and the distance a-b shown upon the bevel in Fig. 9 for radius and draw the semi-circle shown. Take the point c' for a center and the distance c, d marked upon the bevel in Fig. 9 for radius, and draw the semi-circle. Take a thin straight edge and bend to touch the circles for both the inside and outside curves, thus completing the face mold.

Another elevation of the steps and pitch of tangents for the same plan curve is shown in Fig. 10. In this diagram it is shown how to prepare the elevation when it is determined to work the easements in the wreath, which as I understand is what is desired by the South African correspondent. The pitch of tangents is shown in this figure at a'-b' and b'-c' to be equal and at both ends prolonged to the joints shown at m and w.

The joints are made square to the straight rails of the flights. The bevels shown at m and w are to be applied to the wreath so that the joint when the wreath is finished shall be a square butt joint. The face mold as shown in Fig. 11 is laid out in exactly the same manner as the one in Fig. 8 by transferring the pitch line of tangents from Fig. 10 to a piece of board as shown at m, a', b', d, c' and w in Fig. 11. Upon d in and outside curves. Turn each quadrant around as shown at m and n. Find the points x and z by turning around m and n as shown.

From z draw a line through 2 to b. Then a-b will be the stretch-out length of the outside curve.

From x draw a line through 1 to d and e-d will be the stretchout length of the inside curve.

Now transfer the stretchout line a-b to Fig. 14 and upon a erect the line a-a' equal in length to a-a' in Fig. 10. Connect a'-b in Fig. 14 and from a' and b draw the pitch of the flights as shown by the pitch board. Now form easements as shown to complete the falling mold for the outside of the wreath.

To draw the mold for the inside use the stretchout line e-d in Fig. 13 for base and the same height a-a' Proceed to complete it as shown in Fig. 14 for the outside curve.

Modern Methods of Bracing Frame Houses

From Edward H. Crussell, California.—In reply to "C. W. K.," Cambridge, Mass., whose letter under the above heading appeared in the August issue of the

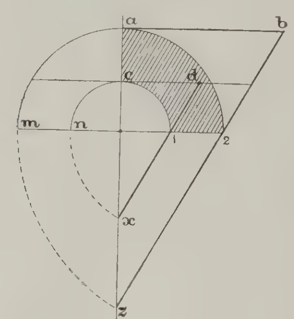
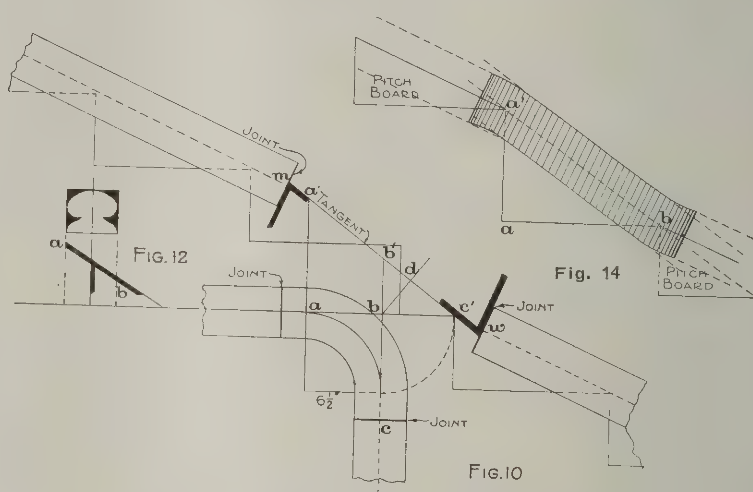


Fig. 13—Showing How to Find the Stretchout Length of the Inside and Outside Curves of the Quarter Turn Plan, Fig. 10



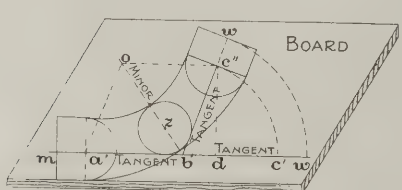


Fig. 11—Laying Out the Face Mold for Fig. 10

Fig. 10—Showing How to Prepare the Elevation and Pitch of Tangents for a Wreath Containing Easements

Fig. 12—Springing Bevel for Figs. 10 and 11

Fig. 14—Laying Out the Outside Falling Mold

Problem in Handrailing from South Africa

Fig. 11 erect a perpendicular line to c''. Place the compasses in b' and extend to c'. Turn around as shown to c'' and connect c'' with b', which will be the bottom tangent as required upon the face mold. Now make the joints square to the tangents as shown at m and w.

Fix the point z upon the minor axis at a distance from o equal to the radius of the plan curve and draw the circle the same size as the width of the plain rail. Draw semi-circles at the ends a' and c'' the same width as a-b shown upon the bevel in Fig. 12. Now draw the inside and outside curve by bending a thin straight edge to touch the circles.

After cutting this pitch board out of the board, use it as a template to cut from the plank the material for the wreath. The material is to be cut all around square to the face of the plank. After working the material to the twisted form of the wreath by means of the springing bevel shown in Fig. 12 it will be necessary to apply two falling molds—one to the inside and one to the outside of the wreath to form the easements. It is a very small matter to lay out the falling molds as shown in Figs. 13 and 14.

In Fig. 13 the quarter turn plan rail is shown shaded. It is required to find the stretch-out length of the inside paper, I would say that both methods of bracing illustrated by the correspondent are used in those parts of the country where I have resided. The two styles of bracing are used for different purposes and in different styles of framing; that illustrated in the correspondent's Fig. 1 being used for heavy timber framing and that shown in his Fig. 2—or a modification of it—is used in what is known as balloon framing, which is the style of framing generally used in the modern frame house.

The correspondent mentions *houses* in his letter, but his sketches appear to be portions of a barn or shed with vertical boarding applied on the outside. His sketches show no studding in the walls and the studding is an item that has a lot to do with the proper method of bracing.

There are, I believe, cities and towns where the building laws call for various systems of bracing and in those places the law must be obeyed. Where these laws are absent the ordinary two-story frame house appears to get along all right without any bracing except that supplied by the external boarding and sheathing. Thousands of them have been built in that way and stood every test required; hundreds of them have to my own personal knowledge stood a more severe test—they have been picked up bodily, moved from one place to another and set up on a new foundation. If a house can stand a test of this kind and remain square and plumb it is sufficient proof that further bracing is not needed.

The mortise and tenon joint has no place in balloon framing and is not needed in any part of the outside frame. It is also being eliminated from heavy framing wherever possible, bolts and iron dowels taking its place.

In Fig. 1 of the sketches which I send is shown the style of bracing we use in balloon framing when we think bracing is necessary. In this framing the studs have the most important duty to perform and so are placed in position intact. A line is then struck across them in the proper direction and the pieces forming the braces are well fitted and nailed in between them. A study of the sketch will show that the brace is placed so as to make thorough nailing possible at all points. When the sheathing is applied on the outside it is well

In Fig. 2 of the sketches is illustrated what we may term a modern style of heavy timber framing. The upper braces in the sketch serve two purposes—they brace the building and help to support the plate. We may surmise that the plate carries a heavy floor or perhaps the track for an overhead traveling crane or something similar. It may be seen that the mortise and tenon joint in this frame is conspicuous by its absence, and it would require considerable argument to convince the intelligent workman that the framing could be improved by its use. The lower ends of the braces are "toed" into the posts and their upper ends butt against a piece of 2-in. plank that is spiked to the plate.

I have shown both ends of the braces as being bolted, but this of course depends upon circumstances. Sometimes only the lower end is bolted and sometimes both ends are fastened with ship-spikes. The plate is fastened to the posts with drift bolts which are simply pieces of straight round iron from ½ in. to ⅞ in. in diameter and of the proper length. The holes for these drift bolts are bored through both timbers at once and are made 1/16 in. smaller than the drift bolt so as to provide sufficient friction to draw the pieces together. The foot of each post is held to the sill with iron dowels which are not so long as the drift bolts, but are usually larger in diameter. The holes for the dowels are marked from a pattern and must be bored separately.

Fig. 1—Style of Bracing Used in Balloon Framing.

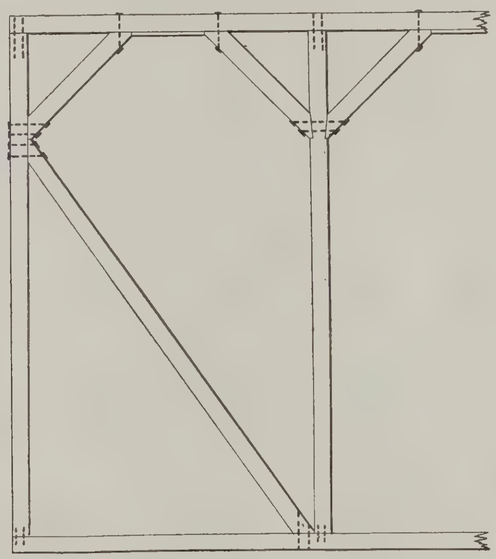


Fig. 2—Modern Style of Heavy Timber Framing.

Modern Methods of Bracing Frame Buildings

nailed to both studs and brace and if it is thought that a corner needs anything more to hold it plumb the carpenter should try to take it to pieces or rack it out of shape and then note what success he has.

Sometimes instead of using the same size of material for studs and braces and cutting the brace in between we use a piece of 1½ x 6-in. or 2 x 6-in. for the brace; set it on edge and gain out the studs for its reception, letting the brace run its entire length in one piece. There are cases where this style of brace seems necessary, but my preference is for the former method.

Fig. 1 also shows our method of constructing the plate and corner studs. The plate is formed of two pieces with the joints broken and the corners lapped. The joints in both the upper and lower members of the plate are cut over a stud. The corner is formed with two studs spiked together with 1-in. filling blocks in between them. The first stud in the side wall is spiked to these two, forming a solid angle for both lath and sheathing boards. The plates are spiked to the studs singly and the studs are "toenailed" to the sill.

The short braces that used to be placed at the foot of each post are now usually omitted—a long brace in each end panel being more frequently used. If the structure is a long one and the situation seems to require it, these long braces are inserted at regular intervals throughout its length.

I have not shown any studs or girts in Fig. 2, but would say that these are usually of smaller material cut in between and spiked to the other members.

Durability of Stucco Finish

From H. B. McMaster, Commissioner, Youngstown, Ohio.—In the August issue of the *Building Age* a correspondent signing himself "W. D. T.," Jersey City, N. J., asked for information concerning the durability or life of stucco finish on metal lath where the building is exposed to salt air.

As the representative of the Associated Metal Lath Manufacturers I unhesitatingly state that the correspondent need have no fear of a disintegration of stucco finish on metal lath, even though exposed to salt air if the work be properly done. In this connection I would refer him to the April issue of the *Building Age,* page 223, where he will find an article entitled "Specifications for Stucco on Metal Lath." This specification is being exploited after a very careful study of the subject, and I am confident that "W. D. T." will get good results if he follow this specification carefully. Slight changes in detail have suggested themselves since this specification was put out, as for instance, we now recommend a ½-in. furring strip instead of ¼-in., and the writer will be glad to send the revised specifications to the correspondent upon his request.

He may also be interested in observing the results of a number of examples in New England, where the houses have been exposed to the sea air. Some of the houses in question have been up five years, 10 years, and even longer. Four of them are at Pride's Crossing, Mass., consisting of the Oliver Ames house, the Frick house, the Bryce Allan house and the Fred Ayer house.

Obtaining Bevels in Roof Framing

From H. R. F., Mildred, Kan.—In reply to the inquiry of J. F. Johnson, Nokomis, Ill., in regard to the cutting of hood rafters, I am sending sketches with explanation which I hope may be of use to him. At the outset I would state that these rafters may be fitted in different positions and the two to be discussed in this article will be that of a hip or valley with a plumb cut at each end and beveled to fit both ridge and gable rafter, also that of a brace from the gable rafter in which there is only one bevel at the bottom end, the side cut being square. We will first take up the rafter as cut for a hip or valley, as that is the position he appears to have in mind from his inquiry.

In Fig. 2 is the plan of the hip, the length of the projecting ridge, 4 ft., being one side, and the distance from the bottom end of the rafter to the center of the barn, 5 ft., being the other side, with the diagonal distance 6 ft. 4.8 in. the run of the rafter.

He gives 10 in. rise to the foot run of common rafter, which would be 50 in. or 4 ft. 2 in. rise for the hip. This taken with the run on the square gives the plumb cut at both ends and the diagonal distance between these points on the square will give the length of the hood rafter.

It will be noticed that the run of this rafter does not meet the plan lines at an angle of 45 degrees as would a hip at the intersection of two roofs of equal pitch, but it meets them at a less angle at one end and a greater angle at the other, so we will have to treat it as a hip at the intersection of two roofs of unequal pitch, both of which would have a rise of 4 ft. 2 in., their runs being 4 and 5 ft. respectively.

Where two rafters rise over the same portion of roof, with their seats or runs at right angles to each other, the bevel to fit the ridge may be obtained by taking the run of one and the length of the other. Cutting by the length will give the bevel for the latter, so to get the bevel for the upper end of the rafter in question, draw the dotted line *a* parallel to the face of the required cut which corresponds to the ridge line in this case; and then the line *b* squared out from the run of the given rafter will give the run of an imaginary rafter, but setting as it would at right angles to the given rafter on the plan. So the length of the line *b* taken with the length of the rafter and cutting on the length will give the required bevel.

For the bottom cut draw the dotted line *c* parallel to the face of the required cut which corresponds to the 5-ft. line on the plan. Square out the line *d* from the run of the given rafter until it intersects the line *c;* then the length of the line *d* taken with the length of the rafter cutting on the length of the rafter as before will give the mechanic the required bevel.

This method, like the ones following, when properly understood may be used for cutting the bevels of nearly all rafters, including hips, valleys, jacks and cripples, not only for hip and valley roofs or for polygonal, circular and irregular shaped roofs. For a more detailed description I would refer the readers to an article entitled "Framing Roofs of Irregular Shape," by R. W. McDowell, which appeared in the February, 1911, issue of *Building Age* and to the author of which I give credit for what I know about it.

Another method of cutting this same rafter involves the laying out of the plumb cuts as before for the proper lengths of the rafter and then drawing an angle as in Fig. 3 to correspond exactly with the angle *e* of Fig. 2. Draw the line *h* of Fig. 3 parallel to the line *g,* the distance square across from *g* to *h* being equal to the exact thickness of the rafter—in this case 1⅝ in.

We now have an exact plan of the cut. Next square across from heel to the line *g* and take off the length from this line to the corner of the angle, which is about 1 5/32 in.

From the plumb cut already laid out on the rafter square out a line to the corner of the rafter, making this line measure exactly 1 5/32 in. and from this point square across the back of the rafter to the opposite side, from which point a line drawn diagonally to the point of the rafter will give the required cut for the upper end. This is shown in Fig. 4 of the sketches.

The heel of this rafter in position should be exactly plumb above the heel of the plan and the point of the rafter exactly over the point in the plan. In other words, a line squared out from a plumb line would be level and a line across the back of a rafter in this position should also be level. For that reason it should correspond exactly with the plan lines, which are also level lines.

For the cut of the lower end proceed in the same manner as for the top except that an angle corresponding to angle *f* should be worked from instead of angle *e,* and it will be necessary to work to the under side of the rafter instead of to its back as at the top so as to get both bevels on the same side of the rafter.

We will now take up the rafter as a brace from the gable rafter. This it seems to me is the better position of the two, as the sheathing will lie flat upon the back of this rafter, while when set as a hip the sheathing would bear only on the outside upper corner. Another thing in its favor is that the facia for this portion of the roof, which, by the way, should be cut to take the same position as the hood rafter, meets the gable facia squarely with their upper and lower edges even, thereby showing a better finish than in the other case. The rafter in this position has both its upper and lower edges in line with the upper and lower edges of the common rafters, therefore the point of this rafter will be square out from the point of the common rafter and its heel will be square out from the heel of the common rafter.

We will therefore begin by laying out a plan of the common rafter cut at the top, which would be represented by the lines 1, 2 and 3 of Fig. 5. Next, square out the line 5, making it equal to the distance from the common rafter to the point of hood rafter. Measure down the back of the common rafter 6 ft. 6 1/12 in., which represents the distance from the ridge board to the bottom of the hood rafter, and draw the diagonal line 4 to meet the ends of the lines 5 and 3, which gives the angle of the brace. Now draw the line 6 square out from the heel of the common rafter to the line 4, which gives a point square across from the heel of the hood rafter. Now square out from 7 from line 4 equal to the width of the hood rafter and we have its heel located. Connect this point with the end of the line 5 and we have the side cut at the top in 9. The lines 4 and 8 will represent the upper and lower edges of the hood rafter and the angle at the intersection of lines 4 and 9 is the angle at the point.

In practice I would take a short cut to the method shown in Fig. 5, which is illustrated in Fig. 6. I would simply go to the center of the piece from which the rafter is to be cut and lay out the plumb cut of the common rafter represented by the two straight lines and the diagonal 1. Square across from one end of this line to the other side of the rafter and place the square as indicated by the dotted lines with the point on the blade representing the distance from the ridge to the bottom of the hood rafter along the common rafter—6 ft. 5 1/12 in.—to what would be the heel of the common rafter cut and point on the tongue representing the distance along the ridge from the common rafter to the upper end of the hood rafter—4 ft. —on the same edge of piece as at *b*. Then the distance from *a* to *c* in Fig. 6—where the blade intersects the line squared across—will be equal to the distance from *a* to *c* in Fig. 5. It will be seen that this distance measured back from the point of the rafter locates a point square across from the heel of the rafter—therefore, we square across from this point—*a* of Fig. 5—and draw the diagonal—9 in Fig. 5—for the cut. This is also shown in Fig. 6.

Now, if we could turn this barn over so as to rest upon its opposite gable end the ridge would stand upright as a studding, the common rafter would lie flat as a plate and the hood rafter would take the position of a hip with its width for the back, its thickness for its depth, its run equal to the distance from its lower end to the ridge, its rise equal to the projection of the ridge and the pitch of the roof as given would be equal to the angle of the plan. It will therefore be seen that the cuts may be obtained by either method for the rafter to set in either position.

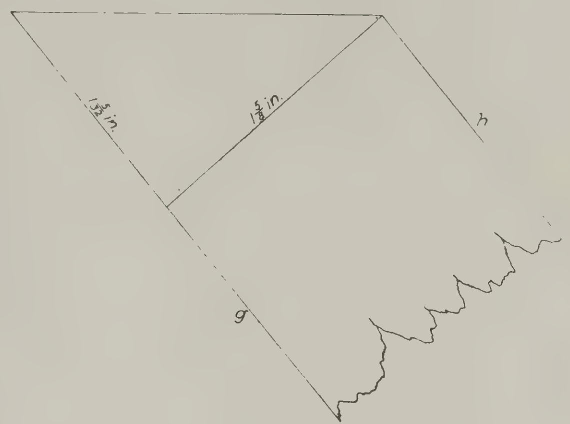


Fig. 3.—One Method of Cutting the Rafter

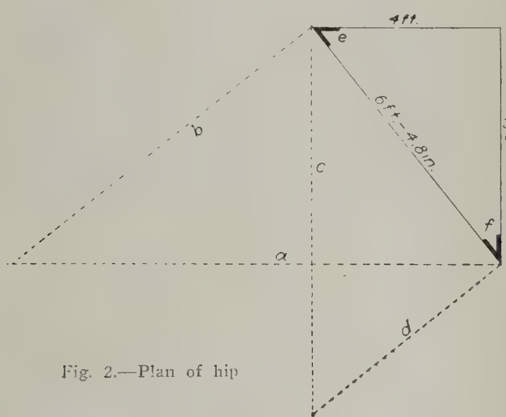


Fig. 2.—Plan of hip

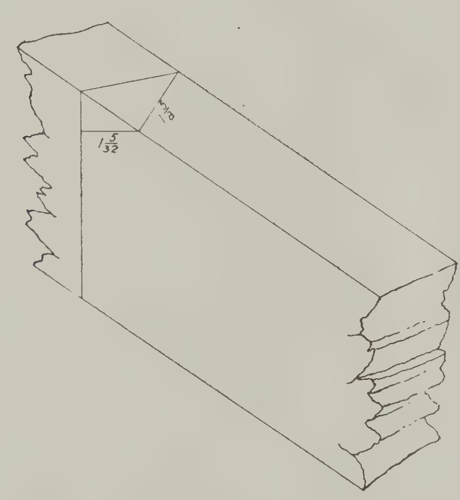


Fig. 4—The Cut on the Rafter

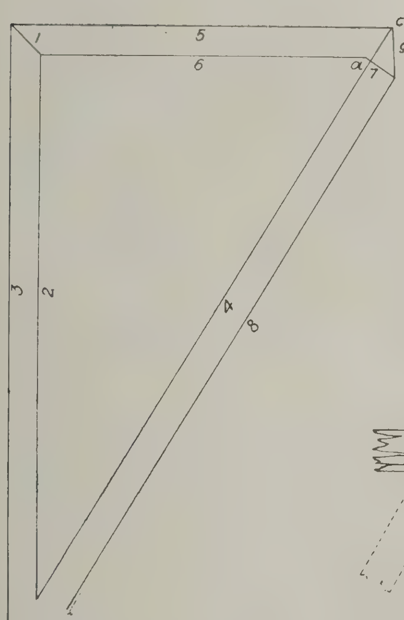


Fig. 5.—Plan of Common Rafter Cut at the Top

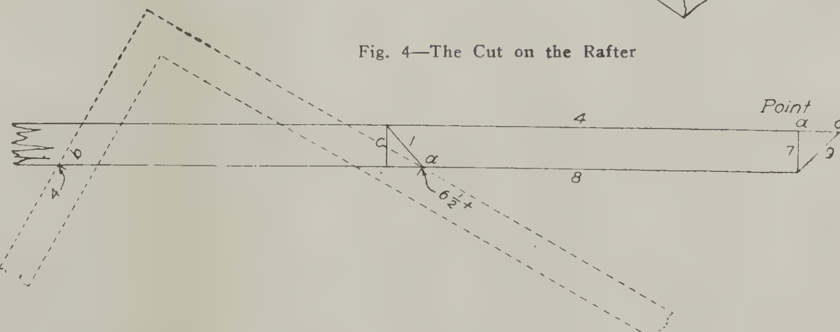


Fig. 6—A Short Method for Getting the Cut

Obtaining Bevels in Roof Framing—Sketches Accompanying Letter of "H. R. F.," Mildred, Kan

Making Scroll Inlaid Work of Veneers

From J. H. P., Penn Yan, N. Y.—Will some reader who has had experience along the line indicated tell me where I can obtain or how to make the composition or wax used to fill the space made by the saw in making scroll inlaid or marquetry work of veneers? The composition is of a greenish color and if any one can tell me the ingredients I shall take it as a favor.

Methods of Making Compo or Plaster Boards

From W. G., Brooklyn, N. Y.—Noticing the query from "J. G.," Wanganui, New Zealand, which appeared under the above heading in a recent issue of the paper and not having seen any reply thereto I should be very glad to help him out of his difficulty, as I have had some little experience in this class of work, were he a little more explicit as to his needs, for compo boards and plaster boards are very different composition. However, assuming that it is a plaster board he requires I would state that a very good and strong board and one requiring no machinery whatever can be made in the following manner:

First of all make a strong bench and if a finished or smooth face board is required it is best to have a smooth faced bench so that the board may be cast face down. This bench can be provided by nailing rods around the edge and a little above the face of it and filling in flush with gauged plaster, then rule it off level, smoothing it with a joint rule or plastering trowel.

This plaster face should be given two coats of shellac to prevent the boards from sticking. It will also be necessary to oil this mold before pouring in the plaster for the boards, otherwise it will stick and pull the face of the bench.

As "J. G." does not state what size board he wants I will assume they are to be fixed to ceiling joist or wall studs placed 16 in. on centers. A good board then would be 16 x 32 in. which would reach two or three joists or studs, whichever way they are fixed.

To make a board ½ in. thick, nail two plaster cornice rods, which are generally ½ x 2 in., on the bench parallel and 16 in. apart. Then nail two short rods between these and 32 in. apart and square with the others. This will give a mold 32 x 16 x ½ in.

Now take a piece of burlap about 40 x 24 in. and two pieces of common plaster lath 31 in. long, also three pieces about 13¾ in. long to fit easily between the others at right angles—two at the ends and one in the center.

Having got these things ready and oiled the bench and rods to prevent the plaster from sticking, gauge the plaster in a tin pail and pour in sufficient to cover the mold about ⅛ of an inch. Spread this evenly and on it lay the burlap, allowing about 4 in. to overlap the edges on each of the four sides. Press the burlap well and evenly down into the plaster and well against the side and end rods. Now take the two long plaster laths and brush them well all over with the plaster; place them on the burlap and tight against the rods on the long sides. Repeat this operation with the two short ones and place the other short lath in the center. Now turn over the edges of the burlap all around the mold and brush it well into the plaster laths and back of the burlap. Brush an extra narrow piece of burlap over the center lath. Now fill in the whole of the mold with the rest of the plaster and rule it off straight with a piece of cornice rod. As this top face will be the back of the board when it is fixed, it is not necessary to make it smooth.

All this work will have to be done very quickly and before the plaster commences to set or a bad board will result. If the operator finds that the plaster sets before he can make his board he had better use a little glue size to keep the plaster from setting. Doubtless after a little experience he will be able to take out two or even three boards in a gauging by making his mold so much longer and using dividing rods.

To fix the boards it is best to use galvanized nails about 1½ in. long with ½-in. heads, using six or eight nails to each board. Drive the nails well into the board so that they can be stopped or pointed flush with the finished face of the board. It is also best in fixing to leave the boards from ¼ in. to ½ in. apart and to fill in the joints with pure gauged plaster, finishing off the face with the plastering trowel.

This will leave a very strong and smooth surface that can be painted or papered without any other coating of plaster. If, however, it is intended that the boards should have a coat of brown mortar and hard finished it is not necessary to have a smooth face, but it is advisable to place an extra sheet of burlap near the top of the board in casting, as it will require stronger board to carry the brown mortar. It would also be well to score the face so as to give the desired key for the brown mortar. In any case when fixing the boards they must be left from ¼ in. to ½ in. apart at all joints and well filled in with gauged plaster squeezing it well into the joints and allowing it to lap over on to the back of the boards.

It is false economy to fill in the joints with gauged brown or white mortar, as this gives a very weak joint and one that easily breaks on laying on a brown mortar or the finishing coat.

If "J. G." follows the above instructions he will have an extremely strong board and a good although somewhat expensive substitute for ordinary plastering. A much cheaper board can be made by filling the back of the board in casting with very fine clean ashes and plaster, or sawdust and plaster, but these backings are not nearly so strong as the pure plaster, although often used for ordinary purposes.

Comments on Winding Stair Rails

From I. S. C., Tarrytown, N. Y.—As "Stairbuilding" is my middle name I feel as though I would like to take a hand in the controversy now going on in *Building Age* in regard to Winding Stair Rails. As I have had occasion in the last thirty-five years to get out a few hundred, more or less, I feel as though I would like to "speak right out in meeting" on the subject, as well as on other items of interest in your valuable paper, of which I possess all the copies published.

As to the articles of "Triangulus," they are all right, as what he has said can be done in the way of projection, but as to their practical value to one in the business for a living the method is "N. G." Too much time and material are required to make it pay. Probably in the near future, with nothing better to do, we might take a try at it to see what can be done. I once upon a time, just for fun, worked out a P. M. rail over a half circle with winders, the rail falling to a level at the top, all in one piece, and I had it, as there was no money in it—just art.

Now here comes a man who should not try-and-angle-us ("Triangulus") from the straight and narrow path of the tangent systems, for I find they are all right for all practical purposes. It all lays with the party planning the stairs and getting out the pattern; also a good workman to manipulate them.

"Triangulus" claims that with the tangent method the patterns do not give wood enough. That depends on the one getting them out. The tangent is one thing and the pattern another; also the method used.

I wonder how "Triangulus" would go to work to get out a rail 2¼ x 3½ P. M. and only had a 3-in. plank from which to cut it? How many know the trick?

"Cymro" is all right and it was a shame that the printing flattened the nice blank he showed on the edge of the plank in Fig. 10. It seems to be human nature to rap one another even when we know what was intended, as in the case of "Cymro." By the way, Fig. 10 seems to be a "hoodoo" in the different cuts presented. "Triangulus" has one showing the hump in a stone hand rail. I cannot just agree with him that the hump was altogether the fault of the mechanic who did the work. He did the best that could be done with the proposition. The fault lies in planning the stairs, as the hump is in the stairs as well as the rail. Fig. 9 is another proposition altogether—just two rakes and levels; they had to look well, as they generally do.

I am surprised at C. C. Grant that he finds so many lines in the tangent method. It takes about 75 lines to develop the "Triangulus" blank. I will agree to produce one by tangents with 25 lines or less. I do not quite agree with "Cymro" myself in his reply to C. C. Grant. He says among other things that the bevel takes care of the joints. I always thought it was the pattern and a try square; the bevel for twisting and direction, as that butt joint is made before any bevel is applied.

Now a remark or two about Morris Williams' answer to "Tangent" as per his elevation Fig. 2 in the September issue of the *Building Age*. In his Figs. 4 and 6 he does not meet the conditions of Fig. 2, elevation of stairs furnished by "Tangent' from floor to top of rail at scroll by 1 in.

Now in his Figs. 9 and 10 he is going to improve things. Let us see if he does so. His floor plan looks dandy, but his sixth step is too narrow for three balusters and too wide for two. The ends 2, 3, 4 and 5 are too narrow for two balusters, too wide for one. Now Fig. 10; if "Tangent" gets that rail out in accordance with the elevation, it will be 2½ in. too high at scroll, and what is to be done at the angle *S* on the elevation? Are we to use a little "Triangulusism" or Secor's Nonpareil system? A word to the wise, etc.

From Cymro.—I wish to make a few remarks upon "Triangulus'" reply to me in the last issue. I realize that the value of the present controversy depends chiefly upon proving the geometrical correctness of the tangent system of handrailing; and that because, as I have said before, it is the only system at present in use all over the world. If incorrect what a poor lot of mechanics handrailers must be; and how are we to account for the existence of winding handrails of the most complex geometrical type that have been constructed by its use? This fact alone should be a satisfactory proof of its unrivaled merit and of its being also a system based of necessity upon purely geometrical principles.

Regarding the thickness of plank required for a wreath "Triangulus" says that my method of finding it, as shown in my Figs. 5 and 10 in the July issue, can "by no means be true" and that it requires more thickness. Who is to decide whether he or I am correct on this point?

He bases his proof on the nature of the helical curve, and my proof is based on my own practical experience and that of others. This much at least is evident, that "Triangulus" with his theory *may* be mistaken, but that I and my co-workers in this craft cannot be mistaken, because we actually construct our rails out of planks the thickness of which had been determined by the method shown in my Figs. 5 and 10.

It seems to me that my method should be accepted as a self-evident truth, for what could be more plain than if the thickness of plank will be equivalent to the diagonal of a square inscribing the profile of a rail that will be throughout its winding in the center of the plank (as shown in Fig. 10); that a plank of such thickness is what is really required. "Triangulus" is at fault in saying that if the curve is more than a quadrant it will call for a thicker plank. What determines the thickness of plank is the pitch of the tangents, not the curve, because it is this pitch that regulates the bevels which determine the thickness of plank, as shown in Figs. 5 and 10.

"Triangulus" in admitting that the "projecting" exhibition of lines presented by him in the April and May issues was not "practical for actual construction" of winding rails and that his purpose was to "explain a principle rather than to advance a method" may be interpreted as equally admitting the tangent system to be something more than an impractical principle, even meriting the appellation of "a method." In his attempt to show errors in my diagrams presented in the July issue he inadvertently discloses an unaccountable lack of knowledge of the rudimental fundaments of the tangent system.

All practical students of handrailing are aware that the system is based on solutions of but few and simple geometrical problems, all of which are contained in the one simple problem of developing a plan curve and its tangents upon an inclined plane. "Triangulus" in commenting upon my Fig. 2 ignores this aspect of the problem as presented in the figure, and confines his comments to errors therein that no geometrician can fail to know are errors resulting from carelessness on the part of the engraver.

If the engraver had followed my explanation of the figure he would not have shown 6 risers from 4 to 4′ when my explanation said it should be 5, nor would he have drawn lines not parallel to d′-3′ if he had followed my explanation that the lines were to be parallel to d′-3′.

These lines being ordinates or level lines, "Triangulus" should know that they could not be but parallel, being as they are the development upon an oblique plane of the parallel plan ordinates 2-0 and 2-0, which are shown in the figure to be parallel to the plan ordinate d-3.

The method, Fig. 2, represents what is known as the "Jones" method. Mr. Jones was the head stairbuilder for Messrs. Heighs & Co., builders, Liverpool, England, for over 30 years. It is considered by stairbuilders to be one of the most simple methods and has to its credit the construction of thousands of the most complex wreath handrails both in England and this country.

In reference to the face mold "Triangulus" finds fault and condemns its geometrical correctness because he finds in my Fig. 7 "that it is narrower in the middle than at the ends" and that he "cannot see reason for this, for the plan plainly shows that the rail is of the same width throughout."

He ought to know that the rail and the face molds are two distinct things, the rail representing portions of concentric circles and the face mold portions of ellipses which cannot be concentric and therefore must be of different widths, and that there is no such thing as a correct parallel face mold.

The most glaring error in my illustrations according to "Triangulus" is shown in Fig. 10. He says: "In this drawing both ends of the wreath appear to be in the one and same plane; that is, on the same edge of the plank, etc."

It puzzles me to understand in what light this comment of "Triangulus" may be considered to have a bearing on the geometrical correctness of the tangent system. Fig. 10 is merely an illustrative figure meant to show how to apply the bevels to the plank, and the appearance of the wreath after being twisted, first in its horizontal position and second in its inclined position. In its first position it appears as it would lying on the bench and in its second position as it would in its pitched position winding above its plan.

"Triangulus" overlooks the fact that my purpose in this figure is to show the twist resulting from the application of the bevels, and that it could not be shown as clearly if I had represented the wreath "lying in planes at right angles to one another" which I would have done if I wanted to show the top face of the wreath and not its sides twisted.

Roof Trusses for Mechanics' Hall

From A. W. A. Eden, East Orange, N. J.—In further reference to the roof truss detail shown in the

June number with letter from the correspondent signing himself "X. X. X.," together with the elaborate reply from P. T. Lesher in the August number, I venture a few remarks. No unit stresses are mentioned, but if we use those from the building code recommended by the National Board of Fire Underwriters, which units are used in New York and several other large cities, we have the following in pounds, per square inch:

Compression $15{,}200 - 58\frac{l}{r}$; tension 16,000.

Shop rivets in shear, 10,000.

Shop rivets in bearing, 20,000.

Field rivets, 80 per cent. of values for shop rivets.

For trusses of short span with light loads ⅝-in. rivets are entirely satisfactory. A thickness of ¼ in. is sufficient to develop the value of a rivet in single shear, but it is usually a mistake to specify a uniform thickness for all gusset plates since it will probably be more economical to use thicker plates with fewer rivets at the shoes and peak, and perhaps at the bottom chord splice.

The writer would use no angle smaller than 2 x 2 x ¼ in. Two such angles with one hole out of each for ⅝-in. rivets will take 24,000 lb. in tension and as a strut 5 ft. long will take 17,800 lb. Two angles 2½ x 2 x ¼ in. with one hole out of each will take 27,800 lb. in tension. The top chord or rafter made of two angles 5 x 3 x 5/16 in. (5-in. legs together) will take 53,800 lb. as a strut 7 ft. long between supports. Though bending between panel points—due to intermediate purlins—must be considered in addition to direct compression, the angles called for appear to be stronger than necessary.

Care must be taken in all tension numbers having rivets in both legs to have ample stagger so that the full net area required may be maintained.

The 2 x 1½ x 3/16-in. angles used by "X. X. X." are not only objectionable in regard to thickness, but being "special" size could not be readily obtained in small structural shops. It is always best to avoid as far as possible the use of material listed in the handbooks as "special."

Creosote Stain vs. Paint for a Frame Building

From D. P. B., Redford, N. Y.—Referring to the inquiry of "Down South" in the August issue I will state that I have used a great deal of creosote stain. It is not a good coverer nor a very good laster. It is creosote so-called, but there is no creosote, chemically speaking, in it. Creosote paint will give better results, but it cannot be covered later by oil paints.

Old gold or French crown green will make suitable trimming for brown. White is a poor trim for any color. Two coats is seldom enough for a new building.

Woods for Pattern Making

From W. D. Mershon, New York City.—In the September issue of the *Building Age* I note with interest the article appearing under the above title and I would say that if the investigation mentioned was made by the Hardwood Record, as stated, they might have gone further into the California products and looked into the merits of redwood. It is safe to say that 75 per cent. of the trade we used to have for white pine pattern lumber are now using redwood. The Humboldt redwood is most desirable, and if thoroughly nature-cured (air-dried) it "stays put." Redwood is entirely free of pitch and there is no difficulty in obtaining large quantities of it entirely free of sap. It has been used by pattern makers on the Pacific Coast for something like 50 years, and is easily worked.

Black Ants as Wood Destroyers

From D. P. B., Redford, N. Y.—I would say to "T. M., of Colonial Beach, Va., whose letter appeared in the April issue of the paper, that kerosene or gasoline will quickly destroy his black ants if he can get it into their cells. Asphalt or tar paints will keep them away, as will also creosote paint or hot oils.

Disappearing Beds for Sleeping Porch

From F. G., Lawrence, Kansas.—As a subscriber to the *Building Age* I would like to ask some of the readers for a working description of disappearing beds for use on a sleeping porch. I have a porch with three such beds to build and would thank any of the readers of the Correspondence columns for any information they may be able to give me in regard to this matter.

Constructing a Canvas Roof

From C. C. H., Brookville, Pa.—I am in need of a little information and therefore come to the Correspondence Columns for aid. I have the job of remodeling a large dwelling and one of the main things to be done is to construct a new roof. I want to make a gambrel roof so as to provide a third floor, of which there is none at present, and on this floor will be a den 14 x 36 ft. in size.

A large portion of the roof is to be made into a roof garden and the floor of it will be canvas, something like the deck of a boat. I would like some of the readers who have had experience in this kind of a roof to give their ideas through the columns of the paper as to how the work should be done. Possibly some of the architectural readers can furnish this information.

I would like to know what kind of canvas to use and how many layers or thicknesses to put on; what kind of paint or pitch; how much fall should be given to the foot and in general how the work should be executed in order to make a good job.

If such a roof has been described in previous issues of the *Building Age* or *Carpentry and Building* I would be glad to have the editor point it out so that I may look it up. The roof garden will have a pipe frame with canvas rolls for covering. I hope that some of the readers who have had similar jobs will tell me how they did the work.

Note.—In the issue of *Carpentry and Building* for June, 1907, on page 212, there are letters from several correspondents telling how to cover a porch roof with canvas and it is possible that "C. C. H." may obtain some ideas from these that will serve his purpose.

Best Method for Sheathing a Frame House

From E. E. H., West Hartford, Conn.—In answer to the correspondent "J. C. B.," Dowagiac, Mich., relative to various methods of sheathing a balloon frame building, I would say that most of the side sheathing in this section is put on diagonally and cut on the studding. Most of the frame buildings have the lining floors laid diagonally and cut on the joist.

With regard to the outside covering, it is always well to start at different angles at the corner of the building, as this tends to act as a brace. It always depends on the architect or the builder which way the sheathing is specified.

The old four-panel door is being extensively replaced with the five and six cross-panel door, and it improves the appearance of the door without adding materially to the cost.

The Architect, the Owner and the Builder*

Important That the Architect Should Be a Practical Man — Some Problems Which Confront the Builder

THE architect is the man of artistic temperament and ability who should design all buildings from utilitarian, architectural and practical standpoints consistent with good construction and within the means of his client. Perfection in the architectural profession is only attained when an architect combines theory and practical knowledge—neither of which, when possessed alone, will make an architect.

Theory will enable one to design and plan artistically but only when combined with practical knowledge will the architect be able to know his profession. Any student from our useful polytechnic schools or colleges can design, but without practical knowledge he cannot write an intelligent specification—the instrument most important to the builder in carrying out the desires of the owner and architect, nor will his plans and details be drawn in a practical manner.

The practice of architecture is therefore an important profession; too often engaged in by irresponsible persons who have neither ability, education nor the knowledge which is required and who often endanger the lives of those erecting buildings or of the occupants after completion. This is the day of either municipal or government control and it would seem proper that before one could engage in this important profession that he should be examined and licensed just as those who engage in other professions and businesses are required to do in many states and cities. Especially for the architect and builder is this necessary—not for a superficial examination, but a thorough and practical test of ability in theory and practical knowledge.

Too often owners seek undeveloped architects in shape of draftsman with little experience to do some very important designing, just because he will undertake the work cheaper than the architect who has paid dearly for his education and whose fee is regulated by the American Institute of Architects.

In the village especially we find builders combining architecture with their business. This accounts for the large number of gable roofs and plain exteriors seen in the country. It cost no more to have an architect design something artistic than an unsightly building designed and erected by a builder with few ideas of architecture and who does not possess the finer sense of the artistic which is a necessary qualification of one who designs. The builder should stick to his business and leave designing to those who have trained for the work.

The architect must be a man of character, clean and upright in his dealings, and free from graft and unprofessionl practices—a man of good business ability and well versed in his profession. He must interpret his plans and specifications in an intelligent manner and not call to his aid, when he has omitted something in his plans and specifications, the following clause which is often interpreted to cover a multitude of sins of omission: "Anything shown on plans and not mentioned in specifications, or visa versa, *or is usual and necessary,* must be provided the same as if shown, implied or called for in both plans and specifications." This is a very pernicious clause and sometimes unreasonably overworked in defective plans and specifications.

The broad minded architect will in cases of omission, either intentional or through negligence, ask the contractor for an estimate on the omission, check the cost himself and submit it to the owner with the statement that "had this item been in the specification originally, the contractors bid would have been just this amount higher, therefore it is due him and I recommend an extra order be given"—and generally it will be agreed upon. To exact the above mentioned clause in such cases as being usual and necessary is unreasonable. Extra work, however, is generally unsatisfactory to the builder and most builders prefer to work from plans and specifications which require no extras, for unless agreed upon and signed by architect and owner and builder in advance of performing the work usully lead to controversy and unpleasantness on final settlement.

The Owner

The owner who pays the bills for building operations has some serious duties to perform for himself, the architect, the builder and the public. No owner should commission an architect to prepare sketches for him unless he expects to pay for them and agrees upon the price before the work is undertaken.

After the plans and specifications have been settled upon the next step is the selection of the builders who will be asked to submit bids. This duty is an important one and the owner must be guided by the architect's knowledge of the ability of the various builders to do the work satisfactorily. Too often incompetent men with no financial standing are pitted in competition against reputable builders. Therefore the architect and owner should select builders of known reputation whose work compares favorably with one another, any one of whose bid should be accepted if low.

The Builder

It is unfortunate, but true, that the building business has many exasperating and harrassing features. No one knows the worry and annoyances connected with the business, unless actually engaged in the work. Many anxious and sleepless nights come to these men by reason of the damage often caused by thoughtless and careless workmen leaving windows open for rain to damage plaster and woodwork; the trouble with labor, its strikes and often unreasonable demands; the dilatory methods of some sub-contractors; the unwarrantable demands of some architects as well as those of municipal inspection; mistakes in architect's plans and specifications; arranging finances to pay labor, subcontractors and material bills, and the thousand and one details which demand his attention.

Few persons realize the great amount of time consumed and the labor and expense to which builders are subjected in submitting estimates on large buildings. When plans and specifications are sent to a builder, some one is delegated to read through the specifications and carefully examine the plans and make

*By Henry B. Davis, Washington, D. C.

up an estimate sheet of all items which his estimate must include, as well as a call sheet of sub-contractors from whom estimates are desired. Then the estimator gets down to business and first takes off quantities relating to excavating, grading, sodding, etc., concrete foundations, concrete surface, reinforced concrete, brick and stone work, fireproofing material, which includes terra cotta floor, partition, column covering, beam protection, and so on, through the various items specified. These quantities are then figured by one clerk and checked by another to be sure that no mistakes exist. All this work is not done by every contractor, but a wise man will do it as a check on his sub-contractors. On a certain item a very high or very low bid may be received and there may be doubt as to using either bid, but by having your own figures you have a clue as to which bid is correct. Then again sub-bidders only submit their bids at the last minute, and there is not time to get in communication with them and to check their figures. Architects make a great mistake in having bids open at noon instead of four or five o'clock, as builders must give up the entire morning to comparing, checking up and listing sub-bids and see that their figures cover everything in the specification and plans. When bids are opened at noon sufficient time is not given.

Estimating is a Great Gamble

Estimating is a great gamble in many respects because a builder must depend on the accuracy of his clerks and sub-bidders. Unless each sub-bidder reads the specifications and examines the plans carefully he may fail to estimate on some item mentioned in the specifications under some other head than where he usually expects to find it, or an item may be shown on plans and omitted from specifications which may seriously affect his bid. The sub-contractor may even decline to proceed with the work when notified that his proposal is accepted, thus necessitating the general contractor to use the next lower figure, which means so much of the contractor's profit has decreased.

The average builder knows each other's work and methods better than any one else and does not object to figuring against reliable competitors, for then it is skill against skill, and while time and expense are involved in making an estimate, it creates a rivalry in business which stimulates a man to keener activity, should he lose.

Favoritism Often Shown

Some architects who are interested in builders in some mysterious way always have them figure on plans from their offices and they try to throw the work into their hands, even revealing bids received from other bidders, changing the drawings and specifications or interpreting them to favor their builder. This is a reprehensible practice and is neither honest nor professional. Some builders adopt the same practice toward favored sub-contractors, which is the reason sub-contractors refuse to send in their bids until the very last moments, much to the disadvantage of the honest contractor. It does not take long for sub-contractors to know to whom they can safely submit their bid so that it will not be given out in advance of opening the general contractor's bid. There are some builders who submit estimates without the usual builder's commission added to their estimate, or pay architects for giving them work and require the sub-contractor to cut a certain percentage from his estimate before the contract is awarded him, to cover the contractor's percentage.

The sub-contractor is then in a dangerous position, for if the contractor, architect, superintendent or inspector requires him to change his work serious inroads are made on his estimated cost of labor, material and profit, and unless he guards against such contingencies, or is so foolish as to share his profits with his contractors, it will not be long before he will be declared a bankrupt. All of these schemes are graft pure and simple and they lower the moral standing, create underhand dealings, place the giver and receiver of such so-called favors in each other's power and are corruptible practices. No man who values his business reputation will so smear his honor as to indulge in such thievery, for it can be called nothing else, and the man who is robbed is the owner.

Men do not have to be Christians to be honorable and upright in business or in all their dealings. It is just as easy to be fair and honorable as it is to be a grafter. All that is needed is to remember the early teachings which our good mother tried to install in our young minds, and if the conscience is kept tender we will be honorable in our business relations, whether a Christian or not. It is up to some architects and builders to mend their ways, for trickery is soon found out and is justly condemned by those who believe in fair practices and who keep in the narrow but righteous path in business dealing.

Year Book of the New York Society of Architects

The Publishing Committee of the New York Society of Architects and of which William T. Towner is secretary, has just issued the 1912 Year Book of that organization which is intended to be an authoritative handbook for the members of the architectural profession, containing as it does much valuable information that is required in the daily routine of an architect's office. It is a volume of something over 300 pages, bound in flexible covers and printed in a size of type which is easily legible. During the past year many of the laws relating to building have been amended by the New York State Legislature and these are reprinted in the 1912 Year Book in the amended form. The state labor law, which has been amended, and the sections relating to buildings are published in full. The law relating to plastering in cities of the first class and which went into effect on the first of January of the current year is also given. An electric code adopted by the Department of Water Supply, Gas and Electricity, and which contains over 200 pages, is reviewed in the Year Book and the new garage regulations adopted by the Municipal Explosives Commission of the city are published in full. The Tenement House Law which is published includes the amendments up to April, 1912. A digest with marginal index notes has been added and so arranged as to assist the architect in quickly finding the correlated parts of the law. Other features are the law relating to architects and their practice; Uniform Contracts of the American Institute of Architects; a checking list for writing specifications; the ethics of architectural competitions of the American Institute of Architects; the regulations of the various Borough Departments of the city; the "Business Man's Law" relating to the practice of architects; lists of officers and offices of the state, city, and borough governments; a list of architects practicing in New York which has been compiled by a systematic canvass, and a list of the societies which have a special interest for the architect. There are also many useful tables which have been arranged for quick reference and with a view to avoiding tedious computations. While the book has been arranged for the use of members of the architectural profession any one not a member can secure copies at $5 each from the secretary, 320 Fifth Avenue, New York City.

Constructing a Home-made Icebox or Refrigerator

Some Details of Interest to the Carpenter Who Is Clever in the Use of His Tools

AMONG the many problems which confront the carpenter in following his chosen calling and the solution of which often entails interesting details is that of providing means for the proper preservation of food in hot and sultry weather. For the household in country and suburban localities the solution of this problem often taxes his ability and intelligence. To be of assistance to those mechanics who may perchance be called upon to solve such a problem a valued correspondent submits to the readers of the *Building Age* for their criticism and information the following particulars.

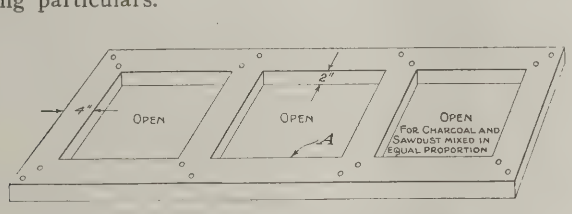


Fig. 3—Base of the Ice Box Shown in Perspective

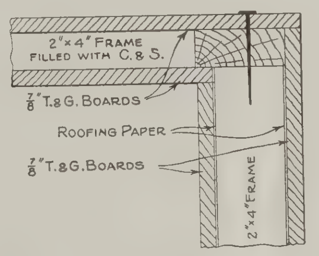
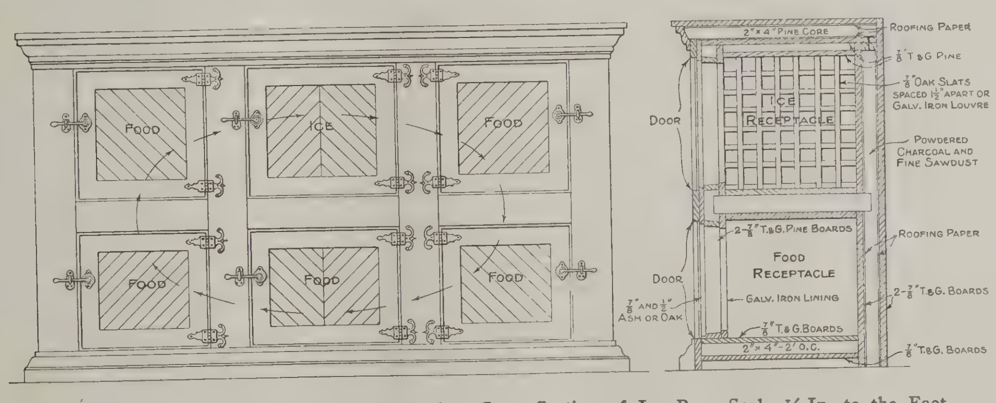


Fig. 4—Detail Showing Construction at Corners



Figs. 1 and 2—Front Elevation and Vertical Cross Section of Ice Box—Scale ½-In. to the Foot

Constructing a Home-Made Ice Box or Refrigerator

The owner of a house in the country or rather suburbs required an ice box or refrigerator to hold a quantity of food stuffs sufficient to last say two or three weeks, or possibly a month, and had in the house a vacant space for one of the dimensions of 6 ft. in length, 2 ft. in width and of a hight to fit under a shelf 4 ft. 8 in. from the floor. With these sizes and *carte blanche* to build the box and submit his bill the carpenter completed his task as follows:

First of all he made working drawings to a scale of 1½ in. to the foot showing a front elevation and cross section of the box as in Figs. 1 and 2 of the illustrations which he submitted to his customer and which on receiving the order to go ahead and do the work he proceeded to carry out the details as shown in connection with the sketches submitted herewith.

Primarily the box consisted of eight sections, namely, the bottom, top, right and left ends, front, back and two separating partitions. The bottom or base was built up of four 2 x 4-in. planed joists or scantlings placed on edge and 2 ft. on centers, the outer ones being each ⅞ in. back to allow for ⅞-in. tongued and grooved pine boards necessary to enclose the frames of the ends. On top of these a flooring of similar boards was laid to a close clean joint. On top of this in turn a 2 x 4-in. frame was constructed by halving together and securing by screws. This was placed on a sheet of thick roofing paper equal to it in area and nailed to the floor underneath.

The openings or spaces shown in Fig. 3 were then filled in with a mixture of powdered charcoal and clean fine pine sawdust thoroughly mixed and rammed to a solid mass. This was again covered with stretched roofing paper and on top of this again another layer of tongued and grooved pine boards was placed, the boards being kept back all around ⅞ of an inch from the edges of the 2 x 4-in. frame so as to form a rabbet to assist in excluding the warm air.

Similar 2 x 4-in. pine frames were put together to form the right and left ends and the two separating partitions as indicated in the front elevation, Fig. 1, the hight being 4 ft. All these frames were halved and screwed together in a workmanlike manner.

The back and front frames were next made of the same material and similarly constructed with the exception that the front frame had its edges as at "A" in Fig. 3 beveled ⅜ in. to the face to receive the doors represented on the front elevation, Fig. 1.

The back and two ends were as before papered, filled in with charcoal and sawdust and sheathed with tongued and grooved pine boards thoroughly nailed, the joints running horizontally.

The top or cover was likewise built up in the same manner, all corners and joints overlapping as shown in the detail, Fig. 4.

All were put together temporarily with 4-in. wire spikes and permanently with 6-in. lag screws, the joints fitting to a nicety, being done straight, true and square in the carpenter's best manner.

Constructing the Frames

In constructing the details first a frame of 2 x 4-in. material was made and covered with paper, then filled in as already described. The frames were the same with the exception that the edges were beveled ⅜ in. to fit to a close joint. The exterior sheathing of the doors was nailed on horizontally and the interior vertically. Narrow hardwood strips were next nailed on each individual section to close all corners air-tight on the interior and in such a manner that the bottom, top, right and left ends and the two separating inside partitions would each come apart from its adjoining fellow and be detachable, thus rendering the whole box portable and movable.

The central top ice chamber was floored on the bottom and arranged to serve as a drip pan for the accumulating water from the melting ice, sloping to the back at a pitch of 1 in. and drained by a 1-in. galvanized iron pipe passing vertically through the bottom and the floor underneath and discharging into a sink in the cellar. It was provided with a proper seal trap and vent pipe. The entire interior was finally lined with galvanized iron soldered and overlapped.

The Air Circulation

Concerning the air circulation it is to be said that the arrows shown on the front elevation, Fig. 1, illustrate its course. The air enters from holes cut in the back of the ice receptacle or chamber above the half cake, becomes chilled and passes right and left through apertures down into the food chambers, thus maintaining a temperature sufficiently low to prevent the heated outer air injuring the contents of the box.

The holes are covered with gauze and wire netting to exclude all dust and atoms likely to be deleterious.

Finally it may be stated that the mixture of charcoal and sawdust is preferable to shavings for core filling owing to the fact that the charcoal chills, purifies and rarifies the air and is not so full of voids as shavings. It is clean and absorbs moisture so that if the above described methods be followed by any carpenter even for an ice box for a small cottage it is fairly safe to conclude that a satisfactory ice box will be the result of the labor expended and materials used.

A Wise Precaution

It would be a wise precaution, however, to test the working of the box practically by purchasing some ice, placing it in the receptacle and then putting a bowl or cup of warm water in the food section so as to ascertain if the temperature is sufficiently low in the several food chambers. A thermometer left in there for an hour will tell the success or failure of the operation.

It must be remembered, however, that the quality of ice varies and often a box excellent structurally is blamed for the fault of defective ice. Much artificial ice being nothing more or less than frozen snow does not distribute much cold, as it is only partially congealed. Good dense river ice is best if it is obtainable. Artificial ice, however, will do fairly well if sufficient quantity be kept in the receptacle and the doors are kept closed when the box is not being used.

To trim out the box may be paneled ash or oak with ⅞ x 4-in. planted stiles and ⅜ x 2-in. tongued, grooved and beaded ceiling laid diagonally and reversed.

An Unusually Attractive Reinforced Concrete Building

In these days when reinforced concrete construction is coming so rapidly to the front there are many readers of this journal who will be interested in features connected with buildings of this character which are decidedly out of the ordinary and which afford suggestions that can in part at least be utilized in the execution of smaller work. The example which we have in mind is a warehouse four stories and basement in height and covering an area 180 x 56 ft. It has a projecting tower on the front enclosing stairs.

The floors of the building were designed to carry a live load of 150 lb. per square foot. The column spacing is 20 by 18 ft., and the height of stories is 14 ft. It is interesting to note in this connection that although the floors were designed for 150 lb. live load they were only slightly damaged by the accidental falling of a 4000-lb. weight. On the second floor was located a baling press with plunger running through the third floor and counterbalanced by a 4000-lb. weight made up of pieces of cast iron. The weight was suspended from the fourth floor by a through belt with hook and pulley attached. The rope parted and the 4000-lb. weight fell to the floor through a distance of 8½ feet. The only damage done to the concrete was a flaking of a space of about 20 in. in diameter on the under side of the floor.

The building was erected by the New England Concrete Construction Co., Boston, Mass., and the methods employed by them in handling the materials and concrete are of unusual interest. The aggregates for the concrete were handled mechanically from the time they left the railroad cars until they were dumped into the mixer. The concrete after being hoisted to a sufficient elevation was distributed through spouts to the various forms.

The practice of placing concrete by spouts instead of by carts or wheelbarrows, while not unusual, is still not common. Where the job is large enough it is a most economical way to handle concrete. On the work in question the amount of concrete used was approximately 3000 yards and the contractors report that they placed concrete rapidly and at a very low cost with the plant adopted.

The building was designed by Lockwood, Greene & Co., architects and engineers of Boston, Mass., who specified the use of brick curtain walls, which make an effective and pleasing contrast with the concrete. It was built for the New England Waste Company, Revere, Mass., and presents a convincing answer to the argument that reinforced concrete buildings are unsightly. To some its appearance is much more attractive than could possibly be obtained by the ordinary brick and timber construction.

Instruction in various branches of trade at the Vocation Schools for Boys in West 138th Street, New York City, has proven its value to such an extent that the Board of Superintendents is planning to extend the work, and new equipment will be added. Among the new features will be a class in cornice and sheet metal work, plaster modeling for terra cotta makers, and tile laying. Nearly 150 new applications for admittance to the school this fall have been received and the register for next term will contain nearly 650 names, which will establish a record.

Meeting of Secretaries of Builders Exchanges

Conference of Representatives of Thirty Organizations — Important Topics Discussed and the Results Achieved

AN International Conference of Secretaries of Builders Exchanges, the first meeting of its kind ever conducted, was held in Detroit, Mich., on September 10th, 11th and 12th. The convention was called by a committee consisting of James M. Carter of Buffalo, William H. Sayward of Boston, I. H. Scates of Baltimore, F. G. Boyd of St. Louis, W. G. Martin of Grand Rapids, Charles A. Bowen of Detroit, and Edward A. Roberts of Cleveland.

The object of the conference was to consider matters relating to the work of the secretaries in conducting the associations with which they are connected. The attendance was fully up to expectations—about thirty secretaries being present, representing as many active organizations of builders in the prosperous cities of the country.

A reception to the visitors was held during Tuesday in the rooms of the Builders & Traders Exchange of Detroit, located in the Penobscot Building. In order to provide a diversion, the delegates were taken to the ball game between the Detroit Club and the Athletics on Tuesday afternoon. A general reception to promote personal acquaintance was held at the Hotel Tuller in the evening.

Representatives Present

The following is a roster of those in attendance at the convention:

Denver Master Builders Exch.	Thos. Bate,	Secretary
Indianapolis Builders Exchange	J. H. Zinn,	“
Louisville Builders Exchange	J. M. Vollmer,	“
Baltimore Builders Exchange	I. H. Scates,	“
Boston Master Builders Assoc.	W. H. Sayward,	“
Lowell Builders Exchange	A. H. Weaver,	“
Grand Rapids Builders & Traders Exchange	W. G. Martin,	“
Duluth Builders Exchange	E. R. Cobb,	“
Minneapolis Builders & Traders Exchange	Eugene Young,	“
St. Paul Builders Exchange	A. V. Williams,	“
St. Louis Building Industries Association	F. G. Boyd,	“
Omaha Builders Exchange	Chas. A. Grigg,	“
Buffalo Builders Asso. Exch.	Jas. M. Carter,	“
Rochester Builders & Traders Exchange	J. Henry Fisk,	“
Cleveland Builders Exchange	E. A. Roberts,	“
Canton Builders Exchange	C. R. Kumpf,	“
Toledo Builders Exchange	W. J. Albrecht,	“
Youngstown Builders Exchange	G. H. Coller,	“
Portland Builders Exchange	L. F. Danforth,	“
Philadelphia Master Builders Exchange	Chas. E. Smith,	“
Pittsburg Mfgs. & Contrs. Club	Mr. Danforth,	“
Scranton Builders Exchange	A. I. Fowler,	“
Providence Builders & Traders Exchange	Geo. R. Ross,	“
Nashville Builders Exchange	T. H. Evans,	“
Winnipeg Builders Exchange	A. M. Rose,	“
Toronto Builders Exchange	T. L. Fraser,	“
London (Ont.) Builders Exch.	G. S. Gould,	“
Montreal Builders Exchange	R. L. Werry,	“
Dauphin Builders Exchange	W. J. Houston,	“

Workmen's Compensation Laws

The sessions of the convention were held in the Exchange Hall and the first assembly was called to order at nine o'clock on Wednesday morning. The conference elected Charles A. Bowen as chairman, and he presided during all the meetings. A discussion on "Workmen's Compensation Laws" was conducted by A. V. Williams, of St. Paul, who explained the results of an exhaustive investigation of this subject among the various states in which such laws have been passed. He favored the New Jersey Act as among the best of those adopted in twelve states whose laws he reviewed. He said that his reports indicated that 85 per cent. of the employers in New Jersey had accepted under the law. Secretary Carter, of the New York State Association of Builders Exchanges, reported that none of the contractors in his state were operating under the law and that a committee of ten were now considering how the interests of builders could be conserved in a proposed new law.

Mr. Bowen stated that a great deal of confusion had arisen relative to the Michigan law and that rates had been increased by liability companies from 20 per cent. to 400 per cent. since the law had been enacted.

Co-Operation Between Architects and Exchange

An address on "Co-Operation Between Architects and The Exchange" was delivered by Charles Elmer Smith, Secretary of the Master Builders Exchange of Philadelphia, Pa., who referred to the friendly relationship existing between the architects of his own city and the builders, especially on matters relating to building regulations. He read a letter from D. Knickerbocker Boyd, President of the Philadelphia Chapter American Institute of Architects, expressing a very cordial feeling toward the Exchange and its work.

Uniform Contracts

A general discussion on "Uniform Contracts" was led by T. L. Fraser, Secretary of the Builders Exchange of Toronto, who brought out the statement that over one hundred thousand copies of the contracts were sold last year. While the contract was not considered perfect, it was nevertheless regarded as a standard blank which could be adapted to general uses wtih good results. A discussion on the subject "Should the Administration of an Exchange be in the Hands of a Board of Directors or of the General Membership" was led by George S. Ross, secretary of the Builders & Traders Exchange of Providence, R. I. The speaker advocated administration by a board of directors for facility in the transaction of business with regular meetings of the membership to consider such matters as could not properly be handled by the smaller governing body.

A discussion on "Publications—What Letters, Bulletins, Magazines, Etc., Are Issued by Exchanges and What Is Their Value" was led by J. M. Vollmer, secretary of the Builders Exchange of Louisville, Ky. This discussion brought out the fact that a number of the exchanges are now issuing monthly bulletins as a means of stimulating interest in their affairs.

At the afternoon session on Wednesday an address was delivered by F. G. Boyd, secretary of the Building Industries Association of St. Louis, on "Exchange Exhibit Feature and Its Value." The general expression was that where exhibits were joined with desk room features, the success of such departments were much more certain than where exhibits alone were displayed in connection with Exchange headquarters.

The next discussion was on the subject "Reciprocity—What May Be Done to Encourage Members to Deal More with Each Other." This was led by Charles A. Grigg, secretary of the Builders Exchange of Omaha, Neb. Various suggestions were made by the speakers including the promotion of acquaintance, the issuing of trade lists, and the adoption of rules requiring an interchange of business. An address on "Exchange Credit Bureau and Its Value" was given by Eugene Young, secretary of the Builders & Traders Exchange of Minneapolis, Minn. Mr. Young explained the system in vogue in his Exchange whereby reports are furnished through a credit bureau divided into sections of allied lines among the material dealers.

More Correct Figuring

A general discussion on methods of securing "More Correct Figuring" was led by W. G. Martin, of the Builders & Traders Exchange of Grand Rapids, Mich. The employment of an estimator to take off quantities was suggested, but several secretaries reported that this method had not proven successful when tried by their own exchanges. It was recommended that Estimate Sheets calling particular attention to items usually omitted and the holding of meetings at which the cost of producing work may be explained by experts, were among the best methods used in this connection.

An address on "The Business Management of an Exchange" was made by Edward A. Roberts, secretary of the Builders Exchange of Cleveland, who advised that secretaries should pay strict heed to the financial problems of their exchanges and endeavor to solve these problems along business lines.

The Dinner

On Wednesday evening a dinner was given at the Griswold Hotel Cafe, at which I. H. Scates, secretary of the National Building Trades & Employers Association of Baltimore, delivered an address on "The National Association of Exchanges and Its Importance." Mr. Scates advocated very strongly the creation of a medium for united action by all the Exchanges of the country on matters of national legislation and other questions directly affecting the interests of the building industry in a national way. He explained the plan adopted at the recent convention in Washington to form a National Association and requested the secretaries to promote a favorable consideration of this plan in their own cities.

Contracts and Bonds

The opening session on Thursday called for an address on "Co-Contracts and Bonds—How the Contractors Profit by the Denver Idea," by Thomas Bate, secretary of the Master Builders Association of Denver. Mr. Bate explained that his association had worked out a scheme by which bonds were furnished to contractors by the association rather than by bonding companies, a small percentage being paid to a general treasury to cover the operation of this feature. He said that the scheme was working very satisfactorily and that the members themselves directly benefited from the profits they accrued from this co-operative method.

A discussion on "Legislation—What Can Be Done to Correct Defective Mechanics' Lien and Other Laws" was read by A. V. Williams, secretary of the Builders Exchange of St. Paul, Minn. It seemed to be the consensus of opinion that mechanic's lien laws in the various states were not favorable to contractors, but were beneficial to material dealers, the sentiment being that irresponsible contractors are kept in business through the law while the responsible contractors are discriminated against.

An address on "State Exchange Association Work and Its Importance" was given by James M. Carter, secretary of the New York State Association, who emphasized the work of that body on legislation at Albany. He said that in 1911 the legislative committee had examined sixty-five measures affecting the building industry and had opposed fifty-eight of these measures, only one of which became a law.

A general discussion on "The Entertainment Features of an Exchange" was conducted by L. F. Danforth, secretary of the Exchange at Portland, Ore. It was demonstrated in this discussion that nearly all the Exchanges depended largely upon entertainment featurs to promote activity and bring the members together. A fixed program was reported by a number of the Exchanges, including outings, smokers, clambakes and similar features.

The business meeting was brought to a close at noon on Thursday. Invitations to hold a similar conference next year were presented by representativs of Denver, Baltimore, Boston and several others. The entire matter, however, was left in the hands of the committee which issued the call for the conference of 1912.

The visitors were taken for an automobile ride about the city on Thursday afternoon through the courtesy of members of the Detroit Exchange, and in the evening a dinner was tendered them at one of the prominent cafes.

The Labor Problem

Following the dinner an address was delivered by William H. Sayward, secretary of the Master Builders Association of Boston, on the subject "The Ever Present Labor Problem."

In the course of his remarks he outlined present conditions existing in the industrial world, and the wrong premises on which some unions were based, and then gradually led up to his solution of the labor problem. His plan of operation, of the bringing together in one body of manual workmen and directing workmen for the purpose of settling matters of mutual concern, he pointed out as having been established in Massachusetts in three trades and the societies incorporated under the laws of the Commonwealth. Five years ago the first organization was set up, its title being "The Massachusetts Society of Brick and Stone Masons—Masters and Craftsmen," and three years ago a similar Society for the Carpenters trade was organized, and in February of this year a Society for Painters and Decorators.

He briefly outlined the form of the organization; its management and the method of fixing wages. Regarding this point he said, "There is full and free discussion by Masters and Craftsmen on this as on all questions, *but the actual fixing of the wage is left entirely to the vote of the Craftsmen.*

The theory of this measure is that under the entirely different conditions prevailing, where Masters and Craftsmen sit together in one general meeting with only actual workmen and actual masters present, an altogether different spirit prevails, and with the responsibility of fixing their own wage comes a positive conservativeness which is wholly admirable. It works well and the great bone of contention—the wage—is quickly and satisfactorily settled.

The cost of running the societies is wholly met by the Masters, who pay a half cent per hour for each hour worked by any journeyman in their employ.

Ventilation of Barns

Arrangement of the Ventilating Flues in Barn Walls of Frame, also of Concrete or Masonry

THE question of proper ventilation of a building is of vital importance, whether it be a dwelling house or a farm barn, for the object of ventilation is to bring fresh air into the building and remove from it the air that has been breathed and which contains the poisonous gases which are so detrimental to health. In the case of a farm barn, for example, the system of ventilation used should be one that accomplishes satisfactory results without making the building cold or causing cold drafts. There is usually plenty of fresh air in a barn that has open windows or wide cracks, but such a barn will be so cold that most of the feed a cow, for example, consumes will be taken up in furnishing bodily heat. Warmth is therefore necessary, but it must be warmth with pure air.

In the system of ventilation here illustrated there are two sets of flues used; one set admits the fresh air and the other set provides an outlet for the foul air. The system is such that it can be installed when the barn is built or it may be installed in barns after they have been constructed. In Figs. 1 and 2 of the illustrations there are shown two styles of intake flues—one for use in barns where the walls are of wood and the other for use in barns constructed of stone or concrete walls. In Fig. 1, which represents a vertical section through a frame wall, *A* is the outside opening and *B* the inside opening. In Fig. 2 is shown a vertical section through a concrete wall with the reference letters *A* and *B* referring to outside and inside openings of an air intake flue.

The flues should be located at least every 10 ft. along both sides of the barn. The outside openings are near the ground and the delivery openings inside the barn near the ceiling as clearly shown in both of the illustrations. In this way the fresh air that is brought into the barn mingles with the warm air near the ceiling and a large part of the chill is taken out of it before it sinks to a level near the floor. The openings of these flues through which the air is admitted to the barn are provided with shutters so that the amount of air admitted can be regulated. This regulation is very necessary in extremely cold weather or when a cold wind is blowing directly against the outside opening of the flues.

In barns with wooden walls these flues can be made by simply utilizing the spaces between the studding. The spaces that are to be used as intake flues should, however, be lined with heavy tar felt paper. In barns having walls of stone or concrete the flues may be made either of vitrified or of ordinary clay tile. The vitrified tile, however, are much more durable than the ordinary tile, which do not very well withstand the constant action of the air.

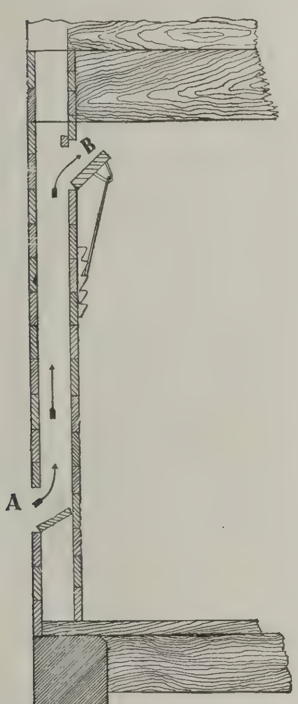


Fig. 1—Section Through Wall of a Frame Building

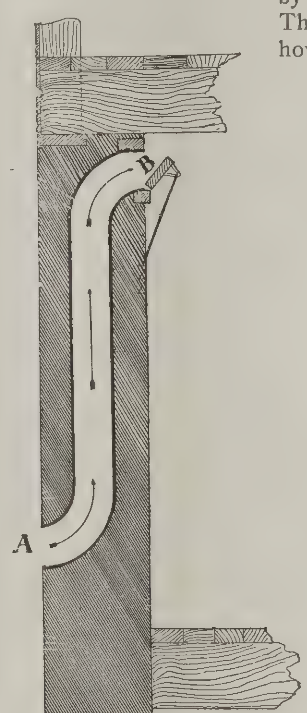


Fig. 2—Section Through Concrete Wall

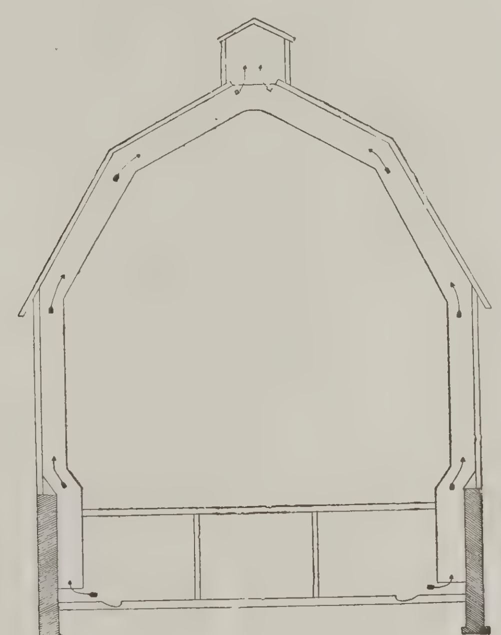


Fig. 3—Vertical Cross Section of Barn Showing Foul Air Flues

Ventilation of Barns

In Fig. 3 of the illustrations is presented a cross section of a barn showing how the foul air flues are installed. These are usually two in number, one being located on each side of the barn midway between the ends of the building. The flues extend from the floor or near the floor to the highest point of the barn. Bringing the flues close to the floor accomplishes two purposes: First, it removes the carbon dioxide and foul air from the barn, and, second, as the cold air is near the floor and the warm air near the ceiling the placing of the flues near the floor removes the cold air instead of the warm. In this way the impure air is disposed of without materially reducing the temperature of the barn.

The flues should be made with as few turns or bends as possible so as to prevent any interference with the free circulation of the air. In a booklet sent out by the I. H. C., Service Department, Harvester Building, Chicago, Ill., to which we are indebted for the illustrations and particulars presented herewith, it is stated that galvanized iron or wood may be used in making the flues, but if wood is used the flues should be lined with tar felt paper as already referred to.

Housing Conditions and Wages in Holland

Some very interesting information regarding the peculiarities of housing conditions in Amsterdam are found in recent consular reports, and one fact which stands out conspicuous is that well-to-do business men very frequently have their residences in their office and warehouse buildings. The upper floors are furnished in appropriate style for living purposes, while the lower floors are occupied as offices, or it may be the lower floors are used for living purposes while the top floors are devoted to warerooms. All of these houses front on the canals and waterways.

The Elevator

Each house in Amsterdam has a lifting pole projecting about 4 ft. over the sidewalk from the highest gable of the roof. All coal, furniture, household supplies and merchandise are lifted by rope and pulley and taken in through the windows. Another peculiarity of Dutch houses is the little mirror attached to the windows that show, to persons in the upper stories, a view of the street or of any one ringing the front door bell.

Recent years have witnessed the construction of new four and five-story apartment houses and tenements, entire blocks and suburban sections having been built up in this manner. The workingman's flat in these new tenements generally consists of only two rooms, rarely of three, and the average rent is $10 to $14 per month. In more pretentious houses the rent is fully twice this amount. In the old sections of the city, where five and six families occupy a single tenement, the rent averages $3 to $4 per month for each room, according to size and general accommodations. In the better inner quarters one large room with a small kitchen and even two small rooms with kitchen can be rented for $5 to $10.

In the old-fashioned houses, peculiar to Amsterdam and predominant on all the side streets, with one living room downstairs, one sleeping room on the second floor, and a kitchen and dining room on the third floor, the rent is $14 to $16 for these three rooms. The upper floors are reached by a winding stairway; the first floor is entered direct from the street. The side streets in Amsterdam on which these dwellings prevail are rarely over 8 ft. wide, yet occasionally the lower rooms are used for business purposes.

Living Quarters for Canal-Boat Men

One of the striking features of the Netherlands housing methods is the quarters of barge and canal-boat men who with their families exist in the hulls of their craft. The rooms are necessarily small, with no ventilation or sunlight except such as may come in through the open hatch, which must be closed at night and in rainy weather. The deck furnishes the children's playground. The larger motor boats and steam barges have one or two small rooms constructed at each end of the barge. The rooms must be low to allow the boats to pass under bridges. These people are leading possibly the most frugal lives of any of the urban working classes of Europe, with no rent, no street-car fares or other usual unavoidable city expenses Chickens are sometimes kept on the boat and consume the garbage.

Workingmen in The Hague generally live in small houses built opposite each other on narrow side streets or garden places. These houses are customarily two stories in height, with one room downstairs and one room upstairs; often a small kitchen, not larger than 6 by 8 ft., is attached. This same class of house is sometimes found in the rear yards of large business structures. The rent paid varies from $5 to $6 per month, according to location. Merchants, especially the retail shop keepers, live in the same building where their business is located, either at the rear or above their stores. If they live in the rear they rent the upper floors, in good locations, as flats at $12 to $20 per month.

In regard to wages of those engaged in various branches of the building trades, bricklayers and masons earn $1.75 to $2 for a ten-hour day, carpenters $1.20 to $1.50 per day and plumbers $1.40 to $1.60 per day. These figures represent the wages of skilled workmen, for second-class men receive less, hod-carriers and other unskilled laborers being paid 80 cents to $1.20 per day, while boy helpers are paid 50 cents to $1 a day.

Young men for the first two years after serving their apprenticeship receive the minimum wage paid and average fully 25 per cent. less than the lowest wages enumerated above.

Death of a Noted Architect

Constant Désiré Despradelle, director of the Department of Architecture at the Massachusetts Institute of Technology, died Tuesday, September 3, at his home, in Boston. He was born in France, May 20, 1862, and at the age of twenty was admitted to *L'Ecole des Beaux Arts*, Paris, and came to the Massachusetts Institute of Technology in 1893. In 1899 he won one of the awards in the competition for a complete plan for the buildings and grounds of the University of California. Later he was a member of the advisory board for building that university.

He was made vice-president of *L'Alliance Française* in 1900 and an officer of the French Academy in 1902. He was also a member of the Boston Society of Architects, the American Institute of Architects, and had been vice-president of the *Société des Beaux Arts*, of New York.

Why Concrete Men Thank Bricklayers

The particular reason why concrete men owe a debt of gratitude to the bricklayers is explained by Morton C, Tuttle, secretary of the Aberthaw Construction Company, in a recent paper. He says: "The cost of cement and the labor cost of building reinforced concrete are two items unique in our day, in that they have decreased in the last few years. The labor cost has gone down in the face of higher wages, because of greater skill in planning and executing work. If this cost continues to drop, and the price of lumber and the cost of brick work continue their present rise the two constructions will eventually exchange positions. The concrete industry has to thank the bricklayers and their decreasing output per man at higher wages for much of its advance."

The increasing popularity of hollow terra cotta tile for use in constructing the walls of dwelling houses is strikingly demonstrated in an operation in South Brooklyn, N. Y. in what is known as the Bay Ridge section, where 17 two-family houses with walls of the character indicated are under way. This form of construction is comparatively new in Brooklyn and was passed upon by the Bureau of Buildings of that Borough only after elaborate tests a year or two ago. The operation is being carried out by Jacob Kaiser who intends to erect more dwellings of the same kind next spring.

New Publications

Fire Prevention and Fire Protection as Applied to Building Construction.—By Joseph K. Freitag; 1038 pages; size, 4¼ x 7¼ in.; 395 figures, including line and halftone cuts. Bound in morocco. Published by John Wiley & Sons. Price, $4.

This work is one of the latest contributions to the subject of fire prevention and fire protection as applied to building construction and constitutes a handbook of both theory and practice. It is something which the architect, the building contractor and the engineer will appreciate. It deals with the various phases of the subject in a way to render the matter of unusual value, particularly at a time when so much attention is being given to forms of construction intended to be fire resisting. In the author's preface he states that it has been his aim to give, in a manner suitable for ready reference, the present status of fire resistance as applied to buildings, including not only many details of construction likely to prove of practical value to architects, constructionists and underwriters, but also those preventive means and those broad principles of scientific fire-protective design without which constructive details are often of little avail. Numerous tests of materials and devices and many descriptions of past experiences of value have also been added in some detail for the benefit of students or those wishing to make a more complete study of the subject. He points out that fire resistance worthy of the name must embrace first, proper planning and designing; second, construction; and last, but by no means least, auxiliary equipment to safeguard both the construction employed and the contents of the structure. Without any one of these essentials of fire protection the fire-resisting qualities of a building are questionable to say the least.

The subject matter is embraced in six parts, the first of which has to do with fire prevention and fire protection; the next with fire tests and materials; the third with fire-resisting design; the fourth with fire-resisting construction; the fifth with special structures and features, and the sixth with auxiliary equipment and safeguards. The text is profusely illustrated with well executed engravings—both line and halftone—and there is a comprehensive index alphabetically arranged, which greatly facilitates reference.

Concrete and Stucco Houses.—By Oswald C. Hering; 106 pages. Size 7½ x 10¼ in. Bound in board covers. Published by McBride, Nast & Co. Price, $2.20, postage paid.

The work under review is one which will appeal to the architect as well as to the progressive and up-to-date builder who desires to keep abreast of the times touching the use of plastic materials in the building of country and suburban houses in a manner to insure qualities of fitness, durability and beauty. The author is an architect of wide experience and he has set forth the subject of building a fireproof or fire-resisting home in a way to command the close attention of the reader once he opens the pages of the book.

In considering his subject the author first discusses Country and Suburban Development, then the Composition of Stucco and Concrete, following which he treats of Stucco as an Outside Wall Covering, Stucco on Wood Frame and Stucco on Masonry. The Concrete Block occupies a short chapter, and then in order come Furring; Fire-Resisting and Fireproof Construction; Reinforced Concrete; Physical Properties and Asthetic Possibilities of Reinforced Concrete; Manufactured Stone and the Dawn of American Architecture. The illustrations are for the most part halftone engravings of examples of domestic architecture accompanied by plans and various details of construction.

Elevator Shaft Construction.—By H. Robert Cullmer, assisted by Albert Bauer, with introductory note by Reginald Pelham Bolton; 170 pages. Size 7 x 9¾ in. Illustrated with 63 engravings. Bound in cloth. Published by the William T. Comstock Company. Price $3.

This work, which is in companion size with "Kidder's Building Construction and Superintendence" series, is a treatise which the architect and the builder will find of special interest and value. Elevator shaft construction in buildings has never before been technically treated in book form, and the work under review supplies the demand for information on this subject. New York practice is followed and the building department laws and regulations of that city are made the standard. The author has also made a careful study of the regulations in use in other cities, giving the deviations from New York requirements. Specification writing for elevator equipment has been covered by two forms—one a simple specification for a single elevator and the other a more elaborate equipment embracing several styles of cars suitable for an office building. Every phase of the elevator shaft problem in building construction appears to have been covered and the method of presentation is such that ready reference is possible to any detail of the subject.

The data and information contained within the book have been gathered by the author in his own practice and systematized and generalized for the purpose of this work. The articles on elevator shaft doors and machine rooms contain information which the author hopes will be highly useful to architects in preparing their plans.

The matter is comprised in five chapters, the first of which deals with elevator shafts; the second with specifications for elevator work; the third with door opening devices and elevator car gates; the fourth with elevator signal systems and special appliances, and the concluding chapter with the rules and regulations governing elevator installation in New York City.

Reinforced Concrete Construction, Volume I.—By George A. Hool, S. B.; 254 pages. Size 6½ x 9½ in. Profusely illustrated. Bound in board covers. Published by the McGraw-Hill Book Company. Price, $2.50.

This volume constitutes the first part of the regular course on Reinforced Concrete Construction offered by the Extension Division of the University of Wisconsin, and in common with a number of the other structural engineering courses offered presupposes a knowledge of the elements of structures. While written primarily to meet the requirements of those desirous of taking up the study of this subject by correspondence, the author sees no reason why a text of this nature may not be employed for other purposes. The complete text for the course in Reinforced Concrete Construction is in three volumes, and the first one deals with fundamental principles, but omits for the sake of simplicity the flat-slab type of floor construction, this subject being reserved for thorough treatment under the heading of Concrete Floors in the second volume of the series.

The subject matter under review is embraced in nine chapters, the first of which deals with the various properties of concrete; the second with the strength of steel, while the third takes up concrete and steel in combination.

The theory and design of slabs, beams and columns are comprehensively treated in the remaining chapters of the work. In addition there are nummerous tables and diagrams to facilitate the calculation and design of reinforced concrete structures. The work gives evidence of having been prepared with great care, and it cannot fail to prove a valuable addition to the library of the architect, the builder and the engineer.

Building Structures in Earthquake Countries.—By Ing. Alfredo Montel; 128 pages. Size 7½ x 10 in. Illustrated with 42 diagrams and one folding plate. Bound in board covers. Published by J. B. Lippincott Company. Price, $3.

This work, translated from the Italian and embracing additions by the author, will be found of special interest to architects and builders in those sections of the world where earthquakes are at least occasional visitors. In such places buildings naturally must be solid and compact and as a general thing are of comparatively few stories in height. Various materials may be used for the purpose of construction, and in the work under review the author describes the method of building wooden houses which are earthquake-proof; tells somewhat in detail of Japanese experiments and investigations regarding the resistance of brick columns and walls, also the calculation of walls of reinforced concrete. One chapter is devoted to what is designated as "Free-Wall Houses," the idea being to so construct the buildings as to permit of free vibration without dislodging the component parts.

Among the concluding chapters is one on monolithic houses in general; another relates to monolithic brick buildings with various details of construction; still another is devoted to notes on the construction of masonry, and another relates to the stability of an ordinary house during an earthquake. Not the least interesting is the concluding chapter which is devoted to Standard Rules for the Execution of Works in Reinforced Concrete.

Bricklayers Elect Officers

The New York State Bricklayers', Masons' and Plasterers' Union at its annual convention held in Albany on September 13, elected the following officers:

President—James J. Carey, Glens Falls.

First Vice-President—John Mackel, Buffalo.

Second Vice-President—Louis Mazzola, New York City.

Third Vice-President—Thomas Cahill, New York City.

Fourth Vice-President—Samuel Quackenbush, Corning.

Fifth Vice-President—Thomas Hannan, New Rochelle.

Secretary and Treasurer—Robert Nethercott, Port Chester.

It was decided to hold the convention at Utica next year.

Automatic Sprinklers in New York Public Library

The five rooms in the basement of this magnificent library building, devoted to book-binding, small printing, and paper storage, are protected with a system of Grinnell automatic sprinklers, there being 147 sprinkler heads supplied with water from the trunk mains of the standpipe system in the building. The trunk main touches the standpipe system at four different points, each with its own controlling and drawoff valve. It is supplied with water by tanks on the roof, by a fire pump, and in emergency by outside fire department steamer connections.

The basement of a building of this character is the place where fire usually originates, due largely to the fact that it is in the basement that rubbish collects ready for removal.

Plans for Small Houses of Poured Concrete

We have received from the Blaw Steel Construction Company, Penn Avenue and Anderson Street, Pittsburgh, Pa., a copy of the book containing reproductions of the drawings awarded prizes in the recent competition conducted by this concern in small houses of poured concrete. In the contest a great number of plans were submitted and six prizes were awarded, the judge being Professor A. D. F. Hamlin of Columbia University. In the book before us the six prize winners are published together with 17 others, all of which offer interesting suggestions to prospective builders. The full specifications accompanying the various plans are not reproduced, but instead there is indicated in connection with each design a brief outline covering the principal points which should be given attention in preparing specifications for concrete houses.

CONTENTS.

What Builders Are Doing

Bird's-Eye View of Building Situation in Leading Cities -- Permits Issued and Estimated Value of the Projected Improvements

WHILE reports from leading centers of the country covering building operations for the month of August indicate something of a shrinkage in the estimated cost of improvements for which permits were issued as compared with the same month last year, the figures are not as significant as might at first glance be supposed. The lessened showing of vested capital involved in new construction work planned last month is due in a measure to the unusual conditions which existed in Chicago a year ago at this time. It will be recalled that a new building ordinance limiting the hight of buildings to 200 ft. went into effect in that city on September 1, 1911, and in order to anticipate that law permits for 1,163 buildings were taken out aggregating something over $26,000,000, of which amount $14,630,000 was represented in the permits issued during the last week of the month. On one day permits for buildings valued at $7,165,700 were issued. During the month just closed the estimated cost of the new construction work for which permits were taken out in the city named was $8,436,100, thus showing a very heavy shrinkage from the enormous total of the same month of last year. Eliminating this unusual feature the statistics covering building operations of the country would doubtless show an increase somewhat more in keeping with the tendency of recent months.

In contrast with the showing made by Chicago is that of New York City, in which the Borough of Manhattan indicates a notable increase over the same period a year ago due to causes stated in another column. Some of the other cities showing notable gains are Cincinnati, Memphis, Detroit, Baltimore, Indianapolis, Omaha and Buffalo. Taking the country over there seems to be a gratifying volume of work in progress with every indication that the year will render a very good account of itself in all branches of the building industry.

Boston, Mass.

The statistics covering building operations in the city of Boston as compiled in the office of the Commissioner for the first seven months of the current year show a decided increase over the figures for the corresponding months of any previous year since 1907, the figures being for the two years respectively $12,976,920 and $6,916,765.

Of the total for this year brick construction accounts for $7,018,775, and frame construction for $2,941,895, the remainder being the cost of alterations. Of the total for the first seven months of 1911 brick construction accounted for $3,032,650 and frame construction for $2,242,570, the rest being for alterations.

In the first seven months of 1910 the statistics of building operations totaled $10,318,245, and for the corresponding period in 1909 it was $7,314,381, and in 1908 it was $4,495,899.

In the year last mentioned brick construction amounted to $1,507,200; but in 1909 this figured a little more than double, and in 1910 it advanced to $5,525,300. Frame construction has for the last four years shown very little change from that of 1912, the difference being about half a million dollars in favor of the current year.

Buffalo, N. Y.

Bureau of Building statistics for the month of August show that 458 building permits were issued with an aggregate estimated valuation of $900,000, as compared with 150 permits with a valuation of $792,000 for the corresponding month of last year.

A large proportion of the gain shown is occasioned by an increase in the number of permits for dwellings, small stores and apartments, few buildings of large cost being included in the list.

Some of the more important or expensive structures covered by the permits issued, or for which plans are completed and permits will soon be asked for, are as follows: A six-story addition to the Buckingham family hotel, $120,000, from plans of Architects Esenwein & Johnson, Ellicott Square Building; four additional factory buildings for the King Sewing Machine Company to cost $92,000; factory warehouse and office building for the Buffalo Weaving & Belting Company to cost $30,000; laboratory, shop and office building for the Rogers Brown Iron Works, Hamburg turnpike and Lake Erie, to cost $30,000; conduit station for the Cataract Power & Conduit Company, Niagara street, to cost $28,000; factory for Sterling Engine Company, $20,000.

A number of fine residences are also embraced in the list, including brick and stone residences for Jno. D. Larkin, Jr.; Chas. H. Larkin and Harry H. Larkin of the Larkin Co., to be erected on Lincoln Parkway and Windsor avenue, to cost $35,000 each.

Chicago, Ill.

Building activity in Chicago is the greatest in many years, the most important development since our last issue being the announcement of the selection of sites for a new Union depot and a new postoffice to be constructed during the next few years at a cost of $35,000,000. The station will be located in the block bounded by Adams, Canal and Clinton Streets and Jackson Boulevard, which is just west of the Chicago River and west of the present Union station.

Plans have been announced for the new postoffice, to be used in addition to the present large structure, which is inadequate for the immense volume of mail handled in Chicago. It will be located in the block west of the new Union station.

Work has been begun on the new building of the Continental & Commercial Trust & Savings Bank, which will cost $6,500,000, and will be one of the greatest office structures in the world. The permit for this structure was taken out a year ago. Many other buildings are being started in the "loop" district for which permits were issued prior to September, 1911, when the new building ordinance became effective.

The month of August, 1912, fell behind the same month last year and the record for the year up to September 1 is about $16,000,000 below that of 1911 for the same period.

In the office of the building department it was stated that there are indications that by the first of January, 1913, this $16,000,000 will be overcome and 1912 will show a greater record than 1911, which was the greatest in Chicago's history.

August's record shows 1091 permits, total frontage of 30,925 ft. and an estimated cost of $8,206,500. In August, 1911, there were 1163 permits, 26,699 ft. frontage and an estimated cost of $26,200,500.

The Builders' & Traders' Exchange of Chicago held its annual "Outing" on Saturday and Sunday, September 14 and 15. About 150 members and their friends left Chicago on electric cars Saturday morning. At Milwaukee the crowd was royally entertained by the members of the Milwaukee Builders' Exchange.

Cincinnati, Ohio

The month of August was a very active one in the building line. Including elevator and plumbing inspection permits, a total of 1068 were issued, carrying an estimated valuation of $1,618,385. This compares very favorably with the showing in August, 1911, when

1023 permits were issued embracing operations valued at $1,420,125, and also with July, 1912, when estimated value of new buildings and additions was $971,224.

A large percentage of the work now under way covers medium priced residences, and the report does not include either Norwood, St. Barnard, Ohio, or Covington and Newport, Ky., where there is much building under way.

Skilled labor is very scarce, especially carpenters and plasterers.

A strike of structural steel workers and stone masons employed in erecting the 34-story office building for the Union Central Life Insurance has delayed finishing this building, the structural work for which is in place up to the twelfth story.

Cleveland, Ohio

Building permits issued during August show considerable gain over July both in number and amount. During the month there were 833 permits issued for buildings to cost $2,102,063. Of these 215 were for frame buildings to cost $543,730, and 76 were brick, stone or steel buildings to cost $1,224,735, while 542 were additions to cost $333,598.

The local building situation is in a very satisfactory condition. There is a steady volume of new work coming out in all lines of building activity with no signs of a falling off that often comes during early fall. There is a good amount of large building work that was started early in the season that will keep contractors busy until the end of the year. A good volume of new work is in prospect that has not yet reached the point of receiving bids.

Los Angeles, Cal.

Activity in the building trades has fallen off a little since the record-breaking months of June and July, but work is still coming out on an unusually large scale, the August record being far above former values for that month. Permits were issued for buildings valued at $3,212,007, compared with $3,585,014 for July. The valuation for August, 1911, was $1,760,776, which was a fair increase over the preceding year. Only one month this year has the record fallen below the corresponding period of 1911, and the total for the eight months is $21,511,295—within a million and a half of the entire total for last year.

The number of permits issued was 1571, a slight increase, and of these 716 were for dwellings, with a valuation of $1,452,781. Only two were for Class A buildings—the 13-story loft building of the Standard Fireproof Building Company and the 13-story office structure of the Washington Improvement Company, with a combined value of $653,000. The principal decrease was in this class of work, while the amount put into dwellings continues to grow. Permits were issued for 37 Class C buildings, valued at $713,718, while over 700 permits were for sheds, barns and alterations. It is hardly to be expected that the present activity can be steadily maintained, though there are several large jobs still in prospect.

Carl Leonardt, of this city, has taken general construction contracts for the Washington Building at $170,000, and the Whittier (Cal.) Savings Bank at 14,940.

Among the principal buildings now figuring, or to be figured shortly, are the following: The four-story concrete Ford Motor Car Building, Parkinson & Bergstrom, architects; the eight-story Title Guarantee & Trust Building at Fifth Street and Broadway; a twelve-story steel and brick building at Seventh Street and Grand Avenue, C. E. Apponyi, architect; a twelve-story concrete hotel at Sixth Street and Benton Way, to cost about $300,000, Fred R. Dorn, architect, and the Laguna Cliff Hotel, to cost about $250,000, R. C. Forsell, architect.

Architects Allison & Allison, this city, have completed plans for the State Normal School at Santa Barbara, Cal., and bids will be received September 10. The lowest bidder on the Federal Building at that place is E. Schuler, of North Dakota, at $115,000.

The city council has for some time had under consideration an amendment to the building ordinance, providing that all hospitals not now fireproof shall be made fireproof. This will probably be modified, allowing the hospitals three years in which to comply with its requirements.

Louisville, Ky.

The members of the Builders' Exchange, with invited guests, participated in the annual "Outing" of the organization, which occurred on Labor Day at Hikes' Point, the affair proving among the most successful and enjoyable ever held by the Exchange. The day was spent in playing games of various kinds and in doing justice to the bounteous chicken dinner which was provided. The members and their guests occupied two long tables accommodating about 100 each, and there were in addition half a dozen smaller tables. The *menu* was of a varied chicken character and embraced all the seasonable delicacies. As one member put it, "The memory of the dinner will linger long with every man who was fortunate enough to be present, and if there was anything lacking nobody found it out."

The outing was in charge of George T. Cross, first vice-president of the Builders' Exchange, who was ably assisted by various committees. The Reception and Amusement Committees were under the direction of E. G. Heartick, president of the Builders' Exchange, and various other members assisted in making the day one of pleasure and joy.

Newark, N. J.

Members and their friends of the Builders' and Traders' Exchange and of the Master Carpenters' Association enjoyed their annual "Outing" on Tuesday, August 20, at Joseph Witzel's Grove, on Long Island Sound. It was the eighteenth annual excursion of the Builders' Exchange and the sixteenth of the Carpenters' Association, and there were about 200 who participated. The excursionists left Newark on a special train for Jersey City, where they embarked on the steamer "Argyle." The committee in charge of the "Outing" consisted of John F. Dey, chairman; Charles Schaedel, John Callan, M. G. Doremus, F. P. Russell, E. H. Harrison, C. H. Grover, G. N. Thompson, W. N. Whitlock and A. H. Vreeland.

A half hour after the special train started the steamer "Commodore" left Ripley's Dock, Newark, accompanied by Krimpke's Band, with 300 members and their friends of the Master Plumbers' Association, also destined for Witzel's Grove. Reaching the grove, a ball game was played between the builders and the plumbers, resulting in a victory for the former by a score of 9 to 7. Probably it would not be far from the mark to state that the feature of the day was the clambake, which was enjoyed by the 500 excursionists. The dinner was well served and was thoroughly enjoyed by every one present. Mayor Haussling of Newark, who went out with the builders, was the guest of the plumbers on the return trip, which started about 5 o'clock with all in good humor for the evening sail.

New York City.

The striking feature of the local building situation in its contrast with this period last year is the increased cost of the buildings planned in the Borough of Manhattan. The report of Superintendent Rudolph P. Miller shows that last month 52 new structures were planned calling for an estimated outlay of $11,405,860, whereas in August last year 48 new buildings were planned estimated to cost $5,392,830. To these figures must of course be added the cost of alterations for the two periods, these being $847,127 and $1,150,055 respectively.

The large increase noted grows out of the fact that last month 16 apartment houses were planned costing $4.233,000 as against 17 costing $2,287,000 in August last year; also to 6 office buildings costing $5,805,000 as against 3 costing only $287,000 a year ago. On the other hand 4 store and loft buildings were planned last month costing $395,000 as against 6 for which permits were issued in August last year to cost $1,345,000.

From January to August inclusive this year plans were filed for 612 new buildings estimated to cost $67,458,180 against 590 new buildings costing $84,769,685 in the corresponding period of last year.

From the first of January to the end of August this year the estimated cost of new buildings and alterations for which permits were issued in the Borough of the Bronx was $26,611,225 and for the same period last year the figures were $17,457,867.

In Brooklyn the volume of operations shows comparatively little change from that of a year ago, although last month's planning calls for the expenditure of a trifle less than in August, 1911. The figures compiled in the office of P. J. Carlin, Superintendent of the Bureau of Buildings, shows that in August permits were taken out for 342 new buildings estimated to cost $2.475,650, while in August last year permits were issued for 365 buildings to cost $2,978,780. In addition to these there were 534 permits issued last month for alterations to cost $329,683, while in August last year 614 permits of this nature were issued to cost $434,648.

For the first eight months of this year the estimated cost of new buildings and alterations was $30,875,791, and for the corresponding period last year $26,542,093.

The showing in the Borough of Queens thus far the present year is not quite up to this season a year ago, although the figures are of liberal proportions. Including the estimated cost of the new buildings planned and the alterations for which permits were taken out this year the amount involved was $13,790,289, while in the corresponding period last year the money value was $17,405,540.

Oakland, Cal.

Building activities have been somewhat curtailed for the last month; but this condition is expected at the end of summer, and most local contractors are well satisfied. A great deal more work has been done so far this year than for the same period of 1911, and workmen are finding steadier employment than for several years.

Building permits issued in August reached a total of $600,080, compared with $1,010,444 for July, and $522,828 for August of last year. With a lot of public work in prospect, values toward the end of the year are expected to keep up at least to the August record. The month's record is made up almost entirely of dwellings and business buildings of the smaller types.

At a recent hearing before the Board of Education, at which Supervising Architect J. J. Donovan, leading contractors and labor union representatives were present, it was decided that general contracts will be let for all new school buildings, with the stipulation that the general contractor shall present receipted vouchers from subcontractors before his bills will be honored by the city. Bids will be taken September 16 for a $100,000 addition to the Fremont High School, and plans are about ready for the Thirteenth Avenue School, to cost $75,000. Foundation and steel plans for the municipal auditorium are ready for figuring, and the building is to be completed by September 9, 1913.

Among the buildings to be figured shortly are a twelve-story Class A office building at 17th Street and Telegraph Avenue, to cost about $200,000; a six-story concrete warehouse for the Bekins Van & Storage Company, to cost about $60,000, and a four-story Class A building for the Providence Hospital, to cost about $200,000, Shea & Lofquist, San Francisco, architects. The Westinghouse Pacific Coast Brake Company has purchased land for an addition to its new factory building.

Architects Bliss & Faville, San Francisco, are taking figures on a $35,000 residence for A. A. Moore, Jr., in the Piedmont district. It will be two stories high, with 15 rooms, the exterior being of cement plaster on metal lath and the interior finished in hardwoods.

Philadelphia, Pa.

Building conditions in August, while comparing favorably with the previous month, continue to fall behind the activity which prevailed at this time last year. The decline continues pronounced in dwelling house operations, and while general building work is active, it has not been heavy enough to overcome the losses shown in the former class of work.

Statistics compiled by the Bureau of Building Inspection show 1309 operations for which permits were issued, the estimated cost of which was $3,445,953. This total compares favorably with the previous month when the authorized expenditure was $3,456,800 for 1257 operations. Compared to August, 1911, however, a sharp decrease is noted, as the expenditure for that month was $4,660,185. The total for the year to date shows a further decline when compared to the first eight months of 1911, during which statistics show a total of 12,647 operations at an estimated cost of $31,941,015, as compared to 10,395 operations costing approximately $26,251,940 in the eight months of the current year, a decline in value alone amounting to $5,689,075. Decreased dwelling operations so far this year more than make up this deficiency, the aggregate decline in two and three story dwellings being $6,721,905, of which two-story dwellings contributed $5,227,930. Apartment and tenement house work compare favorably, this year's figures being slightly greater than those of 1911, the respective totals for the eight months being $852,000 and $892,000. A good volume of business continues to be done in manufacturing buildings, work begun during August aggregating almost half a million dollars.

The Allegheny Avenue Improvement Company has recently begun the erection of 30 two-story dwelling houses, each 16 x 35 ft., on 26th Street below Indiana Avenue, at a cost of approximately $75,000.

The contract for 66 two-story houses to be built on the village plan for the American Viscose Company, Marcus Hook, Pa., has been given to H. Brocklehurst. This operation represents one-quarter of the total number of houses that will be ultimately built.

Plans are in progress by Furness, Evans & Co., architects, for a 13-story addition to the present office building known as the Arcade Building, 15th and Market Streets. The Arcade Realty Company has recently acquired additional property on South Broad Street, which will be used as a site for the new addition.

Samuel Shoemaker has taken out a permit for a high-class apartment house to be erected at Wayne Avenue and School Lane, Germantown. It will be a four-story building, 135 x 181 ft., of brick and steel, and contain 28 housekeeping flats. A vacuum cleaning, refrigerating and heating plant will be installed. Plans were drawn by Horace Trumbauer, architect.

Local contractors are estimating on a large apartment house to be erected at the corner of Maryland Avenue and the Boardwalk, Atlantic City, N. J., for Samuel F. Nixon.

Pittsburgh, Pa.

During the month just closed there were no unusual operations planned in the building line and the value of the work for which permits were taken out was about the same as for August last year. There were 108 permits issued for new buildings calling for an outlay of $588,579 and 45 additions to cost $172,410. The alteration work amounted to $409,445, so that the total was $1,170,434.

In August last year the total amount of money involved in the building operations for which permits were issued was $1,138,531.

Portland, Ore.

Building has been hardly as active this summer as for the same period of 1911, and August has made only a fair showing. While a few projects of some importance are in prospect the greater part of the new work is of a small nature. Permits issued last month were valued at $1,227,573, compared with $1,494,921 for July, and $1,683,605 for August last year, while for the same month of 1910 the record was two millions and a half.

In connection with these values the number of permits is especially interesting, as last month the number was 1067, compared with 676 for the preceding month and 775 for August, 1911. The increase of over 30 per cent in number, with decrease in value from the preceding month, is a sufficient indication of the prevailing class of work. The present activity in small dwellings has seldom been surpassed.

The engineering department of the Pacific Telephone & Telegraph Company at San Francisco has about completed plans for a building in this city, which will be next to the Yeon Building in height. It will be 14 stories high, with an estimated cost of about $500,000, and will be of steel frame construction. Contracts are to be let about October 1.

Plans have been filed by Architects Whitehouse & Fouilhoux for the University Club Building, to cover a quarter block at Sixth and Madison Streets, estimated cost $175,000. Another important job to be figured shortly is the ten-story building of the Multnomah Securities Company at Seventh and Morrison Streets, to cost about $300,000.

The Spalding Construction Company, this city, is low bidder on the construction of officers' quarters at the new naval station in the Hawaiian Islands.

Reading, Pa.

A fair amount of building is in progress in the city and vicinity, the volume of operations running a little ahead of this period last year. The statement issued by City Building Inspector Grove for August shows 35 permits to have been issued for building operations involving an outlay of $109,375, while in August last year 31 permits were taken out for work costing $71,750.

The total for the 264 permits issued during the first eight months of the year was $1,275,850 and in the corresponding period of 1911 the value of the improvements for which 320 permits were issued was $414,050.

Sacramento, Cal.

Building operations, as is to be expected at the end of summer, are of a rather limited nature, as at this season the harvesting and shipping of fruit crops receives more attention than anything else. Business is duller, in fact, than it has been since last February.

The outlook is fair for the remainder of the year, however, as several jobs which were to have come up last month have been delayed, and an encouraging amount of new work is in sight. Building permits issued last month amounted to $115,391, compared with $286,681 for the previous month and $239,949 for August of last year. The total includes a few business buildings, but is made up mainly of dwellings and other small work.

General contracts have been let for two buildings at the State Hospital, Agnew, Cal. The contractors are McLeran & Peterson, for the assembly hall, $51,461, and C. Christensen, for the convalescent ward, $32,967.

Figures will be taken shortly for the seven-story Travelers' Hotel at 5th and J Streets, to cost about $400,000, Cuff & Diggs, architects, and for the $150,000 Sullivan & Considine theatre at 10th and K Streets, Lee B. Camp, San Francisco, architect. Figures will also be taken shortly for a $150,000 high school at Lodi, Cal.

Officers of the local contractors' and dealers' association have requested the city commission to let all contracts on public buildings to sub-contractors direct, instead of to general contractors. No definite action has been taken.

Fire Chief Anderson has submitted an ordinance to the city commissioners, providing for more efficient enforcement of the requirement of fire escapes on all buildings of three or more stories. Specifications for fire escape construction are also laid down, with the requirement that plans for large buildings must be approved by the fire chief.

San Diego, Cal.

New work is not as plentiful just now as it was in July, but the past month is well up to the average for this year, which is much higher than for any previous season on record. Permits were issued last month for buildings valued at $752,861, compared with $898,977 for July and $411,700 for August of last year. While much of the work was on buildings of an unimportant nature, the business district of the city is growing rapidly with a fairly substantial class of buildings, and indications are favorable for consderable activity during the fall.

Among the most important plans filed last month were a $25,000 concrete hotel, to be erected by the Chaffey Construction Company for A. Wuest and a $50.000 concrete building on F street, extending from Front to Union Street. The following contracts have been let recently: A six-story concrete store and hotel on C Street near 7th, to the Chaffey Construction Company; an eight-story addition to the Cecil Hotel on 6th Street, to the San Diego Construction Company, at about $40,000, and a $40,000 hotel at Front and C Streets, Quayle Bros., architects, to W. E. Keir.

Architect R. C. Kismer has prepared plans for a four-story apartment house to cost about $40,000. The same architect is taking bids on an apartment house to cost about $18,000.

Architect Norman F. Marsh, Los Angeles, is ready for bids on his plans for the new Baptist Church in this city. The cost is estimated at $80,000.

San Francisco, Cal.

In view of the activity of early summer, and the number of important buildings figured in the last few months, the comparative quietness of the building trades for August was something of a surprise. The only reason that can be assigned is delay in starting work on the more important projects, contracts for some of which are now being let, though the building trades do not look for any very marked revival before November, when the exposition work will begin to have a material effect on the situation.

Buildings for which permits were issued in August were valued at $1,950,502, compared with nearly two and a half millions for the previous month and $2,139,095 for August, 1911. As usual, a large amount was involved in alterations and repairs, but the preponderance of value of the remainder was on permanent construction, which amounted to over $850,000, with less than $700,000 for wooden buildings. The principal features of current construction are large second-class hotels in the downtown district and apartments.

The building material situation shows little change. Lumber, though higher than last year, is rather easy, San Francisco being a "dumping ground" for the surplus of many mills on the Coast, though both cedar and redwood shingles are very strong. Cement is picking up a little, but without improvement in price, while brick remains steady. Hardware and steel products generally are not only very firm, but scarce, structural steel and plumbing contractors in particular finding difficulty in getting materials. Several large stone jobs are under way, including one front of Georgia marble, a material seldom used here.

At a recent conference between Mayor Rolph, the city's consulting architects and a number of leading contractors, it was informally agreed that contracts on the new City Hall should be segregated, but not so extensively as in the construction of some other municipal buildings. Everything connected with a particular line of work will be grouped under one head, and one contract let for it, so that 12 contracts will cover the entire work. The contracts can thus be so timed that work can proceed continuously, and contractors say that under this arrangement there should be no doubt of the completion of the building by 1915. In addition to the City Hall and Municipal Auditorium on the civic center ground, arrangements are being made for the erection of an opera house to be under official control, the local musical association having pledged $650,000 for the building. Another large building of a semi-public nature will be the Academy of Sciences Museum in Golden Gate Park, the first unit of which will cost about $120,000, bids for which are to be taken shortly.

The lowest bid for the complete finishing of the eight buildings of the San Francisco Hospital was that of Grant Fee, at $156,500.

The largest building on which contracts were let during the month was the St. Francis Hotel addition at Powell and Post Streets, the steel in which, amounting to about 2200 tons, will be furnished by Milliken Bros. Contracts amounting to about $70,000 have been let for the seven-story Magner Hotel on the Embarcadero, and F. J. Kleuch has taken the contract for the Druids' Hall on Page Street at $76,804. This building, designed by Architect E. P. Antonovich, is of classic type, with Corinthian columns, etc., of glazed terra cotta.

The largest office building figured here for some time is that of the Insurance Exchange, Willis Polk, architect, at California and Leidesdorff Streets, which will be 15 stories high, take about 1600 tons of steel, and will cost altogether about $600,000.

Other buildings now being figured are a six-story brick and steel hotel at Fourth and Mission Streets, estimated cost $100,000, Miller & Colmesnil, architects; two new wings for the State Ferry Building, steel frame with Colusa sandstone facing, L. B. Dutton & Co., architects, and a two-story reinforced concrete power house for the Union Iron Works, to cost about $100,000, C. P. Weeks, architect.

The principal buildings to be figured shortly are the reinforced concrete Ford Motor Building, estimated cost $200,000, William Knowles, architect; the five-story steel and concrete Labor Temple at 16th and Capp Streets, to cost about $300,000, O'Brien & Werner, architects; a three-story concrete garage at O'Farrell Street and Van Ness Avenue, to cost $80,000, Ward & Blohme, architects, and a four-story brick and steel business building at Sutter and Powell Streets, to cost $75,000, F. H. Meyer, architect.

The Executive Board of the Contractors' and Dealers' Association of California held its semi-annual meeting recently at the Builders' Exchange in this city, H. C. Muddox, of Sacramento, presiding. Reports from locals throughout the State indicated a generally flourishing condition, and arrangements were made to organize locals at Woodland, Chico, Red Bluff, Fresno and Los Angeles. Munday & Williams, local attorneys, were employed as legal advisers. The San Francisco local tendered a banquet in the evening at the Heidelberg Inn, Frank J. Klimm acting as toastmaster. The speakers were enthusiastic as to the outlook for the future, as the organization meets a long-felt want, and it was predicted that similar associations would soon be formed in all Pacific Coast States. The association has 1700 members in the State, 500 in San Francisco alone.

At the August meeting of the architectural commission of the Panama-Pacific Exposition, preliminary sketches for the various buildings were definitely adopted, and working drawings are expected to be ready in November, when the next meeting will be held. In all contracts for exhibit buildings it will be stipulated that the work is to be finished by June 25, 1914. The first contract, that for the machinery building, will be let about November 11, and for the following nine months two contracts will be let each month. The main part of the exposition will occupy 625 acres on the north shore of the city, with about two miles of water frontage.

Seattle, Wash.

Owing partly to the less expensive nature of the semi-fireproof buildings planned in August and to the absence of any permit for a fireproof structure the amount of vested capital involved shows an appreciable shrinkage as compared with August last year, although as regards the number of buildings planned the decrease is comparatively slight. According to the report of R. H. Ober, Superintendent of the Department of Buildings, Seattle, there were issued in August 1005 permits for new buildings, alterations and additions, involving an estimated outlay of $563,435, while in August of 1911 there were issued 1017 permits for construction work estimated to cost $1,100,280.

Residence construction is maintained upon a fairly liberal scale, the amount involved in last month's planning being a trifle more than a year ago, although there were less plans filed. The figures show that permits were issued for 154 dwellings costing $250,970, whereas in August last year permits were taken out for 181 dwellings costing $247,295.

Builders' Appliances and Equipment

Some Things of Seasonable Interest to Those Having To Do with the Building Business

The Reliance Patented Chimney Top

A new chimney top known as the "Reliance" and recently placed upon the market by the Berger Mfg. Company, Canton, O., is illustrated in Fig. 1, the picture representing a front view of the top and clearly indicating the arrangement of parts. The point is made that many tops heretofore designed were not always successful for use in connection with chimneys surrounded by a group of buildings, owing to the fact that the wind would be deflected downward by the roofs, enter the top of the chim-

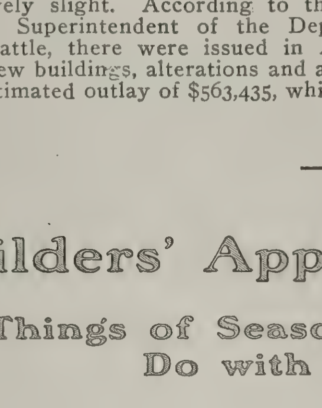


Fig. 1—The Reliance Patented Chimney Top—Front View Showing Construction

ney at the side of the chimney top and cause annoying down drafts. The claim is made that with the Reliance type this is impossible as the hood extends below the top of the chimney and encompasses it on three sides. By reason of careful machining the pivot movement is said to insure positive and instant action; in fact the hood motion is so easily affected that it is said a breath of air from the lungs of a person will cause it to revolve. The hood design which keeps out the drafts, also keeps out the rain, thereby preventing any interference with the operation through rusting of the bearing surfaces. The top is strong and durable and can be used on every type and size of chimney where conditions exist as outlined above. It is said to give the same good service whether used on a dwelling or on a factory building.

Catalogue of Metal Ceilings

"Everything in Sheet Metal Building Material" is the statement which greets the eye upon opening the attractive catalogue of metal ceilings which reaches us from the Indianapolis Corrugating Company, Indianapolis, Ind. The company was established something like 20 years ago under the name of the Indianapolis Steel Roofing & Corrugating Company, which name it held until the first of July, 1907. The beginning was small, with metal roofing the principal item of output, but as time went on new lines were added and developed, new and up-to-date machinery installed, so that at present the company is in a position to promptly meet the wants of a constantly growing trade. In the introductory pages of the catalogue in question there are a number of suggestions intended for those desiring estimates on metal ceilings and how to place the order to the best advantage. With each ceiling order the company furnishes a carefully executed working plan together with directions for applying the furring strips and then the ceiling material. The catalogue under review is oblong in shape, consists of 44 pages and is profusely illustrated with designs of ceiling plates which the company is prepared to furnish. The combination designs illustrated are rich and effective and clearly demonstrate the artistic effects possible by the use of sheet metal as an interior decoration.

Atlas Sanitary Composition Flooring

Some interesting particulars relating to the subject indicated by the above title are contained in a pamphlet sent out by the Atlas Floor Company with offices in the Old Colony Building, Chicago, Ill. The improved sanitary and fireproof floor which this company has put on the market is the result of many years of experience. It is of a nature to be laid over old floors of wood, cement or iron; it can be laid any thickness desired; is ready to use the day after it is laid and there is no slipping when the floor is wet. A base or wainscot can be laid with the floor and the point is made that the latter is too elastic to crack with the settling of the building, consequently no dust is likely to accumulate from cracks as is frequently the case with wood floors.

The Van Guilder Three-Wall Concrete Machine

We referred in our last issue to the Van Guilder Hollow Wall Machine as used in connection with the construction of a dwelling house on Long Island and we now bring to the attention of our readers a new machine which the Van Guilder Hollow Wall Company, 712 Chamber of Commerce Building, Rochester, N. Y., has brought out for building cold storage houses. With this machine is built a triple wall having two continuous air chambers or spaces and all at one operation. It produces at low cost a store house impervious to heat and cold and the walls of which will be durable and require no outlay for repairs.

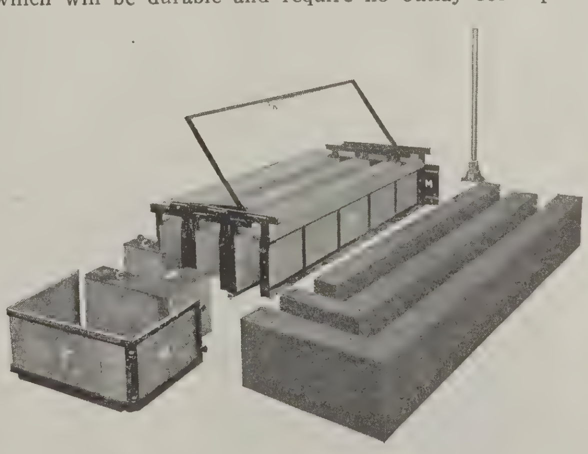


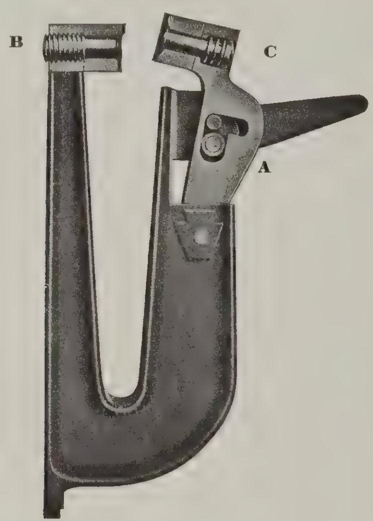
Fig. 2—The Van Guilder 3-Wall Concrete Machine with Specimen of Its Work

In the picture presented in Fig. 2 of the engravings is shown the machine itself, the tamper, also a section of a triple wall at what would be the corner of a building. A store house constructed of walls of this nature is said to be not only substantial but frost-proof and vermin-proof and to provide an inexpensive cooling and ventilating system which effectually eliminates the injurious gases arising from stored fruits and vegetables, while maintaining the storage house at a low uniform temperature.

The company in question is also giving attention to heavy concrete construction in which the double wall system is used, thus showing the adaptability of the double wall machines for both large and small buildings. The principle involved in the heavy construction work is the same as that used in the erection of private dwellings, and other small buildings, except that in the heavy construction work reinforcing rods are run vertically from floor to floor in the pilasters and are tied together across every 9 1/3 in. course with galvanized iron ties. A number of buildings of this character have been and are now being erected in various sections of the country with highly satisfactory results. The Van Guilder Hollow Wall Company issue illustrated folders showing the adaptation of their machines to all classes of construction and copies of these may be obtained free of charge by any one making request for them to the address given above.

The "Keystone" Folding Saw Clamp

A new folding saw clamp which is so constructed that it may be instantly fastened to a work bench, tool box, window sill or to the edge of a board, rail of a fence or



The "Keystone" Folding Saw Clamp—Fig. 3—End View of Clamp Showing Mechanism

any other suitable place without the use of nails or screws, is the "Keystone" illustrated herewith and placed upon the market by the Joseph Woodwell Company, 201 and 203 Wood Street, Pittsburgh, Pa. This device is referred to as simple in construction, easy and rapid in operation, durable and as weighing but 3 lb. The jaws are 14 in. long, thus requiring only one shift for filing a 28-in. saw. Fig. 4 of the illustrations shows the folding saw clamp in position. The jaws drop to position by their own weight, thus allowing the free use of both hands of the operator for adjusting the saw. The eccentric lever shown in Fig. 3, which represents a cross section of the mechanism, automatically centers the jaws exactly opposite each other with a single closing motion, giving the tighest possible grip yet working quickly under slight effort. Another advantage of this clamp is the roller bearing "A" which reduces friction and wear to a minimum. It is said that a slight turn of the screw "B" takes up all wear and lost motion. The rivet and spring "C" holds the front jaw in place by means of the recess and centers the

Fig. 4—Showing the Saw Clamp in Use

jaws opposite each other when the saw is in position as indicated in Fig. 4. The felt face jaws deaden the noise of filing and also protect from marking or scratching the finest finished saw. The jaws have a ½-in. opening, giving sufficient clearance for quick and easy working. The clamp is made of malleable iron, is warranted not to break and folds up like a jack-knife so that it may be easily carried in the pocket. It is said to occupy no more space in the tool box than the ordinary hammer.

Lignine (Wood) Carvings

The Ornamental Products Company, Detroit, Mich., has issued to the woodworking trade an interesting catalogue relating to Lignine (Wood) Carvings, and a copy of it can be secured free of charge by any architect, builder, contractor or other interested reader who may make application for it. The carvings in question are reproduced from expensive hand-carved oak, mahogany and walnut models and they are referred to as being wood for the reason that practically all of the formula from which the carvings are made is wood, the binder—a trade secret—composing only a small part. The excellent detail of the carvings is readily understood for the reason that they carve but one master model. The products of the company are said to be equal in every way to the most expensive hand carvings, while being very much cheaper, yet stronger and more durable. The company points out that a trial order for carvings will be shipped with the understanding that if they are not perfectly satisfactory when received the initial order can be returned within 10 days at its expense.

"Symplist" Steel Sash Fixtures

A simple and inexpensive fixture consisting of several metal parts of such a nature as to render their use rapid and secure has just been brought out by the Niagara Falls Metal Stamping Works, Niagara Falls, N. Y., and is illustrated herewith. The fixture essentially consists of three different parts, two of which are shown in Fig. 5 actual size, while in Fig. 6 these parts are shown with sash chain attached together with the wire hook which connects the chain to the sash weight. The sheet metal parts

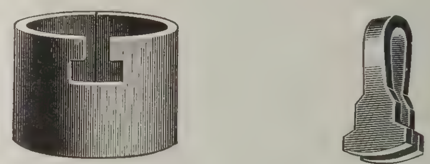


Fig. 5—The Sheet Metal Parts, Actual Size.

Fig. 6—Showing Parts with Chain Connected; also the Wire Hook

Symplist Steel Sash Fixtures

are new and improved while the wire hook is the same the company has used for some time on the Niagara sash fixture. In the use of the sheet metal parts the special link is passed through the end of the sash chain, inserted in the slot and turned, all as clearly shown in Fig. 6. When once in place and in operation the claim is made that there is no possibility of its becoming loose or getting out of order. The fixture is intended for use with Premax or other sash chain as may be desired. The company is sending out Folder No. 57A which illustrates and describes the "Symplist" fixture as well as various other specialties made by the company. These include among others the Niagara Wall and Veneer Ties; the Niagara Galvanized Wall Plugs; Steel Sash Pulleys and the Premax Steel Sash Chain. The company will be glad to mail samples of its building specialties on request to any interested reader who makes mention of the *Building Age*.

Fire Tests of Building Partitions

"Under Fire" is the title of an interesting booklet issued by the General Fireproofing Company, Youngstown, O., and giving detailed results of the fire tests held in Cleveland June 28 and 29 under the direction of V. D. Allen, building inspector of that city, to show the relative fire-resisting value of various types of partitions. While the detailed official report of the committee that conducted these tests has not yet been made, interesting conclusions relating to the tests are found in this booklet. The result of the test of metal lath on wooden studding is stated to have been a remarkable demonstration of the holding power of metal lath even under the most unfavorable conditions. This type that is pointed out is seldom recommended as absolutely fireproof. In regard to the test of wood lath partition it is stated that this test was made merely to show how little resistance wood lath offers the flames and to justify building inspectors in the stand they have taken against wood lath in the fire zone.

Commenting on the test of 2-inch solid metal lath the booklet states that this partition developed the most surprising resistance to the fire. For the entire two hours it stood with no outward sign of the flames beating against the inner side and at the conclusion of the test it seemed ready to stand another two-hours heat.

Referring to the stucco wall type of construction specifications for which were recently prepared by the metal lath manufacturers the comment is made that this type of construction while not recommended as absolutely fireproof proved conclusively that even in the path of conflagration a residence built with these stucco walls would act as an effective fire barrier.

In the test of the 4-inch hollow metal lath no water or steam came through the partition and it is stated that ample evidence was afforded that this type of construction really belongs to the fireproof class.

The Wray Floor Scraping Machine

The Wray floor scraping machine, made by Duncan Brothers & Wray Company, Ludlow Falls, Ohio, and Binghamton, N. Y., is said to be so made as to scrape every

Fig. 7—The Wray Floor Scraping Machine

part of the floor and can be used on either hard or soft wood floors or on parquet floors. The handle is adjustable to any hight and should be placed at the right point, that the full weight is on the knife or nose of the tool when the machine is pulled towards the operator. The wheels are large in diameter and have heavy rubber tires to protect the floor and remove all jar and noise of the machine while at work. A general view is shown in Fig. 7.

The knife is made of a good quality of band saw steel. It is pointed out that the blade is readily honed and holds its edge better than blades made of crucible sheet steel. Blades are 2 in. wide and 6 in. long, have a cutting edge of about 4 or 4½ in., depending on the surface of the floor. Every one of the blades is accurately beveled, it is said, well honed and the edge turned over with a burnishing tool ready for use. It is pointed out that a knife is no harder to sharpen than an ordinary plane bit. In sharpening the blade the same bevel and fullness in the center should be retained. The middle of the blade is slightly higher than the outside corner. It is ground in this way so that it will always make an even surface to the floor, the principal part of the scraping being done in the center of the blade.

New Type of Warm Air Register

An improvement in warm-air registers, as shown in Fig. 8 of the accompanying illustrations, has been announced by the Rock Island Register Company, Rock Island, Ill. This new type of register consists of an adjustable fastening which is designed to overcome those unavoidable mistakes where the box has been mis-set or carpenters have raised the floor so that the register will

Fig. 8—New Type of Warm Air Register

not fit into the place made for it. The fastening consists of a slotted nut placed between the edges of the double box and makes possible an adjustment of the register ⅜ in. up or down as required. This improvement has been designed to enable the furnaceman to make a rapid and workmanlike job of setting the register, which is one of several features emphasized by the manufacturer to prove the superiority of the Burgess line of registers, which it manufactures exclusively.

"Floredome" Type of Floor Construction

A system of two-way steel floor dome reinforced concrete construction known as the Floredome type has been developed by the Trussed Concrete Steel Company, Detroit, Mich., and is illustrated in Fig. 9 of the cuts. The essential feature is a rectangular dome-shaped steel tile with only the bottom side open. The special advantages claimed for this system are the providing of additional reinforcement for the concrete, light weight, tight joints and freedom from breakage in transit. Fig. 9 is a view of the Floredomes in position showing the arrangement of the metal lath, reinforcing rods and the concrete. The Floredomes are made by a process of cold pressing from rolled steel plates and the deep corrugations provide additional stiffness so as to support the loads imposed upon them by the material which is trucked over them. These ridges also give an improved bond between the domes and the concrete and act as extra reinforcement for the latter. It is pointed out that in combination with reinforced concrete joists these domes make an ideal construction for floors and roofs since they take the place of a portion of the concrete and thus reduce the dead weight of the construction without impairing its strength. These joists

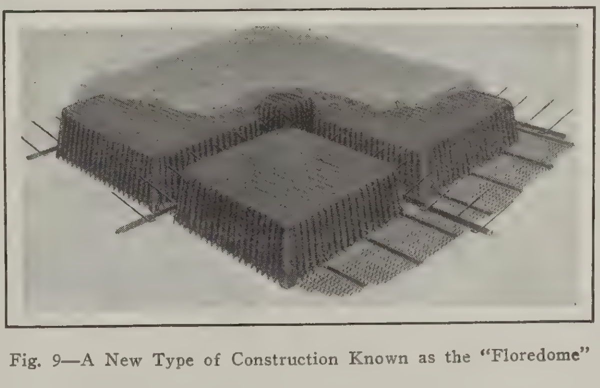


Fig. 9—A New Type of Construction Known as the "Floredome"

extend on all four sides and transmit the loads in two directions to the supports.

The floors made in this way are very deep which gives an increased strength and rigidity to the construction with a reduction in the amount of material required for beams, columns and footings. The Floredomes are much lighter than terra cotta floor arches and are about three times as large, which results in doubling the amount of floor laid by the average workman.

The illustration shows the general method of constructing a floor by this system. A number of the maker's reinforcement bars are laid upon the main beams in both directions and Hy-Rib is placed on the underside of these bars. After the Floredomes have been put in position the concrete is poured over them and tamped in place in the regular way. By employing this construction an absolutely flat ceiling design without any projecting beams or girders can be obtained, as the reinforced concrete girders which extend around the four sides of the panel are built flush with the bottom of the concrete joists. The Hy-Rib extends continuously over the entire ceiling and the plaster can be applied to its underside. The reinforcement extends in all directions and it is pointed out that there is little or no likelihood of the plaster cracking or falling. Where flat ceilings are not required, as in factories and warehouses, the Hy-Rib is omitted and the domes remain permanently in place. In this way a considerable saving in the cost of construction is effected, as practically all centering is done away with and only the simplest type of falsework is required.

A New Sash and Door Sticker

The carpenter-contractor who operates a woodworking shop and of course every up-to-date carpenter does this, is frequently called upon to turn out more or less work in the way of sash and doors in order to meet special requirements of his business. To do this he must include in his outfit a first-class sash and door sticker. A machine which is intended to meet the requirements of the case in all particulars is that which we illustrate in Fig. 10. Its construction is such that it will effect a great saving of time and labor as compared with methods formerly employed or by getting work done at the mills. For instance, sticking the sash stiles, and plowing and boring for the sash cord are done at the same time—one operator doing the work that heretofore has required two machines and two operators to successfully accomplish. The stile is first moved along the table over the grooving saw, thus cutting the groove to the proper length, after which the boring is accomplished by means of a foot treadle, raising the boring bit into the stile to the proper depth. This work being performed the stile is passed under the feed rolls and cutter heads and properly dressed. Since the plowing and

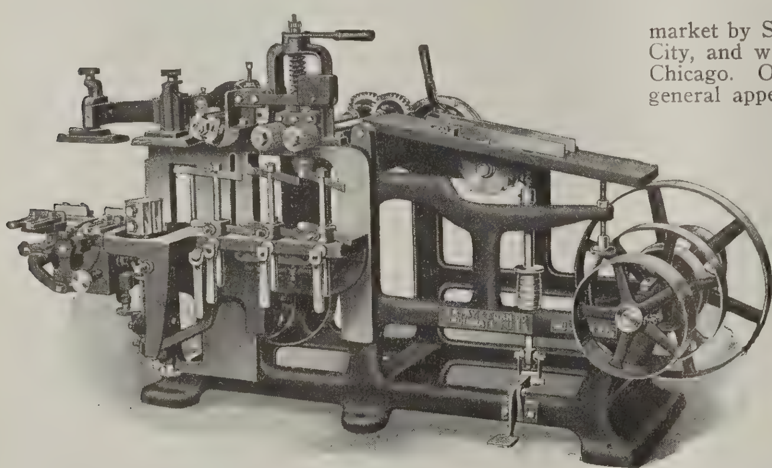


Fig. 10—A New Sash and Door Sticker

boring of one stile is done while another is passing through the sticking machine, there is no delay in combining the two operations. The machine here shown is known as the No. 226 made by J. A. Fay & Egan Company, 221 to 241 West Front Street, Cincinnati, O. It has a strong, substantial frame made long to give good length to the belts. The top rolls raise to stop feed, thus eliminating the necessity of setting the bed for each cut when door stiles are molded part way only. There are spring pressures to the feed rolls, thus furnishing an even pressure at all times graduated according to the thickness of the stock being worked. The treadle at the side of the machine is convenient to the operator.

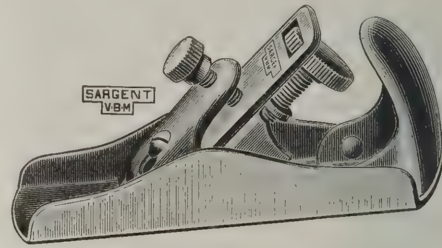
Alabasco—A Flat Washable Wall Paint

A flat washable wall paint in liquid form which is intended to take the place of the old method of lead and oil on walls is being marketed in connection with Alabastine, the popular water color for walls, by the Alabastine Company, Grand Rapids, Mich. The company is of the opinion that with the combination of Alabastine and Alabasco it can meet the requirements in every home and every building. There are certain rooms in the home where a washable surface is desired: in kitchens, bathrooms, dado on nurseries, stairways and any surface children are liable to soil with their hands, a material that can be washed should be used. Objections have frequently been urged against ordinary lead and oil which either presented a shiny surface or one that would wash shiny and the company in question has brought out Alabasco as giving an absolutely flat surface in close imitation of Alabastine tints and which at the same time will not gloss or wash shiny. Alabasco is claimed to be peculiarly adapted and largely used for decorating in hospitals, churches, school houses, apartments and public buildings. The material is put up in quart, half-gallon, gallon and five-gallon cans, prepared ready for use with complete directions for mixing and applying. The company states that Alabasco admits of thorough and repeated washing; is easy of application and is economical owing to its covering capacities, dries slowly and does not show laps or brush marks.

A large demand for the material has developed and the company is of the opinion that Alabasco is sure to attain the same degree of prominence in the leading line as Alabastine and it is the intention to feature the merits of Alabasco in all of the large Alabastine publicity campaigns.

Two New Types of Sargent Planes

Two new types of planes which cannot fail to be appreciated by carpenters, manual training instructors and all mechanics who work in wood have been placed on the



Two New Types of Sargent Planes—Fig. 11—Pocket Plane

market by Sargent & Co., 1153 Leonard Street, New York City, and with branch offices in Boston, Philadelphia and Chicago. One of these is a pocket plane, No. 2204, the general appearance of which is indicated in Fig. 1 of the engravings. It is 4¼ in. long, has a 1⅛-in. cutter, is furnished in highly polished finish and is a tool which pattern makers will find particularly useful. The low-angle block plane shown in Fig. 2 is 6 in. in length and has a cutter 1⅝ in. wide. It can be obtained both highly polished and nickel plated, the former finish being designated as No. 4206 and the latter as 5206. These planes are light and as they are all steel they are practically indestructible. Owing to their shape and size they may be readily carried in the pocket of a carpenter's apron and are particularly desirable for use in work on scaffoldings, etc. Mechanics will find the tools substantial, serviceable and convenient and they will also be found particularly suitable for amateur work at home. Each tool is stamped with the trade-mark "Sargent V. B.M." The clamp on both planes is es-

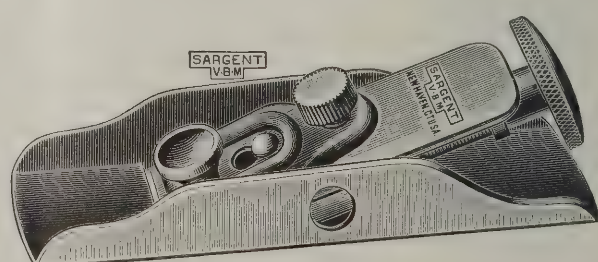


Fig. 12—Low Angle Block Plane

pecially powerful owing to the screw construction which takes the place of the cam generally used on block planes. This is indicated by the fact that it is necessary to loosen the clamp screw before making the lateral or up-and-down adjustment. The adjustments are quickly and easily made, the side adjustment by moving the cutter with the fingers and the up-and-down adjustment by the screw in the rear. On Nos. 4206 and 5206 the head of this screw is made to serve as a handle.

Fisher Automatic Ventilator

A departure from the usual construction of ventilators is made by the makers of the Fisher automatic ventilator, Martin Fisher & Sons, 75 West Chippewa street, Buffalo, N. Y. In this the construction is intended to take advantage of air currents, allowing the moving air to enter in a volume and, as it nears the exit of the inside tube, to be compressed by the force behind and in this way form an ejector of high velocity. In addition to this the moving air passing over the outside shell of the ventilator causes a natural suction at all points around the circular form. An important feature is that, owing to its peculiar construction, back drafts are said to be impossible. A further deflection of the air is made directly across the air to be moved in the ventilator by means of a circular deflector at the rear end of the ejector. The ventilator revolves on opposed ball bearings turning with the slightest wind pressure, which tends to give operation without noise. The Fisher automatic ventilator has been used with success upon all classes of buildings, and under difficult working conditions has proven highly successful. It is said to have been tried and found very efficient in the ventilation of heavy atmosphere, gasoline fumes, barn odors and where it is desired to remove a large amount of foul air, and does not depend on the temperature of the air moved for its successful operation.

The Stanley Miter Box

The Stanley Rule & Level Company, New Britain, Conn., has incorporated a number of new features in its miter box, a general view of which is presented in Fig. 13. As now made the miter box can be adjusted to counteract a saw that runs out of true, this being a distinctive feature and one which the manufacturers strongly emphasize. Uprights, both front and back, are now graduated in sixteenths of inches so that the users can set the movable stops provided to the depth of the cut desired. Another point is that the rear legs are now fitted with cone-pointed leveling screws to prevent the box from sliding when in use. All three of the features mentioned are new and cannot fail to be appreciated by all building mechanics having occasion to make use of a miter box. The box and frame as well as the graduated quadrant and swivel arm bearing are in one piece and accurately machined. The saw guide uprights are steel rods and carry the saw guide cylinder in which the saw works. A second socket in the swivel arm is provided in which the front saw guide upright can be placed, thus permitting the use of a short saw or allowing a much longer stroke with the standard or regular saw. The swivel arm is provided with a tapered index pin which engages in holes placed on the underside of the quadrant. As the pin is tapered it is always tight in the hole; consequently the swivel arm is held rigidly and correctly without any lost motion. The saw is held up by means of automatic catches on the uprights, thus allowing the operator to use both hands in placing the work. A narrow opening in the back of the frame is especially adapted for sawing narrow work.

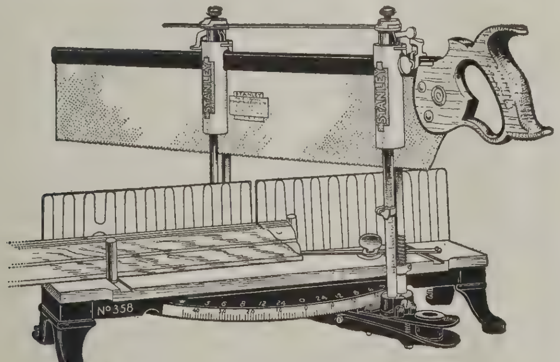


Fig. 13—The Stanley Miter Box

Oshkosh Eveready Saw Rig a "Whole Planing Mill"

The above title tersely describes what the Oshkosh Mfg. Company, 541 South Main street, Oshkosh, Wis., claims for the saw rig which it has introduced under the name "Eveready." The sole effort has been to make it not only a mere saw rig but a machine with which the carpenter and the builder can do all of the more frequent planing mill jobs. To accomplish this a number of attachments are furnished with the machine, these including, in addition to a crosscut and a rip saw, a boring attachment which takes bits of standard size; a heavy and durable jig saw; a 10-in. sander that has an entirely new method of holding the paper; a dado head of special design; a 6-in. emery wheel; an 18-in. saw gauge; an adjustable miter device and a jointer head that works on the plan of a planer. Great care is taken by the company to impress upon the carpenter, the builder, the woodworker or whoever may think of purchasing a machine, that the attachments referred to are not flimsy devices gotten up carelessly and without regard to the exacting requirements of the work which they are expected to perform, but that much money, time and study have been expended to give the purchaser an excellent outfit that will prove entirely satisfactory in every respect. We understand that the company is so confident of the merits of its saw rig that it will allow any responsible carpenter or contractor to put it into actual every-day use for a week and then take it back without charge after the trial if he feels that he can get along without it.

Some "Royal" Ventilators

The group of Royal ventilators, shown in Fig. 14 of the accompanying illustrations, were made by the Royal Ventilator Co., 420 Locust street, Philadelphia, for shipment to the Inland Steel Co., Indian Harbor, Ind. They consist of eleven 48-in. ventilators and six 36-in. ventilators. At the present time the company uses an 80-page catalogue to present the different types of its ventilators. The book gives full information in reference to them and also presents engravings of buildings on which they have been used, including hospitals, churches and residences. The Royal Ventilator Co. has made a specialty of making rectangular as well as round ventilators and has furnished them with either glass or metal tops. Ordinarily the Royal ventilators are made with galvanized steel or iron, brass or copper, but when they are to be used in factory buildings, where the acid fumes are liable to affect these metals, they are furnished of other materials to resist the corrosive effect more successfully.

Fig. 14—Some "Royal" Ventilators

Amos Johnson and His Barn Roof

Amos Johnson was in a particularly good humor, but when he made an examination of the roof of his new barn, which he had put on only two years before, he muttered several times to himself.

"It beats all tarnation," he said, "how it is that I have to be put to the trouble and expense every couple of years patching up and putting on new roofs.

"Here's this new one with big damp spots under it in half a dozen places where the rain has soaked through. The man that sold it said it would last for years. Was on hardly half the first summer before it begun to curl up, and as soon as the first cold rain struck it, it cracked.

"Here's winter coming on and I'll have to spend nearly as much to have the roof fixed as it will cost to put on a brand new one. It's funny that some smart fellow can't invent a roof that won't crack, break, rattle off and leak."

"Hello, Amos," shouted the jolly voice of Henry Smith, Amos Johnson's nearest neighbor; "you look blue all over."

"I am," answered Johnson, "and when I see that storekeeper again that recommended me to take the roofing that's on this barn just because it was a little cheaper, I'll wallop him.

"Has been on only a little over two years and it leaks in a dozen places."

"Why, I had my house, barn, chicken pens, corn-cribs and all my other outbuildings roofed six years ago," said Farmer Smith, with a chuckle, "and I haven't seen a speck of a leak since.

"I used to have the same trouble that you have before I put this kind on. Every couple of years the leaks would begin and every four or five years it was a new roof. Mother and I were only talking about it the other night."

"What is the name of your roofing?" inquired Farmer Johnson, anxiously.

"Genasco Ready Roofing," said Farmer Smith. "It's made of natural Trinidad Lake asphalt, which makes it heatproof, coldproof and waterproof. The weather can't affect it.

"It's easy to put on, too," continued Farmer Smith; "there's a cleat that goes with smooth surface Genasco called the Kant-leak Kleet, which prevents nail-hole leaks. It clamps that seam so tight the roofing acts like one solid sheet of covering. Why, Abner and I put the roof on in no time."

"I'll order it at once," said Farmer Johnson, "and if that storekeeper tries to sell me anything else I'll carry out my threat for sure."

Bit Set for Home Use

C. E. Jennings & Co., 42 Murray street, New York City, has put out a bit set, No. 902½, arrow head brand, especially serviceable about a farm, in a city household or for

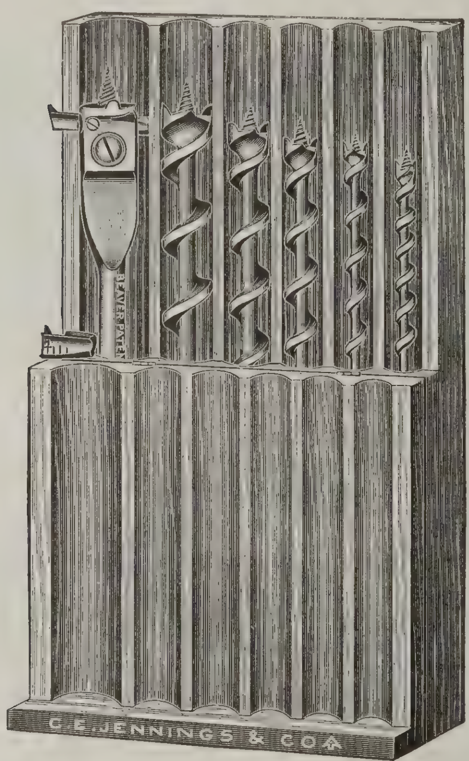


Fig. 15.—Bit Set with Expansion Bit for All Around Service

the professional mechanic. This bit set, illustrated in Fig. 15, is intended to provide a great boring range, ¼ to 3 in., at a low price. Each bit is fully warranted and the expansion bit is designed to afford good all around service when used by the expert. The 902½ X set contains one No. 2½ solid center bit with polished twist, each 4, 6, 8, 10 and 12/16, and one expansive bit with a cutting range up to 3 in. The No. 902½ CX set has the same sizes of bits as the other set, but No. 2½ C solid center bits with Stubbs finish in the twist and polished edges. Both sets are carried in upright Bartlett folding cherry boxes, 10⅞ x 5⅞ x 1⅜ in., with brass hinges and brass side hooks. Single sets weigh about 3 lb. each, cases contain 25 sets, weigh 95 lb. gross and measure outside, in shipping order, 34 x 13 x 9½ in.

"Max Royal" and "Max Ideal" Veneered Doors

We have received from the R. McMillen Company, Oshkosh, Wis., a copy of the very attractive catalogue which it has issued from the press. It is a volume of 80 pages, profusely illustrated with well executed engravings showing leading designs of veneered doors made by the company under the names indicated by the title above. The catalogue is something of a departure as regards shape and size from the stereotyped trade publication in that it measures 7¾ in. in width and 14 in. in hight, thus giving ample opportunity for the display of cuts of doors of somewhat liberal proportions. The leaves are stitched at the back with a silken cord—old gold and black in color. The entire make-up is an excellent example of the printer's art and the catalogue cannot fail to be appreciated by every architect and contracting builder into whose hands a copy may come.

Many styles of "Max Royal" doors are shown, some being made of birch and others of red oak. The same is true of the "Max Ideal" veneered doors and here the designs are sufficiently varied to meet the most exacting requirements. An interesting feature of the catalogue is a series of pages carrying designs of doors printed in colors to represent the actual wood—some of oak and others of birch and red birch. There are also some photographic reproductions of red oak and birch panels which add much to the attractiveness of the catalogue.

In connection with the illustrations is to be found much valuable information relative to the care and finish of hardwood doors, also brief reference to the special features to be found in the hardwood veneered doors as turned out by the R. McMillen Company.

Catalogue of Wood Mantels

A handsome publication consisting of 90 pages and illustrating a varied line of wood mantels has just been issued from the press by the Huber Builders Material Company, 39 to 43 Vine street, Cincinnati, Ohio. It measures 9½ x 12½ in. in size, thus affording opportunity for the use of illustrations of liberal proportions. There is only one design of mantel used on a page and each is presented with great fidelity to detail. The printing is in colors and the results clearly indicate the rich and effective nature of the designs produced. Among the early pages are two colored interiors showing the use of the wood mantel in the sleeping room. In connection with the varied and extensive assortment of new models in many popular designs illustrated within the covers of the catalogue are to be found dimensions of fireplace, mantel and mirror, the number by which each design is designated and an enumeration of the kinds of wood from which made. The entire make-up of the catalogue gives evidence of careful preparation and it constitutes a valuable addition to the library of trade literature for the architect, the builder and the contractor.

Shipping Portland Cement in Bulk

The Universal Portland Cement Company, 72 West Adams street, Chicago, Ill., has recently been making some shipments of Universal Portland Cement in bulk, this probably being the first time that cement has been shipped without being packed in sacks or barrels. The experiment thus far has proved highly satisfactory, the cement arriving at its destination with no signs of loss or damage. A carload of Universal Portland Cement shipped from the company's mill at Buffington and consigned to the Pennsylvania Coal & Supply Company, Milwaukee, Wis., was apparently in the same condition when it reached Milwaukee as when it left the mill. The car was unloaded with shovels into wheelbarrows and the operation seemed to cause less dust than does the handling of cement in sacks. The Universal Portland Cement Company is endeavoring to find out whether the cement companies are wasting a great deal of time, energy and money in the handling of cement sacks. Dealers and cement users who have to team will probably continue to demand shipments in sacks, but factories making cement products and contractors doing big jobs adjacent to railroad tracks and using central mixing plants could probably be served better and more economically with bulk shipments of cement.

The Hill Dryer Company, of Worcester, Mass., and the Hill Canton Company, of Canton, Ohio, and Worcester, Mass., have obtained contracts for the installation of their dryers in 15 of the new fire houses in New York City.

The latest Bulletin of the "Grinnell" Automatic Sprinkler issued by the General Fire Extinguisher Company, Providence, R. I., contains a great deal of interesting information relative to the subject above indicated. The matter is appropriately illustrated and the story which each one tells is suggestive of the value of the Automatic Sprinkler System. Not the least interesting feature of the Bulletin is a record of fires under Grinnell Sprinklers reported between March 1 and June 1 of the current year, and which tend to show the effective nature of this Sprinkler System.

(For Trade Notes see second page following)

DON'T BE PENNY WISE AND POUND FOOLISH

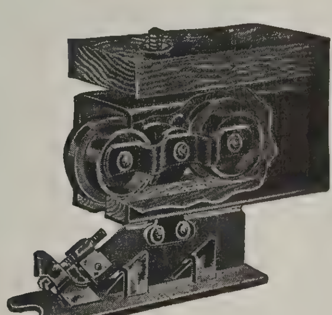
Said Poor Richard

It will take more than the pennies you may save on a cheap hanger to buy a new one to replace it. And think of all the dissatisfaction caused.

Use

Richards-Wilcox

Door Hangers



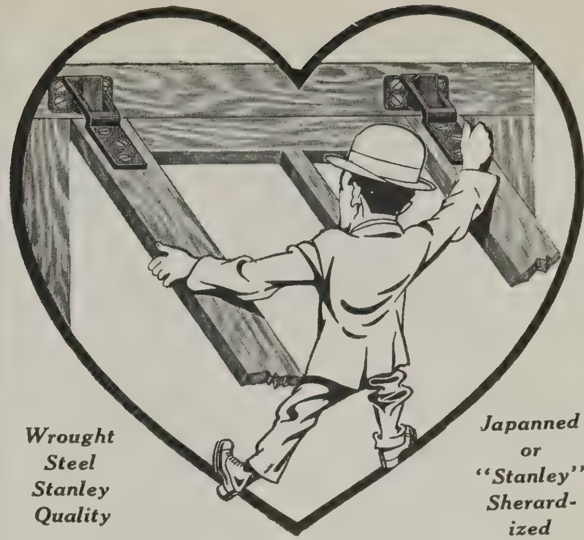
Richards-Wilcox No. 122 Royal Ball-Bearing Trolley House Door Hanger

for barns, granaries, warehouses, garages and homes, and you will get a good, honest, substantial, noiseless Ball Bearing Door Hanger with direct centre draft and adjustment in both hanger and track.

Catalog No. 10 and prices on application.

Richards-Wilcox
MANUFACTURING CO.
AURORA, ILL. U.S.A.

"A Hanger for any Door that Slides"



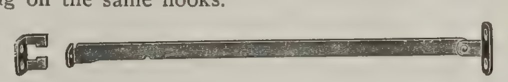
Wrought Steel Stanley Quality

Japanned or "Stanley" Sherardized

"PEERLESS"

Storm Sash Hangers and Fasteners

Once applied, Storm Sash can be quickly taken down and put up without the use of tools. Screens can be hung on the same hooks.



The "Peerless" Fastener

holds the sash firmly in place, either open for ventilation or closed to keep out a storm.

Write for Circular "E." It tells the whole story.

The Stanley Works

NEW YORK NEW BRITAIN, CONN. CHICAGO

Black Diamond File Works

ESTABLISHED 1863 INCORPORATED 1895

TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company

Philadelphia, Pa.

Owned and operated by Nicholson File Company.

TRADE NOTES

J. M. Marston & Co., 201 Ruggles street, Boston, Mass., have issued a catalogue of their hand and foot-power machinery which carpenters, contractors, builders and others operating woodworking shops will find of special interest. One of the machines to which the company invites particular attention is Marston's hand and foot-power circular saw which is mounted on an iron frame 36 in. high. The central part of the top is also made of iron, and is accurately planed. It has grooves on each side of the saw in which the gauges slide. The gears are all machine cut from solid iron. On one side of the machine is a boring table operated by foot treadle.

The Cyclone Vacuum Cleaner Company, Bradford, Pa., is decidedly of the opinion that every modern house should have a vacuum system of cleaning, and that the most efficient way to get it is to *build* it in the house. The machine is usually located in the basement or cellar with a standpipe running to the upper story, while suitable hose connections are made at each floor.

Eastern Granite Roofing Company, 16 Battery place, New York City, states that in laying "Granite" roofing a 6-in. lap is much better than a 3-in. lap, for the reason that it gives better protection against leaks and permits nailing down on the under sheet only, so that no nail heads appear on the surface. The claim is made that its roofing thus laid is immune from damage by coal, smoke or cinders, and it has a sea-grit surface which makes painting unnecessary.

The W. H. Mullins Company, 208 Franklin street, Salem, Ohio, has ready for distribution among architects, builders, contractors and others interested, an attractive catalogue relating to its metal tile roofing which, when put on according to directions, is guaranteed to keep in perfect condition for years. A copy of the catalogue can be secured on application.

Buffalo Wire Works Company, 446 Terrace, Buffalo, N. Y., and with office in New York City at 30 Church street, calls attention to the fact that Greening's Trussed Steel Wire Lathing which it manufactures is so stiff that ceiling or walls plastered over it cannot crack or fall. The claim is made that the lathing will sustain a much greater load than any square mesh cloth of similar weight per square foot; that it requires no furring, as it can be nailed directly to the studs or joist, and that the scratch coat can be worked on easier; has a surer grip and cannot be scraped off.

American Veneer Company, 22 Market street, Kenilworth, N. J., makes a specialty of panels for wainscoting, ceiling, mantels, doors, partitions, cabinets, shelving, etc. which are of any thickness and of any kind of wood, and are made curved or flat.

The William Connors Paint Mfg. Company, Troy, N. Y., makes the distinction that the price of paint and the cost of paint are two different things. A few cents difference in the price does not mean a saving in cost, for final cost depends on the covering capacity and durability in service. The claim is therefore made that a given quantity of American Seal paint will go one third farther than cheaper brands and stay where it is put at high efficiency—twice as long.

The Simonds Mfg. Company, Fitchburg, Mass., states that the Simonds Blue Ribbon Brand hand saw is made of Simonds steel, which is a sufficient guarantee that the saw is evenly tempered throughout all parts of the blade and that the teeth are made of a material which will take just the right amount of set and hold a cutting edge in good shape. There is a saving of power because the saw cuts easily and a saving of time because it requires less filing. The hand saw in question is made sway-back and straight-back, according to preference, and is furnished in either rip or cross-cut tooth, any desired number of points to the inch.

The Sidney Tool Company, Sidney, Ohio, points out that its Famous No. 3 Portable Universal Woodworker is an "ideal outfit for contractors." The combination includes a 27-in. band saw, a 10-in. jointer, an upright shaper, a boring machine and a saw table connected to a five-horse-power gasoline engine fitted with an endless belt. The arrangement is such that more than one machine can be used at the same time when desired.

The Burt Mfg. Company, 312 Main street, Akron, Ohio, recently installed 150 Burt ventilators in connection with skylights on the roof of a commercial building in Detroit, Mich., and as it is obvious that no installation of this size is made without mature deliberation, the fact that the Burt combination skylight and ventilator was selected is striking evidence of the merits of this construction. The Burt ventilators are built either with or without glass tops and each ventilator is provided with the company's patent sliding sleeve damper, which is easily adjusted and offers no lodging place for dust and dirt.

Northrop, Coburn & Dodge Company, 43 Cherry street, New York City, will send to any architect, builder or sheet-metal contractor who may be sufficiently interested to make application for it a copy of an attractive tile booklet showing the company's metal tiling which is referred to as just the thing for the walls and ceilings of kitchens, bathrooms, butcher shops, bakeries, etc., etc. The company also has a catalogue of metal ceilings which are referred to as sanitary and incombustible.

An attractive feature of the latest issue of the Cortright Metal Shingle *Advocate* is a supplement carrying group pictures of buildings covered with Cortright Metal Shingles. There is the usual quota of interesting information relative to this specialty of the Cortright Metal Roofing Company, 50 North Twenty-third Street, Philadelphia, Pa., not the least important of which is a table enumerating the patterns of shingles made, the sizes and the number of shingles per box.

The second issue of "Ideal Ideas" published by the Ideal Concrete Machinery Company, South Bend, Ind., contains an account of the experiences of some of the men who left other lines of business to engage in that of making concrete building blocks. Not only does it give a brief history of these but there is also presented pictures of some of the houses built by these men and also views in their shops. Some suggestions to the concrete manufacturer are given in which reference is made to the machinery of the company in question. The typographical features are well considered and this issue of "Ideal Ideas" is very attractive.

The latest issue of *Graphite* published by the Joseph Dixon Crucible Company, Jersey City, N. J., is unusually interesting and instructive. Primarily it contains much relative to graphite productions and among its special features is a group of likenesses of the St. Louis district sales force of the company together with a few lines relative to each salesman. The pictures in this issue are particularly attractive, especially the First National Bank Building and that of the Life Insurance Company of Virginia, in course of erection at Richmond. The steel work in both buildings was treated to coats of Dixon's silica-graphite paint. Another building illustrated is the home of the Commercial National Bank at Raleigh, N. C., the steel work of which was similarly treated.

The Albertháw Construction Company, 8 Beacon Street, Boston, Mass., has just issued a beautiful 16-page booklet describing the handsome reinforced concrete factory of the Carter's Ink Company, at Cambridge, Mass. The work is well illustrated and shows strikingly the adaptability of reinforced concrete for industrial buildings. A copy may be secured by sending to the Albertháw Construction Company at the above address.

The Lansing Company, Lansing, Mich., has put on the market an all-steel mortar tub for the use of contractors, which is claimed to be lighter than the old style wooden tub since it will not absorb water; is neater in appearance; cleaner, since mortar will not adhere to it; and cheaper in the long run, since it will outwear three wooden boxes. As several of these tubs may be nested together in moving from job to job, they are more conveniently handled.

La Salle Pressed Brick Company, La Salle, Ill., has recently issued a very interesting pamphlet giving a number of attractive designs for mantels constructed from brick manufactured by the company. There are also a number of suggestive hints for grates and the entire make-up is of a character to interest architects, builders and houseowners generally. We understand that a copy of the pamphlet can be had on application.

Corrugated Bar Company, Buffalo, N. Y., has been distributing a series of pamphlets describing the various types of Corr-Products, which include square and round bars, plate floors, line spacers, waterproofing materials and mesh sheets for walls and ceilings. All of these products are illustrated and briefly described, with directions for their use.

The Building Age

NEW YORK, NOVEMBER, 1912

A Garage and Studio Building of Cement Exterior

The Studio a Special Feature of the Arrangement -- Bath Room and Chauffeur's Quarters on the Main Floor

SOMETHING entirely unique in the way of a private garage constitutes the basis of the present article. The problem in designing the building in a way to meet the desires of the owner was to produce a structure for automobiles and having on the second floor a large studio, the architect bearing in mind the fact that the building was to be placed on a conspicuous site on the estate and when completed should not convey too strongly to the mind at first sight the idea of a garage. The front hood of pergola treatment with its large columns of cement standing out boldly, as shown in the half-tone engraving presented upon this page, was built to partially conceal against a flat wall the large double swing doors required in a garage of this character.

As will be seen from an inspection of the picture the building is of the Mission style of architecture wth cement exteror and tile roof of decidedly striking effect. The same general treatment is carried out in connection with the fence, the gate posts, etc., bordering the path leading from the side entrance of the garage to the house of the owner.

The entrance doors are 4 ft. by 8 ft. 6 in. and are 2½ in. thick, the fenders at the jambs of the doors being of concrete.

General Appearance of the Building Showing Main Approach with Ornamental Gateway at the Left

A Garage and Studio Building of Cement Exterior—H. M. Ramsay, Architect, Boston, Mass.

An examination of the plans will clearly indicate the general arrangement carried out on the two floors of the building, while the sectional views taken in conjunction with the half-tone engravings showing interiors, afford suggestions as to construction and finish.

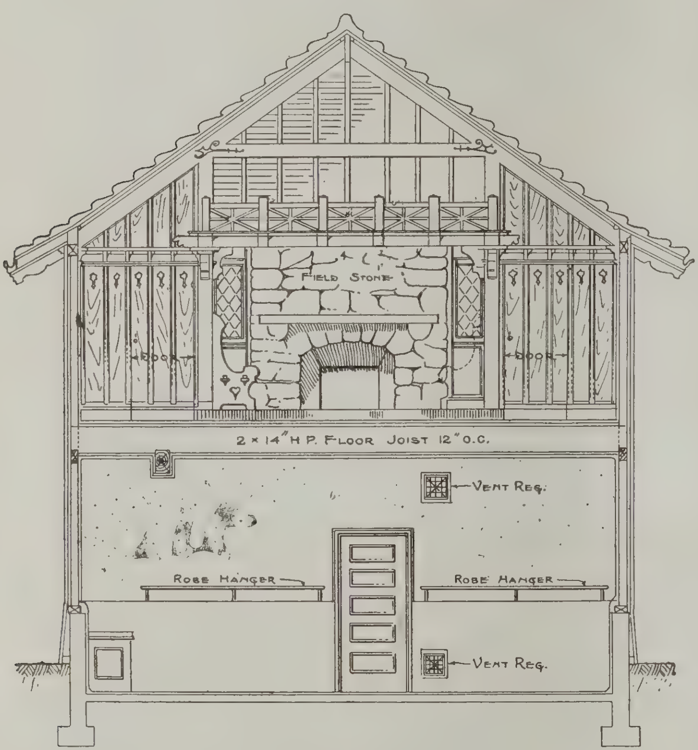
The garage proper has storage room for three cars with chauffeur's room and heater room at the rear. The space for the automobiles has a 5-in. concrete floor with granolithic finish 1 in. thick, the pitch of the floor being toward the catch-basin in the center, as shown on the plan. The granolithic finish extends to the hight of the window sills, above which the walls and ceilings are covered with cement plaster on wire lathing.

The beam running parallel to the space wherein is located the sink and work bench is supported by 3½-in. Lally columns made by the Eagle Column Mfg. Company, Brooklyn, N. Y.

The chauffeur's room has a wood floor over a concrete bed. The bathroom is equipped with wash bowl, water closet and a cast iron shower bath. The floor is of concrete with granolithic finish.

From the passageway, out of which opens the bathroom on the right and the chauffeur's room on the left, one reaches the heater room by descending a flight of four concrete steps. The heater room has a 5-in. concrete floor with granolithic finish, cement plaster walls and ceiling upon wire lath.

There is a 12 x 12-in. galvanized iron vent pipe to the chimney at the ceiling and in the partition wall between the bathroom and the garage proper are 12 x 12-in. vent registers with damper at the floor and ceiling.



Vertical Cross Section of the Building—Scale ⅛ In. to the Foot

A Garage and Studio Building of Cement Exterior

In the garage proper and at the right and left of the passage leading to the rear rooms are polished brass pipe robe hangers supported by brass brackets.

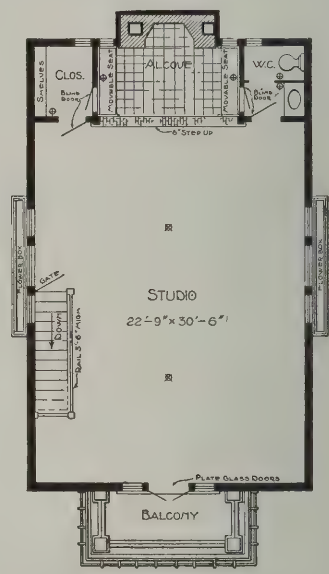
Leading from the first floor to the second is a stairway accessible both from the garage and from an exterior door at the side of the building. This affords the owner and his family a very convenient way to reach the second floor from his house without going through the garage, there being a path from this door to the house. When using the room over the garage the other door renders it convenient to reach the car.

The floor joists are 2 x 14-in. hard pine placed 12 in. on centers, while the rafters are 2 x 8 in. placed 20 in. on centers.

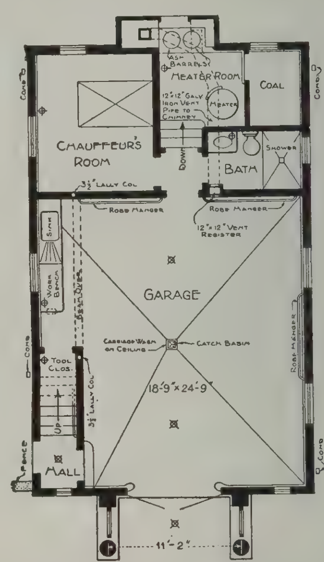
As shown on the plan the second floor of the garage is used as a studio and consists of a large well-lighted room with hardwood floor and oak wainscoting with base and plate rail to the line of the wall plate of the frame. The roof rafters are exposed and planed three sides giving a very impressive effect. Hanging from these rafters are three hammered brass chandeliers of special design.

At the end of the room is a massive field stone fireplace with red quarry tile hearth filling the entire floor of the alcove. This tile floor has a brick border laid over concrete filling on expanded metal. On either side of the fireplace are two seats built so that they can be moved out to any part of the room. At the right of the alcove is a lavatory, beyond which is a water closet. At the left of the alcove is a closet 5 x 6 ft. in size fitted with two shelves.

At the opposite end of the room French doors lead from the studio to a balcony which is so disposed as to prove an admirable place in summer time.



The Studio Floor



Main Floor—Scale 1/16 In. to the Foot

The balcony over the pergola entrance is covered with "M.F." tin, over which is a wood floor laid "open."

The drive and curb leading from the street to the main entrance of the garage are of concrete with granolithic finish.

The building here shown is the garage of Mr. F. M. Archer, Brookline, Mass., and cost to build about $6,000.

The design is that of Harry Morton Ramsay, architect, 50 Bromfield street, Boston, Mass.

Cause and Remedy for Cracked Ceilings

Among the defects of minor importance associated with the completion of a new building, it would be difficult to name any which cause more dissatisfaction and unpleasantness than unsightly cracks in plaster ceilings. These usually make their appearance when the building is ready for occupation, and continue to appear for a considerable time in the most provoking manner.

I would here explain that I am not considering the numerous patent plasters on the market which have been designed to supersede the old-fashioned lime and hair mortar, as I readily admit that the use of these reduces the above defects to a minimum, but in every case which has come under my notice the cost is more, says V. Dorian in a London building journal.

Bearing in mind, therefore, this fact, I will confine my remarks to the ordinary lime and hair mortar, this being the material in general use throughout the country. During a connection with the plastering trade extending over a period of sixteen years, I have been associated with many interesting experiments to find the cause and, perhaps, the remedy for cracked ceilings. In many cases considerable expense has been incurred by the contractors in order to assist the architect and clerk of works to solve the problem. The result of the most elaborate experiments impressed me as only deepening the mystery, for some of the ceilings on which most money was spent turned out the worst of all. To prove that enterprise and ingenuity were not lacking, I will give particulars of the principal cases.

Experiment No. 1.—An old ceiling was removed, the joists, being perfectly sound, remaining. Lathed with best quality hand-riven lath and half, joints broken every 2 ft. and butted. Hand-made mortar, consisting of lime, sand, and best quality hair for first coat, scratched to form key and allowed to stand until "white" dry. Afterward floated carefully and when semi-dry skimmed in usual way.

No. 2.—Joists, lathing, material and first coat as before, but second coat put on when the first was changing color and not quite "white" dry. Skimmed following day.

Experiments 3 and 4.—New joists and new building material as before and the plasterers adopting methods 1 and 2.

No. 5.—Same as 3 and 4, excepting that the mortar passed through a mortar mill.

No. 6.—New joists, best lathing and a bag of cement added to the mortar in one ceiling containing 16 superficial yards.

In all these experiments the sand used, which is, of course, the principal material in regard to bulk, was ordinary pit sand unwashed.

In every instance the ceilings cracked, the way of the joists, the way of the laths, and diagonally.

And now I will relate the most interesting case of all which transpired in the ordinary course of business.

A few years ago I settled in a district where sand is not available. All building and plastering mortar consists of ashes and lime ground in a mortar mill. The ceiling mortar is in the proportion of about three of ashes to one of lime, that for walls about four or five to one. Plasterers in many districts would be surprised to learn that hair is practically an unknown quantity in these places. Experience has proved to me that it is not absolutely necessary, though I still believe it is somewhat desirable. I, of course, argued in favor of using it, but finally gave way before the arguments of the builders and plasterers belonging to the locality.

The result was as follows: Twelve houses were plastered as above, no hair being used. The lath were cheapest quality sawn, lapped at joints and unbroken for the whole length of room. Joists were 7 in. x 2 in. The plastering was let piecework. The ceilings, walls and studded partitions were given one coat about 5/8 in.

View in Garage Proper Looking Toward the Work Bench—Door to Chauffer's Room Seen at the Rear

View in the "Studio" Looking Toward the Open Fireplace and Alcove

A Garage and Studio Building of Cement Exterior thick, rubbed up with float and skimmed when quite firm, but not completely "white" dry. No plaster of paris was used, the plasterers being allowed a "free hand."

I examined these ceilings about six months after occupation and found them practically free from cracks. I examined the key and found it firm and unbroken.

I am inclined to believe that the omission of hair will be felt at a later date. I left the houses with the impression that the key could not possibly stand the same strain as those where good, long hair is used, and I would not care to expose them to any severe test. Otherwise they appeared eminently satisfactory.

By this process of reasoning I arrive at the conclusion that cracked ceilings are chiefly due to the free use of loaming sand. Only in rare and isolated cases is it perfectly clean and all grit. I know the plasterers' intense dislike of sharp sand, and their passion for the kind as much like soil as possible, for in their own expressive phraseology, it "spreads like butter." Work can be carried out with greater ease and rapidity when the inferior kind is used. Not to seem unfair to them, I allow that unless plenty of lime is used plastering with sharp grit sand is most laborious, and a man must work very hard indeed to show good results. It must also be remembered that where clean grit sand is not easily procurable, the same can only be obtained at considerable cost; it must either be imported or local sand must be washed. This can only be done where a good price is paid for the work.

To obtain the best results at the cheapest price in districts where sand is costly, I would advocate the use of good, clean ashes in the proportion of two or three to one of lime, with clean, long hair added, after removing mortar from mill, and worked in with a rake. I have known cases where the hair has been thrown into the mill a few minutes before the grinding is completed, but it is obvious that it must be considerably broken by the grinding process, and this being so, the object for which it is used is thereby to some extent defeated. It is, however, a simple matter to learn the best way of mixing it; a few handfuls thrown into a pan will be a sufficient test for the purpose.

Domestic ashes and flue dust are more objectionable than cheap sand and should, therefore, never be used. Those supplied by railway companies, colliery companies or other large works give excellent results.

With this material, as with all lime and hair mortar, it is essential that a good key should be allowed in all lathing. A case is mentioned above where the laths were lapped at joints, and though this is very common on cottages, it is not good work. I am, however, convinced that very good results may be obtained by two-coat work.

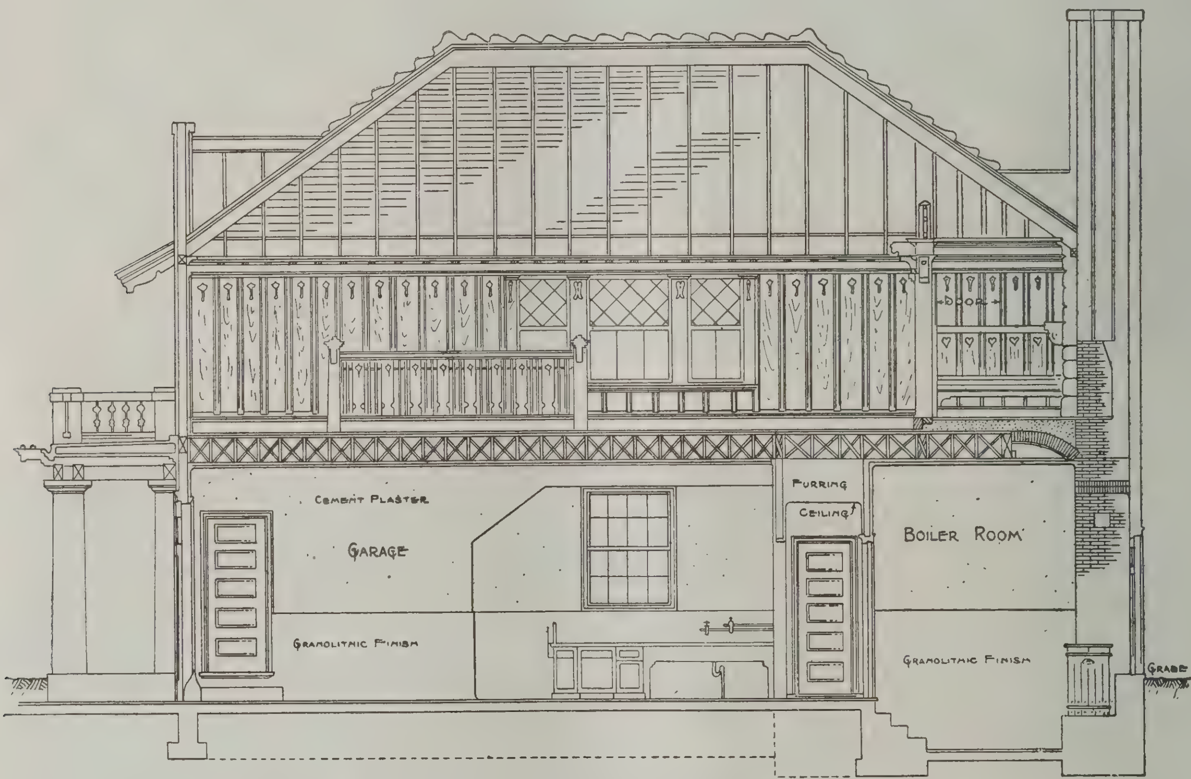
Sawdust Concrete

When sawdust or wood pulp is used as part of the aggregate in mixing the resulting concrete is of light weight and low tensile strength, but has some special properties that commend it for certain indoor uses. On account of its elasticity, combined with its practically non-absorbent character, it is said to be especially adapted as a floor veneer for butcher shops, saloons, etc.

It may be laid without joints, says a writer in the *Cement World*, in a continuous layer one and a half inches deep, upon paper spread over the floor that is being treated. In these cases the customary proportions for mixing are one part cement, two sand and two and a half sawdust.

A novel application of sawdust concrete has recently been made in the New Public Library building in Springfield, Mass. It was employed there as a base on which to lay the cork carpet covering the floors. The object was to obtain a layer into which nails could be driven and which at the same time would hold the nails.

The company that laid it states that it accomplished both purposes. After several experiments with different mixtures it was found that a 1:2:¾ mix—three-fourths of a part of sawdust—gave the desired result; and 5,000 square feet of this mixture was laid. The thickness of the layer was one inch, and after four months indications are that the material is a success.



Vertical Longitudinal Section Through the Building—Scale ⅛ In. to the Foot

A Garage and Studio Building of Cement Exterior

Rustic or Field-Stone Masonry

Some Suggestions to Be Followed if Good Work Is to Be Accomplished

By Lawrence S. Keir

IN the last issue we were discussing at the close of the chapter the subject of "weather pointing" and in this number we show by means of Fig. 12 the appearance of "weather pointed" work in a large mass. The picture is of an Episcopal church at Cragsmoor, N. Y., the architect being F. S. Dellenbaugh. The stones are laid in Portland cement with a little lime added and the walls are not covered on the inside with the exception of the wainscoting but show the natural stone. The church is used only during the summer. An interior view is presented in Fig. 13.

There is illustrated in Fig. 14 an object lesson to any good mason. The picturesque little gate-house has been spoiled by having the stone work laid hap-hazard. It will be seen that most of the stones are laid on the slant with apparently no attempt at bond and in a curved wall at that. A real mechanic would no more think of laying stone in this manner than he would of stacking boards on edge.

The general idea of the man who had this work done seems to have been that as stone was used just as it was picked up in the fields and not dressed with the hammer—any way to pile them up was good enough and that any mason could do the work. This is far from the fact, for only a man having experience in this line can do the work so as to bring out to the fullest extent the beauty of the work and at the same time make a permanent job of it.

It takes time and care to do good stone work. The writer once worked for a man having the reputation of laying more stone in a day than any other man in that section of the country. The fact of the matter

Fig. 12—The Appearance of Weather Pointed Work in a Large Mass

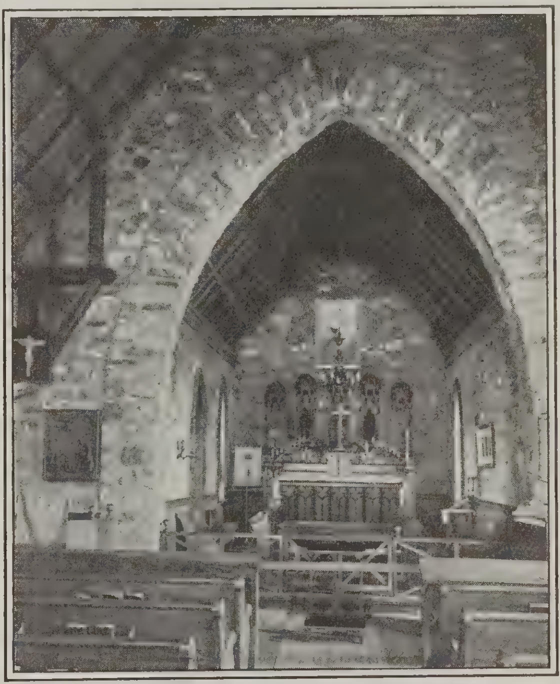


Fig. 13—Interior View of the Church Shown in Fig. 12

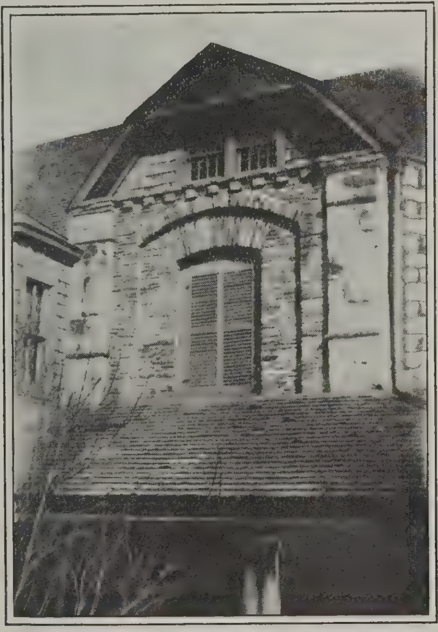


Fig. 15—A Rather Unusual Treatment Involving the Use of Common Field Stone

Fig. 14—An Object Lesson to Any Good Mason

Rustic or Field-Stone Masonry

was the stones were not laid at all but merely piled up in any fashion whatever to get them there and any mason who was wiry enough to stand the "dragging" could have done the same amount of work if he did it in the same careless way. Right here is where many mistakes are made. Portland cement being such an excellent mortar, the mason often relies on it to hold some of the stones in place. This is not good practice because every stone should be placed just as if no mortar had been used. Walls laid of small round cobbles are really not stone walls, but are, properly speaking, concrete walls. These walls are sometimes constructed by having a wooden form built on the inside, after which the face is laid with small stones and filled back to the "form" with a rich concrete. A very good wall can be built in this manner.

A rather unusual treatment is seen in Fig. 15. Here the pilasters at either side of the window are of common field stone, while the arches and jambs are of common field slates such as are found in numerous

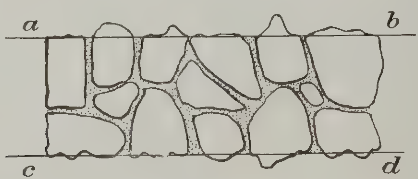


Fig. 18—Showing Two Methods Used in Laying to the Line

Fig. 16—A Sun Dial Mounted on Rough Stone Foundation

Avoid the use of many small stones in the face of the wall and do not use chips where they will show.

Do not lay one stone snug against another; have every stone well bedded in mortar on all sides.

In turning arches keep the joints parallel to the radius of the arch.

When mixing colors measure everything every time; also observe this rule when using lime in cement mortar. Do not use much lime.

Use judgment. Do not make the face of the wall too smooth nor yet so rough that the stone appears about to fall. There is a happy medium.

Be sure to break joints.

Keep walls and piers plumb. This can be done no matter how rough may be the stones.

Above all things, do not hammer or mar the face of the stone. If you cannot lay the stone without hammering the faces, you do not belong on the job.

It is also well to use judgment in selecting the stone. Huge boulders do not, as a rule, look well in small foundations, nor do pebbles look well in heavy walls.

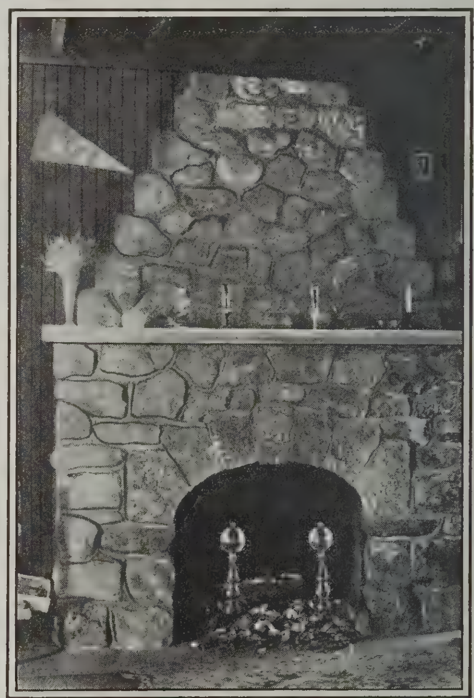


Fig. 17—An Open Fireplace and Chimney Breast Constructed of Field Stone

Rustic or Field-Stone Masonry

sections. These slates are from 1½ to 2 in. thick of an irregular length. The effect is very pretty.

The sun dial in Fig. 16 shows another unusual use for rough stone. The dial face is of cement.

A good example of inside work is shown in Fig. 17, which represents an open fireplace and chimney breast of field stone. The shelf and hearth are of cement. The writer would call the attention of the reader to the finished appearance of the work.

In order to do good rustic stone work, the following are some of the things that should be observed:

Be sure to have a good foundation—one well below the frost line.

Never use sloppy mortar nor wet or frosty stone. If necessary to use salt to prevent freezing, keep the cement well back from the face of the wall and wait until spring to point up. However, the best results are never obtained by laying stone in freezing weather.

Do not lay stone on end nor on edge, neither place flat stone on the slant. As far as possible keep the long way of the stone horizontal.

Be careful not to put a lot of small stones in one place and bunch several of the largest stones in another.

This also applies to smooth stones and rough stones; to light colored ones and to dark colored ones. Be careful to distribute any flat stones that are used evenly throughout the wall.

Make it a point to avoid laying the wall in courses.

The joints should run in every direction and should be broken in every direction.

There are two methods used in laying to the line. One way is to keep the stone having even or nearly even faces with the face to the line and let all very rough stones lie with the projections on the face of the stones beyond the line. Keep the mortar joints about half an inch back of the line.

The other way is to average the face of the medium rough stone on the line and let any unusual projections overhang.

The two methods are illustrated in Fig. 18, where *a* and *b* show the position of the line in the first method and *c* and *d* the line in the second method. The plumb line is used in the same way on the corners.

Where two masons work on the same stretch of wall they should observe each other's work and try to keep the appearance of the wall as nearly uniform as possible. It is even well in some cases to change hands occasionally, as there is usually a very marked individuality in each man's work, and the wall will show and look different where each man worked unless care is taken to work one section into another.

Just what the difference is may sometimes be difficult to determine, yet it is so marked that where the different masons are known it is an easy matter to point out different jobs and tell by the general appearance of the walls which masons laid them.

In laying piers of any kind make them of good size. Spindly stone piers are not things of beauty.

The chimney shown in Fig. 19 is really brick work, the brick being the misshapen bloated brick and chunks that have become glazed together in firing and which a few years ago were considered useless. Because of the roughness of this line of brick work the rustic stone mason is sometimes called upon to do the work. In Fig. 20 is shown a vine-clad terrace and steps, while Fig. 21 shows a small office at a summer resort. It is used only by a doctor as an office, but would also make an excellent real estate office.

Both in very small and large buildings field stone may be used to advantage. It is equally effective when used for entire exterior walls of a house or for the first story only. Even when used for just the foundations, porch columns and perhaps a bow window or outside fireplace and chimney it adds wonderfully to the appearance of a building.

In connection with brick, stucco or concrete it shows up well and a little experimenting will soon convince one that we do not combine these materials nearly as often as we should.

Fig. 19—A Chimney of Rough Brick

Fig. 20—A Vine-Clad Terrace and Steps of Stone

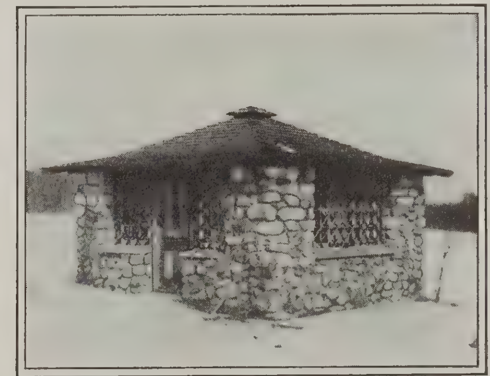


Fig. 21—A Cobblestone Office at a Summer Resort

Rustic or Field-Stone Masonry

Some Comments on Noisy Plumbing

In the effort of architects, plumbers and sanitarians to protect plumbing installations within buildings, they should not lose sight of the fact that no matter how well appointed the work may be, or however perfect the operation of the fixtures might appear, the work is far from being perfect if it is noisy when in use. This feature of plumbing work has been too long ignored, and striking evidence of the fact may be observed in most homes, where from any room, or any part of the building, the operation of the water closet in the bath room can be heard. Disagreeable as this feature of the use of plumbing fixtures is, it is not necessary, and can be avoided by co-operation of the plumber, architect and manufacturer.

Most of the noise of plumbing work can be traced to four different causes, any one of which can be easily and inexpensively eliminated. Noisy water closets are due chiefly to the singing and hissing of water flowing through the supply pipe; to noisy ball cocks, which close so slowly that a disagreeable hissing noise is evident for some time before the water is shut off; to the way the flushing water strikes the contents of the closet bowl, and to the dashing of water against the sides of the soil stack when flowing to the sewer. The noise due to water flowing through the supply pipes can be eliminated by making the fixture branches sufficiently large so that the velocity through the pipes will be very low. This is where the architect can contribute to the noiselessness of plumbing, by specifying large size water supply pipes.

He can still further improve his work by investigating the merits of closets more closely, and not assume that all closets will work equally well. Manufacturers must supply goods to fill the demand already created and for this purpose must carry an extensive line of goods suitable for all places, conditions and prices. In many buildings the noise of a water closet is not objectionable, so long as it can be had at a cheaper price than the noiseless kinds, and to fill such orders the manufacturers must stand ready. In the better class of work, however, such as private houses and hotels, noiseless closets are preferable, and the architect will do well to look carefully into the merits of the various combinations, so that when in need of noiseless goods he can specify them by the plate number. Knowing the quality of the closets he specifies he should then insist upon getting those fixtures and no other.

The design of water closets influences to a great extent the noiselessness of operation, and here the law of the survival of the fittest should intervene to eliminate in time the less desirable. This probability is the more likely as, in proportion as closets are more sanitary and satisfactory in other ways, they likewise are less noisy. Siphon-jet water closets, which are the most nearly perfect of any closets yet designed, are by far the least noisy; the water is removed from such closets by siphonic action, induced by a submerged jet, and only sufficient water flows down the sides of the bowls to flush the surface. The bowls are so designed, however, that the chance of being soiled is reduced to the minimum; consequently, a strong flush of water concentrated into a torrent is not needed at any one point to cleanse the bowl. In washout closets, on the other hand, the contents are swept out of the bowl by a large flush of water, concentrated at one point, and as the water leaves the bowl it is dashed against the sides of the closet outlet, churning the water into foam and creating a disagreeable noise. In wash-down closets the water is actually beaten out of the bowl by a torrent of water poured in from the tank, and as water cannot be poured onto water without creating a noise, this type of closet is far from being noiseless. It follows that when the least noisy type of closet is desired a siphon-jet closet should be selected.

Final Cause of the Noise

The final cause which contributes to the noise of water closets, says a writer in *Modern Sanitation*, is the washing of water against the sides of the soil pipe. When this pipe from the bath room passes down a partition alongside of a dining room or living room, as it often does in private houses, the noise caused by the discharge of a closet in the bath room becomes quite perceptible and very disagreeable. Noise from this source can be deadened to a great extent by installing three-inch instead of four-inch soil pipe. In the smaller pipe there is less room for the water to be dashed about in, consequently the impulse which produces the noise will be less; in the second place, the smaller the pipe the less the vibration, and a correspondingly smaller sound wave. The sound produced in a soil stack can be still further reduced by packing it in some non-conductor of sound and here, again, a three-inch pipe lends itself better than a four-inch pipe to the packing, for with a three-inch pipe there is more room in an ordinary four-inch partition. Filling that section of the partition between the two studding where a soil pipe is concealed with cement or mortar will deaden the sound so that if a three-inch pipe be used little or no noise will be perceptible.

When all the precautions outlined in the foregoing paragraph are complied with there will still remain some little noise in the bath room. This might not be more than the splashing of a bather in the bath tub, but this sound can be deadened by making the walls surrounding a bath room sound-proof, and by hanging sound-proof doors in the door openings.

Another Source of Noise

Another source of noise in plumbing is due to water hammer in pipes, or to vibration of loose parts of a faucet when water is running. The remedies for these noises are so obvious that the plumber, whose work it is, can easily eliminate the cause. Water hammer can be avoided by using slow-closing cocks and faucets and placing air chambers wherever they are required in the system. It may also be reduced to the minimum by installing such large supply pipes that the velocity will be reduced to the minimum. Noises due to loose parts of a faucet can be easily remedied by making tight the loose parts. In conclusion, it may be said that the architect who designs and the plumber who installs noiseless plumbing will give far greater satisfaction to their clients than those who design and install noisy plumbing, and it is pleased clients who advertise a business and bring return orders to the office.

How to Start Contracting

It is the aim of every ambitious young man who selects carpentry and building as his chosen calling to some day become a contractor, but the difficulty of securing a start in the business doubtless keeps many a good man in the ranks of the employees. Some very interesting suggestions as to the ways and means of starting in the contracting business are found in an article which recently appeared in *The Contractor*, and we have selected the following extracts as likely to prove interesting to readers of the *Building Age*:

With an adequate knowledge of construction, and with a small capital, there are numerous methods and ways of starting at contracting. If a man wishes to enter the building field, it may be possible to buy certain real estate in some growing section of a city, and by selling part obtain money enough to build houses on the rest. This would be combining construction work with real estate dealing.

Another method is to specialize in some part of building construction. Nearly every building in a city today has concrete foundations and footings, and the outfit to do such work is not expensive. The beginner can get in touch with building contractors and show them that he can save them money in this class of work and yet give them a quick and good job. The first few jobs may be difficult to obtain, but a few jobs well done will be the means of getting others.

A Foreman Should be Placed in Charge of the Work

As soon as a contract is obtained a good foreman should be placed in charge of the work, but the contractor should give the job his personal attention, leaving it only to see about other work. The excavation of the foundation and cellar may also be obtained, but a more expensive outfit is needed for this class of work, yet most of it can be rented. Builders also sublet other classes of work, such as plastering, metal and steel work, painting, etc. In some cities some men are doing well in the line of manufacturing and selling concrete blocks. Others are furnishing mortar to builders, mixing it by machines at a central mixing plant and delivering it in wagons. We have heard of a firm of young men that, from plans furnished, bend and fasten together all reinforcing steel for concrete buildings. The builder furnishes the steel and the sub-contractor does the work on it.

Man with Limited Means

A man with limited means can enter contracting by taking sub-contracts for driving piles. Simple jobs can be undertaken first, and as money is earned better machines can be purchased that will allow of special work being undertaken.

In wagon-road work, an easy method for a man to learn about this class of construction is to purchase a steam roller, and if possible operate it himself, renting it to contractors who may be doing work nearby.

For sewer work, excavating machines can be rented or purchased, and the excavation of the trenches can be sub-contracted. In other cases the concrete work could be obtained from the general contractor.

On railroad construction one of the best methods of getting started is to sub-contract small culverts from the general contractor. Whether these are built with wet or dry rubble masonry or of concrete, the plant is very simple and seldom costs over fifteen hundred dollars; for rubble masonry much less.

Building a Wooden Silo

Size of Materials to Be Used -- Method of Bracing the Corners -- Various Details of Construction

A SHORT time since there appeared in the Correspondence Department a letter from a writer discussing the inquiry of a reader in New Hampshire, who desired information concerning the construction of a brick silo. He was of the opinion that a brick silo would hardly give satisfactory results and suggested to the reader making the inquiry that he use stone. At the same time he offered to furnish for publication a good plan of a cold-climate wooden silo which any carpenter could build and which would be cheap, practically frost-proof and durable. We now take pleasure in presenting to the attention of our readers and especially to the New Hampshire correspondent the drawings and descriptive data relating to this wooden silo contributed by the correspondent in question—D. P. Barry, Redford, N. Y. Fig. 1 represents a perspective of the frame work, showing the sills, corner posts, girts and braces in position, while Fig. 2 is a plan of the framing. Fig. 3 is a vertical section showing the vertical inside boarding, while Fig. 4 is a detail showing the construction of the hollow corner and the placing of the octagonal braces.

In describing the construction Mr. Barry offers a few words of explanation likely to be of interest to those using silos. He states that the sills may be 4 x 8 in. in size and of hemlock, Norway pine or Southern pine, 16 ft. in length and braced as shown in the drawings. The corners are 2 x 6 in. and 2 x 8 in., nailed together at right angles or solid and cut 14 in. long for the first 15 ft. in hight, after which they may be gradually lengthened to 30 in.

The girts are 2 x 8 in. and are lapped and spiked at the corners. Short leveling pieces 2 in. thick are placed under the low end of the corner ties or braces, as clearly indicated in the framing perspective, Fig. 1, and in the detail, Fig. 4. Vertical braces may be utilized if preferred in much the same way as in the corners of a balloon frame.

A ventilator is placed in the lower corner of the silo on the windy side, and an outlet is placed at the top of the opposite side. The ventilator doors should be flush

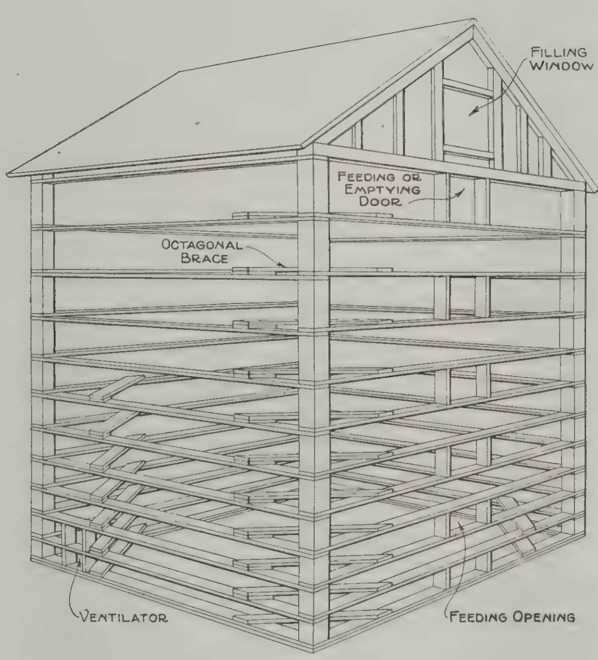


Fig. 1—Perspective of the Framing of the Silo

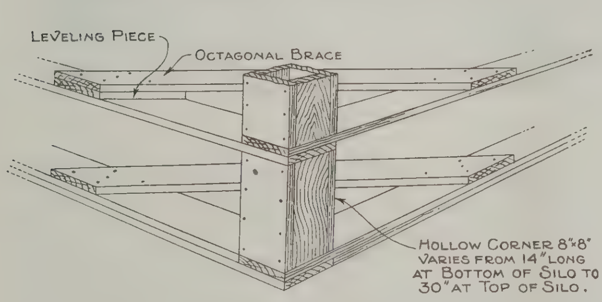


Fig. 2—Detail Showing the Corner Construction with Its Octagonal Bracing

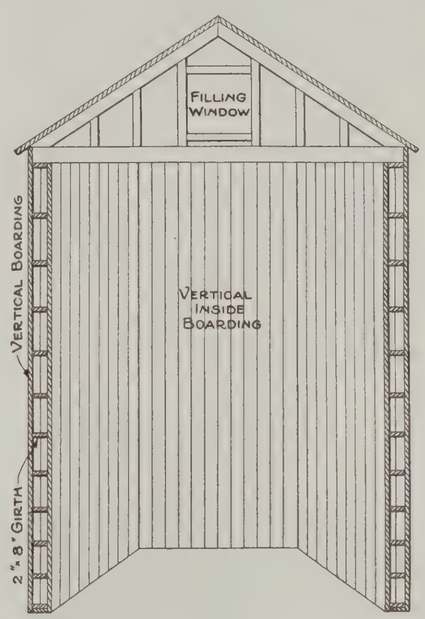


Fig. 3—A Vertical Cross Section of the Silo Showing the Wall Construction and Inside Boarding

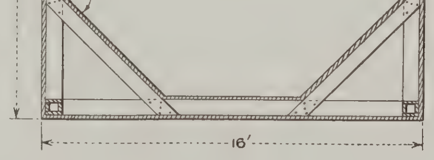


Fig. 4—Plan of the Framing—Scale ⅛ In. to the Foot

Building a Wooden Silo—By D. P. Barry

with the outside boarding and air tight without cutting any girts. If by any possibility the girts are cut, they should be well crippled. The filling window should be in one sash and swing on hinges to the inside with a storm door outside. The top ventilator should be opened and shut by means of a rope and should be kept closed in freezing weather.

The roof may be gable, or gable in front and hipped behind with a permanent double air-tight window. The feed openings may vary to suit the owner.

The inside and outside of the frame may be covered with matched hemlock, Southern pine or cypress. The inside boarding should not be painted or tarred.

The silo may be set on the walls of an underground portion as deep as 16 ft. and laid up with field stones.

The construction is of simple square work. Between the horizontal girt and in the corners is a dead air space. The building is square outside and octagonal inside. The feed openings should be arranged to cut no girts and should slide up and down. They should have outside storm shutters swinging out and fastened with hooks from the inside.

It may not be without interest to state that each horizontal section of the frame can be nailed together and then set upon the short corner posts. The corner spaces at the top should be tightly covered by matched lumber nailed on top of the girts and braces. The corners may be solid timber if such construction is preferred or if it should prove to be cheaper in the locality where the silo is erected.

It has been demonstrated that underground silos 15 ft. deep are practicable and free from gas. The silo here shown may also be rough boarded inside and then plastered with cement applied to metal lath. The outside may be boarded diagonally with rough lumber papered and then clapboarded or covered with metal.

The silo may be built as half or quarter of some other necessary building and of any size by simply using proportional girts.

There is great need for small capacity silos, and the one here illustrated can profitably be built small enough to meet the requirements of only one or two cows, if such be necessary.

Mr. Barry states that many farmers in his section are now building silos in half of a bay in their barns by lining inside of the girts and putting in concrete bottoms. He points out that many stave silos now in existence are warped and out of plumb; others are guyed with long rods, and one near him which was less than two years old blew down. All these may be seen, he says, in a drive of 20 miles.

The drawings here presented so clearly indicate the basic construction that we are quite sure the average builder will have no trouble in readily understanding what is intended.

A Country Home in England

We present in the half-tone engraving on this page a picture of a house upon a country estate in England. Like the general run of houses of this kind it covers an extended area, for ground space is hardly ever a consideration in an undertaking of this nature. The main building, it will be seen, is two stories and attic in hight, while the wings at the right and left are two stories. The materials of which the building is constructed are brick, with pressed tiles for the walls of the upper stories. The roofs are covered with hand-made tiles.

A Country House in England—View of the Garden Front

Most of the joinery and paneling is of oak, but in the billiard room it is of bird's-eye veneer mahogany inlaid with green shell and mother-o'-pearl.

The house was designed by Arnold Mitchell, a member of the Royal Institute of British Architects, 17 Hanover Square, London, England, and the contract was executed by John Parnell & Sons of Rugby.

For a long time past 12 stories has been the usual hight of the high-class apartment house in New York City, but the limit has now been exceeded and a 17-story apartment house has been planned for the corner of Park avenue and Seventy-ninth street. One of 16 stories has been planned for the Broadway block front extending from 115th to 116th street.

Influence of Antique Models on Present-Day Furniture

Various Forms of Tables Described — The Tray Table — The Telephone Table

By Paul D. Otter

IN the two previous articles a general view and discussion of furniture forms was given. Time has tested these forms and other general characteristic features described in those articles, and it will be found that the influence of these "periods" actively determines our form of furniture as does the period style of the building determine the nature and decoration of the room within, and so it is with the intention of dividing the furniture family under headings that the subject of tables is now considered. It is not so much what we make for ourselves in unrestrained enthusiasm, urged on by watching the clean shavings curl from our plane, but it is what others might think of our product when we get through with it that impels us to consider with some deference, what is in the market?—what kind of furniture is the home furnisher seeking?

In this inspection of present furniture it will inspire the practical tool user with increased confidence that many of the furniture forms bought by discriminating purchasers he can make for his own home and use them also as models for private orders.

With this idea in mind the present subject has been prepared, presenting types of simple construction and of the character which will harmonize well in the furnishing of the modest home; particularly will others fit in well with the bungalow and concrete order of home, the character of which originally springs from the same source as shown in many under consideration.

Having a two-fold use, Fig. 1 is very desirable in the small cottage or bungalow home where the dining room is frequently the living room. It is well adapted for beginners in the home life and when not in use looks well against the wall as a settle, particularly when the room has a timbered or paneled treatment.

Fig. 4—A Gate Leg Table

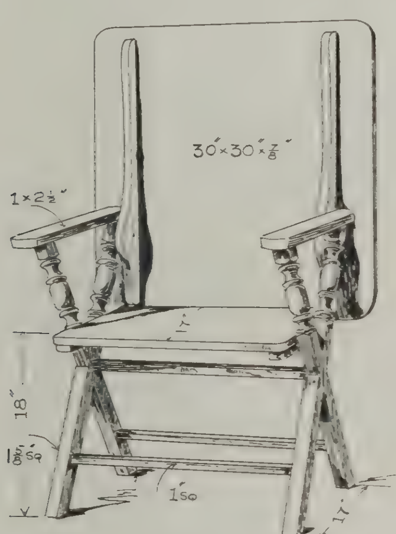


Fig. 1.—Table Chair 29½-In. High Shown with Top Down

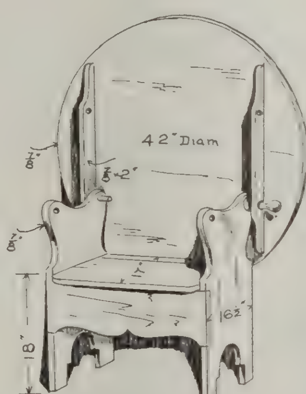


Fig. 2—A Settle Table 29½ In. High Shown with Top Down

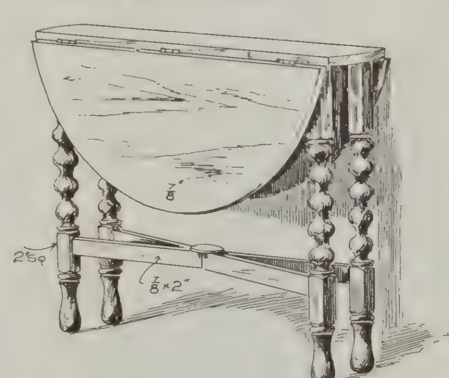


Fig. 3—An English Breakfast Table with 36x36 In. Top

Influence of Antique Models on Present-Day Furniture

It might be well to note here in passing that all such pieces of furniture never look well in natural or light finish, even golden oak finish, for much of the square furniture is too light. The main purpose and most satisfactory color finish is to get age brown tones immediately, as they blend well with drapes, rugs and all other furnishings. Such a tone, you will notice, accords well with standard tones adopted by the architect and decorator. This age tone is commonly known under the name of "fumed" oak." "Cathedral oak" is another pleasing shade of brown. Oak is also a safe wood to use for furniture of a medieval type, or that which partakes of a sturdy character and possesses a combination of square and round-turned parts.

It is assumed a sufficient working drawing be made showing the end view of the subject and also one-half of the front view. With the skill of a workman and the experience in getting out and handling stock much of unnecessary and familiar detail need not be placed on the drawing if time does not permit. The use of the drawing will be to pencil in between determined measurements unknown detail of form and outline. Other simple parts may with judgment be arranged for and fitted as the work proceeds.

These remarks do not, of course, minimize the value of a clearly defined working drawing, should there be any need of referring to it at some later time or of making a modified interpretation of the same class of subject.

Well seasoned wood should at all times be made use of and generous well fitting tenons be given to the cross stretchers which should go clear through the thickness of cross legs and further secured either by a headless brad or a hardwood peg. The top of the table may operate on a bolt or lag screw secured through a hole in the enlarged part of batten and pass into arm or back post. This is a matter of experimenting and also the location of top in central position over the base when down in place.

Little need be said of the settle table in Fig. 2 except to call attention to another use of the compartment under the lift-up seat. This is entirely of ⅞-in. boards. The drawing here shown represents a familiar type of early English or early colony utility table. It admits, however, of varied outline and more elaborate treatment. Sometimes the seat is padded and upholstered with a padded and upholstered panel treatment, covering much of the space within the battens of the underside of the top. This, then, to use an expression, "puts it in another class" and identifies it more with the furnishings of a craftsman's living room.

It is desired by the aid of the cuts shown to excite individual expression as much as possible. Much of the old furniture is interesting from the ingenious devices or construction, designed just as much then as to-day, to serve a double purpose, and it is hoped that the spark of inventive genius may be fanned into a flame of enthusiasm for other simplifying means or comfort-giving features. Meanwhile curb any desire to change good form for some untrained outline or erratic profile to your turnings; rather seek out and make a rough pencil sketch of a bit of turning or an approved outline which you think would apply to a particular form of furniture needing a little more grace or livelier expression to it by a change of outline, or an added bit of modest carving or moulding.

Fig. 3 presents an English breakfast table which is coming again into renewed favor. It has its advantages of looking well when not used as a meal table and of being useful for other purposes.

The marked revival of needlework among ladies demands attractiveness in table designs and for this reason the antique models are more than ever being reproduced, fashion dictating that luncheons be served on bare table tops over open lace work doilies and scarfs. A becoming design of table is therefore much in demand. A simple turned shape to the posts of the Jacobean period is shown, although other profiles may be used. Two specially fitted hinges screwed firmly in the usual way to ends of leg strainers and brought together by a central pin covered by finishing cap will provide one of the many ways of throwing open the legs to a square position under the table top.

Certain unobtrusive stops and a locking device to be provided to check the posts at a determined position. Whatever may be the diameter of the table, make the center of the table about 3 in. less than a third of the diameter.

The size of leg stock shown on cut is for the larger size of table, 48 in. x 48 in.

Fig. 4 is now one of the very popular forms of gate leg tables—most frequently made in mahogany. This fits in well with furniture of a mahogany order, as does most of the William and Mary style, of which this is a suggestion.

The gate with the halved out post A fitting into cross rail correspondingly halved in a loose fitting manner, pivots or swings out from post, loosely pivoting on top of rail. The corresponding gate on other side of table swings out in a similar but alternating direction, stopping at a check at right angles with the table frame. All dropleaf tables should be treated with a rule joint contact with leaf and top of table.

Fig. 5 meets with favor now even though its class

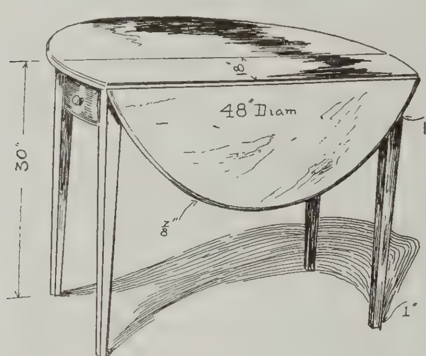


Fig. 5—A "Sheraton" Dining Table, 42 or 48 In. in Diameter

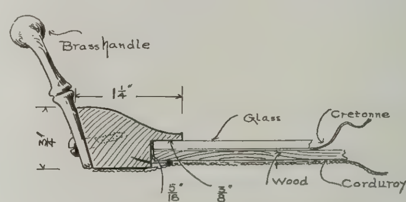


Fig. 8—Section of Serving Tray for the Tray Table Shown in Fig. 7

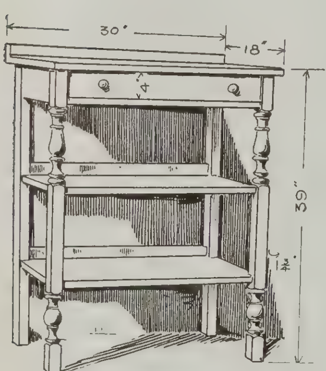


Fig. 6—A Serving Table

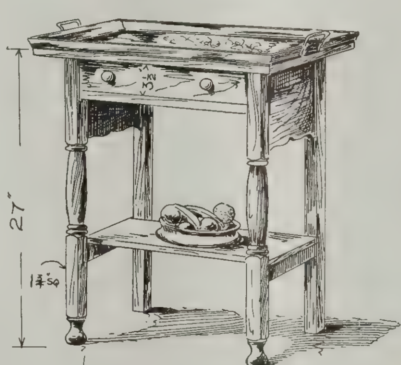


Fig. 7—A Tray Table to Fit Glass Tray 10 x 25 In.

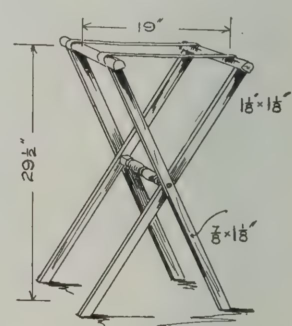


Fig. 9—Tray Stand to Be Used in Connection with Glass Tray, Fig. 8

Influence of Antique Models on Present-Day Furniture was replaced by the pedestal table, yet it, too, has the merit of side wall attractiveness which the modern table cannot have. The leaves are usually supported by a stiff swinging cross bar set into top of apron rail. Care should be used in the selection of dry lumber for the tops and also to screw on a batten, using *no glue,* but setting each screw in a small slot so that the top may shrink and expand unretarded.

Mahogany, or birch finished mahogany, is properly the wood for this table and more particularly if it is made in a smaller size than a 42-in. top.

We used to feel very well satisfied with the ordinary dining table and a direct communication to the kitchen and the pantry, but now our needs, through a process of refinement, must take on considerable complexity, all of which adds to home charms and the wife's pleasure in displaying in an attractive way and on suitable furniture her growing collection of silver, cut glass, decorated ware, and last but not least, her linen, for every day or on festal occasions. This requires us to show Fig. 6, a serving table, which is very simple and plain, being a sort of second cousin of the more aristocratic sideboard. It is one remove from the buffet and consequently about fits in with our modest ideas of living and the useful furniture we need about a bungalow or that class of home.

Little need be said about this except that a form of frame made similar to one suggested in Fig. 13 is to be used as a base of construction and the two lower shelves are to be cut out and fitted in a similar manner. The shelves may be secured to posts from the underside by means of a counter-bored screw hole bored on a long slant. This simple sideboard is becoming a necessity, as in a home without servants it permits of extra table furnishings and the desserts to be placed in readiness before the meal is begun, thus creating greater repose for the housewife.

Fig. 7 offers a good substitute or even an adjunct to Fig. 6, being a tray table which provides a proper resting place for the glass filled tray when not in use.

We do not pass the social hour or two without on many occasions being served with refreshments, and the tray has truly become a necessary article, and like everything else an object of attractiveness and friendly rivalry as to who will own the prettiest tray.

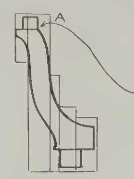


Fig. 12—Half Shape of Lyre Pedestal Showing Manner of Gluing Up Irregular Shape

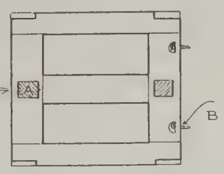


Fig. 13—Frame for Sewing Table

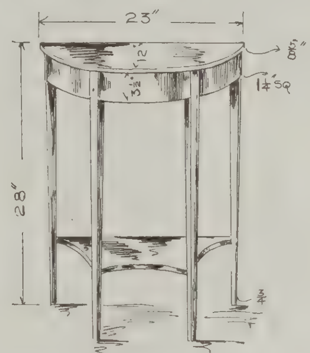


Fig. 15—A "Sheraton" Side Table

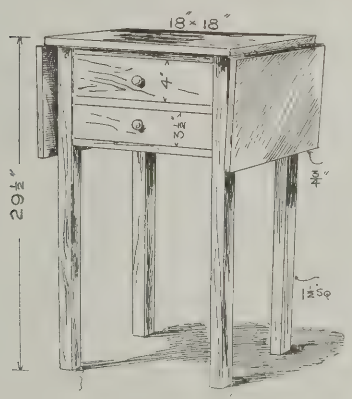


Fig. 10—Serving Table Having Top Area When the Leaves are up, 18 x 33 In.

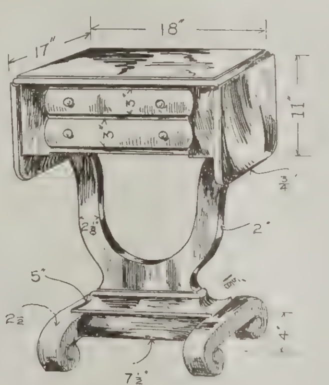


Fig. 11—Colonial Sewing Table 30 In. High and Top When Both Leaves Are Up, 18 x 40 in.

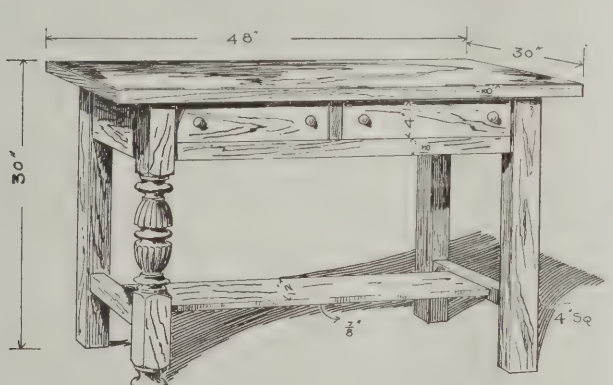


Fig. 14—Mission Table Showing "Elizabethan" Treatment on Left Leg

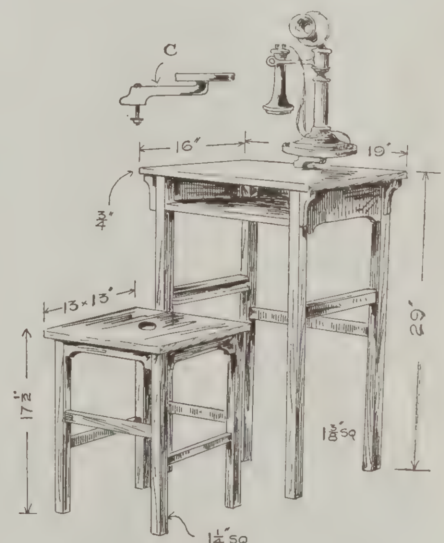


Fig. 16—A Telephone Table and Stool

Influence of Antique Models on Present-Day Furniture

Fig. 7 may properly have a second drawer, although where the lower shelf might be used for a fruit bowl such an addition may destroy the decorative effect.

The glass tray, Fig. 8, which in this instance determines the size of table top for Fig. 7, consists of a moulding of oak or mahogany cut from a stick ¾ in. x 1¼ in. of a section, preferably the one shown. These pieces are cut to a mitered frame measuring over all 16 x 25 in. Long brads properly set in and concealed, or a ⅛-in. saw kerf run across the glued up frame at an angle of 45 deg. with a slip of wood set in glue and trimmed off, will probably produce a more dependable joint. A piece of good, clear, clean single thick glass, a piece of attractive figured cretonne with birds, foliage or flowers, a piece of dry thin board or flat stiff straw board, are to be cut to fit not too tightly within the rabbet size of the frame, then with a number of stiff thin brads securely nail in position; a small round reed or stick is sometimes used to brad in over the backing. As a final covering of this surface and also to extend over the bottom face of frame, glue on an extra large piece of corduroy, preferably brown, green or gray, starting from one end, and using some stiff paste, or rather thick prepared glue, which has little moisture. After this covering is set and dry use a sharp knife in trimming off the material overhanging outer edges. Brass handles are now to be had for such trays and care should be taken to set the screws into the light frame in a prepared hole small enough to make the screw draw up firmly.

Fig. 9 is a collapsable table or stand to support tray in kitchen or pantry when receiving contents previous to carrying to dining room tray table, Fig. 7, or in to guests during some social gathering. It is quite a useful article for large gatherings where other table space is being used and is also necessary for the welfare of a handsome tray when away from its proper place.

The Sewing Table

Among the many kinds of tables the sewing table provides an orderly place for materials and ample space to lay out work on the top and extending leaves. The plain and less expensive type shown in Fig. 10 in Mission style is here used as a basis for any different treatment the reader may wish to give it and not depart from form or size of parts. The legs may be treated with a squared neck or lessening of stock under the lower drawer frame and the major part of post reduced to a taper and expanded again before it reaches the floor into a square ball effect; or this full length may be turned by using some well selected taper form. The shelf and top may then be treated with a moulded edge and slightly rounded corners and the rule joint be used instead of plain square.

Fig. 11 is a more pretentious table properly made in mahogany. This is the type the interested worker will find gives him the opportunity for skilled workmanship and in the drawers he may insert various small compartments and specified divisions which would delight the future possessor of such an article.

By the use of Fig. 12 the manner of glueing up stock is shown and may be resorted to produce a flowing shape or outline which is frequently wider than stock obtainable. The heavy line shows the proposed shape of one-half of lyre pedestal to work table, Fig. 11, allowing length for large tenons, top and bottom *"A"* to fit in mortise in frame, Fig. 13, and the lower tenon to fit in moulded base above scroll feet in Fig. 11. Before the outline indicated in heavy line is sawed out, unite the two halves by glueing. This will enable you to use long clamps on flat surfaces. When dry saw out on band saw and cut tenons.

The frame, Fig. 13, here shown is a base in most all forms of modern construction of carcase work. If the reader will inspect any available piece of furniture of a case of like nature, he will find this frame to be a convenient one upon which to secure other constructional parts. In many instances it is not in outward evidence, while in the case of the sewing-table, Fig. 11, it appears between the two drawers and above and below. Where thus exposed to view the stile should either be faced with veneer or be of the same kind of wood as the entire construction; these frames otherwise may be made of inferior wood, generally of ¾ or ⅞ in. thickness and 2 or more inches wide, judgment showing whether one or more crossbars will be needed for extra stiffness.

A preparatory working drawing which you should make will indicate where you are to relish out the corners, as instanced in Fig. 13, to provide a place for the jamb blocks on each side of drawer. The ends of the carcase hidden by the drop leaves in the cut are glued and secured by screws to these frames by screws countersunked or set in, as shown at *"B."*

Use of Corner Blocks

A double insurance of strength and stiffness is always secured in cabinet work by setting in frequent corner blocks; these may be made of neatly cut triangular blocks or strips two or more inches in length.

The upholding of the drop leaves may be secured by various means and I take it that if it is a pleasure to construct an article it is equally interesting to study out and provide certain ingenious devices which further embody personality in one's productions. Various holding-up methods are used on such tables, the simplest possibly being a swing bar, space for which must be provided for its action under the middle part of the table top, or sufficient space may be provided on your drawing so that the middle top shall hang over sufficient to hinge to each side of the case a ¾-in., swing bracket long enough to properly support the drop leaf when drawn up.

Our broad-handed way of living makes the subject of tables very varied, as each room appears to demand a special form of table, but I am going to give the parlor scant attention at present, for that room is falling much in disfavor. Fig. 14 shows a very popular and approved form of convenience table for the living room: It is of the Mission order, yet to those who wish a less heavy effect, the left leg is shown turned in the Elizabethan style, which will be found to modify the over-weighty appearance, and permit of its use in greater harmony with a mixed assortment of furniture patterns, which are generally to be found in a living room. Such tables are generally made in three sizes, 40 in. x 30 in, 42 in. x 28 in. and 36 in. x 26 in.

Fig. 15 is a graceful form of table adapted to a ladies' room, parlor or reception hall and should be made in mahogany or other rare wood.

The top is semi-circular and the apron is sawed in conformity and set under very slightly, about ⅜ in.; the legs are 1¼ in. square and mortised between the aprons and reduced by a taper to ¾ in. at floor. By making a small grooving tool or plane a groove of 3/32 in. square may be plowed in ¼ in. away from edges of legs on front and also on apron front and one groove in edge of table top, into which may be set in glue a strip of wood or veneer of a lighter color. Let dry and then scrape flush with cabinet scraper and sand smooth with No. 00 sandpaper.

The Telephone Table

The telephone table, Fig. 16, I am sure will be highly valued in the home, particularly by the feminine members of the family. The style is a modified type fitting in well with the "Mission," "Quaint" or "Arts and Crafts" style so prevalent. The simple general form is one permitting various changes in leg treatment and shape of outline to apron, the interposition of turning above and below the stretchers of a character similar to the "Early English" or "Jacobean" patterns shown in the August issue, page 423, will enable the interested reader to produce a variety of styles of this most useful table and stool to match. An undershelf in table provides for the telephone book. The top, shelves and side rails are of ¾-in. material. The table stand is so made with the side strainers or stretchers provided with a groove and projecting lower lip to carry top of stool when it is slid in out of the way. A 1⅜-in. hole is bored into center of stool top to facilitate withdrawing it. A wooden arm represented in *"C"* and a turned disk to hold telephone stand is secured by a bolt with nut and washers to table top at back so that instrument may be swung back or forward for convenience.

Moving Office Partitions of Gypsum

An Alteration Job Which Involved Interesting Points for the Builder

REMODELING operations are usually of such a nature as to involve in their execution features of more than ordinary interest, and frequently they are of a kind which call for the exercise of no little ingenuity and skill on the part of the builder who is carrying out the work. Most of the moving operations to which attention has been directed in these columns have had to do with the transferring of a building from one site to another, but in the present article the problem deals with the removal of office partitions constructed of gypsum blocks from one part of the floor area to another.

The building where this work was done is that of the Poughkeepsie Trust Company, Poughkeepsie, N. Y.—a five-story structure built of stone, with floors of concrete and 4-in. partitions of gypsum blocks. It was designed by P. M. Lloyd, a Poughkeepsie architect, and erected in 1906.

In connection with the alterations it became advisable to change the arrangement of the offices on the fifth floor. The rooms which originally opened off the corridor were rearranged in the new plan so as to have a large central office with the other rooms opening from it. This was accomplished by moving the partitions bodily from their original place to the proposed location. The gypsum blocks lent themselves admirably to this method of procedure, and it was possible to saw the partitions apart and move them in sections.

An inspection of the plan presented in Fig. 1, which represents the fifth floor of the building, shows the original positions of the partitions, indicated by the parallel dotted lines, while the partitions in their new location are indicated by the dark sections. The lines with the arrowheads clearly show the direction in which the partitions were moved or swung.

In carrying out the work the first thing was the cutting through of the partitions at intervals along the bottom, making the openings large enough to receive a 4 x 4-in. timber and allowing it to project several feet on each side of the wall. An upright piece was then placed against each side of the wall with its lower end on the timber which had been inserted through the wall. From this upright to the end of the timber a diagonal brace was placed on each side of the wall, this arrangement being such that the wall or partition was prevented from toppling over while it was being moved. An excellent idea of the method of bracing the partition is indicated in the detail, Fig. 2, given herewith.

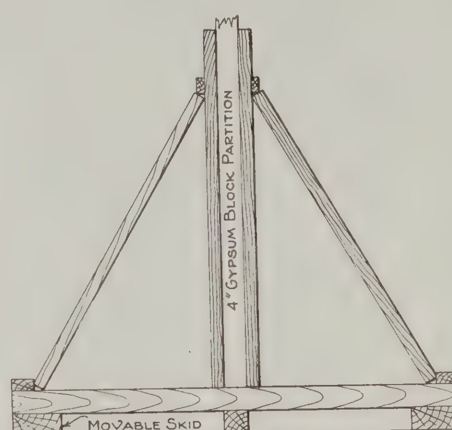


Fig. 2—Vertical Cross Section of Bracing Used to Move the Partitions—Scale 3/8 In. to the Foot

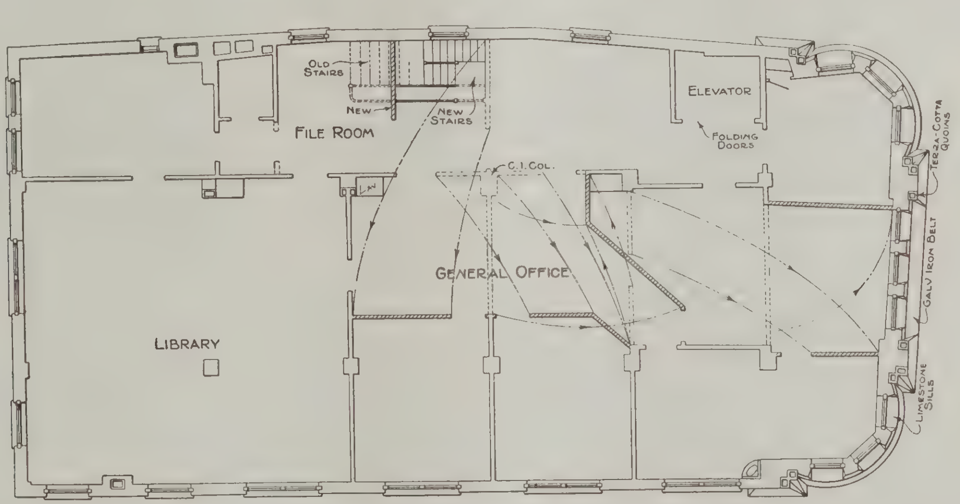


Fig. 1—Plan of Fifth Floor of the Building, Showing by Means of the Arrow-Head Leaders the Direction in Which the Various Partitions Were Moved to Their New Locations—Scale 3/8 In. to the Foot

Moving Office Partitions of Gypsum

The next steps were to break out the base of the partition, loosen it at the top and saw it loose at each end. Skid it then across the floor to its new position.

It was found better to move the partitions in large sections than in small ones, since the smaller ones were so much more top-heavy in comparison to their strength longitudinally that they were likely to crack. While moving the walls the bottoms were supported by timbers running longitudinally in place of the base which had been removed.

After the partitions were in their new position they were fastened with metal straps at the ends. The openings left at the bottom were enclosed with wooden forms and filled with concrete. The openings between sections were filled with mortar and plastered smooth. A cement base was molded with a template around the foot of all partitions to correspond with the old one.

In starting the cut through the partition a key-hole saw was used until the opening was large enough to insert a nail saw. After the nail saw had enlarged the cut sufficiently a cross-cut saw with ⅝-in. teeth was used to complete the operation.

One feature of the new arrangement of the floor is the file room. The original plan was to equip the general office with filing shelves and book shelves, but it was found that by partitioning off a portion of the space for a file room a large item of expense could be saved in the way of furnishings, since the file room could be equipped with rough shelves instead of equipping the general office with expensively finished cabinet shelves. To provide space, however, for the file room it was necessary to somewhat reduce the area occupied by the stairs. In place of the wide straight flight a narrow one was constructed only half as wide as the old one. This was made to start at the side of the opening at the top of the old flight, and at the junction four steps down with the old steps a turn was made so that the old steps could be used from there down, all as clearly indicated on the floor plan.

The alteration work was designed and carried out by the Poughkeepsie Engineering & Contracting Company, Poughkeepsie, N. Y. The blocks in the partitions were made by the United States Gypsum Company, 205 West Monroe Street, Chicago, Ill.

The Woman Architect in America and Europe

The development of the feminine in architectural practice has not only been slow, but might be said to have been in "status quo" for the past twenty years or more, since the firm of Robert A. and Louise Bethune commenced regular practice in Buffalo,—a practice that has been as large, varied, and successful as most in that city, says a writer in the *Western Architect*. There have been other women who have essayed adventure into architectural realms, but meteoric, in the way of a newspaper story or a special design attributed to them, and then lost, not in oblivion, perhaps, but to the Architectural Directory. Miss Hayden was credited with the design for the Woman's Building at the Columbian Exposition, and others from time to time have likewise been mentioned as a "lady architect," having worked as draftsmen for a greater or shorter period in architects' offices and then, prior to getting married, furnished a story for a Sunday supplement, of a design which she had produced.

There seems to be no logical reason for this dearth of women architects, for there are many who have as draftsmen given evidence of exceptional artistic and constructive talents. Russia now comes to the front with nine certificated architects. Each has passed examinations in design, construction and engineering; served apprenticeships as superintendents on steel buildings, railway bridges, and house building, under private architects of reputation. Most of them have enough private work to start independently, and one has been especially successful in the planning of school buildings, and another has been invited to Germany,—a distinction that has never come to a male Russian architect. Law limitations may step in and debar them from some forms of practice, such as competitions for Government work, but they are not debarred from private practice.

St. Petersburg officialdom looks with interest upon the innovation, the success of which is not opposed by male architects. With talent, physical strength and mental acumen that will stand the test of safe construction and practical superintendence outside the office, and a talent as well for the details of office work, there is no reason why sex of itself should debar any woman from architectural practice.

Wages in the English Building Trades

There was recently perfected an agreement between the Manchester, Salford and District Building Trades Employers' Association and the Joint Committee of the Carpenters and Joiners of the District, touching the matter of wages and hours of work, which may interest the trade in this country.

For March to October inclusive 49½ hours are to constitute a week's work; in December and January the men shall work 41½ hours per week and the rate of wages shall be 10d. (20 cents) per hour both summer and winter.

Overtime is to commence at the times stated for leaving off work and shall be paid for at the rate of time and a quarter for the first two hours; then until 10 o'clock at time and a half, and from 10 o'clock until starting time next morning at double time. From noon until 4 o'clock on Saturdays the overtime charge will be time and a half and from 4 o'clock until starting time on Monday shall be double time.

Night gangs (made up of men who have not been employed during the day) are not to be inaugurated for less than a week and in these cases the rate of pay shall be 1s. ½d. per hour (25 cents).

In the event of a dispute it is agreed that no strike or lockout shall take place until the question has been referred to a local Joint Committee of not more than six employers and six operators. Where there is failure to agree the point of difference will be submitted to an umpire mutually agreed upon by the committee.

Evening Courses in Trade Instruction

The Department of Education of the city of New York has recently issued a statement on short courses in evening trade schools in which attention is called to the fact that instruction in them is given only in the following-named schools:

Manhattan—Stuyvesant Evening Trade school (S.), Fifteenth and Sixteenth Streets, near First Avenue; Harlem Evening Trade School (H.), One Hundred and Thirty-eighth Street, west of Fifth Avenue; Murray Hill Evening Trade School (M. H.), No. 232 East Thirty-eighth Street.

Brooklyn—Brooklyn Evening Trade School (B.), Seventh Avenue, between Fourth and Fifth Streets.

Queens—Long Island City Evening Trade School (L. I.), Wilbur Avenue and Academy Street.

Richmond—Instruction in "gas engines" and plumbing in the Curtis Evening High School, and instruction in "gas engines" and industries related to the terracotta industry in Evening School No. 1, Tottenville, Staten Island, N. Y.

The Fulton County Court House in course of erection in Atlanta, Ga., is nine stories in height and has framing and roof trusses entirely of reinforced concrete.

Prize Plans of Small Concrete Houses

A Contest Showing the Quality of Concrete Cottage Which Can Be Built for $3,000

WE take pleasure in bringing to the attention of our readers a series of designs awarded prizes in a recent competition for small houses of poured concrete, the plans being of such a nature as to offer interesting suggestions to prospective builders. The conditions governing the contest stipulated among other things that the foundations and outside walls must be of poured concrete reinforced where necessary, and that the floors, ceilings, partitions, roofs, porches and stairways might be of concrete or of any other material according to the judgment of the designer. The total cost of the house ready for occupancy was not to exceed $3,000. The best of the plans submitted were referred to Professor A. D. F. Hamlin of Columbia University, who selected those which in his opinion were the most meritorious and therefore entitled to the six cash prizes which were offered.

Upon this page we present in Fig. 1 the design submitted by E. Parmiter, 25 West Forty-second Street, New York City, and awarded the first prize.

The exterior walls and foundations are of concrete and the exterior is coated with cement plaster. The house has wooden floors, stud partitions and stained shingle roof; is heated by hot air and wired for electric lights. Professor Hamlin's comments are as follows:

"The best of all the plans from the point of view of simplicity, spaciousness and general convenience. Adequate entrance lobby; living room admirable, 13½ x 21½ ft.; dining room fair, 12 x 12 ft.; kitchen excellent, 12 x 12 ft.; pantry; three bed rooms, 13½ x 14½ ft., 12 x 12 ft., 10½ x 12 ft., each with closets; bath room 8 x 5½ ft.; all have good head room; all rooms

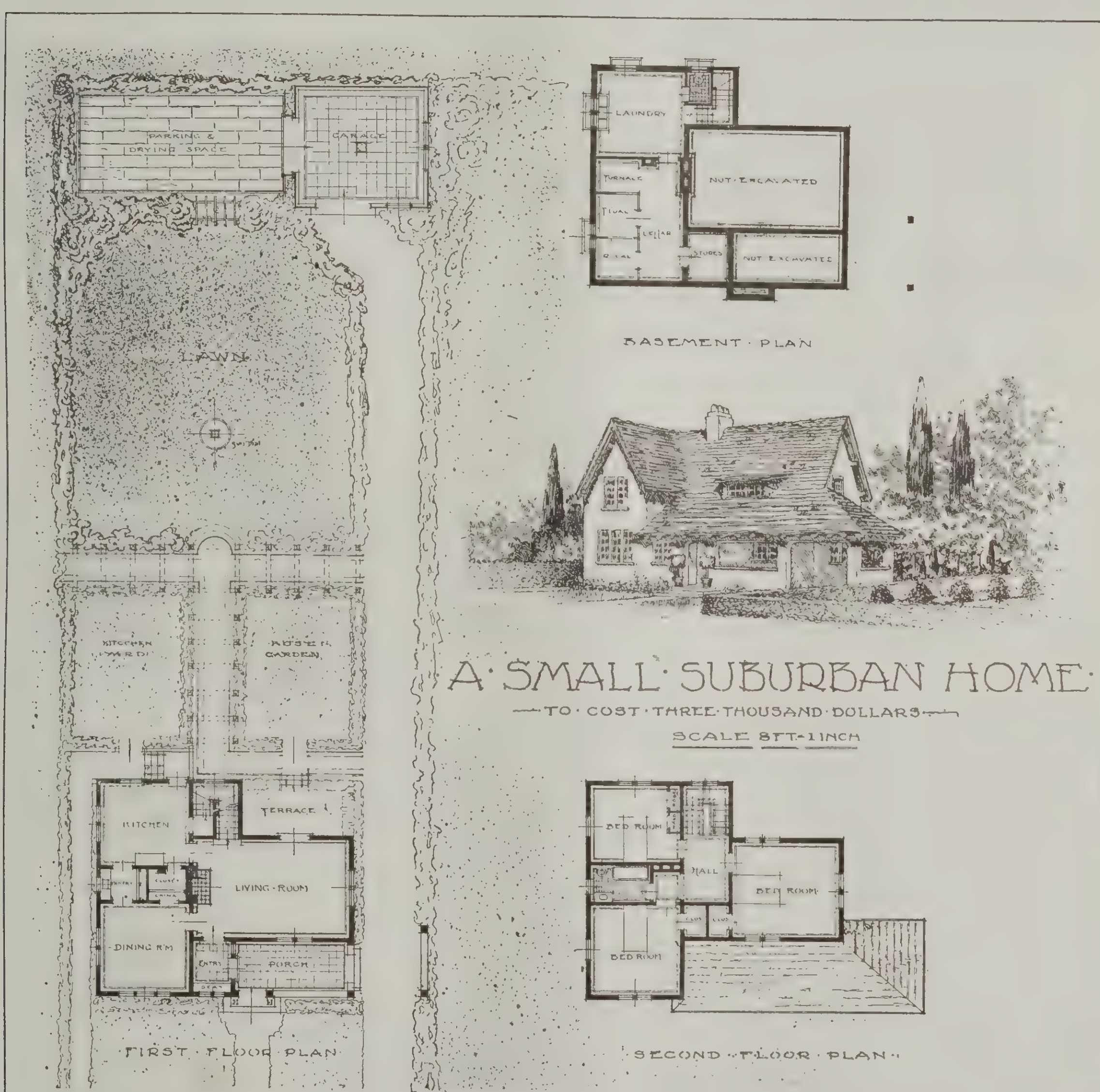


Fig. 1—The Design Awarded the First Prize and Secured by E. Parmiter, of New York City

Prize Plans of Small Concrete Houses

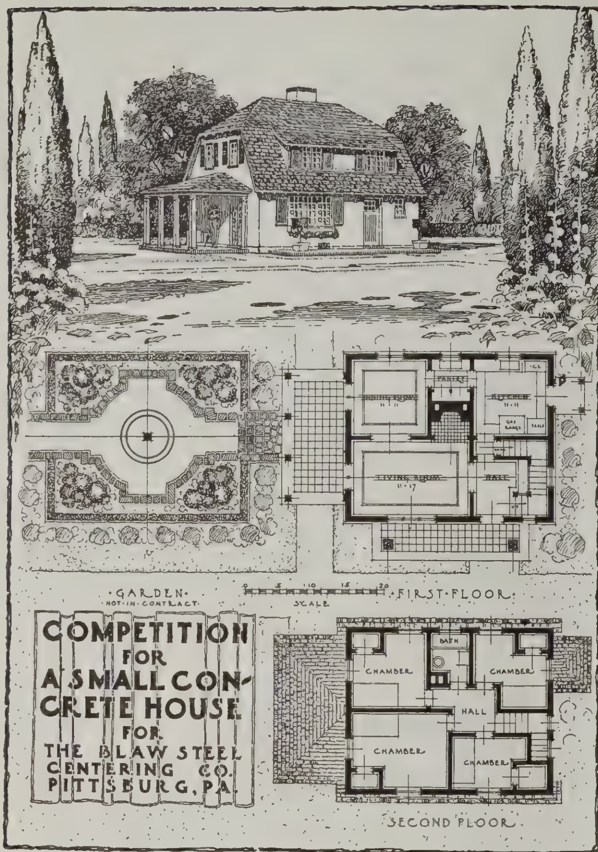


Fig. 3—Design Awarded the Third Prize

well lighted; good porch. Plan of second story superposes well on first; one chimney stack. Exterior simple and attractive, good lines and masses; simple roof. Plan of grounds shows admirable taste. Entire design shows artistic skill and taste. Cubic contents, exclusive of porch, 15,773 ft. from cellar floor to middle of hight of gable roof; porches 2,480 cu. ft."

The design illustrated in Fig. 2 is that submitted by William C. Lurkey, 144 Winslow Avenue, Buffalo, N. Y., and awarded second prize.

According to the specifications the outer walls and porch posts are to be of monolithic concrete construction; cellar and porch floors to be concrete; porch floor to be marked off into 8 x 8 in. squares as shown on plan. Outer concrete walls to be 6 in. thick, reinforced with ¼ in. vertical and horizontal rods 18 in. apart, furred on inside with wood furring strips and plastered; cellar under kitchen, dining and living rooms; walls to be 12 in. thick.

All first floor partitions 3 in. thick of concrete, and plastered.

All inside partitions on second floor to be 2 in. x 4 in. studs, 20 in. on centers lathed and plastered.

Floor joists 2 x 10 in., 16 in. on centers.

Roof rafters 2 x 6 in., 20 in. on centers.

Floors to be oak in living and dining rooms; balance hard pine.

All inside trim cypress stained an oak color.

Window frames built into walls with a 2-in. reveal on outside and flush on inside; all exterior trim to be cypress stained a dark brown color; sash of white pine painted. Chimney to be lined with flue tile built into concrete. Soil and vent pipes built into walls.

Roof shingled with red asbestos cement shingles.

Living room and dining room to be rough floated plaster tinted; balance of rooms hard plaster, white finish; all doors, sash and trim to be of stock pattern.

Hot air furnace and laundry tubs in cellar.

The design awarded the third prize in the contest is shown in Fig. 3 of the illustrations. This was submitted by Jack Lehti, Fourth and T Streets, N. E., Washington, D. C.

The specifications state that the exterior walls, foundations, footings, chimney and basement floor shall be of concrete. The first and second floors shall be of wooden construction. All partitions shall be of stud, lath and plaster. The roof shall be of wooden construction, with shingle roofing left in its natural condition. All flashing shall be copper. Finished floors generally shall be wood, with exception of bath room, which shall be tile. All exterior trim shall be painted white. Shutters shall be painted a dark green. Interior trim shall be specified. Plumbing, heating and lighting shall be installed and connected according to

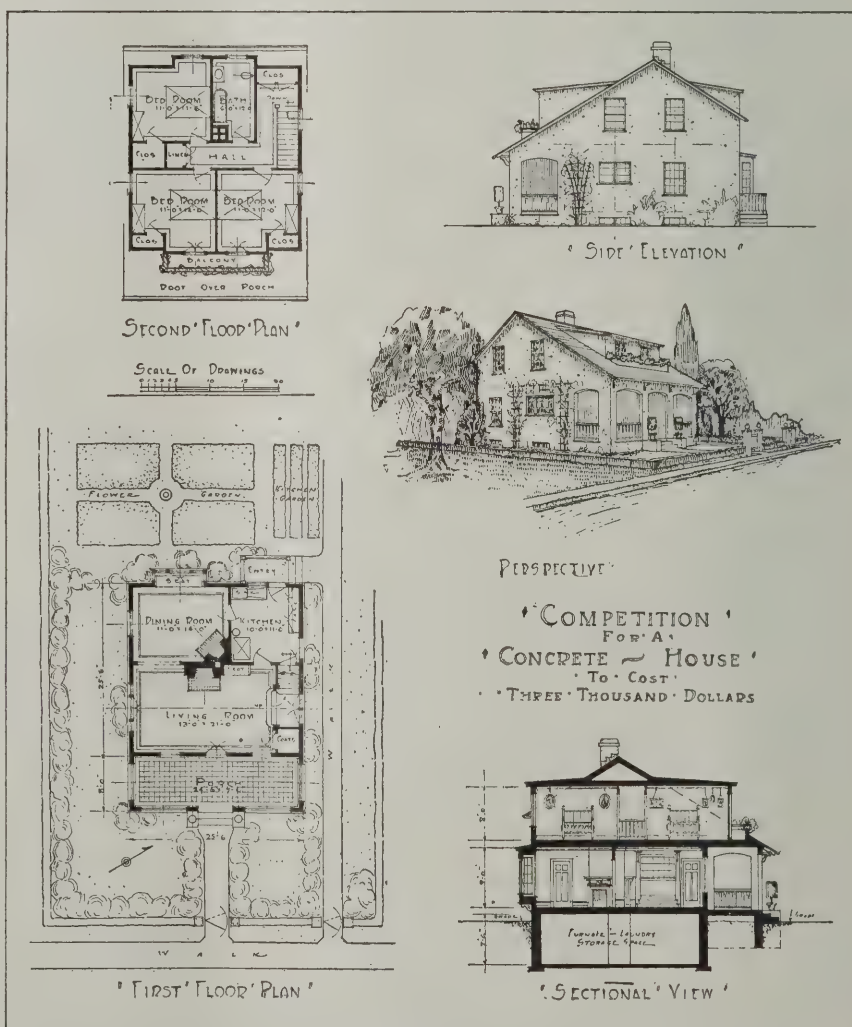


Fig. 2—Design Awarded the Second Prize and Secured by W. C. Lurkey, Buffalo, N. Y.

Prize Plans of Small Concrete Houses

prevailing regulations. Steel reinforcing rods shall be provided for all openings to act as lintels. All exterior steps shall be of brick and floors to same shall be tile laid on a bed of cinder concrete.

The contents of the house are figured at 14,720 cubic feet and the porch 1413. It could be built for $2,800.

In Fig. 4 we illustrate one of the three sets of plans awarded a fourth prize, this having been submitted by Grover Lippert, 418 West Doty Street, Madison, Wis.

In connection with this design Professor Hamlin commented as follows:

"This is distinctly the best of the three fourth-prize designs. The living room is 13 x 15 ft. and has open fireplace and entrance vestibule. The dining room is 11 x 12 ft., the kitchen 8 ft. 6 in. x 12 ft.; small pantry and good closet. There are three bed rooms, two of which are 9 x 10 ft. each, and one 7 ft. 6 in. x 12 ft. 6 in. The bath room is very small, 4 ft. 6 in. x 8 ft. 6 in. Second story is somewhat complicated. * * * * The cubic contents, exclusive of porches, 14,858 cu. ft.; porches 1310 ft., but porches too small to be worth much. This is the next most economical design on a cubic foot basis to the third prize winner."

In Fig. 5 is shown the design submitted by Clyde W. Smith, 3236 Fifth Avenue, South, Minneapolis, Minn., and awarded one of the fourth prizes in the contest in question.

Regarding these plans Professor Hamlin says: "This design at first laid aside because of its somewhat excessive cubic volume, proved on closer comparison with all the remaining designs, so far superior to them in almost every respect that it was finally adjudged as deserving one of the $25 prizes. The plan is a model of simplicity and in directness and constructibility presses close upon the first prize winner. It is, however, too large in nearly all dimensions for any likelihood of being buildable for $3,000. The design shows a good understanding of 'concrete' quality in plan and design. Were it not for the too great area and volume of this design it would deserve a place among the first three instead of the second three." The house could perhaps be built for $4,200.

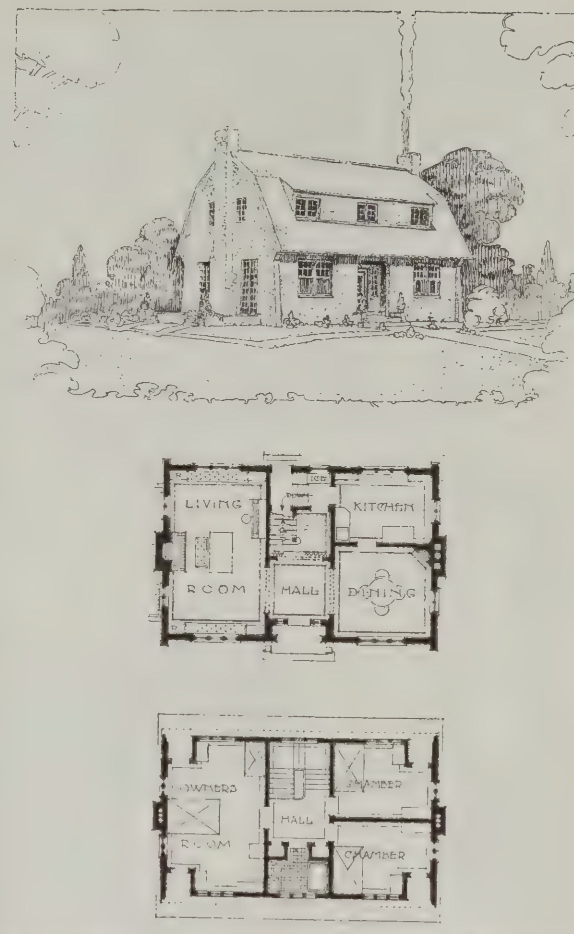


Fig. 6—A Design of Economical Construction but Not Awarded a Prize

Fig. 4—Design Securing One of the Fourth Prizes and Submitted by G. Lippert, Madison, Wis.

Prize Plans of Small Concrete Houses

In Fig. 6 we give one of the designs submitted in the contest but not awarded a prize. We present it to the attention of our readers for the compactness of the arrangement and its general suitability to meet the requirements of a family in moderate circumstances.

The design is distinctly economical in that the second story is superimposed upon the first so that the partitions run through from basement to attic. The kitchen is well separated from the living room, but is convenient for access from the dining room and the hall and communicates conveniently with the basement. The principal feature of the house is the location of the living room, which has windows facing in three directions with the entrance from the hall on the inside so that it is at all times well lighted and is free from the objection of having many doors, which would interfere with the proper location of furniture and decoration. A commodious open fireplace is a feature of this room. What might be considered by many as a very serious defect is the location of the bath room immediately over the main entrance hall. In this position the noise of running water from the plumbing fixtures could doubtless be heard distinctly in both the living room and the dining room—a drawback often to be found in houses of a more expensive nature. This design

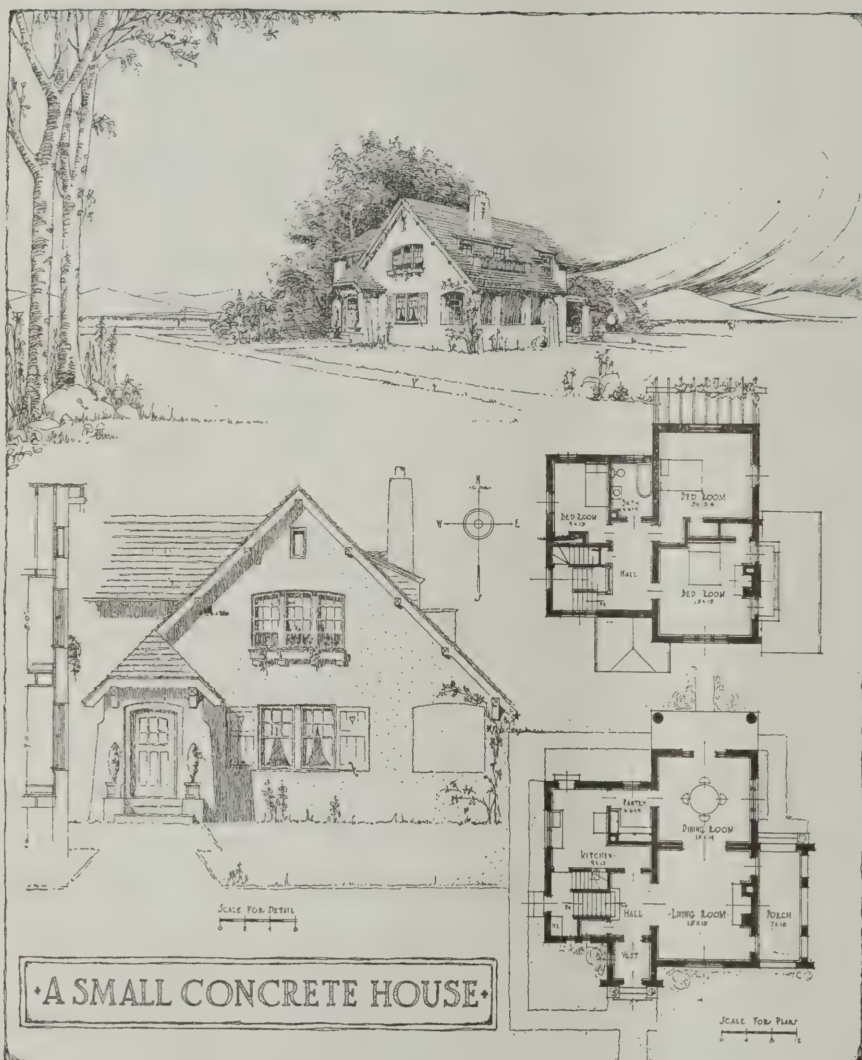


Fig. 5—Another Design Securing One of the Fourth Prizes

Prize Plans of Small Concrete Houses

was submitted by M. G. Kingsley, Feeding Hills, Mass.

The competition in which these plans for small houses of poured concrete were submitted was conducted by the Blaw Steel Construction Company, Westinghouse Building, Pittsburgh, Pa., to whom we are indebted for the information concerning the plans here published.

Short Lengths of Studding

Mosby, the builder, was contemplating a pile of studding 2 in. x 4 in. x 10 ft., and there was a puzzled expression on his face as if he was trying to solve a problem and couldn't analyze it just to his notion.

"Many things have been taught me by the philosophy of Old Uncle Rural, but every now and then I come across something that apparently his philosophy has not touched, and here is a sample of it. Here is a pile of 2 x 4 x 10 that looked straight and nice when I bought it, and now look at it. Some of it looks like sled runners, some like it is trying to twist into a spiral, and no more than one piece in every six is reasonably straight. I would not be surprised at this if it occurred in double length studding, 2 x 4 x 20, but here it is in the short lengths, the very stuff that I thought would stay reasonably straight, and it looks puzzling."

"It may look puzzling to you," said the lumberman who had supplied the stock and was on the job looking over the work with Mosby, "but it is as plain as daylight to me. They make this short length studding out of short logs, of course. Now, did you ever stop and think about the why of short logs at the mills? If you ever worked in a sawmill you would know that all the straight grained, clean, nice timber is cut into comparatively long lengths, from 16 ft. up, and the shorter lengths are made from crooked timber, scrubby timber, second growth timber, and other rough stock that would not make long logs. Naturally, therefore, the resultant product does not compare in quality to the product in the longer logs, even though it may be graded the same. There is a difference within the grade of any wood. Some is twisted and some is full of hard streaks, so that short studding is really inferior and that is one thing that makes for the difference in price.

"You ordinarily assume that the difference in price between 9 or 10-ft. studding and 18 or 20 comes merely from the fact that it is easy to get short logs. And that is part of the reason, but there is this other difference in value that makes some of it. That is why there is from $3 to $5 difference in the retail price between short studding and long, and it is the reason why I advised you to use double length studding for your outside walls even though it costs you more. You get a better job. It stands up straighter and you really save money in the end, because it is a lot of trouble to trim and straighten short-length studding and put it up."

"Is that it?" Mosby replied. "Well, it's a new one on me. I thought the grade of No. 1 common in framing was No. 1 common and it would be the same kind of stuff in the short lengths as in the long ones, but now I am to understand that there is a real difference in the quality notwithstanding the grade is technically the same?"

"That's exactly it," the lumberman replied. "And you will find the same logic applies to long and short length lumber of practically all kinds."

Little Chats with Big Builders

One of Columbus' Oldest Contractors and an Active Member of the Builders and Traders' Exchange

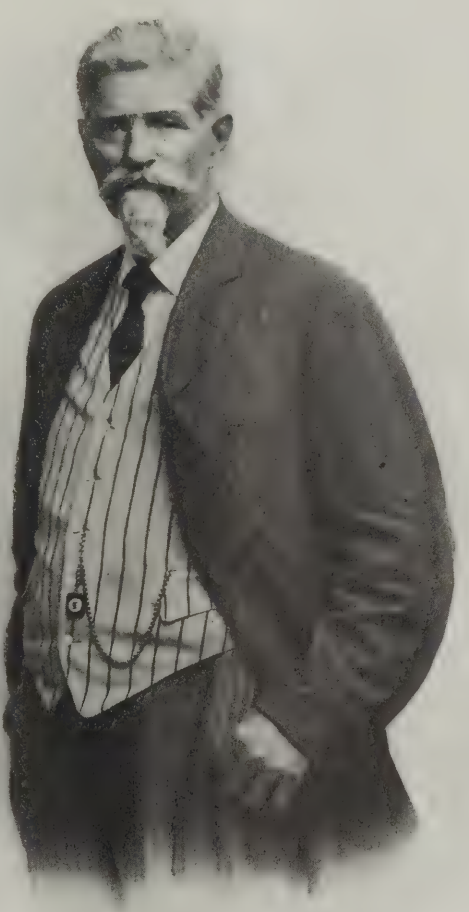
TO keep apace with the progress and development of the building industry requires constant study and close application to business in this day and age. Contractors have fallen by the wayside by the hundreds in the past decade and the development of the reinforced concrete type of construction is certainly reducing competition, for there are comparatively few builders who may be said to have thoroughly mastered this system. A majority of the contractors are content to take the jobs of brick and stone and the way they go after an old-fashioned heavy mill construction building is a "sin and a shame."

One of the oldest contractors in Columbus, Ohio, in point of years as well as in a business way, is F. H. Nichol, of the old-time firm of Nichol & Carr. He was one of the organizers of and is still very active in the Builders and Traders' Exchange of that city. He is familiarly known in Ohio's capital as the "Globe Trotter" and mail addressed to him with just those words has often come to him from all parts of the country. Despite his years and his travels, Festus Hague Nichol is to-day very actively engaged in the building game. He has to his credit one of the finest homes ever built in Columbus and he has erected also the tallest building.

Nobody loves to dwell upon the changes that have occurred in the development of the building industry any more than the "Globe Trotter." He got his start as a contractor helping build log houses. "Fifty years has certainly made changes in the game," he said, in speaking of old times. "We started building with two men, using the broad axe, hewing the timber, making the shingles, splitting the logs and smoothing them for laying. Two men built a house in those days and I counted the other day the number of men working on a house I was completing and in all 68 workmen had been engaged in its construction.

"After the log house came those of frame, but this was only when the water mills on the streams made it possible to save the labor of sawing and planing. As in all countries, frame gives way to brick and we started with the common brick and got fancy later with the face brick. Then we came to the steel frame building, the tile floors and the composition roof. And now we have arrived at the age of concrete and hollow tile. I have been through all of these stages, and let me tell you a contractor must change with the times and keep ever on the alert or he will find himself trailing behind like the cow's tail.

"I confess that I believe I am too old to make a study of the reinforced concrete building and its construction. It has backed me off the boards, but of course I have tied up with sub-contractors who are able to take this part of the work off my hands and I figure these jobs, not the larger ones, but many of the smaller, just as though I knew the business. But it is no sleep producer or good for the nerves. I would not be afraid to tackle a reinforced job if I had to, but I have come to the age that I am not eager to take up new studies.



One of Columbus' Oldest Contractors and an Active Member of the Builders and Traders' Exchange

"Let me say this, however: If I was a few years younger reinforced concrete would be my specialty, not carpentry, for I firmly believe that the day of the frame building and the 'mill construction' is on the wane. It will be a fight to the death between brick and concrete and it looks to me like concrete will win out. And then we shall do everything by electricity and all of our furniture will be steel. It is only a few years away.

"I have been in the contracting business all of my life and I have made money at it. I believe that it is a good business and one that any young man should be glad to have the opportunity to get into. It requires strong nerves and many a plunge, but there is no business in which the profits are larger, when properly conducted. Close application to the business and untiring energy is, of course, the key to success.

"I have also made it a rule always to investigate the financial condition and the nature of the people for whom I contract to do work. I turned down a $75,000 job one time simply because I had learned that the owner was a snoopy person who would always be around trying to superintend the job instead of letting his architects take care of it. Mind you, I had more than $7,500 profit figured in that work, too. A person can't afford to wreck his nerves fussing with some old rooster, no matter how much there is in it.

"Many contractors get into a rut. They can't see the changes going on about them. They do not take easily to the new devices and labor-saving machines. They are afraid to invest their capital in these things and wonder how their younger competitors are able to beat them in competitive figuring. The contractor who sleeps on his job in this way surely lands in the junk pile. I say to the young contractor that he must constantly study his business and conditions of the trade, as well as details of running his work. And furthermore, he need never worry about a trust in the contracting business. It will always be a free-for-all game and the only change that I can see coming in methods is that work will be done on a percentage basis and a man's reputation will count for more than it does to-day."

The Value of Good Tools

Every carpenter, builder, cabinet maker or woodworker appreciates the fact that in order to do good work he must have good tools, and not only that, but he must keep them in good condition so that the results of his efforts will be entirely satisfactory to those for whom the work is being done. Tools serve to give men a greater mastery of nature and powerfully augment the usefulness of the hand from which they no doubt have been modeled. When primitive man wanted to strike a blow harder than he could strike without hurting his hand, says a writer in the *Craftsman,* he picked up a stone about the size and shape of his clenched fist, attached a rude handle to it, representing his forearm, and thus invented the first tool—a hammer. Then he sharpened the stone slightly and it became a crude hatchet and also a very powerful weapon of defense. To increase the power of his grasp he invented nippers and the jaws of a vise. His hand really became the model for almost all his tools, and as he learned to handle the tools the sensitiveness and delicacy of his hands increased. "The entire history of man," says Reitlinger, "if examined carefully, finally reveals itself in the history of the invention of better tools."

All mechanical aids of our wonderful system of industry can be traced to the simple fundamental forms suggested by the hand or by the teeth, for the saw and file are but adaptations of the teeth, for the more efficient tearing and ripping of heavy and tough materials.

As man increases the power and cunning of his hand by the use of tools, the fiber of his mind undergoes a change also. It takes a well-trained mind to direct the hand ably, so it also becomes sharpened, strengthened as it endeavors to command the hand. Thus the use of tools develops the whole man, the mind and hand together gaining fineness, alertness, accuracy, sensitiveness, and a vital relationship is established between the two. Herbert Spencer says that every instrument of observation is but an artificial expansion of our senses, while the tools and machines constitute an artificial development of our limbs.

Love of a good tool is almost a universal trait in both boys and girls, even though they have little knowledge of their use. A row of them placed in orderly way upon a wall or in a chest attracts the interest of almost everyone. Desire is aroused in the heart for a better understanding of them, and for a knowledge of their uses. A man who does not like the "feel" of a good steel hammer, to test the balance of it, to drive a nail squarely home with it, is an exceptional man.

Manufacturers report a marvelous increase in the demand for cases of tools, those useful in tinkering about a home; they say that business men who formerly never cared for tools are buying these home kits, that they are finding great pleasure and relaxation in making things for the home, small pieces of furniture, a shelf, repairing things generally and keeping the home in perfect running order.

One reason for this increased interest in the use of tools is that the benefits of manual training in schools are being discussed and put into practice more widely than formerly, so that the subject is being brought closer to men's attention. Because the boys are clamoring for a set of tools, the fathers have also become more interested.

Nowadays if the boys are given a case of tools to experiment with or for their instruction in manual schools, they are not second or third-rate tools, but the very best of their kind, such as genuine mechanics own. And this is an important step in the right direction, for if a skilled mechanic cannot turn out a good piece of work with a poor tool, how much less can a boy who has had little experience in handling a tool? If you give a boy a poor piece of wood and a poor saw —how could he possibly make a craftsmanlike joint? The most skilled of workmen would have difficulty in constructing a piece of good furniture unless their materials were good.

If a boy is given a work bench such as are on sale in large hardware stores, it will be outfitted with the best tools on the market, for it is realized that he should start with the best, be given every advantage and no unnecessary handicaps. The arrangement is such that every tool is exposed, which teaches orderliness of mind and motion. The tools can be found with no loss of time, used and returned to position naturally, as the easiest place to put them, and the boy thus consciously and unconsciously acquires an accurate, orderly and masterful command of mind and hand.

Brick for Building Purposes in Austria

Many of the bricks used in Prague, Austria, are yet made by hand, both women and men working in the yards. Practically all the buildings are constructed of brick and plastered on the outside. The bricks are larger than those commonly used in the United States and not so well finished, not being used for facing the outside walls. The ordinary building bricks sell at about $8 per thousand. Many new buildings are being erected, which makes the brick business one of the best in the city. Large quantities of brick and stone are brought to Prague from points up the River Moldau, as labor is not well paid in these more distant villages.

Flag Pole for Panama-Pacific Exposition

One of the features of the Panama-Pacific International Exposition to be held in San Francisco in 1915 will be the giant pole from which will float the National colors. This pole has been contributed by the citizens of Astoria and was recently delivered to the Exposition site at Harbor View. The pole is of Douglas fir and is said to be a perfect piece of timber. Its base is 56 in. in diameter, its top 23 in. and its length over all is 246 ft. Its cubical contents are figured at 1958½ cubic feet and it contains 23,515½ solid lumber feet.

Staircase Construction

Hereafter, in the construction of iron and steel stairways in New York City, the strings and other supporting members shall not be less than three-sixteenths of an inch thick for interior stairways, and not less than one-quarter of an inch thick for outside stairways.

Plans for a Poultry House

Some of the Important Points to be Considered in Building a House of This Kind

DOUBTLESS there are many readers of this journal, especially those living in the rural sections of the country, who are interested in the arrangement and construction of poultry houses, and for the benefit of such we present the accompanying illustrations and particulars which relate to a small structure of the kind indicated. The plan clearly shows the general arrangement of the interior, while the details afford an excellent idea of the way the work is done.

Naturally one of the first things to be considered in building a poultry house is its location. The most desirable site is on a slightly southern slope on good soil, where the land is well drained so that it will warm up quickly in the spring and where frosts come latest in the fall. The building should be sheltered as much as possible from the prevailing storm winds by hills or groves. It is best to plan for expansion in the future by so placing the building that additions may be built on it and locating it so that yards may be fenced off without undue expense.

Cement is probably one of the best materials to use for poultry house floors because if properly and smoothly laid it is durable, easily cleaned, rat-proof and dry. The walls should be smooth and of such material as will permit spraying them with an insecticide of some sort, and lath-and-plaster walls are much easier to keep clean than board walls, as they do not afford corners, cracks and crevices in which vermin may hide, while at the same time they permit spraying with dips, washes, etc. Sufficient glass should be provided to keep the building well lighted and afford plenty of sunlight, which is a very important factor in maintaining the health of the fowls. Vertical windows on the side of the half-Monitor building will allow the sunlight to reach all parts of it.

The roofs are covered with shingles and the outside frame with drop siding. The sills are 6 x 6 in., the studs are 2 x 4 in. placed 16 in. on centers, and the rafters are 2 x 4 in. placed 4 ft. on centers, while the roofing boards are 1 x 6 in. placed 2 in. apart.

The floor of the poultry house is composed of 3¾ in. of concrete resting upon a bed of cinders or clean gravel according to preference.

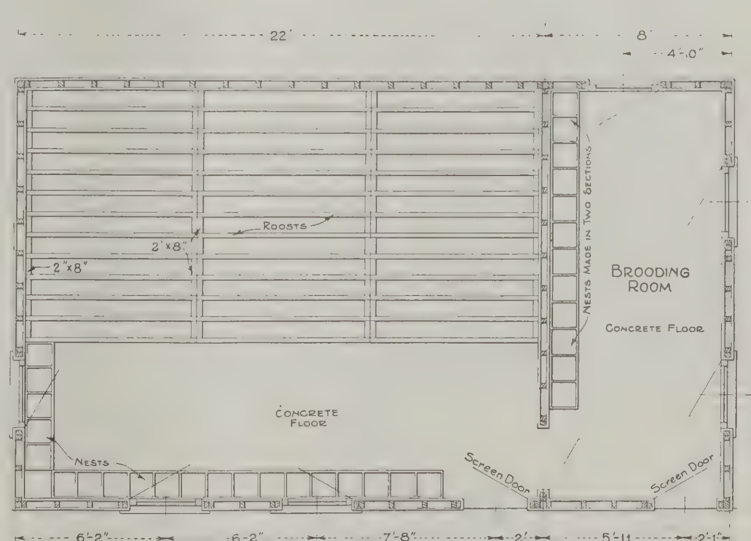
In what may be called the "Roosting Room" the nests are made in three sections, while those in the "Brooding Room" are made in two sections.

The two entrance doors shown on the front elevation and which swing outward are made of ⅞-in. matched and dressed boards reinforced on the inside with 1 x 4-in. battens. Just inside these doors and swinging inward are 1-in. mesh screen doors, thus giving opportunity for ventilation.

The method of constructing the roosts and also the nests, which are made in removable sections, is carefully indicated in the details accompanying this article.

Front Elevation Showing Location of Doors and Windows

An End Elevation



Floor Plan Showing Position of Roosts and Nests

Plans for a Poultry House—Scale ⅛-In. to the Foot

Bill of Material

The bill of material for the poultry house tells its story so effectively that it is unnecessary to go deeply into the details of construction, for this list taken in connection with the plans and constructive details will enable any carpenter or builder who is clever with his tools to do the work. The bill of material and the plans have been prepared by the I. H. C. Service Bureau, Harvester Building, Chicago, Ill., and are regarded by it as reliable.

Bill of Materials For Poultry House

SILLS
2 Pieces 6" x 6" x 18'
6 Pieces 6" x 6" x 10'

STUDS
15 Pieces 2" x 4" x 16'
23 Pieces 2" x 4" x 14'
50 Pieces 2" x 4" x 12'
11 Pieces 2" x 4" x 10'

RAFTERS
16 Pieces 2" x 4" x 16'
7 Pieces 2" x 4" x 12'
9 Pieces 2" x 4" x 8'

SIDING
900 Bd. Ft. ⅞" Drop Siding

ROOF BOARDS
550 Bd. Ft. 1" x 6" Rough.

SHINGLES
6500 Shingles 4" wide.

SCREEN DOORS
1 Piece 1" x 6" x 6' S-4-S
2 Pieces 1" x 4" x 8' S-4-S
4 Pieces 1" x 4" x 6' S-4-S
50 Lin. Ft. ⅞" Half Rounds

CORNER CASINGS
2 Pieces 1" x 4" x 14' S-4-S
1 Piece 1" x 4" x 10' S-4-S
2 Pieces 1" x 3⅛" x 14' S-4-S
1 Piece 1" x 3⅛" x 10' S-4-S

FACIA
2 Pieces 1" x 10" x 16' S-4-S
4 Pieces 1" x 6" x 16' S-4-S
80 Lin. Ft. ⅞" Quarter Rounds

LATH
23 Bundles

NESTS
6 Pieces 1" x 14" x 14' S-4-S
3 Pieces 1" x 14" x 10' S-4-S
3 Pieces 1" x 12" x 14' S-4-S
1 Piece 1" x 12" x 12' S-4-S
3 Pieces 1" x 12" x 10' S-4-S
2 Pieces 1" x 6" x 14' S-4-S
1 Piece 1" x 6" x 10' S-4-S
1 Piece 2" x 4" x 14' S-4-S
2 Pieces 2" x 4" x 12' S-4-S
36 Lin. Ft. 1" x 2"

ROOSTS
6 Pieces 2" x 8" x 12'
33 Pieces 1¾" x 1¾" x 8'

PLASTERING
16 Bu. Lime
2½ Cu. Yds. Sand.
9 Bbls. Portland Cement
3 Bu. Hair.

MIXTURE
1 Part Lime Paste.
4 Parts Sand
2 Parts Cement

CONCRETE WORK
Floor Foundation and Piers: 7½ Cu. Yds.
9 Bbls. Portland Cement
4 Cu. Yds. Sand
6 Cu. Yds. Gravel or Crushed Stone.

FINISH
4 Bbls. Portland Cement
1 Cu. Yd. Sand

WINDOWS
6 Sash of 6-lights 10" x 14" each
4 Sash of 8-lights 8" x 8" each

FRAMES
1 Piece 1" x 6" x 14' S-4-S Heads and Jambs
5 Pieces 1" x 6" x 12' S-4-S Heads and Jambs
2 Pieces 1" x 6" x 10' S-4-S Heads and Jambs
2 Pieces 1" x 4" x 16' S-4-S Casings
6 Pieces 1" x 4" x 12' S-4-S Casings
12 Pieces 1" x 4" x 10' S-4-S Casings
1 Piece 2" x 8" x 18' S-4-S Sills
2 Pieces 2" x 8" x 12' S-4-S Sills

DOOR FRAMES
3 Pieces 1" x 6" x 14' S-4-S Heads and Jambs
6 Pieces 1" x 4" x 12' S-4-S Casings
3 Pieces 1" x 4" x 10' S-4-S Casings
1 Piece 2" x 8" x 8' S-4-S Sills

DOORS
1 Piece 1" x 4" x 14' S-4-S Battens
2 Pieces 1" x 4" x 10' S-4-S Battens
55 Bd. Ft. ⅞" M and D Sheathing

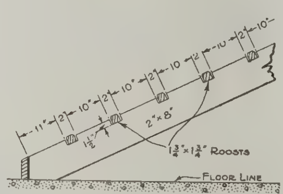
MIXTURE
Foundation—1 part Cement, 3 parts Sand, 5 parts Gravel.
Finish—1 part Cement, 1½ parts Sand

GRAVEL OR CINDER FILL
5 Cu. Yds.

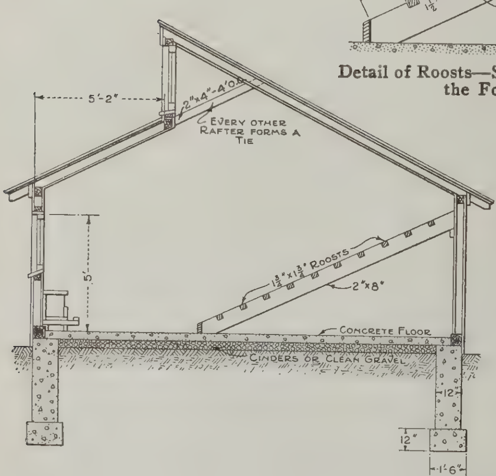
WIRE SCREEN
35 Lin. Ft. 36" wide, 1" mesh
10 Lin. Ft. 30" wide, 1" mesh

FLASHING
30 Lin. Ft. Galv. Iron, 10" wide

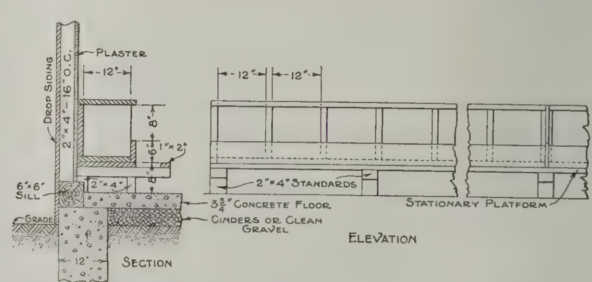
The cost of this poultry house based on prices of material and labor in the state of Illinois would be approximately $285, but this figure will vary in localities, depending on freight rates on material from source of supply and local labor conditions. The cost can be reduced somewhat by decreasing the dimensions or eliminating some of the concrete work.



Detail of Roosts—Scale ¼-In. to the Foot



Vertical Section Through the Poultry House—Scale ⅛-In. to the Foot



Details of Nests Which Are Made in Removable Sections—Scale ⅛-In. to the Foot

Plans for a Poultry House

The man who fails to scan the advertising pages of his trade paper does not get the meat from the cocoanut.

Cold Storage Insulating Methods Applied to Residences

A form of wall construction that will be of decided interest to those concerned in advanced construction ideas has been embodied in the residence of Dr. W. P. Abbott, of Duluth, Minn., which has recently been completed by the general contractors, MacLeod & Smith.

The outside walls of the house are built of hollow tile, finished off with a smooth gray stucco. On the interior side of these walls a layer of 1 in. of insulating material has been applied in the same manner that has been used for years in the erecting of cold storage buildings, viz.: By sticking the sheets to the walls with hot asphalt. That this method of applying insulation is practical, says the *Improvement Bulletin,* is shown by the fact that it has been for years almost exclusively used by the best insulation engineers. After the insulation—called "Feltlino," made by the Union Fibre Company of Winona, Minn., composed chiefly of flax fibre especially prepared and worked into sheets with a high efficiency as a barrier to the passage of heat and cold—is in place it is coated with hot asphalt and is then ready to receive the plaster.

This form of construction will appeal to everyone who has made a study of the building of economical residences. The hollow tile walls are much warmer than brick, though costing less, while the insulation adds but a trifle to the cost of the house, as it does away with the necessity of furring and lathing.

A Transplanted Residence of Cobble Stone Construction

A Case Where a Stone Dwelling Was Taken Down, Removed to a Distant State and Rebuilt

WHAT is said to be one of the most unique houses in the South, as well as one that is attracting much attention, is that which has recently been erected at Sherley Crest Farm just outside of the city of Lexington, Ky., and a view of which is indicated by means of the picture presented herewith. The building is the property of Mr. Douglas Sherley, who had it taken down stone by stone at its site in Bar Harbor, Maine, and erected on his farm in Kentucky just as it was originally built. It is constructed entirely of cobblestones and has unusual window illumination. In fact the walls of almost the whole of the first story are taken up with triple-section windows.

Another feature of the house is a large central chimney, with which is connected seven mammoth fireplaces where logs are used for fuel. The interior decorations are a combination of the New England seacoast and the primitive Kentucky backwoods type.

In one corner of the reception room is a seacoast rowboat fitted up like a couch with cushions and pillows, and suspended from the ceiling by cables.

For the main entrance there is a life-sized plaster figure of a jockey sitting with hands outstretched to receive the cards of callers.

The large stones with the anchor and chain shown at the left in the foreground of the picture were brought from Bar Harbor and occupy precisely the same relative position at Sherley Crest Farm that they did in the state of Maine; in fact everything about the house is reproduced exactly as it was when the dwelling was originally constructed.

In order to transport the material of which the house is built from Bar Harbor, Maine, to the present site several railroad cars were required and the cost of the work is said to have been in the neighborhood of $20,-000. The fact that the operation was carried to a successful issue, combined with the quaint design of the building, has attracted throngs of visitors to the farm to inspect the interesting structure.

Dwelling House Originally Erected at Bar Harbor, Maine, Taken Down Stone by Stone, Transported to Kentucky and Rebuilt on Sherley Crest Farm Near Lexington

A Transplanted Residence of Cobblestone Construction

Shower Baths in Houses in India

Real bathrooms are scarce in the interior of India, as a lady who was traveling with her husband discovered, upon arriving at an out-of-the-way place one evening, says an exchange. The host, when showing them their room, said, pointing to a door: "The shower bath is there." Later the lady went into the bathroom, disrobed, and seeing before her just a tub and a tin mug and nothing more, began to investigate for the source of the "shower." Suddenly she heard a masculine voice apparently in the ceiling say: "If memsahib coming more this side I throwing water more proper."

Contractors and Builders of St. Paul, Minn., are required to keep sidewalks clear of obstructions.

The Building Age

Formerly Carpentry and Building

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NOVEMBER, 1912

Motive Power for the Carpenter Shop

The carpenter-contractor and builder who operates a small woodworking shop is interested in running it upon the most economical basis, and naturally the question of motive power is an all important one. When his shop is located in a small town or suburban section where electricity is readily available he is apt to drive his machines through the medium of electric motors, but in the case of the country carpenter, where his shop is isolated from any such public supply of power, he is apt to revert to the gasoline engine. In order to run an engine of this kind it is only necessary for him to obtain a supply of gasoline, which in these days, owing to the popularity of the automobile, can readily be done in even the smallest village and hamlet in the country that boasts of a "general store." Probably for the average carpenter shop, equipped as it is with a few woodworking machines, yet of a character to turn out a considerable variety of work, a 3 or 4 horse-power engine would be all that was required for the purpose. This would not only furnish driving power and thereby the means for doing certain kinds of special machine woodworking called for at various times by those living in the community, but it makes the carpenter shop a sort of local factory where during bad weather and throughout the winter months, when building operations have ceased, the carpenter can turn out a wide range of woodwork that will likely be required for the spring season. The opportunities, however, do not stop here, but may be expanded into the execution of quite an extensive line of cabinet woodwork, the manufacture of wood novelties, etc., depending much on the ingenuity and enterprise of the carpenter himself and the taste and prosperity of the community.

The Shop Equipment

In fitting up a carpenter shop in a country place with small woodworking machines intended to be operated by power the equipment may safely be regarded as consisting of a rip saw, a small scroll saw, a turning lathe, a small planer, either a top smoother or some light panel planer and a 3 or 4 horse-power gasoline engine. In some cases possibly a small rip saw and lathe with a light scroll saw might meet the requirements of the case. If there should be a regular planing mill within convenient distance the planer part might be omitted entirely, but generally where there is no planing mill conveniently at hand the country carpenter can save a great amount of hand planing by having either a top smoother or a panel planer. The lathe could hardly be omitted under any conditions, for there is a chance to utilize almost anything in the shape of waste in the turning lathe and scroll saw. Corner blocks can be turned out of scraps; also an almost endless variety of special decorative woodwork, to say nothing of the various wood novelties for household use that can be made during the dull winter season.

Value of the Rip Saw

A rip saw is one of the most handy machines imaginable about the shop because there is really more ripping than anything else, especially where a carpenter uses rough framing. By changing saws the rip saw can be converted into a cross cut and by adjusting the extension of this saw up through the table quite a lot of work can be done that usually requires a hand saw. The operator can cut in gains, tenon shoulders, and do all sorts of things of that kind. By putting on a bunch of saws or a dado head he can cut the gains, rabbet and do various other things. By putting on a slide form for cutting shapes the operator can cut the ends of rafters, cut miters, and joist bridging, make wedges, etc.; in fact, there is hardly any limit to the possibilities of a rip saw table when it is in the hands of a man of some ingenuity. There is one thing, however, the average carpenter must guard against in taking up the idea of the small gasoline engine for operating a few woodworking machines, and that is the tendency to go too far in the matter. An opportunity properly handled can and will do a vast amount of good work for the carpenter, but if it is not handled right it is likely to do all sorts of contrary things, and when overloaded it is a foregone conclusion that it will balk.

New York's Latest Skyscraper

The latest addition to the colony of sky piercing office buildings which congest the lower portion of the Island of Manhattan is the 32-story structure which is now being erected on the northwest corner of Broadway and Exchange place running through to Trinity place. The old buildings which have just been torn down to make room for the new structure were long occupied by the Adams Express Company, which will have offices in the new building. According to the plans of Architect Francis H. Kimball, 71 Broadway, New York City, the new building will rise to a hight of 442 ft. above the level of the sidewalk. The contract for the foundations has been awarded Holbrook, Cabot & Rollins Corporation, 331 Madison avenue, New York City.

"Outing" of Chicago Builders and Traders' Exchange

The Builders & Traders' Exchange of Chicago, Ill., held its fifth annual outing at Milwaukee, Wis., on Saturday and Sunday, September 14 and 15.

Leaving Chicago at 8:30 Saturday morning the party arrived at Milwaukee at 11 o'clock and were met by members of the Milwaukee Builders' Exchange, whose guests they were during their stay in Milwaukee.

Saturday afternoon the Milwaukee exchange provided automobiles and took the Chicago people to all points of interest in and around the city, stopping for refreshments at Whitefish Bay, where there is a resort quite well known for its good things to eat.

A banquet at the Blatz Hotel took place in the early evening, at which the Milwaukee builders were again the hosts. A pleasant feature of the banquet was the presentation of a gold watch and chain to President J. D. Corlett of the Chicago Builders & Traders' Exchange by the members of that body. In the later hours of the evening the party went to a theater.

Sunday the Chicagoans visited the Milwaukee exchange and expressed admiration for the fine displays of building materials, a feature which received extended comment in The Building Age some months ago.

The Chicago party arrived home at 6 o'clock Sunday evening.

Licensing Architects

With a view to ascertaining the general feeling regarding the licensing of architects an exchange recently submitted to various examining boards, including those in the States of California, Colorado, Illinois, Louisiana, New Jersey and Utah, as well as in Quebec and Manitoba, Canada, a list of questions which had been selected with the greatest possible care. The consensus of opinion as expressed in the answers received indicated a strong sentiment in favor of licensing architects.

Trade School Courses in St. Paul

Industrial courses in elementary and intermediate architectural drawing, sheet metal work, electrical construction, architectural sculpture and modeling as well as plumbing and ventilation are being conducted by the St. Paul Institute and the St. Paul Builders Exchange in co-operation with the Board of School Inspectors for the benefit of practical workmen who desire to increase their skill. The courses opened on October 7, and will continue for two terms of ten weeks each, classes being held on Tuesdays, Thursdays and Fridays from 7:30 until 9:00 p. m. in the new Mechanics Arts High School building in St. Paul, Minn. The tuition is $5 for each term or $7.50 for the two terms, when paid in advance. The instructors in these subjects are all practical men recommended by the Builders Exchange of that city.

Prizes for Builders

One of the recent arichtectural developments in the Boroughs of Manhattan and the Bronx, New York City, is the offer of medals for excellence in exterior designs of apartment houses. The awards are made to owners of buildings erected within three years prior to October 1 in the boroughs named and the New York Chapter of the American Institute of Architects has just published the conditions under which these medals are to be awarded. The points for consideration in making the awards are simplicity, good proportion, artistic and practical use of inexpensive materials; the avoidance of imitation or sham materials; the adaptability of design to site and the satisfactory solution of such features as fire escapes, tanks, bulkheads, awnings, etc., thus making a competition that interests all and tends to produce results both practical and artistic. The head of the jury of awards is C. Grant La Farge.

A Two-Story Concrete Tank

Something rather unusual in the way of tank construction is a reinforced concrete affair which is built in two stories; that is, one above the other with an interval between. Both, however, are supported by the one foundation. This unique structure is used in connection with the water-softening plant of extensive hosiery mills in Rockford, Ill. The capacity of the lower tank is 85,000 gallons and of the upper one 62,000 gallons. The columns which continue from the walls of the lower tank support the upper one. An artesian well supplies the water for the upper tank and, passing through the softening process as it leaves the upper tank, it goes to the lower one until used.

The tanks are circular in shape and 24 ft. in diameter, the lower one being 22 ft. high and the upper one 18 ft. high, the walls being 8 in. thick.

New Feature in Loft Buildings

Something of an innovation in connection with buildings erected for loft purposes is a dressing room, toilet and shower bath on each floor. In the older buildings the sole idea seemed to be to provide a great spread of space, little or no attention being given to the comfort of those working therein. The buildings were for the display and manufacture of goods and the main thing sought was a big room with as little obstruction as possible. In one of the latest loft buildings erected in New York City and designed by George and Edward Blum, the innovation above referred to has been introduced. The baths and dressing rooms are in the front of the building and are 6 ft. wide by 8 ft. long. The space for dressing purposes may also be used for a lounging room.

In discussing the construction of concrete floors for barns and stables a writer on the subject recommends that the floor be so planned that every part of it will drain uniformly to one point. He suggests that 1 in. in 10 ft. will give sufficient slope and without this there is very likely to be water standing on the floor which is both unsanitary and unhealthy.

CORRESPONDENCE

A Department Where Those Interested Can Discuss Practical Trade Topics—All Are Invited to Participate

Constructing a Drawing Board

From W. A. Emery, East Waterford, Maine.—Having noticed in recent issues of the paper more or less discussion relating to drawing boards I am sending sketches of a board I have used for the past ten years in the hope that a description of it may be interesting to some of the readers.

The trestle legs and bars are of 1 x 1½ in. cherry, or they may be of any good hard wood that is readily available. The ends are draw-bored and glued together solid. The front and rear bars are framed with dovetail tenon and key so the frame can be readily taken apart or put together without the use of any tools. It is very rigid and firm. The bar at the bottom makes a good foot rest for the draftsman when sitting. The board is hung to the front legs by two small brass butts so that with the two slotted strips which are held to the rear top bar by thumb bolts all as clearly shown, the top can be tilted to any angle desired. The frame is 39 in. high, as I prefer to stand when drawing, but I have a high stool to sit on when I want to rest. The board is glued up of soft pine strips and is about 1 in. thick. A little thicker, however, would be better. The end cleats are oak and a groove is stuck in the center as shown so that the round head screws will go in a little more than flush, this arrangement preventing their being hit with the plane iron when truing up the end of the board at any time. Again, it is much better when handling the board.

The cleats on the under side of the board are grooved the same and are of 1 in. oak and 4½ in. wide. The screws are all put in with small cut washers and the holes in the cleats are quite a little larger than the screws so that the board can expand and contract without warping.

The board has grooves stuck in the under side every 2 in. so it cannot bend the cleats if swelling.

The board is in good shape now and I have never had to true it up. I use a small board on it unless wanting to lay off two floor plans or two elevations at the same time. It makes a very light and good looking rig for small work.

The board and trestle can be made as much larger as one may desire. The end, however, of the board here presented represents it slighthly elevated.

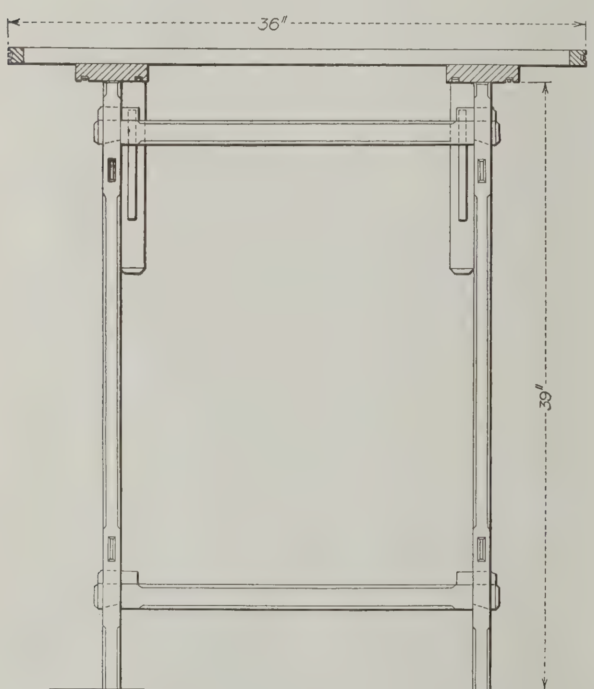
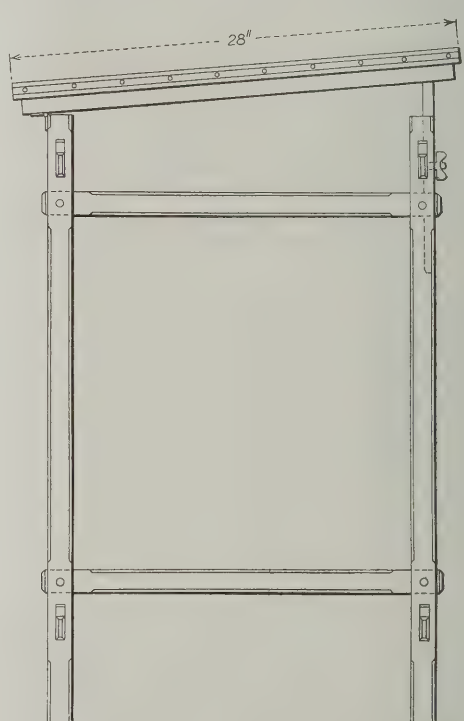


Fig. 1—Front Elevation—Scale 1 In. to the Foot



End Elevation—Scale 1 In. to the Foot

Constructing a Drawing Board—By W. A. Emery

A Problem in Chimney Construction

From D. P. Barry, Redford, N. Y.—If I had "G. E's" chimney problem to solve I would partition off the boiler vent and build it as high up the chimney as I could from the bottom. Then put in the fireplace and let both vent into the chimney and try it out; if a failure and the chimney vertical enough I would drop two lines of light 7-in. stovepipe inside the chimney; connect well over each vent and pour in from the top cement-mortar made of one part cement and four of sand.

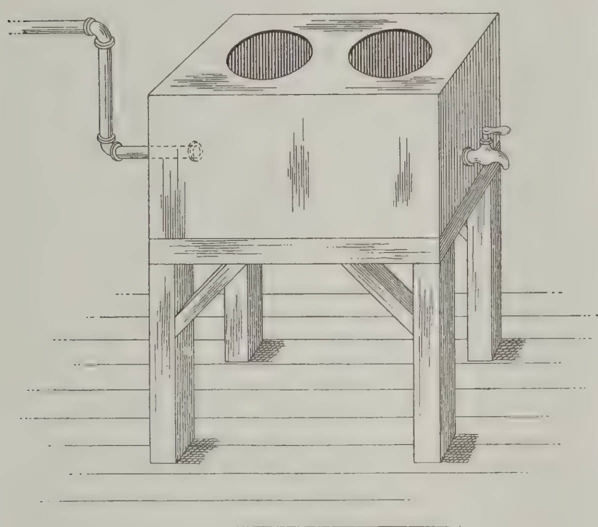
If the chimney is too large at the bottom to warrant this and the first plan a failure, then I would take it down and build a modern concrete chimney. There is no reason why the first plan should fail, but when a chimney has the smoke habit it is incurable. I have a concrete 8 x 8-in. tile chimney starting from the bottom of the cellar and going out at the roof 35 ft. high and I often put on three stoves at a time and always have to turn the drafts off, otherwise it is an uproar.

Tiling should not be used for a form on the inside of a concrete chimney; the concrete cracks at every joint; stovepipe is better and lighter and more convenient to handle.

A Glue Heating Apparatus

From O. B. M., New York City.—I am enclosing a sketch of a proposed scheme for heating and maintaining hot glue in a carpenter's shop or small woodworking establishment where it is necessary to have conveniently at hand more or less hot glue for use in connection with the work in progress. The idea is to abolish the dangerous system of using a fire pot for heating the glue.

The apparatus here shown consists of a simple gal-



A Glue Heating Apparatus

vanized iron hot water chamber filled by hand and kept continuously hot by a steam pipe connected with a radiator. The hot water chamber rests upon a wooden stand which is 2 ft. long by 14 in. wide and is supported by legs made of 2 x 3 in. material. Braces are used as shown. The hot water chamber is 12 in. deep and has in the top two openings for the glue pots. The faucet shown at the right is for the purpose of drawing off a supply of hot water for washing or any other purpose for which it might be desired. When there is no water in the galvanized iron chamber or tank, it can be filled with steam, and by allowing it to blow out through the faucet it can be used for bending wood.

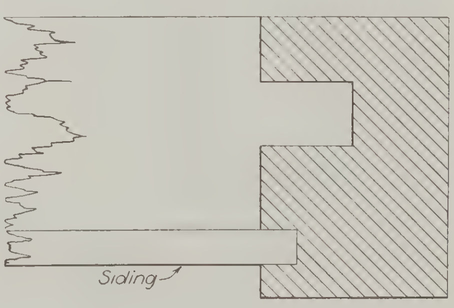
Relative Cost of Regular vs. Plank Framing

From L. H. Hand, Bloomfield, Ind.—In the light of all that has appeared upon the subject of plank frame construction I am of the opinion that the relative cost of regular framing as compared with plank framing is a matter of the greatest importance, but unfortunately little reliable data is available for use in such shape as to be of any great service to the builder and I am unabe to discover any definite way to figure the actual cost of regular framing. To illustrate my point I will cite one or two examples. In 1887 a very competent bridge foreman took a gang of eight men and began framing bents for a bridge. There were six bents framed of 12 by 12 in. oak and averaging about 10 ft. in height. At the end of the second day this gang had framed and raised one bent. Some time afterwards I was working part of the same gang of men when a bent was laid off and framed complete in one hour and 10 minutes. It was put into the bridge and the track lowered in place in 29 minutes after the train passed over.

I remember that in the old days when men had more or less pride as to how much work was accomplished in a day that it was considered a fair day's work to bore, mortise, box, through-bore and work the tenons on two ordinary barn posts 8 by 8 in. with 3 in. beam mortise, three runs of nail ties and two runs of braces. The tie mortises were 2 x 4 in. to 6 in. and the brace mortise 1½ x 6 in. In those days all mortises were made true and smooth with 3-in. framing chisel or "shick." Boxings were true to line with both sides and good joints were the rule not the exception. My boss framed four such posts on a race one day last summer. The firm I was with built a large factory of mill construction type on the percentage plan, using labor at the 62½ cent scale. In this building was a plain queen-truss of about 40 ft. span framed of 10 x 10 in. machine planed timber. Under any known rule for figuring frame work this truss should be framed, raised and forgotten for about $20. In the old days I should have expected two good bridge men to cut every stick, bore every hole and have every bit of work done on the entire truss except raising it in place in the building in five hours. I saw this truss for 5 or 6 days with as many as six men at work upon it. Eventually it was assembled as per instructions in Nicholson's Mechanics Companion, dated 1750. There seemed to be an effort on foot to bore the long angular stay bolt holes. I had occasion to be about the place for probably half an hour and while I was there the foreman devoted his time to looking at the blueprint and the four carpenters looked at the timbers.

I will state further that the estimate on this building was made by two civil engineers—one educated in a New York College holding a position under the company as general manager; the other was one of the head draftsmen, educated in Europe and held a diploma form a noted college there. Their estimate on the complete building, which was slow-burning mill-construction, was $25,000. The labor alone cost $20,000 and the building approximately $40,000.

The difficulty in figuring the cost of regular framing —mortise and tenon—is principally because it is a lost art or nearly so. Take the single item of the old fashioned barn post with its mortises, tenons, boxing, draw-bores, etc., of which any of us used to frame



Relative Cost of Regular vs. Plank Framing

two for a day's work and of which my boss framed four on a race, and I do not think any two carpenters who worked on the factory building in question would have framed one in a day.

The reasons are numerous: In the old times, the day began just before the sun got up and a days work was seldom less than 12 hours long. Second, men hired whom they pleased, paid what they pleased, and to secure a permanent job of a prosperous contractor who had steady work, it was necessary for the journeyman to "deliver the goods" so to speak. Third, the men in former days were trained for what was the regular work of the times. They were prepared for it by a boyhood experience with axe, maul, grub hoe, etc., so that their muscles were not overtaxed by the use of boring machine, mallet, chisel, adz, etc. As a fact, however, the work of heavy framing was lighter than ordinary work in the country. Take a man who is quick, and skillful with timbers from 2 x 4 in. up to 2 x 12 in. and he is more at sea with 14 x 14 in., 7 x 16 in., etc., than a common intelligent section hand on a railway or a healthy young farmer.

A man who worked for me near Chicago some 10 years ago said that a large firm carried an advertisement for several days during a rather dull period for carpenters who understood heavy framing. He said that he went and secured employment at once but that a great many who came looked at the timber and then went away, saying that they knew nothing of the work; had no suitable tools and did not care to buy them.

Along in the '70's barns were framed for 12 and 16 cents per running foot of timber contained in the building including everything 4 x 5 in. and over. That is, the hewed timber was counted at 4 cents per running foot extra for the labor of felling the timber and squaring it up and while this was considered a fair price 40 years ago conditions have changed so much that I am in doubt whether 40 cents per running foot would pay for the work with Chicago carpenters at 62½ cents per hour.

The old-time carpenter grew up with an axe in his hands; the modern carpenter does not know for what the instrument is used.

In Union County, Ind., there are two barns built about 80 or 90 years ago, which will serve to further illustrate the labor cost of heavy frame work. The first is framed with posts 14 x 14 in. and beams 14 x 16 in. The beams are all double tenoned and pinned with three 1½-in. pins and there is a cambered beam with 36-in. face. This barn required 60 men and 3 yoke of cattle 3 days to raise but I never learned the cost of labor on it. Possibly it was as much as $100.

Near it is another barn framed of 12 x 12 in. hewn timber. The barn is 30 x 50 ft. in plan and the contract price for labor was $50. After the contract was closed the owner said, "I want the plates to extend 2 in. over the post and be plowed to receive the upper end of the siding," which was a form in some use in that section of the country. An idea of what was required is shown in the accompanying sketch.

The contractor, whose name by the way was Whiteneck, demurred at this and wanted $2 extra for the work, but it was compromised for $1. It will be borne in mind that barn raising in the country was done by the combined effort of the men of the neighborhood and was not counted as a labor cost.

Coal mine derricks and the like are framed and raised at prices varying from $10 to $15 per thousand ft. counting all material used. Now the rules for figuring the labor cost of frame work are too numerous to mention but they will not serve. The only accurate way is to select a gang and after the men have worked on the same kind of a job for a year you can tell to a cent what it will cost for this work on a given job. But to take an unknown gang one is just sure to go astray.

Now with the plank frame it is altogether different. There are no timbers to take out of wind and no mortises and tenons. The work is little different from framing joist in any other building. A little careful work with the templates as to gains and bolt holes and a mark on each one of the number of pieces required and there you are. You can safely figure the labor of framing at exactly the same amount per thousand ft. as it costs to frame joists in an ordinary building. With wages at 20 cents per hour it will cost $7 to $10 to frame and with wages at 40 cents it will cost double.

You know something about your men on other jobs and this is so similar that you are safe in figuring your material by the thousand feet. This becomes plainer when we think it over. Carpenters are migratory birds. They work from Maine to Texas, from Florida to Oregon, and every place it is 2 x 4, 2 x 6, 2 x 8, 2 x 10, etc. The heavy timber is only used by railroads and big corporations and steel is rapidly taking the place of this, so to sum it all up the figures on a plank frame for labor is a sum in simple arithmetic.

The heavy frame under present conditions is an example in algebra and the unknown quantity is the amount of work you get for your money.

Roof Truss for Mechanics Hall

From XXX., Yonkers, N. Y.—I first wish to thank Mr. Lesher and also Mr. Eden for the interest they have taken in reference to my roof truss which appeared in the August number of the *Building Age*.

I wish to ask Mr. Lesher why he goes to so much trouble to work out the stresses, if he thinks it practical to use angles so much larger than is required by his diagram. He says he would advise using 2½ in. x 2 in. x 5/16 in. This no doubt would simplify the construction, but one with ordinary experience could see at a glance that such sizes would be amply strong with no diagram whatever.

Now, in regard to Mr. Eden's reply, I don't quite agree with him where he says it is a mistake to specify all gusset plates of a uniform thickness. If thicker gussets are required at the foot and apex of the truss, what would be the serious objection to using thicker gussets at all other joints? This, in my mind, would be as essential as to make all angles of the same size.

Some Questions in Barn Construction

From W. H. J. P., Philadelphia, Pa.—Will some of the many practical readers of the Correspondence Department tell me how to frame and build a square or octagon ventilator for a barn? I want to know how to frame it between the rafters or over the rafters as the case may be. I have had no experience in this sort of framing and have a job of it to execute and therefore come to the readers of this journal for the information.

Some other points in connection with barn construction concerning which I shall be glad to have informaiton are the width and hight of stalls for horses and cows, also the hight of mangers or feed boxes to be used in connection therewith.

Repairing Old Houses with Cement

From J. C. B., Dowagiac, Mich.—Referring to the article entitled "Repairing Old Houses with Cement," which appeared on page 379 of the November issue of the paper for 1909—when known as *Carpentry and Building*—I would like to ask the author, Mr. Hand, why he prefers the old-fashioned wood lath to metal or expanded metal lathing; how he finishes the corners of the building and if he will be so good as to describe how he would proceed in the case of entirely new work, using 1⅜-in. thick doors and windows—the usual sizes in low cost houses and cottages? I am sure an article from him on this topic would be very interesting to a number of us.

I would also like to know what he would recommend as a fire retardant for covering the roof, as the use of shingles is not encouraged by the insurance companies.

A Problem in Stair Building

From W. R., Denver, Colo.—I have on hand an all-cement job of stair building except the handrail, as shown in plan and section in the accompanying sketches, this being only one of several different kinds. The risers are any old way for four stories, no two being the same. The form 2 x 4 is already made, although I am not certain if it is perfect.

What "Triangulus" had to say in recent issues of the paper scared me a little and I would like to have Morris Williams or some other stairbuilding expert tell me how to get out the side marked *"A"* shown on the sectional view. I thought of making a drum and then bending to the pitch and use a falling mold. What say the experts?

Answer.—In regard to the stairbuilding problem presented by this correspondent, Morris Williams offers the following comment in reply:

In Fig. 1 are represented the sketches accompanying the query of the correspondent. It is defective as a drawing in that it does not represent the elevation and pitch of the tangents in their correct relation to the plan tangents. If the pitch rail were to be constructed as shown in this drawing it would be too short to reach from the landing rail to the quarter turn cylinder. The springing bevel is correct, as is also the developed section of the cutting plane.

Fig. 2 has been prepared for the inspection of the correspondent and as one representing the best development of elevation and tangents of the plan conditions. Here are shown the two plan tangents unfolded; whereas in Fig. 1 there is one tangent and one springing line shown to have been unfolded.

The face mold in Fig. 2 is shown developed over and above its plan curve, and is so plainly drawn as to need no explanation, although the method differs somewhat from the one partially indicated in Fig. 1.

The correspondent need have no misgivings by what has been said by "Triangulus." His duty is to go ahead and construct his rail with his own method, relying on its effectiveness to produce satisfactory results, and stimulated by the past achievements of his system.

With regard to getting out the side marked *"A,"* I would say that it is a very simple operation. It is a matter of casing an already constructed rail. As the side *A* may be considered as merely the falling mold for both the inside and outside of the rail, and as the pitches are equal over the plan curve tangents, it follows that the falling mold will be a straight piece of 1 x 3, as indicated in Fig. 3, from joint to joint, where the falling mold is shown developed. The base line *m-n* in this figure equals the length of the stretchout of the outside curve of the plan rail and the line *m-z* equals the hight the rail rises in winding above its plan curve.

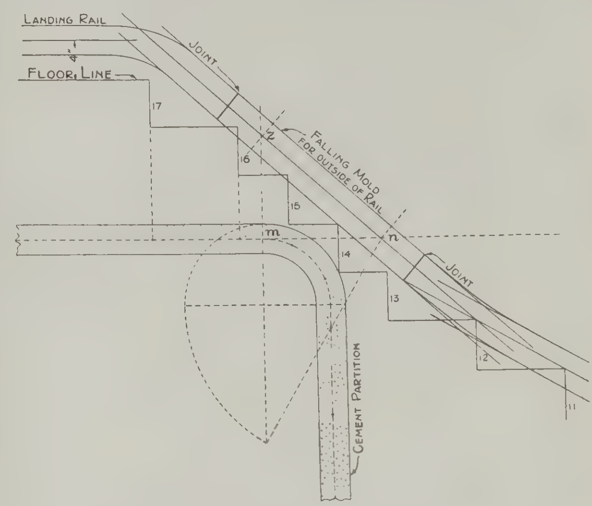


Fig. 3—Showing Falling Mold for Outside Rail

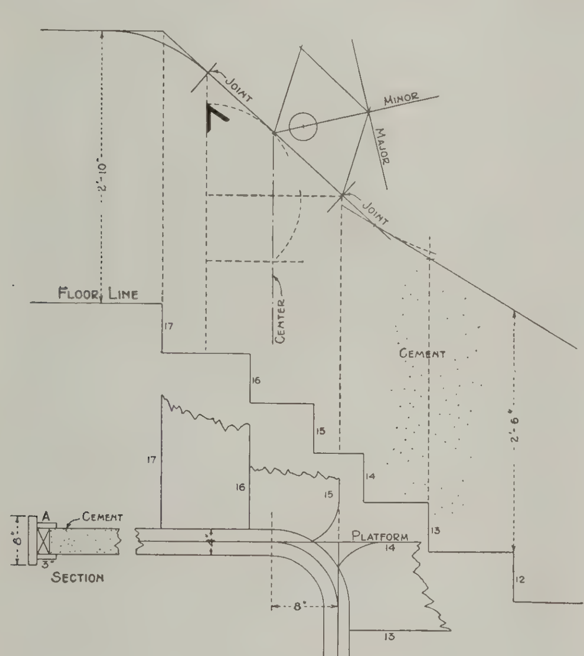


Fig. 1—Sketches Submitted by "W. R.," Denver, Colo.

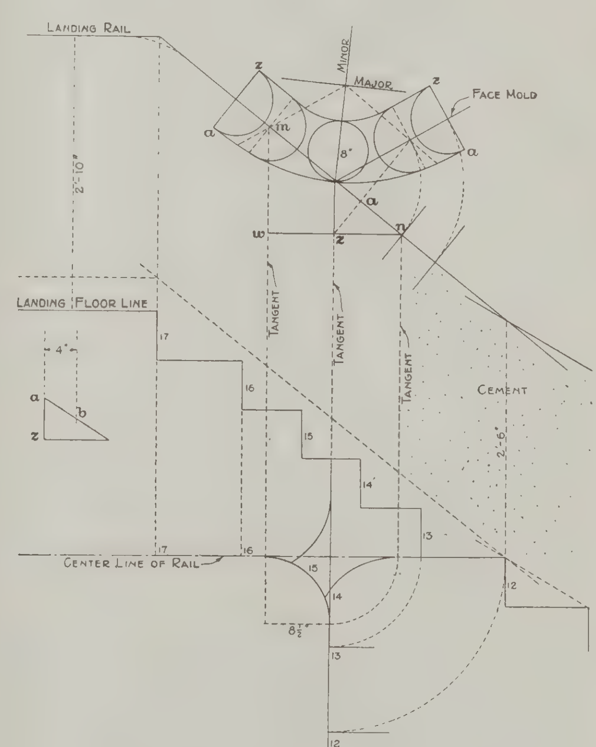


Fig. 2—Elevation of Stairs and Face Mold.

A Problem in Stairbuilding.

As to bending the sides at *A* around the quarter turn it seems to me that it can be easily done without having to construct a drum. The 2 x 4 already fixed may be utilized as a substitute. By using plenty of nails the pieces will bend around uniformly without being kerfed if he will utilize two ½-in. thicknesses instead of one of 1 in.

The same applies also to the 8-in. top piece of the rail.

The fact that the construction is to be made of pine and painted facilitates such an operation. If I had a similar job to construct I certainly would prepare the face mold as shown in Fig. 2; my falling mold as in Fig. 3, and then would nail up the side pieces on the inside and outside to the 2 x 4 from newel to landing, taking care to have them square on top all along. I would finish by nailing the top piece to the 2 x 4 and the side pieces, using two or even more thin layers of stuff, one upon the other, to form the top piece around the quarter turn and let the painters do the finishing operation.

Plans Wanted for Wayside Inn

From J. C. B., Dowagiac, Mich.—A year or so ago I made request for the first and second floor plans of a small wayside inn minus bar and dancing hall, but so far nothing has appeared. Perhaps some of the readers may be able to give me the dimensions of the several rooms; that is, reception room, dining room, kitchen and the bedrooms upstairs. If my memory serves nothing of the kind has ever appeared in the columns of the paper, either when known as *Carpentry and Building* or as the *Building Age*.

Some Further Comments on Winding Stair Rails

From Cymro.—It would appear that the correspondent "I. S. C.," Tarrytown, N. Y., in the October issue of the paper, looks upon a "square butt joint" of a wreath from a somewhat different point of view to that of most handrailers. I stated in the September issue, in answer to C. C. Grant, that the "bevels take care of the joints in every tangent method and in all cases will produce by correct application a true 'square butt' joint."

Now "I. S. C." says, "I always thought it was the pattern and a try square—the bevel for twisting and direction, as that butt joint is made before any bevel is applied."

It will be observed that he is looking at the joint before the bevel is applied—a joint simply made square to the tangent and face of plank. Such a joint is not that of a wreath. It is merely the first process of its manipulation. It is the joint of the material cut out of the plank which as yet is not a wreath.

It is when the bevel is applied to this joint and the material twisted that the joint comes to be strictly a correct "square butt" joint of a wreath, hence the appropriateness of my remarks to C. C. Grant that the bevels take care of the joints in all tangent methods of handrailing.

From C. C. Grant, Red Deer, Alta.—Referring to the letter of "Cymro" in the October issue of the *Building Age* wherein he asks who is to decide between "Triangulus" and himself as to the thickness of plank necessary, I would suggest that if "Cymro" will try the following simple experiment he will discover that he is wrong.

Cut a sheet of paper at an angle of 45 degrees to its side; wind it around a cylinder, say a stove pipe with its side vertical; take a piece of wire 1/8 of an inch thick, for example, and wind it around the cylinder, following the cut edge of the paper. The wire will then follow a true helical course such as does a regularly climbing circular stair. File out a part of the wire which stands over a quarter turn on the ground plan and then try to place that piece of wire between two planes no further apart than 1/8 of an inch—the diameter of the wire.

From C. F. S., Brooklyn, N. Y.—In the October issue of the *Building Age* I notice that "Cymro" refers to some of the figures used by him in his "Comments on Triangulus System of Winding Stair Rails."

Regarding Fig. 2, which appeared in the July issue of your valuable paper, there seems to be no great fault in geometrical construction, if the elevation be allowed to stand at the height of six risers, but no weight of authority—not even Mr. Jones himself—can obtain correctness if the elevation be reduced to five risers.

This simple method must be strictly limited to cases of handrailing where the tangents are pitched at an angle of 45 degrees, and this fact makes it very improbable that thousands of rails are standing to the credit of this same method.

The misleading nature of this problem for use as a general method seems to me worthy of some notice in the next issue of the paper.

Problem in Scroll Stairway Construction

From Morris Williams, New York.—Regarding my answer to the query of "Tangent," New Orleans, La., in the September issue of the paper, the correspondent "I. S. C.," Tarrytown, N. Y., comes out in the October issue to combat its correctness. He says that in my Figs. 4 and 6, I do not meet the conditions of Fig. 2 furnished by "Tangent" from floor to top of rail at scroll by 1 in.

While maintaining that 1 in. is altogether too insignificant an item to be considered in a case like this, I wish to state that the methods represented in both figures were intended to show "Tangent" how to handle the elevation tangents in such a manner as to raise or lower the rail at the scroll as desired.

The correspondent "I. S. C." does not say whether the rail at the scroll is 1 in. too low or 1 in. too high. In either case it may be easily rectified by reducing or adding to the length of the flight balusters or if preferred by altering the pitch of the tangents. In the two figures I have shown "Tangent" the method to fix the hight at the scroll as he may decide it to be.

In his comment on Figs. 9 and 10, he says the plan, Fig. 9, looks dandy "but the sixth step is too narrow for three balusters and too wide for two. The ends 2, 3, 4 and 5 are too narrow for two balusters and too wide for one."

If this is the case what is to be done? We are limited to a certain space in which to crowd six steps. Can it be done better than shown in the figures mentioned?

By this arrangement the rail will follow the steps and the balusters will be of equal length. I would be pleased, indeed, to have "I. S. C." present a better arrangement of the steps. It will be a revelation to handrailers generally and, I am sure, greatly appreciated.

In Fig. 10, he finds that the rail at the scroll will be 2½ in. too high. How this can be so, I fail to see for it is shown in the figure that its center is 1 in. below the third step as in Figs. 4 and 6. It appears to me that "Tangent" after all the comment may proceed without fear of being stuck.

Cleaning India Oil Stones

From P. M. H., Sedalia, Mo.—Can anyone of the readers of the *Building Age* tell me how to get the oil out of India oil stones. Any information on the subject will be greatly appreciated.

Turning Ovals in a Lathe

From M. B. O., Westchester, N. Y.—Will some of those who have had experience tell me through the Correspondence columns, how to turn ovals in a wood turner's lathe. What I have in mind are hammer and axe handles, etc.

Heating an Old Remodeled House

Use of a System to Overcome Difficulties in a Residence Not Originally Planned for Furnace Heating

By J. E. Robinson

A RATHER one-sided system of furnace piping is shown in the plans reproduced in the accompanying illustrations. Nevertheless, this system has proved very satisfactory and there has been no trouble in heating the entire house in zero weather. The house is situated thirteen miles north of Boston, Mass., where the thermometer often registers 10 deg. below zero. It was built a great many years ago and was originally heated by four large fireplaces. The fireplace in the den was bricked up several years ago and a stove used instead. The fireplace in the dining room was bricked up and an 8-in. tile pipe set on the foundation and extended up through to furnish a flue for the furnace.

The cellar is excavated under about one-half of the main portion of the house and the cellar stairs go down in such a way that the furnace had to be set near the cellar wall, as shown in Fig. 1, in order to run pipes to all the rooms and still leave space for the coal bin and sufficient room to attend to the furnace.

The cold-air box was built of matched boards and extends across the floor of the cellar, then up to the opening in the cellar wall.

which extends 7 ft. to the den. The 10-in. pipe extends 4 ft. beyond the Y before it turns up through the closet to heat the two north chambers on the second floor. The 11-in. pipe to the hall is large enough to heat the first, second and third floor halls.

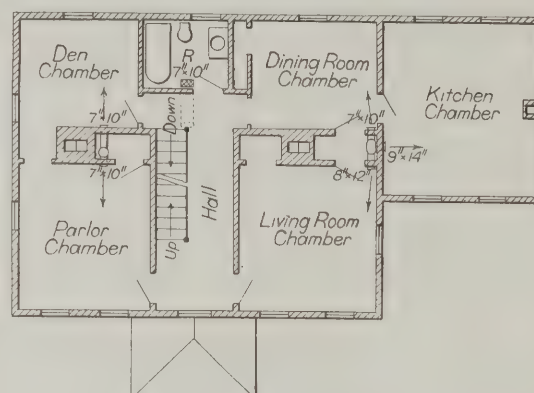


Fig. 3—Second Floor Plan, Showing Outlets from Vertical Trunk Risers to Registers

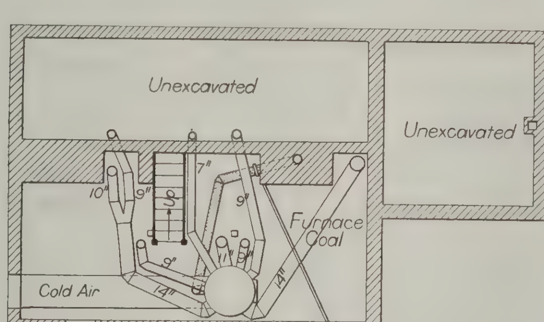


Fig. 1—Basement Plan, Showing Location of Furnace, Air Supply Duct and Piping to Horizontal and Vertical Trunk Mains

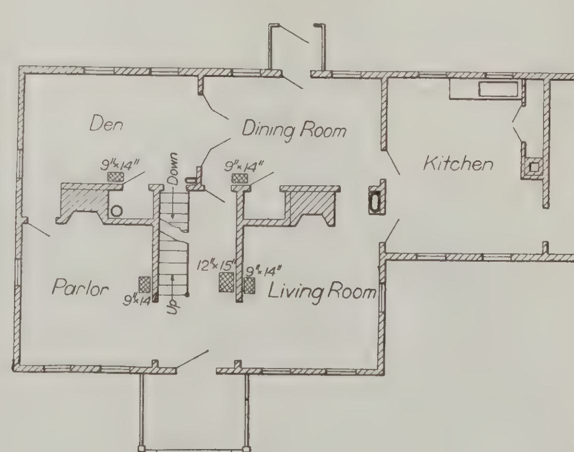


Fig. 2—First Floor, Showing Location of Registers and Round and Oval Trunk Risers

Furnace Heating in an Old Remodeled House

Openings had to be made through the stone foundation under the center of the house for the pipes running to the dining room and den on the first floor (Fig. 2), also for those to the five chambers and bath room on the second floor. By referring to Fig. 3, it will be seen that the living room chamber, dining room chamber and kitchen chamber are all heated from one 14-in. pipe. This pipe is 16 ft. long in the cellar and where it goes up through the liivng room is oval in form and is 9 in. deep. This oval section is covered with heavy asbestos paper and sheeted in with thin boards so that the space taken out of this corner of the dining room is hardly noticed.

The den on the first floor, also the den chamber and parlor chamber on the second floor, are all heated from a 14-in. pipe. This 14-in. pipe extends 15 ft. in the cellar, then a Y is used to connect the 9-in. pipe, The chambers on the third floor are not heated except from the halls.

The 7-in. pipe to the bath room is made oval and is 4 in. deep where it goes up through the den, and is cased in with sheet iron in order to save the space that wood sheathing would require. This pipe is carried up above the plaster ceiling of the den so that the horizontal connection from the riser to the register is entirely concealed. It required considerable carpenter and mason work to make room for these pipes, but the space taken out of the rooms was not near as much as would have been required for radiators if a system of direct hot-water heating had been installed. The owner preferred a furnace to a hot-water system, provided that he could be sure that he could heat all the rooms in zero weather.

This system was planned and installed by the Ridgway Furnace Co., 6 Portland street, Boston, Mass., which guaranteed to heat all rooms in which registers were placed to 70 deg. F. in zero weather. There was installed one No. 270 Ridgway revolving open fire-pot furnace, having a 27-in. fire-pot, a 53-in. casing, connected with registers and pipes, as shown on the accompanying plans.

The sizes of the rooms, also the glass and wall exposures are as given in the accompanying table. The height of the ceilings in the clear is 7 ft. for the first floor and 7 ft. 4 in. for the second floor. From the table, by assuming that it takes 4 sq. ft. of wall to exert the same cooling influence as 1 sq. ft. of glass, it can readily be seen that there are 636 sq. ft. of equivalent glass surface, so that there is provided about 1 sq. in. of warm-air pipe for 1 sq. ft. of equivalent glass surface. The grate has an area of 572 sq. in. and has almost the same proportion. Where the thermometer goes below zero the use of similar proportions will probably insure the same character of service that has attended the use of this heating system. The total cross section of the warm-air pipes is 630 sq. in., the 9-in. pipe to the den and the 10-in. pipe to the chamber over the parlor and den being supplied from the 14-in. trunk main in the cellar. The cold-air box is 14 x 35 in. in the clear, giving an area of 490 sq. in., or a little more than three-quarters of the area of the warm-air pipes.

TABLE OF DIMENSIONS, EXPOSURES AND PIPE CAPACITY

First Floor	Size of Rooms. ft.	Sq. ft. Glass	Sq. ft. Exposed Wall	Size of Register in.	Diameter Warm-Air Pipes in.	Area sq. in.
Living room	12x13	27	127	9x14	9	63
Parlor	12x13	27	148	9x14	9	63
*Den	10x16	30	173	9x14	9	..
Dining room	10x16	35	77	9x14	9	63
Hall	7x16	26	23	12x15	11	95
Second Floor—						
Hall	7x19½	9	42	.....	..	..
Kitchen chamber	14x16	36	287	9x14	..	..
Dining room chamber	10x11	9	72	7x10	14	154
Living room chamber	12x13	27	134	8x12		
Bath	7x 8	9	50	7x10	7	38
Parlor chamber	12x13	27	156	8x12	14	154
Den chamber	10x11	18	136	7x10		
		280	1,425			630

*Den on first floor and these two chambers heated from one 14-in. cellar pipe.

In addition to the application of the trunk main to one line in the cellar, it is used in two vertical trunk mains to the second floor. In one, the round riser so often advocated is used and with excellent results. In the other the 14-in. round riser is flattened to an oval to avoid too great an encroachment on space, but yet it is made 9 in. deep or greatly in excess of the depth of any of the wall stacks, unfortunately so generally used. Even the small pipe to the bath room is 4 in. deep.

Cooking by Electricity

Interesting figures on experiments in electrical cooking and heating have been made by the Incorporated Municipal Electrical Association of London. In a paper which was presented at a recent meeting of the society the results of the experiments were given. The consumption of many of the domestic heaters installed in Marylebone has been carefully noted and the average consumption for a family of eight persons in full and constant occupation of the house and doing the whole of the cooking operation by electricity, but having a separate hot-water supply for baths and washing purposes, works out at 1.9 units per person per day. This figure, however, presented a maximum consumption for an average well-to-do house. The consumption of a middle class house would probably be, and from experience often was, as low as ½ to 1 unit per person per day. In concluding the report the association secretary says: "In almost every instance a substantial saving was shown in the latter case using electricity and a typical example shows an economy of 17 per cent." Gas for cooking is supplied at 61c. per 1000 cu. ft. and electricity at 2c. per unit.

Staining Wood a Rich Brown

One of the formulæ for staining wood a very rich brown is that given by Dr. Stolzell as follows: Boil one part of catchu (cutch or gambier) with 30 parts of water and a little soda. Apply this to the wood, and let dry. Make another solution of one part bichromate of potash and 30 parts of water. Apply a coat of this. By a little difference in the mode of treatment and by varying the strength of the solution various shades of brown may be given by this formula. The stain is said to be permanent, and also to preserve the wood.

Use of "Sillar" Bricks in Mexico

In the construction of large buildings in Monterey, structural steel and concrete has been used to some extent of late, but brick is used for the most part in the erection of city buildings and private residences, says Deputy Consul John C. Allen, writing from the city named.

The building material most used is the "sillar," found only in certain parts of Mexico, and consists of blocks of hard compact clay about 3 or 4 feet square. These blocks are cut out of the solid clay ground in the same manner as ice is cut from ponds, in the cold north, and are used for building purposes without further preparation. The sillar should not be confused with the adobe, which is used very little here, as sillar is cheaper. In some parts of the country there is another building material called "tepetate," which is similar to the sillar. Mexico has many mines of beautiful building rock of different colors, which is used to some extent for large and costly buildings, theaters, statehouses, etc.

Sillar is used for side, end, and interior walls. The exterior walls are plastered and whitewashed any color to suit the taste. Interior walls are plastered and whitewashed or painted. The painting is generally an imitation of wall paper. Wall paper is sometimes used instead of whitewash or paint, but very rarely. No studding is used in the walls; it would involve considerable extra expense, as lumber is very high in price. The sillar will not hold nails. There is absolutely so woodwork in the walls except for the doors and windows. Floors are made of cement or tile.

The roofs of buildings in Mexico, with few exceptions, are flat. Strong wood rafters are placed with ends resting in the walls about 2 feet below the top of the wall. A tight board floor is laid over the rafters. This floor is covered over with 6 to 10 inches of clay or cement, or both. Holes, water drains, are made through the walls at the top level of the roof. The roof of a building resembles a great open box without cover. The walls of the averae dwelling are about 18 feet high, which makes 15 feet from floor to ceiling, inside, 1 foot for ceiling, rafters, and roofing, and 2 feet projecting above the top of the roof.

The ceiling most used is strong canvas cloth nailed to the rafters. The canvas is sometimes whitewashed: others paint it with water or oil colors, while some have their ceilings decorated with all kinds of fancy designs and landscapes at a cost of hundreds or thousands of dollars. Many prefer no ceiling at all, painting the rafters insead.

John W. Woolett has recently been appointed state architect for California.

Constructing a Small Concrete Ice House

How a Country Family May Enjoy the Comforts Afforded by a Home Supply of Ice

THE matter of small ice house construction is one in which many of our readers are doubtless interested and about which many in the past have made inquiry. A plan often followed is to construct the building of frame, filling the spaces between the studs with some insulating material so as to preserve the ice as much as possible from the effects of the outside heat in summer. A frame building, however, is not as durable as one of concrete owing to the fact that this material is heat-resisting; does not decay by reason

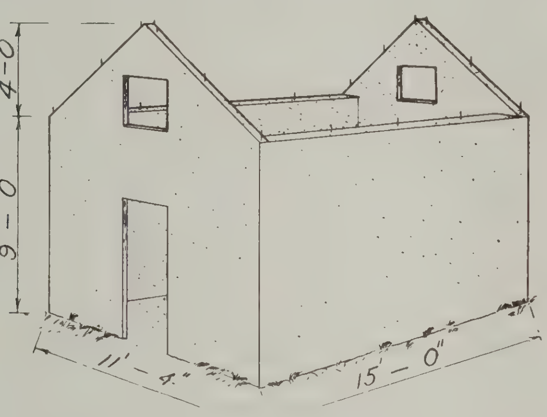


Fig. 1—Ice House Before Roof is Put On.

of the continual dampness in the ice, and is ready for use every winter without repairs. Likewise a concrete building is fireproof—a quality especially valuable in the country. It is a well-known fact that during the sweltering heat of summer many a family longs for the comforts afforded by a home supply of ice and too often the summer passes without any preparation having been made for harvesting the winter ice crop With a concrete house successful storage of ice depends only upon careful packing, air-trapped drainage at the floor line, and well regulated ventilation beneath the roof. As a consequence the ice house must be located on a well drained site and if possible in the shade of other buildings or trees. If possible it should be so located that the gable end faces the south.

The size of the building is obviously dependent upon the needs of the family. Let us suppose that the household will make use of 100 lb. of ice per day, it would require something like 10 tons for the season. Assuming that one cubic foot of ice weighs 50 lb., a ton in the ice house will occupy 40 cubic feet. If the ice is of poor quality it is not infrequently the case that the amount melting is equal to one-third the quantity harvested. Therefore it is wise to build a house of a capacity twice the calculated needs. For a family with a small dairy a sufficient supply can be stored in a building 10 x 14 ft. inside measurement by 9 ft. to the eaves and 13 ft. to the comb of the roof. With an allowance of 1 ft. on all sides of the ice for a packing of sawdust the capacity of this structure is 20 tons.

In constructing the building it is suggested by the Association of American Portland Cement Manufacturers, to whom we are indebted for the accompanying illustrations, that either concrete blocks or solid concrete be used for the walls. Dig the foundation trenches 10 inches wide and 2½ feet deep. To remove water from the melting ice, lay a string of 4-inch drain tile from a point outside the building and ending at the service door, so that the top of the last pipe, a sewer "goose neck," will be at the floor line 4 inches above the natural ground level. Fill the foundation trenches with concrete proportioned 1 to 2½ to 5. Above the ground level the walls may be made of blocks (laid in a 1 to 2 cement-sand mortar) or of solid concrete. For the solid wall mix the concrete 1 bag of Portland cement to 2 cubic feet of sand to 4 cubic feet of crushed rock, or 1 part cement to 4 parts bank-run gravel. Use movable forms, 3 feet high and extending around the entire building, to hold the mushy, wet concrete until it sets.

The day after they are filled, the forms may be loosened, moved up and filled again. During the placing of the concrete, reinforce the walls, 3 inches from the outside, with woven wire fencing or with ⅜-inch rods spaced 18 inches apart and running in both direc-

Fig. 2—Appearance of the Finished Ice House with Milk Room in the Rear

tions. Stagger the rods by placing half of them 3 inches from the inside surface of the walls. Imbed two rods or an old wagon tire in the concrete two inches above all door openings. During the construction set a service door frame (2½ by 6½ feet) between the forms at one end of the building. Likewise, while pouring the concrete for the gable ends, make provision for small ventilation doors 2½ feet square. In Fig. 1 is shown the appearance of an ice house of this kind before the roof is applied, while Fig. 2 shows the completed structure.

A wooden roof, while not durable like one of concrete, is more easily built. To hold the plates on the top of the side and gable walls, sink ½-inch bolts 8 inches long, heads down 6 inches into the concrete. Use 8-foot rafters and cover the building with a watertight roofing material.

Lay a 4-inch concrete floor upon the natural ground and give it a slope of ¼ inch to thefoot in the direction of the drain at the service door. Place a trash strainer in the drain opening. The water in the "goose neck" sewer pipe will act as a seal and keep out the warm air of the drain.

Hinge the small doors in the gables to the outside and top of the frames, so that they can remain slightly open at the bottom yet shut out rain. The service door also swings outward. The frame is fitted with short removable sections of boards set in slots or grooves so as to hold the packing in place.

In storing ice use a thickness of 12 inches of sawdust or 18 inches of marsh hay or straw over the floor and around the sides of the house. Set the ice on edge and pack it tightly together without any filler between the cakes. To prevent blocks from slipping, lay them in courses lengthwise in opposite directions in what

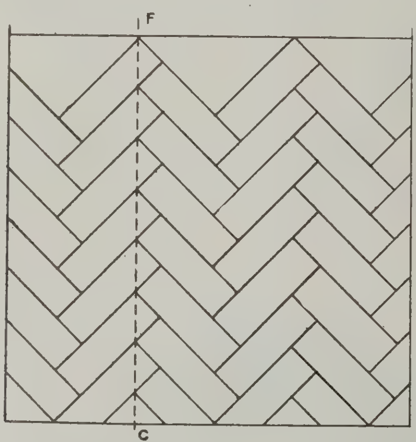


Fig. 1—Plain Herring-Bone Pattern

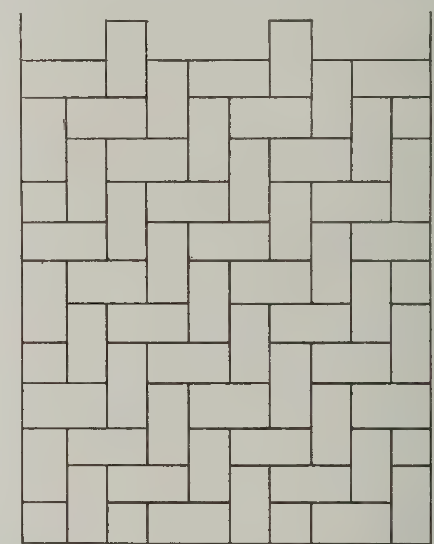


Fig. 2—Another Pattern Easily Laid

The Use of Brick for Cellar Floors

masons call "headers and stretchers." When the house is full, cover the ice-pack with sawdust or hay weighted down. Keep the service door closed while removing ice and take care that the pack is again well covered. See that the drain works properly and prevents water from standing on the floor.

For building this solid wall concrete ice-house, there will be required 27 barrels of Portland cement, 8½ cubic yards of sand, 17 cubic yards of crushed rock and 74 pieces (250 pounds) of ⅜-inch rods 9 feet long. If good pit gravel is at hand, haul 18 cubic yards: no sand will be required other than that in the gravel. The approximate total cost of these materials is $75.00. Such a structure will not rot out and will keep the ice with minimum shrinkage.

The Use of Brick for Cellar Floors

Apropos of the extent to which concrete and cement floors are being used in cellars of buildings of various kinds the following comments touching the use of brick for such a purpose may not be without interest. The ideas are those of a correspondent of the *Clay Record* who expresses himself to the following effect:

Some time ago I built a fairly large hospital, the basement of which was full measure below the top of foundation walls. Owing to a lack of funds the question of flooring the basement was left over until the upper part of the building was about completed, when an additional sum was realized, and a portion of it put aside by the trustees for the purpose of putting in some sort of a floor in the basement. There was not sufficient money to lay in a cement floor, so it was suggested that a hard brick pavement with cemented joints be put down. This was done, and though half a dozen years have elapsed since the floor was laid, there has not been one cent spent on it for repairs, and it is as sound and as clean, and as good from a sanitary point of view as when first laid, and cost but little more than half the money it would have taken for a cement floor.

This is one of the evidences among many which might be produced that the wide-awake brickmaker could often suggest the use of brick to advantage to himself and owner where other more expensive materials are intended to be employed. While it is always better to employ an expert bricklayer to lay down a brick pavement, it is not absolutely necessary, as an intelligent laboring man or any other handy man can with a little care and practice lay any brick pavement of simple design; and it is astonishing the number of handsome designs that a clever fellow can evolve by a judicious use of the common, unassuming plebeian brick. The combinations are beyond count.

Fig. 1 shows a plain herring-bone pattern and one that is quite easy to lay. The line shown at F C, will explain the manner by which the brick may be laid regularly. This line is supposed to be a cord, and the upper corner of the brick are laid so as to coincide with it; after one course is properly laid, all the rest of the work may be laid without further use of the cord.

Fig. 2 exhibits another pattern, and that is quite easy to make and one that always looks well, and requires but little cutting of brick to complete the work. These patterns, along with those already mentioned, will naturally suggest others, so the bricklayer may not confine himself to any set pattern.

The claim is made that the truest and best effects are produced when stucco is left in its natural state, the result being a delicate gray which merges beautifully with unstained shingle roofs or the tile roofs of greens and reds.

The Workmen's Compensation Acts

Theory of New Laws -- Their Main Features Summarized -- Effect on Litigation

By A. L. H. Street

SOME of us may doubt that the rapid spread throughout the states of radical legislation affecting the relation of employer and employee is influenced more by a suddenly awakened humane sense than by efforts of politicians to make themselves "solid with the Labor vote." Nevertheless, the vital fact remains that such laws are taking effect one after another. Probably the most important class of these laws is the one now commonly known as "Workmen's Compensation," a term used to include forms of compensation for industrial accidents, to be allowed workmen without regard to any question of ordinary negligence on the part of the employer or ordinary contributory negligence on the part of the injured employee, determination of which questions usually governs the result of personal injury litigation. Therefore, touching but briefly on the motives which are prompting enactment of these new measures, the writer presents a brief review of existing Compensation acts, with a hope that readers in the states where the laws are in force will obtain a clearer understanding of the effect of the Acts on their trade, and that readers in other states will find the subject interesting in view of the fact that efforts will undoubtedly be made to extend operation of the plan to their states at forthcoming sessions of their legislatures.

Old Laws Unjust

Advocates of the Compensation system urge that the old Employers' Liability Laws are unjust, in that a workman is denied recovery for injuries resulting from the negligence of fellow employees, in whose selection he has no voice; from risks arising from the nature of his employment; and from his mere inadvertence not amounting to gross carelessness for his own safety. He contends that these causes of industrial accidents should be charged against the industry in which he is employed, and not against him. These causes of injury, respectively known in law and hereinafter mentioned as the defenses of fellow service, assumption of risk and contributory negligence, constitute the principal grounds on which employees have been heretofore denied recovery for injury. At first blush, it would seem that if these defenses are to be abrogated, a material increase in the cost of an employer's operation must be taken in account by him in making contracts involving the performance of labor. Thus any such increase of cost in the building trades will naturally fall upon the owner and not upon the contractor. But it is urged by those who have made a close study of the plan that when it is in permanent operation, there will be no large increase in cost, and that there will be a great economic saving in life and limb, forcing both employer and employee to take greater precautions for the safety of the latter.

Advantages to Workmen

The chief advantage intended to be secured to workmen is fair and certain compensation for injuries not caused by their own willful misconduct, without unnecessary delay and without being compelled to lose a large part of their recovery in payment of attorneys' fees and other expenses of litigation.

Aside from the New York law, which was adjudged unconstitutional, Compensation Acts are now in force in California, Kansas, Illinois, Massachusetts, Nevada, New Hampshire, New Jersey, Ohio, Wisconsin and Washington. The Michigan Acts took effect September 1, 1912.

Referring to the Acts now in force, their adoption is optional with employers and employees, the former having the first right to elect, excepting the Nevada Act, which is compulsory, and the Washington Act, which is partly compulsory. The systems in Massachusetts, Ohio, and Washington differ from those of the other states, in that they provide for insurance against accidents carried at the employer's expense, instead of compensation to be paid by him. However, the practical effect of the two plans is identical.

An employer who, having the right to elect to be bound by the law, fails to do so, practically loses the right, in a suit for injury to a workman, to assert the customary defenses of assumption of risk, fellow service and contributory negligence. Thus, though the Compensation system is theoretically elective, it is virtually compulsory, since, deprived of those defenses, an employer could not win one out of twenty personal injury suits brought against him. On the other hand, in Kansas and Massachusetts, and perhaps in some of the other states, the defenses are available if the employee refuses to adopt the law after the employer has signified his acceptance.

Occupations Which are "Extra Hazardous"

Several of the Acts do not extend to all employments, being limited to enumerated occupations which are declared to be "extra hazardous." The acts in California, Wisconsin and Massachusetts extend to all industries, excepting "casual" employees. Undoubtedly it will take litigation to determine just who are "casual" employees. The New Jersey law applies to all industries; that of Ohio to all industries employing five or more workmen. The Michigan act extends to all occupations, excepting farm laborers and domestic service. The Illinois law includes the building or demolishing of structures, and occupations in which explosives are used in dangerous quantities. The Kansas act applies to building operations and use of explosives where fifteen or more workmen are employed, but employers of fewer men may avail themselves of the act. If they do not, they do not lose the benefit of the defenses of assumption of risk, fellow service, or contributory negligence. The New Hampshire law includes any "place" where five or more workmen are engaged in manual or mechanical labor at or in proximity to hoisting apparatus, and work necessitating dangerous proximity to explosives. The Nevada act, which, as above indicated, is compulsory, extends to work in erecting or demolishing any bridge or building, involving steel or iron framework, the operation of derricks or hoisting apparatus, work on scaffolds 20 feet above ground, water or a floor, and work near explosives. The Washington law includes engineering works and the construction, repair and demolition of buildings.

Election by an employer to be governed by the new law is signified in California, Kansas, New Hampshire and Wisconsin by filing written notice. In Illinois and New Jersey election is presumed in the absence of notice to the contrary. The Massachusetts insurance system is adopted by subscribing to a state association provided for; and the Ohio plan, by paying the required premiums. Under all the acts an employee's election to be bound is presumed unless he gives notice to the contrary after the employer elects, except in New Hampshire, where the workmens' acceptance may be indicated by accepting compensation or by bringing proceedings under the law.

Suits for damages for injuries may be brought by a workman, notwithstanding his election, in California or Ohio, if the employer was grossly negligent or violated a safety law; in Illinois, if the employer ignored a statute; in Kansas, if the employer was personally negligent; and in Washington, if the accident was deliberately caused by the employer. In New Hampshire and Nevada, a workman may sue for damage instead of claiming compensation under the law. In New Jersey, Wisconsin, and Massachusetts, suit does not lie by a workman for injuries compensated by the Acts.

Contracts of employment cannot validly reduce the employer's liability under the laws, but in Kansas a plan approved by the insurance commissioner and the attorney-general may be substituted for the statutory plan. In Massachusetts, an employer may insure in an authorized liability company. In all the states the cost of the compensation falls directly on the employer, except in Ohio, where the employees pay 10%.

To be compensated, disabilities must continue more than one week in California, Illinois, Wisconsin and Ohio; more than ten days in Nevada; more than two weeks in Kansas, New Hampshire, New Jersey and Massachusetts; and in Washington "loss of earning power shall exceed 5 per cent."

Amounts Payable on Accident Claims

The following limits are placed on the amounts payable on accident claims: For death. California, minimum $1000, maximum $5000; if there are no dependent relatives, $100.—Illinois, minimum $1500, maximum $3500; if there are no dependent relatives $150. Kansas, minimum $1200, maximum $3600; no dependents, $100. New Hampshire, maximum $3000; no dependents 100. New Jersey, minimum $1500, maximum $3000, no dependents $200. Michigan, maximum $3000. Wisconsin, minimum $1500, maximum $3000; no dependents $100. Nevada, minimum $2000, maximum $3000; no dependents $300. Massachusetts, minimum $1200; maximum $3000; no dependents $200. Ohio, minimum $1500, maximum $3400; $150 funeral expenses. Washington, maximum $4000.—For total disability. California, minimum $1000, maximum $5000. Illinois, maximum $3500. Kansas, not less than $6 nor more than $15 weekly for not more than ten years. New Hampshire, maximum $3000. New Jersey, not less than $5 nor more than $10 weekly for 400 weeks. Wisconsin, not more than amount of four years' earnings. Nevada, maximum $3000. Massachusetts, maximum $3000. Ohio, not less than $5 nor more than $12 weekly for life, if permanently disabled. Washington, not more than $35 monthly.—For partial disability. California, maximum $5000. Illinois, $12 maximum weekly for not more than eight years. Kansas, $3 minimum and $12 maximum for not more than ten years. New Hampshire, maximum $3000 weeks. New Jersey, scale for specific injuries. Wisconsin, not more than four years' earnings. Nevada, maximum $3000. Massachusetts, maximum $3000. Ohio, maximum $3400. Washington, maximum $1500. Provisions are made for allowance for medical and surgical aid not exceeding $100 in some states and not more than $200 in others.

Notice of accidents and claims for compensation must be made as follows: California, notice in 30 days; claim in one year. Illinois, New Hampshire, Nevada and Massachusetts, notice as soon as practicable; claim within six months. Kansas, notice ten days; claim six months. New Jersey, notice must be given within thirty days; in ninety days, if employee can justify the delay and employer is not prejudiced. Wisconsin, notice within thirty days; claim within two years. Ohio, time fixed by state board. Washington, claim must be made in one year.

Provision is made in each of the laws for settlement of disputes by state boards, arbitrators or judges, and appeals are generally allowed to the courts on questions of law only.

Fireproof Houses and How to Build Them

We have before us a copy of the sixth edition of a most interesting work from the standpoint of the architect and the builder, just issued by the National Fireproofing Company, Fulton Building, Pittsburgh, Pa. It deals with fireproof construction for houses and other buildings of moderate cost and in the erection of which Natco Hollow Tile is used for the purpose. The work is illustrated with many interesting examples of houses constructed of this material and having for the most part an exterior finish of stucco. In many instances floor plans accompany the pictures and there are brief descriptive particulars relative to the size of the house and the rooms contained therein.

Not the least interesting feature of the work is found in a statement of the principal advantages of Natco hollow tile for residence construction. It is pointed out that it is worth while for both architect and owner to bear in mind that the kind of buildings illustrated and described in this book are not only fire-resisting but are of enduring masonry construction throughout, also that by reason of their substantial construction the houses cost far less for maintenance and repairs than is the case with frame buildings. Reference is made to the fact that hollow tile houses are warmer in winter, cooler in summer, require no furring and are moisture-proof, sun-proof and vermin-proof.

Stains on Brick

The brown, white and yellow stains which frequently disfigure brick buildings or walls are the result of a saline efflorescence which may sometimes be removed, according to the *Bibliothèque Universelle,* by washing with slightly acidulated water, when pure water proves inadequate. Prevention, however, is better than cure. The stains are caused by particles of soluble salts which have been carried to the surface by water and are then crystallized by evaporation. These comprise sulphates of potassium, sodium, aluminium, magnesium and calcium, the last being the one commonest found and the one most resistant to rain. Chlorides and carbonates are also often found. These salts pre-exist either in the earth or in the waters used in manufacture, or in the mortar or sand, the latter being especially the case near the seashore, where sand from the beach is commonly used without the precaution of washing with fresh water. The entry of salts into the brick may occur during the baking also when the coal contains pyrites. Care should be taken, says the *Scientific American,* to use water of low mineral content, especially as regards sulphates. Where only "sulphur water" is available it should be neutralized with a barium salt (the chloride or carbonate).

A movement is on foot in New York City looking to the placing upon every public building, dwelling, theatre, hotel, etc., of a conspicuous plate bearing the name and address of the owner.

A Carriage House and Stable of Shingled Exterior

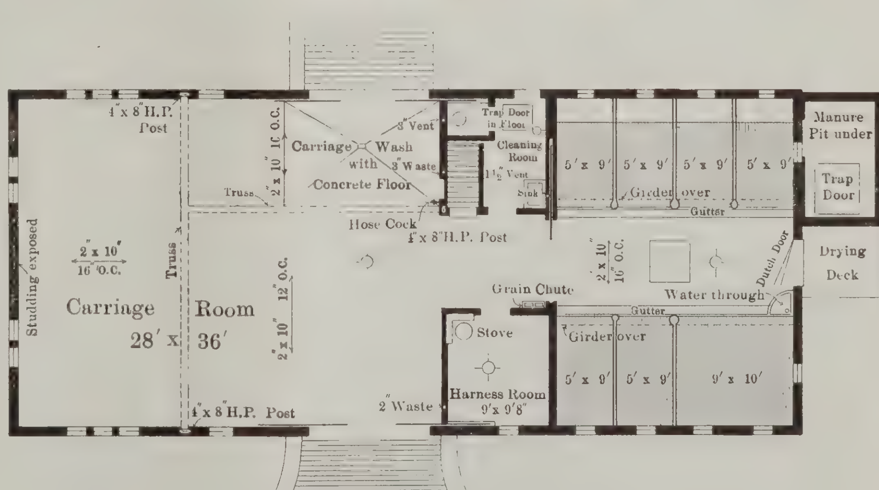
A Design which Provides Accommodations for Seven Horses -- The Carriage Room a Feature

THE subject of the illustrations presented upon this page is a carriage house and stable shingled upon the sides, ends, gables and roof and providing accommodations for seven horses. The surroundings are picturesque and the location is a prominent resort for the

Appearance of the Building and Its Surroundings as Depicted by a Photograph

summer colony from New York City and elsewhere. The well kept hedge enclosing the approach and the vine-clad surfaces about the main entrance to the building combine to produce a most pleasing picture.

The floor plan shows six of the stalls to be 5 x 9 ft. each, while the box stall measures 9 x 10 ft. The floor joists are 2 x 10 in. placed in the short spans 16 in. on centers and under the main portion of the carriage room 12 in. on centers. The truss supporting the carriage room floor has a bearing at each end on a 4 x 8-in. hard pine post. The sheathing boards are dressed inside and the studding is left exposed.



Main Floor Plan—Scale 1/16 In. to the Foot

A Carriage House and Stable of Shingled Exterior — Grosvenor Atterbury, Architect, New York City

The carriage room proper measures 28 x 36 ft. in area and directly opposite the main entrance is the carriage "wash," with concrete floor and hose cock conveniently placed.

Between the stalls at the rear and the carriage wash is the cleaning room provided with sink, and there is a trapdoor in the floor giving access to the basement at this point when necessary. Opening from this room is the toilet and over it rise the stairs to the hayloft.

Opposite the cleaning room is the harness room, 9 x 9 ft. 8 in., and provided with stove for heating water and furnishing heat when necessary.

The grain chutes are placed conveniently to the stalls as an inspection of the plan will show.

At the extreme right on the stable floor is a watering trough and just outside the building, accessible through a "Dutch" door, is a drying deck. Adjacent to this is the manure pit with trapdoor as shown.

This carriage house and stable was built for Dr. Albert H. Ely at Southampton, Long Island, N. Y., in accordance with plans prepared by Grosvenor Atterbury, architect, 20 West Forty-third street, New York City.

Exhibits at Rochester Industrial Exhibition

One of the numerous ways in which Rochester, N. Y., shows its progressiveness, and it ranks high in the list of progressive cities, if indeed it does not take first place, is by an annual Industrial Exposition. This exposition is liberally advertised not only in the Rochester newspapers but also in nearby cities and towns, from which reduced excursion fares are made by the railroad companies, so that the fame of the exposition is in no sense local.

The exposition for 1912 was held September 14 to 28, at the permanent Exposition Park, "40 Acres of Education, Amusement and Surprises," as the advertisements had it. This statement is accurate, for recognizing that "variety is the spice of life," the directors of the exposition combined business and pleasure in pleasing proportions, as witness: Three buildings were devoted to merchants' and manufacturers' exhibits and displays, one to displays of fruits and vegetables, ten to a fine art loan exhibit by noted American and European artists, one to exhibition of beasts, birds and animals from the city's zoological collection, one to interesting work in arts and crafts by boys from Rochester schools, and one to exhibit by Rochester Historical School, consisting of interesting relics and documents in connection with the foundation and early history of Rochester. In addition to the foregoing there was music in the open-air stand by Pryor's Band and Creatore's Band, fireworks each night, open-air performances, the Midway with its usual list of attractions, the horse show for three days, athletic events, etc. The charge for admission was 25 cents.

Among the exhibits of interest to readers of the *Building Age* were the following:

Pullman Mfg. Company, Rochester, N. Y., made an interesting display of sash balances, in charge of T. E. Wright and W. Morton.

Rochester Asbestos Shingle & Fireproofing Company, 227 North street, Rochester, exhibited "Everlasbestos" sanitary flooring, kitchen tables, sinks, laundry tubs, etc.

Rochester Composite Brick Company, 64 North Clinton avenue, Rochester, exhibited brick and granite stone blocks.

Smith Sash & Door Company, 175 to 181 Exchange street, Rochester, had on view some very fine specimens of exterior and interior woodwork showing a new one panel sanitary door.

The Paragon Machine Company, 16 State street, Rochester, had a variety of blueprinting machines which attracted much attention.

Watson Mfg. Company, Jamestown, N. Y., showed window screens through its local representative.

Whitmore, Rauber & Vicinus, 279 South avenue, Rochester, has an especially attractive exhibit representing the fireproofing material made by the General Fireproofing Company, Youngstown, Ohio, also "wearproof, dustproof and waterproof concrete floors" as made by the Master Builders Company, Cleveland, Ohio, and "Bay State" brick and cement coatings made by Wadsworth, Howland & Co., Boston, Mass.

Traders Box & Lumber Company, 1040 Jay street, Rochester, exhibited an attractive line of high grade hardwood doors, windows, columns, etc.

The Alling & Cory Co., Rochester, Buffalo and Pittsburgh, exhibited its own brand of Alcon and Ontario roofings and the Flintkote roofing made by the Flintkote Manufacturing Co., Boston, Mass.

The Beers Bros. Thermostat Co., Rochester, exhibited its heat-regulating device.

The C. T. Ham Manufacturing Co., Rochester, exhibited "Auto silent water closets" and "Ideal water saving devices."

The McCray Refrigerator Co. exhibited refrigerators through its branch office at Rochester.

The Monarch Vacuum Cleaner Co., New York City, demonstrated its cleaners in an effective booth.

The Turbina Vacuum Cleaner Co., 510 S. Clinton avenue, Rochester, exhibited portable and stationary cleaners. W. Hiller, proprietor, was in attendance.

The United Electric Co., Canton, Ohio, was represented by the Tuec Co., of Rochester, which showed its Tuec electric cleaners very effectively.

The Vacuum Ash Sifter & Dust Remover Co., Granite Building, Rochester, exhibited its device which is made for application to any furnace.

The Jewell Manufacturing Co., Auburn, N. Y., exhibited heat regulators and was represented by Wm. H. Brown, Rochester.

Huge Girders for a Theater

The new construction work which has been inaugurated in New York City during the past few years has involved from time to time the use of steel girders of unusual size and weight and the putting of them into place has in not a few instances required no little engineering skill. One of the noteworthy operations now rapidly approaching completion at Broadway and Forty-seventh street is the new Palace Theater, the entrance to which is on Broadway. Some rather unusual steel construction work has been successfully accomplished in connection with this building, the huge girders spanning the auditorium being much larger than usually required even in some of the tallest office buildings.

There are five girders altogether, each 86 ft. in length, 8 ft. deep and each weighing over 30 tons. By reason of their unusual length and weight not a little difficulty was experienced in placing these girders in position, seeing that it was necessary to raise them to a height of 80 ft. above the auditorium. In doing this work an Oregon fir mast 110 ft. long and 30 in. in diameter at the butt was used, the mast itself weighing 9 tons.

On the Broadway side a 12-story building is being erected, the upper floors of which will be used for theater offices. The theater building proper is 88 ft. wide by 125 ft. deep and will seat 1800 people. The balcony and gallery are carried by heavy cantilever girders which in turn are supported by a huge girder spanning the full width of the building and thus eliminating all columns that might obstruct the view of those in the audience.

The building is being erected in accordance with plans prepared by Kirchhoff & Rose, architects, of Milwaukee, Wis., with James J. F. Gavigan, of New York City, associated architect.

Opening of New York Trade School

The New York Trade School, 67th Street and First Avenue, New York City, entered upon its thirty-second year on September 30, with an approximate enrollment of 900 pupils. There are both day and night classes and among the trades taught are carpentry, plumbing, cornice and skylight work, steam and hot water fitting and sheet metal pattern drafting.

New Publications

Cement Houses and Private Garages with Constructive Details.—By various architects. Size 9 x 13 in. Illustrated with halftone reproductions from photographs of completed structures and 87 full-page plates of plans and elevations. Bound in board covers. Published by David Williams Company, 231 to 241 West 39th street, New York City. Price, $1.00.

This work is known as Volume 5 of the "Building Age Series of Designs," and comprises 22 interesting examples of artistic cement-coated dwellings ranging in cost from $1,250 to $16,500, and 11 cleverly designed private garages ranging in cost from $500 to $10,000. The matter is of such a nature that it cannot fail to command the attention of the wideawake and progressive building contractor who desires to have conveniently at hand a series of designs to show his prospective client and at the same time make use of the information as the basis of construction work after the order has been secured.

The drawings include floor plans, elevations and constructive details all drawn to scale, thus rendering the designs of a practical value to the builder which they would not otherwise possess. The illustrations show in many cases exterior and interior views, thus affording the prospective builder an excellent idea of how the work appears when completed. In every instance there is a technical description of the building covering materials used, dimensions, style of trim, etc., while in many cases a complete specification is presented with bill of materials.

The increasing use of the automobile renders more than ordinarily interesting the numerous designs of garages which are presented, these covering work actually erected. Here, as in the case of the cement-coated dwellings, brief specifications covering salient features are given and the collection cannot fail to prove of suggestive value to the builder called upon to execute work of this nature.

Among the concluding pages of the volume are to be found the names of a series of useful books selected from the latest works published by the David Williams Company and which will be found of special interest to builders.

Successful Houses and How to Build Them.—By Charles E. White, Jr., Architect; 520 pages. Size 5¼ by 7¾ in. Profusely illustrated. Bound in stiff covers. Published by the Macmillan Company. Price $2.00.

This work is written from the standpoint of the houseowner and considers the building of frame houses as well as those of brick and concrete, beginning with the purchase of the site and covering every factor bearing on the erection and equipment of the completed structure. The text is divided into 29 chapters dealing with the choosing of the site; the style of architecture; the owner, architect and contractor and the planning of the rooms. The specifications are explained in one chapter, while others treat on legal documents; the excavation and foundations; advantages of a frame house; the exterior finish; masonry houses, and how to build a fireproof house. The subject of carpentry and cabinet work is also considered, followed by the importance of a good roof; plumbing fixtures and sewage disposal in the country; heating; plastering; painting and glazing; gas and electric lighting and hardware for the house. The concluding chapters deal with remodeling houses; sensible types of American houses and garages and garage apparatus.

Not only are city and suburban houses considered, but a portion of the book is devoted to country and farm houses, bungalows, camps, cottages, barns and greenhouses, while outdoor accessories such as terraces, walls, banks, sidewalks and pergolas are not overlooked. There are numerous half-tone views of exteriors and interiors of dwellings throughout the text, together with diagrams showing floor plans and details drawn by the author, and illustrations of handy devices for the convenience of the houseowner, all of which tend to increase the interest and value of the book for the prospective house builder.

House Painting and Decorating.—By Arthur S. Jennings; 182 pages. Size 5½ x 8½ in. Illustrated. Bound in cloth. Supplied by the *Building Age* Book Department, 239 West 39th Street, New York City. Price $1.00.

The matter contained within the covers of this work has been prepared as a popular guide for the house-painter and decorator of Great Britain, and although representing English practice in the treatment of the subjects, it will be found of interest and value to the American painter. It is a well-known fact that there is a great deal of painting done by people other than professional painters and the object of this little work is to instruct the reader exactly what to use for different jobs of painting, whitewashing, paper hanging, etc., and how to do the work. The theory of the subject is not discussed excepting when it is necessary to be understood for the proper completion of a job. For example, a short explanation is given with a view of showing the inadvisability of varnishing on a cold, damp day, but the whole subject is treated in as practical a manner as possible.

The reader may gain an idea of its scope from some of the chapter headings, of which there are 16. At the outset the author tells how to re-paint a room and describes the brushes and other painters' tools. He next takes up the removal of paint, tells how to re-paint outside work, touches upon paint blistering, its cause and cure, and discusses the subject of re-painting in general. Varnishes and varnishing, color mixing, whitewashing, paper hanging, graining and staining are also considered. The last chapter has to do with enamels and enameling.

Modern Hospitals.—By various architects and engineers. Size 9¼ x 12¼ in. More than 125 full page and text illustrations. Bound in heavy board covers. Published by the American Architect. Price $5.

In the above-mentioned volume we have a most interesting series of articles on planning details and equipment of hospitals, as exemplified by the best practice in this country and Europe. While a portion of the text and illustrations have appeared in the pages of the American Architect, much of the material presented has never before been published. Its collection in book form "presents a work encyclopedic in character and recommends it as a volume for ready reference." The illustrations relate to well designed hospitals in their different special or general fields which have recently been erected, while the names of their designers will be found sufficient proof that their architectural treatment is of a character to afford valuable suggestions to every one engaged in the field of hospital construction. There are articles by Edward F. Stevens on "Details and Equipment of Hospitals"; by Edward P. Casey, describing The Seaside Hospital of the Brooklyn Children's Aid Society on Surf Avenue, Coney Island; by Clarence W. Williams on "Modern Practice in Hospital Heating and Ventilation"; by D. D. Kimball on "Some Essentials of Hospital Heating and Ventilation"; by E. H. Bostock on "Hospital Lighting," and by Martin and Hall, architects, describing the "Contagious Group of the Providence City Hospital." There is also a short article on "Co-operation in Hospital Planning" by M. E. McCalmont, chief of the Division of Hospital Construction and Equipment, Bureau of Health, Philippine Islands. The same author describes a "Tropical Hospital Adaptable for Tuberculosis." The work is one which will be found of special value to architects who are interested in the construction of modern hospitals and their proper equipment.

Twelve World's Records in Building Construction

In connection with the 30-story store and office structure now in course of erection in West Fortieth Street, between Sixth Avenue and Broadway, New York City, the builder claims that when completed it will represent the trusteeship of twelve world's records in construction. These are given as follows:

Tallest building ever built on a plot 50x98.9.

Has the greatest number of stories of any building ever built for the area upon which it stands.

Has the largest gross and net floor area of any building covering the same size plot.

Only office, loft, showroom or studio building in the world having all four sides richly ornamented in white glazed terra cotta and windows finished in gold.

Has the best light and air in proportion to its size.

Probably the only building that has not one particle of wood, fireproof or otherwise, in any part of its construction.

The tallest building of any description in the world for the width of the plot, and also has the greatest number of stories for the width.

Only building of this height having an absolutely fireproof and smokeproof tower with entrance from exterior connecting at bottom with street.

The tallest building ever erected in a side street; also has largest area for electrical display around tower in proportion to size of roof.

Only office and store building ever erected having every suite of offices above the fifth floor all corner suites, all elevators in centre and windows all round on all four sides.

Has the greatest number of windows of any building in proportion to size.

Has more windows than any other building of any description ever erected in proportion to area of ground building covers.

The structure represents the highest type of steel skeleton frame construction and was designed by Buchman & Fox, architects, 11 East Fifty-ninth Street, New York City. The heating will be furnished by high pressure boilers with down feed system, so that the live steam will be carried at once to the top of the building and be distributed from there downward, being so arranged as to give a uniform temperature at all floors. High speed over-head traction electric elevators will be arranged in the center of the building so as not to interfere with the light on its four sides.

The windows, doors and all metal work will be in gold bronze and the halls and stairs throughout marble and mosaic. The building will also be equipped with approved fireproof and smoke-proof towers.

The statement is made that there will be room on the rear of the building and the four sides around the tower for a display of nearly 20,000 electric lights. By reason of the fact that the adjacent structures are of comparatively few stories the building will be a conspicuous landmark.

New York Fire Exposition

One of the most unique, and at the same time useful, exhibits at the exposition in Madison Square Garden, October 2d to 12th, inclusive, was that of the General Fire Extinguisher Co., Providence, R. I., in the shape of a full-sized working model of Grinnell automatic sprinklers. A steel and wired glass house 10 ft. square had been erected, fitted with a drainage pan at the bottom and provided with one Grinnell sprinkler near the middle of the ceiling. This was connected up by pipe to city water pressure and proper means taken to carry away the discharge water.

A fire was built within the enclosure and the spectators around the four sides obtained a splendid view of what was going on inside. The heat of the incipient fire fuses the strut in the sprinkler head, and a copious shower of water puts out the fire almost in the twinkling of an eye. This exhibit was in operation at short intervals throughout each of the ten days during which the exposition was in progress.

There was a similar demonstration hourly at the Municipal Water Conservation Exhibit which opened in Philadelphia October 7.

CONTENTS.

What Builders Are Doing

Bird's-Eye View of Building Situation in Leading Cities -- Permits Issued and Estimated Value of the Projected Improvements

THE amount of new construction work planned thus far the present year is still somewhat in excess of that for the corresponding period of 1911, although the figures for the month just closed indicate a falling off of a trifle more than 12 per cent. as compared with September a year ago, which month, however, showed a gain of nearly 12 per cent. over September, 1910. Taking the country over there is no particular section in which building activity has been conspicuous during the month under review, neither is there any zone in which there has been notable depression. The reports indicate a variable condition of affairs influenced altogether by local environment.

Among leading cities showing an increased activity in September over the same month a year ago mention may be made of Cleveland, Philadelphia, Memphis, Atlanta, Seattle, Omaha, Louisville, Tacoma, Wash.; Worcester and Salt Lake City; while among the cities showing decreases are New York, Portland, Me.; Chattanooga, Los Angeles, Portland, Ore.; Kansas City, Washington, D. C.; New Orleans, New Haven and Hartford, Conn.; St. Paul, Cincinnati, Buffalo, Evansville, Ind.; Jacksonville, Florida, and Milwaukee. From these figures it will be seen that many of the losses are in cities which have heretofore shown exceptional activity.

The labor situation has been comparatively free from disturbances and building operations are being carried forward in a way to render 1912 above the average of previous presidential years.

Baltimore, Md.

There is shown a steady progress in building operations at the present time, both as compared with the month of August and also with September of last year. According to the report of Building Inspector Stubbs, the estimated cost of new construction last month for which permits were filed was $522,701, while additions and alterations brought the total up to $622,001. These figures compare with $541,378 in September, 1911, when the feature was the planning of two-story dwellings.

Of the totals for last month 143 permits were for two-story brick dwellings, costing $164,050, and 14 were for two-story frame dwellings, costing $38,600. There was one permit for a parish house costing $52,000 and one for an apartment house costing $30,000. The city contemplates the erection of a school building costing $106,196. Among the other buildings planned were eight manufactories and warehouses to cost $70,500.

Buffalo, N. Y.

Fall building operations are of large volume, and the month of October starts in with a heavier daily ratio of building permits issued than was the case in September. The permits for the first ten days in October nearly equal in number and valuation the permits for the entire month of September, when 307 permits were issued, with a total estimated valuation of $838,000. Bureau statistics for the corresponding month of last year show 278 permits, with a valuation of $991,000.

The crowded condition of steel mills and the inability of fabricators and contractors to obtain deliveries of structural steel under three to five months from date of specifications has had a retarding effect on the starting of work on a number of steel frame structures upon which bids have been received, or for which plans have been completed and held in abeyance. As a consequence the majority of the recent projects of this character will have to be carried over until next spring.

The Easetrn Concrete Steel Company has been awarded the contract for the construction of the new State Normal School building to be erected at Normal avenue, Jersey, York and Fourteenth streets, at its bid of $363,398, and work will soon be commenced.

A large amount of work is under way or will soon be started on industrial plants and commercial buildings of various kinds. These operations include reinforced concrete additions to the Pierce-Arrow Company's plant to cost $135,000, and a four-story fireproof factory for the Crosby Company to cost $100,000.

Plans have also been filed for the new plant of the Cyphers Incubator Company at Dewey avenue and the New York Central Railroad Belt Line, comprising five extensive buildings, to cost $250,000.

The September permits include church buildings for the English Evangelical Pilgrim Church on Humbolt Parkway, to cost $35,000; for the Helenic Eastern Orthodox Society on Oak street; a chapel for the Englewood Church of Christ, and a chapel for the Baptist Union on Austin street; a convent for the St. Nicholas Church, to cost $25,000; a tuberculosis pavilion for the Buffalo State Hospital, Forest and Elmwood avenues, to cost $20,000, and a store building for the Main Street Development Company at 1127 Main street, to cost $30,000.

An unusually large number of dwelling houses and small apartment buildings are included in the September permits.

Plans are being drawn by Architects Green & Wicks for a 10-story steel frame office building to be erected by the American Express Company at Shelton Square, Main and Erie streets.

Canton, Ohio

Building operations are rather quiet just now in this city, although the outlook is bright for some good fall work. Early in the month the building committee of the First Baptist Church expects to award the contract for their new church and parsonage; a new theater 60 x 200 ft. in plan and of fireproof construction is being planned, and the Young Men's Catholic Club has commenced operations on a new clubhouse to cost $40,000; the cornerstone of the New Trinity Reformed Church building was laid September 29 and work is slowly progressing. The Pennsylvania Railroad is preparing to erect a new passenger station on South Market street, and Berg & Sons have commenced a large fireproof building for the manufacture of wagons. H. S. Renkert is having plans prepared for a 10-story store and office building of modern fireproof construction.

During the month of September 45 permits were issued calling for an estimated outlay of $71,200.

The members of the Builders' Exchange held their October meeting on the 2d, when Secretary Charles R. Kumpf presented a report, with recommendations, of the Conference of Secretaries recently held in the city of Detroit.

A new code governing estimating to be issued to architects and prospective builders was adopted and ordered printed. A lively social session at which refreshments were served closed the meeting.

Chicago, Ill.

Two new hotel projects are now engaging attention in Chicago. The Mayer estate has had plans prepared by Marshall & Fox for a modern hotel structure on the site of the Stratford Hotel, at Michigan avenue and Jackson boulevard, to be the finest hotel in Chicago and one of the best in America. It will cost, as projected, about $7,000,000. It is expected that work will be started in the spring. The other hotel project contemplates the use of property at Lake Shore drive and Oak street for a fashionable family apartment hotel to be built at a cost of several million dollars. Both of these projects are still in the promotion stage of development.

Present records indicate that the total amount of building in the city of Chicago during 1912 will approximate $90,000,000. The record up to October 1 was $66,805,300. The month of September showed a record of 969 permits issued, with a total frontage of 28,447 feet and an estimated valuation of $7,210,900.

Cincinnati, Ohio

A total of 928 permits, including elevator and plumbing inspections, were issued during the month of September, having an estimated valuation of $699,340. This was below August of this year, that showed up with $1,618,385 for estimated improvements, but $800,000 of this was for the proposed Gibson Hotel. However, the showing made is nearly $100,000 behind September, 1911, during which month permits were taken out covering a valuation of $793,590. This can be partly explained as due to the extensive present building operations just outside the city limits, that are not included in the estimates given. The suburban traction lines and the automobile have contributed in no small measure to the upbuilding of the suburbs during the past year.

For the quarter ending September 30, 1912, the total for improvements in Cincinnati proper reaches $3,288,939, which is a decided improvement over the same period of 1911, that carried only $2,923,015.

Building operations just now are confined principally to residence construction, with the exception of a 28-story office building and two large hotels, previously reported.

Skilled labor continues scarce, but excellent weather conditons have enabled contractors to push work on hand to a much better advantage than might be expected.

Cleveland, Ohio

Building operations are going along at a rapid rate. There is a large amount of new work under way which contractors are rushing in order to get along as far as possible before bad weather sets in. As a result there is a heavy demand for labor in all building lines and carpenters are scarce. Building contractors are all very busy and steel structural fabricators have all the work they can do. That a good volume of work is still coming out is indicated by the number of building permits issued during September, which does not show a large falling off as compared with August. During the month there were 763 permits issued for new buildings, to cost $1,379,315. Of these 191 permits were for frame buildings, to cost $543,935, and 51 were for brick, stone and steel buildings, to cost $594,310, while 521 were for additions, to cost $341,070.

A revision of the Cleveland building code is being planned. At a recent meeting attended by representatives of the city building department, the Builders' Exchange, the Cleveland chapter of the American Institute of Architects and the Cleveland Engineering Society it was decided that efforts should be made to revise the code. Considerable objection has been made to the present code on the ground that it is ambiguous and indefinite in many of its provisions. At this meeting the State building code now in preparation at Columbus was also discussed. It was the sentiment of the meeting that the State code should deal only with general conditions, leaving details to be worked out according to the requirements of the individual cities.

Los Angeles, Cal.

After a summer season of unparalleled activity, during which for three successive months the building record averaged nearly three and a half million dollars, conditions have quieted down somewhat and are now about normal. The official valuation of buildings for which permits were issued in September was $2,310,517, covering something over 1300 permits, as compared with 1571 permits, valued at $3,212,007 for August, and 1150 permits, with a valuation of $2,813,247 for September, 1911. The decrease, as usual, is accounted for by the absence of large single items, the value of small buildings remaining nearly as large as in early summer. In September, 1911, one permit was for a $1,000,000 building, while last month the most expensive item was a $20,000 reinforced concrete structure. About 600 permits were issued for dwellings, hardly as many as for the previous month, while the aggregate value was $1,311,596. Class C permits numbered 28, valued at $671,802. The year's valuation to date is nearly $1,000,000 ahead of the entire valuation for 1911.

Several large contracts have been let recently, among them being the eight-story Billicke-Rowan building, general contract, $150,000; the 12-story Women's Athletic Club; steel for the Merchants' National Bank, let to the Llewellyn Iron Works, and segregated contracts on the Standard Fireproof Building Company's 13-story structure on Seventh street near Grand avenue, on which J. V. McNeill has the general contract at $75,000; Gladding, McBean & Co., San Francisco, the terra cotta at $12,000, and the Baker Iron Works the steel contract.

Among the principal buildings for which plans are about ready are the following: the 12-story John Brockman office building, to cost about $500,000, Barnett, Haynes & Barnett, architects; a six-story concrete loft building on South Los Angeles street near Sixth, E. C. Thorne, architect; the South Los Angeles high school, to cost about $150,000, Edgar Cline, architect, and a four-story concrete apartment house on Ingraham street near Bixel, Noonan & Kyser, architects.

Architect Elmer Gray, this city, is drawing plans for a $100,000 Christian Science church at Long Beach.

M. C. Halsey, structural engineer of the Pacific Electric Railway, is drawing plans for six brick shop buildings to be erected for that company at Redondo, the largest being 200 x 460 ft. in area.

Some changes are being made in plans for the State Normal School at Santa Barbara, Cal., and new bids will be submitted by the three lowest bidders.

The great amusement pier at Ocean Park, much of which was recently destroyed by fire, is to be rebuilt, and plans are being drawn for two three-story Class A concrete buildings at the front of the pier.

A proposal has recently been made, with strong support, for a change in the building ordinance to permit the construction of small one-story brick or concrete buildings with walls 4 in. thick.

A company has been organized here by C. W. Roberts, I. J. Gill and others, under the name of the Concrete Building & Investment Company, proposing to erect concrete buildings at low cost by pouring the walls separately on a tilting platform.

New York City

As might naturally be expected at this season of the year, there is usually a slight falling off in the amount of vested capital involved in new building construction as compared with previous months, and September has been no exception to this tendency. The figures also show a falling off as compared with September a year ago, both as regards the number of buildings planned and their estimated cost. According to the report of Superintendent Rudolph P. Miller this falling off in the cost of current building operations is due to lessened activity in several classes of work. Last month there were no plans for private dwellings filed as against five in September last year, costing $366,000; last month there were 17 apartment houses planned, to cost $2,475,000, against 23 costing $4,323,000 in September a year ago, and there was one hotel planned last month, costing $100,000, against two costing $535,000 in the corresponding month last year. There were no manufactories and workshops, schoolhouses or churches planned last month, against three, one and five of this class of buildings projected in September last year, costing respectively $251,800, $30,000 and $579,000. The totals for September this year were 46 new buildings, costing $7,004,075, as against 72 new buildings in September last year, costing $10,723,670. To these figures must be added for alterations and repairs $731,665 and $687,154 for the two periods respectively.

For the first nine months of this year permits were taken out in the Borough of Manhattan for 636 new buildings, to cost $91,773,760, as compared with 684 buildings, costing $78,181,850 in the corresponding months of last year. The estimated cost of the alterations in the first nine months of this year was $8,781,073, and in the corresponding period of last year $10,084,929.

In Brooklyn Superintendent P. J. Carlin of the Bureau of Buildings reports that September showed permits to have issued for 408 new buildings, costing $3,029,020, and 510 permits for alterations, costing $261,803, making a total of $3,290,823.

In September last year permits were taken out for 362 new buildings, costing $2,052,365, and for 590 alterations, costing $272,629, making a total of $2,324,994.

For the first nine months of the year the figures are in excess of those for the corresponding months of last year, both as regards the number of buildings planned and the amount of capital involved.

Superintendent Carlin has been giving considerable

thought since he took office to the question of licensing builders in this city and is inclined to the opinion that of all trades this is the one for which a license should be required to permit construction work. So firmly convinced is he that this should be done that it is his intention to have a bill drafted covering this feature for introduction in the next session of the state legislature.

There has been considerably less building in the Borough of Queens thus far the present year than was the case a year ago, which is not altogether surprising because last year residential work especially was conducted upon a scale of broad activity.

Oakland, Cal.

Building operations are again on the increase, being now well up to this year's average, and considerably ahead of that of last year. Permits were issued in September for buildings of an aggregate value of $839,440, compared with $600,080 for August, and $471,-353 for September of last year. The records of May and July each exceeded $1,000,000, but with these exceptions the month was the best of the year. While several single permits were issued for values approaching $100,000, the greater part of the total was made up of small jobs, principally dwellings. It is expected that this class of work will keep up until the rainy season begins, while the letting of contracts for public buildings has commenced, and will doubtless add materially to the values for the next few months.

The contract for an addition to the Fremont High School has been let to the Van Sant-Houghton Company at $72,000. Plans have been completed for the Washington school, and several others will be ready within a few weeks. Contracts for 17 public buildings, including 16 schools and the municipal auditorium, are to be let before January 1.

O. M. Bullock, a local builder, has purchased the entire block bounded by Manila, Clifton, Cavour and James streets, and will commence the work of erecting 40 bungalows on this land.

Philadelphia, Pa.

Statistics available show but little change in the general conditions in the building trades. The taking out of a permit for the erection of the Evans Museum of Dental Science, to cost $495,000, swelled the aggregate, but there was little improvement in the general building field. In dwelling house operations a further decline was noted during September. The gain made in total operations during the first nine months of the year, as compared to the same period in 1912, has been unimportant. So far this year the total cost of work undertaken amounts to $29,050,640, as compared to $34,331,900 during the same period last year, while the cost of dwelling house operations so far this year amounts to $11,380,085, as compared to $18,626,250 during the same period in 1911, indicating a loss of more than the total decrease recorded this year in this one class of building alone.

Statistics compiled by the Bureau Building Inspection show that 719 permits for 1010 operations, at an estimated cost of $2,798,700, were issued in September, a decrease of $647,235 when compared with August, but slightly in excess of the total for September, 1911.

The decrease in dwelling house operations continues marked. Work was begun on but 234 two-story dwellings during the month, at an estimated cost of $517,000, as compared to 400, costing $992,550 in August, and 533, costing approximately $1,000,450 in September, 1911. Tenement house construction during the month of September was unimportant, an expenditure of but $55,000 being authorized for this class of work. The total expenditure for tenement and flathouses during the past nine months aggregates $1,022,000, making but a small portion of the deficiency in dwelling house work.

Notwithstanding decreased building operations, contractors and builders continue busy, suburban work figuring materially in the activity. Considerable work is on architects' boards, and, while possibilities of a record building year are remote, the volume will, no doubt, reach a very fair average.

William E. Howes is planning to construct 19 three-story flathouses, 21 x 67 ft., each containing three apartments, at Chestnut and 48th streets. The cost totals $209,000.

The Pomeroy Construction Company has the contract for the Evans Museum of Dental Science, at 40th and Spruce streets, for which permits were recently issued.

Permits have been issued to George R. Brinker for the erection of 10 three-story flathouses, 22 x 74 ft. each, to be erected at 46th and Walnut strets, for the Satterlee Realty Company. The cost will be about $125,000.

Work on 46 two-story dwelling houses will be started at an early date by P. J. & J. T. Whelan at 401-449 and 402-446 West Wellens avenue. The houses will be 15 x 45 ft., and cost in the aggregate about $75,000.

Lachman & Murphy, architects, Witherspoon Building, have been taking estimates for a brick and limestone building to be erected for the Y. M. C. A. at Pottstown, Pa., at a cost of about $75,000.

The Board of Education of this city is preparing to float a loan of $5,000,000, the proceeds of which are to be used for building schools. The board has also been receiving bids for the construction of a new elementary school building at Third and Mifflin streets. This will be the largest elementary school in the city, provisions being made for 2100 pupils.

C. R. Johnson has made arrangements to build at 82d and Laycock avenue two two-story houses, 16 x 36 ft., which, it is stated, will be the first practically complete concrete dwelling houses in this city. The construction of these dwellings will be observed by builders with considerable interest.

Portland, Ore.

Notwithstanding the comparatively large amount of work in architects' offices, actual building operations have been gradually falling off, and are at present hardly up to normal. The record of building permits for September was $912,580, the smallest for any month since January, compared with $1,227,573 for August and $1,436,120 for September, 1911. Obviously, no buildings of much importance were included in this total, though small residence work shows very little decrease. A few large contracts are coming out, however, the most notable being the 10-story Multnomah building, McNaughton & Raymond, architects, contracts amounting to about $150,000. Figures are also being taken on a large court house at Klamath Falls, in southern Oregon.

Architect Charles N. Elliott is preparing plans for a complete group of factory buildings for the Armstrong Mfg. Company at the new townsite of Armstrong, near this city.

Sacramento, Cal.

Building activities have increased remarkably in the last month, which has been the busiest enjoyed by local builders so far this year. The official record is over twice as large as that for August, the comparative figures being, for August, $115,391, and for September, $291,365, compared with $205,302 for September last year. The largest building for which a permit was taken out was the State armory, to cost $90,000, though several other buildings of fairly large value were started. One of the largest contracts let recently was for the C. Dunn apartment house on 14th street, taken by the Ransome Concrete Company at about $75,000. The bids received on the Travelers' Hotel building were considered too high, but the contract will probably be let in a few days on slight changes in specifications.

Another large building to be figured shortly is the Faris apartment house on N street, to contain 100 apartments, covering an area of 120 x 160 ft. Smith & Stewart, San Francisco, are the architects, and the cost is estimated at $180,000.

Local building contractors are greatly agitated over opposition coming from some of their number against the Contractors' and Dealers' Association, recently organized. This association has from the start found a certain amount of antagonism locally, the assertion being made in some quarters that it is operating under an illegal agreement in restraint of trade, and the matter was recently brought before the Sacramento County Grand Jury, though no decisive action has been taken by that body as yet.

San Diego, Cal.

The month of September has been one of the best on record for the local building trades, and judging from plans now more or less definitely under consideration the next few months will show continued activity. The valuation of buildings for which permits were issued last month was $1,596,859, compared with $752,-861 for the previous month, and about the same amount for September of last year. The best previous month this year was April, with $1,062,631, over half a million below that of last month; while the best months in the two previous years were but little over $800,000. It is believed on substantial grounds that the fairly rapid increase noted this year will continue at least up to the Exposition of 1915. Arrangements are now being made for the construction of the Southern California Counties building, to be one of the largest structures of the local Exposition.

Among the principal buildings for which plans have been filed are the Lu Mau Building Company's four-story block, to cost $40,000, W. S. Keller, architect, and Carter Construction Company, contractor; a six-story concrete hotel valued at $60,000 on C street between Sixth and Seventh; and a $40,000 three-story concrete building at First and F streets.

The most important buildings to be figured in the next month are: A $70,000 apartment house at Front and Ivy streets, Quayle Bros. & Cressey, architects; a $100,000 Presbyterian church, Robert H. Orr, architect; a five-story Woodmen's building at 12th and G streets, Dell W. Harris, architect; and the 10-story Nathan Watts office building at Fifth and E streets, to cost about $200,000.

G. A. Bailey and E. H. Post expect to be ready in a few months for figures on an eight or ten-story concrete hotel at Seventh and D streets.

Plans will be considered shortly by a joint committee of the local city council and the county supervisors for a combined city hall and court house, which will probably be located at the old courthouse site on D street, between Front and State streets. It is proposed to spend about $750,000 on the building.

San Francisco, Cal.

Buildings for which permits were issued in September reached a valuation of $1,783,145, compared with $1,950,502 in August. The September record was, in fact, the poorest since last February, though the showing is not discouraging as compared with the same month of the two previous years, the record for September, 1911, being $1,634,048, while that for 1910 was still lower. The official figures do not take account of several large contracts let, on which permits have not yet been issued, and the decrease is partly accounted for by the short month, business being interrupted by five Sundays and three holidays. The total valuation for the nine months is $18,614,645, compared with $16,834,263 for the same period last year.

A closer analysis of the records shows a material increase in the construction of small frame buildings. The number of permits last month was 544, compared with 514 for September, 1911. Of this number only one permit was issued for a Class A building, the Sierra Investment Co.'s hotel, valued at $132,000, while three Class B structures were valued at $124,000, and 20 Class C at $750,000. There were 203 new frame buildings, with an aggregate value of $605,000. The records show increasing activity in the outlying parts of the city.

Hotel and apartment construction, however, is still a very prominent feature. The burnt district in a half-mile radius from Market and Kearny streets is now almost solidly rebuilt, and in the district bounded by Market, Kearny, Bush and Jones streets hotels and apartments are greatly in the majority, while a large number of hotels are being built south of Market street. The number of hotels built since the fire is estimated at about 12,000, the construction cost alone being about $75,000,000, while there are about 300 apartment houses of the highest class, completed or under construction.

In the material market, lumber and steel are very strong, while other materials are rather easy. All steel products show a further advance, and in sheets, reinforcing bars, pipe and structural steel contractors frequently have difficulty in getting just what they want. Eastern steel contractors show little desire for business here, and local shops expect to get considerable work during the fall. It is interesting to note that one steel job at Portland, Ore., was recently figured by San Francisco shops, which has seldom if ever occurred in the past. Lumber is still unsettled, with pressure to sell by some northern mills, though upper grades are in strong demand and redwood is $1 higher. Shingles are easier. There is an apparent overproduction of cement, lime and brick, and while the latter is still held at $7.50 per M, the market tends to easiness.

The use of shingles as an exterior wall covering, which has for some years been a fad in California, is being replaced to a considerable extent by plaster as an outside covering. The latter is especially adapted to California conditions, and many pleasing effects are obtained by its use in connection with modifications of the Spanish or California Mission type. A local shingle agent says many of his customers report a marked curtailment of demand due to the popularity of plaster. The latter, however, is also reaching the point of a fad, and in some places the prevalence of both shingle and plaster types has created a monotonous appearance. In view of this, a reaction in favor of Colonial types, now little used, is by no means improbable.

Bids were opened Sept. 24 for the Service Building of the Panama-Pacific Exposition, a three-story structure of wood frame with plastered exterior, 150 ft. square, with an interior court. The lowest figure was $55,111. The contract for three greenhouses was let to N. A. McLeon at $5,150. No further work is to be given out until next month, when figures will be taken on the first of the exhibit halls.

The designs for steel work and other engineering features of the new city hall are now being drawn, but will probably not be completed for several months.

Among other large contracts recently let was that on the seven-story Voorman estate building—Architect W. J. Miller—to P. J. Walker, at about $120,000; and the general contract for a three-story concrete automobile building to Chas. Wright at $71,875.

Some of the principal buildings to come up for figures in the near future are: A six-story concrete apartment house on Leavenworth street, near Ellis, to cost about $90,000, C. M. and A. F. Rousseau, architects; the Stewart Hotel annex, seven stories, with 30-ft. front; a seven-story steel frame hotel on Bush street, near Mason, to cost $100,000, C. M. and A. F. Rousseau, architects; a seven-story brick and steel hotel on O'Farrell street, near Mason, to cost about $80,000, H. Skidmore, architect; and a seven-story Class A hotel in Italian Renaissance style, faced with brick and marble, to be erected on O'Farrell street, near Jones, at a cost of about $200,000, Righetti & Headman, architects.

Reid Bros., architects, are preparing plans for alterations to the old Hale Bros. department store, Sixth and Market streets, with the intention of converting it into a hotel building at a cost of about $100,000. The ground floor will be divided into small stores, and the upper floors will contain about 350 rooms.

Several improvements are planned for the Presidio military post, including five concrete buildings at the general hospital, and a three-story concrete officers' club house, to cost $60,000, at Fort Winfield Scott.

The master plasterers of Fresno, Cal., recently acceded to the demands of the plasterers' union, ending a quiet strike of a week. The journeymen will now receive $7 per day, an advance of $1, for eight hours' work. The best workmen had been paid at this rate for some time before the strike.

Scranton, Pa.

Building activities greatly increased in September as compared with the same month last year, indicating that contractors have had a rush of work following the settlement of the strike of the building laborers. According to the figures of E. L. Walter, Superintendent of the Bureau of Building Inspection, there were 70 permits issued in September for building operations involving a total outlay of $159,375. In September last year 50 permits were issued for building construction involving an outlay of only $90,922.

Seattle, Wash.

Building activity in the city is being maintained upon a gratifying scale and residence construction constitutes an important feature of the work that is being planned from month to month. Among the improvements for which permits were issued was a $60,000 fireproof building, an $18.000 warehouse and a $15,000 apartment house. The report for September of Superintendent R. H. Ober, of the Department of Buildings, shows that altogether 958 permits were taken out for new construction as well as alterations and additions involving an estimated outlay of $607,870. In September last lear 1,026 permits were taken out, calling for an expenditure of $462,051.

Of the total for September there were permits for 164 detached dwellings costing $280,500, as in September last year 143 detached dwellings were planned to cost $200,500.

From January 1 to September 30 inclusive of the current year the department issued 7,776 permits calling for an estimated expenditure of $6,669,620, while in the corresponding period of 1911 there were 8701 permits taken out for building improvements costing $6,076,266.

(For Builders' Appliances and Equipment see third page following.)

Builders' Appliances and Equipment

Some Things of Seasonable Interest to Those Having To Do with the Building Business

"Deco" for Interior Decorative Work

The tendency toward the artistic in the decoration of our homes and business buildings is very strongly marked at the present time and manufacturers are constantly on the alert to meet the exacting requirements of a discriminating public. The methods of accomplishing the desired results are varied and manifold. One of these which is meeting with constantly growing popularity involves the use of the products of the Deco Mfg. Company, Indianapolis, Ind. This concern makes what is known as Deco-veneer, which consists of a basic material or core to which is applied by means of certain patented processes a thin veneer of selected wood, the whole being subjected to great hydraulic pressure and producing a veneered panel which is said to be strong and durable, yet free from the pull and twist so common in ply-veneer construction. The veneers are made from choice foreign and domestic timbers selected by the company's experts and are said to be readily distinguishable from the usual commercial product. Some of the more common uses to which Deco is put are wainscots, portable partitions, door panels, screens, window backgrounds, bar, bank and office fixtures, cabinets, mothproof chests and in fact any place where the natural wood effect is desired. For wainscots and similar interior decorative work Deco is shipped finished with strips, base and cap complete and ready for immediate installation by a carpenter—no mill or cabinet work being required. An interesting example of the application of Deco-Veneer is illustrated in Fig. 1 of the engravings, the picture representing an interior view of the salesroom of a prominent automobile manufacturing concern in Indianapolis, Ind.

Fig. 1—Interior of Automobile Salesroom Showing Application of Deco-Veneer as a Wainscoting

A booklet daintily printed on delicately tinted paper has been issued by the company especially for "The Lover of the Artistic, be he decorator, houseowner, architect or one who contemplates building or remodeling." It is profusely illustrated showing the effects produced by the application of Deco for a great variety of places, not the least conspicuous of which are show windows in stores of various kinds. At the present time the company is installing work in a large apartment house in Baltimore, Md.; the Tarpon Club at Miami, Florida; two large buildings in Chicago; and window backgrounds in buildings as far West as Portland, Ore. In Indianapolis the company has just secured an order for the decoration of a 16-story hotel, not to mention many smaller jobs.

Cannon Ball Door Hangers

We have received from Hunt, Helm, Ferris & Co., 6608 Hunt street, Harvard, Ill., a copy of the catalogue which it has just issued from the press and which illustrates and describes the "Star" line of goods. The work consists of 148 pages profusely illustrated and carrying descriptive data of such a nature as to cover the salient features of the various lines. Prominent among the goods to which attention is invited, is the "Cannon Ball" house door hanger, which has been brought out in response to repeated demands for a hanger similar in construction to the "Cannon Ball" barn door hanger. In the house door hanger there are two adjustments—one for the hanger and one for the track. Both are instantly accessible with a screw driver and either end of the track may be instantly raised or lowered as desired from the center of the door opening. The hanger is fitted with specially formed roller-bearing wheels, which are leather covered, wide tread, and referred to as being frictionless, noiseless and practically indestructible. The hanger and plate for attaching to the door are made of steel. The track is of 14 gauge steel, 2¼ in. inside diameter and slotted ¼ in. on the under side. The construction has been rigidly tested and is guaranteed to be entirely satisfactory. The claim is made that it is not necessary to take down the Cannon Ball track to adjust it as this may be done with the use of a screw driver.

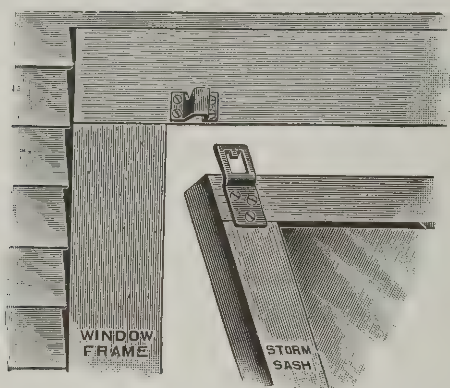
Other goods shown in the catalogue and which are likely to interest our readers include the new Star Flexible Door Hanger, the Star Roller-Bearing Door Hanger, the Flexo Barn Door Hanger, the Knoxall Flexible Door Hanger, the Twentieth Century Barn Door Hanger and rail, the Cannon Ball Barn Door Hanger with lateral and vertical adjustments, Screen Door Hinges, Tank Heaters of various kinds, Hoisting Apparatus, Automatic Barn Door Latches, Hay Carrier Outfits for barns of various lengths, Star Steel Stalls and Stanchions, Star Adjustable Wood Stanchions, etc., etc. Those readers of the *Building Age* who are interested in the Cannon Ball House Door Hanger can secure a special circular by making application to the company.

New Gypsum Mill in the South

With a view to showing in a substantial way its appreciation of the splendid support accorded on the part of architects, contractors, builders, plasterers and supply dealers generally in the South during the past few years, the United States Gypsum Company, 205 West Monroe Street, Chicago, Ill., has just erected at Plasterco, Va., a modern gypsum mill which will enable the company to improve its service to the consumers of gypsum products in a way that will be of real advantage to them. The new mill was formally opened on the first of September and this new equipment will enable the company to furnish wall plasters and other gypsum products fully up to the U. S. G. standard—nationally regarded as the best obtainable. The new Plasterco mill has all the advantages and exclusive features which have characterized the company's mills as among the most modern and perfectly equipped plaster making plants in the world. The company now has mills located at all gypsum producing centers in the United States and has sales offices in New York City, Cleveland, Chicago, Minneapolis, San Francisco and Plasterco, Va. The opening of the new mill is regarded as "a new factor in the progress of the South."

"Peerless" Hangers and Fasteners

At this season of the year when preparations for the winter are being made about the home carpenters are frequently called upon to equip new as well as old dwellings with storm sash. The value of double windows, more



"Peerless" Hangers and Fasteners—Fig. 2—The Two Parts of the Hanger

particularly on the northern and western sides of a dwelling, is being more and more appreciated, for not only is a house more comfortable thereby, but there is a considerable saving in the consumotion of fuel which tends to offset in a measure at least the expense of the storm sash. Possibly the most important matter for the carpenter to consider in hanging the storm sash is the hardware and obviously the hooks or hangers should be strong; neat in design, and attractively finished, while at the same time they should be of a nature to permit of the storm sash being quickly put up or taken down. The windows should also be equipped with braces or fasteners to hold the sash in place and it is naturally an advantage to have adjustable fasteners which will hold the sash firmly when partially

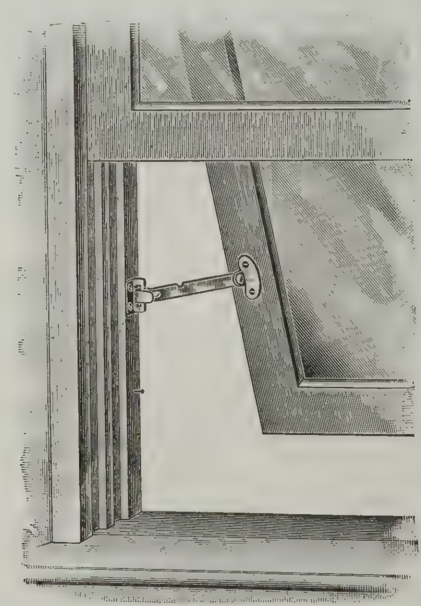


Fig. 3—Showing Manner of Holding the Storm Sash Open for Cleaning or Ventilation

open so as to permit of proper ventilation and also provide for window cleaning. The "Peerless" hangers and fasteners made by the Stanley Works, New Britain, Conn., and illustrated in Figs. 2 and 3 are said to fulfill the requirements stated. They are made of wrought steel neatly finished in japan, although if preferred they can be procured in what is known as "Stanley" Sherardized, which is claimed to be rust-proof and the ideal finish for hardware exposed to the weather. The point is made that when once hung on "Peerless" hangers the storm sash can be readily taken down or put up without using either ladder or tools. In the spring of the year full length screens can be hung on the same hooks. The fasteners are referred to as being strong but of simple design and easily operated. They hold the sash securely either open or shut and prevent it from rattling or being blown off the hooks. The company has issued what is known as "Circular E" which gives full information concerning these goods and a copy of which can be obtained by any reader of this journal upon application.

Catalogue of Mechanics' Tool Satchels

We have received from the Excelsior Bag & Mfg. Company, Inc., Troy, N. Y., a copy of an interesting catalogue relating to the Excelsior Brand of products. Of special interest to our readers are the various lines of mechanics' satchels for use by carpenters, plasterers, plumbers, masons, electricians, tilers, linemen and others who have occasion to carry tools from place to place, and more particularly on jobbing trips. The satchel can be taken aboard a street or passenger car as well as other place where a tool box is either not as convenient or is not permitted. The satchels are well made and are offered in a variety of sizes. Other goods include carpenters' bit and chisel rolls, carpenters' aprons, etc. Hammocks of various kinds and styles are included in the assortment of goods presented, also tents, coal bags, feed bags, skate straps, etc.

Crescent Door Holders

The Crescent Door Holder Company, 225 San Fernando Building, Los Angeles, Cal., is marketing the Crescent door holders, illustrated in Fig. 4, which shows the appearance of the holder when the door is both opened and closed. This holder is designed for application to screen doors, storm doors, double doors, as well as other types of door or gate.

The holder is made of wrought steel, has a strong and

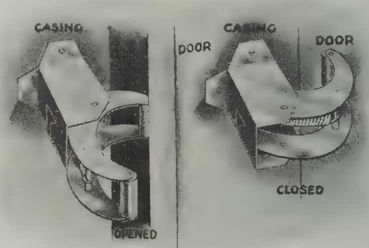


Fig. 4—Crescent Door Holders, Showing the Door Open and Closed

durable steel spring, and rubber bumpers prevent the marring of the casing. This device is designed to keep a screen door closed, and will, it is said, also prevent warping, sagging or rattling. The door holder is made in both antique copper and brass finish.

"The House That Jack Built"

Under the above title which suggests the fairy tale ot old the Paine Lumber Company, Ltd., Oshkosh, Wis., has issued an exceedingly attractive booklet which illustrates in most convincing style the cost of hardwood trim as compared with soft wood. The story is given as the actual experience of a home builder and the statement made that hardwood birch floors and trim for the first floor cost "Jack" $25 more than common yellow pine or other soft woods and increased the value of his house $100 or 400 per cent. Further it is stated that hardwood birch doors and trim for the *entire house* cost "Jack" $50 more than common yellow pine or other soft woods and increased the value of his house $200. The point is made that hardwood doors and hardwood trim are more attractive, more sanitary and cost but little more than soft wood doors and woodwork and when the builder or houseowner is using the former he is building for the future and making his home more satisfactory and valuable. Some of the illustrations are in colors, one showing a view in the dining room looking toward the fireplace in the library; another represents one end of the library and corner of the music room, while a third is a corner of the library looking toward the open fireplace with bookcases on either side, the finish in all the rooms being Wisconsin birch—the American mahogany.

Not the least interesting and valuable features of this attractive work are the pages of designs of trim in "The House That Jack Built." The assortment includes a great variety of birch moldings which are carried in stock ready to ship, the stair work including newels, balusters, etc., and "Korelock" doors in great variety. The last page carries an interior view in colors of another cottage finished in Wisconsin birch. A careful study of the facts and figures presented in connection with "The House That Jack Built" cannot fail to emphasize the large profit which may accrue from a small investment.

A New Line of Breast Drills

The Millers Falls Company, 28 Warren street, New York and Millers Falls, Mass., has just put on the market a new line of breast drills in several numbers, fully illustrated and described in catalogue H, recently issued. One of them, No. 87, is typical of Nos. 84 to 86 and 94 to 97, inclusive, each having its own distinctive operation, although all are constructed on the same general plan. These drills have a range of various desirable and ingenious movements, are fitted with hardwood handles, stained, have malleable iron black frame, large gear and breastplate enameled a French gray with red trimmings, while other metal parts are polished and nickeled. The breastplate is adjustable to different positions, at right angles to each other, by loosening the knurled nut A. It is made to fit the hand and when grasped, as shown in Fig. 5 of the illustrations, with the middle finger through the hole D in the frame, the tool can easily be held and steadied in awkward and out-of-the-way places where the breastplate must be held in the hand. The auxiliary breastplate may be clamped over the regular breastplate to add to the ease and comfort necessary when doing heavy work. The ratchet adjustment C, with positive mechanism, permits of action without ratchet, as with an ordinary breast drill. There is also both right-hand and left-hand ratchet. In the case of continuous right-hand ratchet action the chuck turns continuously on to the right with the crank moving both forward and backward alternately and the same operation is possible for continuous left-hand ratchet action; that is, the chuck turning continuously on to the left. The crank handle is adjustable in two positions, one at right angles to the crank and the other in line with the crank, as indicated by the outlined illustration, which is of advantage in cramped quarters and increases the power of the crank. The change of position is accomplished by inserting the pin on the end of the handle, as shown, into hole in the screw B and using the pin as a wrench to loosen the screw. This handle is primarily intended to be screwed into the main frame at a point between the chuck and gears and to be used in steadying the tool. There are two speeds, 2¾ to 1 and even, which are instantly changeable by means of the knob shown without removing the drill from the work. By the same knob the gears can be locked for tightening or loosening the chuck. The drill is double geared, has cut teeth and the small gears are of steel. The ball thrust bearing will take up in case of wear. The chuck of the master pattern holds and centers with accuracy round shanks from ⅛ to ½ in. in diameter, No. 1 Morse Taper and all sizes of bit stock shanks. The No. 87 drill is 17 in. long and the weight of auxiliary breastplate is ½ lb.

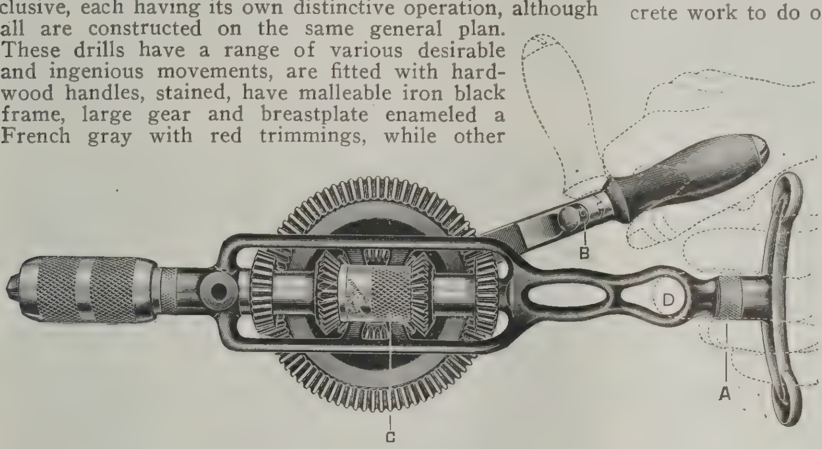


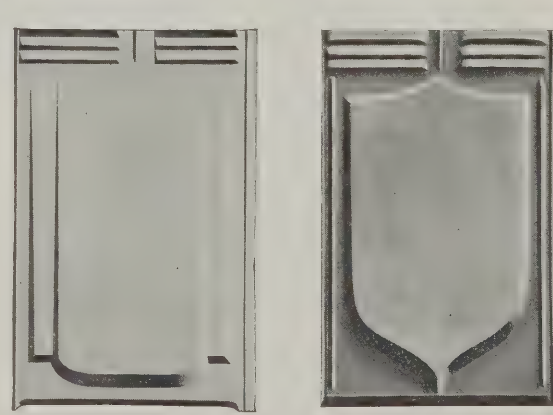
Fig. 5—The New No. 87 Breast Drill Adjustable to Different Positions

"Smooth-On" Iron Cement

One of the problems which more often than otherwise perhaps confronts the builder, the contractor and the property owner is to render concrete floors and walls, especially in cellars, impervious to moisture. Complaints are often made that the cellar is damp or that water actually enters in such quantity as to make the place not only unhealthy but destroys its usefulness for the purpose for which it is intended. Various methods have been put forward for overcoming this trouble and there are now upon the market numerous waterproofing compounds intended for accomplishing the desired results. Among these mention should be made of what is known as "Smooth-On" Iron Cement No. 7, which is designed for coating concrete walls, floors, roofs, tanks and elevator pits to make them water, oil and gasoline proof; repair cracks and leaks in concrete walls, floors, etc.; for bonding concrete to concrete; for making concrete hard and dense; for use in the construction of floors under furnaces, boilers, etc.; for mixing with Portland cement when making water pipe joints; for repairing iron pipe work, and for mixing with fire clay for setting boilers. The material in question has been placed on the market by the Smooth-On Mfg. Company, 572 and 574 Communipaw Avenue, Jersey City, N. J., and in an interesting pamphlet which the company has issued full particulars are given covering the various applications of "Smooth-On" Iron Cement No. 7. The information contained cannot fail to be appreciated by those having concrete work to do or who are called upon to repair or render waterproof concrete floors and walls already constructed. The general directions presented are clear and comprehensive, while the illustrations tend to impress upon the reader the practical value of the material named. Sectional views show the general method for using "Smooth-On" for waterproofing concrete, brick or stone walls, floors or ceilings, also general method for waterproofing a brick wall on the inside. Those readers of the *Building Age* who are interested in the merits of the material in question can secure a copy of what is known as "Instruction Book No. 7" by making application to the address above.

Two New Designs of Metal Shingles

The constantly growing demand for ornamental roofing, especially that offering the least resistance to fire, has caused many new types and designs to be placed upon the market. Two of these new designs which have just been added to its line of metal shingles by the Berger Mfg. Company, Canton, Ohio, are known as the "Chieftain," shown in Fig. 6, and the "Swanee," shown in Fig. 7. These shingles make an attractive, economical and durable covering for residences, bungalows, churches, schools, garages, etc., and are of such distinctive styles as to meet the varying requirements of those desiring a roof of this nature. The "Chieftain" is a bold clay tile pattern and when painted is said to give the effect of a tile roof, while the "Swanee" is a plain design. They are made in galvanized Toncan metal, galvanized open-hearth steel or terne plate of any standard weight, and have the three-point contact side lock which it is claimed cannot possibly become unhooked after the shingles are nailed in position. The nails, two of which are required to each shingle, are covered by the next shingle when laid in place. An important feature, it is pointed out, is the fact that heavy ribs are formed at the top of each shingle to prevent rain or snow from entering, thus eliminating all possibility of leaks, while the construction is such that no damage is caused by expansion and contraction. The popularity of these new designs of shingles is demonstrated by the num-


Two New Designs of Metal Shingles—Fig. 6—The Chieftain—Fig. 7—The Swanee

ber of orders which have already been received by the company for them.

A New Rafter-Framing Square

The rafter square illustrated in Fig. 8 of these cuts and which is being placed on the market by the Peck, Stow & Wilcox Company, 27 Murray street, New York,

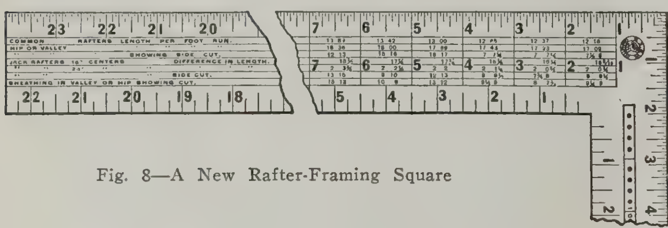


Fig. 8—A New Rafter-Framing Square

presents an entirely new feature in the method by which the rafter framing tables are displayed on the face of its body. The inch spaces on the face of the square are distinguished from each other by vertical lines extending from the numbers on the outer margin, clear across the square, thus forming a series of boxed-in rectangular spaces. At the left-hand side of each of these spaces and almost equally distant from the outer and inner margins of the square is situated a conspicuous numeral corresponding to the number on the inch scale above. The right-hand portions of the rectangular spaces previously referred to are occupied in each case by a column of figures. The large numeral indicates the rise per foot run of a roof; the column of figures at the right of it contains the information for finding the length of a common rafter per foot run of roof; the length of hip or valley rafter; the length of jack rafters spaced 16 or 24 in; the side cuts for hip, valley or jack rafters; the cut for sheathing or shingles in the valley or on the hip.

The peculiar advantage claimed for this square consists in the fact that each column of figures giving the necessary information is enclosed with the numeral standing for the rise of roof wholly within two parallel lines at right angles to the body of the square. Thus the mechanic can never be in doubt as to which column of figures corresponds to the number indicating the rise per foot run. The square has a 24 x 2-in. body and 16 x 1½-in. tongue, and is made in a variety of markings and finishes. Of the six styles, three, numbered R-100, R-1 and SR-100, respectively, show the full set of measures; rafter, brace, Essex board and eight-square. The SR-100 is also a "take-down," being one of the regular numbers of the company's Samson "take-down" square.

A New Storm Proof Ventilator

The swinging top ventilator shown in Fig. 9 of the illustrations is made by the Swinging Top Ventilator Com-

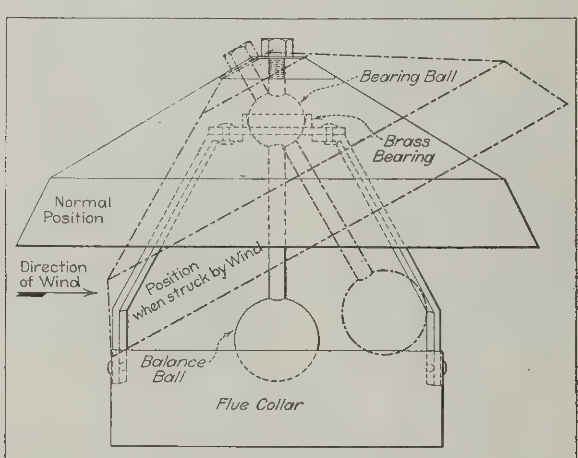


Fig. 9—A New Storm Proof Ventilator

pany, Lewisburg, Pa., and is being offered to the trade as a storm-proof ventilator. The ventilator is shown in its normal position by the full lines of the illustration, which shows the detail of its construction and the dotted lines show the ventilator in the position which it assumes when the wind is blowing on it. This illustration shows that the ventilator is provided with a balance ball hanging down in the center, which is employed to have the ventilator retain its normal position after the gust of wind has passed. The construction is such that when the ventilator top closes down automatically on the sides in the direction from which the wind is coming to exclude the rain or snow a full opening for the gases to escape is allowed on the opposite side from the wind. There is also left a full opening for the gases to escape from the flue in calm weather. These ventilators, which are made with a copper top, are fitted with ball bearings and are made in three sizes, 6, 7 and 8 in. This type of ventilator is the invention of John M. Cromley, president and manager of the company. Printed matter is available from the company on request.

Richards Vertical Fire-Door Fixtures

The Richards-Wilcox Mfg. Company, Aurora, Ill., and 85 Walker street, New York City, has put on the market the vertical fire-door fixture, No. 203, shown in Fig. 10 of the illustrations, as applied to a door. It is a heavy fixture, with counterbalanced weights for the operation of vertical sliding standard tin clad firedoors. As these doors are very heavy, they require extra strong sheaves and other working parts

Fig. 10—Richards Vertical Fire-Door Fixture, No. 203

to correspond. This type of door is so operated only where hinged or sliding doors for any reason cannot be used. Literature with descriptive matter is now ready for distribution to any who are interested and make application for it.

Blaw Steel Wall Forms

The Blaw Steel Construction Company, with general offices in the Westinghouse Building, Pittsburgh, Pa., has just issued "Bulletin 56," relating to steel forms for use in concrete construction of all kinds. The forms are referred to as being practically indestructible and thus have a decided advantage over wood forms on any work where the forms may be used over and over again. The point is made that a steel form which has been used a hundred times should be in better condition than a wooden form that has been used but twice, consequently the material cost of steel forms per unit of concrete surface is less than that of wooden forms. The claim is made that the greatest opportunity for saving in the labor on form work occurs in combining the three processes of assembling, lining up and spacing the panels, which processes are usually conducted separately. The Blaw forms are so made that when the various parts are put together they are necessarily lined up and spaced automatically and at the same time correctly. The steel forms provide an outfit that may be used on walls of any length and of any thickness with corners and partition walls located at pleasure. They can be used to carry up a wall to any desired height and an outfit which is suitable for one building is said to be suitable for another, provided it is large enough to carry on the work at the desired rate. All parts are interchangeable and an equipment may be increased by procuring duplicate parts. The forms can be used for columns, beams and floors if desired.

In addition to the forms described in Bulletin 56 the company designs and manufactures steel forms for practically every type of concrete construction. With steel forms a contractor is able to work more quickly, as in most cases the steel forms can be shifted to new positions in very much less time than is required to shift wood forms. Another point is that with steel forms resurfacing of the concrete is reduced to a minimum. Blaw steel forms are put on the market both on a lease and a sales basis. Bulletin 56 sets forth the merits of the Blaw Forms at considerable length and presents numerous illustrations, showing the manner in which they are used in connection with various forms of wall construction. There are also numerous half-tone engravings, showing buildings in construction with Blaw steel forms.

Chain Belt Concrete Mixer

There are at the present day so many opportunities for the builder doing small jobs of concrete work that a portable mixer is an essential adjunct of his equipment. With one of these he may, when one job is finished, readily move the mixer to another job and this without the necessity of any motive power other than a horse to draw it. A machine which has recently been put upon the market and designed especially for light concrete work such as building silos and small buildings, the laying of sidewalks and the execution of any job of concrete work requiring a capacity of about 20 to 30 cubic yards per day, is the Chain Belt No. 00 Concrete Mixer which in Fig. 11 of the engravings we show with horse attached and ready to move to another job. The machine is made by the Chain Belt Company, Milwaukee, Wis., and has a capacity of 3½ cu. ft. of mixed materials or 4½ cu. ft. of loose materials per batch. It is furnished with either a 3-horsepower vertical water-cooled gasoline engine or a 3-horsepower motor. It is also equipped with either a standard hopper, batch hopper or power loader according to requirements. The drum is constructed entirely of a special semi-steel mixture and is cast in two sections. The mixing is accomplished by means of ¼-in. steel mixing blades and malleable iron buckets in the interior of the drum. The rollers on which the drum turns are made of chilled semi-steel and there is the least possible opportunity for the moving parts to wear out. These are features which cannot fail to be appreciated by the up-to-date builder and contractor who may be in need of a mixer of this capacity. The trucks and frame are steel and no woodwork is used in the entire construction. We understand that all sizes of chain-belt concrete mixers are guaranteed for a period of one year against inherent defects in workmanship and material and the chain-belt drive is guaranteed for two years.

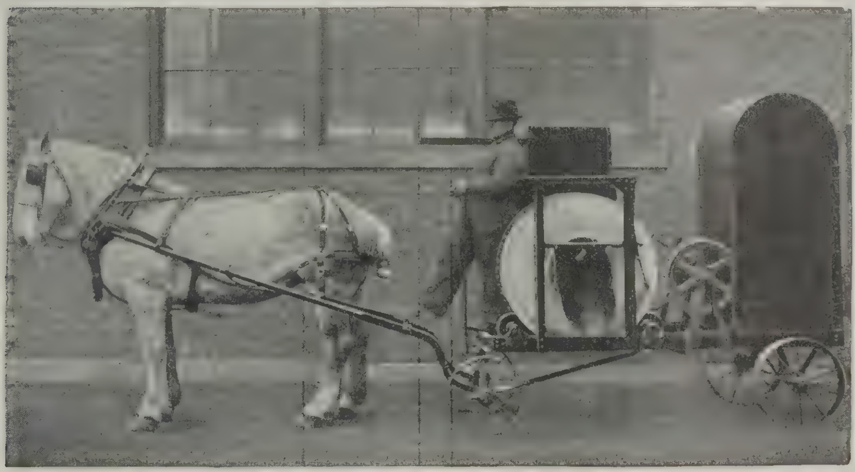


Fig. 11—The Chain Belt Concrete Mixer Showing Engine Enclosed and Horse Attached, Ready to Move to Next Job

The picture here presented shows the gasoline engine enclosed by a casing with large side door which gives ready access to the engine when the mixer is in operation. The company emphasizes the fact that on this mixer there are no gears, as it is driven by a steel roller chain belt.

A four-page folder which the company has issued sets forth the merits of this portable concrete mixer and a copy of it can be secured by any reader of the *Building Age* by making mention of this journal.

Folding Hand Drawing Knife

C. E. Jennings & Company, 42 Murray street, New York, has put on the market the Arrow Head folding hand drawing knife for wood workers, shown in Fig. 12 and made with both plain and cocobola handles in 6, 7, 8, 9, 10 and 12-in. sizes. The advantage of this form of construction, aside from the great convenience of small compass in carrying about and protection to the sharp blade of an awkward tool in the kit, is the rapidity with which any one of four positions throughout a complete circle may be obtained for either or both of the handles, according to the complicated character of the work, especially when there is use for a drawing knife, in otherwise inaccessible places. The handles are held firmly by knurled thumb nuts, working against the handle shanks, the bolts having a tapered angular formation with a corresponding taper on the handle shank. The knife is of the razor-blade pattern and the tool is of the finest material and workmanship.

Fig. 12—Folding Hand Drawing Knife

Septic Tanks of Sewer Pipe

Septic tanks of vitrified salt glazed sewer pipe, which are said to be scientifically proportioned to induce the rapid breaking up of the sewage, are made by the Blackmer & Post Pipe Co., Wainwright Building, St. Louis, Mo. A booklet on this septic tank sewage disposal system which the company has recently issued describes the process in detail, and contains useful data relative to installation. An isometric drawing showing how groups of buildings may utilize one septic tank is a feature of the booklet. The septic tank manufactured by this company consists of three pieces of vitrified salt-glazed sewer pipe molded especially for such purpose. The flow of sewage to the tank is through curved pipe, which is intended to prevent a disturbance of the sewage in the bottom of the tank or the sludge which forms at the water line. Connected with the main tank by a dip pipe is the filter from which the treated effluvium escapes. The booklet is for general distribution.

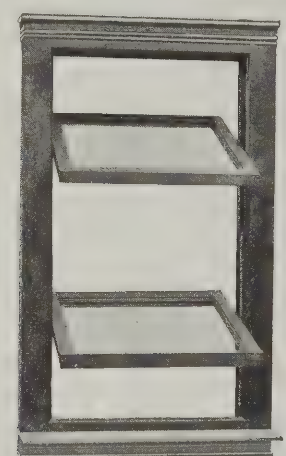
"Rib-Trus" in Hotel Construction

There has recently been erected in connection with the Hotel Cape May at Cape May, N. J., a new dining room addition which involves some interesting features, more especially as regards floor and roof construction. Bids on the contract for the floors and roof were put in by many large manufacturers of reinforcing and furring plates and the engineer who had this work in charge insisted that the plates should offer ease of application, strength and perfect bonding qualities. After many tests selection was made of Rib-Trus, a product of the Berger

Mfg. Company, Canton, Ohio. The chief advantages claimed for these furring plates are the ease and rapidity with which they may be placed and the fact that no false work is required. As neither nuts nor bolts are used, all the work is done from the top. Special clips fasten the plates to the purlins and when the concrete is applied it engages with the loops, forming, it is claimed, a perfect lock. The design of the plate produces a dovetail clinch on the under side which insures the full tensile strength of the plate and holds the plaster securely. This interlocking plan is said to reduce the amount of cement drip to a minimum.

The Mitchell Reversible Window Device

One of the marked tendencies of the present day in every calling and in every branch of industry is in reducing liability to accident to a minimum. By reason of the frequent accidents which formerly occurred in the cleaning of windows from the outside, especially in office



The Mitchell Reversible Window Device—Fig. 13—Showing Sash Reversed Ready for Cleaning from the Inside

buildings or others many stories in height, attention was directed to the construction and arrangement of windows in such a way that they might readily be cleaned, glazed or painted from the inside. One of the latest devices for accomplishing this purpose is illustrated in its details herewith, and is being introduced to the trade by the Mitchell-Conner Mfg. Company, 519 Main Street, Cincinnati, Ohio. This device is of such a nature that it can be adjusted at pleasure so as to give the desired ventilation and locks itself wherever set. A general view of a window with the sash partially reversed is presented in Fig. 13. The device is made entirely of 18-gauge aluminum-coated steel and is guaranteed rust-proof. The claim is made that there is no swelling nor shrinking of the sash, while noise and rattling of windows are entirely overcome. The Mitchell Improved Reversible Window Device fills the entire space between the sash and the jamb and the steel parts coming together as indicated in Fig. 14,

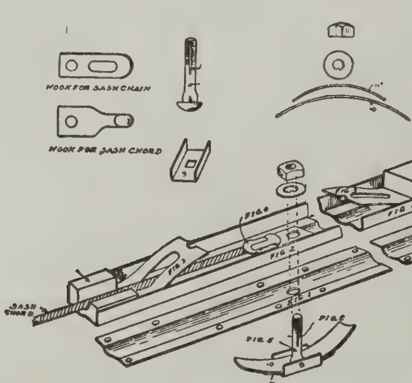


Fig. 14—The Mechanism of the Device

and at the same time being enclosed from top to bottom of the sash, render the window dust and weather-proof. The device is said to be easily attached to old or new sash and is shipped all ready to assemble, so that even the novice can screw it on to the sash. The company points out in connection with large buildings that by installing the window device in a plank frame instead of box frame and doing away with sash cord or chains, pulleys, weights, etc., the device costs nothing. For private residences the expense and annoyance of obtaining help to wash windows is dispensed with, as the Mitchell Window Device permits the sash to slide up and down the same as ordinary sash and it is only necessary to reverse and wash the outside of the glass from within the room. Another point to which the company makes reference is that a painter can paint 10 outside sash from within the room in the time that would be required in getting scaffolding ready to paint one window the old way. The company states that it guarantees this window device and will assume all expense of repairs for a term of 10 years from installation.

"Certain-Teed" Rubber Roofing

The General Roofing Mfg. Company, East St. Louis, Ill., has just launched a most comprehensive and scientific advertising campaign in connection with its line of "Certain-teed" rubber roofing which is likely to interest not only the architect who specifies it; the contractor who builds the house; and the roofer who applies the roofing; but more especially the owner who pays the bills. In carrying out its campaign the company's policy is to create a demand for the roofing on the part of the consumer which will be reflected in a desire on the part of jobbers and dealers to handle the goods. The foundation of "Certain-teed" rubber roofing is a long fiber felt thoroughly saturated and impregnated with an asphalt compound, the basis of which is Gilsonite asphalt. This saturated felt has a heavy asphalt coating both sides, hermetically sealing the felt and giving it long life and great durability. It is finished on the outside with a coating of powdered soapstone or talc, giving this grade of roofing an appearance similar to rubber belting, and for this reason it is called "rubber roofing." It is made in three thicknesses and is claimed to be waterproof as well as practically fireproof against falling sparks, embers, etc. It is put up in rolls 32 in. wide, containing one square and two squares. It is also furnished in 36-in. width but containing the same number of square feet. The roofing is furnished in the shape of shingles as well as in rolls, and are laid the same as ordinary wood shingles 10⅔ in. to the weather, the shingles being 10⅔ in. wide and 24 in. long.

The "Certain-teed" label is only applied to the company's highest grade products, whether sold under jobbers' brands or the company's own brands—a method which is said to solve to a great extent the difficulties that grow out of the policy of marketing goods under the private brands of each. For the purpose of describing the details of the campaign the company has issued a 32-page booklet entitled "Certain-teed Selling Helps and Advertising Ideas that have made good for other dealers," with an index referring to the individual features of the campaign. In addition there is a treatise entitled "Double Your Roofing Sales," by John Lee Mahin, the well-known advertising and selling service authority.

Course in Carpentry at Pratt Institute

We have before us a copy of the Circular of Information covering the day courses in the School of Science and Technology at Pratt Institute, Brooklyn, N. Y. The one of special interest to the younger element among the readers of this journal is the one year day-course in carpentry and building, this course being planned to furnish in a shorter time and in a more efficient way the training that the old-time system of apprenticeship formerly offered and to insure greater opportunities for promotion. The course gives the student a knowledge of the fundamental principles of the trade, of carpentry and building and also a large amount of practical skill that it is impossible under present conditions for the student to secure in any other way. It is not intended to replace practical experience at the trade which is necessary before one can become a thoroughly competent mechanic, but rather to shorten and supplement it and to lay a broad foundation.

Carborundum Sharpening Stones

One of the prime requisites to success on the part of the carpenter is that he possess a "kit" of first-class tools and another is that in order to accomplish satisfactory work the tools must be kept sharp and ready for instant use. In order to do this he must have a sharpening stone and this is probably the reason why so many include in their "kit" a carborundum stone. The claim is made that by the use of a stone of this nature all edged tools can be quickly put in shape; that there is no glazing of the stone when properly cared for, and that it cuts clean and quick. The Carborundum Company, Niagara Falls, N. Y., has issued a catalogue of these stones and which also illustrates other shapes and sizes.

(For Trade Notes see second page following)

TRADE NOTES

The Oak Flooring Bureau, 895 Hammond Building, Detroit, Mich., is distributing a celluloid calendar for the year beginning October, 1912, and carrying upon one side a brief description of the use of the different grades of oak flooring. Reference is made to the standard thicknesses and widths and to the fact that the flooring is tongued, grooved and end matched.

The "Imperishable Silo" manufactured from patented vitrified clay blocks is the subject of an interesting pamphlet sent out by the National Fireproofing Company, Fulton Building, Pittsburgh, Pa. Silos constructed according to directions given within the covers of this little work are substantial and durable and are guaranteed for a period of two years against any and all loss or damage which may be due to the cracking or breaking of the silo as a result of ensilage pressure or from the silo being blown down or damaged by winds, except damage to the roof. Among the descriptive text are suggestions as to size of silo to select and there is a table showing sizes and capacities of silos of varying diameter.

The Stanley Works, New Britain, Conn., announce the death of De Wilton Brown Woodbury, manager of their Chicago office. Mr. Woodbury was born at South Albion, N. Y., July 18, 1856, and had been engaged in the hardware business for 30 years. He was with the Marshall-Wells Hardware Company, Duluth, Minn., until 1891, when he became Western manager of the Stanley Works.

The Union Roofing & Mfg. Company, St. Paul, Minn., is sending out a unique folder setting forth the various uses of Gal-Va-Nite Black Enamel Sheathing, which is put up in rolls containing 500 sq. ft., each roll being 36 in. wide and weighing about 55 lb. It is stated that this material is recommended for use by architects and builders as a good insulation liner between concrete and hardwood flooring; also under door and window frames in concrete buildings, as it prevents warping and shrinkage; and for use in damp-proofing foundation walls. By reason of its great strength Gal-Va-Nite sheathing can be used as a winter covering for screen doors, making an economical and effective storm door; and it has been found to be a good insulator for icehouses and refrigerators. The advantages of Gal-Va-Nite Roofing are also set forth and other products made by the company are enumerated.

Graphite for October is replete with interesting matter pertaining to the graphite productions of the Joseph Dixon Crucible Company, Jersey City, N. J. Numerous half-tone engravings add to the pictorial appearance of this issue, while the letter press is of a nature to hold the attention of the reader.

The Raymond Concrete Pile Company, of 90 West Street, New York City, has been awarded the contract for the concrete piles for the foundations of the new buildings being erected at Blissville, Long Island, for the American Agricultural Chemical Company. The engineer is A. H. Nickerson and the general contractors are the Turner Construction Company, 11 Broadway, New York City.

James M. Thompson, treasurer and superintendent of the Luther Grinder Mfg. Company, 1117 Michigan Street, Milwaukee, Wis., lost his life in a boating accident on the Milwaukee River on Sept. 22. He was born at Poynette, Wis., 33 years ago and was a nephew of C. J. Luther, president of the company, in which he had become treasurer and superintendent.

The Foley-Wardwell Mfg. Company, 110 Hamilton Avenue, Cleveland, Ohio, successor to the Foley Company, has just issued advance sheets of its new catalogue showing machines recently brought out by that company for the care of saws and machine knives. Among the most important of these are an electric portable planer and jointer knife sharpener for sharpening knives in the heads while on the planer, which can be adjusted to grind by scale one-thousandth of an inch, a self-adjusting shaper collar and combination band saw filing, setting and jointing machine, which files, sets and joints band re-saws all in one operation.

Joseph Dixon Crucible Company, Jersey City, N. J., announces with profound sorrow the death of its honored vice-president, William Horace Corbin, which occurred on Wednesday, September 25.

The Kanneberg Roofing & Ceiling Company, Canton, Ohio, has been sending out a post-card announcement relating to its ceiling catalogue and special discounts. The card carries several illustrations of designs of ceilings which are of artistic conception and composed of deeply embossed plates. The company has a catalogue on metal tiles, shingles, roofing and siding and also on skylights, cornices, ventilators, eave trough, conductor pipe, etc.

The Union Steel Screen Company, Ltd., Albion, Mich., has just completed a new brick and concrete building for handling special brass work. The company has also added to its line the manufacture of wire and iron work, such as office railing, partitions and elevator inclosures.

Massee & Felton Lumber Company, Macon, Ga., is sending out a very attractive catalogue relating to hardwood veneered doors of artistic design, all of which are of special interest in view of the increasing tendency to make use of hardwood doors in the better class of buildings. The company makes veneered doors of any design and in any wood, also hardwood trim, yellow pine sash, doors, blinds, etc. The company also points out that its red gum often called "Satin Walnut" or "Hazelwood" closely resembles mahogany, but has a wider range of color and figure.

"Cement User" is the title of an interesting little publication devoted to the interests of the country contractor, the farmer, the home owner and the smaller user of concrete which has just been launched by the Chicago Portland Cement Company, Chicago, Ill. The major portion of the first issue of this little work is devoted to "The Farm of the Future" and in connection with the matter is to be found illustrations of concrete models of various buildings usually found upon an up-to-date farm. The cover design is particularly interesting, being printed in colors and representing three men at work in laying a cement walk leading up to a country mansion which occupies a portion of the background.

HINTS FOR THE ROOFER are presented in the latest issue of the "Tin Truth Bulletin of Good Tin Roofs," being sent the trade by the Follansbee Bros. Co., Pittsburgh, Pa. The pamphlet specifies that for roof covering the first point to be considered is the durability of the material to be used, then the practicability of using the material should be considered. It also states that even though the roof be covered with slate, tile, concrete or tin the most severe wear is placed on the valleys and gutters, and extreme care should be exercised in specifying the material to be used. Several illustrations are shown where the use of Scott's extra-coated, hammered open-hearth roof plate has been used, together with a view of one of their 800-ton hammers in operation.

In a recent issue of the *Farm Cement News*, published quarterly by the Universal Portland Cement Company, Chicago, Ill., is to be found some interesting information regarding the construction of a circular concrete block barn. A plan is given together with pictures of the interior and exterior and a description by the owner. Other matters relate to concrete silos, milk houses, poultry houses and other things connected with farm life.

Wilcox, Crittenden & Co., Inc., Middletown, Conn., set forth in a booklet which has been issued some of the many merits claimed for its "Neverust" brand of hot galvanized nails which are said to be "smooth and free from skin cutting edges." It is pointed out that very often the blame for defective work is laid at the door of the builder as the customer expected a rustproof nail when he specified "galvanized." If the nails used by the builder rust there is bound to be complaint, but such difficulties can be avoided, the company claims, by insisting on the use of its "Neverust" brand.

The Winthrop Asphalt Shingle Company, 12 61st street, Argo, Ill., will send a free sample of its asphalt shingles to any architect, builder or contractor making application for it. The shingles are made by a patented process, are tapered and lie flat and close together. Another feature of the shingles is that chipped slate or granite in rich natural colors is rolled into the exposed surface, thus producing a very rich and attractive appearance. The colors are red and green, and being natural they cannot fade or wash off.

The Jahant Heating Company, 95 Mill street, Akron, Ohio, calls the attention of architects, builders and contractors to the Jahant Down Draft Furnace with the built-to-order heat distributing system. It is pointed out that this warm air system of heating is economical, easily installed and requires a minimum amount of space. An illustrated book giving general specifications and descriptions of the company's furnaces can be obtained on application.

The Star Encaustic Tile Company, Bluff street near Gist street, Pittsburgh, Pa., is offering an extensive line of unglazed, encaustic, ceramic and vitrified tile, which is especially adapted for floors in buildings of various kinds or wherever durable and sanitary floors are wanted. The tile is also adapted for fireplaces, and the effects produced by its use are both pleasing and satisfactory.

The Building Age

New York, December, 1912

A Frame House with Stucco Exterior

A Summer Home on the Banks of the Hudson River Embodying a Number of Interesting Features

OCCUPYING a commanding site at the river edge of the Tappan Zee, on the road leading along the west bank of the Hudson River from New York to Albany, is the frame dwelling of stucco exterior which we have taken for the subject of the present article and which we illustrate upon this and the pages which immediately follow. The house is situated in what is known as the Palisade Park section and embodies features of arrangement which cannot fail to attract the attention of both architect and builder.

Entrance to the main hall is from the side, while the front, as shown in the picture upon this page, faces the Hudson River—"the Rhine of America." In the arrangement of the first floor, the living room and dining room look out upon the river, the dining room being reached directly from the veranda on this side as well as through the medium of the main hall at the left of the building.

It will be seen that the main stairs rise from the center of the house and are lighted by a window at the upper landing. A music room or library is at the left as one enters the main hall, while the kitchen is next to the dining room and communicates with it through a double swing door. The ice box in the kitchen is conveniently located just within the door opening upon the rear porch, while the sink receives ample light from the window directly over it.

Photographic View of the House of Dr. Charles Vetter at Grand View on the Hudson River, Overlooking Tappan Zee

A Frame House with Stucco Exterior—Designed by Tracy L. Freeman, Nyack, N. Y.

On the second floor are five sleeping rooms, each provided with a commodious closet, and so placed as to be readily accessible from all the rooms on that floor is the bath room. The stairs are so situated as to require a minimum of space, the flight from the kitchen to the cellar being directly under the main flight leading to the second story, while over it in turn are the stairs leading to the attic.

The halftone engravings convey an excellent idea of the finish of the principal rooms, while the details indicate more or less of the constructive features.

The foundation walls are constructed of field or local stone laid up in cement mortar. All piers are built of similar materials.

The chimneys are of hard burned brick laid up in cement mortar and the flues lined with tile.

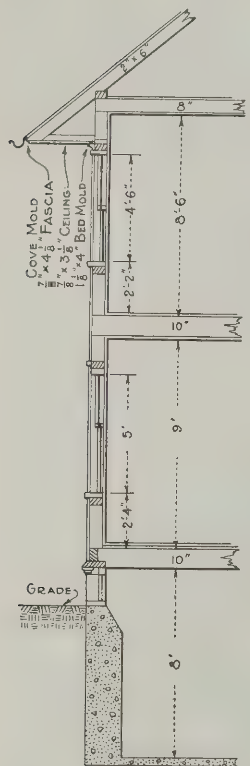
All framing timber is of hemlock and the frame is well braced. The girders are formed by spiking together three 2 x 8-in. beams. The sills are 4 x 4 in., made with broken joints and halved at the corners. The posts are also 4 x 4 in.; the girts, 1 x 6 in.; the first floor beams, 2 x 10 in.; the second floor beams, 2 x 8 in., and the attic floor beams, 2 x 6 in., all spaced 16 in. on centers. The ridge beam is 2 x 8 in. and the rafters 2 x 6 in., spaced 24 in. on centers. The collar beams are 2 x 4 in., firmly spiked to the rafters. All headers and trimmers are doubled and all openings of 4 ft. or more are trussed. The floor joists are also doubled under partitions.

The studding is 2 x 4 in., placed 16 in. on centers and doubled in full length at all door and window openings. All floor joists are cross bridged every 6 ft. with 1 x 3-in. hemlock.

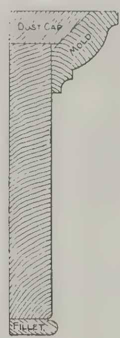
The vertical walls of the house are covered with 1 x 8-in. hemlock boards laid horizontally and nailed to every bearing. Over the sheathing boards is placed a layer of tar paper with 3-in. lap, and over this in turn are furring strips placed not less than 12 in. on centers. To the furring strips expanded metal lath is attached and on this is placed two coats of plaster with stucco finish composed of equal parts of Portland cement and clean, sharp sand finishing with a smooth surface under the float. The stucco is rendered impervious to moisture by means of Cabot's stucco waterproofing.

The rafters support 1 x 2-in. shingle lath placed 5 in. on centers, the entire surface of the roof being covered with Washington red cedar 18-in. shingles laid 5½ in. to the weather, two 4-d. nails being used to each shingle. Before laying, the shingles were dipped in Cabot's red shingle stain.

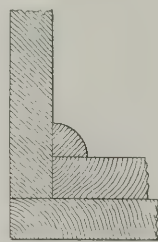
The piazza is framed with 2 x 8-in. members and

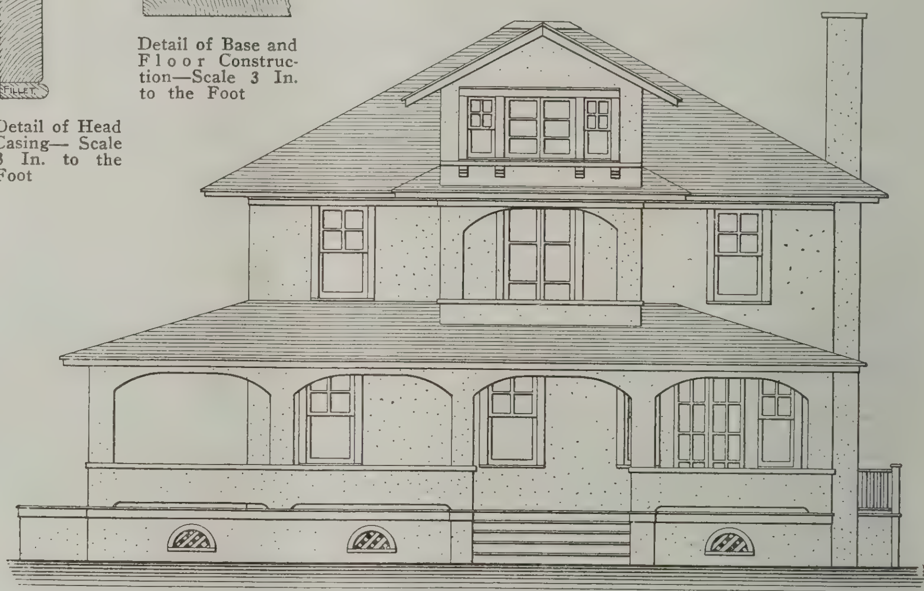


Section Through Main Wall —Scale ⅛ In. to the Foot

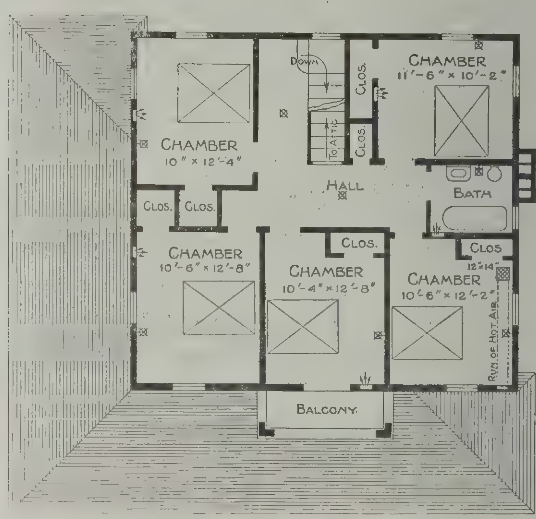


Detail of Head Casing— Scale 3 In. to the Foot


Detail of Base and Floor Construction—Scale 3 In. to the Foot


Front or River Elevation—Scale 3/32 In. to the Foot

First Floor Plan—Scale 1/16 In. to the Foot



Second Floor Plan—Scale 1/16 In. to the Foot

A Frame House with Stucco Exterior—Plans, Elevations and Miscellaneous Details the floors are ⅞-in. white pine with 3½-in. face. The ceiling is ½-inch North Carolina beaded material. The railing is built solid, covered with metal lath and stuccoed.

The window frames are of cypress and are 1½ in. rabbeted for sash. Double hung sash has box frames with 1-in. yellow pine pulley stiles and noiseless pulleys. The cellar sash is glazed with single thickness second quality glass, while all windows on the first and second floors have first quality American glass single thick for small lights and double thick for large single lights. The outside door frames are 1½ in. thick and have 2-in. hardwood sills. All walls, ceilings and stair soffits of the first and second floors are lathed and plastered with three-coat work, using King's Windsor patent mortar for the first two coats and lime, putty and plaster for the finish coat. All corners are protected with metal corner beads.

the inside doors being of the five-cross panel variety 1½ in. thick, while the front door is 1⅞ in. thick with beveled panel in the upper half.

The floor of the balcony is of Meurer's tin painted before being laid. Galvanized iron gutters are hung with heavy straps at the eaves of the main roof and porch roofs.

The laundry is located in the cellar and the tubs are two-part Alberene stone. The laundry stove is a No. 13 "Laundress" made by the Richardson & Boynton Company, 31 West Thirty-first Street, New York City.

The toilet is fitted with washdown closet. The boiler in the kitchen is of galvanized iron, with a capacity of 40 gal., and the range is a No. 448 "Perfect," with a plate shelf, made by the Richardson & Boynton Company. The kitchen sink is of white enamel and measures 18 x 30 in. in size. In the kitchen

View in Living Room Showing Main Stairs to the Left and the Dining Room in the Background to the Right

A Frame House with Stucco Exterior

The floors of the first story are double, the under floor being of 1 x 8-in. North Carolina pine and the finish floor of ½-in. maple with 2½-in. face. A layer of heavy building paper is placed between the two. The rooms of the entire second story are covered with No. 2 North Carolina pine flooring. A rough floor is laid in the attic.

The dining room has a wainscoting of panel work 6 ft. high constructed of ½-in. material. Above the panel work is a plate rail with brackets.

The stairs have 1⅛-in. North Carolina pine treads, ⅞-in. risers and ⅞ x 1½-in. balusters plain three to a step. The newels are of the built-up type and are 5 in. square.

All doors are of North Carolina pine, stock design,

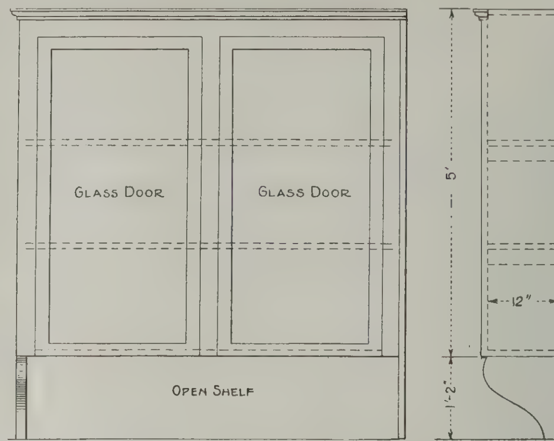
is also a pitcher pump connected to the well with a 1¼-in. galvanized pipe.

In the bath room is a 5-ft. white enameled iron tub with 3-in. roll rim and compression bath cocks connected to waste and overflow. The lavatory is one-piece enameled iron 20 x 24 in. in size with nickel-plated low-down compression cocks, chain, waste and trap. The bath room is also fitted with a syphon jet closet with oak seat and cover and low-down tank. All exposed piping in the bath room is nickel-plated brass. The plumbing fixtures are of the Standard Mfg. Company's make.

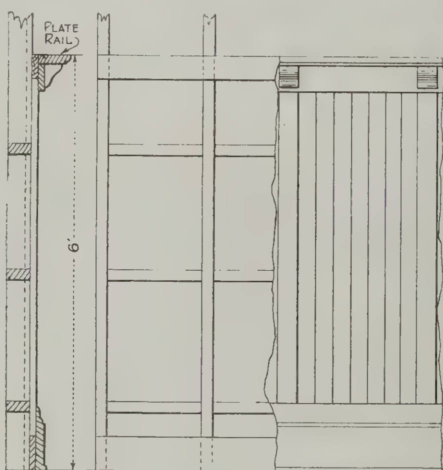
The tile wainscoting in the kitchen and bath room is 4 ft. 6 in. high. The floor of the bath room is of small hexagon tile, a tile base extending up at least

6 in. and resting against the plaster of the walls. The house is heated with a portable furnace of the slide at window and small door near furnace. Across the end of the duct at the window is a wire screen.

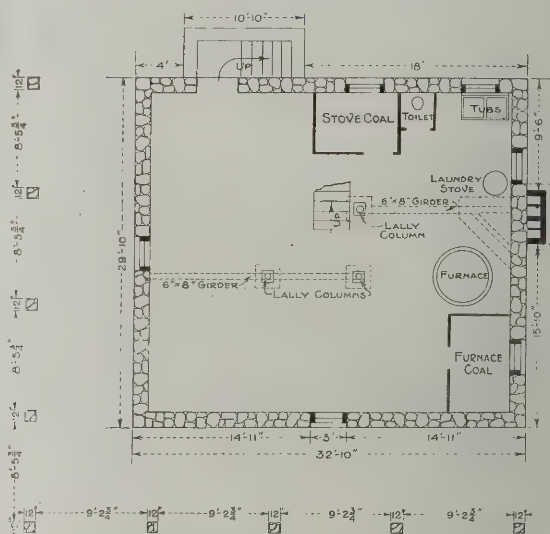

View of Rear and Side with the Hudson River in the Background



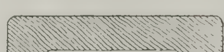
Elevation and Section of Kitchen Wall Dresser—Scale ⅜ In. to the Foot

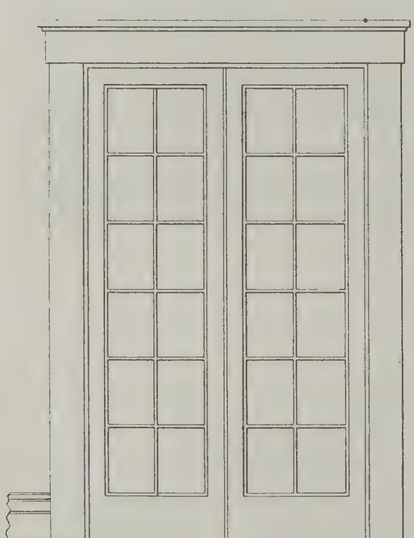


Details of Panel Wainscoting in Dining Room Showing Plate Rail—Scale ⅜ In. to the Foot



Foundation—Scale 1/16 In. to the Foot


Section of Side Casing—Scale 3 In. to the Foot


Elevation of Doors Between Living Room and Hall—Scale ⅜ In. to the Foot


View in Main Hall Looking Toward the Stairs and to the Dining Room Beyond

A Frame House with Stucco Exterior

Richardson & Boynton make, and is connected with the outside by means of a 24-in. galvanized iron fresh air duct. The balance of the ducts are of wood with The heating pipes running from the furnace to the registers are covered with asbestos paper and the pipes in the outside walls are double wrapped. The face of the studding or beams next to the heater pipes is covered with tin, and where the pipes pass through partitions they are covered with metal lath. Japanned iron register faces are used in connection with the heating installation.

The house is wired for electric lighting, all work being done in accordance with the rules and regulations of the National Board of Fire Underwriters. Switches are provided where shown on the plans. The wiring is of the type known as "knob and tube." A 3-in. bell is provided in the kitchen with push button at the front door.

The exterior trim, belt course, sash, etc., have two coats of lead and oil, including priming coat. All gutters, leaders and tin work have two coats of metallic paint. The porch floors have two coats of floor paint and the porch ceiling two coats of spar varnish.

All interior woodwork is finished natural. The finish floors of the first story are waxed, except the kitchen and pantry, which are oiled.

View in the Dining Room of the House of Dr. Charles Vetter Looking Toward the Kitchen

A Frame House with Stucco Exterior

The frame and stucco house here illustrated is located on Piermont Avenue, Grand View, N. Y., and was designed and constructed by Tracy L. Freeman, Nyack, N. Y., for Dr. Charles Vetter, of New York City.

Operations have been commenced on the foundations for the new unit of a school of engineering group of buildings at Pennsylvania State College, State College, Pa. This unit will be largely of steel, brown stone and brick construction. It is to be 100 x 60 ft. in plan and is arranged for three floors. Plans have been made whereby similar units can be added as demanded by the increasing student enrollment and in such a way as to enable the engineering group to extend harmoniously and effectively both from an architectural and from an engineering standpoint.

The Architect and the Builder

A very interesting discussion of the relation of the architect to the builder and of the builder to the architect is contained in the last Monthly Letter issued by Secretary William H. Sayward of the Master Builders' Association of the city of Boston, and we present the following extracts:

"The question of the relation of architect to builder and of builder to architect is one of perennial interest, and from a business point of view alone every practitioner in either department should feel the liveliest concern in the existence of the best possible conditions in these relations in order that the owner, whom architect and builder conjoin to serve, shall receive that to which he is entitled, and those who thus unite to serve the owner shall receive that which they are entitled to receive from the owner and from each other.

"It is of primary importance to accept as an indisputable fact that building connot be treated as part profession and part trade or business. Building is a process which from start to finish demands the service of trained men assuming different fields of responsibility but operating together to produce wished-for results. There is no point in the process where the effect of the designer and planner may be said to end and that of some other operator to begin. The initial study, even before it materializes in the first sketches upon paper, presupposes the carrying out of the idea into actual form. Building begins with the conception in the mind of the designer, and every subsequent movement toward the end in view, whether it be of draughting-pencil, or mechanic tool, or direction and control, is not only tributary to that end, but an inseparable part of the process.

"It is, of course, natural and to large extent imperative that responsibility for various parts of the process of building be divided; that he who conceives the design, prepares the necessary description of proposed structures, makes the drawings illustrating how the materials are to be put together, and has supervision of the work, should be distinct from the operator who has direct responsibility for the actual practical combining of mechanical forces, human labor and inert materials to produce the desired end. It usually would be advisable, under conditions of contracting for execution of work at a fixed sum, to do otherwise than divide the process of building as above indicated, but out of this separation has arisen a sense of sentiment that there is an opposition of interests between architect and contractor.

"It is true that in carrying on building work under the conditions described it has constantly been insisted that the architect may also assume the function of a judge, and act as an unprejudiced referee upon disputed points; but, as a matter of fact, this purpose, however sincere, defeats itself, for under such a rule the architect is called upon for a service which only a superman could fully render. The differences which arrive at the stage of dispute are almost invariably based upon interpretations of the instruments which the architect himself is responsible for, and, as in the practice of law a judge is not considered acceptable in a case where he is personally interested or to which he is intimately related, so in disputes arising out of building work it is equally inappropriate that the architect be placed in the position of absolute arbiter on all points arising in the carrying out of work based upon his own design. But the practice has been in vogue for many a year, and out of it has grown this wholly undesirable and in most cases unjustifiable feeling that the architect in his decisions leans perceptibly in favor of the employer, that is, the owner. Specific cases where the contrary attitude is positively in evidence are not frequent enough to be held as seriously modifying the general condition, and in any event it is very plain that the circumstances impose a service of extreme difficulty upon the person who already has a responsibility much greater than the usual fees compensate him for assuming.

"There can be no question that some improvement can be made which will relieve the architect of this extremely difficult task and tend to free the situation of its unwholesome atmosphere."

The Letter points out what the Master Builders' Association can accomplish in a matter of this kind and refers to the work which is now being done by the Joint Advisory Committee, made up of representatives of the Boston Society of Architects and the Master Builders' Association of Boston. It is stated that the only way in which general reforms can be secured or reasonably fair conditions can be maintained is through united action, which has increased value from the fact that it is based upon the judgment of many persons rather than that of a single individual. There is no method of computing accurately what associated effort, well applied, means to each individual concerned, but it is possible to conceive how disastrous it would be were no combined effort made to correct abuses and to stand for the rights that are common to all.

How far should an architect heed the request of a builder to put up a cheap structure?

North or River Side Elevation—Scale 3/32 In. to the Foot

View in Main Hall of the Residence of Dr. Charles Vetter Looking Toward the Entrance and Showing Library or Music Room to the Right

A Frame House with Stucco Exterior

Corner and Gate-Posts of Concrete

Method of Making One-Piece Posts with Braces -- Forms -- Proportions of Mixture -- Stringing Fence Wires

By Percy H. Wilson

THE ever-increasing cost of lumber is one of the important factors in influencing the property owner to seek a substitute for extensive wooden corner and gate posts and this substitute in many cases is concrete. Nothing gives more trouble or injures the price of property so much as sagging gates and fences caused by decayed posts, but when made of concrete they do not rot and are absolutely rigid under the pull of the wire fence or gate. In Fig. 1 of the accompanying illustrations we show a concrete post which is a home-made article planned by the owner of the property. It has been in service for 5 years and is said to be easily good for 95 more. The post and braces were molded in position and as one piece. The post proper is 10 in. square and the braces 6 in. It extends 3½ ft. into the ground and ends in a bulb of concrete.

Fig. 1—Appearance of the Finished Post in Position

Corner and Gate-Posts of Concrete

For the post mold proper, 2-in. lumber makes a stiff form and the carpenter can readily do all the work with a little care and attention. Cut two boards 2 x 10 in. and two 2 x 14 in., all 7 ft. 6 in. long. For the 2 x 10 a 2 x 4 and a 2 x 6-in. piece may be substituted if desired; likewise for the 2 x 14-in. a 2 x 6 and a 2 x 8-in. may be used. The 2 x 10-in. pieces are nailed to the three sets of 2 x 4-in. cleats as shown in the drawing. Holes are bored in the cleats so that the ⅝-in. bolts 18 in. long, running across the forms from cleat to cleat, will rest against the 2 x 14-in. boards and hold the box-like form in shape. One-in. triangular-shaped strips tacked in the corners of the form will bevel the sharp edges and produce a neater appearing post.

Each form for the braces consists of two side pieces, 1 x 6 in., and one bottom piece, 1 x 8 in., all 10 ft. long. Nail the pieces together in the form of a trough 6 in. deep. To make the bevel joint with the post form, lay off 3½ in. on the lower edge of the side pieces at one end and saw off the trough to the bevel. In the side pieces of the post mold, 8 in. from the top, cut an opening extending downward 7 in. deep and 8 in. wide to receive the molds for the braces. In Fig. 2 is a plan of the "form" for the post and in Fig. 3 the form for post and braces is shown in position for pouring the concrete.

With the forms ready and all of the material on hand, dig the hole 3½ ft. deep for the post proper. At distances of 9 ft. 6 in. from the center of the finished post dig another hole 3½ ft. deep for the concrete bulb in which the brace will end. One ft. above bottom of this hole, open a trench 8 in. wide sloping upward toward the corner post to a point within 7 ft. of the center of it.

Mix the concrete, 1 bag of Portland cement to 2 cu. ft. of sand to 4 cu. ft. of crushed rock, or 1 bag of cement to 4 cu. ft. of good pit gravel. Make the concrete mushy wet and fill the holes to the depth of 1 ft. Set the mold for the post in position and slide the troughs for the braces into the openings, with the upper ends even with the inside of the post form. Fasten them securely and chink the cracks with old rags. Brace all forms firmly. Down the post form, 2 in. from each corner, set a ⅜-in. rod 10 ft. long with the upper ends bent backward. Fill the post form with concrete to the openings of the braces. Place 1 in. of concrete in the troughs for the braces and lay upon it, 1 in. from each side, two ⅜-in. rods with their upper ends extending into the post mold. Put in 4 in. more of concrete, place two more rods in a similar manner and then another inch of concrete. Work rapidly and without delay finish filling the post form with concrete. After the concrete has stiffened, bevel the top edges of the post and the upper edges of the brace with a trowel.

For each post with two braces there will be required four bags of Portland cement, 8 cu. ft. of sand, 16 cu. ft. of crushed rock (or four bags of cement and 16 cu. ft. of bank-run gravel), and twelve pieces of ⅜-in. rods 10 ft. long. These materials will cost about $2.50.

See that the post is fenced off so that animals cannot disturb it before the concrete has acquired its strength. After seven days the forms may be carefully removed. Do not use the post until it is 30 days old. Many persons make corner-posts in the fall, before freezing weather, and do not place the fencing on them until the next spring. The wire fencing may be pulled around the post, as shown, or ratchet fasteners may be attached by making holes through the post by means of small gas pipe set through holes in the form or by means of greased rods turned frequently while the cement is in process of setting.

The same form is adaptable to brace-posts in the fence line or to gate-posts. Hinges and fasteners for gates can be secured in the manner described above for ratchet wire-tighteners. For entrance ways, very attractive ornamental posts can be made in the same general method.

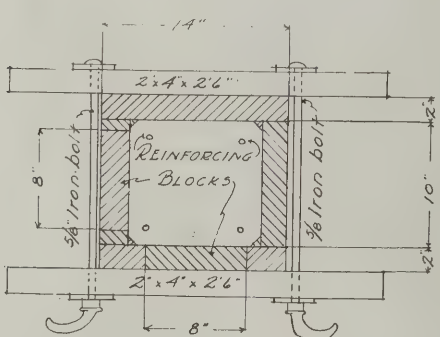


Fig. 2—Plan of "Form" for Post

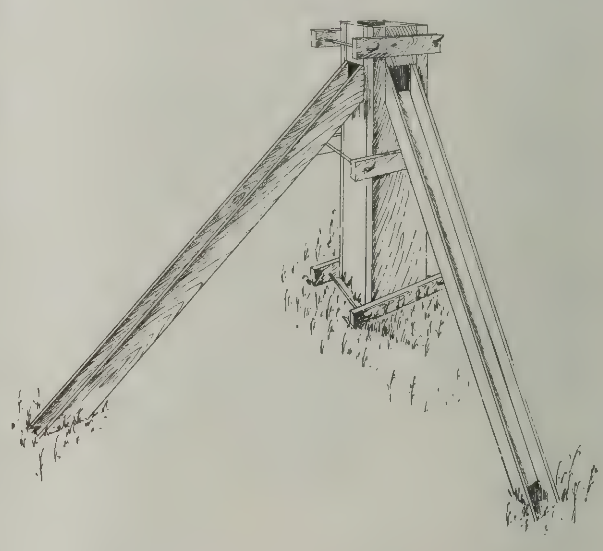


Fig. 3—"Forms" for One-Piece Post and Braces

Corner and Gate-Posts of Concrete

Massive Chinese Roofs

No one who has seen the Temple of Heaven in Peking or the tomb of Yung Lo, in the Valley of the Tombs of the Kings, can forget certain general impressions, writes Professor Dorsey to the Chicago *Tribune*. First of these is the massive roof, striking in color, majestic and stately in the sweep of its curves. Next is the idea conveyed by the columns which support this wonderful roof. Third, the impression of color on the ceiling and columns as seen from within.

After miles and miles of jolting over impossible streets to visit a dozen or more of the important temples of Peking, each a congeries of halls, one gets an idea that the Chinese love to build palatial structures merely to show what they can do in the way of a roof. For, after all, this is the first and last impression one carries away from each temple. The west builds roofs to keep out rain, or a place to dry clothes. Our roofs can't be seen and no one regrets it.

The Chinese roof can be seen, every inch of it. And there is little in China more worth looking at. This is certain—the Chinese architect considers the roof of his building half the battle; the artist considers it of the best color his science affords. For this roof, you understand, is always of tile; in all imperial buildings of colored tile. It may be a solid flame of yellow, it may be the purest cobalt blue, or green, a green which only Chinese tilemakers can secure. Or the body of the roof of blue may be inclosed within a broad border of yellow or green. I realize that these colors, especially yellow and green, don't suggest much to you, or at best a clash, something of the vulgar. We almost consider color immodest. But nothing could be farther from vulgarity or cheapness than the colorings of these roofs.

The curvilinear tiling of the corners of the roof may be a relic of the days when the Chinese dwelt in tents and hung the angles of the canvas on spears. But there is no proof of this and no knowledge of the Chinese other than as a sessile, agricultural people. Whatever its origin, it is difficult to conceive of anything more graceful than these recurving edges and curvilinear and tilted corners.

By tradition the architect must find outlet for most of his energy on the roof; therefore he is lavish in details which, while remaining fairly simple, serve to focus the eye. In the color of his tiles, in accordance with sumptuary laws, he expresses the rank of the owner or indicates that the edifice is an imperial foundation. The massive crest of the roof begins and ends with heads of monsters; its entire expanse, which may rise 3 ft. above the roof proper, bristles with dragons, phoenixes and other fabulous beasts. Smaller animals in tile are mounted along the ridges near the corners. To give variety the artist often doubles the roof, or even triples it, as in the circular temple within the Temple of Heaven inclosure.

Lavishing his energy upon the roof, the architect finds that he has built a structure of enormous weight, which makes a multiplication of great columns necessary. The columns are invariably made of wood; the shaft almost always.

The mechanics of the construction of a Chinese building is somewhat analogous to a modern American skyscraper. In the latter the skeleton is of steel filled in with dummy walls; in the former, the skeleton is columns and roof, of wood, the walls being filled in later with stone, more often with brick. But the walls do not contribute to the support of the roof.

Estimating Building Costs in Australia

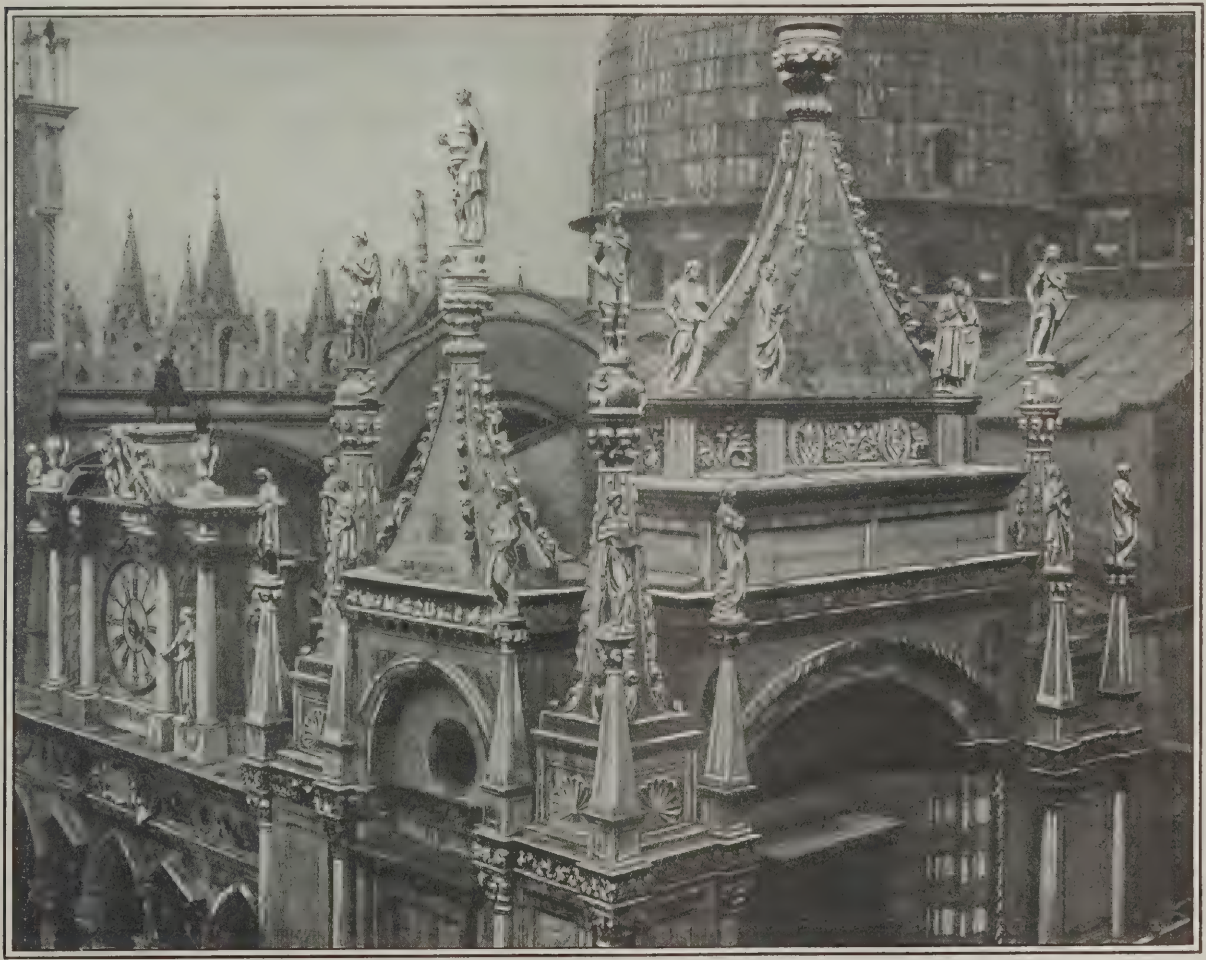
The custom of preparing estimates of cost in connection with building construction in Australia differs somewhat radically from that which obtains in this country. In Australia the practice of architects having plans of a building for which estimates of cost are required is to have the lists of quantities involved prepared by what are there known as "quantity surveyors." These lists instead of the plans are then submitted to the contractors for their figures of cost. In this way the bidders are only required to figure the labor and price of the quantities, thereby being relieved of the large amount of work of figuring a number of sets of plans for the one job that they may secure. This practice is also said to result in securing closer figures as each contractor bases his bid on the same quantities and eliminates the possibility of serious mistakes. The successful bidder is extended the privilege of checking the quantities from the plans before the contract is signed. The fee of the quantity surveyor is paid by the contractor from his first payment on the contract.

Ornamental Roofs

Two Striking Examples, but of Entirely Different Styles -- Both Involve Elaborate Decorative Detail

WE have taken as a most interesting example of the kind of work indicated by the above title the south end of the roofs of St. Mark's in Venice as seen from one of the windows of an apartment forming part of the picture galleries of the Doge's Palace, immediately above the "*Scala dei Giganti*"—the giants' staircase. On the highest landing of these steps the Doges were wont to be crowned, and close to the doorway was placed the lion's head, into which secret accusations were placed—taken by Napoleon to Paris, and never restored. The clock tower forms part of the façade of the north front of the court. To the right is a statute of the Venetian general Duke Francis Maria I of Urbino, by the Florentine sculptor, G. Bandini. It has an admirable façade on the east side, probably by Ant. Rizzo. In the center of the court are two cistern fronts, in bronze, of 1556 and 1559. The fine portal adjoining St. Mark's, by the Brothers Biron, 1439, in late Gothic style with Renaissance motives, is called *Porta della Carta,* from the placards which announced the decrees of the Republic here. In the tympanum is Justice.

The photograph from which the engraving on this page is made was taken by an English amateur with a hand camera. Photographic amateurs may be interested to know that it was made upon a film. Its interest to readers of this journal, however, is entirely as a piece of artistic roof construction. But, beautiful as it is, comprising antique statues upon every pinnacle and carvings on all the more prominent cornices and moldings, it is entirely unsuited to use in a climate where snow falls in considerable quantities every winter, and where freezing takes place regularly during cold weather. In a warm climate without a great range in the annual temperature, such a roof as this is perfectly legitimate.



View of the South End of Roofs of St. Mark's in Venice as Seen from the Doge's Palace

Ornamental Roofs—A Most Striking Example

Here we have a complex roof, decorated most elaborately with delicate carved work in stone, retaining its beauty and completeness, between three and five hundred years, the building having been commenced at the close of the 15th century but only partially completed. Even the details of the statuary, and the fine tracery in the stone work has not suffered as much as does exposed carved work in this country, in the course of fifty years. The reason for this does not perhaps seem clear without explanation. It is usually attributed to the character of the stone, and we frequently hear it said that it is impossible in these degenerate days to obtain such marble as used by ancient sculptors.

It must be borne in mind, as has been said, all the statues are antique, although they have been freely restored, except the one on the right of the clock tower, which is that of the Venetian general, Duke Francis Maria I of Urbino. If this same beautiful piece of work could be erected in New York, Albany, Buffalo, Cleveland or Chicago it would probably suffer more from the action of frost, ice and snow in forty years than it would suffer in Venice in a thousand years. The peculiarity of the greater portion of the American climate is that freezing cold frequently follows heavy rains or wet snow. The accumulation in the small crevices, or details of ornamental work expands on freezing, with a force measured only by the compressibility of water, and this to ordinary measurements is practically infinite. Small details then are split, and in time pieces are thrown off by this expansive action.

Another objection to this form of roof is found in the flat crevices which retain snow. When the snow melts and freezes, pools of water are formed in angles and various sheltered places, and every joint of the roof beneath is subjected to an actual water pressure. If, under these conditions, sharp frost comes, the expansive action of water is intensified many times over.

The object of the roof as an architectural feature was undoubtedly, first, to keep out the sun; next, the rain; then, the snow, and lastly, to retain heat. Like any other architectural feature, the character of roofs should differ with the climate of a country. Unfortunately, they don't. In snow countries where accumulations of from two to three feet may occur, and these may become saturated with water until the weight amounts to fifty or sixty pounds per square foot, we find roofs so flat as to differ but little from the horizontal. We also find in countries where the sunlight in the winter time is materially diminished that the overhanging cornices of the tropics are adopted as architectural features. The architects seek these features as novelties, forgetting that the climatic conditions ought to have greater weight than fashion. Ruskin said that in a snow country only sharp roofs should be tolerated. Roofs of themselves should shed the snow and prevent those complicated conditions which render flat roofs a nuisance during a snowfall.

Our second engraving shows another style of roof—being a part of the Chateau of Chambord.

It was designed to be a sort of temporary refuge for royal sportsmen, and was built for Francis I. Here we have a roof which has been imitated to some extent in buildings in New York. At first sight, it might seem philosophically correct and well suited to the climate, but a little examination shows the same over-abundance of fine detail, likely to be destroyed by the weather. In fact, the cornice of the wall, in front of the molding at its base, appears to have suffered severely. The cutting up of the roof by windows, and by chimneys set at an angle, is such as to make almost numberless pockets for the lodgement both of rain and of snow.

The multiplication of these features would in one sense fill a roofer with delight. The flashings would cost far more than the roof itself, but flashings, unless the roof be covered with metal, are hardly a protection against eight or ten inches of water, and there are a great many places where a slight snowfall would back up water on this roof to a very much greater depth than this. Fortunately, a mild climate has spared this beautiful edifice to modern times, in a comparatively uninjured condition; and yet on close examination of the engraving one finds cornices and moldings have everywhere been destroyed by the weather.

Another Style of Roof, Being a Portion of the Chateau of Chambord

Ornamental Roofs—An Example of Another Type

A feature of an apartment house just completed in the city of Cleveland, Ohio, is that each suite of rooms has a front porch 10 x 16 ft. and a sun parlor of the same size opening from the living room. There is a covered sleeping porch in the rear of each suite. The servants' rooms and butler's pantry are grouped in the center of the building entirely separated from the family portion of the suites, and there are extra servants' quarters and baths in the basement. Each tenant has an individual brick garage. The building is heated by the vapor steam system, and in the front rooms of the suites the indirect lighting system is used.

Double Sliding Garage Doors

Different Styles of Doors Used for Garages -- Some Details of Their Construction

By J. Gordon Dempsey

THERE are three different styles of doors used in the construction of garages. They are the double sliding door, the single sliding door and the double swinging-in door. This month we are giving illustrations and a specification for the double sliding doors.

The double sliding doors are the ones which are most used. For an opening greater than 8 ft. a single sliding door would be too large. Double swinging-in doors occupy too much space in their action and are therefore not as suitable for this use as the double sliding doors. There are many ways of constructing them, but the sections shown herewith are the ones which are more frequently used than any others. The design of the sash in the doors should be selected according to the design of the windows in the garage so that they will correspond. The size of the doors are made in accordance with the size of the opening through which the automobile will enter.

One-half of the cross-section as shown is taken below the center rail and the other half above the center rail of the door. The widths and thicknesses of the rails are made in accordance with the size of the door. The following are good suggestions to follow: Bottom rails, 10 or 12 in.; center rails, 8 in.; top rails, 8 or 10 in.; side rails, 8 or 10 in., and center rails, 8 in. The thickness of the rails should be not less than 2¼-in. stock or more than 3-in. stock. The vertical side and center rails are also known as stiles to distinguish them from the horizontal rails. The center rail is also called the lock rail, as it is designed to lock the parts together.

The designs shown in Figs. 1, 2, 3, 4, 5 and 6 are of doors in which there are no swinging sash or wicket door, while the styles represented in Figs. 7, 8 and 9 have both the swinging sash and wicket door. In Figs. 10 and 11 are shown doors in which swinging sash are used. Fig. 12 represents the design of a door made of ceiling strips and having a wicket door.

The designs represented in Figs. 1 to 6 inclusive can be used with the vertical and horizontal sections shown in Figs. 13 and 17 or with Figs. 16 and 20.

The designs shown in Figs. 7, 8 and 9 can be used with the vertical and horizontal sections shown in Fig. 14 and Fig. 18.

With the styles indicated in Figs. 10 and 11, the upper parts of the sections in Figs. 14 and 18 with the swinging sash are used, and the lower sections of Figs. 13 and 17.

The vertical and horizontal sections shown in Figs. 15 and 19 relate to doors composed of ceiling strips but having stationary sash with diamond shaped glass near the top.

The following are the specifications for the double sliding doors:

All doors will be made to the sizes as shown on the plans and as per details. The frame of the doors will be made to the widths and thicknesses as shown and are to be of kiln dried white pine, yellow pine or cypress. A few small red knots will be permitted. Side and

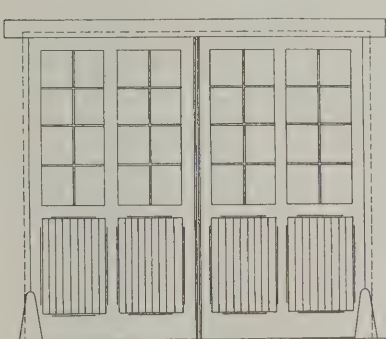


Fig. 1.

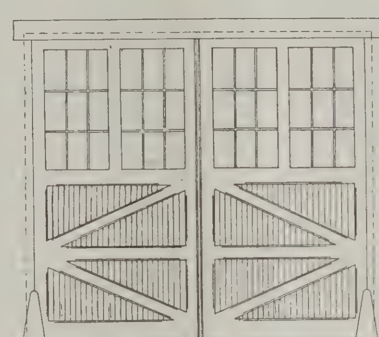


Fig. 3

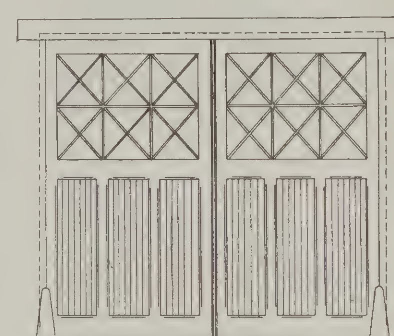


Fig. 4

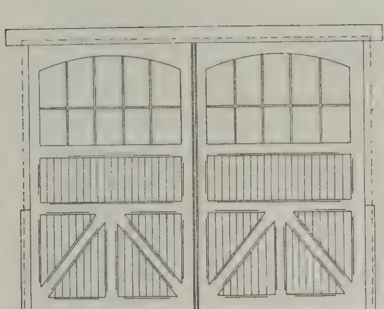


Fig. 2

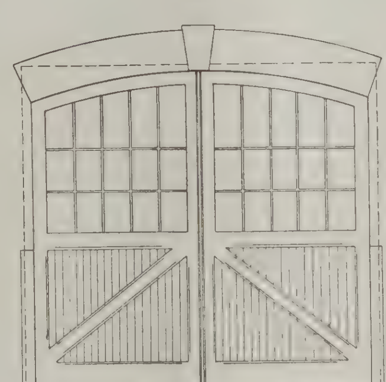


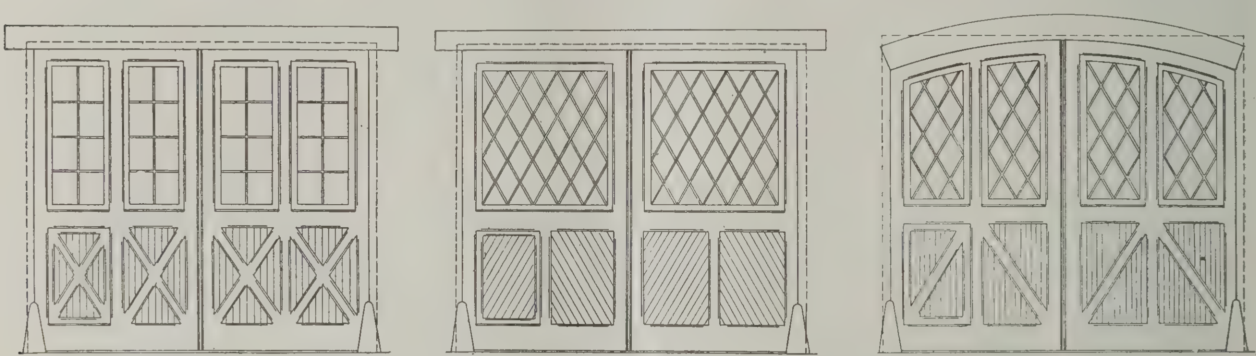
Fig. 5

Fig. 6

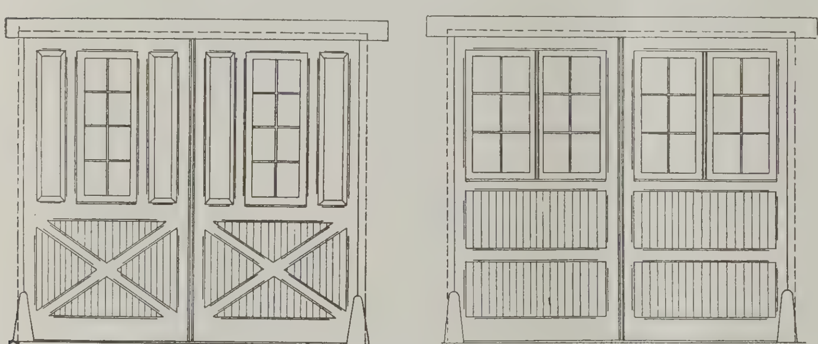
Double Sliding Garage Doors—Designs of Doors in Which There Are No Swinging Sash center rails to be mortised and stubbed to receive horizontal rails. The middle and bottom rails will have a double tenon running through the side and center rails with a stub tenon between; all joints to be neatly and tightly made. All doors to be put together with pure white lead, drawn, bored, pinned and wedged. Panels to be made of ⅞-in. x 3½-in. matched and beaded clear white pine ceiling put together and set in place in the frame with pure white lead.

All rails to be neatly chamfered as shown. The swinging sash in doors will be made of clear kiln dried white pine or cypress of 1¾-in. stock properly mortised, tenoned and coped, and put together with pure white lead in a thorough and workmanlike manner.

All rails and muntins to be of the sizes called for by the details. Meeting rails shall be carefully and properly fitted together and shall be strongly dovetailed to side rails. Particular care shall be taken in forming the rebates for the glass to obtain a true and uniform bed for the glass. In figuring glass and sash sizes 1/16-in. clearance has been allowed for each light.



Figs. 7, 8 and 9—Designs of Doors in Which There Are Both Swinging Sash and Wicket



Figs. 10 and 11—Doors in Which Swinging Sash Are Used.

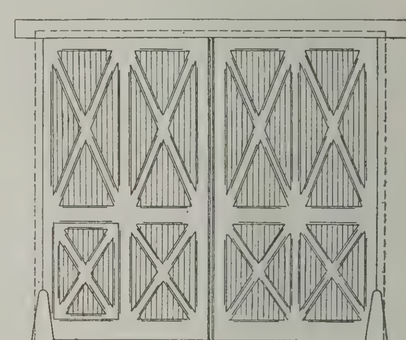


Fig. 12—A Ceiled Door with a Wicket Door

Double Sliding Garage Doors—Elevations of Various Styles

All doors unless otherwise specified or noted shall be given a good priming coat of pure white lead mixed with pure linseed oil applied at the shop. Rebates for glass must be thoroughly primed and in suitable condition for puttying. When sash are ordered glazed the glass shall in all respects be up to the quality specified. Glazing to be done in a neat, thorough and workmanlike manner with all glass properly sprigged, well bedded and puttied, using the best grade of linseed oil putty.

Painting Cement Buildings in Germany

According to information obtained from builders and architects, the principal precautions taken in northern Germany to prevent the peeling of oil paints is to defer their application until the cement is quite dry. When it is intended to apply color on outside walls which are still damp, water paints are used which are weatherproof and which can be washed if necessary. These colors, necessarily, are not impervious to moisture.

In his textbook for 1910, Dr. Glinzer, director of the State Building School in Hamburg, says that to make oil paint adhere to cement the surface of the material should be coated with diluted sulphuric acid (1 part concentrated acid to 100 parts of water), which afterwards must be washed off and the surface allowed to dry. Or the surface may be covered with diluted silicate of soda (wasserglas), the solution to be 1 to 3 or 1 to 4, and applied three times in succession. Still another method is to apply two coats of building "fluat" at least 24 hours apart. Practical builders state, however, that the applications of sulphuric acid are not made by them, and that such success as they have results merely from careful work and the use of good materials.

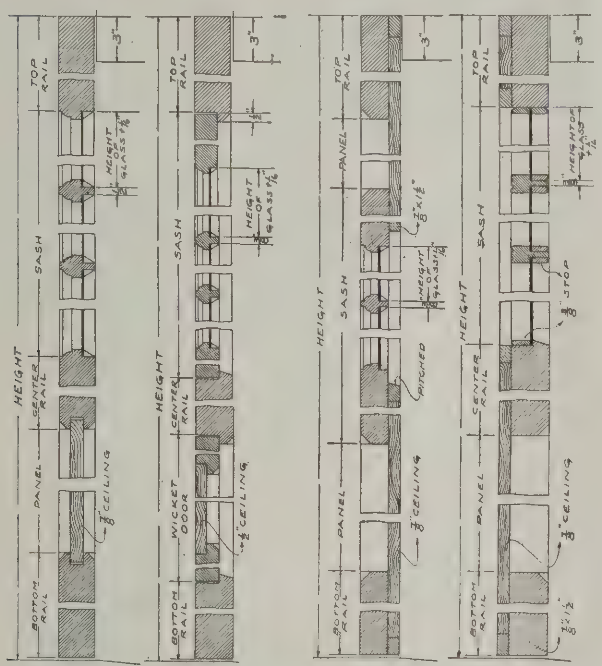
Dr. Glinzer also says that oil paint should be applied to cement in the following manner: The surface is given one coating of linseed-oil varnish, to which is added a first coat of white lead when the varnish is dry. A second coat is then added, also containing white lead, together with more or less coloring matter, as the building laws forbid the use of absolutely white paint on the exterior of structures. In this climate the use of oil paints is recommended, as they are waterproof and present smooth surfaces which attract a minimum of dirt. Painting according to this method costs here about 10 cents per square yard.

Applied to iron, linseed-oil varnish when used by itself flakes off readily. It should be thoroughly mixed with red oxide of lead, caput mortuum, or other graphite. This mixture serves as a first coat after the perfectly clean and dry surface has been gone over with the ordinary hot linseed-oil varnish. When the dead color has dried, another coat of the color desired is applied. The oil, being partly converted into resin, combines with the coloring material, making a thick coating that is the more impervious to water accordingly as the color is finely ground or not. Lead should be used when the paint is exposed to water.

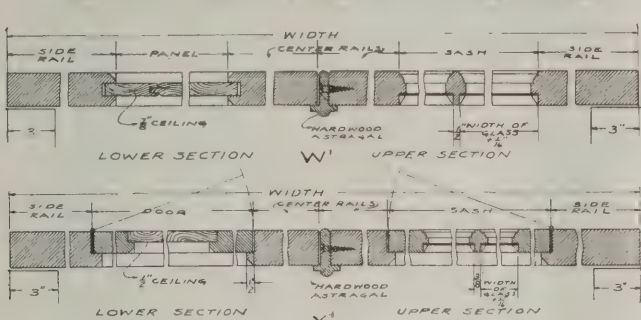
The water colors so frequently used in Germany as a rule have silicate of soda as their base. These colors can be used on cement, plaster of paris, brick, or glass. Liquid casein paints are easily worked and are said to be durable. The discoloration of cement buildings results very frequently from the class of cement employed rather than from the color applied afterwards.

Jointer Accidents in the Woodworking Industry

According to statistics compiled by the Industrial Commission of Wisconsin there were 60 jointer accidents during the 12 months ending September 1, 1912. Of the 60 accidents reported, 36 caused permanent disability, either by the loss of one or of several fingers. It is also interesting to note that 36 accidents occurred on unguarded jointing machines, while 24 occurred on guarded jointers.



Figs. 13, 14, 15 and 16—Vertical Sections Through the Doors



Figs. 17 and 18—Horizontal Sections Through Doors with and without Swing Sash

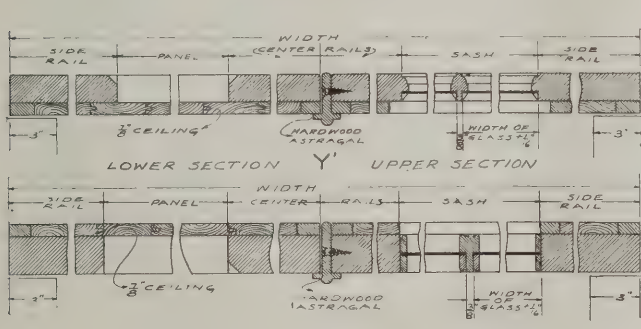


Fig. 19—Horizontal Section Through Door Shown in Fig. 15
Fig. 20—Horizontal Section of Doors in Figs. 1 to 6

Double Sliding Garage Doors—Vertical and Horizontal Sections—Scale 1 In. to the Foot.

The facts clearly show the great danger to which the operators of these machines are constantly subjected and it is evident that rigid inspection should be made of all jointers to see that the safety orders regarding safety cylinder heads and guards over the knives are complied with. In 36 of the 60 cases reported it was stated by the employer that the machine was not guarded in any way at the time of the accident. In 12 of the 36 cases the machine was equipped with a guard but it had been removed for some reason or other at the time of the accident.

It is further evident from the reports that not all employers are familiar with the safety orders on jointers. In two cases the reports stated that it was impossible to provide a suitable guard. Accidents on this class of machine when equipped with guards in compliance with the safety orders ought to be almost wholly eliminated, as the safety cylinder head makes it impossible for an operator to have his fingers cut off.

The statistics compiled, however, show that guards when provided and used do not altogether prevent accidents, for in 10 cases fingers were cut off on supposedly guarded machines.

Building Construction in Mexico

The walls of buildings on the Mexican plateau are too soft to retain permanently driven nails, but this condition is overcome in the case of wainscoting, door trim, baseboards, etc., by inserting wooden studding and leaving the outside surface flush with the wall. This studding serves as a base to which to nail the other woodwork. The ordinary adobe construction consists of a sun-dried brick of various dimensions, the largest size being 14 in. wide and 3 in. thick. The earth from which they are made is strongly impregnated with lime which is pulverized with a heavy hoe and then water is added. When brought to a proper consistency straw is added, and the mass is then molded in a wooden frame, and when sun dried is ready for use. The cost of making adobe varies all the way from $3.75 to $6.25 (gold) per thousand. Masons charge $5 to $10 (gold) per thousand for laying them in the wall, but when properly made and laid they last a long time, there being adobe houses in Saltillo that have been in use for more than 150 years.

In adobe houses the wall finish is a cheap plaster made of fine sand and locally burned lime. It is then given a finish of whitewash.

The ceiling is ordinarily made of cloth which comes in bolts containing 27⅓ yards in length and about 23⅔ in. wide. The cloth is finished in the same design as the walls.

In writing from Saltillo, Philip E. Holland states that there are a number of stone and brick buildings in that city, some of which are of recent construction and built on modern lines. Most of the interior wall construction is solid and very little lathing is used. There are no houses constructed entirely of wood in Saltillo, but there are a few ironclad with wooden finish inside.

Carpenters, painters and masons earn 50 cents to $1.25 (gold) a day and their helpers 31 to 37 cents a day, 11 hours constituting a day's work.

While this may appear to be very low wages, they are about the same as in the United States when the labor conditions are taken into consideration.

Cabinet Work for the Carpenter

How the Clever Mechanic Can Furnish the Home During Off Days -- Some Articles Which Have Become a Necessity

By Paul D. Otter

WINTER interests and outside occupations are frequently interrupted by weather conditions, and, as the various holidays come and pass, suggestions enter the mind of the many things which might be made—articles not only highly essential but many which might be classed as luxurious comforts were we to buy them for our own use. The purpose of this article, at what may be termed the shut-in time of the year, is to consider a few of the many pieces of household equipment which partake more or less of the nature of gift pieces—the things which the housewife would like to have you make for her; features to the home which aid her to plan and make it attractive and modern.

I am writing intimately on this subject, for there has just been a decorative upheaval in one of the living rooms, and before the paperhangers had cleaned away their sticky mess feminine desires called for another bookcase of special size to house the many books which had accumulated, so not a few fragments of evenings and Saturday afternoons were used to bring about this particular piece of furniture.

I think the cedar chest and the bed box will be the most desired and needed, whether the home be amply provided with closets or store room or is so compact that the space under the bed must be used. Whether it be entirely true that red cedar repels moths and insects, the wood itself has enough virtues in its color and markings as well as lightness to recommend it for a storing chest for woolens and furs.

Little need be said to the carpenter about its construction, as it is simply a box of the acceptable form and size, the parts of which may be assembled by the usual box construction, or more elaborate joining may enter into it. Whatever the method, be it dovetailing, mitering or lap-jointing the corners, a small triangular strip set in glue around the inner corners helps the finish, while frequently the outer corners, as shown in Fig. 1, are given an added finish by bending a heavy plate of brass to fit the corners. A simple scroll or other ornament may be filed out or cut on the jig saw, according to taste.

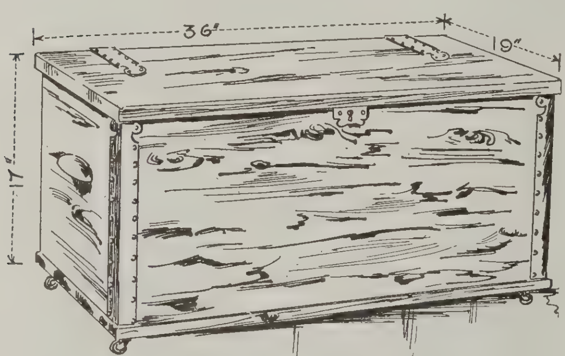


Fig. 1—A Cedar Chest

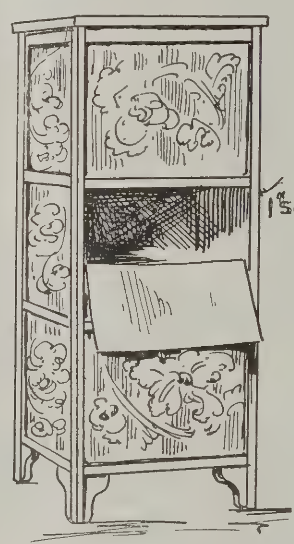


Fig. 4—Stand for Millinery

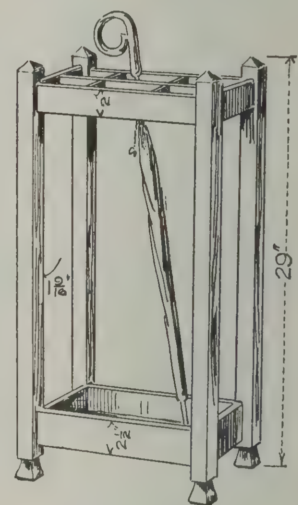


Fig. 5—An Umbrella Stand

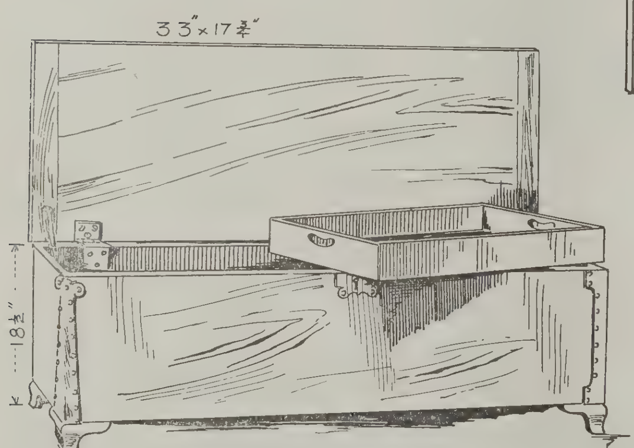


Fig. 2—Cedar Chest with Sliding Tray

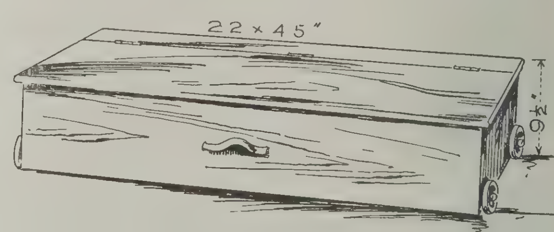


Fig. 3—An Under-Bed Box

Cabinet Work for the Carpenter

As our experience with the cedar chest partakes somewhat of the revival of the old dower chest, much license and personal whim may enter in the final ornamenting by brass bands, hinge plates or some decorative escutcheon plate.

Another size of chest than that shown is 24 in. high, 24 in. wide and 48 in. long; still another is 17 in. high, 16 in. wide and 32 in. long.

The more modern Utility Box is of the same shape and proportions as the cedar chests but smaller and lighter, being

14 in. high, 15 in. wide, 27½ in. long.
15½ in. high, 16½ in. wide, 32 in. long.
16½ in. high, 19½ in. wide, 36 in. long.

These are for ladies' shirtwaists and other apparel of a light character.

In Fig. 2 is shown a light sliding upper tray about two-thirds of the length of the chest and 3 in. deep. This sets on a neat strip secured to the inside of the chest, the material of the tray being ½ in. in thickness.

Living in flats or small homes will soon create a desire for more storing space and the under-bed box offers a very ready means of laying away ladies' skirts or any other long garment. With the small wooden wheels projecting slightly over bottom edge of box, it may be drawn out very easily from under the bed by axle being driven into a tight hole in the ends of the box. An offsetting wood washer should be placed between the wheel and the side of the box.

One thing suggests another, and to provide a proper place for ladies' hats Fig. 4 will be given the greatest consideration in a lady's bed room, for in the three boxes she may find ample space for the modern hat. What the size of these boxes shall be no man will ever know, but make them big enough; that is, the stand, for it consists of four 1-in. posts, two center boards and top and bottom fitted as shown. As to the boxes, they should be three of the same size pasteboard boxes

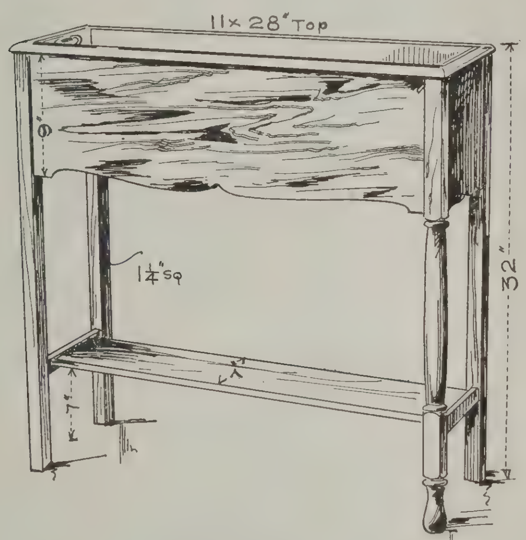


Fig. 7—A Plant Stand

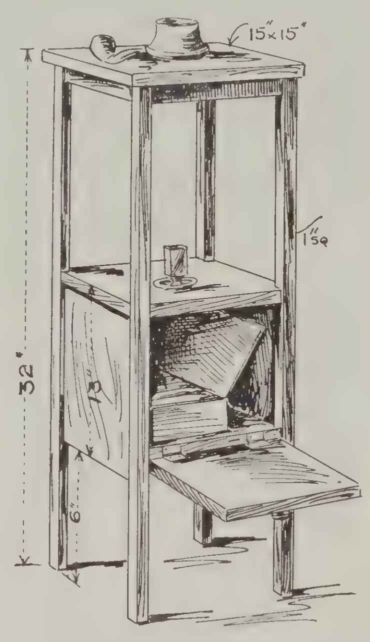


Fig. 10—A Smoker's Stand

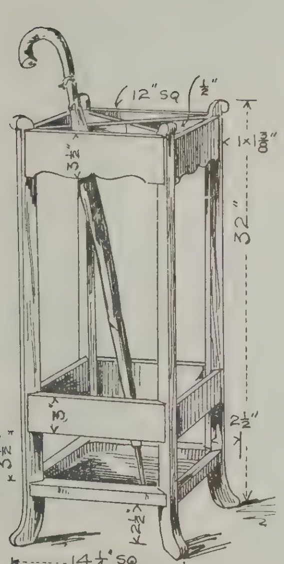


Fig. 6—An Umbrella Stand

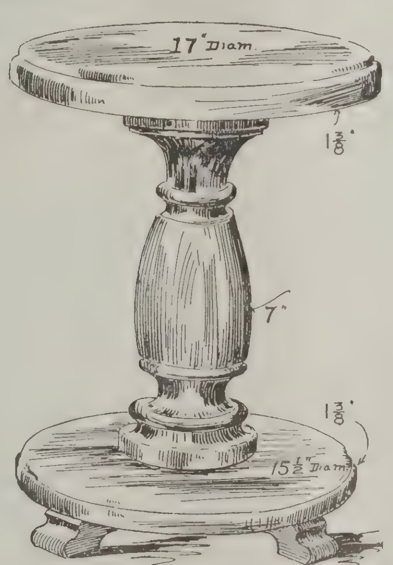


Fig. 8—Lamp or Plant Stand

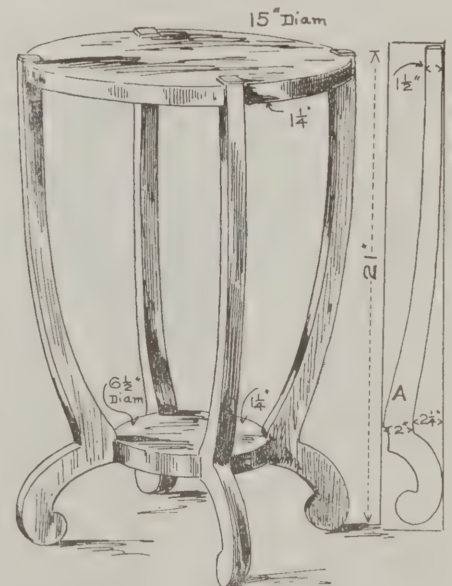


Fig. 9—A Small Stand

Cabinet Work for the Carpenter

means of a handle secured to the front panel. Cedar may be used for this also, but as it is not on dress parade other woods, such as pine, sycamore or basswood can be used, and with careful surfacing of the boards and final smooth sanding, such a box may represent good carpentry just as well in inferior wood as if it were in mahogany. The wheels are either sawed or turned to 4 in. in diameter and ½ in. thick, provided with a ⅝-in. hole, through which is passed a short wood axle with a round button head, the end of the covered on the outside with a figured cretonne. The stand may then be made large enough to permit of the boxes being set in and taken out readily. Oak, mahogany or white enamel finish will create a very attractive article of furniture when completed.

A place for umbrellas eventually becomes a necessity, and Figs. 5 and 6 represent two forms. This is one of the many objects which also prove an acceptable gift. Fig. 5 is 12½ x 14 in. and 29 in. high, outside measurement, while Fig. 6 stands within 14 in.

square and is 32 in. high. The posts are set at an angle of 45 degrees with the sides.

The shape of the posts which are secured from stock dressed 1 in. thick and the curve of the foot contained within a width of 2½ in., should be laid out on paper and a patetrn drawn and cut out. The lower framing in each style, Figs. 5 and 6, contains a light galvanized iron or copper drip pan, which can be made to fit.

Another form of furniture which the winter months suggest as quite necessary is some orderly place to hold the plants which we desire to have. Fig. 7 admits of a very simple treatment, as shown in the three home, and Fig. 8 or a similar form of tabouret stand enhances greatly the furnishing of a room. With a top 17 in. in diameter and the base 15½ in. the shaft should be turned out of solid or glued up stock, not less than 7 in. square. The four feet are sawed from 1¾ in. stock 2¾ in. wide, and are fastened to extend 1¼ in. beyond the base.

Fig. 9 is within the ability of those who are not equipped with a turning lathe to turn such a pattern

Fig. 12—A Music Cabinet

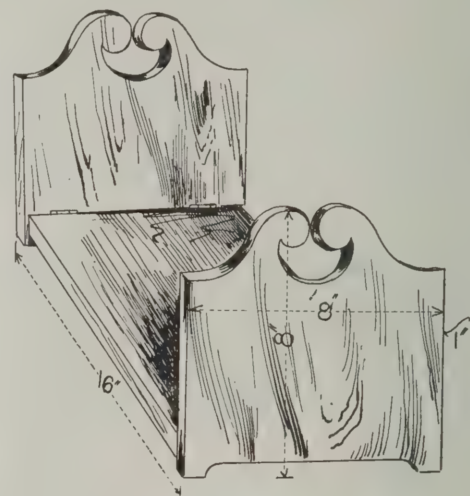


Fig. 13—A Book Rack

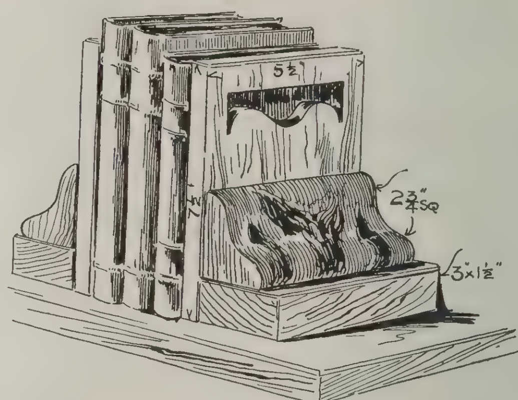


Fig. 14—Book Blocks

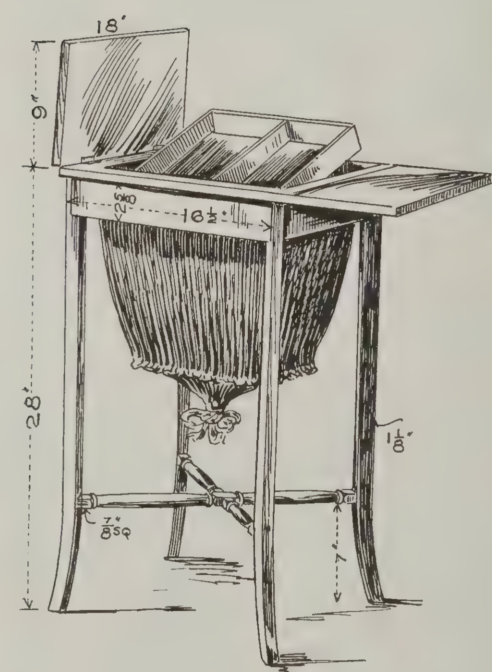


Fig. 11—A Sewing Stand

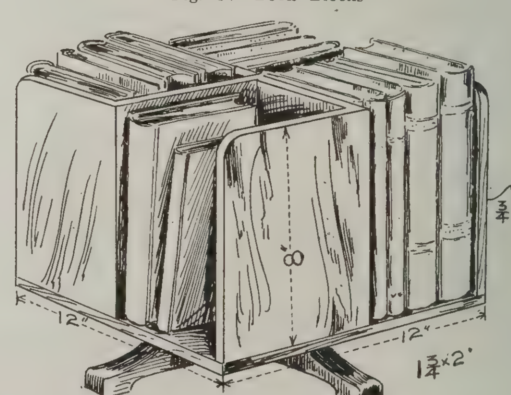


Fig. 15—A Revolving Book Holder

Cabinet Work for the Carpenter

plain Mission style of posts, or they may be given an Early English turned form as suggested. A loose fitting galvanized pan should be made, provided with lift-up rings at each end. Oak with the customary finish is the usual wood for this article, although it is very attractive made in basswood and enameled white or old ivory.

A beautiful fern or rare plant is to be found in every as shown in Fig. 8. In Fig. 9 the four posts are marked from a pattern drawn out as shown at A within a width of 4¼ in. It may be marked out on a board 1¼ in. thick, dressed, and two legs secured in a length of 32 in. The view of the stand shows the form of construction. It might be suggested that jointing with the lower shelf should be by the use of a ⅝ in. dowel with the greatest length passing slantwise through the cross grain of the post. This would insure strength at a point that is considerably cut into. The pattern is offered as an expression of the very popular Colonial type.

A man of tools seldom gets an opportunity to make anything for himself, but it may be barely possible that he can slip in at odd times a smoker's stand to care for his smoking outfit. Fig. 10 is a simple form which can be elaborated on if desired. It is 32 in. high and stands within a square of 13½ in. The construction is evident and requires no explanation.

The English sewing stand shown in Fig. 11 is another gift piece which spare moments may bring about and afford an immense satisfaction not only to the recipient but the giver in making it. The posts of 1⅛ in. dressed stock are placed diagonally to the frame and a top frame is secured over all to which are hinged two panels, which, when closed, form the top. A removable tray as shown sets over a small cleat on inside of apron. Below this tray is tacked the bag to contain dress work and materials. The two table tops when open may be supported by a very thin swing out bracket hinged to the table legs and fitting under the center table frame.

For the proper care of sheet music a cabinet should be provided. Fig. 12 illustrates one form which is very simply made, using in connection with the 1¼ in. square posts, boards ¾ in. thick throughout, or making up ⅞ x 2 in. front door frame, and putting in a thinner panel having some particularly fine marking, or figure, or inlaying some simple square or diamond of lighter wood as a distinctive feature. The bottom consists of a board shouldered out to receive the corner posts and the sides and back are secured to it by sunk screws and glue corner blocks. The back may be made up of basswood into a paneled frame like front door. The disposition of shelving is much to be decided by personal needs and ideas and in view of the prevalence of automatic piano players and phonographs, some thought might be given to spacing for such records.

Little need be said of the three forms of book holders except that they suggest quickly made articles for friends, or the various members of the family, for the holding of choice personal and often used books. From their size some cherished piece of wood may enter into the construction, and in the making and after finish develop some hidden beauty of color and grain.

Fig. 14 is an instance of some simple form in which rare grain marking often occurs when wood is worked into a simple undulating surface. The three blocks when fitted and glued up form the end of a book support which is simply used for a few favored books on one's sitting room table. Fig. 13 shows a colonial treatment of a common form of rack. Fig. 15 is a revolving book holder built on the plan of an Indian "Swastika" over a 12-in. square base board which revolves about a central pin or bolt with a washer, held to a base as shown. This offers a very convenient holder for certain books which come in sets, or for the student who uses several books which he desires to have at hand.

Code Governing Builders' Estimates

A Movement Looking to a More Uniform Practice in the Preparation of Builders' Bids on Contracts

THE members of the Builders' Exchange at Canton, Ohio, have taken up the matter of builders' estimates and the manner of receiving bids on work prepared by architects and others, and at the October meeting of the organization adopted a code covering the conditions under which the members are willing to submit bids for work. It is well known that it is extremely difficult, if not impossible, for contractors to figure on some plans, owing to the incomplete details and specification work, the result being that the contractor either is too high in his figures because of making allowance for further details, or else he fails to consider that question at all, and as a consequence is unable to finish the job without subjecting the owner to a great deal of bother and expense in the way of "extras."

The code adopted by the Canton Builders' Exchange looking to a more uniform practice is as follows:

Plans

1.—Drawings prepared for final or competitive estimates must be sufficient in number and character to represent the proposed works clearly and shall be to a scale of not less than ⅛ inch to the foot, and preferably ¼ in. (except block plans), and be rendered in ink, or some permanent process, colored, figured and otherwise marked in such a manner as to clearly show all kinds of material to be used, thickness of walls, etc., in the construction.

When to ⅛-in. scale, figures giving dimensions shall be added.

Details

2.—Proper details must be furnished for work that is not otherwise sufficiently shown, not less than ¾ in. to the foot, except those of an intricate nature, which shall be 3 in. to the foot.

Full-sized details which are furnished to contractors for any part of the work must conform identically with the smaller details shown on the original plans. Any variation from the same which entails an additional expense on the part of the contractor shall be paid for by the owner at cost of same plus 10 per cent., and any such additional cost shall be agreed upon by the owner in writing and countersigned by the architect.

Specifications

3.—Specifications must be in ink or typewritten. They shall be definite where the work is not clearly shown by the drawings. Every distinctive class of work to be included in the contract must be mentioned and placed under its appropriate heading.

4.—The phrase usually found in specifications at the close of each particular branch of the work specified which reads as follows: "Furnish all material under this head necessary for the full completion of the work whether shown on the plans or called for in the specifications or not," is requested to be eliminated from architects' specifications, as the same is misleading and the cause of much dissatisfaction between contractors, architects and owners, as it sometimes causes architects or owners to demand things that are unreasonable and unjust and practically does away with any limit to such demands.

Restrictions to Sub-Contractors

5.—Contractors must be notified at time of estimate if they are to be restricted in the employment of sub-contractors. Contractors are not to be held responsible for the work of sub-contractors employed on request of owner.

Notice for Opening Bids

6.—Before opening bids the bidders shall be notified of the time when and the place where the bids will be opened, and in the presence of the attending bidders. Specifications must state when and where bids are to be submitted.

Percentage on Sub-Contracts

7.—Contractors shall be allowed a compensation of 10 per cent. on all sub-contracts which at the time of estimating are "reserved," or not called for in their portion of the specifications, but which may be assumed by them by request of the owner or architect, after the bids have been received and opened. Contractors shall not be denied contracts upon the work covered in their original estimate on account of declining to assume the aforesaid reserved estimates.

Sub-Contracts

8.—A contractor who may refuse to become a sub-contractor shall not thereby forfeit his right to the award.

Award

9.—When work is to be let for which estimates have been solicited, unless previous notification to the contrary has been given, the lowest invited bidder shall be entitled to the contract, and all minor changes shall be agreed upon with him, provided his prices are equitable.

If radical changes are made, the whole competition may be reopened.

Bidders must not be allowed to amend their estimates after the bids have been opened and before the award.

10.—Bids shall be binding upon the bidders for not more than sixty days.

11.—No payments on contracts shall be less than 90 per cent. of the value of work done and material delivered, the remaining 10 per cent. to be paid within 30 days after the completion of the contract. Sureties will be furnished by the contractor if so required by the specifications.

12.—This exchange desires it to be understood that we wish to work in complete harmony with all architects who may do business in Canton, and we invite their criticisms and suggestions at all times. We feel that there should be a closer understanding between architects and builders, and this can only be accomplished by working together in harmony and becoming acquainted one with another.

13.—The "Uniform Contract" adopted by the American Institute of Architects, the Western Association of Architects and the National Association of Builders is recommended.

Yellow Pine Timber in Building Construction

Shrinkage, Checks and Quarter Sawings -- Anchorage of Beams in Brick Walls -- Hints on Framing

BY JOHN S. EDMUND

THE trees from which most of our timber is taken are of two kinds, the "broad leaved," including the oak, chestnut, poplar, maple, etc., and the needle leaved, including the pines, cedar and fir. The Georgia or long leafed yellow pine of the needle leaved variety is used in "mill construction," sometimes called "slow-burning," for girders, trusses, floor plank, etc., and is the most popular wood in use for this purpose.

It grows in extensive forests in the coast region from North Carolina to Texas, which makes it very convenient for shipping, and yields very hard, strong timber which can be obtained in straight pieces as large as 60 ft. It increases in diameter as well as in hight each year and the age of the tree may usually be determined by counting the concentric rings. These rings are due to the fact that one layer of wood is formed each year on the outside of the trunk and branches underneath the bark. For this reason the rings or layers are called "annual rings." The sap rises in the spring from the roots of the tree to the branches and twigs forming the leaves, and in the autumn it flows back again, forming the wood and bark. Thus a new annual ring is formed.

These rings vary in width according to the position or location in the tree. The widest rings are found nearest the center and grow narrower as they reach the bark. The rings follow the outline of the tree trunk. The lines which run at right angles to the annual rings are called "medullary" rays. The fibers which form the medullary rays bind the whole together.

The wood nearest the center or pith is considerably harder and darker in color than that which it on the outside nearer the bark. It is called the "heartwood" to distinguish it from the other, which is called the "sapwood." Only the heartwood should be used for building purposes. The reason it is harder than the sapwood is that it is older and has become compressed more and more each year as the tree has been increased in size and the pores have gradually become filled up. The sapwood is soft and of lighter color and shows that it has been recently formed.

When a piece of wood shrinks, the diameter alone is taken into consideration, as the length is often a hundred times or more as great as the diameter, and the effects of the longitudinal shrinkage is unappreciable. All wood shrinks more in a tangential direction or around the rings than in a radial direction, and all phases of woodworking is effected by this tangential shrinkage. The external parts of the wood shrink the most and the heartwood very little, causing the wood to split in radial lines from the center as shown in Fig. 1. It, however, keeps its original diameter. Cracks or checks undoubtedly have been noticed by every reader, as shown in Fig. 2, in beams and columns, and where the same are very heavily loaded care should be taken in selecting the timber, as they sometimes seriously impair the strength.

A log if cut into four square pieces with one corner in the center will shrink as shown in Fig. 3. The distance *a-b* will remain the same, but the timber will be no longer square. Care should be taken in selecting small size columns and other exposed timbers which have been cut this way, as the warping and twisting take away their good appearances.

Figs. 4, 5, 6 show different methods for cutting planks from logs. Fig. 4 is known as quarter sawed lumber. The log is first divided into quarters and the planks are cut as shown. The method shown at *A* is the best.

All the planks are cut radiating from the center and there will be no splitting and warping. A fairly good method is that shown at *B* where the planks are pretty nearly in radial lines and may be cut out much more timber thoroughly dried out before it is used. After it is thoroughly seasoned it will not warp unless it is allowed to absorb more moisture. All wood that is to be used for fine work where any warping after it is in place will spoil the appearance of the whole job must be so seasoned either in open air or in a specially prepared kiln.

The approximate shrinkage of yellow pine timber is about 4 per cent., which is the radial and tangential shrinkage taken together and averaged.

In Figs. 8 and 10 is illustrated a beam at the wall showing the correct anchorage and fire cut of the same. The drawings of cross sections of buildings very often show the beam resting on a blue stone block or plate, with ¾-in. diameter straight rods averaging 24 in. long for anchors, and the fire cut where the bearing of the beam is 8 in. is shown beveled anywhere from 2 in. to 6 in. which is a very bad violation of both the building codes and fire insurance laws.

The following are some extracts from building codes of various cities on this particular point:

"The ends of all beams shall be so shaped or arranged that in case of fire they may fall without injury to the wall."

"The beams shall be beveled back from the bottom to the top so that the top does not enter the wall."

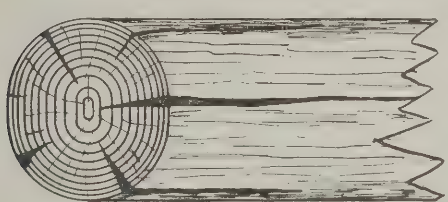


Fig. 1

Fig. 2

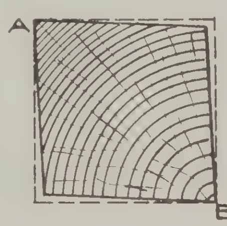


Fig. 3

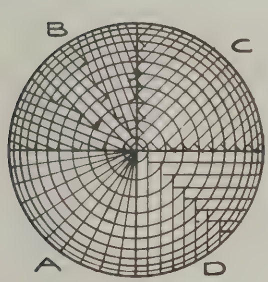


Fig. 4

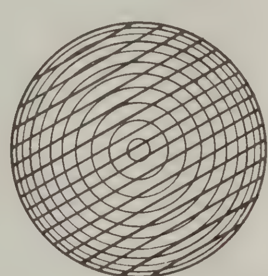


Fig. 5

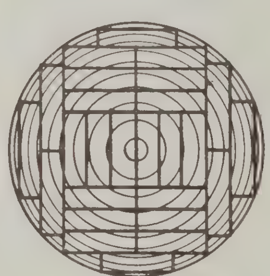


Fig. 6

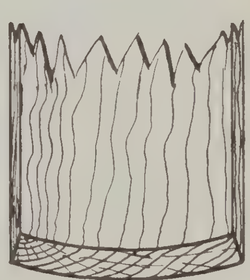


Fig. 7

Yellow Pine Timber in Building Construction—Showing Quarter Sawing, Also Effects of Shrinkage

easily than those shown at *A*. The method shown at *C* is a common one and leads to fairly good results although only the plank at the center is on a radial line. It is practically as good a method as that shown at *B* and is much more simple. The method shown at *D* is not so good as shown at *A-B-C*, planks cut this way being very liable to warp and twist. If the silver grain caused by the cutting of the medullary rays is desired, the plank should be cut as at *A* or *B*. In quarter sawing there is very little waste and most of the boards are cut at right angles to the annual rings. This method costs a little more as it takes more time to saw the lumber, but it possesses advantages which more than compensate for the extra cost.

Planks may sometimes be simply sliced from the log as shown in Fig. 5 without first dividing it into quarters or may be cut as shown in Fig. 6. These are the worst possible ways to cut them, as the plank which is not at right angles to the annual rings will naturally shrink and cause the plank to curl up as shown at Fig. 7. It is almost impossible to flatten them out again and they cannot be used as they are. The only way in which warping can be prevented is to have the

"Beams built into walls of masonry shall be beveled at an agle of 45 deg. from the injunction of the wall and the upper edge of the beam."

"Beams built into brick walls shall be beveled off to 45 deg. to the full extent of their bearing capacity."

"The wall end of timbers shall be beveled off and secured only at the bottom so that they may fall out easily if burned, and not pull down the wall."

The brickwork should be kept at least ½ in. away from the beams so as to prevent dry rot. The corbeling around the beam end should be built as shown. There are many different designs of wall boxes on the market, both patented and unpatented, which serve the same purpose. The value of a wall box is demonstrated where the openings in the walls are to be left for future beams of additional buildings to be built later on. Wall boxes are also used a great deal in running up brick walls when the yellow pine timber is delayed to any extent.

Fig. 9 shows the method of making an extension to a building where the beams are supported on wooden girders. The original building is marked present and the new extension is marked new. The following data and dimensions were made at the time of an extension to a three-story mill building. A wooden temporary end was located at this point and was removed to the temporary end, of the new extension. At the time the original building was constructed the floor timbers were framed 2 in. higher at the columns or at the center of the building to allow for shrinkage. Two years later at the time the new extension was made the actual shrinkage between the bottom of the 10 x 16-in. yellow pine girder and the top of the ⅞-in. maple floor plank was found to be ⅞ in. To make the floor levels the same after the shrinkage in the new timber had taken place, the new building was also framed 2 in. higher at the columns so that the new floor plank projected above the present ⅞ in. An additional 6 x 10-in. yellow pine beam was placed at this point to carry the new floor plank, otherwise they were spaced 7 ft. center to center. The piece *A* was placed at the point of injunction of the new and old floor plank and was removed later on after the shrinkage of the new timber nearly equaled that of the original.

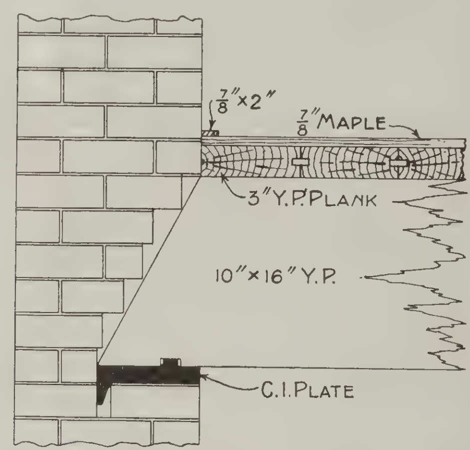


Fig. 8—Anchorage and Fire Cut of Beam at a Wall

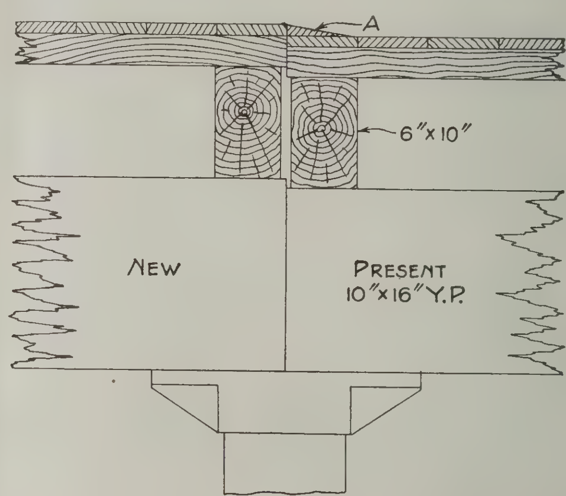


Fig. 9—Making an Extension to a Building Where Beams are Supported on Wooden Girders

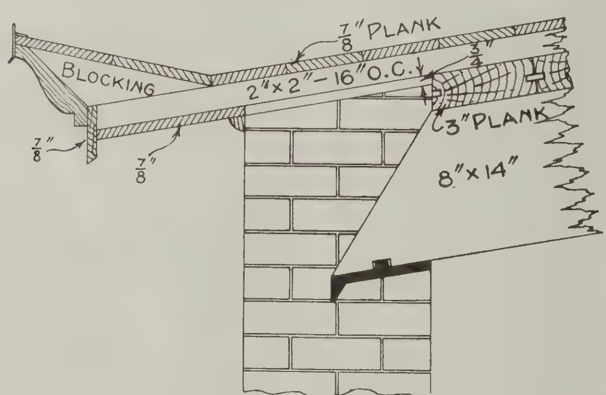


Fig. 10—Another Example of Anchorage of Beam at Wall

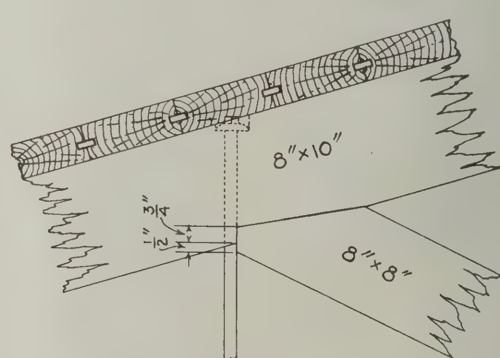


Fig. 11—Proper Method of Making Joint Between Brace and Upper Chord of Truss

Yellow Pine Timber in Building Construction

The framing at the center of all buildings having wooden columns and beams should be framed at least 1 in. to 2½ in. higher than at the wall, to allow for the shrinkage of the timber. The exact amount should be determined by the floor hights and also the depths of the beams and girders.

Fig. 11 gives the dimensions and the proper way to make the joint between the brace and upper chord or rafter of a truss. The brace should always be notched into the rafter at least ¾ in. The end of the brace should project at least ½ in. below the rafter as shown to allow for the shrinkage at this point. The rod or bolt should pass through the rafter at the end of the brace as shown.

After all that has been written in the various handbooks, bound volums, etc., about the folly of putting wooden lintels in walls of masonry it is still done to a certain extent. The attention of the writer was drawn to a 4 x 10-in. wooden lintel in a plastered 4-in. hollow tile partition wall over a door opening. Some time after the building was finished and occupied a crack developed in the plaster over the door which was caused by the shrinkage of the wooden lintel. This being the only crack in the walls of the room and the angle in which it ran proved this beyond doubt. Another case is where the brickwork runs up to the underside of the sill of the windows of the first floor in houses. Wooden lintels are used to span the openings of the cellar windows, and in time as the wood shrinks causes a crack to appear in the brickwork. The shrinkage of timber should be kept in mind at all times when building, and also to keep timber out of walls of masonry unless absolutely necessary and much inconvenience and expense can be saved later on to both tenants and owners.

The new Synod House of the Cathedral of St. John the Divine, for which plans have just been filed by Architects Cram, Goodhue & Ferguson, will be two stories in hight at the front and four stories at the rear, and will cost in the neighborhood of $250,000. It will be 72 ft. by 171 ft. in plan, will be constructed of stone and will be of the same Gothic design as the remainder of the buildings adjoining it.

Arrangements have been completed for erecting a theater in Newark, N. J., which it is estimated will cost $200,000 and have a seating capacity of 2,260 people.

Construction of Metal-Lath Cement Silos

Some Interesting Details Regarding the Erection of a Valuable Adjunct of the Up-to-Date Farm Equipment

THE extent to which cement is being used as an exterior coating for buildings of all kinds renders more than ordinarily interesting some particulars regarding the construction of silos wherein the cement is applied to metal lath and is used for the inside and outside finish. These are known as metal-lath cement silos, and the descriptive particulars which follow are taken from an article by George C. Wheeler of the Kansas State Agricultural College, which is being distributed with the compliments of the North Western Expanded Metal Company, Chicago, Ill., in the form of an attractive booklet profusely illustrated with half-tone engravings showing various stages of the work.

At the outset it is suggested that whenever possible the plastered type of cement silo should be placed 4 ft. in the ground and that the excavation for it should have a diameter 3 or 4 ft. greater than the diameter of the silo to be built. The foundation for the silo wall is made by digging a circular trench 2 ft. deep and 12 in. wide and filling it with concrete. In digging this trench the inner side should be kept as smooth and dry as possible, since the dirt is to be used in forming the inside of the lower part of the silo wall. The bottom of the trench should be widened out on the inside to give a footing 16 or 18 in. wide.

The first round of the metal lath which forms the chief reinforcement of the silo must have its edge embedded 5 or 6 in. in the top of the foundation, in order to insure a perfect union between the foundation and the wall proper. When the trench has been filled to within about 6 in. of the top and the concrete brought to an approximate level, the lath, which comes in strips 8 ft. long and 18 in. wide, should be set on edge on this base and concrete should be poured on both sides of it. Its position should be on a circle having a radius 2 in. greater than the inside radius of the finished silo. As the strips of lath are set up and the mortar poured in, they should be carefully curved and should be lapped about 3 in. at the ends. When the circle is completed, the wall outside of the lath should be carefully leveled. In 8 or 10 hours the dirt inside of the foundation wall may be thrown out to within 10 or 12 in. of the bottom of the concrete. The exposed part of the wall while still green should be smoothed as much as possible.

In building this type of silo it is necessary to erect on the inside a scaffold of at least four platforms before any other work can be done. In silos 14 ft. or greater in diameter a six-legged scaffold is used, but in the

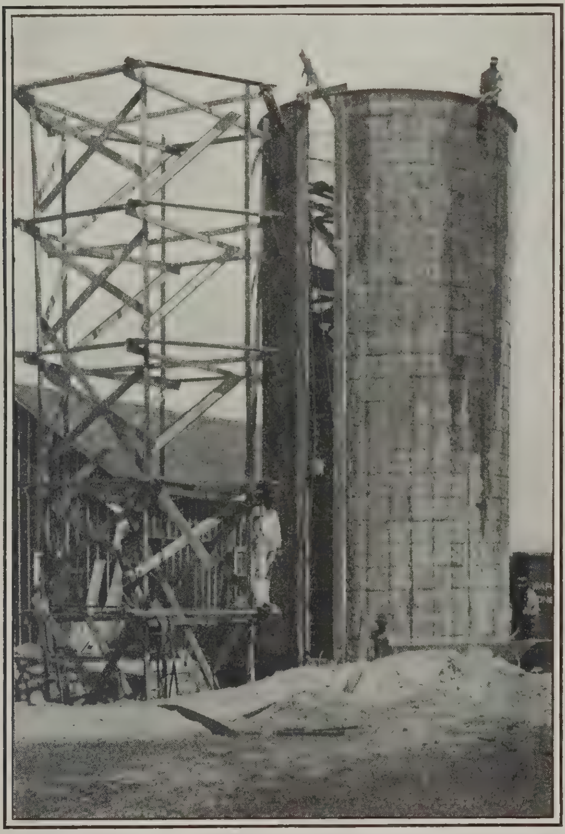


Fig. 1—Silo in Process of Construction and Showing Outside Scaffolding

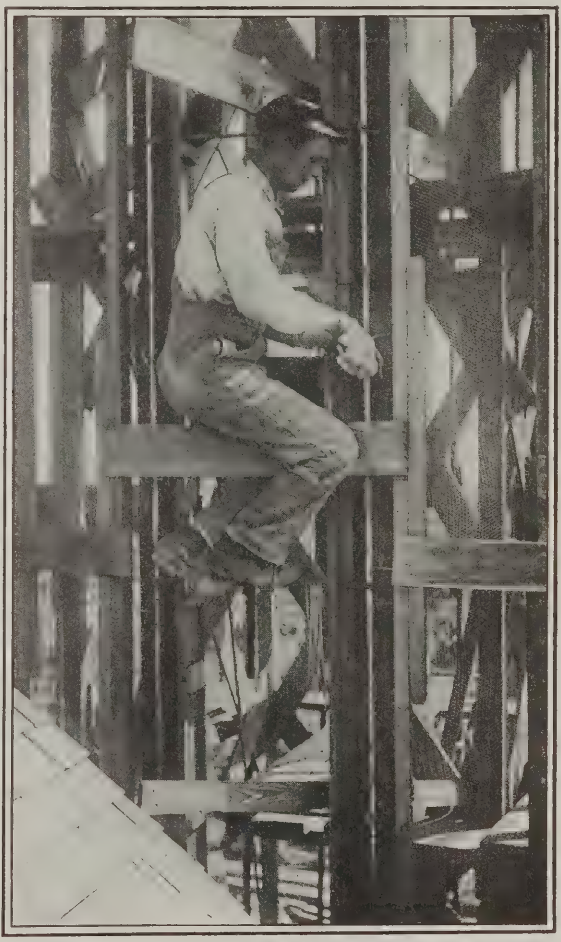


Fig. 2—Showing Method of Placing Reinforcing Material in the "Forms" for the Door Posts

Construction of Metal-Lath Cement Silos case of a 12-ft. silo a scaffold of only four legs is required. The platforms of the scaffold should be placed about 6½ ft. apart, although this distance may be varied to suit the convenience of those working on the silo. All the cross pieces should be of 2 x 4-in. material and of such length as to extend at least a foot outside the legs of the scaffold. The planks to form the runway on the outside should be of 2 x 8-in. stuff and in a silo 16 ft. in diameter should be 8 ft. long. It will be found convenient to have the top platform come within 3 or 4 ft. of the top of the silo, since the work of raising the 2 x 4's and nailing the plate on top is done from this platform. The scaffold should be guyed with four or five wires in order to protect it against windstorms. In Fig. 1 of the illustrations we show a silo in process of construction with some of the scaffolding used in doing the work.

Casting the Door Jambs

In order to cast the door jambs for the continuous door opening shown in Fig. 1 and to properly hold the reinforcing in place, a form must be constructed extending the full hight of the silo above the foundation. When this has been done it is raised into position by means of a pulley attached to the top scaffold. The studding are then placed in position and the framework made perfectly plumb and secure.

Pieces of gas pipe, which have previously been cut to the proper length, are then placed in each door box and wired to the ends of the rods across the door form, as shown in Fig. 2 of the illustrations. In the construction of the silo 24-gauge expanded metal or metal lath is used. This comes in bundles, each one of which usually contains 9 strips or 12 square yards. The metal lath is fastened to the inside of the studding with double-pointed tacks.

Placing Lath in Position

In placing the lath in position begin at the top, starting at the door post. The end of the first strip is passed through the opening in the side of the door box and bent around the gas pipe already in position. The end of the second piece is lapped at least 3 in. on the piece already placed, and this process is continued until the gas pipe on the other side of the door is reached. Where the ends of the lath pass the hooks of the rods across the floor it is necessary to split the end back about 4 in. so that it can be properly bent around the gas pipe. Two workmen are required to accomplish this to the best advantage, although more men can be used if they are available. The different rounds of the lath should lap from ¼ to ½ in., and in case of any bagging the edges must be wired together with light wire. This will prevent much annoyance to the plasterers in placing the first coat of plaster. Care must be taken in having the lath smoothly placed and carefully wired, as it will prove economical in the end, since the plasterers can make better headway where this work has been properly done. The method of placing loops in the door form is best accomplished by fastening short wire loops to the gas pipe in the door post. The second illustration shows the method of doing this and also the bending of the metal lath around the gas pipe and the wiring of the rods. A 16-ft. silo 30 ft. high should have at least 150 lb. of additional wire reinforcement. Since the pressure is much greater at the bottom, gradually decreasing toward the top of the silo, a larger amount of wire should be placed in the lower part of the wall.

The scratch coat of the inside plaster consists of one part cement, 2½ parts sand and 10 per cent as much hydrated lime as cement. About one bushel of hair to every 300 sq. ft. surface to be covered is used in the first coat. For the plastering of a silo 16 x 30 ft., about seven sacks of hydrated lime and five bushels of hair will be necessary. When the scratch coat is all on, the door posts are filled. In filling the posts the outside of the form should be cased up a section at a time and the mortar should be prepared and poured into place by means of a coal scuttle. A narrow paddle 3 or 4 ft. long may be used to work the mortar thoroughly around the corner of the post where the shoulder is to be cast in order to avoid any open spaces or air bubbles.

The mixture for the second layer of plaster consists of one part cement to 2½ parts sand and is applied in three coats, giving a total thickness, including the scratch coat, of at least 1¾ in. In applying these coats begin at the top and work down, one coat following the other as rapidly as possible. An old broom can be used to rough up each coat as soon as it has sufficiently set, so that succeeding coats will not be applied to the glossy surface left by the trowel. Should the work dry too rapidly, as it occasionally will, the wall should be sprinkled before applying the next coat of plaster.

The inner part of the door form should be removed before applying the last layer of plaster to the inside. The form can be taken part and passed out through the door in sections. When the form is out of the way, the finish coat, consisting of equal parts of cement and screened sand, may be smoothly applied in such a manner as to leave the inside surface flush with the face of the door posts. The finish coat should be smoothed up neatly, and when it has sufficiently set it should be given a "slush coat," consisting of a wash of pure cement.

Taking Down the Scaffolding

The inside scaffolding and studding are then taken down, and the outside scaffolding erected. Before the plastering on the outside is begun the extra wire reinforcement is put in place. This wire is attached to the wire loops which lie flat on the outside of the wall. These hoops of wire are passed around the silo and attached to the loops on the opposite side. This process is continued until all the loops have bands of wire attached to them.

The outside layer of plastering should be at least 1 in. thick and applied in two coats, using a mixture consisting of one part cement to 2½ parts of sand. A "Float" finish gives a pleasing appearance to the outside, while the use of a wash coat of pure cement as a final finish adds greatly to the appearance of the silo.

The finished silo should be wet thoroughly once a day for at least a week after the job is completed, as the use of water is a very important factor in the securing of a good concrete job built above ground, since the constant tendency is for the material to dry before proper setting can take place.

The cost of building the plastered type of cement silo, it is stated by the author, has not exceeded $3 a ton capacity in any case, the average cost being considerably less than that amount.

Sugi Finish Applied to Cypress

What is known as the Sugi Process of treating woods as followed by the Japanese and as adapted especially to the treatment of cypress, is receiving no little attention at the hands of American architects. The wood is first charred with the flame from a gasoline torch and then cleaned out with a wire brush, leaving the grain raised and the surface darkened to the rich brown tones. We understand that the process was introduced and developed in this country by John S. Bradstreet, of Minneapolis, Minn., who is a builder, decorator and landscape architect and who has traveled extensively in Japan.

Little Chats with Big Builders

One of Cleveland's Enterprising Builders Who Considers a Carefully Prepared Cost System a Most Important Feature of the Contracting Business

FROM making shine boxes for newsboys to building skyscrapers is a long reach, and yet this avenue of progress has been traveled by George A. Rutherford,

one of the prosperous and enterprising general contractors of Cleveland who was recently elected president of The Builders' Exchange of that city—the largest exchange of restricted membership in the United States. Mr. Rutherford received his early training as a contractor in his father's carpenter shop, which bore the sign "Mark Rutherford, Jobber," and was located on the Public Square near the present site of the Chamber of Commerce building in what was formerly called the "Forest City," but which of late years is losing this sylvan title.

The first partnership of Mr. Rutherford was with a boy companion who collected his accounts for making bread-boards, dressmakers' cutting boards, pigeon houses and the aforementioned shine boxes for newsboys.

At the present time Mr. Rutherford holds a leading place among Cleveland builders in the jobbing trade and also in the construction of both business and residence buildings.

Aside from his interest in the affairs of builders he takes a lively hold on civic affairs, being prominently identified with the Chamber of Commerce, Cleveland Advertising Club, the Cleveland Athletic Club, the Cleveland Real Estate Board, the Rotary Club, and several social organizations.

George A. Rutherford, President Cleveland Builders' Exchange

A rather unique feature of Mr. Rutherford's business development has been the evolution of the trade-mark which is herewith produced as the initial illustration of these comments. The idea for this symbol was obtained from a wood cut which was observed on his father's tool-chest by Mr. Rutherford when a boy, the picture representing a man carrying a tool box on his shoulder. After several efforts to reproduce the idea Mr. Rutherford "struck the nail on the head" by having Donahey, the cartoonist of the Cleveland *Plain Dealer,* produce the design substantially as it has been used ever since.

The action of the trademark is its principal recommendation, and all Clevelanders are familiar with the hustling journeyman as they see him daily on advertising cards in the street cars, as well as in the daily newspapers and other publications, where he is constantly "on the job."

Among the matters which Mr. Rutherford hopes to push under his administration as president of the Builders' Exchange are closer co-operation with the architects of the city of Cleveland and the builders, consideration of a revised Workmen's Compensation Law, a new and improved Lien Law, and many other enterprises of similar importance.

"The most important feature of the contracting business," said Mr. Rutherford the other day, "is the adoption of a carefully prepared cost system. Few contractors take any account of their overhead expenses and the value of their own time. They are too prone to estimate labor and materials and base their bids upon these items alone.

Construction of Japanese Houses

The typical Japanese house is a dwelling without walls; it has a roof raised on wooden uprights from a wooden platform some 18 in. above the ground which forms the main and in one-story houses the only floor. The roof and the upper floor or floors are supported entirely by the posts which form the skeleton of the whole structure.

The space which in American houses is occupied by walls and windows is here given over to sliding panels of a different sort from those which form the partitions between the rooms. Each house has an outer and an inner casing; the former consisting of wooden shutters called "armado" slides away every morning into cupboard boxes so disposed that a dozen armado slip into them with perfect ease and can be slid out of them at night with a minimum exertion. The inner casing also consists of sliding panels placed some 2 or 3 ft. behind the outer casing, which space forms a sort of veranda for a lower story or balcony for an upper story. These inner panels, however, are entirely different from the outer and are the peculiar characteristics of Japanese architecture. They consist of light wooden frames, over the rectangular panes of which white paper is pasted in lieu of glass. The paper being translucent admits light and secures privacy.

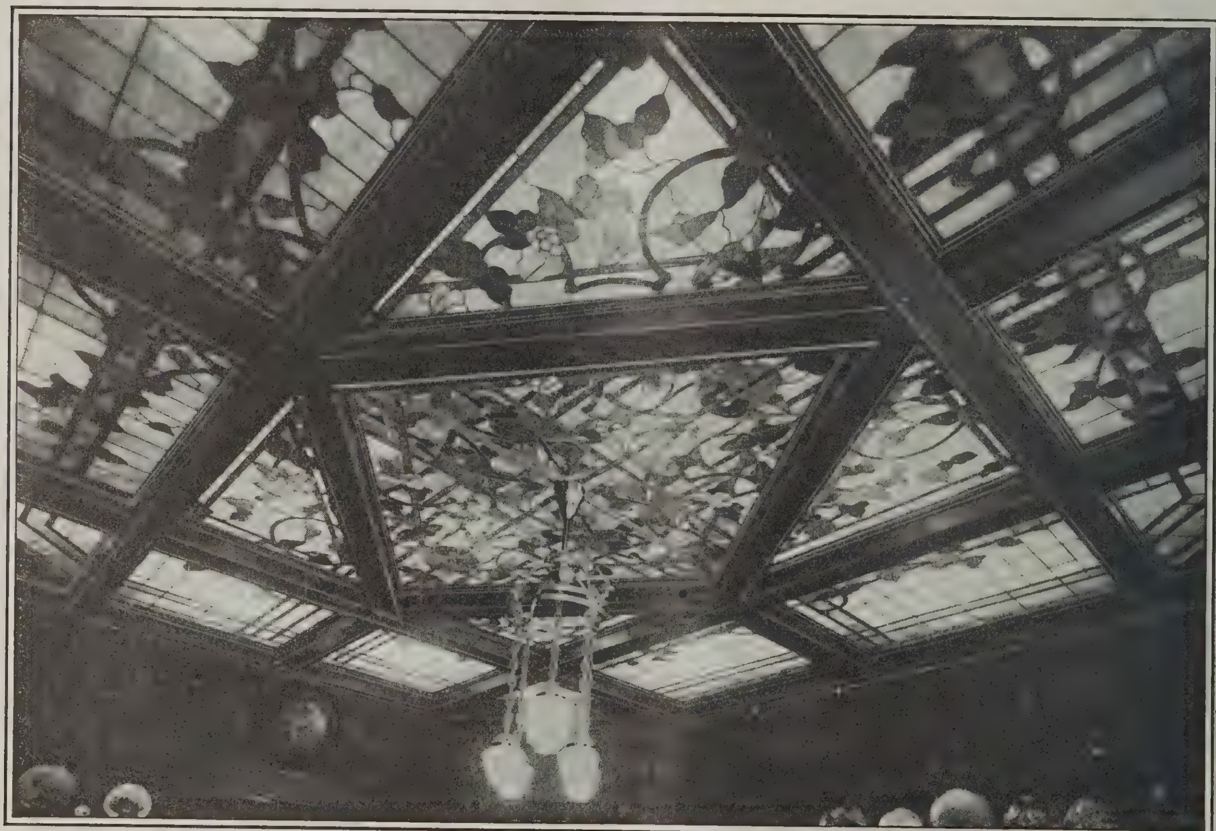
Save its roof and its floors there is scarcely anything solid or immovable about the Japanese house. When the "armado" are stowed away for the day the walls are literally of white paper, and though these paper walls are seldom quite removed, one panel is generally slid behind another, so that to all intents and purposes the building is as wall-less as a bandstand. The partitions consist of sliding panels 5 ft. 9 in. in hight, whereas the hight of the room is generally 8 ft. When all the panels are drawn back the entire floor is practically one large room.

Use of Art Glass in Home Decoration

Some Suggestions of Interest to the Architect, the Builder and the Houseowner

By Warfield Webb

OUR living abodes at the present day demand the very best that is in use as regards materials, durability, style, comfort and artistic effects. In order to attain the highest in all these things it requires ample means to render them actualities, and yet it does not necessarily imply the expenditure of a fortune to approach the ideals so many are seeking but who have not the requisite sum to expend on the home. With good judgment and economy, however, we can erect a home that will command the admiration of our friends and still be far from possessing the qualities of a mansion.



The Latest Idea in Home Decoration with Art Glass. Ceiling of Dining Room Illuminated with Electric Lights, Giving a Most Beautiful Effect

Use of Art Glass in Home Decoration

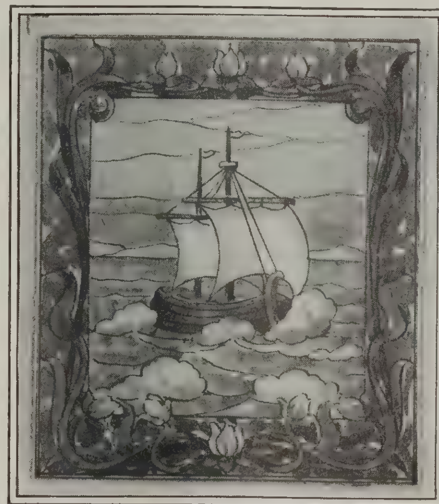
The secret in home building is to secure as much as possible in the way of artistic effects with a minimum outlay in cash. The real factors which make this possible are many, but one that is more and more compelling admiration and adoption is that of art glass. This we know is not a thing of somber and dismal appearance. It has outlived that original conception and crudeness that was born with its advent into the world of construction ideals. Since its first appearance it has undergone such changes as have placed it in a newer light and made its use quite the vogue.

Properly speaking the old ideas in art glass were termed stained glass. This industry had its beginning in the fifteenth century and the credit is due to the little town of Tegensee in Bavaria, where its manufacture and adoption became known. Its development was very slow and it was several centuries before it was used to any considerable extent. Within the past 20 years, however, much progress has been made in America along newer lines, so that a comparison can scarcely be made with the industry as it existed in the early days. The later development brought out opalescent glass, draperies, art beveled glass and delicate tints which have in reality modernized the entire industry and placed it on a plane higher than was ever before attempted. Since this development there have been continual changes, so that one might say even at this late date that the industry as an art is still in embryo. As we have progressed along the line of real art as applied to the development of the times there have been many new uses found to which this decorative feature could be made a part. Not alone in the matter of windows, doors and transoms which serve the double purpose of decoration and privacy, but also in the interior of the home, where there is a continual demand for features that will lend a consoling and restful complement to it. Where there are particular features desired for the interior decoration of the house the results are frequently accomplished by the use of art glass. One method in which it may be utilized to excellent advantage, but one, however, that has been adopted only in a limited way, is that of the art glass ceiling. In such rooms as the library, the dining room and even the living room there is reason to demand some particular features of art and attractiveness, and the ideal is best attained by the art glass ceiling. In its construction the ceiling is divided into sections, and frequently the room is constructed with beamed ceiling, in this way permitting of the use of the art glass ceiling in an easy and admirable manner. The design is specially made and the sections are suited to the space between the beams, thus making the construction one of simplicity.

Between the ceiling proper and the art glass is a space of about 8 in. The ceiling being pure white there is placed between it and the art glass a series of electric bulbs, either at frequent intervals or at the four corners, according to circumstances. The size and number of the bulbs vary with the desire of the owner, and the effect when the bulbs are lighted is most artistic. The glass is so placed that its removal for any purpose is a simple matter, and there are likewise air ducts which permit of a circulation of air at all times. The design of the art glass is appropriate to the room, and there is free play here as to one's desires in this respect.

In the large half tone engraving is represented the latest idea in home decoration with art glass. Here is shown the ceiling of a dining room which is illuminated with electric lights and giving a most beautiful effect.

Another idea less elaborate but still carrying out the decorative features of the scheme is that produced with a glass cove construction, this being about 2 ft. in depth and extending all around the ceiling which is formed in any room having a beamed ceiling. The glass is fastened to the beams, the lights being placed in the space between the wall and the glass. Generally there is an octagonal effect made possible by eliminating the four corners of the room and placing electric lights at these sections. As in the art glass ceiling, there is room for any possible design, and the effects are most inviting.



Design for Buffet Door and Library Cases

Design Suitable for Stair Landing or Bath Room

Another Design Suitable for Hall or Stair Landing

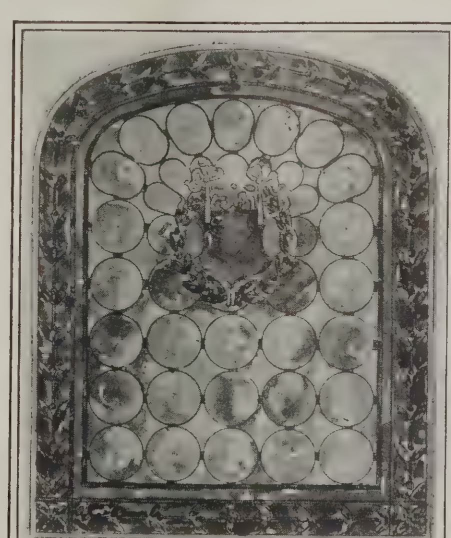
In the use of art glass in connection with buffet doors, transoms, screens, lavatory windows and elsewhere, now becoming so general with home builders, there is much that is commendable. Being manufactured with the highest ideals in view in point of art and sufficiently durable to last for ages, there can be no reasonable objection to its greater adoption. When the question of interior decoration has been properly considered there is always included the beauty of art glass.

There is a wide difference as to the true meaning of this term. Some people fail to see in it the value that should be accorded to it.

The scheme of design for art glass must enter just as much as any other idea, and to properly carry out this effect there is demanded the work of real artists. Mistakes are sometimes made by the installation of art glass simply because there has been too little consideration given the subject. It must be studied and made to partake of the general scheme, yet in order to be appreciated must harmonize with the other decorative features. There are times when the use of art glass will make possible a much more beautiful effect, but this is not realized without due consideration from the very beginning. The intention is one of improved effects, and this is best made possible where forethought is given to it by architect, owner and builder.

Real art glass serves the double purpose of adding to the charm of the home and of becoming a screen from outside gazing. It is best noted where the light is possible and this is its primary purpose—to admit light and still not become simply an aperture without enhancing its charm. We are coming to value this form of decoration more and more as time goes on.

In the illustrations here given are several designs adapted to a variety of uses and producing artistic effects. For some of these the writer is indebted to the courtesy of Flanagan & Biedenweg Company of Chicago. The upper design is especially suitable for buffet doors and library cases, while those at the right and left are



A Pattern in Antique Glass

Use of Art Glass in Home Decoration

excellent for a stair landing, for the hall or bath room. The landscape effect in the design at the left is produced by selecting different shades and tones, and this class of work is adapted to any size. It is not especially costly, and the artistic effects are sure to prove pleasing to every beholder. On account of the delicate effects secured the glass is bound together with leads. The design at the bottom of the page is a suggestion for a stair landing and is made up of antique glass in opals, the result being that it admits ample light and one can even look through it, while at the same time it gives the artistic effects desired.

The use of art glass, that is, in the color effects for the home, is very often dependent upon the location of a window or a door. The effect of the light on the glass has much to do with its proper selection. At times only a tracery is required to give the proper effect.

Metal and lead are the binding agents that hold the various particles together, and the increasing use of and the advance made in this art within recent years in this country are of the greatest moment to every home builder.

How to Patch a Concrete Floor

When a cement floor surface begins to wear it is often desirable to patch it and the way in which this can be done to the best advantage is described in a recent paper prepared by President L. C. Wason of the Aberthaw Construction Company, Boston, Mass. In this paper he gives the wrong way to do the work as well as the right way, and we present both herewith for the benefit of our readers:

The Wrong Way.—Commonly a sand and cement mortar is made, some cutting is done and the mortar is put in and scrubbed with a steel trowel until smooth. It is then covered up for awhile. If the concrete under the patch is left dry it soaks up the water of the mortar. As a result, the mortar does not set. If the room is dry or hot the surface of the patch dries out and for the same reason it does not set. If the concrete under the patch is dusty the patch does not adhere to the concrete. If the materials in the mortar are not suitable, naturally the patch wears badly, particularly as it is obviously located at a point of severe wear.

The Right Way.—Cut down the worn place at least 1½ in. This cutting should be carried into the strong unbroken concrete and the edges should be cleanly undercut. The bottom of the cut should then be swept out, clean-blown out with compressed air or a pair of bellows, if available, then thoroughly wet and scrubbed with a broom. In this way small loose particles of broken material which the chisel has driven into the surface are removed. A grout made of pure cement and water about the consistency of thin cream should be scrubbed into the pores with a broom or brush, both at the bottom and sides of the cut. Following this a stiffer grout, about the consistency of soft putty, should be thoroughly compressed and worked into the surface, which has already been spread with grout. Finally, before the grout is set, a mortar made of one part cement to one part crushed stone or gravel, consisting of graded sizes from ½ in. down to the smallest excluding dust, should be thoroughly mixed and put in place, then floated to a proper surface. Cover with wet bagging, wet sand, sawdust, or other available material. All trucking should be kept off and the surface kept thoroughly wet for at least one week or ten days.

If a particularly hard surface is required, 6-penny nails are sometimes mixed with the mortar and other nails stuck into the surface when the patch is finished. This will produce a surface which is extremely hard and durable.

Constructing Tile Floors

In recent years the old-fashioned tile pavement has come into great favor, particularly the large, dark red squares known as Welch tiles. To support such a flooring on a house built of masonry is no great problem, for the necessary bed of concrete rests securely on a masonry arch as some form of terra-cotta construction. But where a tiled conservatory or porch or dining-room is desired in a frame house, how to support the concrete bed on which the tiles are laid is a matter of considerable care says a writer in *House Beautiful.* It is best done by having rough boards cut in between the floor beams and resting on ⅞-in. strips nailed to the sides of the beams. The tops of these boards must be at least 4 in. below the finished floor line, and better still 5 in., to allow of a concrete bed of sufficient thickness. A thin one would surely crack. The tops of the beams should be beveled off to an edge in the center. This is necessary for two reasons; it allows whatever moisture may gather in the concrete both while it is green and during subsequent scrubbing operations, to run off; and also it is much better structurally, as it lessens the shallowness of the concrete over each beam.

Where a tile floor is put into an old building during alterations further care must be taken to cover the rough boarding and the beams with waterproof paper to keep the moisture from discoloring the ceiling below. No heed should be given to builders who advise soaking the beams with creosote as a protection, for the creosote will eventually find its way to the plaster beneath, whence its stain will be impossible to remove. Where the tiles are for an exterior porch under which there is no excavating, it is best to build a brick retaining wall as foundation for the porch, fill the enclosure with sand, bring it to a level and spread on it an 8-in. bed of concrete for the tiling. This all sounds troublesome, but one is well repaid by the stability and permanence of a properly laid tile floor. As to its beauty, that depends on the selecting of the tiles. Decorated ones are risky and except for the famous examples such as the Persians or the Moors once made, there is greater beauty in good plain colors that contrast, not harmonize, with the walls.

Moving a Long Brick Wall

In order to widen the train shed of one of the railroad stations in Antwerp, Belgium, it was found necessary to move a brick wall, about 236 ft. in length, a distance of 80 ft., says *Popular Mechanics.* The plan first decided upon consisted of demolishing the wall and rebuilding it of the same material at the new location, but when the contractor undertook to do this, he found that the masonry construction was so solid that tearing it down would so damage the old material that it could not be used again. Therefore, he had the wall cut off in one solid piece, and moved on rails to its new location. The complete operation was accomplished by 18 men in 14 days, the actual moving taking but 27 minutes. The plans were so well carried out that not even one crack appeared in the wall.

The School Board of Brown County, Kansas, has made an order that will supply every schoolhouse in the county with a cyclone cellar, in which the teacher must lead the pupils whenever signs of a cyclone appear.

Cost of Building Construction in Various Localities

Actual Estimates Based on Same Design from Various Localities -- Relation of Materials and Cost

THE following comparative costs of building construction as they are to be found in various cities and states of the country, together with some comments on the manner of estimating the cost from architects' drawings, is contributed to a recent issue of House and Garden by H. W. Butterfield.

Many people are apt to be skeptical about the usual magazine articles relating to the cost of small country houses. We dare say that in the majority of cases the magazines are correct, for they publish information regarding an actual house built in some one section of the country. However, the fact that the house is located in one section is responsible for the misunderstanding upon the part of the readers.

It is impossible to give a figure that would cover the cost for the entire country. We must consider each factor that enters into the total outlay and judge its relative importance in the various sections in which building is carried on.

Labor and Material the Important Factors

The two principal factors are labor and material. In some places the first factor, labor, plays the more important part. Wages are high and hours are short. For example, in the vincinity of New York City, union labor is well organized and the mechanics receive the maximum wage for the minimum number of hours. In central and western New York State, carpenters and masons get a modest wage and some materials, requiring a long haul, are expensive. The lumber sections of the Northwest and some parts of the South give a plentiful supply of cheap material and where labor's demands are not exorbitant at the same time, we find here the most favorable conditions in which to build cheaply.

The distance which material is hauled is a strong factor in determining its cost to the consumer. Therefore, aside from esthetic reasons, it is always wiser to construct your house with native materials, as far as possible.

In spite of the growing price of woods and the reduction in the price of masonry material, such as cement, it is still cheaper to build a frame house than one of any other kind. Of course, certain parts favored with the close proximity of brick yards or quarries give these materials the advantage over frame on account of durability and cheapness.

To get down to facts we shall compare the prices obtained from each quarter of the country; prices obtained on the same house and specifications. To test this the plans and specifications of a house were sent to architects all over the country. There was a list of questions to be answered and the costs of various materials sought. The replies were carefully averaged and the results are given below. We give prices, both in lump sums and per cubic foot:

New York City (suburban) $4,300

Per cubic foot frame	17 cents
Per cubic foot brick	21½ cents
Per cubic foot stone	22½ cents
Stucco on metal lath	18 cents

Vicinity of Philadelphia 10 per cent. to 15 per cent. less than near New York.

Maine $3,400

Per cubic foot frame	14 cents
Per cubic foot brick	17 cents
Per cubic foot stone	20 cents
Stucco on metal lath	15 cents

In the southern New England States the cost would be slightly in excess of the above.

Middle South, Kentucky, Maryland, etc........ $3,000

Per cubic foot frame	10 to 12 cents
Per cubic foot brick	12 to 14 cents
Per cubic foot stone	15 to 20 cents
Stucco on metal lath	11 to 14 cents

Chicago, vicinity of $3,800

Per cubic foot frame	15 to 16 cents
Per cubic foot brick	18 cents
Per cubic foot stone	20 cents
Stucco on metal lath	16 to 17 cents

Middle Western States, such as Ohio, Michigan, Iowa and Wisconsin .... $2,550 to $4,000

Per cubic foot frame	10 to 17 cents
Per cubic foot brick	12½ to 20 cents
Per cubic foot stone	16 to 25 cents up
Per cubic foot stucco on metal lath	12 to 18 cents up

Pacific Coast (Northwest) .... $2,000 to $3,200

Per cubic foot frame	8½ to 13 cents
Per cubic foot brick	9½ to 14 cents
Per cubic foot stone	14 to 16 cents
Per cubic foot stucco on metal lath	9 to 14 cents

Colorado (average) .... $3,100 to $3,200

Per cubic foot frame	12 cents
Per cubic foot brick	14 cents
Per cubic foot stone	15 cents
Per cubic foot stucco on metal lath	13 cents

Southwest (Arizona and New Mexico) . $2,900 to $3,000

Per cubic foot frame	12 cents
Per cubic foot brick	13½ to 14 cents
Per cubic foot stone	16 cents
Per cubic foot stucco on metal lath	13½ to 14 cents

We have covered in the above list a wide range of territory; the districts mentioned are characteristic of all sections. The New York section heads the list, with the Northwest Pacific Coast at the foot, due to the peculiar conditions mentioned above. Prices, however, may vary in each section. We have known of two houses built from the same plans and specifications, one in Flushing, Long Island, and the other in Essex County, New Jersey, in which the cost at Flushing was 10 per cent. less than the Jersey cost. Transportation had much to do with this variation.

In giving a scale of prices such as above it is necessary to adhere to a certain type of house; this is one which includes all the conveniences and arrangements suitable for the average family without any special features or elaborate details. The construction is supposed to be thorough and materials first class. Simply a good, substantial home built according to the custom of the locality for such a class house. These figures are for a completed house with the exception of the lighting fixtures, which may cost any amount one is willing to pay. They could be procured for $50 or up.

Everyone about to build is desirous of first ascertaining as near as possible the total outlay he will be obliged to make. The first step after selecting the design is to multiply the total cubage as given with each design by the cost per cubic foot in your section. You will then be able to get an idea if it is possible to keep within your appropriation. Next consult a local builder, one who is accustomed to putting up the class of building you desire. There may be certain governing conditions in your neighborhood with which he is familiar and you are not. He will take the cubical contents and the design as submitted, together with instructions as how you wish the house finished, and give you a very close preliminary estimate. Then when he receives the working drawings, details and complete specifications his figures may be gone over and verified. Of course, if the builder has the final drawings from the first he will be able to give at once an exact and final figure.

If you contemplate building a home, study your own section. What in the long run seems to have proven to be the best materials for the locality; what materials are used for foundation walls, exterior walls, roofs, porches, trim, chimneys, etc. If one material predominates for each part, then there is some good reason why it was used. Probably for the sake of economy or procurability. A little thought and careful study in the beginning may save time and expense in the end.

Novel Housemoving Operation

One of the most interesting and novel feats of housemoving which has come to our notice has recently been accomplished in the city of San Francisco, where a four-story frame office building was transferred from its foundations to the deck of a scow or barge used in transporting railroad cars from one point to another, and then floated across the bay to Hunters Point, where it was rolled ashore and placed upon its new site.

The four-story building is 180 ft. long, 40 ft. wide and about 50 ft. high. It was moved to make way for the new power house at the Union Iron Works, and between where it stood and where the barge lay the yard was littered with lathes, shafts, propellers and other heavy material, the moving of which would have involved heavy expense. In order to avoid this the building was jacked up 9 ft. in the air to clear some of the obstacles and then moved over them. The work was executed under the personal direction of J. J. Tynan, the general manager of the Union Iron Works, and the barge was floated across at a time when the water was smooth.

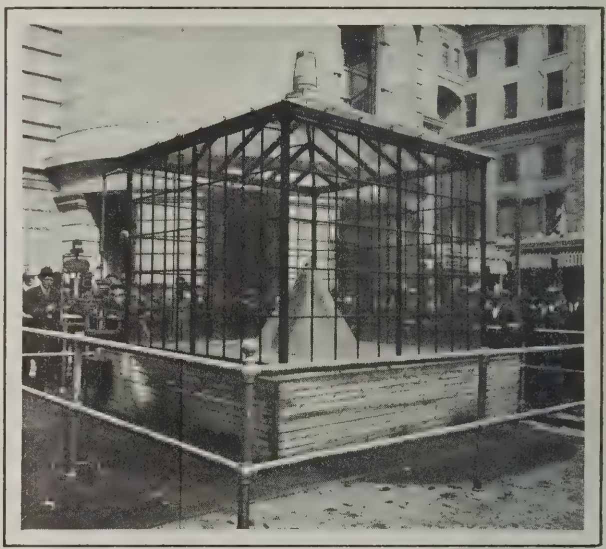
The building was originally erected and used for many years to house the naval inspectors detailed to the yard to oversee the government work done there, but upon its new site at the dry dock it will be used as a storage house for tools and for office purposes.

Demonstration of Automatic Fire Protection

Brief reference was made in these columns last month to the very impressive demonstration of automatic fire protection which constituted a feature of the Municipal Water Conservation Exhibit that opened in the city of Philadelphia, October 7, and continued during the month. The display in question was held in the courtyard of the City Hall under the direction of Morris L. Cooke, director of Public Works, and a committee appointed by the Mayor.

The exhibit, a photographic view of which is shown herewith, consisted of a 10 x 10 x 10-ft. steel sash building furnished by the Detroit Fenestra Steel Products Company and with a roof of the same character, surmounted with a Drouve ventilator. Wire glass windows made by the Mississippi Wire Glass Company were used in the sash. The bottom of the building was covered with asbestos board and a pyramid of the same material 2 ft. square at the base and 3 ft. high was erected in the center, all as clearly shown in the picture. Above the pyramid was suspended a single Grinnell automatic sprinkler with a fusible link adjusted to melt at 155 deg. and operating under a pressure of 75 lb.

In making the demonstration of the device the pyramid covered with asbestos fiber was saturated with alcohol and then lighted. It was demonstrated that 15 seconds after the alcohol was ignited the temperature rose to the fusing point of the link, opening the sprinkler and quenching the fire.



Educating the Public in Philadelphia in Regard to the Automatic Fire Extinguishing Sprinkler

In addition to the demonstration of the sprinkler there was shown in operation in connection with it the Grinnell straightway alarm valve which provides a means of giving notice that a fire is in progress. Through the alarm valve the water supplied to the sprinkler must pass. The flow of water operates to close an electric circuit which operates alarm bells located at desirable points. The device provides for the variation in water pressure so that by any unequal pressure operating on the valve the possibility of a false alarm is avoided. The novel point about this exhibit was that it not only gave a visual demonstration to the spectators of the power of the automatic sprinkler to extinguish a fire, but also to discover it.

The conservation of water comes from the fact that the automatic sprinkler which puts out a fire while it is in its incipient stage requires very much less water than does the fire department attacking a fire after it has gathered headway.

The demonstrations were given during October every fifteen minutes for the greater part of the day and evening and were under the auspices of the General Fire Extinguisher Company, Providence, R. I.

Contracting on a Percentage Basis

The Usual Percentage Method--Advantages to Both Sides--This Method Compared with Other Plans

THE matter of handling contracts upon a percentage basis is one which has been discussed at intervals in the past in these columns and which is receiving more or less attention at the present time in many sections of the country. One of the latest contributions to the literature of the subject is an article written for the *Western Canada Contractor* and which we present herewith as embodying points of interest to our readers.

The percentage plan of handling contracts has been adopted recently by a number of prominent contracting firms in Western Canada. This plan is one which in many ways suits some departments of the business much better than does the older "lump-sum" method. It is a recognized fact that one of the greatest difficulties and drawbacks of the contracting business is the difficulty of reaching a satisfactory basis of relationship between the contractor and the owner. Under the ordinary method of contracting, the interests of the two parties, it will be readily seen, are often diametrically opposed.

Once the contractor has secured a contract, it is decidedly to his interests to rush the job to completion as quickly and as cheaply as possible. Quickness is quite essential, as it tends to an early completion, an early settlement, the opportunity to use his gear and equipment in connection with other work and the closing up and getting from off his hands the necessity of supervision of the work. But cheapness is still more essential than is despatch in the carrying out of the work. It is here that the interests of the contractor and his employer are opposed. Every dollar that the contractor spends comes directly out of his own pocket. The temptation is always present to curtail expenditures with the probability that the owner's interests will suffer if this is done. The principle that the better the class of work and the materials used the lower the contractor's profits is not a principle that may be said to be conducive to the best results and the highest quality of work.

It is conditions like these which make it possible for the wider adoption of a different system of handling contracts of a general nature. These conditions are responsible for the use of the percentage system, which lacks many of the drawbacks of the usual method of handling contracts.

The Usual Percentage Method

When the subject of contracting on a percentage basis is alluded to it is usually associated with some such rate as 10 per cent. This rate might be said, however, to be higher than the average, as many important jobs are being carried out in the West at rates ranging from 6 to 10 per cent., the latter rate being the highest paid and the average being perhaps 8 per cent. The fixing of the rate depends, entirely, of course, upon conditions under which the contract is to be carried out. It is in this connection that the one opportunity is provided for competition among the contractors, the lowest rate bidden having, of course, the first chance at securing the contract.

It is in the bidding that the contractor has an opportunity to make a loss by bidding too low a rate, although the consequences are not apt to be nearly so serious as in the case of bidding on the job by the lump-sum plan. He must figure upon all the conditions specified, what he will be obliged to supply in the way of gear and equipment, how great the wear and tear will be upon that gear and other matters of a similar nature, all in addition to the usual matters which come up for consideration in connection with the bidding on a contract. Many circumstances have a bearing upon the making of this rate. It is possible that the owner may provide a hoist or some of the other important parts of the plant required. The question of the lumber for the "forms" in a concrete building is always an element—these and similar circumstances have a bearing in the deciding of the rate. The lower the rate, the less the contractor can afford to supply.

When the rate is as high as 10 per cent. it is safe to assume that the contractor is supplying everything in the way of gear and equipment as well as the materials and supplies necessary to the actual carrying on of the work. In cases in which the rate goes as low as 5 per cent. the contractor will probably supply very little in the way of plant, and might be said to be merely acting as a building superintendent with the additional responsibility for the successful outcome of the work.

The rate is figured on the total cost, an estimate of which is prepared by the architect. If the total cost exceeds this estimate the contractor is allowed his percentage at the same rate specified in the original agreement. In case he is able to complete the job at a less figure than that specified by the architect, he is a material gainer, as he is allowed a good percentage on the amount saved. The rate of the allowance on the amount this saved ranges from 25 per cent. to 50 per cent. The greater the rate provided to cover such a saving, the greater the incentive to the contractor to save, and while doing so he is saving for both himself and the owner.

It is this principle of dividing the savings which is one of the most attractive features to the man who has the true principles of business in mind. It will readily be seen that there is every incentive for the owner and the contractor to work together, how the contractor, while working for himself, is helping the interests of the owner and how both benefit by his efforts. The better the building and the higher the class of workmanship, the greater the returns to the contractor. Both parties gain by the extra expenditure, a more equable arrangement than under the older and more widely used system by which the better the building the less the profit of the contractor.

Advantages to Both Sides

The percentage system is a safer one for the contractor than is the lump-sum system. There is little or none of the risk of making a mistake and taking a job at too low a figure. He has none of the responsibility for the total cost of the work, which, under the ordinary plan, is the greatest element of risk in connection with the business. His entire risk consists in the possibility that he may figure his rate too low—a risk that is a small one in comparison with the danger in other plans of taking jobs. Should he happen to make this mistake his loss will not be nearly so serious a matter than if the entire responsibility were his.

The percentage plan is one of many advantages to the owner. He has a greater knowledge of operations and a much more direct control of the work. He is able to specify any change or extra outlay without dickering with the contractor. He may also effect a considerable saving—if he so desires—by paying the bills in such a manner that he will save his cash discounts. He has a greater knowledge of both the quality and costs of the material used. At the same time he has the advantage of having the work carried out and supervised by a contractor of experience who can use his knowledge and ability as well as his trade connection to further operations, knowing that the better the quality of his work the greater will be his financial return.

Compared With Other Plans

Many comparisons have been made and much discussion presented as to the best form of contract. The solving of this problem is a difficult one. Each plan has adherents and vigorous ones. To the contractor who feels that his executive ability is such that he will speculate on it and that he must have such an opportunity to realize on it, the ordinary method presents the greatest opportunity. It is often the case that contractors—particularly in western Canada—will spend thousands of dollars in plant and equipment in order that they will be able to carry on their work at the lowest possible cost and so that they will then be in a position to carry out a job at a lower figure than is generally recognized as the average cost. To those who thus wish to match their organization against the conditions and circumstances in connection with a contract, the lump sum will be the favored plan. To the firm or individual who wishes to follow a more conservative policy and to eliminate as far as possible any chance of loss the percentage plan will appeal most strongly. The latter plan has features which recommend it in the case of a job consisting of alterations or repair—in connection with jobs of this nature there are so many opportunities for mistakes in figuring a bid as well as for disputes and differences of opinion. For the contractor who is starting business in a new country where he may be more or less unfamiliar with conditions, the percentage plan will have much to recommend it.

The "cost-plus-a-fixed-price" method of awarding contracts also has many adherents among contractors. It would seem as if this plan would place the contractor simply on the footing of one who works for a fee. It is scarcely in human nature for the average man to take the same interest in his work as he would under one of the other plans mentioned. When chance and risk and the prospect of a greater or less return is eliminated it is safe to say that the average contractor will take a less active interest in the work. True, the contractor of integrity will give conscientious service under any circumstances, but he lacks incentive; he is not an active partner in the work, but practically a wage-earner.

Not Suitable for Small Jobs

The percentage plan has its limitations. One of these is its unsuitability for small jobs. There are many reasons for this, all of them important. The principal reason is that the total amount of the small contract is not large enough to bring the amount of the contractor's commission to a total that would prove any inducement. In addition to this—as every contractor knows—the small job, such as building a residence, must be watched quite as closely and diligently as the large job. It is easily apparent that the percentage plan does not work out in connection with small jobs and must necessarily be confined to the larger ones if the contractor would receive returns for his work.

Stain for Pressed Brick Fronts

Answering a reader of its columns as to the existence of a reliable stain for use on pressed brick fronts a recent issue of the *Painters' Magazine* contained the following: "We have known of red brick stain that was made by mixing dry Venetian red with water into a pulp, pressing it through a sieve to break up lumps that formed in mixing, then adding enough stale ale or beer to make the stain of proper consistency. To each gallon of this mixture was added one-quarter pound of calcined green copperas (iron sulphate), previously beaten up with a portion of the stain to a thin batter. This is the mordant, or fixative, without which the stain would finally wash off from the effects of rain. The calcined copperas is produced by heating green copperas in an unglazed earthen pot or pan, thus driving off its water, under which process it falls into a dry whitish powder.

"As a more durable and permanent stain, however, we would suggest the following: Take Venetian red that has been ground in pure linseed oil in stout paste form, or if the stain is to be of lighter shade a mixture of Venetian red and French yellow ocher, both ground fine in linseed oil, and beat up the paste with a small portion of a good turpentine japan to a smooth semi-paste, gradually adding in small quantities, while stirring, a mixture of one part by measure of 90 degree benzol or good solvent coal-tar naphtha and four parts by measure of turpentine, until the proper consistency of stain is had. Strain through cheesecloth and throw away the coarse particles, as these would remain on the surface and be of no benefit in sealing the pores of the brick. An excess of oil in the stain must be avoided, as it is apt to produce shiners."

Cement lumber consisting of slabs made in suitable lengths is being used in many instances instead of wood on the outside of a house.

Convention of Texas Builders' Exchanges

Closer Relations between Contractors and Architects -- Officers Elected and Committees Appointed

AT the annual meeting of the Texas State Association of Builders' Exchanges recently held in Dallas, approval was given looking to closer affiliation between the contractors and the architects and suggesting that there be co-operation with the material men to the end that all needed supplies shall be promptly furnished and at reasonable rates. The Exchange also approved the plan of the Architects' Association to have a state license for architects, and further approval was given to the suggestion that when the contractor signs the contracts accepting the plans and specifications, he in effect guarantees their correctness and the effectiveness of the work undertaken.

Election of Officers

The officers elected for the ensuing year were:

President..........N. M. Karney of San Antonio
Vice-President...........C. W. Moore of Austin
Secretary................H. J. Emmins of Dallas
Treasurer................L. R. Wright of Dallas
Sergeant-at-Arms...Clarence R. Nesbit of Dallas.

The chairmen of the various Standing Committees appointed were:

Resolutions—Alexander Watson of Dallas.

Nominations—L. R. Wright and W. R. Hatcher of Dallas.

Legislative—C. P. Ledbetter of Austin.

Auditing—J. M. Grasty and L. R. Wright of Dallas.

Laws—N. M. Karney of San Antonio.

It is interesting in this connection to state that retiring President Francis Fischer of Austin is the only man who has twice been president during the 14 years the organization has been in existence. Retiring Secretary Henry C. Oppermann of Galveston has been secretary since the organization of the Association, and at this convention was presented by Harry J. Emmins on behalf of the membership with a jeweled fob as a token of their appreciation.

Resolutions

Before final adjournment resolutions were adopted thanking the contractors and citizens of Dallas for the entertainment of the members; praising the Texas State Fair as a Texas institution, and the press of the state for publicity.

It was decided to hold the next meeting of the Association in Fort Worth.

The Banquet

The annual banquet was held at the Oriental Hotel with Lou R. Wright as toastmaster. A male sextet rendered several selections during the evening, and Miss Geneva Lindsay of Dallas read "Rules for Stealing a Ripe Watermelon," which brought out generous applause.

Among the speakers of the evening were Francis Fischer of Austin, who spoke on "Old-Time Texas"; Otto Lang of Dallas, who talked about "The Architect and the Contractor"; J. R. Babcock, secretary of the Dallas Chamber of Commerce, who responded to the toast "Contractors as Are Contractors"; N. M. Karney of San Antonio, who made some very interesting remarks about "The Texas State Fair"; C. M. Moore of Austin, who discussed "Progressiveness in Building"; J. S. Skirwin of San Antonio, who had for his topic "The Outlook for Construction Work." Some interesting remarks were also made by M. R. Diony of Beaumont, secretary of the Texas Wholesale Lumbermen's Association.

Building Regulations in Melbourne

In the new building code which has been prepared to replace the building regulations in force in the city of Melbourne, Australia, since 1865, the most important section relates to new materials and their methods of use. With the introduction of the steel frame construction and concrete foundations, the thickness of the walls has been greatly reduced. In the case of brick walls the minimum thickness is now 9 in., which is a very heavy reduction on the old regulations. The calculations are now based on length as well as hight, whereas formerly it was merely a question of hight alone which determined the strength of walls. The safe bearing load to apply to concrete when Portland cement is used is to be taken at 2 tons per square foot. The Council is to be given power to approve, with the consent of the referees, any new materials or methods of construction different from those described in the regulations.

In the old regulations it was stated that no building should be erected upon foundations that were not set on bed rock; now provision has been made for artificial foundations such as rafts or piles on which the superstructures may be placed.

Foundations of all walls of wood are to consist of red gum 4 in. square spaced not less than 18 in. below the natural surface of the ground.

Buildings are allowed to be erected to a hight of 132 ft. instead of 110 ft. in streets that are 99 ft. wide, but this is subject to certain conditions being fulfilled.

In streets 33 ft. wide the hight has been increased from 82 ft. 6 in. to 99 ft.

The minimum of each story from floor to roof is to be 9 ft. The greatest space to be enclosed by dividing walls and fireproof ceilings is 350,000 cu. ft. This means that for about every four stories there shall be a fireproof floor.

Under the old regulations the special provisions laid down for either lighting or ventilation were altogether inadequate and many of the old buildings are now being reconstructed to allow light courts to be placed in the center of the buildings. The new regulations lay down minimum space for the light courts and specific directions for ventilation.

Every room is to be provided with outlet ventilators of which the total area in square inches free from obstructions shall be equal to the cubic capacity of the room in cubic feet divided by 75. Every room of a domestic building is to have one or more windows opening directly into the external air or into a conservatory with a total superficial area equal to one-tenth of the total area of the room. Provision is also made that the windows shall be easy to open.

The hight of any wall abutting on a light court is not to exceed three and one-half times the width of such court if it be enclosed or may be enclosed on every side or four times the width if it be open at one or both ends.

The Building Age

Formerly Carpentry and Building

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DECEMBER, 1912

Floor Heated Rooms

The beauty, the durability and the sanitary qualifications of the Mosaic or tile floor has led to its introduction in the American home with a somewhat rapid progress since the concrete form of building has been so extensively used. With the advent of floors of this type the question of floor heating has been raised and leads to a study of the methods of heating buildings of the ancient days when tile floors were extensively used not only in homes but in public buildings. In some of the Roman buildings there were piers 6 in. square placed on about 24-in. centers on which the corners of the flat tiles which were laid for a floor, met. The piers were high enough to leave a space of from 16 to 20 in. beneath the tiles. Over these tiles a more attractive and smoother wearing surface was laid. In the colder seasons arrangements were made to send the smoke and gases from a fire through the flues under the floor formed by this type of construction. In this way the floor was kept at a temperature comfortable to the occupants of the room. This method of heating a room was the only one employed. In the recent construction of one of the college buildings of Cornell University at Ithaca, N. Y., tile floors are used throughout and to avoid complaint from a cold floor steam pipes were laid in cases in the upper surface of the floor around the edge of the room. The pipes were then surrounded with concrete and covered with a decorated tile. It is pointed out that this eliminates the use of a radiator in the room. This experiment will be watched with some interest by architects and builders and especially by men associated with the heating trade. In the average American home with its wooden floor any heat that is lost from the heating apparatus, whether it is a warm-air furnace or a steam or hot-water heater in the basement, is absorbed by the floor, adding substantially to its warmth, and goes a long way toward making the building comfortable for habitation. In such buildings the question of floor warming or floor heating is of no moment, but heating contractors having occasion to install their work in residences which have concrete floors are liable to meet a new experience, particularly where concrete or tile floors are extensively used.

Metal for Farm Buildings

Builders and sheet metal contractors throughout the country cannot fail to be interested in the action of the Agricultural Department in Washington in recommending the more general use of sheet metal in the construction of various farm buildings. It is pointed out that such buildings can readily be erected to shelter not only the animals and crops but also the implements and prevent a destruction and waste which will go a long way in defraying their cost. The ease with which corrugated iron can be applied for roofs or for side walls of a frame constructed of either wood or iron is so explained as to prepare the farmer for the overtures which the enterprising sheet metal worker in any community can make to extend his business by either supplying the material or erecting the building complete. Of equal importance, it is pointed out, is the fire-protective value of sheet metal, and this is a point which the farmer can readily appreciate, being isolated from a fire department so that when a conflagration starts among farm buildings it is likely to result in a total loss. Sheet metal constructions are protective against fire or are fire retardent when through accident a fire may start in some one of a group of buildings. The sheet metal worker can readily point out means of putting the necessary windows in buildings of this type and arranging for such ventilation as may be needed, and if his work is intelligently and well done the farmer will be provided with better shelter for his stock, crops and implements than ofttimes prevails.

Local Building Operations

The feature of building operations in New York City during the month just closed was the lessened activity in the planning of apartment houses, schoolhouses and business structures. While it is quite natural to expect a falling off in building operations as the year draws to a close the figures for October are somewhat striking and are widely at variance with those of the corresponding month of last year. The falling off is not confined to any one class of building, but is common to several. The figures for the Borough of Manhattan covering the month of October show that only six apartment houses were planned, estimated to cost $1,395,000, as against 17 such buildings in September to cost $2,475,000 and 12 buildings of this class in October, 1911, involving an estimated outlay of $2,150,000. The five store and loft buildings planned in October were estimated to cost $354,000, while in September 9 such buildings were planned costing $1,395,500 and in October last year permits were issued for 12 such buildings costing $684,600. In the way of office buildings only two were planned last month and these were of moderate cost, involving only $150,000 in their construction, while in September five such buildings were planned, involving an estimated outlay of $2,410,000, and in October last year permits were taken out for two buildings of this class costing $460,000. Of manufactories and workshops only one was planned last month and this a very small affair, costing only $5,000 as against three in October last year costing $480,000. There were no schoolhouses planned last month, while in October, 1911, permits were issued for three, involving an estimated outlay of $250,000. Last month one public building was planned to cost $50,000, while in October last year the one for which a permit was issued involved an outlay of $300,000. Of places of amusement there were none planned last month against four in September to cost $545,000 and one in October last year calling for the expenditure of half a million dollars. The total estimated expenditure for new building construction last month is only half what it was in October a year ago, both as regards the number of buildings for which permits were issued and their estimated cost. This is quite at variance with building conditions in some of the other cities which show an important gain in operations as compared with this season a year ago.

Convention American Institute of Architects

The Forty-sixth Annual Convention of the American Institute of Architects will be held in the city of Washington December 10, 11 and 12. The topic to be considered by the convention will be the "Relation of Fine Arts, Sculpture, Painting, Landscape and Building to Each Other."

On the evening of Tuesday, December 10, representatives of the different Chapters of the Institute on Education, Competitions, Membership and Public Information will have an opportunity to meet and present the views of their Chapters on these subjects.

On the evening of December 12 the banquet will be held at which distinguished speakers will be present.

Coming Builders' Conventions

We learn from Secretary James M. Carter that the next meeting of the New York State Association of Builders will be held in the city of Syracuse the latter part of January.

The annual meeting of the Frontier Mason Builders' Association will be held in the city of Detroit, Mich., December 11 and 12, the association embracing the leading cities along the frontier.

Proposed Building Code of Illinois

The commission appointed by Governor Charles S. Deneen to revise and codify the building laws of the state of Illinois has just issued a preliminary report covering features tentatively adopted. These include the administrative features of the proposed building laws together with the sections regulating the construction of theaters, halls, churches, amusement parks, grand stands and other buildings of Class I, and school buildings of Class II. Copies of the report have been printed by the commission for general distribution in order to acquaint builders, contractors, architects and others interested in the work of the commission with the nature of the building laws which have thus far been tentatively adopted. Suggestions and criticisms in writing are invited by the commission, the secretary of which is William Sherman Stahl, 110 Tacoma Building, Chicago, Ill.

Builders' School for Women

Some months ago we mentioned in these columns the project of a builders' school for women which was being constructed at Winfield, L. I., and which was expected to open some time in October. So many applications have been received by the Board of Trustees, of which Thomas J. Buckley is president, that it was decided to wait until the building could be enlarged to accommodate all the applicants. The original capacity of the school was 90, but two more stories are being added so as to give room for at least 250 pupils.

Already more than 150 women and girls have enrolled. The reasons which many of them gave for wanting to take a course of instruction at this school are interesting as well as novel. One girl wanted to become a carpenter because her father was one; another wanted to learn plumbing, as she believed it a road to wealth; one girl, who is said to be the daughter of a wealthy St. Louis man, is to take the course in order to assist her father in building operations, and still another, the daughter of a United States Senator, hopes to start a trade school in her home town for the benefit of factory girls.

The course of study will cover a period of two years and will include carpentry, estimating, drafting, masonry, etc. The tuition is said to be $300 a year. As stated in our previous announcement, Edward Middleton, architect and civil engineer, will be in charge of the school.

Officers of Real Estate Board of Brokers

At the annual election of the Real Estate Board of Brokers held at 115 Broadway, New York City, on October 16, the following officers were elected:

President..............Albert B. Ashforth
Vice-President............E. A. Treadwell
Secretary...................Elisha Sniffen
Treasurer......................A. V. Amy

Various committees were also chosen as well as governors to serve for a period of three years.

Convention House Painters and Decorators

The twenty-ninth annual convention of the International Association of Master House Painters and Decorators of the United States and Canada will be held in the city of Denver, Col., February 4 to 7, inclusive, 1913. The headquarters will be the Albany Hotel, and the business sessions and exhibition will be held in the Auditorium.

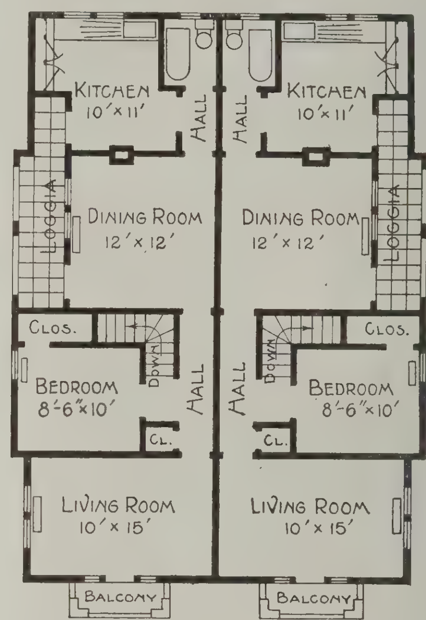
CORRESPONDENCE

A Department Where Those Interested Can Discuss Practical Trade Topics—All Are Invited to Participate

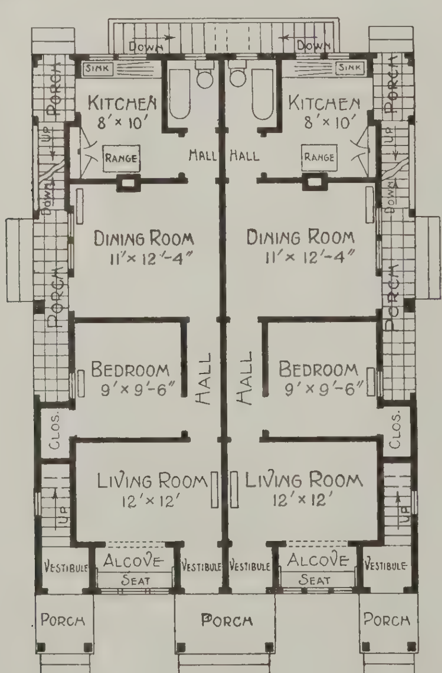
Design for a Six-Family House

From H. C. Winans, Hood River, Ore.—Some time since there appeared in the Correspondence columns of the paper a request from "T .W. K.," Cedar Rapids, Iowa, for a design of a house suitable for occupancy by six families. I am sending drawings which I think may interest the correspondent in question. The ground space, however, is so small that it makes the rooms somewhat contracted, although the arrangement may be satisfactory to him. The plans so clearly show the arrangement that further comment would appear unnecessary.

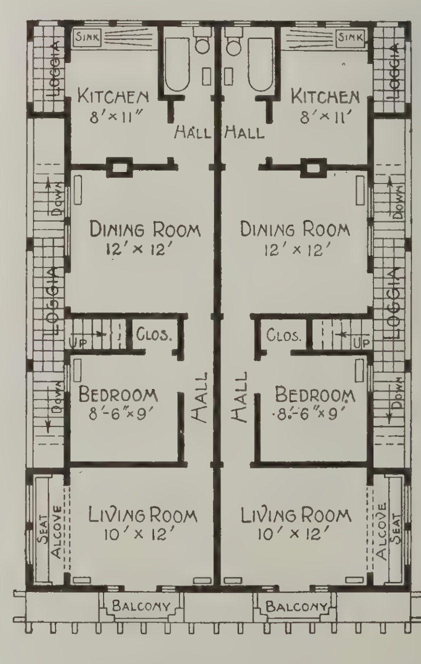
Front Elevation and Section



Third Floor



Main Floor



Second Floor

Design for a Six-Family House—Contributed by H. C. Winans, Hood River, Oregon

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Roof Truss for Mechanics Hall

From A. W. A. Eden, East Orange, N. J.—Replying to the question by "X. X. X.," Yonkers, N. Y., in the November issue of the *Building Age* in regard to roof trusses, I maintain that it is well to specify that the gusset plates should be *not less than* ¼ in. thick for rivets of ⅝ in. diameter; 5/16 in. thick for ¾ in. rivets and ⅜ in. thick for ⅞ in. rivets.

Thicker plates are generally used where the amount of riveting may thereby be reduced, but it would be a waste of material to use for the connection of a single angle a plate of greater thickness than that angle, since the rivets need no greater bearing in the plate than in the angle. A single 2 x 2 x ¼-in. angle may be connected effectively and efficiently by ¼-in. gusset plates, provided the section of the plate itself be sufficient for the load to be transmitted.

In structures where corrosion is likely to occur it is best to use material not less than 5/16 in. thick or even ⅜ in.; but in an ordinary building where the steel is well painted when erected, ¼-in. metal is usually very satisfactory for minor members and connections, and even for some main members.

Figuring Size of Timbers for Bracing Trenches

From J. W. S., Paterson, N. J.—I would like some of the practical readers of the *Building Age* to tell me how to figure the proper size of timbers to use in order to hold the banks of a trench 14 ft. deep and 5 ft. wide to be sheeted on each side with 2-in. plank driven down. The accompanying sketch, Fig. 1, may be taken as a cross section of the trench with the timbers in place.

I should like to know the method of figuring the bank pressure on the sides of the sheeting and the frame.

Answer.—In reply to the above request Ernest McCullough furnishes the following:

In his sketch the correspondent shows that he intended using sizes demonstrated by years of experience to be about right. For many years the majority of contractors used the rule "Don't be afraid to use timber," while engineers figure the sizes of timbers from rules derived for retaining walls. On the majority of jobs, where not a great deal of timber would be used, the contractor's rule was all right, provided the contractor was an experienced man and his foremen were experienced. On very large pieces of work economy had to be considered, so engineers were employed to make tables of timbers for trenches of various depths. A few years ago a number of engineers commenced studying carefully the pressures on trench braces and found that while for loose material the pressure was greatest at the bottom, running to zero at the top, there were many instances in sewer trenches of a greater pressure at the top than at the bottom.

In a discussion before the American Society of Civil Engineers in 1907 J. C. Meems presented formulas for computing the pressure, which were not very different from old-time retaining wall formulas, but which placed the maximum pressure at the top of a trench and made it zero at the bottom. In the discussion it was pointed out that all previous experiments from which formulas had been derived had been with materials placed against small walls, so that a tendency of the material to slip on an angle equal to the angle of repose, or limit of friction, was observed. This naturally brought the greater pressure against the bottom of the wall. In excavating trenches in compacted material it was observed that the bank would stand until the trench was excavated for quite a depth, when it would topple forward, thus bringing the greatest pressure to bear at the top. E. G. Haines showed that in reality after the ground has been excavated to a depth where the cohesion is destroyed, that is, when the strength of the material in tension is gone, the lower portion tends to slide forward on a circle and the unsupported material above will fall down unless restrained. If restrained it exerts an arching action at the top against the supports.

The two actions cannot occur at one and the same time, but bracing should always be designed to take care of either condition, this applying also to the design of a retaining wall. In Fig. 2 the curved line *B-E-A* is the line along which the cleavage occurs, the material sliding along the curve *B-E* and exerting

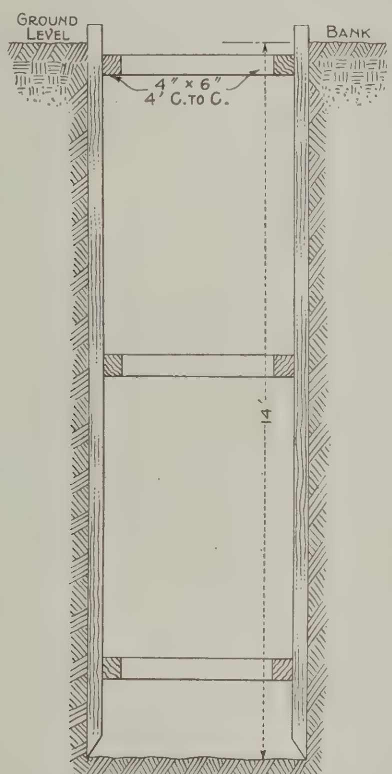


Fig. 1—Vertical Section Through Trench as Submitted by "J. W. S."

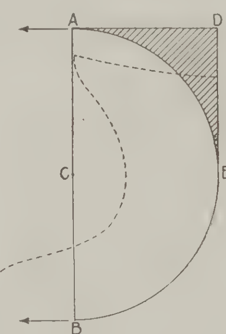


Fig. 2—Diagram Showing Slipping Action of Excavated Material

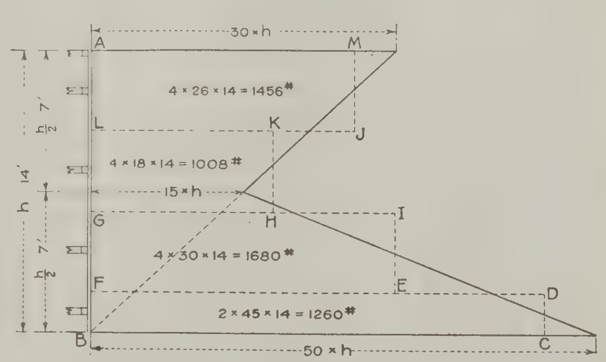


Fig. 3—Showing Method for Determining Pressures in Trenches Applied to a Trench 14 Ft. Deep

Figuring Size of Timbers for Bracing Trenches pressure at B. The triangular portion, A-D-E, is prevented from falling by arching action exerted as a thrust against A. Old contractors will recognize this action occurring behind trench braces, the shaded portion, gradually falling down in the space below, so that the braces and sheeting drop into the trench. The writer has taken the formulas developed and assuming a material fairly cohesive and weighing 100 lbs. per cubic foot, obtained the data from which we make a diagram similar to that shown in Fig. 3, for a trench of any depth, the width having nothing to do with the question, except as it may govern the sizes of the cross braces. When the cross braces are of wood they are usually of the same size as the rangers. The vertical 2-in. planks are termed "sheeting" and the horizontal stringers are termed "rangers," the cross pieces being known as braces. For convenience in working the rangers are placed from 4 ft. to 8 ft. apart. When placed 4 ft. apart staging is placed on the alternate braces, so the men can throw 8 ft., a 6-ft. throw being wasteful of energy. A table of braces is therefore generally arranged for 4-ft. lines of rangers, with braces 4 ft. apart horizontally. This horizontal spacing of braces is not always best and may often be made greater with considerable advantage. Six feet is a good spacing, while 8 ft. is a spacing not considered safe or economical.

Reducing all the quantities to a final stage the result is shown in Fig. 3. To construct such a diagram draw a vertical line to scale representing the depth of the trench in feet. Draw a horizontal line, to any scale, at the top equal in length to thirty times the depth, or as it is marked, the height. At the bottom draw a horizontal line to same scale as the top line, equal in length to fifty times the depth, or height. Connect the end of the top line with the bottom of the vertical line. It will be found that opposite the middle height the distance from the vertical line to this slant line of pressure will be fifteen times the depth, or height. The end of the lower line is then connected to the point where the pressure $= 15 \times h$, as shown. A horizontal line drawn from the vertical line at any point will give by scale the pressure in pounds per square foot on the wall, or side of trench, at that point. Now place a ranger 1 ft. above the bottom and draw the rectangle F-B-D-C, averaging the length as determined by the slant line. This ranger will be high enough above the bottom of the trench to allow a shovel to go beneath it, the next rangers being spaced 4 ft. above it, to retain the material in the rectangle F-E-I-G. Proceed in this manner to the top, where it will be seen the first ranger will be below the top, at the middle of the rectangle. The area of each rectangle, multiplied by the depth, in feet, gives the pressure for a depth of 4 ft., for 1 ft. in length of trench, against the rangers.

The pressures in the case given by J. W. S. are shown in Fig. 3. It will be necessary to make a similar diagram for each depth of trench. For a contractor having much work of this sort it is well to make up tables once for all, for trenches of all depths from 8 ft. to 40 ft., so that orders can be placed for sheeting, rangers and bracing when a contract is signed.

The next thing is to determine the sizes of rangers. The moment of resistance in foot pounds for different sized timbers is here given.

4-ins. x 4-ins.	1300
4-ins. x 6-ins. (flat)	2000
4-ins. x 6-ins. (edge)	3000
6-ins. x 6-ins.	4500
6-ins. x 8-ins. (flat)	6000
6-ins. x 8-ins. (edge)	7500
8-ins. x 8-ins.	13400

these moments being good for ordinary timber and with a lower factor of safety than would be used in buildings of a permanent character.

To find the size of rangers required the following formula is used, the length of ranger center to center of brace being 4 ft.:

$$M = \frac{1456 \times 4 \times 4}{10} = 2350$$

Use 4×6 with edge to planks.

$$M = \frac{1008 \times 4 \times 4}{10} = 1240$$

Use 4×4.

$$M = \frac{1680 \times 4 \times 4}{10} = 2660$$

Use 4×6 with edge to planks.

$$M = \frac{1260 \times 4 \times 4}{10} = 2030$$

Use 4×6 with flat to planks.

At the very top a light ranger may be placed with light braces across the trench if desired. The pressure being taken care of by the ranger 2 ft. below the surface there is seldom any necessity for the top ranger and brace. Notice that in the formula the total pressure is multiplied by the distance between braces squared. While the rules will give rangers varying somewhat in size it is of course customary to compute the size required for the greatest pressure and make them all alike. On large pieces of work and with deep trenches considerable economy will result when the sizes are different at each staging.

Best Method of Placing Sheathing Boards

From J. C. C., Omaha, Neb.—In the October issue of the paper "E. E. H.," West Hartford, Conn., in answer to "J. C. B.," Dowagiac, Mich., states that the custom in Connecticut is to place siding or sheathing on frame buildings diagonally. I believe this way is quite abandoned by the best builders outside of New England, for the reason that leaks are liable to be led a long distance and it is difficult to find the place of entrance.

I find the best possible way is to lay tongue and grove stock or shiplap horizontally. This way any moderate leak will follow the first seam or groove and soon check.

Some Questions in Barn Construction

From D. P. Barry, Redford, N. Y.—In answering the questions of "W. H. J. P.," Philadelphia, Pa., which appeared under the above heading on page 586 of the November issue of the *Building Age*, I would say, do not put an octagonal ventilator on a rectangular barn; make the ventilator one-sixth or one-seventh the size of the barn; cut the posts all the same length, 4 x 4 in. or 5 x 5 in. Frame in girts just high enough to go over the peak of the barn. Run them all around and bevel the top to 45 degrees. Board up to this and run a water table all around. Frame a girt on each side beveled to fit the roof. Cut in pieces on the ends to fit the roof.

Cut the gains for slats at an angle of 45 degrees. Slat up to the side frieze finish square around and up the gables. Put on the cornice of the roof and base to suit yourself. Cut a hole in the barn roof 2 ft square and anchor the ventilator.

My ventilators consist of a neat little window without glass, 10 x 18 in., high up in each gable, thus producing a current in the upper part of the barn.

The correspondent does not want any stalls for cows. He should use stanchions. Feed racks should be 1 ft. above the feet of the cattle and the feed boxes the same hight. There should be a passage in front of the cows to feed them, or they may be fed from above.

I do not like a horse stall less than 6 ft. wide. The partitions should be 4 ft. high at the rear post and in front they should run to the ceiling. The top of the manger may be 3½ ft. high and 2 ft. wide. The top of the feed box should be level with the top of the manger. I would suggest that iron feed racks and feed boxes, however, are altogether better than mangers, but they should be properly located and then built down to the rack and fed from above.

Comments on Winding Stair Rails

From C. F. S., Brooklyn, N. Y.—Referring to the discussion which has been running through recent issues of the *Building Age* touching the subject of Winding Stair Rails and which has made the "Tangent System" an object of attack, I note that the chief contention now being urged is "that the thickness of the plank found by the methods of this system is insufficient; that it will not permit the formation of a rail in accordance with the helical nature, required in a climbing stair.

The efficiency of this method cast for months in the shadow of a prolonged doubt seemed worthy of some investigation and the result of an inquiry into this reputed failing is contained in the remarks which follow and shown in the several diagrams.

Fig. 1 includes the plan and elevation of tangents for a quarter circle. With the exception of different methods used in obtaining the bevels and face mold, the plan and elevation has been made to correspond with Fig. 2, given by "Cymro" in the July issue of the paper. A plan of the quadrant is seen again in Fig. 5 and the reader is asked here to notice its division into four equal parts. Since the rail, of which this quadrant is the plan, is to be one of uniform ascent, agreement will exist that the center line of rail represented in either of these equal parts must ascend one-fourth of the hight shown in the elevation.

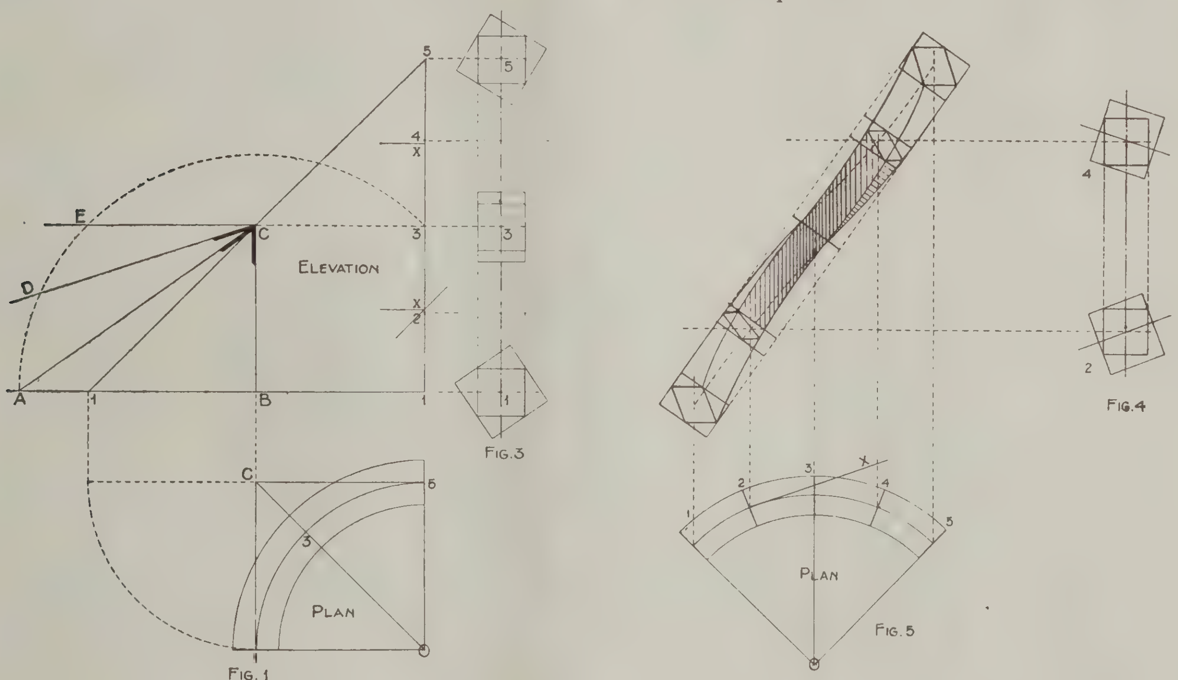
In Fig. 1 construct the square 1-O-5-C and draw the diagonal O-C. Unfold and transfer the tangents to the base of the elevation as shown at 1-B-1. Now set up the hight and divide it into four equal parts, as shown by the points 1, X, 3, X, 5; also draw the line giving the pitch of the tangents as 1-C-5. Now, from the point 3 draw the line E-C-3 parallel to 1-B-1 and draw B-C parallel to 1-5.

By dividing the line 1-5 of the elevation into four equal parts the hights of the center of rail over the divisional lines of the plan in Fig. 5 will be determined.

Over three of these points in the plan will be observed the correspondence of the center of the rail with the center of the plank. At the joints, which are denoted both in plan and elevation by the numbers 1 and 5, the center of the rail and the center of the plank are made to coincide, but in regard to the correspondence of the rail and the plank above the point 3 the helical nature of the rail is responsible.

The center of the plank may be considered as being part of the surface of an oblique plane—a plane whereon may be projected the center line of the rail and tangents. In this projection a line drawn bisecting the angle of tangents will be a level line and will lie directly over the diagonal of the plan. Its hight as shown by C in the elevation is equal to the hight of the center of rail as indicated by the level line E-C-3 in Fig. 1.

Thus the intersection of this line with the elliptical curve must be the center of the rail, and since it is found in the oblique plane it must also be the center of the plank, and consequently three points that are equidistant in the helical curve have been found in the center of the plank.



Comments on Winding Stair Rails—Contributed by "C. F. S.," Brooklyn, N. Y.

In Fig. 1 the bevel used for application at the joints is found by describing the arc 3-E-D-A from the center B with a radius equal to the diagonal O-C of the plan. Then join A-C of the elevation. To form the sections shown in Fig. 3 we draw three vertical lines at distances apart equal to half the width of the rail. Then from the points in the elevation 1, 3, 5 produce the horizontals, which give the centers of these sections. Set off half the thickness of the rail on each side of the horizontal lines, thus forming three rectangles sufficient to contain the profile of the rail.

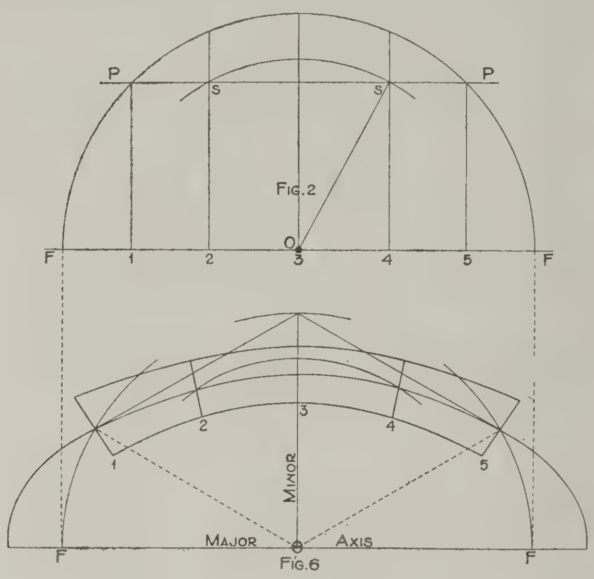
The lower rectangle represents the rail at the lower joint and the thickness of plank is found between two lines drawn parallel to A-C of Fig. 1 touching the corners.

Two other lines drawn at right angles to A-C complete this section of the plank as required by the face mold. The top section may be found in a similar manner, but with the bevel reversed.

Section 3 is at the minor axis and the face plank is parallel to the level section of the rail.

Reverting now to the plan, Fig. 5, two points have been fixed in the elevation as the hight of the centers of rail over the divisional lines 2 and 4. To find the hights of centers of plank over these points a method is shown in Fig. 2.

Draw two parallel lines as F-F and P-P at a distance apart equal to the radius of the center line of the rail. Now with one leg of the dividers in O as center and with O-C of Fig. 1 as radius, describe the semi-circle



Comments on Winding Stair Rails—By "C. F. S.," Brooklyn, N. Y.

on F-F. Divide the portion of the semi-circle which is cut off by the line P-P into four equal parts and draw from these divisions lines at right angles to F-F. Number the intersections made on F-F as shown from 1 to 5, and the distance between the points on F-F so numbered show the relative hights of the centers of plank.

The distances 1-2 and 1-4 in Fig. 2 transferred to the elevation will show at once the differences between the centers of rail and centers of plank over the divisional lines 2 and 4 shown in plan in Fig. 5.

Having transferred the distances found in Fig. 2 to the line 1-5 in the elevation, the distance between 2 and X must be understood as the vertical difference between the center of rail and center of plank over the line 2 in Fig. 5. Now, to raise the rail correctly, in a right section of the plank as seen at 2 in Fig. 4, the pitch of a tangent is found, as for example that shown in plan at X in Fig. 5.

The inclination of this tangent is drawn through X in the elevation, Fig. 1, and a line squared from the point 2 in the elevation to meet it. The length of the short line from 2 as found will be the distance to raise the rail above the center of the section.

A bevel for the sections in Fig. 4 is found in the elevation of Fig. 1. The angle B-C-D is the bevel and is obtained by bisecting the angle A-C-E.

To draw the sections project lines from the points 2 and 4 of the elevation to any convenient position, as for example 2 and 4 of Fig. 4. Drop three perpendicular lines at a distance apart equal to half the width of the rail. Where the perpendicular intersects the horizontals will be the centers of the plank.

For the section at 2 the center of rail is raised above the intersection equal to the short line squared from 2 in the elevation, and for the section at 4 the rail center is the same distance below the intersection.

Complete the rectangle at each section about the center of the rail. Then through the lower intersection which is the center of plank in section 2 draw a line parallel to C-D of Fig. 1. Above and below this line draw parallels at a distance from the center line equal to half the thickness of the plank. Complete the plank section as shown with two lines at right angles, touching the corners of the rectangular rail.

Section 4 is drawn with the bevel reversed, and if turned upside down would be identical with section 2.

The face mold is shown in Fig. 6. To find the foci for the center elliptical curve repeat the operation of Fig. 2. With a tangent as radius describe a semi-circle on F-F. Set off the semi-minor axis on a line through the center at right angles to F-F. The points F-F will be the location of the pins to which to attach the string and trace the semi-ellipse through the points in the minor axis.

The two intersections of the elliptical curve with the semi-circle indicate points which are the extremities of the tangents at the joints, and points found in the elliptical curve by the intersection of a circular arc of radius O-S of Fig. 2, will locate the center points of the sections 2 and 4. Complete the mold by drawing the tangents and section lines, making the width of the mold at the sections equal to the width of the plank in Figs. 3 and 4, then trace inner and outer curves.

The methods submitted for finding the face mold, bevels and hight of plank centers are simple and peculiarly adapted to cases where the tangents incline at 45 degrees over a quadrant.

The thickness of plank which was found for the first section drawn has been applied in each of the other sections, and in each of these instances sufficient wood has been found to allow the construction of a rail as proposed. A projection showing the squared wreath in the plank is given in Fig. 5, which, together with what has been said, illustrates beyond all doubt the reliable nature of the method in question.

This conclusion which must force itself upon every attentive mind, if at all familiar with the subject, may be reasonably expected to throw some confusion into the camp of certain adverse critics, in view of their recent contentions.

Turning Ovals in a Lathe

From D. P. Barry, Redford, N. Y.—For the benefit of "M. B. O.," whose letter appears on page 588 of the November number of the paper, I would state that no such thing as he mentions can be done. A special lathe is used for the purpose. A finished axe handle or last is put in a hanging frame and revolves the same as that in the turning lathe, passing its whole length over a wheel, and as a convex or concave surface touches the wheel it lets the chisel in or out. The operator does nothing but put in and take out—put in a block and take out a last.

Some years ago several of them were in use in Burlington, Vt.

Seasoning and Curing Cherry Lumber

From R. H. R., Portland, Ore.—I come to the Correspondence columns of the *Building Age* in search of a little information in regard to the seasoning and curing of wild or tame cherry lumber. I have the opportunity of securing some very fine logs of tame cherry trees, some of them being 18 to 20 in. in diameter and from 6 ft. to 12 ft. in length. I would be very thankful for any information which the readers of the paper may furnish on this subject.

The new home which ex-Fire Chief Edward F. Croker is building at Long Beach, Long Island, N. Y., will be a fireproof dwelling constructed of hollow tile and with doors, window frames and sashes of metal. There will not be a piece of wood used in the building.

Heating a Portable Schoolhouse

How the Problem of Heating Temporary School Buildings Has Been Solved by Use of Warm-Air Furnace

THE heating of a temporary school building with warm-air furnaces, as worked out in New York City, has been selected for discussion in this article as embodying something of more than usual interest to the practical reader. The necessity for properly housing school children in New York City has grown faster than the funds have become available for the erection of the necessary structures. This has brought a problem of housing the school children temporarily. One solution has been found in the erection of portable school buildings on grounds which have been available in close proximity to the school buildings already in service. Such a temporary structure was erected from plans accepted by the Department of Education some time ago as an annex to school No. 97 at Ulmer Park, Borough of Brooklyn, the heating and ventilation of which as here described present some interesting features.

As these structures are sooner or later replaced with permanent buildings, they are of the portable type and can be taken from one place where they have completed their service to another where they are needed. The framework is so constructed that the interior finish is a wood wainscoting and on the outside of this there is a heavy paper covering, then a layer of hair felt, then more paper, over which the sheathing is placed to make the building weatherproof and capable of being readily heated.

Exterior View of the Portable Building Showing Position of Chimneys and Ventilator

Heating a Portable Schoolhouse

The building in question occupies a space on the ground of about 24 x 70 ft. and is divided into two rooms, with a hall about 9 ft. wide between and running directly across the center of the building. Each of the rooms has accommodations in the way of desks and seats for about 35 pupils. The interior is about 9 ft. high on the side walls with a height of about 17 ft. in the center. The building is covered with one of the ready roofing materials and is provided with galvanized iron eaves trough and conductor pipe.

An exterior view of the building is reproduced to give the reader an idea of the general construction and exposure and also to show the sheet iron smoke-pipes, cowls and ventilators used in connection with them for fire protection. This view also shows the Anchor ventilator made by the Meurer Bros. Co., Brooklyn, N. Y., which is used in connection with the exhaust ventilating system provided for removing the air from the building and ventilating the wardrobes through the piping shown in one of the illustrations.

The method of heating and ventilating the building will be more readily understood from a view of the interior of the north school room. A similar heater and equipment are installed in each room. In the extreme northwest corner of each room there is located a No. 328 Comfort furnace made by the Graff Furnace Co., 208 Water street, New York City. This furnace is made with a 28-in. casing, a 16-in. grate and a 16-in. fire-pot. Above the fire-pot is a combustion chamber rising in a dome with an outlet leading into a ring radiator which is connected with a 6-in. smoke-pipe made of 20 gauge galvanized iron extending through the roof.

In extending through the roof the smoke-pipe passes through a special sheet iron drum which is 18 in. in diameter and about 34 in. in hight, one-half of which is within the building and one-half without. The drum is made with an inner and outer cylinder and the 6-in. smoke-pipe is run up through the interior cylinder with ample space between it and the cylinder. Around the bottom and top of the cylinders 1¼-in. holes are punched between the cylinders and around the smoke-pipe for the double purpose of preventing the overheating of this sheet iron drum and for fire protection to the woodwork. These vents also serve in ventilating the schoolroom. This ventilating smoke-pipe protector is made of 22 gauge galvanized iron and, as will be seen from the accompanying reproduction of an outside view of the building, it terminates in a cone top so arranged as to prevent the entrance of snow or rain while permitting a free exit of air. The arrangement of the bottom of this ventilating drum is shown in the interior view.

The furnace rests on a blue stone slab which is supported on brick walls so that no heat comes in direct contact with any timber.

In the interior views the 12 x 24-in. galvanized iron fresh-air supply duct is shown entering the building near the ceiling and dropping down to the floor, where the necessary turns are made for a proper connection with the casing of the furnace. In one of the views it will be noticed that there is a quadrant damper handle, so arranged that the air from out of doors may be reduced in volume and the air within the schoolroom circulated as may be necessary in extremely severe weather in the character of buildings which circumstances make it necessary to use. It will be noticed that all of the turns in this fresh-air supply duct are made on curved lines and with sufficient sweep to reduce friction and facilitate the flow of air to the heater.

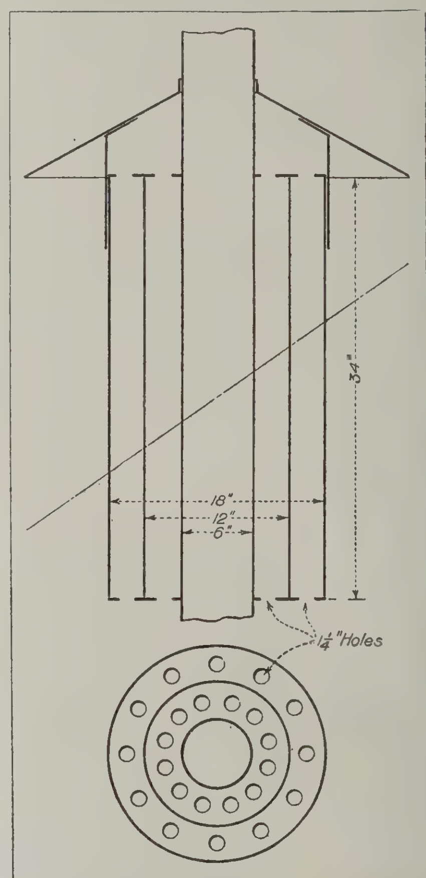
The view of the north schoolroom shows in the side wall near the furnace an opening through which access can be had to the coal supply in the bin on the outside of the building and shown in the view of the exterior. Another important feature is that the casing of the heater is made of galvanized iron and is insulated on the inside to prevent excessive heat at the point where it is located.

From the top of the heater a 16-in. round pipe rises to a round elbow, which connects with a 16-in. round pipe at a point about 7 ft. above the level of the floor. This pipe runs about 3 ft. to a point where a 9-in. Y branch is taken from its side. This branch ends with a 45 deg. turn in a short pipe with a wire screen on the end made of 16 gauge woven wire of ⅜-in. mesh. The air passing through it is discharged at right angles to the main pipe so as to flow directly across the room.

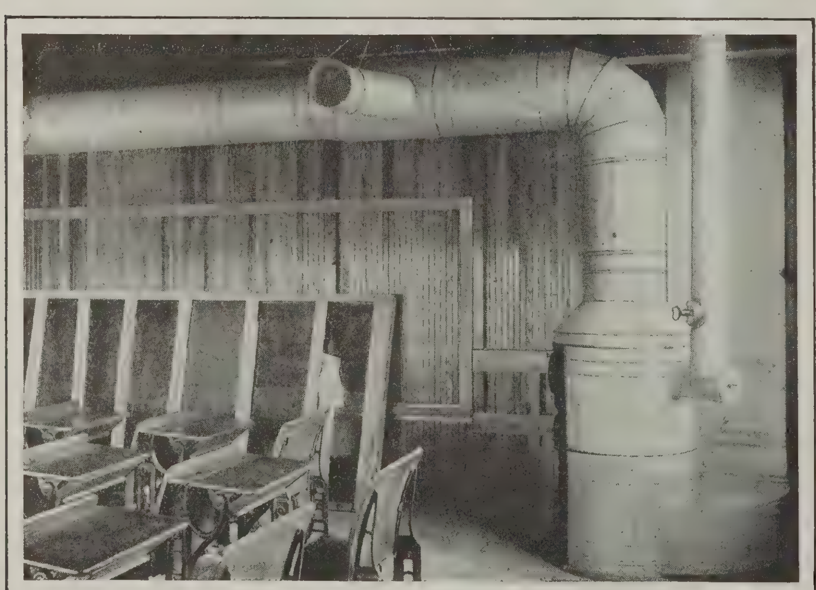
After the first branch is taken off the pipe is reduced to 14 in. in diameter and continues about 8 ft., where a similar outlet, 10 in. in diameter, is provided. The pipe is then reduced to 12 in. and continues that size to the end, terminating in a round elbow. Through this 12-in. elbow the air is thrown across the schoolroom.

Another view in the hall shows the ventilating system. Near the bottom of the illustration, at the right of the wardrobe, there is shown a 12 x 18-in., coarse wire grill opening into the schoolroom. One of these grills is in the wardrobe on each side of the hall. From the top of the wardrobe a 12 x 12-in. 20 gauge galvanized iron pipe leads to a central 20 x 20-in. vertical ventilating shaft which terminates in the Anchor ventilator on the roof. By this means it will be seen that the air exhausted from the schoolroom is carried through the wardrobe and the ventilating system serves the double purpose of drying the clothing of the school children in inclement weather and of ventilating both the wardrobe and the schoolroom. This ventilation also facilitates the inflow of the warm air from the furnace, by removing the cooled air to make room for the warmed air.

With the accompanying plan, elevation and views in the building, the detail of the installation will be understood by the reader who now may desire to look into the relation which various parts bear to one another. The building exposes two ends each 23 ft. wide and two sides each 67 ft. long, or a total girth of 180 ft. With the hight of 9 ft. this gives the building a wall exposure of 1620 sq. ft.



Smoke-Pipe Protector and Ventilator


Heater and Piping Connections in North Schoolroom

Heating a Portable Schoolhouse

If 20 per cent. of this is glass surface, there is exposed 324 sq. ft. of glass and if one-third of the remaining surface is considered in cooling effect equivalent to glass, there would be 432 sq. ft. additional. If the gable ends are computed on the same basis, there is 61 sq. ft. more. If one-tenth of the roof area is estimated as the equivalent of glass in cooling effect, there is a total equivalent glass surface of about 1000 sq. ft.

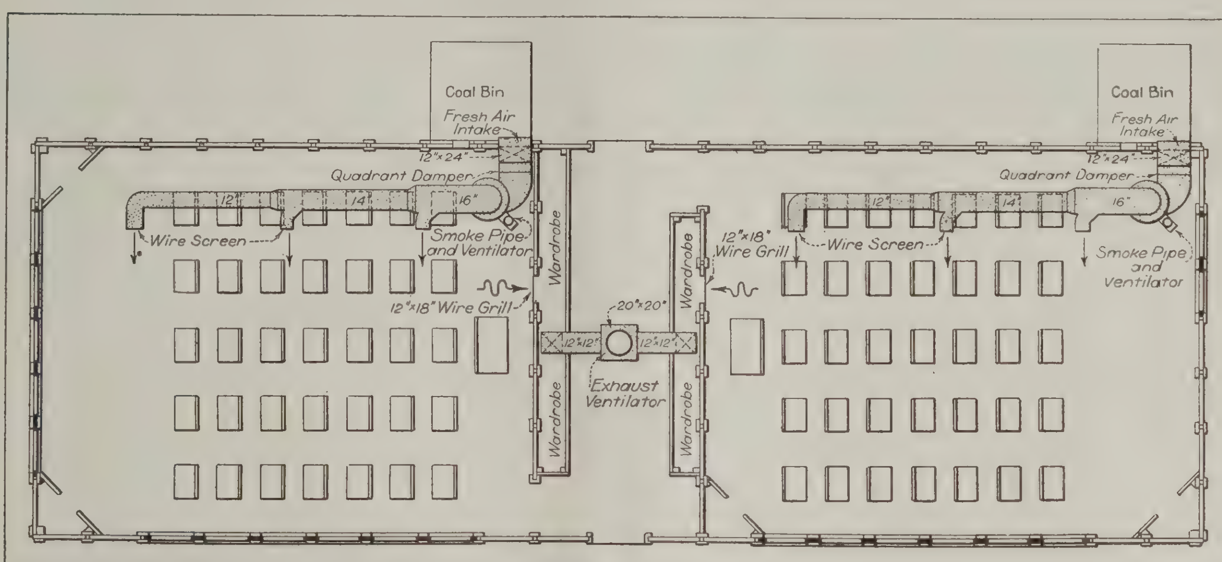
If each sq. ft. of equivalent glass surface loses 85 heat units per hour in zero weather the furnaces must supply about 85,000 heat units per hour to make up for the losses through the roof, walls and windows. When air is used to carry the heat to a room the air cools and must be removed to allow for the entrance of more air at the higher temperature needed to do effective work. Under such conditions it is customary to figure that practically one-half of the heat brought in is lost. This makes it necessary to supply twice 85,000 heat units or a total of 170,000 per hour.

With the heater placed in the room to be heated and with the smoke-pipe running through this space, it is fair to assume a higher efficiency from the fuel than is ordinarily conceded to furnaces, and it is safe to assume that from each pound of hard coal burned at least 9000 heat units are available for heating the air. By dividing 170,000 by 9000 it will be seen that 19 lb. of coal must be burned per hour, and as the grates of the two furnaces have a combined area of 2.8 sq. ft. the furnaces must burn 6.78 lb. per square foot per hour. This should not be too high a rate for furnaces connected to a vertical 6-in. pipe running up to 20 ft. and having a cowl at the top which will have a beneficial effect on the draft when there is any wind blowing.

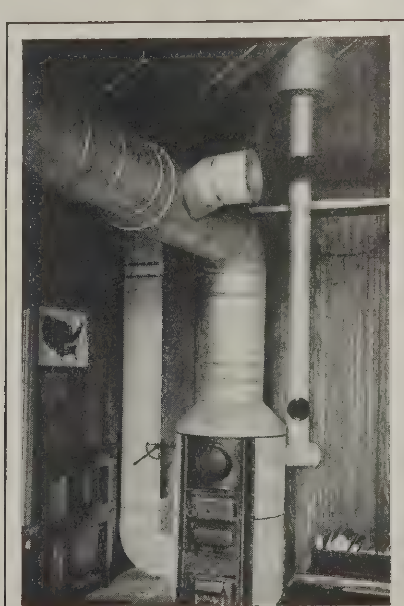
With the furnaces run under such conditions and with the rate of combustion mentioned it is quite probable that the air would be discharged from the various outlets at a temperature of 120 deg. If as high a velocity as 8 ft. per second is assumed, calculation shows that the 16-in. pipe from the heater in each schoolroom would pass 672 cu. ft. of air per min., or 40,320 cu. ft. of air per hour, or a total of 80,640 cu. ft. of air per hour from the two heaters. As the contents of each schoolroom contain about 8670 cu. ft. this would provide a change of air in the schoolroom 4.65 times per hour. This would provide ample fresh air in the schoolroom which has 240 cu. ft. of space for each pupil.

It is quite possible for the velocity of the air flow assumed to be attained in view of the fact that whenever there is a strong wind blowing the ventilator will be active in exhausting the air from the building and facilitate a lively air movement.

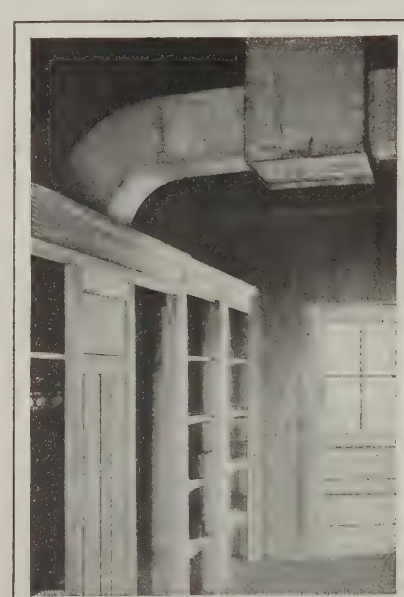
As has been mentioned, provision is made for circulating the air in this portable building to facilitate heating it in excessively cold weather, but experience in similar schools shows that the heaters have capacity to burn the fuel to offset the heat losses in zero weather and the need of circulating the air in the building is improbable.



Plan of School Building Showing Provisions for Heating and Ventilating



Heater and Piping in South Schoolroom



View in Hall Showing Ventilating Grill

Heating a Portable Schoolhouse

Is Technical Education Worth While?

An English correspondent in discussing the question indicated by the above title expresses views which we doubt not will find an echo in the thoughts of many American readers associated with the building and allied trades. Among other things he says:

"I must say it is not an uncommon experience to meet with workingmen who declare that technical education does not pay. The present age has, they argue, so reduced the scope of work carried out by each person, that all that remains can be done with the exercise of a comparatively small amount of mechanical skill. Of course, even this demands a certain amount of intellectual capacity, but it does not exact the same acuteness of imagination, and the same degree of initiative, as were required when the scope of work that each had to do was considerably wider. But, however well founded the objection to technical education may be with regard to the lower positions, it undoubtedly loses its force as the ladder of advancement is mounted, until, in the highest positions, the pay is made entirely for brains.

"Too many young men do not appear to think it worth while to cultivate brains to apply in their work. Under present industrial conditions, it is often possible for a young man of very limited education and experience to be making just as comfortable a living as a man of infinitely wider knowledge. Consequently, when the ideal of full wages has been reached, the incentive to improvement flies. Anyone who has had to deal much with members of the building trades knows how true this is, and also knows that many wake up when the best part of life is past, and indulge in vain, bitter regrets at their neglect to cultivate their opportunities.

"Of course, there must always be the hewers of wood and drawers of water, or there would be no need for the overseers, foremen, managers, and men whose duty it is to make the best use of labor. But, except in the case of physical or mental incapacity of the most marked character, no young man ought to think he cannot improve his position by patient endeavor. His efforts may not command immediate success, and perhaps may never meet with the reward they deserve, but he will, at all events, gain happiness and interest in life by the development of mental faculties.

"Biography is full of instances of men who have succeeded in spite of obstacles sufficient to daunt ordinary men; and it is impossible even to guess what results may follow a long striving toward self-improvement. Many examples of the success that follows determined effort are recorded in every newspaper.

"Many have been helped to success in no small degree by the stimulus of technical schools and institutes; but the road to success is neither short nor easy. In the technical schools it is the men of persistent effort who achieve the most solid success. The longer a man is able to keep to his determination to know all about a single subject, the nearer does he get to that ideal.

"It has been remarked that what a man really wishes to do, that will he succeed at. Let a young man determine to be at the top of his profession, and it is more likely than not that he will reach the goal. Let him lay down a bold plan early in life, and keep to the plan except when experience justifies a modification. Let him not wait for opportunities to occur, but make them whenever possible, and try to be ready to take advantage of such opportunities as come his way. Let him not be discouraged at apparent failures, but remember that many apparent early failures have been the foundations of after success.

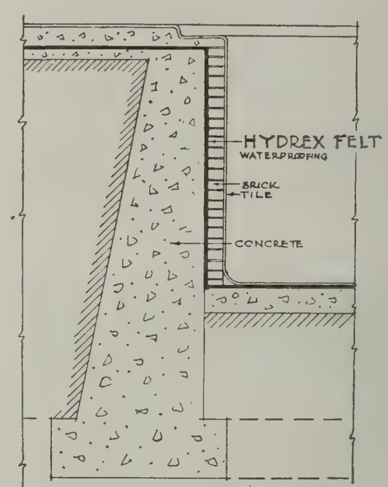
"Every effort gives the mind strength to proceed in making another, if failure of immediate success is not allowed to swamp the determination to succeed. Time and patience will aid the development of the weakest powers, and valuable results may be obtained in a direction which seemed previously hopeless. These are only a few maxims that are all covered by the determination to succeed.

"While the ambitious man is steadily plodding onward toward the goal he has set himself, he may be making influence in a way of which he never dreamt. There may be observers watching him who will some day require such a man as he is becoming, to fill a post that will lead the quicker to the fulfilment of his ambitions. This kind of influence is the only variety that is really worth cultivating, as it has its bed rock on that true foundation—real merit."

Waterproofing a Swimming Pool

It has been stated that thousands of dollars of damage has been done by using improper methods of waterproofing swimming pools. The general construction of a swimming pool consists of concrete walls and bottom on which is placed brick and then an outer layer of tile or other finish. It is necessary, therefore, to waterproof the concrete.

Various washes, cement, plaster, have been applied to the concrete with the object of making it impervious. While some of these have been partially successful, it is generally admitted that when they become rigid and set there is a considerable possibility of cracking from contraction and expansion, settlement, jars and vibration.



Section Through Swimming Pool Showing Method of Waterproofing

One method to waterproof a swimming pool is to use several layers of impervious felt cemented together, forming a tough, flexible, impervious stratum, which will at all times yield to settlement, contraction, expansion and varying temperatures. One sheet of this material is absolutely impervious to water, but it is the general practice to use three or four. In the accompanying illustration is shown a section of the swimming pool at the Montreal Central Y. M. C. A. It will be noticed that between the brick and concrete has been placed several layers of "Hydrex" felt cemented together with a hot compound.

This pool was designed by Jackson & Rosencrans, architects, New York, and the waterproofing is in general similar to that used at the swimming pool of the Nichols School, Buffalo, N. Y., this latter design being by Green & Wicks. In this case the pool was waterproofed with four layers of "Hydrex" felt cemented together.

Building in Vancouver

What an English Writer Has to Say about Wages and Methods of Building Construction in City

A RATHER interesting account of building conditions in Vancouver, British Columbia, and covering rates of wages in various branches of the trade, together with some reference to the methods of construction which prevail in that locality, is contained in a letter of a correspondent of the Illustrated Carpenter and Builder published in London, England. As indicative of the English viewpoint we present it herewith.

At the present time there is plenty of work of all kinds going on in Vancouver, but there is no shortage of labor. In fact, I believe the supply more than meets the demand. The average wage of the different workmen is as follows: Laborers on buildings, $2.75 per day (those working for the city in the making of roads, etc., get $3 per day); bricklayers, $6 per day; carpenters, $4.25; plumbers, $5; plasterers, $6; stonemasons, $6; painters, $4.25; electricians, $4. Workmen in the building trade work eight hours a day, four hours on Saturdays. Tile setters get $6 per day and marble setters $6 per day.

Living in British Columbia costs more than in the other Canadian provinces, and as a consequence wages are higher here.

The age of the city of Vancouver is about twenty-five years, and it has made wonderful strides in every way; indeed, people coming to visit the city are surprised to find such a large and busy one. It is a very English city in appearance, but there are now two very high buildings ranging round 260 ft., and one of these is claimed to be the highest in the Empire; they are the World Building and the Burns Block. Another high building is the Rogers Block. Among the population are numbers of foreigners of all nationalities. They are mostly engaged in the rough laboring work. At this time of the year gangs of men are engaged making the roads and building sewers. The majority of the residences are of wood, so that numbers of carpenters are employed in building them. This does not imply that a lot more men are required, because at present there seems to be no scarcity of men, but still they are more in demand than other trades, and prospects for all are much better out here than in the Old Country.

The carpentry and joinery of some of the residences, and in some cases in the larger buildings, is not to be compared with English work. They do the work out here in such a way that it takes very little time to build a house. The majority are frame houses, built of studs or posts 2 in. by 4 in. or 6 in., 16-in. centers, and resting on a plate either 2 in. by 6 in. or 2 in. by 8 in., as shown in Fig. 1 of the sketches.

But you have no doubt seen an American building construction book. A point to be noted about these houses is that the house itself is in no way made secure to the foundations. It simply rests on the concrete as shown. That is the reason one sees a house perhaps in the middle of the street being moved. I happened to see one shortly after my arrival here. A chimney stack was built inside the house right up the center, but the moving did not seem to affect it. If a gale was to blow here, as in England, I am certain some of the houses would be blown over.

The posts are placed on the plate and simply nailed, not let into the plate at all, but nailed as shown in Fig. 2. And what a job it looks, too. Joists are never tenoned to each other, but nailed as in Fig. 3; also they do not house the treads and risers, but do it as shown in Fig. 4.

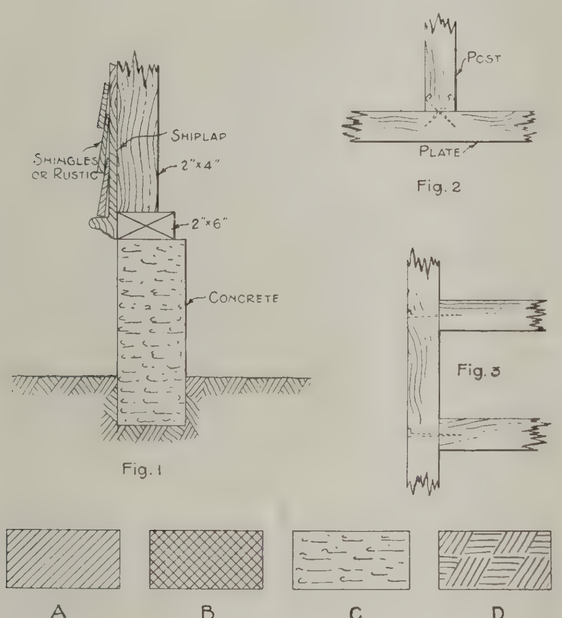


Fig. 1—Water Table Construction
Fig. 2—Method of Fastening Post to Plate
Fig. 3—Arrangement of Joist

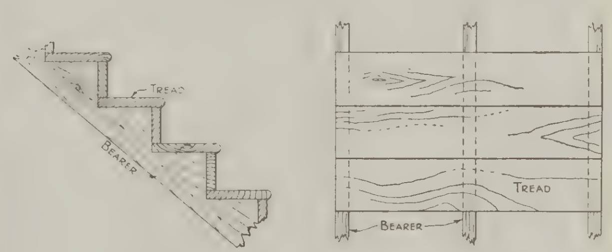


Fig. 4—Showing Method of Constructing Stairs

Building in Vancouver

They cut a piece of wood as bearers and nail the treads and risers to them.

From this you will see why houses are built so much quicker than in England. They don't, however, last as long as a good, substantial English house. (As regards bricklaying, English bricklayers and stonemasons will be glad to know that their fellow English workmen out here are always praised for the good work they do. They all know nobody can beat the English bricklayer.)

Architects preparing plans do them on a quicker system than in England. Working drawings they do not color. The different materials are marked each in a certain way, and a key is put on every sheet if required.

Thus brick walls A, stone walls B, concrete C, and wood walls D. Blue prints are taken of the original tracings, and the blue prints are the contract drawings, not the original tracings. Coloring is done on occasions where a sketch is required, or materials marked on a full-sized detail. Then more often a colored pencil is used. From this you will see how quickly sets of drawings can be prepared.

Galvanized iron is used to a great extent here in making cornices for outside a building, as stone is expensive. It is, of course, painted various colors to suit the building.

Treatment and Finishing of Floors

A practical painter who has been in the habit of finishing floors in various ways, such as painting or graining when too much worn to finish in the natural, raises the question as to the best way to finish floors and how to wax and polish them. He also asks how painters in the larger cities treat hardwood floors. In replying to these questions of its correspondent *The Painters' Magazine* presents in a recent issue the following interesting comments:

For ordinary floors, such as in kitchens or laundries, warehouses, etc., the floor oil treatment is most practised. This consists in applying to the new floor a non-drying mineral oil, which is prepared for the purpose by heating in a hot-water bath one gallon of light paraffine oil to near the boiling point and in the meantime melt in a ladle one-half pound of paraffine wax, adding same to the hot oil, while continually stirring. Stir occasionally, while the mixture is cooling, to keep the wax from going back into lumps. The oil is applied to the floors with a brush, allowed to soak into the wood, and when well set the floor is wiped with a woolen rag wrapped around a floor brush to remove the excess of oil, so as not to soil dresses. The operation should be repeated until the wood is so saturated all over that no flat spots are visible, but a finished surface apparent all over the floor. This finish applies only to soft and hard pine as well as spruce. It is what has been called "dustless" floor finishing, and when the wood is once well saturated it does not need oiling again for from four to six months, and is far cheaper than waxing.

Oak and hard maple floors also are often simply oiled, but for these woods the floor oil described above is not the proper material. Take one-half gallon of kettle-boiled linseed oil, one quart of benzine and one quart kerosene oil; mix these and brush over the floor. Do not flow it on, but brush it out and apply a second coat, after all greasiness from the first oiling has disappeared. Three coats should be applied, if time permits. This makes a very durable finish, which, when wiped over with a moistened cloth from time to time, will appear bright and clean.

Yellow or hard pine floors may, without any previous treatment, be waxed, and the best method is to use one of the reputable floor waxes now on the market, applying same to the wood as directed and then polishing by the use of the weighted floor brush. When the first coat, which acts as the filler, is hard, a second coat should be applied, and also polished in a similar manner. Oak and all other open grained woods require hardwood filler before waxing. When the wood has been filled, the surplus filler removed with excelsior or tow, and the filler has dried hard, the floor should be sandpapered and the waxing done as above.

The occupants of the house can wax polish such floors from time to time. If it is desired to stain a hardwood floor, the staining is done before filling and the paste filler colored to match the stain. In very fine residences the hardwood floors are filled with paste filler to match the color of the wood as closely as possible, then smooth sandpapered and varnished with one coat of high-grade shellac varnish, again sandpapered and finished with at least two coats of very best floor varnish. For extra fine rooms the last coat of varnish is rubbed or mossed, then polished with rottenstone and sweet oil. In touching up old varnished floors it is best to touch up the bare spots with quick drying flat color to match the remainder of floor in color, then give a coat of floor varnish to which color has been added to match the old color of the floor. The color in this case should be ground in japan or varnish and only enough added to stain the floor varnish.

For parquetry floors the best treatment is to apply, in succession, three coats of white shellac varnish, allowing each coat to dry hard, but they can also be waxed without any other treatment.

Floors that are badly worn no matter what the nature of the wood may be, are best painted with good, hard drying, yet elastic floor paint, which may be all oil and pigment paint and drier or made from oil and pigment with drier and thinned for application with good, hard-drying floor varnish.

Individuality in Carpentry

In carpentry and building, just as in everything else, there is too much of a tendency to imitate the other fellow in the business and thus put a checkrein on individuality, which is, to say the least, a bad move and one that knocks the carpenter-contractor out of business he might otherwise get, says J. Crow Taylor. The average carpenter, when he becomes free from apprenticeship under someone else and goes into business for himself, instead of planning and conducting his business on a little different or entirely different basis from that of other carpenters, generally looks around and sees how it is done by them and imitates to the dot their work, their methods, their prices, etc. What would seem a better plan would be to go in for building up a business that would be characteristic of himself, in which the credit for success would all be his own, and in which he would build up a reputation for having some enterprise.

It may seem like going pretty deep into the matter, but is there really any credit in imitating somebody, and making a success? It seems like the credit is coming to the fellow who first thought out the way to conduct his business, and not to those who came afterward and merely imitated him.

There is room in building for the carpenter-contractor to exercise his individuality, and bring variety into his work. Anything will grow commonplace if new ideas are not introduced now and then, and if the carpenter in the course of his work thinks out or runs across a new and what appears a better way to do the same work there is no need for him to keep his brilliant ideas to himself and make no good use of them. He should not be afraid to introduce new methods into his work for fear they will prove a failure. One or two failures are no killing matter, and they may eventually be rounded into a success. The censure, if the progressive carpenter has been censured for trying new ideas in his work, will turn to admiration and imitation from others less progressive, for thus it is that the industrial world learned to spell Progress.

Brickwork of modern type came into general use in England about A. D. 1300, after being comparatively unused since the departure of the Romans, Little Wenham Hall (A. D. 1260), in Suffolk, being probably the earliest brick building existing in England. During the reigns of William and Mary, and Queen Anne, brickwork was largely used in house construction by Sir Christopher Wren and others. Hampton Court contains good examples of sixteenth and seventeenth century brickwork. Terra cotta was also employed, as at Layer Marney Towers, Essex (1500-1525), and in parts of Hampton Court Palace.

Wall Flashing for a Slate Roof

Methods of Flashing Slate Roof against Extending Gable on Which Readers Are Requested to Comment

BY J. HENRY TESCHMACHER, JR.

WHILE reading some English technical journals recently I came across an article on lead flashing as applied to slate roofs in London, and was signally impressed by a method of flashing where the slate roof finishes against a gable, the wall of which rises above the roof as shown in Fig. 1 of the accompanying illustrations. The method in question was presented because several cases had come to the author's notice, who, however, contended that it was not superior to the customary shingle flashing methods universally adopted regardless of whether the flashing is tin, zinc, copper or lead and for shingle, slate or tile roofing. His objections were about as incorporated in the following remarks of mine, in which I will endeavor to point out the advantages and disadvantages of this method of flashing. I will treat the matter for copper instead of lead, inasmuch as very little lead is used in the United States.

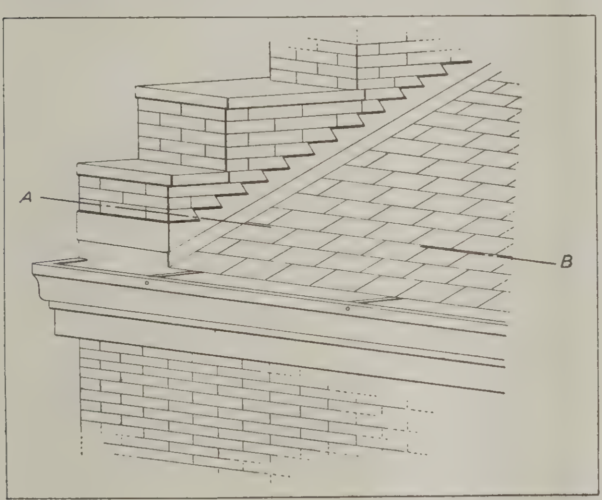


Fig. 1—Slate Roof and Extending Gable

Fig. 2 is a section on the line A B of Fig. 1 and shows the usual way the finish is made in a case of this kind. As the slater proceeds with the courses of slate, a "shingle" flashing is laid in with the courses. This flashing is generally cut from 8-in. material, is bent square through the middle so that 4 in. will be out over the slate and 4 in. up the wall. The length of the flashing is about 2 in. more than the slate exposure, that is, if the slates show 6 in. to the weather—the depth of the courses—the flashings would be 8 in. long. The flashing is held in place by a small nail driven into the top of it, and is placed with its bottom edge ½ in. above the bottom edge of the slate that covers it; the idea being to keep the flashing from showing. A cap flashing is then stepped into the wall, covering the line of "shingle" flashings. Many roofers, however, first set the cap flashing, inserting the other one under it as they proceed with the slating.

The objection to this method is that it is not positively reliable against beating rain. It has failed in many instances in which water has found its way past the flashing and under the slates. It requires more material than the straight run of flashing and needs individual cutting, bending and applying operations. On the other hand, with the method shown in Fig. 2, scrap pieces of metal can be used owing to their size; the cutting can be quickly done on the small squaring shears included in the equipment of most roofing shops, and a boy can easily bend them over a hatchet stake if no other means is available. They are easily applied and must be reliable, for in the majority of cases this is the method employed.

The method presented by the English writer is given in Fig. 3, which is also a section on A B of Fig. 1. As will be seen, the flashing is continuous and applied before laying the slates, in the following manner, but modified by me to suit American conditions and copper.

After the roof rafters are in place and before laying the roof boards, the carpenters nail a strip of roof board, temporarily, 1¾ in. wide, parallel to and against the gable wall. Against this strip the carpenters finish their roof boards and when all are in place they remove the strip, leaving a depression the depth of the strip and as wide as it, or ⅞ in. deep and 1¾ in. wide.

The necessary amount of copper is cut in strips 8 ft. long and 8 in. wide, and bent as shown in Fig. 3. And after the gutter is erected, no matter whether the hanging type or the lined box gutter is used, a copper strip is set in place fitting the depression in the roof mentioned, and connected to the roof flange of the gutter, this flange being cut to allow the depression of the copper strip to go right to the gutter and give a free passage for any water that may be in the depression.

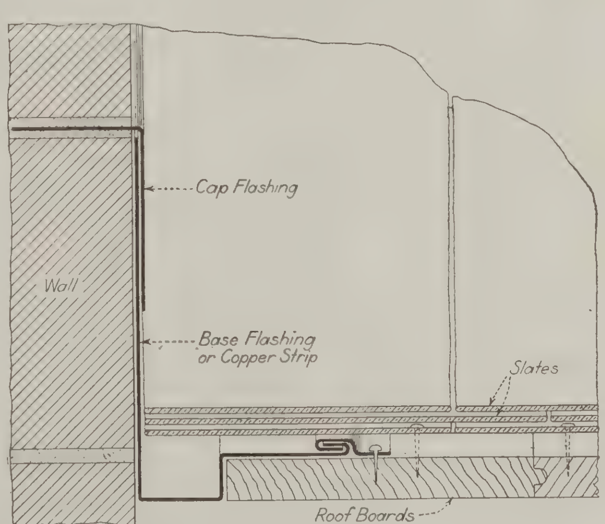


Fig. 2—Section on Line A B, Fig. 1, Showing Usual Flashing Method

Wall Flashing for a Slate Roof

Other copper strips lapped 2 in. but not soldered are laid in place until the edge is reached, and to prevent sliding of the strip one of the cleats is soldered to it. The cap flashing is now applied similarly to the other method.

The apparent advantages for this method are: All sheet metal work, with the possible exception of the ridging, can be completed before a slate is laid. Cutting and bending operations for the flashing are for 8-ft. instead of 8-in. lengths. A 2-in. lap is only necessary every 8 ft., whereas with the small flashing the 2-in. lap is required every 8 in., a saving of considerable material. Besides, it can be placed in position much faster, and provides a small gutter by having the depression to direct any seepage to the main gutter. There will, however, be more seepage with this method than with the other. And should dirt, leaves or the like fill the depression, its purpose is nullified.

Although fully informed as to the practice in this country I cannot recall if this method was ever used, and for the edification of myself and other readers I would like to see printed in these columns the versions of other roofers. So far as I am concerned, I have a decided preference for this scheme and am sanguine enough to employ it on any job for which I am to be responsible.

Honesty in House Building

"No layman should buy a house without its first being examined by a competent architect," declared an authority, on being asked to sympathize with a friend whose recently purchased, newly built, suburban home necessitated extensive and expensive repairs, says a recent

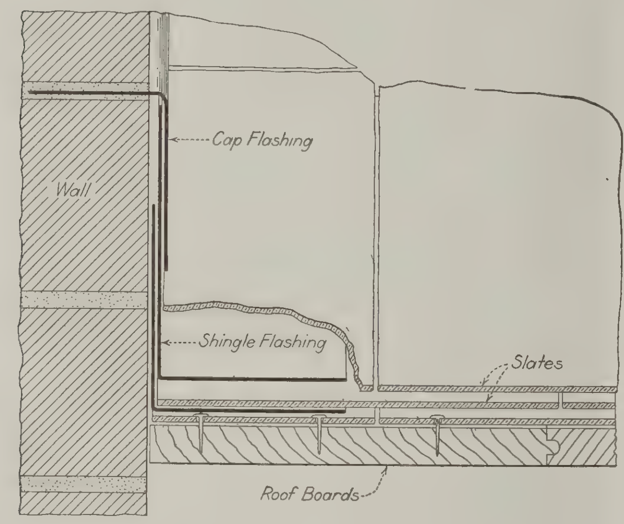


Fig. 3—Section on Line A B, Fig. 1, Showing Methods Advocated by English Writer

Wall Flashing for a Slate Roof

issue of *House Beautiful*. "It was one of several dozen attractive houses making up a little colony in Westchester and called, say, Ashley-Burton Manor or some equally high-sounding name, for high-sounding names go far toward selling real estate. There was no doubt as to the picturesqueness of the houses in question; they had the appearance of having been designed individually. To be convinced of their merits one had only to glance at an old, contractor-built row of twenty narrow little peaked wooden houses, which, all connecting, all precisely alike, and flush with the street, stretched their dreary ugliness just beyond the 'Manor's' sacred precincts, and which, so prospective purchasers were told, were soon to be pulled down. Meanwhile they acted as a most convincing foil for the newly completed concrete and shingle 'cottages de luxe' offered for sale.

"How could young couples in search of a 'nest' probe beneath that surface attractiveness of 'English' brick fireplaces, chestnut wainscoting and ceiling beams, small panel and broad muntined windows, and the ubiquitous pergola? Or, if the more cautious had misgivings, were not these quieted by the builder's assurance that his brother, who designed the houses, 'was formerly with McKim, Mead & White.' Such an assertion, to those who know nothing of the large floating army of inferior architects taken on temporarily by every large firm in a rush season, is convincing. Perhaps it still consoles the residents of 'Ashley-Burton Manor' as they contemplate cracked walls that were papered before the plaster had dried out; fireplaces too shallow to permit of a draught; wainscoting all shrunken; because the wood was unseasoned; front bedrooms icy in winter because they were built over verandas without the precaution of felt flooring, or on pergolas prone because they were planted in only a foot or less of earth.

"A few—but only a few—of the colony have discovered that for the entire collection of thirty or forty houses, only three or four different plans were used, the rest being merely variations of these—a difference of material, or a veranda on the side instead of the front, or the house placed endwise instead of lengthwise to the street, or some other treatment that disguises its close relationship to its neighbor, yet to the knowing, proclaims the whole scheme a contractor's job. The 'Manor,' in short, is simply a degree better in the way of jerry-building, than the frankly commercial 'row' beyond (for of course this eyesore has not been and probably never will be removed, unless by 'act of God or the Nation's enemies').

"Meanwhile those purchasers who have grown tired of rebuilding their homes and would like to sell cannot find a customer, because the original developer of the property still goes on erecting houses equally pretty in the neighborhood and offering them, as well he may considering the discounts and 'rakeoffs' allowed to contractors, at a price that would mean great loss to the man who has, since acquiring his place, spent a large sum in making it habitable. It is too bad that the commendable ambition to 'own your own home' should be taken advantage of in this cruel way, but it might have been avoided had intending purchasers hired an architect to go over the house first and report on its honesty of construction and quality of the material. Indeed, if contractors knew that their work would be submitted to such an examination before purchase, the knowledge could not fail to force them into more scrupulous methods."

A Lofty Dwelling House

One of the most unique places of abode to be found anywhere in the country is probably the lofty dwelling of Captain Meeker, an old pioneer at what is known as Camp Meeker, a summer resort in Sonoma County, California. The site is on the top of a hill more than 200 ft. high and the corner posts of the dwelling are four young redwood trees standing about 12 ft. apart, representing a perfect square. The trees were each originally about 150 ft. high, but 50 ft. of each top was lopped off and the work of building six stories was then begun.

Each floor is about 12 x 12 ft. and rests on strong timbers, the ends of which are securely attached to the four trees by means of steel cables and bolts. Every part is so well braced that the whole structure does not sway as much as one might suppose, even when rocked by heavy winds.

In the execution of the work great care was taken by the builders to cut only the branches growing on the inside of the square and the trees were neither mutilated nor weakened any more than could possibly be avoided.

Leading up from each story are broad stairways so that one may ascend and descend with perfect safety, while around the edge of each floor are strong railings to prevent accidents.

New Publications

The Building Age Handy Estimate Blanks.—Compiled by Arthur W. Joslin. Size 7½ x 10 in. Bound in paper covers. Published by the David Williams Company, 239 West Thirty-ninth street, New York City. Price 25 cents per copy or $2.50 a dozen.

One of the most important factors in connection with a successful building business is the ability to make accurate estimates of cost and in order to do this it is necessary to have a "reminder" in the way of estimate blanks so as to make sure that in preparing figures on a given piece of work nothing be omitted or overlooked. The blanks above referred to are intended to be used largely by building contractors for dwellings, small apartment houses, stables, garages, small public and semi-public buildings, etc. The pages are ruled so as to provide space for every item that could reasonably occur in such structures. It is believed by the publishers that these blanks provide sufficient flexibility to make them readily adaptable to all

STUDDING. Usual Unit of Measure 1 M B. M. Installed.	COLUMN 1	COLUMN 2
Outside Walls		
Partition		
Misc.		
Labor		
Remarks		
	TOTAL	
FURRING. Usual Unit 1 M B. M. Installed.		
Outside Walls		
Ceilings		
Misc.		
Labor		
Remarks		
	TOTAL	
GROUNDS, CORNER BEADS.		
Doors		
Windows		
Base, etc		
Misc.		
Wood Corner Beads		
Labor		
Remarks		
	TOTAL	
WALL COVERING		
Clapboards		
Siding Ship Lap		
Shingles		
Paper		
Nails		
Labor		
Misc		
Remarks		
	TOTAL	
SHEET TOTAL		

Fac-simile Page from the Building Age Handy Estimate Blanks

except very special cases and that they will be found of material aid to contractors and estimators.

We have reproduced herewith a page from the book of blanks showing the manner in which it is ruled and the sub-divisions appearing under a few of the headings. The blanks are arranged so that each sub-item can be considered and priced on the customary "unit of measure" installed complete or with the material and labor separately considered and priced. It is probably safe to say that 90 per cent. of the successful estimators consider and price each "unit" complete, installed in the structure. As labor always bears an average ratio to each unit, figuring by the method here presented eliminates much of the guesswork in computing labor.

In the introductory pages of the Handy Estimate Blanks explicit instructions for their use are given and the general make-up is such that no up-to-date builder doing work of the character indicated can afford to be without these blanks, while the price is such as to bring them within the reach of every one connected with the business. At the close of the book are "extra sheets" or pages properly ruled which may be used for lists of bidders and their bids, if known; information in regard to the cost, profit, etc., if the bidder has been successful in obtaining the contract; and schedules, memoranda, etc., that may appear to the estimator as desirable to be recorded.

The compiler of the blanks is the author of the well-known work on "Estimating the Cost of Buildings" and has had a wide, practical experience in the building business, being connected as he is with one of the prominent building contracting firms in the eastern section of the country.

Modern American Homes.—Prepared by H. V. von Holst; 108 plates. Size 13¼ x 9¾ in. Bound in heavy board covers. Published by American School of Correspondence. Price $3.00.

This work, as its name indicates, consists of a series of designs by architects in various sections of the country and covering homes ranging all the way from the low cost bungalow of Southern California to the more pretentious residence of the larger cities and towns. The great bulk of the designs relate to houses of moderate cost and these are illustrated in as concise a form as possible, embracing floor plans, in many cases, together with exterior views and sometimes interiors. Wherever possible the cost of the building has been given, but attention is called to the fact that the cost must be considered in connection with the date of erection of the building and its locality, as these two factors have an important bearing upon the question. The author points out as a curious fact that building in or near a large city is considerably more expensive than building in a small town or in the country.

It has been the aim in the work under review to show as much a variety of types and styles of homes as possible, not only as regards plans but also as to the materials used. Special reference is made to "the uniformity of modern floor plans" and "studies of different exterior treatments of the same plan." An examination of the pages relating to these will enable the reader to appreciate some of the fundamental points to consider when studying the plans of a house or when contemplating the building of a home.

In addition to the designs of detached residences are several relating to apartment houses, schoolhouses, libraries, churches, etc.

The Painters' Pocket Book.—By Arthur Seymour Jennings; 252 pages. Size 3½ x 6¼ in. Numerous illustrations. Bound in flexible cloth. Supplied by the *Building Age* Book Department, 239 West Thirty-ninth street, New York City. Price $1.50.

This is a revised and much enlarged edition of a pocket reference guide of every-day work. It is written from the standpoint of English practice, yet contains a great deal of useful information that the American painter will find available provided he keeps in mind the fact that the English hundredweight is 112 lb.; the ton is 2240 lb.; that the English gallon is not the same as the United States gallon, together with a number of other differences that are met in making up tables for grinding pigments, mixing paints, etc. There are tables of prices for painters' work, wage scales and tables showing materials required for painting on various surfaces, all of which are of special interest to the painters and decorators of Great Britain, but are of no particular advantage to the American workman in this line.

There is a chapter on defects in painting and how to remedy them; another on colors and how to mix them; followed by some comments on practical geometry and setting out work. A considerable proportion of the volume is given up to a concise glossary of terms used in painting, building, architecture, applied chemistry, etc. There are hints on paper hanging, tables of discount, etc., etc.

There are many designs for stencils, including a number relating to church work, numerous examples of sign painters' letters, together with specimens of colors, all of which will assist a customer in making selections. A comprehensive index alphabetically arranged will be found a convenient feature.

Use of Joints in Concrete Work

Where a finish is applied to a structural concrete floor slab reinforced with steel throughout, and where every means is taken to bend the finish to the underslab, there is no excuse for the line joint which is so generally used. It does not prevent cracks; it is only used because it is conventional. The first trouble experienced with the concrete floor arises from the breaking down of the edges of these joints, and manifestly they should be omitted, says Leonard C. Wason, president of the Aberthaw Construction Co., Boston, Mass. Basement pavements should be laid in as large blocks as possible. A 10 x 10 block of 4-inch pavement laid on a good bottom is reasonably free from danger of cracking. Structurally, it is probably better to lay the floor continuously without joints, and let cracks occur where they may.

First Use of Mahogany

Mahogany was first used in the repair of some of Sir Walter Raleigh's ships at Trinidad in 1597. The discovery of the beauty of its grain for furniture was accidental.

A Dr. Gibbons was building a house in King street, Covent Garden, says a writer in an exchange. His brother, a West Indian captain, had brought over some planks of mahogany as ballast. He thought the wood might be used in the house, but the carpenters found the wood too hard for their tools and objected. Mrs. Gibbons shortly afterward wanted a small box made, so the doctor sent the mahogany to a cabinet-maker. He also complained that the wood was too hard. But the doctor insisted as he wanted to preserve some of the wood as a memento of his brother.

The finished box polished so nicely that the doctor ordered a bureau made of the same wood. The cabinet-maker displayed that in his shop window before delivering it. The Duchess of Buckingham saw it and begged enough wood from the doctor to have it duplicated. Mahogany furniture soon after came into popular favor.

The Mexican Kitchen

To a person accustomed to the luxuriousness of an American kitchen, the crudity of a "Cocina Mexicana" is at first sight most disheartening, writes a contributor to *Gas Logic*. There are no conveniences or labor-saving devices, and the lack of these has almost proved the undoing of many a house-keeping novice in Mexico. The "brasero" which does duty for our kitchen range is a puzzle which some women never solve.

As a rule, the Mexican kitchens are clean, though you could hardly call them tidy. There are never any closets. The red brick floor gives a cheery look and the grass mats, called "petates," spread over the bricks lend an impression of cleanliness, the buff or blue walls forming a good background for the array of "ollas" or earthenware crocks, wooden spoons, and few iron utensils which are hung around.

The brasero, generally of blue and white tiles, is a long affair standing on medium high legs. Across the front are as many square openings as there are grates on top. Into the grates the charcoal is put, together with some pine splinters, the maid patiently working a straw fan back and forth in front of the lower openings, which correspond to the draughts in our ranges; after some time the charcoal ignites and a hot fire is started—a feat impossible to an amateur.

Upon the charcoal of each grate the ollas of various sizes are balanced. These are the cooking utensils of the country, and are made of a dark brown, highly glazed clay, which heats quickly and retains the heat a long time. As the charcoal burns it naturally changes position, thus endangering the proper balance of the ollas, a condition not unknown to result in toppling the dinner into the fire.

For roasting meats and baking, a square tin oven is placed on top of the brasero, covering two or more of the grates in which a hot fire has been started. It takes a long time, with much fanning, for the oven to heat sufficiently, so that roast for dinner or a batch of fresh bread is no light matter.

CONTENTS.

What Builders Are Doing

Bird's-Eye View of Building Situation in Leading Cities -- Permits Issued and Estimated Value of the Projected Improvements

THE report of Building Inspector Stubbs of Baltimore, Md., for October is of unusual interest as showing the extent to which two-story dwelling houses are being constructed. This class of work has been a feature of the building operations for the first 10 months of the current year and not less than 2000 buildings of this character have been planned. In October out of a total estimated expenditure of $799,765 for all classes of buildings for which permits were issued more than $200,000 was for two-story dwellings. One hospital was planned to cost $100,000 and four warehouses to cost $342,300, a private school was also planned to cost $30,000, a telephone exchange to cost $48,000 and a lodge building to cost $31,000.

The total estimated cost of two-story frame and brick dwellings in the first 10 months of this year was $3,351,154 out of a total of $6,677,080 for all classes of buildings for which permits were issued. Another feature of the figures is found in the number of manufacturing warehouses which were planned, there being 79 of this class, costing $1,469,598. There were eight apartment houses costing $165,000 and four office buildings costing $555,000.

Birmingham, Ala.

The estimated cost of buildings for which permits were issued during the past month from the office of Building Inspector Matthews is appreciably less than for September and is also under the figures for October, 1911. In fact, with the exception of January and February of the present year, the figures for October are less than in other months. September was the banner month, the figures being $470,262. The report of Building Inspector Matthews for October shows 324 permits to have been issued for building improvements involving an outlay of $252,375, while in September the value of the building improvements for which permits were issued was $470,262. In comparison with October, 1911, there is a falling off in the figures for last month of $47,865.

There are a number of buildings about being erected for which the permits have not yet been taken out but which it is expected will soon be filed. Eliminating these the building operations thus far the current year approximate a valuation of $3,500,000.

Buffalo, N. Y.

Building Bureau statistics for October show 481 permits to have been issued with an aggregate estimate valuation of $1,616,000, as compared with 356 permits and $916,000 valuation for October last year, a gain of 76 per cent.

The total of building operations for the first 10 months of this year is $11,797,000, as against $8,364,000 for the corresponding period of last year—a gain of 41 per cent. The total for the ten months is greater than for the 12 months of 1911, and adding the figures for the two remaining months of 1912 will make it a record breaker as regards building operations and the largest in the history of the city.

Construction work is under way on many large buildings intended for factory and commercial purposes, among them being a 7-story and basement fireproof building 90 x 100 ft. to be erected by William H. Hotchkiss as an annex for the J. N. Adams Company's department store, to cost $100,000; a business block and theater at Main street and Fillmore avenue, to cost $35,000; Globe Theater, for the Sherman Amusement Company, to cost $50,000, 1200 seating capacity, and a store and loft building, four stories and basement, on Pearl street, for Wickser & Goetz. In other departments a Settlement House for the Associated Jewish Charities, to cost $50,000; a club house for the Fraternal Order of Orioles, to cost $75,000; a church for the Evangelican Lutheran Missionary Association, and a chapel for the Home Mission Reformed Church.

Several school buildings have been planned for the city, as well as a large number of residences and apartment houses, principally of moderate cost, although the list includes one to cost $50,000 and three of $25,000 to $35,000 each.

Fifty workingmen's houses are being erected at Delawanda, a suburb of Buffalo.

Architects Green & Wicks have plans on the boards for the new city hospital buildings to be erected at West Farms, to cost $600,000.

Chicago, Ill.

Building permits for this year are still considerably behind the same period during 1911. The aggregate for the ten months up to November 1, 1912, is an estimated cost of $75,550,000, as compared with $91,290,400 for the same ten months in 1911.

In October this year there were 1178 permits issued, with a total frontage of 34,080 feet and an estimated cost of $8,745,600. The same month last year produced 1082 permits, with a frontage of 30,309 feet and an estimated cost of $8,785,700. The record for October, 1912, is considered excellent, however, in view of the fact that it was just preceding a National election, which might be expected to cause investors to go a little slow with building projects.

At the recent general election in Chicago a proposition to issue bonds amounting to $1,750,000 for the widening and improvement of Twelfth street was approved by the voters. This is the first step in a comprehensive city beautiful plan for Chicago. Twelfth street will be widened from Ashland boulevard east to the lake front. Closely connected with this project is the proposed removal of the Illinois Central railroad tracks from the lake front and the construction of a new passenger station by the Illinois Central road. Should the negotiations between the city of Chicago and the railroad company prove successful there will be opportunity for a boulevard along the lake front, Grant Park will be made more beautiful and work will be begun on the new Marshall Field Museum.

Work of wrecking buildings on the land acquired by the Pennsylvania Railroad, in co-operation with other roads, for a new central terminal has been started. It will probably be three or four years, at least, before the whole improvement is completed. It will involve an expenditure of many millions of dollars. The buildings being demolished are mostly old frame structures.

The construction of a new store building for Charles A. Stevens & Bros., retail merchants, will be begun soon. Inquiries have been made for the structural material, which will aggregate 7000 tons. This will add another modern store building to the several that have gone up in State street recently. Two new stores have recently been occupied, those of Mandel Brothers and Rothschild & Co.; the "Boston" store has added several stories, making a seventeen-story structure; the Hub clothing store is about to occupy the first three floors of a new nineteen-story building at State street and Jackson boulevard. The big store of Marshall Field & Co. is receiving an addition eleven stories high that will cost $500,000. An alley between two sections of the store building is being utilized as the site for the addition.

Further details have been made known concerning the proposed new North Shore Hotel. The site has a frontage of 400 feet on Oak street facing north and 216 feet on the Lake Shore Drive, facing west. This location is in the heart of the most fashionable residence district of Chicago and about midway between the downtown business section and Lincoln Park. The building will cost approximately $1,400,000; furnishings and equipment, $300,000; operating capital, $350,000. Plans for the building, which will be in the French Rennaisance style, have been completed by Holabird & Roche, architects. The structure will be ten stories high and will stand on a terrace fourteen feet above street level. The hotel will be a fashionable family place.

Another new business block for the "loop" district was assured when the Williams property at the southwest corner of Wabash avenue and Monroe street was leased to the Spiegel House Furnishing Company. The lease has 99 years to run, and becomes operative May 1, 1913, when the Spiegel interests will tear down the present five-story building on the property and erect a twelve-story mercantile structure at a cost of about $1,000,000.

A new organization has recently been formed having for its object the betterment of the condition of architectural draftsmen, and among other features will be an information bureau, where draftsmen can learn of vacant positions and where architects can learn in regard to qualifications of draftsmen. The organization is known as the Architectural Draftsmen of North America, with B. J. Winkel as president and treasurer and E. G. Albricht vice-president and C. Hale secretary.

Cincinnati, Ohio

Building operations have been somewhat retarded on account of the scarcity of labor. The monthly report of the Building Commissioner shows that the total estimated cost of building operations for the month of October was $798,625. In October, 1911, permits valued at $2,624,570 were taken out, but $2,000,000 worth of these represented the permit issued for the 34-story Union Central Life Insurance building.

There is considerable more residence building under way in the suburbs, proportionately speaking, than in the city proper. In addition to a scarcity of plasterers, plumbers are also in demand, and skilled carpenters are commanding fancy wages.

Factory construction in this immediate vicinity is somewhat on the wane, but it is understood that a number of office and factory buildings are contemplated for next spring.

At a recent meeting of the Cincinnati Chapter of the American Institute of Architects A. O. Elzner, of the firm of Elzner & Anderson, was elected president; Louis Dittoe, vice-president; Fred W. Garbert, secretary, and Henry M. Hooper, treasurer.

Cleveland, Ohio

Building operations continue very active in this city. In fact, there is no indication of the usual falling off that comes late in the season. So far weather conditions have been very satisfactory and outside work has been interfered with very little.

During October there were 954 permits issued for new buildings, to cost $1,916,260. Of these 188 were for frame buildings, to cost $477,865; 101 were for brick, steel and stone buildings, to cost $1,231,630, and 665 were for additions, to cost $207,365. During the year until November 1 permits were issued for buildings to cost $14,552,360, as compared with $13,689,757 for the corresponding period a year ago.

The annual meeting of the Cleveland Builders' Exchange was held November 7. An interesting address was given by Fred. K. Elliott, consulting architect of the State Building Code Commission. He made a plea for a State building code which should supersede all municipal codes and should apply to rural districts as well as to municipalities. He said that at present 70 per cent of the people of Ohio are without protection afforded by building codes. To provide a building code for each of the 781 municipalities of Ohio, he said, would entail an outlay of $781,000—a sum sufficient to provide a general State code and maintain a permanent code commission for 130 years. A new State code has been practically completed by the State Building Code Commission, and this has been submitted to various Builders' Exchanges, building inspection departments and architectural clubs in the State for consideration. Representatives of these organizations will meet in Columbus shortly to consider the code. The matter of adopting the new code will come before the State Legislature at its session this winter. President J. D. Skeel in his annual address spoke of the progress that had been made during the year in establishing a medium of co-operation between the building contractors of the city and the architects. He urged the adoption of an effective workingmen's compensation law.

The following directors were elected for the ensuing year: C. A. Carson, Ford Donley, Fred. Epple, Frank B. Hiller, H. C. Klump, J. H. Libby, C. R. Leutkemeyer, D. E. Reynolds, George A. Rutherford and Henry Watterson.

At the annual meeting of the directors of the exchange held November 11 officers for the ensuing year were elected as follows: President, George A. Rutherford; vice-president, C. A. Carson; treasurer, Henry Watterson; secretary, E. A. Roberts; assistant secretary, H. A. Hall.

Dallas, Texas

Permits issued from the office of City Building Inspector H. J. Emmins for the month of October aggregate a valuation of $274,875, as compared with $274,860 in October last year. Among the work projected last month were 16 brick structures and 97 frame buildings.

For the first 10 months of the current year the estimated cost of the construction work for which permits were issued was $4,274,875, while in the corresponding months of 1911 the total was $4,665,786.

The decrease in the value of building operations thus far the present year is due in large measure to the fact that last year's figures covered permits for a number of expensive structures, such as the Adolphus Hotel, the new building of the Southwestern Life Insurance Company and the Commonwealth National Bank Building. The amount of building thus far the present year, however, exceeds that of last year, and the aggregate for the year will be fully up to the average.

Dayton, Ohio

Seventy building permits were issued in the city of Dayton during the month of October, as compared with 52 during the same period last year. From the 16th to the 31st of October there were 26 permits issued, and the total cost of the buildings and alterations erected under them was $80,425. Last year during the same period there were 23 permits issued, but the value of the improvements they covered was $135,750. The decreased showing this year, as compared with last, however, is owing to the fact that permits were issued for two important buildings, totaling $100,000 last October, while this year the most extensive improvement of the month was a $30,000 warehouse.

Since October 16, 1911, the mayor's office has been requiring a statement of the estimated cost of the alteration, or new building, with the result that the first year this record has been kept shows the total amount of money expended on building operations to be $3,722,228. In addition to this nearly $500,000 has been spent in building operations in territory contiguous to the city, but outside of the corporate limits. The estimates given are in most cases exceedingly low, and much more has been actually spent than reported.

Los Angeles, Cal.

Permits were issued in October for buildings having a valuation of $2,677,780, the figures for October, 1911, being $1,821,427. The 1646 permits issued was the highest on record. The value represented by dwelling construction amounted approximately to $1,500,000—by far the highest figure for this class of work in any single month. Notwithstanding the increase in small frame buildings, the amount expended for work of a more substantial nature remains about as before, and several jobs ranging from $100,000 to $300,000 were undertaken. The year's valuation thus far is over $3,000,000 in excess of the total for 1911.

The larger buildings for which contracts were let during the month are the John Brockman building, to cost $300,000; three concrete buildings for the Children's Hospital at Vermont avenue and Sunset Boulevard, to the F. O. Engstrum Company at about $150,000; a $500,000 building at Ninth and Hope streets for the Trinity Methodist Church, to the Los Angeles Investment Company; a 6-story concrete office building on Spring street, near Seventh, to Carl Leonhardt at $63,000, and a group of eight bungalows and an apartment house on Prospect avenue to the Milwaukee Building Company at about $65,000.

A large amount of work is in prospect at the new industrial town of Torrance, near this city, which has accepted plans for a $40,000 hospital, a $30,000 library, an auditorium and several schools.

Other building projects in nearby towns are: an $85,000 Y. M. C. A. building at Santa Barbara, with Russel Ray, architect, and a city hall and library at Alhambra, to cost $40,000 and $25,000, with Parkinson & Bergstrom and F. L. Roehrig, architects.

The largest amount of lumber ever received in this city on a single order is being brought from the North by steamers for the Los Angeles Investment Company. The amount is 10,860,000 ft., and is to be used in the construction by this company of 400 houses in new residence tracts.

Minneapolis, Minn.

The Minneapolis Society of Architects and the

Minnesota Chapter of the American Institute of Architects recently elected officers for the ensuing year as follows:

President........................William C. Whitney
Vice-President...........................H. T. Downs
Secretary-Treasurer......................E. H. Brown

Some time ago the members of the Minneapolis Society of Architects were by vote made members of the Minnesota Institute of Architects and all were invited to enroll.

Building has been brisk as compared with a year ago, and mechanics in all lines are actively engaged. In October 514 permits were issued for buildings to cost $1,117,380, while in October last year 507 permits were taken out for construction work to cost $718,815.

Newark, N. J.

The very favorable weather which has prevailed has been utilized by builders throughout the city and active operations have been conducted upon a scale which was slightly in excess of that for the corresponding month of last year. The largest permit issued by the department was for the erection of a store and wareroom for the Lauter Company to cost $75,000. The building will be of brick with terra cotta trimmings. Another important permit was for a 4-story factory on Ogden street, to cost $28,000.

During October the department issued 262 permits for construction work involving an estimated outlay of $773,748, while in the same period last year 261 permits were granted for buildings estimated to cost $724,766.

The Building Material Men's Club of Newark at its annual meeting elected James Taffe as president; S. F. Bailey, vice-president, and W. F. Hopping, secretary and treasurer.

New York City

The most notable feature of local building operations during October was the heavy falling off in projected undertakings in Manhattan as contrasted with October last year. This shrinkage was not confined to any one class of building, but included apartment houses, store and loft buildings, office buildings, manufactories and workshops and schoolhouses. The monthly report of Rudolph P. Miller, of the Bureau of Buildings, shows that 26 permits were issued in October for new construction work, estimated to cost $2,262,300, while in October last year 52 new buildings were planned, to cost $5,117,950.

In the way of alterations and repairs 328 permits were taken out in October for work costing $959,185, while in October, 1911, there were 249 permits taken out covering this class of work and involving an outlay of $1,220,383.

In the Bronx the showing for October is a trifle better than last year, there having been 92 permits issued, estimated to cost $2,243,550, as against 92 buildings, costing $1,458,650, in October last year. Adding the cost of alterations in the two periods the figures total $2,460,189 and $1,508,175, respectively. The feature of last month's operations was the brick tenement houses constructed, permits having been issued for 37 such buildings, costing $1,877,000, as against 15 such buildings, costing $618,000, in October last year.

In Brooklyn the month just closed makes a favorable comparison with October last year, both as regards the number of permits issued and the amount of vested capital involved. The report of Superintendent P. J. Carlin, of the Bureau of Buildings, shows that last month 509 permits were issued for new buildings, to cost $2,973,680, and 614 permits for alterations, costing $406,167, making a total of 1123 permits for buildings, costing $3,379,847, as against 1052 permits for new buildings and alterations, costing $2,741,530, in October last year.

The month of October in the Borough of Queens was one of the best ever experienced, the feature being the activity in dwelling house construction. In October plans for 506 new buildings were filed, estimated to cost $1,702,000, as against 348 buildings, to cost $1,449,867, in October last year, and 354 to cost $1,501,105 in October, 1910. Architects and builders expect that next year will be a record breaker, this view being based upon the larger number of actual sales of home building sites during the present year.

Pittsburgh, Pa.

Compared with September of the present year and October of last year, building operations planned during the month just closed in the city of Pittsburgh show a marked decrease. According to the report of the Bureau of Building Inspection, there were 359 permits issued last month for buildings estimated to cost $797,999, as against 308 permits for construction work estimated to cost $1,343,749 in September this year and 329 permits for buildings costing $2,136,670 in October, 1911. It should be stated, however, that the latter month included the permit for the new First National Bank Building.

Of the total figures for last month 133 permits were for new buildings, to cost $625,329, and of these new buildings 98 were brick, 61 were brick veneer, 19 were frame, and 4 were concrete.

Philadelphia, Pa.

October's total of building operations was the best for that month which has been reported in the past six years. While the total was made up largely of a few operations, there appears to be a disposition to go ahead more freely with the better class of dwelling house work than has been in evidence for several months. Figures compiled by the Bureau of Building Inspection show 1053 permits issued for 1408 operations, at an estimated cost of $3,644,225, which is about $1,250,000 above the expenditure in October, 1911. Notwithstanding this improvement in October the 10 months' record for this year is still materially behind that for the same period in 1911, the aggregate to November 1 showing an expenditure of approximately $32,694,865, as compared with $36,678,030 for the same period in 1911. This decline is due to a large extent to the decrease in dwelling house operations.

Two and three-story dwelling operations, together with apartment house operations, so far this year aggregate an expenditure of $13,281,985, as compared with $20,626,450 during the first 10 months of 1911.

Tenement houses contributed $12,000 to the month's total; office buildings $80,000 manufactories $283,700, and garages $65,500. Operations involving 331 2-story dwelling houses, costing $746,050, and 26 3-story dwellings, costing about $113,650, were also begun. The aggregate in dwelling work shows a decline of $116,600, as compared to October, 1911. Indications point, however, to more active conditions in the dwelling house class of work, particularly in those of the better class and also in the better types of apartment houses.

The building trades continue actively engaged, open weather conditions so far this fall permitting active outdoor operations, so that in many instances work begun late in the year is pretty well advanced.

James G. Doak & Company, contractors, have taken out permits for the construction of the Adelphi Hotel at Thirteenth and Chestnut streets, the estimated cost being fixed at $1,000,000. It will be built for the Bingham Hotel Company, which paid $1,250,000 for the site. The excavation work has been completed and the structural steel work is now going up.

E. Allen Wilson, architect, has completed plans for 77 2-story houses to be erected for J. Henry Parker in the vicinity of Fifth and Wingohocking streets. The houses will vary from 17 ft. 8 in. x 36 ft. and 14 ft. 8 in. x 34 ft. 6 in. in size.

Plans are being considered for the erection of an 8-story apartment house, with roof garden and every modern convenience and facility, at Spruce and Quince streets, by F. C. Michaelson. The proposed building is estimated to represent an expenditure of $250,000.

Watson & Huckle, architects, are reported to be preparing plans for a 10-story apartment house, to cost $500,000, to be erected at Thirty-sixth and Chestnut streets, for Clarence R. Siegel. The proposed site measures 100 x 229 ft. The structure is to be fireproof and rooms will be arranged in suites of one, two, three and four, with bath. Work is not expected to be started until early next year.

Realty transfers are noted involving the sale of a large tract of land in the vicinity of Fifty-fifth and Angora streets to Alexander Wilson, Jr., on which it is proposed to erect, in the near future, 120 dwelling houses, to cost about $360,000.

J. A. Wood has taken permits and will shortly begin work on 79 2-story dwellings to be erected on Clearfield street, between Sixteenth and Seventeenth streets, at an estimated cost of $154,000. Davidson & Silberman have been issued permits for an operation of 16 2-story dwellings, 16 x 58 ft., to be erected on Snyder avenue west of Eighth street. Forty dwellings will, it is stated, be built on a tract at Ninth and Lindley avenue, Logan, by F. K. Hammer.

The Lam Building Company has the contract for a 2-story apartment house, 80 x 100 ft., to be built fronting on the Boardwalk, Atlantic City, between Delaware avenue and St. Charles place. Matzinger & Potter are the architects. The operation will cost about $35,000.

Portland, Ore.

While local building activities picked up a little last month, the improvement was of small consequence, and the amount of new work coming out is below the average of the last two years. The total valuation of building permits for October was $1,040,410, compared with $1,688,580 for October, 1911.

The largest contract recently let was for the Pacific Telephone & Telegraph Company's building, for which the Sound Construction Company has the foundation contract, and the Northwest Steel Company the steel work. This building was designed for 14 stories, but only 11 stories will be erected at present. A special permit will have to be issued by the Council for the completion of the building, as the present code limits the hight of buildings to 12 stories, and the system of floor construction used does not comply with the code.

Several interesting buildings are now in progress, one of which is the University Club's four-story brick structure, with wood and steel frame, said to be the only Class IV building ever erected in Portland. Whitehouse & Fouilhoux are the architects and the Lewis Hicks Company has the general contract at $102,000.

Another interesting job is the extensive alteration of the eight-story Marquam Building, a heavy masonry structure and the first high building erected in Portland. The work consists in carrying the building on steel girders and columns, some of the columns carrying over 400 tons. The Sound Construction Company has the contract at $70,000.

Under present regulations all new school buildings must be of fireproof construction. The duties of the office of Superintendent of School Properties, now held by F. A. Naramore, include the work of designing all school buildings and superintending their construction. The principal school job is the Ainsworth Grammar School, costing about $100,000, Foster & Barks, contractors.

Under a new electrical code all contractors are required to register and take out licenses.

Local engineering and architectural societies unite in having a luncheon and talks on matters of professional interest every Tuesday noon.

Rochester, N. Y.

Although the value of the buildings for which permits were issued in October showed a slight falling off as compared with October last year, the total for the first 10 months of 1912 is far ahead of that for the corresponding months of last year. The report of Fire Marshall Wheeler for October shows that the number of permits issued was 373, and the value of new building operations was $915,121. In October, 1911, the value of the building operatons for which permits were issued was $1,104,775.

One of the special points to be noted in connection with the report is that more than 75 per cent. of the total value of operations for which permits were taken out applied to private dwellings and apartment houses. This percentage has been carried on for several years past and is expected to do much to relieve the congested conditions in the city.

For the first 10 months of this year building operations totaled $10,517,361, and in the first 10 months of last year $8,085,135.

Sacramento, Cal.

That the building trades in the central valley of California are in a healthy condition is indicated not only by a further marked increase in the local record, but by favorable reports from many smaller towns, some of which are growing with unprecedented rapidity. The month's record in Fresno, for instance, was about $100,000, while the year's record for that town so far is nearly $500,000 above the total for last year.

Locally, October was the best month of the year, with a total valuation of $385,378, against $122,400 for the same month last year, and $291,365 for September. While a large amount of the work is of an insignificant nature, more business buildings are under way than for some time, and indications are that several important jobs will come out by the end of the year.

Principal buildings for which contracts have recently been let include a 4-story concrete building at Eleventh and K streets, to cost $86,000, and addition to the Sacramento Hotel, $50,000. Figures have been taken on a $75,000 steel frame building for the Schaw-Batcher Company. Other work to be figured within the next few months includes a $150,000 plant for Libby, McNeill & Libby, large shop buildings for the Western Pacific Railroad, and the Sacramento Club building, estimated cost $250,000.

San Diego, Cal.

The total value of buildings for which permits were issued in October was $884,319, against $831,705 in October, 1911, and $234,070 for the same month of 1910. The September valuation, $1,596,859, still stands as the city's record. Aside from a good proportion of residence work, the total includes a wide variety of buildings—one large church, hotels and apartments, and a number of small business buildings, practically all of which are being erected to meet actual requirements.

The general contract for the First Presbyterian Church has been awarded to Chas. Kline at $106,847. The heating contract was let separately, and the painting, seating and art glass work have not been awarded.

The contract for the Wolfe & Thorndyke building on Seventh street has been let to the H. M. Baward Construction Company at $26,500.

Plans have been completed by Architect E. M. Hoffmann for the Holland Investment Company's 3-story hotel at State and F streets, to cost about $25,000. The same architect is preparing plans for a $45,000 hotel and store at Third and E streets.

The San Diego Home Builders and Investment Company, recently incorporated at $500,000, has purchased a tract of land near La Mesa, and will cover the tract with bungalows and cottages.

San Francisco, Cal.

The majority of contracting firms are still well occupied, and mechanics in the building trades find fairly steady employment. The valuation of building permits last month was $1,722,860, and in October, 1911, the total was $1,255,892. A marked gain in the year's record over 1911 is already assured, every month except August showing an increase over the corresponding period of 1911.

Except for further advances in steel products and hardware the material market shows little change. The local lumber market is practically stationary, with some uncertainty as to the future. Northern lumbermen have been endeavoring to induce local dealers to adopt a new selling list, but have encountered some opposition on the ground that the change would cause confusion. Efforts are also being made to induce local builders to use finished lumber products from the Northern mills, such materials, with one or two exceptions, having been for some years barred from this market by the attitude of union labor. There is some scarcity of bars for concrete reinforcement, though the two local mills are able to give prompt delivery on a considerable quantity. Stocks of building hardware are somewhat broken, and there is considerable delay in getting additional supplies. The car shortage has also caused an acute temporary scarcity of lime, cement and plaster, though prices in these lines are not especially firm. It is remarked that this is the first year in a long time in which no price-cutting has developed in the common brick market, the price having been steadily maintained throughout the year.

The use of piling to support building foundations is quite general in the downtown district of San Francisco, much of which is filled land, and of late the use of concrete piles has been increasing. In two large jobs, the Standard Oil building (now about completed) and on the large lot at Fourteenth and Mission streets the forms were built flat on the ground and after pouring concrete into one tier other tiers were built above.

Among the new projects for which figures will be taken shortly are a 6-story Class C hotel on Post street, to cost $80,000—Creighton Withers, architect; a 7-story concrete hotel on Ellis street to contain 200 rooms and cost $115,000—Chas. E. J. Rogers, architect, and a 6-story brick and steel hotel at Geary and Jones streets, to cost $75,000—Milton Lichtenstein, architect.

Miller & Colmesnil, architects, are preparing plans for a $150,000 building to cover the east Fillmore street frontage of the block between Eddy and Turk streets.

One of the largest residence contracts recently let was for the S. E. Slade home at Atherton, near this city, taken by Weeden Bros. at about $20,000.

The headquarters of the local General Contractors' Association in the new Sharon building, on New Montgomery street, opposite the Palace Hotel, are to be ready for occupation about January 1.

Seattle, Wash.

The advent of the holiday during the month may have had some bearing upon the figures covering building operations for October, although it would hardly account for all of the difference between the totals for October, 1912, and October, 1911. According to the report of Superintendent R. H. Ober, of the Department of Buildings, there were issued from his office last month 799 permits for building construction estimated to cost $374,045. These figures compare with 1016 permits issued in October, last year, for new construction work, alterations, additions, etc., involving an estimated outlay of $638,895.

Of last month's total, 119 permits covered private dwellings costing $182,445, and 6 covered office and store buildings costing $16,750. There was one permit issued for a semi-fireproof building costing $60,000.

In the ten months from January 1 to November 1 there were 8575 permits issued by the department for construction work valued at $7,043,665, of which amount $2,468,195 was for 1611 private dwellings. In the first ten months of last year there were 9717 permits issued for construction work valued at $6,715,161, of which $2,610,445 was for 1933 private dwellings.

Springfield, Ill.

With the waning of the building season there is a shrinkage in the amount of new construction work planned and during October there were only 32 permits issued for structures valued at $78,815, while in October last year there were 38 permits issued calling for an estimated expenditure of $320,000. The size of the figures for the latter month was due to the permit for the new building of the Franklin Life Insurance Company, estimated to cost $200,000.

For the first ten months of the year the estimated cost of all buildings for which permits were issued was $1,119,727. According to Building Inspector Edgar Offlighter, the present year will fall about $300,000 short of the record of 1911. There have been comparatively few permits for large buildings this year and, while some are expected to be issued before the close of 1912, they will not be sufficient, it is thought, to bring the total up to that of 1911, which was $1,572,550.

Toledo, Ohio

The month which has just closed showed a very noticeable increase in building operations as compared with October last year, both as to the number of permits issued and the value of the work for which plans were filed. According to the report of the city building department there were 215 permits taken out last month for construction work valued at $404,553, while in October last year 165 permits were issued and the valuation totaled $250,868.

Taking the first ten months of the year and comparing the figures with the corresponding period of last year there is seen to be an increase in the value of building operations of $1,527,184. The report shows that 1801 permits were issued by the department between January 1 and November 1 of the current year and calling for an expenditure of $4,909,048, while in the first ten months of 1911 there were 1609 permits issued for buildings valued at $3,383,864.

Builders' Appliances and Equipment

Some Things of Seasonable Interest to Those Having To Do with the Building Business

The Smith Hand Mixer

It is a well-known fact that in connection with concrete work the making of the wooden "forms' is an essential

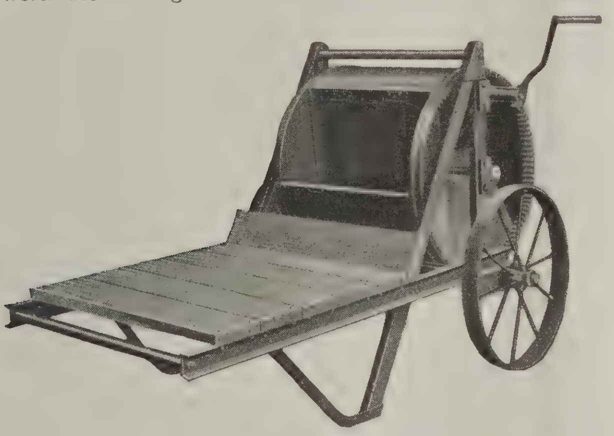


Fig. 1—The Smith Hand Mixer

feature of the construction, requiring care and skill in their execution. There would seem to be no reason why the carpenter-contractor who is engaged in doing this sort of work regularly could not with a little attention satisfactorily fill the forms with concrete and thus place himself in a position to take bids on concrete work and execute it with profit to himself and satisfaction to the owner. In order to do this, however, it is necessary to have a concrete mixer that is convenient and reliable for the purpose and in this connection attention is invited to the 1912 model of hand mixer which has been placed upon the market by the T. L. Smith Company, 1327 Majestic Building, Milwaukee, Wis., and illustrated in general view in Fig. 1 of the engravings. The point is made that those doing concrete work have for years been looking for a light portable outfit with low feed suitable for small work where a power outfit would not prove profitable. To meet this demand the company offers the Smith Hand Mixer, which is a batch mixer easily operated by hand and dispensing with the services of an engineer, for the reason that no engineer is required to run it.

The drum consists of a cylinder, the ends of which are sloped inward until they almost meet, thus forming in the cylinder two wedge-like chambers united by a 5-in. slot extending diametrically across the drum. When the drum is revolved the batch is poured from chamber to chamber and when the motion of the drum is reversed the concrete is discharged. A cleaning door is provided and if the drum is cleaned when the day's work is finished clogging is said to be impossible. The claim is made that actual tests have proven that three turns of the drum produce an entirely satisfactory grade of concrete. The capacity of the mixer here shown is 2½ cu. ft. of mixed concrete per batch, and it will turn out from 30 to 35 cu. yd. per day. The hight of the feeding platform is 12 in. and the width of the platform is 3 ft. 7 in. The extreme hight of the outfit is 4 ft. 5 in. and the extreme width 4 ft. 2½ in.

The Reinhardt Profile Gauge

An important adjunct of the "kit" of tools of the cabinet maker, the carpenter and the pattern maker is the profile gauge illustrated in Fig. 2 of the accompanying illustration and which is being offered under the name "Reinhardt" by the Warren Supply Company, 85 Warren Street, New York City. It is specially intended for the purpose

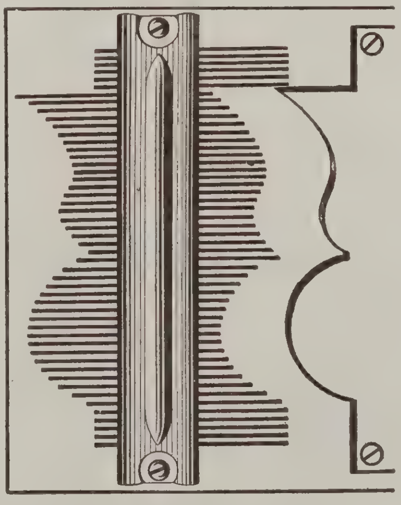


Fig. 2—The Reinhardt Profile Gauge

of outlining irregular curves and shapes and is made in five sizes. The rods which are shown running horizontally in the illustration are made of spring steel 2¼ in. long and are ground to length. There are 20 rods to the inch and when using the device the ends of the rods are in a vertical line so that when they are pressed against the profile of a molding or other irregular shape they will exactly reproduce the profile similar for example to that shown in the illustration. The side plates between which the rods slide are oxidized. The profile gauge is made in 2, 3, 4, 5 and 6 in. sizes.

Catalogue of Lignine Carvings

Some very attractive designs of ornamental Lignine carvings are shown in Catalogue No. 7 which has just been issued from the press by the Ornamental Products Company, 615 Lafayette Boulevard, Detroit, Mich. These carvings are referred to as being unbreakable and can be

Fig. 3—Design of a Lignine (Wood) Carving

made in perfect reproductions of hand-carved oak, mahogany and walnut models. The claim is made that the carvings will not break, check, chip, crack nor shrink; do not deteriorate with age; can be nailed, screwed, braded and glued, and that they finish the same as hand-carvings with filler or stain. A great variety of designs are shown in this catalogue and in connection with each is given its number; its various dimensions and its price. In Fig. 3 of the illustrations we show one of these designs which is among the latest that the company has added to its extensive assortment. The claim is made that Lignine carvings will stand the roughest usage and that their use will prove economical in many ways.

Changes in Officers and Board of Directors of Joseph Dixon Crucible Company

At the regular monthly meeting of the Board of Directors of the Joseph Dixon Crucible Company, Jersey City, N. J., held Monday, October 21, the following changes in the board of management were made on account of the death of vice-president William H. Corbin.

George E. Long, former treasurer, was elected vice-president to succeed Mr. Corbin. Former assistant secretary and assistant treasurer J. H. Schermerhorn was elected to membership in the Board of Directors and treasurer of the company. Albert Norris was elected to the office of assistant secretary and assistant treasurer.

The "Perfect Handle" Shingling Hatchet

The perfect handle shingling hatchet, which H. D. Smith & Co., Plantsville, Conn., is offering to the trade

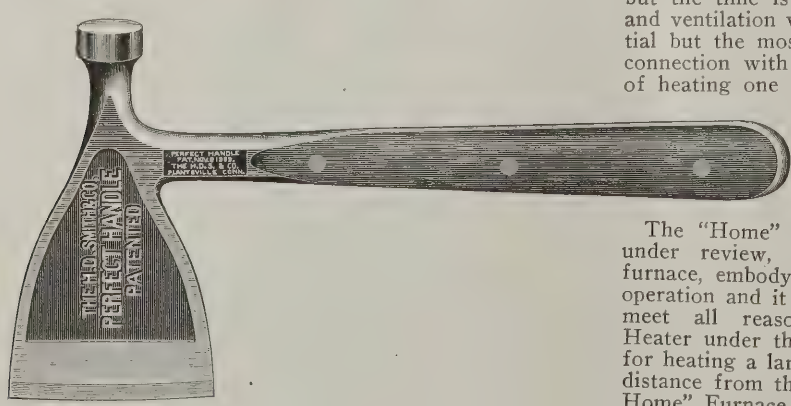


Fig. 4—The Perfect Handle Shingling Hatchet

and which is illustrated in Fig. 4 of the engraving, is referred to as the first hatchet ever made which shows an improvement over the wooden handle. The handle is said to be practically unbreakable. These hatchets are made of special high grade hatchet steel and fully warranted. The Perfect handle tools are all drop forged and the Perfect handle itself locked in and riveted waterproof, making a practical and permanent handle.

Some Comments on Bishopric Wall Board

A very interesting educational campaign for the purpose of acquainting builders, contractors, carpenters and house-owners with the advantages of Bishopric Wall Board is now being conducted by the Mastic Wall Board & Roofing Manufacturing Company, 382 Este avenue, Cincinnati, Ohio. In order to introduce the use of this board in every community in the country liberal samples and complete information are sent to each inquirer who writes for prices. The material which is sent out includes a copy of the Bishopric book, a sample of the Bishopric Wall Board, a duplicate of the $5,000 Anti-Warp Bond Guarantee and blue prints showing plans of a model home. This campaign of education is intended to be of direct benefit to carpenters and builders in every community as it tends to give additional work to those who apply the material. It is pointed out that under the Anti-Warp Bond referred to the Bishopric Wall Board is guaranteed "not to warp, shrink, buckle nor pull loose." It is claimed to be moisture-proof, rat-proof and fire-resisting; is unaffected by temperature and remains solid and firm in any climate, winter or summer. On large jobs the material is shipped in crates of 16 sheets to the crate or 256 sq. ft. of material. It is ready at once for use and lends itself to artistic interior decoration. The material contains no free chemical and the most delicate tints it is claimed can be used on its surface without the slightest change in color. It gives a solid surface which may be cleaned with a damp rag without harm to the decoration. The material is used for walls and ceilings in fine homes, country clubs, schools, churches, hospitals and in fact all kinds of buildings where walls of beauty and permanence are necessary. By reason of its low cost it is used extensively by carpenters and farmers on small construction work, and the company states that any carpenter may take any sort of an interior job and complete it quickly at small cost without the aid of lathers and plasterers.

The Home Warm Air Furnaces

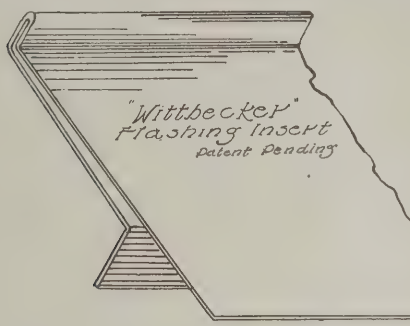
We have received from the Hood Furnace & Supply Company, Corning, N. Y., a copy of a neat and attractive catalogue illustrating and describing the "Home" line of warm air furnaces, combination heaters and furnace supplies. The object in sending out the catalogue is to place in the hands of the trade and their customers such information regarding the relative merits of sanitary and economical heating by warm air furnaces and other systems, that intending purchasers may select for themselves. The problem is what system of heating will give the best sanitary as well as the most economical results in our homes, schools, churches and public buildings. Overheated air and improper ventilation are not conducive to good health or comfort, but these may be secured through the introduction of pure warm air with proper changes by means of ventilation.

In building a new home or remodeling an old one, we should have most regard for those things which contribute to the health and comfort of our families, while style and beauty of the whole should be a secondary consideration. Generally, however, this order of things is reversed but the time is at hand when the best sanitary heating and ventilation will be considered not only the most essential but the most economical outlay that can be made in connection with the home. It is stated that any system of heating one may select has some points of advantage over any other system and if the fact is kept clearly in mind that one cannot afford to select anything but the system furnishing the most fresh air, he will be on the safe side for good health as the chief consideration.

The "Home" line of heaters, shown in the catalogue under review, include the "Cheerful Home" hot air furnace, embodying features which render it powerful in operation and it is offered in sufficient number of sizes to meet all reasonable requirements. The combination Heater under the same name is intended more especially for heating a large house or one with rooms located some distance from the heater. Other gooods are the "Cottage Home" Furnace, the "New Home" hot blast furnace with cast radiator, and also made with steel radiator and having automatic direct draft and gas damper, and the "Cheerful Home" furnaces in battery form, which are intended for heating churches, schoolhouses, and large dwellings where a single heating plant is desired. The concluding pages are given up to furnace supplies of various kinds and there is a short chapter entitled "A Building Suggestion," in which special reference is made to the chimney draft, the cold air supply, etc. There are some remarks on the care of furnaces and a number of testimonial letters from some of those who have used the company's goods.

Wittbecker's Flashing Insert

It is a well-known fact that many a good roof leaks because of imperfect flashing and every one knows how annoying is a roof which leaks, especially to the tenants of the building. With a view to overcoming this difficulty



Wittbecker's Flashing Insert—Fig. 5—General View

W. A. Wittbecker, Raymond and University streets, St. Paul, Minn., has just brought out the "Flashing Insert" which we illustrate herewith. It is of such a nature as to make a poor job of flashing absolutely impossible, for when the counterflashing is inserted and the extending flange hammered down it makes a smooth and water-tight job. By reason of the fact that it is built into the wall and that it has an upwardly projecting shoulder it cannot possibly become loose, consequently it is tight as long as the wall stands. It is particularly valuable in concrete work where it is almost impossible to cut a groove for the flashing after the concrete has set. For brick walls it is much cheaper to have the insert laid in the wall during process of construction than to cut out the mortar afterward, to say nothing of the superior job which it makes. It is referred to as inexpensive, practical and durable and it is made in galvanized iron or copper.

In Fig. 5 of the illustrations is a general view of the flashing insert, while in Figs. 6 and 7 is clearly indicated the manner in which the insert is used. In Fig. 6 the

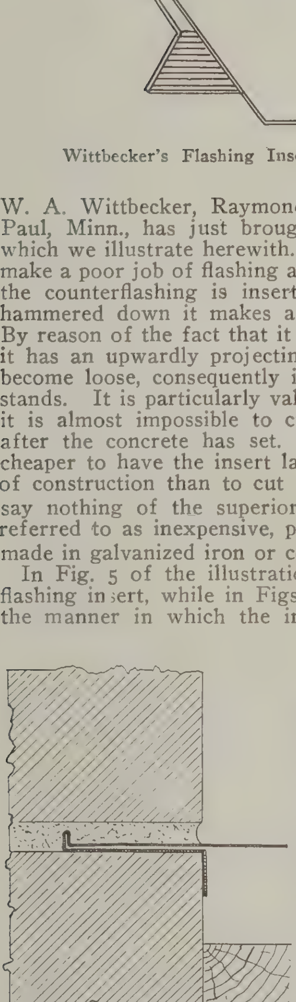


Fig. 6—Flashing Insert in Place

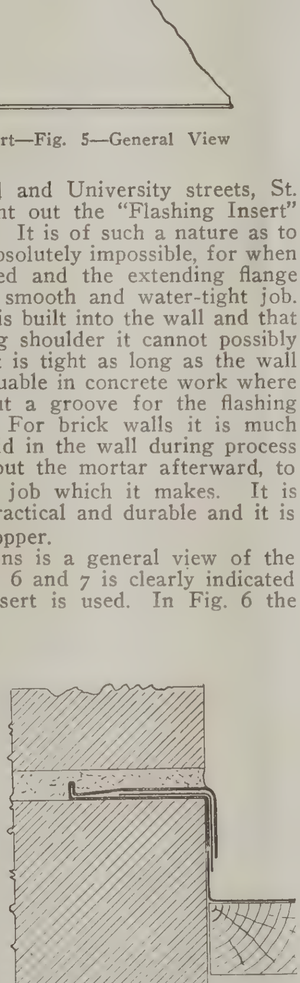


Fig. 7—The Flashing Completed

insert is shown in place, while Fig. 7 represents the flashing completed. We understand that Mr. Wittbecker will send on application to any architect, builder or roofer a sample of the device. He states that he has been assured by architects and builders that the device will revolutionize the work of the roofer and that it is both expedient and economical for the builders to have the insert put in place while the building is being erected even though it may not have been included in the specifications.

A Novel Business Campaign

The Blaw Steel Construction Company with general offices at the corner of Penn Avenue and Anderson Street, Pittsburgh, Pa., has just inaugurated what is regarded as one of the most aggressive business campaigns ever attempted. The company is starting 16 of its sales engineers from Pittsburgh, New York and Chicago to visit practically every town in the United States and spread the doctrine of the Blaw Steel Forms. It is not a "selling" campaign but a "telling" campaign in that the men are not instructed primarily to get orders but to call on the principal building contractors and engineers in every town and tell them what the company can do for them; show them how the company can save them money and tell them about the service the company has rendered to other building contractors and engineers. It is estimated that it will take three to four months of this campaign to cover the field, as practically every town of any size in the United States and Canada will be visited. In this connection it may be stated that the company's representatives will be glad to call on any building contractor or engineer anywhere in the country merely to tell something about the Blaw Steel Forms, should the company receive a request for such a visit while one of its representatives is anywhere in the vicinity of the inquirer.

Automatic Shingle Nailing Machine

The latest candidate for popular favor in the way of a labor-saving device for the builder and carpenter who has very much shingling to do is the automatic nailing device just patented by F. A. Devereaux and is being placed upon

Fig. 8—General View of Automatic Shingle Nailing Machine

the market by Donnelly & Devereaux, 4242 Nicollet avenue, Minneapolis, Minn. This shingle nailing machine is referred to as being so simple in construction and easy of manipulation that even an inexperienced person can nail on shingles faster than expert operators using the old methods. The construction is such that the machine always drops the nail in the desired place and does its work automatically. It is simply necessary to place a quantity of nails in the hopper, put the machine in position and drop the plunger. The escapement is so adjusted that only one nail can be dropped into place at a time. It weighs only 1½ lb. and can therefore readily be carried in the hand. The best materials are used in its construction, thus rendering it durable, and at the same time the manufacturers point out that it is convenient, dependable and accurate. The claim is made that with this machine shingling may be done as easily and as rapidly in the winter time as in summer; in lamplight as well as in daylight. A general view of the complete machine and showing the nailing hopper attached is clearly indicated in Fig. 8 of the accompanying illustrations. The advantages claimed for the machine are time and labor saved; no hammer is required; no split shingles result from its use; no crooked nails; no sore lips from holding nails in the mouth and no cold or injured fingers, as the operator may use gloves or mittens if the weather demands it.

Catalogue of Tool Chests

A very comprehensive and attractive catalogue of 50 pages illustrating and describing various lines of tool chests has just been issued from the press by C. E. Jennings & Co., 42 Murray Street, New York City. The early pages are given up to tool outfits in which all the tools are warranted. An interesting line of tool cabinets with contents are illustrated and described, these varying in size from the one containing only 14 tools up to the more elaborate cabinet containing 52 articles. One section of the catalogue is given up to carpenters' tool chests which are well made and finely finished but which are not equipped with tools. There are also shoulder or hand carrying tool chests in great variety, these being adapted for carpenters, electricians, machinists, tool makers, etc. Other goods include metal corners for tool chests and hardwood miter boxes.

One of the interesting features of the catalogue is the Arrow Head Brace and Bit Set No. 1912, an illustration of which is presented in Fig. 9 of the engravings. The

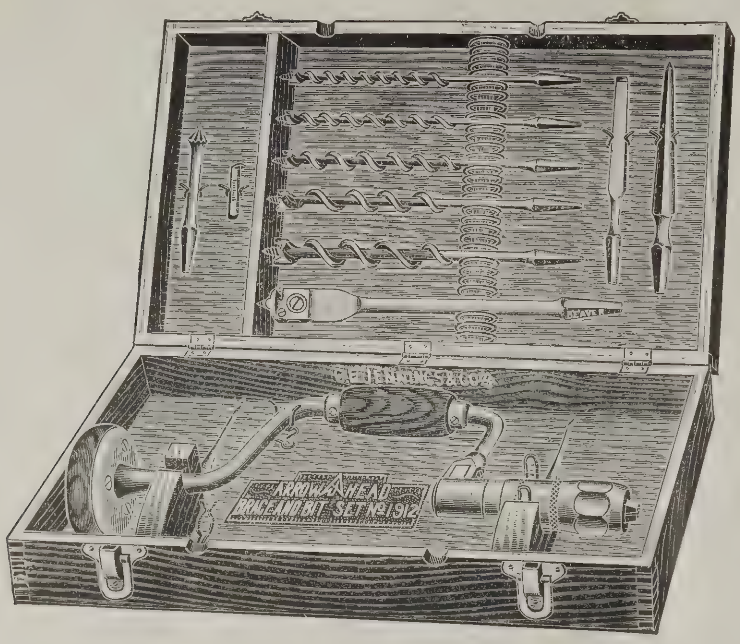


Fig. 9—Brace and Bit Set, Arrow Head Brand, No. 1912, Open

outer dimensions of the case are 15¾ x 9¼ x 3⅝ in. The 12 warranted tools include a nickeled 10 in. ratchet brace; one each gimlet bit 2/32 and 4/32 in.; one No. 2½ C auger bit each 4 to 8, 10 and 12/16ths; one expansion bit cutting from ⅞ to 3 in., and one each countersink, square reamer and screw driver bit. The cutting range of the bits is from 2/32 to 3 in. The manner in which each tool is held in its place is clearly shown in the illustration, which represents the case open. When being carried from place to place, the brace is turned over so that it projects outside the case and serves as a handle.

Sanitas Plumbing Fixtures

Within the covers of a daintily printed *brochure,* which reaches us from the Sanitas Mfg. Company, 54 Union Street, Boston, Mass., is to be found much interesting information relative to the various lines of Sanitas Plumbing Fixtures turned out by this concern. In the introductory remarks it is stated that the name "Sanitas," as applied to the company's plumbing fixtures, "has come to mean the very best toilet sanitation of which it is possible to conceive or build." They are designed to meet the exacting requirements of discriminating and particular people and the claim is made that the use of Sanitas fixtures insures the maximum of simplicity and sanitary cleanliness. Furthermore, it is stated "it means continuous and uninterrupted service year in and year out," which means the practical elimination of repair bills. The types of fixtures shown in the booklet very well illustrate the character of the goods, their distinctive style, graceful lines and finish. A feature of the booklet is found in a series of half-tone engravings of notable residences in which Sanitas fixtures have been installed.

A Bit of History of Mayhew Bits

Under the above suggestive title, H. Mayhew Company, Shelburne Falls, Mass., has issued a neat little pamphlet of a size convenient to carry in the pocket and briefly relating the history of Shelburne Falls where the first small wood boring bits were made and also of the tools in question. It appears that in the year 1856, H. S. Shepardson, with imported steel and a few workmen from the old country skilled in the art of forging and tempering, began the manufacture of what is familiarly known as the "German bit." Previously these bits had all been imported and Mr. Shepardson was the pioneer of this industry in America. Later other tools of kindred nature were added and these were placed on the market under the now well-known trademark of the company. It is stated that the steel used is still imported and that hand work still predominates throughout the company's shops. The various tools are still forged by the old-time hand methods but in the finishing processes, where machinery can be employed without detriment to the quality of the tool, the latest and most up-to-date machines are used. The hardening and tempering are now done by electrically heated furnaces insuring both correct and uniform results.

The leading lines of the company's product are illustrated and described in the pamphlet and we understand that a copy of it will be sent to any carpenter or builder who may make application to the company for it.

Fire-Door Hardware

The Richards-Wilcox Mfg. Company, Aurora, Ill., has just issued from the press a very attractive catalogue of 36 pages relating to fire-door hardware which it manufactures in great variety. Where mentioned in the pages of the catalogue, the hardware has been tested, bears the label and is approved for use by the National Board of Fire Underwriters. The company's fixtures are made in accordance with their rules governing the various types of standard equipment. In connection with the illustrations much valuable information is presented and the work cannot fail to be of interest to architects and builders generally.

The company has also issued an eight-page pamphlet relating to garage door equipment which is intended to assist architects in providing for the proper sliding door hangers in their garage work. Within the covers of the pamphlet are illustrated the Richards Ball Bearing Trolley Hangers and there are also shown various possibilities of handling the sliding door proposition.

Handsome Ceiling Catalogue

The Canton Art Metal Company, Canton, Ohio, is just sending out a 144-page metal ceiling catalogue 10½x14 inches which illustrates its various designs in Modern French, Louis XIV, Greek, Rococo, Colonial, Empire, Gothic, Romanesque, in separate plates, borders, moldings, etc., and in various combination designs. The catalogue shows one entirely new order termed "Modern French," together with a number of new designs which the company has added to its large number of designs under the classifications that it has previously shown. The catalogue also illustrates many interior views showing the ornamental ceiling designs in the different classes of buildings in which they are used and the beautiful effects produced. The photographs from which full page designs were produced were made by the company's own photographer in its own gallery and are views of metal plates in position just as they appear on a ceiling in a room. The catalogue is printed on a very high quality and finish of white enamel paper.

Special attention is called to the superior features incorporated in the Canton metal ceilings, particularly the architectural features and beautiful designs in the construction of the new repressed joints. It is stated that the one objectionable feature in the steel ceilings in the past has been in the mechanical construction, many artistic designs being spoiled by open joints which in many cases had to be closed with putty. The Canton Art Metal Company has always aimed to make construction first and above everything else in the manufacture of its ceilings and with that aim in view it claims to have gone a step further than any other manufacturer by repressing the beads on steel upper and lower dies, making them accurate to the one-thousandth part of an inch, and in the same operation punching the nail holes in the plates at the nailing points, which does away entirely with nailing through the metal at the different sections. This feature is claimed to result in a saving of 20 to 50 per cent. in the cost of erection and at the same time giving when completed a perfect fitting ceiling. The company has also issued a catalogue in Spanish for the Spanish-speaking countries which is as complete as the one in English. The new catalogue is being sent to the trade and the company will be glad to hear from all who are interested in interior metal finish.

American Column Company, Battle Creek, Mich., has a new catalogue of "Stay-Locked" Columns which it will send free to any architect or builder who may make application for it.

(For Trade Notes see second page following.)

TRADE NOTES

As the holiday season approaches there are doubtless many of the readers of the *Building Age* who are interested in "antiques" of all sorts and any who will be glad to secure a copy of the comprehensive catalogue of such goods which has been issued by Ralph Warren Burnham, Ipswich, Mass. He states that he ransacks a thousand attics annually and that his stock is replete with fine old things from New England homes. A copy of the catalogue will be sent to any address on receipt of 4 cents to cover postage.

The board of directors and officers of the Luther Grinder Mfg. Company, Milwaukee, Wis., have selected Edwin B. Bartlett to fill the office of treasurer and superintendent, made vacant by the death of James M. Thompson. Mr. Bartlett is a young man with plenty of energy; has had a technical training in mechanical engineering and with his experience is highly qualified to fill the office of superintendent, to which he has been appointed. He was for a number of years assistant superintendent for the A. O. Smith Company of Milwaukee, a concern which is a large manufacturer of automobile parts.

The last issue of *Graphite*, published by the Joseph Dixon Crucible Company, Jersey City, N. J., carries some attractive illustrations bearing upon the use and sale of the company's products. There is an excellent picture of the new Sloane building on Fifth avenue, in the construction of which between 6,000 and 8,000 tons of structural steel were used and which is protected with Dixon's Silica Graphite Paint. Another striking picture is the company's display at the recent foundrymen's convention in Buffalo and still another is its display at the Canadian National Exhibition in Toronto. Most impressive perhaps of all is the likeness of the late William H. Corbin, vice-president of the company, which is accompanied by a very interesting account of his business career, together with a tribute to his memory.

The Blaw Steel Construction Company, Pittsburgh, Pa., makes the announcement that Herman Nieter, recently general sales manager of the Kennicott Company of Chicago, is now associated with the Blaw Company, and is located at its Eastern office, 165 Broadway, New York City. Mr. Nieter was for four years New York agent for the Hammond Iron Works of Warren, Pa., previous to which time he was connected with the Engineering Department of Westinghouse, Church, Kerr & Co. and J. G. White & Co.

We are in receipt of a very attractive copy of the Cortright Metal Shingle "Advocate" containing the usual amount of suggestive information relative to the roof covering manufactured by the Cortright Metal Roofing Company, 50 North 23rd street, Philadelphia, Pa. The illustrations are of a varied nature and some of the dwelling houses whereon Cortright metal shingles have been used are printed in colors. Any reader of the *Building Age* who is contemplating re-roofing a building or putting up a new structure can secure a copy of the "Advocate" free of charge by sending to the address above given.

Sedgwick Machine Works, 123 Liberty Street, New York City, suggest to those builders who are interested in dumbwaiters to send for a copy of "Catalogue K," which will be mailed free to any address. The catalogue contains much valuable information regarding the construction of dumbwaiters and the recipient of a copy of the publication can select from it just what will best suit his requirements.

American Wood Working Machinery Company, Rochester, N. Y., refers to its new American 36-in. ball-bearing band saw as a most important adjunct of the equipment of every up-to-date woodworking establishment where boards are required. One of the essential factors of a band saw is its ease of operation and the ball bearings for both wheels on the "American" assist in accomplishing this result. Contracting builders and others operating woodworking establishments can secure a photograph and full description of this machine by making application to the company.

Wood-Mosaic Company, 32 Hebard Street, Rochester, N. Y., will send a copy of its new wood mosaic booklet to any reader of the *Building Age* who is interested in parquetry flooring. The book has been published for those desirous of knowing more about parquet floors and it answers practically every question the average person would be likely to ask regarding this subject.

"Climate-Proof 1912" is the title of a booklet relating to Veneered Red Asbestos "Century" Shingles, which is being sent out by Keasbey & Mattison Company, Ambler, Pa. The statement is made that these veneered red shingles have an Indian red weather surface backed up with gray composition. They are made of the "Century" Asbestos-Cement Composition, and are referred to as being fireproof and permanent and as never needing painting or repairs.

George V. K. Greene, architect and engineer, 36 Main Street, Flushing, N. Y., is desirous of receiving catalogues of building materials from the advertisers of the *Building Age*, as he wishes to place the copies on file for reference.

Hammacher, Schlemmer & Co., Fourth Avenue and 13th Street, New York City, shows in its recently issued catalogue the various styles and sizes of miter boxes, trimmers, etc., which it is prepared to furnish. The statement is made that there are 16 styles and many sizes, ranging all the way from the ordinary wooden miter box up to the Marsh-Langdon all-metal machine to cut any angle and including hand and foot miters, trimmers, etc. Those of our readers who desire a copy of the little work in question should specify "Catalogue No. 3069."

The Smith & Egge Mfg. Company, Bridgeport, Conn., refers to the capacity of its sash chain plant as being 30 miles per day, and makes the announcement that it will send copies of its catalogues together with prices to any reader of the paper who may be interested.

Sanford E. Thompson, the well-known consulting engineer and familiar to the readers of the *Building Age* through various communications which have appeared in its columns, has established Boston offices at 141 Milk Street, but the main offices and laboratory will still be maintained at Newton Highlands, Mass. Mr. Thompson expresses the hope that through this extension of facilities he may be able to better and more efficiently serve his clients in matters pertaining to structural design of steel and reinforced concrete, and to the organization of construction and industrial operations.

The Emmert Mfg. Company, Waynesboro, Pa., has just issued from the press an attractive little pamphlet of a size convenient to carry in the pocket and relating to the various lines of woodworkers and pattern makers' vises. The goods are illustrated and described in a way to command the attention of the mechanic and he can secure a copy of the catalogue by making application for it. The Emmert Universal Vise is made in two standard sizes differing in weight and holding capacity and also in size of jaw, etc. The larger size has seven different pairs of jaws, any pair of which may be instantly adjusted to the position required by the operator. The smaller size of vise has one less pair of holding dogs, so arranged that they mav be secreted when not required for service. The statement is made that there are more than 50,000 of the company's Universal Woodworkers' Vises in use at the present day and the demand for them is constantly increasing. Among the closing pages of the little catalogue reference is made to improved tool makers and metal workers' Universal vises which are shown in several varieties. There are also price lists of extra parts and a telegraphic code.

BUILDING AGE

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Stays Waterproof

Trinidad Lake asphalt makes roofing *stay* waterproof. It is the product of Nature. And man has never equaled it for roofing. We use it to make

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Ready Roofing

Genasco doesn't rot, rust, dry-out, crack, break—and doesn't leak.

Mineral or smooth surface. Comes in rolls ready and easy for anybody to lay. Ask your dealer for Genasco. Write us for samples and the valuable Good Roof Guide Book—free.

The **Kant-leak Kleet** for smooth-surface roofings does away with nail-leaks and makes seams watertight without cement. Ask for it packed in the roll.

THE BARBER ASPHALT PAVING COMPANY

Largest producers of asphalt and largest manufacturers of ready roofing in the world

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We have been manufacturing Parquetry and all kinds of hardwood flooring for twenty-five years or more. If our flooring is properly handled you will not be troubled by shrinkage in finished floors. Our material is kept in heated stock rooms until moment of shipment, and troubles incident to the use of the ordinary lumber yard flooring are avoided by the use of our product.

We have Agents who are experts in the principal cities.

In the smaller cities and towns our flooring should be handled by the most **Progressive Carpenter** in the place. "Instructions for Laying and Finishing" constitute a text book of the best methods employed by the largest floor-laying agencies.

Our agents are Floor Specialists—we are Floor Specialists.

Good carpenters should write us with a view to acting as agents. We protect agents in their territories and aid them in every way possible. The line requires no investment on your part if you do not wish to carry stock. We want to hear from you.

WOOD-MOSAIC COMPANY

ROCHESTER, N. Y. NEW ALBANY, IND.

YOU Make No Mistake When You Buy

RUSSELL JENNINGS BITS

Whether you buy the ordinary shank bit, or the new Precision turned shank bit, you may be sure of the quality when you see Russell Jennings stamped on the round.

Our regular style auger bit, with ordinary bit shank, is made with 3 different threads on the screw point—standard for ordinary boring; quick boring, for hard or gummy woods, and double quick boring, for rapid work in soft wood. These bits have been the standard among the best workmen for over half a century and are backed by the RUSSELL JENNINGS GUARANTEE.

Our new Precision turned shank auger bit is the same as our regular auger bit, but with a turned shank which makes placing or removing from the brace chuck easy and rapid. It cannot wobble or pull out.

Russell Jennings Precision tools are now sold separately or in sets, and may be seen at your dealer's. Ask him for the new Bulletin describing them.

Incidentally, if you want to know about the care of auger bits, ask for our booklet, "How to Sharpen Auger Bits." It tells you what you ought to know about bits.

RUSSELL JENNINGS MFG. CO.

Chester, Conn.

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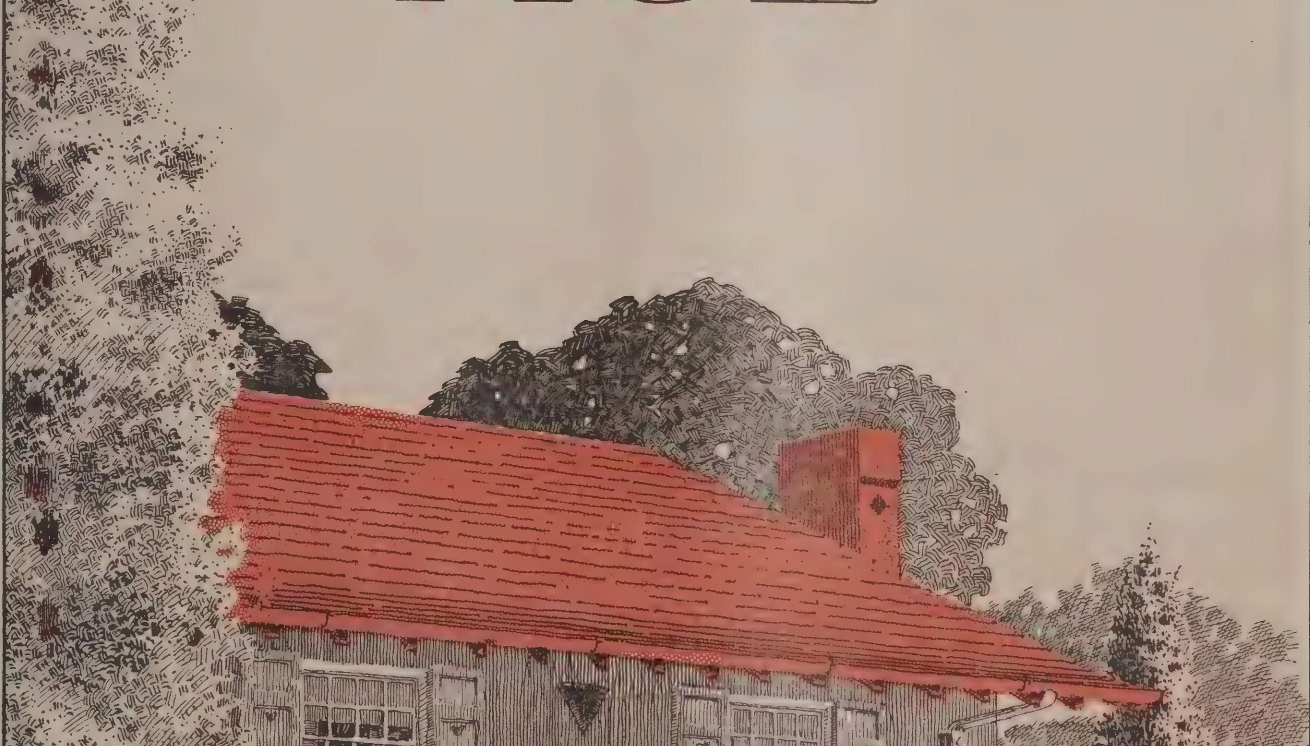

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Mineral or smooth surface. Comes in rolls ready and easy for anybody to lay. Ask your dealer for Genasco. Write us for samples and the valuable Good Roof Guide Book—free.

The **Kant-leak Kleet** for smooth-surface roofings does away with nail-leaks and makes seams water-tight without cement. Ask for it packed in the roll.

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THE BARBER ASPHALT PAVING COMPANY

Largest producers of asphalt and largest manufacturers of ready roofing in the world.

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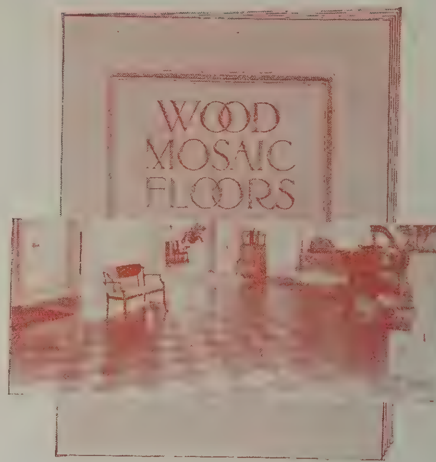


You should get The New Wood-Mosaic Booklet. More information regarding parquetry flooring is between its covers than any other work of its kind ever published.

This book has been published for those interested in knowing more about parquet floors. We believe that it answers every question the average person would ask. It does this in an entertaining manner. As a piece of business literature we believe you could employ it to good advantage.

Write us for a copy of this booklet yourself. You will know more about us, the Wood-Mosaic Products and our ability to work with you to the profit of us both. A copy is yours for the asking. What's the name and address?

WOOD-MOSAIC COMPANY

32 Hebard Street — **Rochester, New York**

Saw Mill and Flooring Factory
New Albany, Indiana

WOOD-MOSAIC FLOORING TRADE MARK REGISTERED

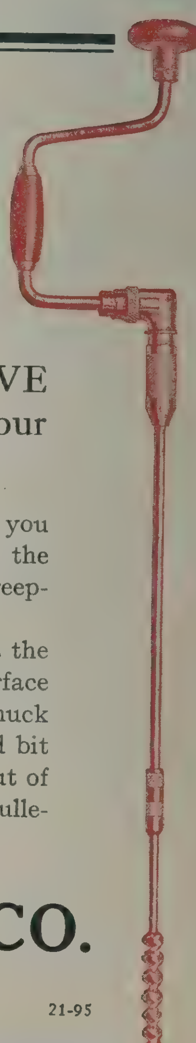
Sales Office and Parquetry Factory
Rochester, New York

DON'T FORGET to put in a Russell Jennings Expansive Bit—when you pack your tool-box

You will find THE SOLID HEAD EXPANSIVE BIT more reliable than any other you ever put in your brace, and this is why:

The head is one solid piece, slotted to receive the cutter. That gives you great strength and prevents chips from getting under the cutter. Then the cutter is adjusted by a worm which absolutely prevents the cutter from creeping.

Another handy tool for your box is the **Precision bit extension.** It is the only one we know of that stays in line with the brace. The true turned surface of the Precision shank accounts for this feature. Then the Precision chuck keeps the bit in line with the extension so that your brace extension and bit are in perfect alignment. The new Precision turned shank never pulls out of the Precision chuck, so you can rely on it under any condition. Send for bulletin describing these tools and our line of braces, bits, and sets.



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To make a roof *lastingly* waterproof lay roofing made of Trinidad Lake Asphalt.

The natural oils of this asphalt give life to

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THE TRINIDAD-LAKE-ASPHALT
Ready Roofing

That is why Genasco lasts.

Mineral or smooth surface. Several weights. Ask your dealer for Genasco. Write us for the helpful Good Roof Guide Book and samples—free.

The Kant-leak Kleet, for smooth-surface roofings, makes seams waterproof without cement, and prevents nail leaks.

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THE BARBER ASPHALT PAVING COMPANY

Largest producers of asphalt and largest manufacturers of ready roofing in the world

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New York San Francisco Chicago

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Write us for a copy of this booklet yourself. You will know more about us, the Wood-Mosaic Products and our ability to work with you to the profit of us both. A copy is yours for the asking. What's the name and address?

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WOOD-MOSAIC FLOORING
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Sales Office and Parquetry Factory
Rochester, New York

Some Suggestions for Christmas Presents

Give your boy who already shows such skill with his hands a set of

Russell Jennings Precision Tools

It is a man's gift that will please him. Give your friend who prides himself on his workmanship a set of Russell Jennings Bits. He will use them a long while and will think well of you every time he uses them. They will last longer than a box of cigars that would never do him half as much good. And give yourself a present of a set of Russell Jennings Tools. You will be pleased with them and with yourself for having purchased them. They cut cleaner and faster than other bits and they never choke or clog. Your hardware dealer will show the full line.

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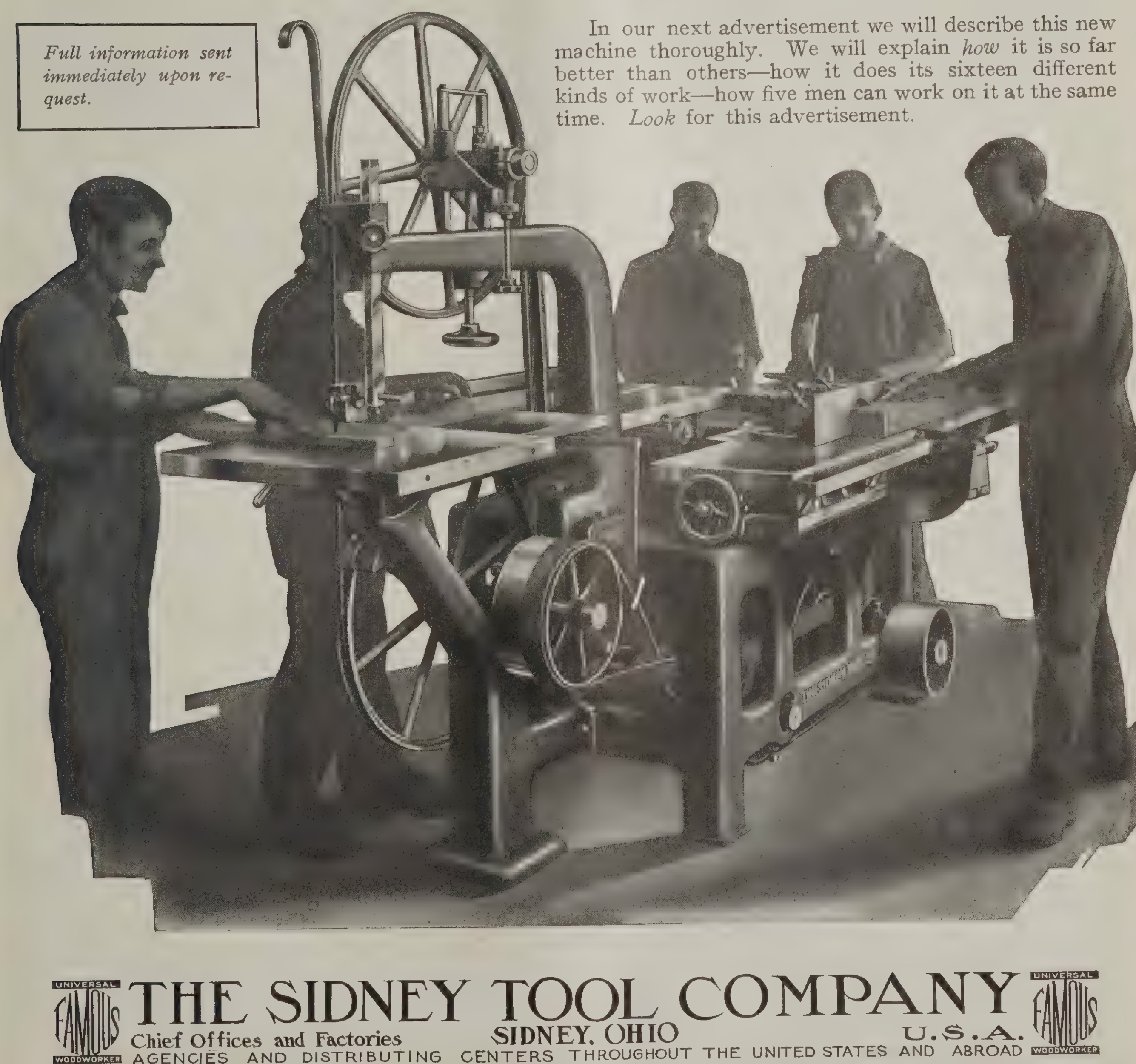
The Woodworking Wonder of the Age

THE FAMOUS "30"

marks the highest point yet reached in universal woodworkers. In ease of operation, multiplicity of work and all-around economy, the New Improved Famous No. 30 sets the highest standard of efficiency

Full information sent immediately upon request.

In our next advertisement we will describe this new machine thoroughly. We will explain *how* it is so far better than others—how it does its sixteen different kinds of work—how five men can work on it at the same time. *Look* for this advertisement.



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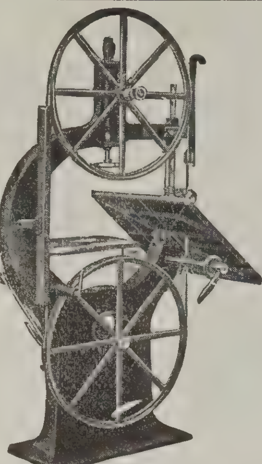

Silver's New Wood-Working Machines

Band Saws and Jointers—tools of good, honest construction, newest improvements and conveniences; patterns fresh from the designers.

Jointers—8, 12, 16, 20 and 24-inch. Band Saws—20, 26, 32 and 36-inch.

Silver's machines are high-pressure machines. They will do your work and do it well, save you money and labor, suit you in sizes, and in prices, too.
Post up on these tools. Ask for our printed matter at once.

THE SILVER MFG. CO.
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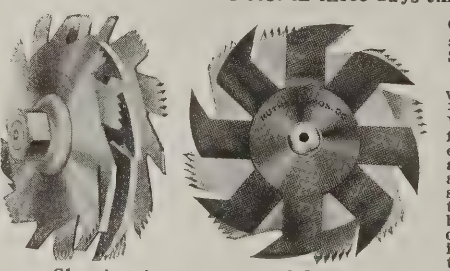
Huther Bros. Patent Groover or Dado Head

Will save its cost in three days time



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Can be used on any Circular Saw Mandrel

For cutting any width groove from ⅛" to 2" or over. Will cut a perfect groove, either with or across the grain, and leave edges smooth. Will ship to any responsible firm on ten days' approval; if not satisfactory you are at liberty to return at our expense.

We also make a specialty of concave ground smooth cutting circular Mitre Saws, for either rip or cross cut; Grooving Saws for all kinds of special work; Lock, Corner Cutters, Concave Saws, etc.

Try our Scraper Blades and you will use no others.

HUTHER BROS. SAW MFG. CO.
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Special Groove and Dado Heads to Order

Adjustable Cutter Head.

We also make any special size of heads, with any number of grooves for special work, to order, at lowest rates. As we make a specialty of Groove and Dado Heads we excel any other firm, without exception.

Over 25,000 Now in Use.

Solid Grooving Head.

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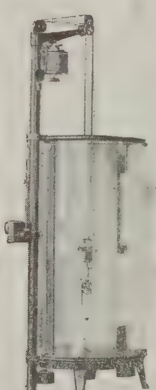

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in the blue print department by using **The Buckeye Electric Blue Printing Machine.** It will enable you to make prints without delay at lower cost.

Send for catalogue.

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THE

Excelsior Dumb Waiter

Sent complete, to a nail $18.50
Knocked down, ready to erect

Self-Retaining Machine, Hardwood Car, Ropes, Guides, Weight, Lumber and Hardware. No splicing necessary. Explicit working directions sent with every outfit. We sell direct to the consumer, and give an up-to-date Waiter for the price of an inferior one. *Send for Descriptive Pamphlet.*

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Do you want the best

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made ? If so, send for illustrated catalogue and prices

R. E. KIDDER
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Improved Quick and Easy Rising Steam Electric and Hand Power Safety

ELEVATORS

AND DUMB WAITERS
Automatic Hatch Gates
Send for Circulars

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Dumb Waiters

The best is the best and the cheapest is not always the cheapest. Builders who have used the most dumb waiters and hand power elevators agree that those made by the Sedgwick Machine Works are the best and if results are considered, that they are the most profitable to handle. Some builders buy the Sedgwick Machines only and build the balance of the outfit themselves. Others find that it is more convenient to let the Sedgwick Machine Works supply the complete outfit, as it is manifestly impossible to make one dumb waiter as cheaply as they can be made a hundred or a thousand at a time.

Send at once to the Sedgwick Machine Works, 123 Liberty Street, New York, for their Catalogue "K" which will be mailed you free and you will then have for reference a catalogue from which you can select just what will best suit your requirements.

THE MYERS GIANT DOOR HANGER

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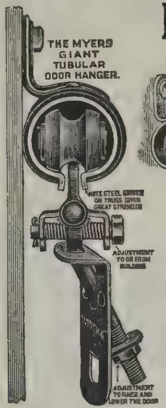

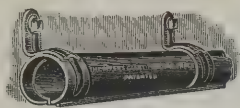

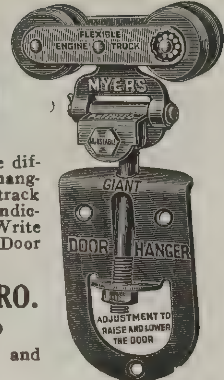

This is one of twelve different styles of door hangers for flat or tubular track with lateral and perpendicular adjustments. Write for Our Complete Door Hanger Catalog.

F. E. MYERS & BRO.
ASHLAND, OHIO
The Ashland Pump and Hay Tool Works.

VOIGTMANN

Hollow Metal Fireproof Windows, tested and approved by the National Board of Fire Underwriters Laboratories.

Manufacturing by

S. H. POMEROY CO., Inc.
Successors to
VOIGTMANN & CO., OF NEW YORK
427 W. 13th St., New York City

Phenix Hangers and Fasteners

Provide the easiest, surest and best manner of hanging storm sash. It's as simple as picture hanging. For ventilation or to clean windows swing them out.

You can profit in small amounts many times multiplied—constantly multiplied—by stocking Phenix Hangers and Fasteners and pushing them. Hangers retail at 10c, Hangers and Fasteners at 15c and 25c.

A request for our catalog, prices and discounts is the first step. Write for them today.

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MILWAUKEE, WIS.

COPPER CABLE SASH CHAIN

Thomas Morton

245 Centre Street
NEW YORK

Copper Cable
Steel Cable
Champion Metal
Steel Champion

SASH CHAINS

CHAINS
For Suspending Heavy Doors, Gates, Etc.
All of SUPERIOR QUALITY

CHAMPION METAL SASH CHAIN

"Grand Rapids" All Steel Sash Pulleys

No Nails No Screws Just Bore 4 Holes

The time saved by using the "GRAND RAPIDS" will pay for the pulleys.

You can't afford to use old style pulleys.

Write for free samples and prices.

Grand Rapids Hardware Company
160 Eleventh St., Grand Rapids, Mich.

Caldwell Sash Balance

Does away with weights and cords, and VASTLY more durable.

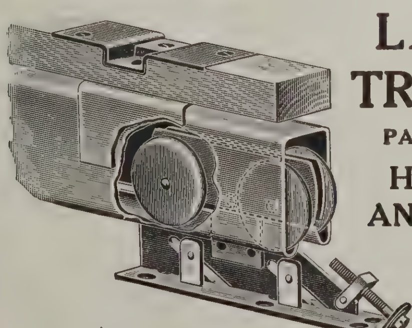
Makes sashes work perfectly.

Permits greater window space in new work, as box frames are not necessary.

May be applied to old windows without altering sashes or frames.

Write for circular to the

CALDWELL MFG. CO.
5 Jones St., Rochester, N.Y.



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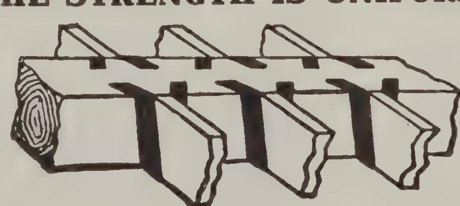
PARLOR DOOR
HANGERS AND TRACK

Have a side adjustment after the equipment is installed.

Get our catalog. Do you know about it?

LANE BROS. CO.
Livingston Street Poughkeepsie, N. Y.

THE STRENGTH IS UNIFORM



This Hanger is made of tough steel, formed hot, to keep the full strength at the bends; it follows the contour of the timber it touches; there is spiking chance everywhere. The strength is uniform everywhere, as the width and gauge of metal is the same in every part.
We make every size in three thicknesses of steel.

TAKE YOUR CHOICE BETWEEN THEM.

The W. J. Clark Company
SIXTH STREET SALEM, OHIO

STAY-LOCKED COLUMNS DO STAY LOCKED

FOR EXTERIOR AND INTERIOR USE

Our beautiful new catalog will be mailed you on receipt of a postal; tells all about Stay-Locked Columns—why you can depend on them—how the joints are secured in such a manner that they cannot come apart; it is a beautiful book full of good ideas and profusely illustrated; it's worth owning and we are anxious to send you a copy ABSOLUTELY FREE.

AMERICAN COLUMN CO., Ltd.
Battle Creek, Mich.

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Will increase your business
Increase your profits
Save you money, and make you Business Friends

INVESTIGATE

Send for free sample and catalog of Capitals, Pilaster Capitals, Heads, Shields, Rosettes, Scrolls, etc.

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Interior and Exterior

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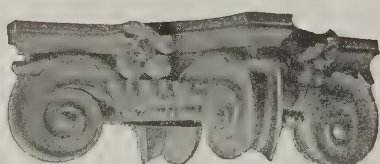
Estab-lished 1871



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We appreciate small orders as well as large ones

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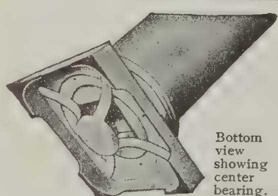

Bottom view showing center bearing.

THE ZIMMERMAN IRON BASE

is the ONLY BASE having a CENTRE-BEARING. It carries the required weight without allowing the corner supports to sink into the floor and prevents the base of column and floor from rotting.

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Manufactured by

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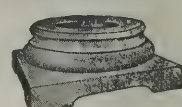

Notice the open center of the turned wood base which ventilates the column shaft, preventing it from opening.

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Builders and owners will find it a clinching argument to say "It's floored with OAK FLOORING." It is the biggest single feature to look for in any house or apartment building. It imparts an air of refinement and elegance. It is the modern flooring.

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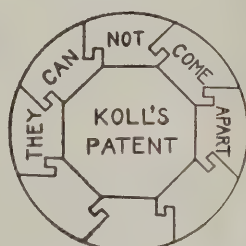

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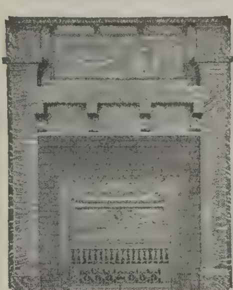
This Quarter-sawed Oak Mantel at $27.00 is the Best Buy of the Year

The height is 6 ft. 1 in., width 4 ft. 10 in. Wall plates to 5 ft. Pilasters 6½ in. Tile opening, 42 x 42 in. Profile, 5 in. Stock finish, golden polish, but we can match or give other finish without additional charge, including best coal grate, summer front, ash pan, tile facing and 18-in. hearth (you can have enameled or dull finish tile) also hooks and plates for fastening to wall.



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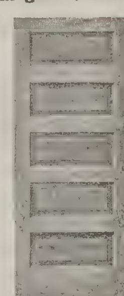

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Write for catalogue E-600 and special circular which will be sent upon request. Briefly described in Sweet's.

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Office and factory; 95 to 107 West Spring Street
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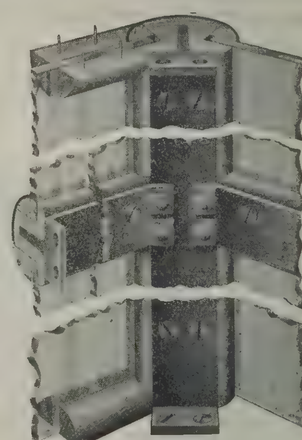
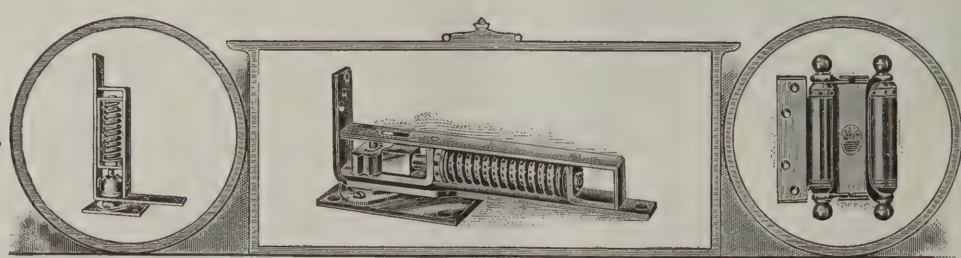


REAR VIEW



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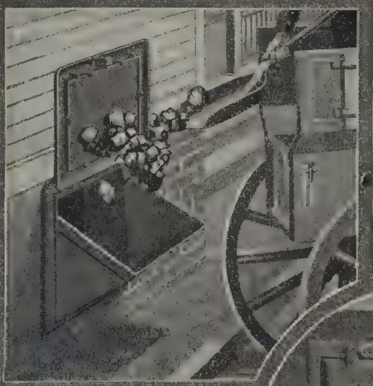

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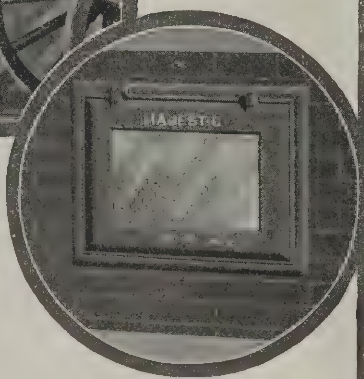

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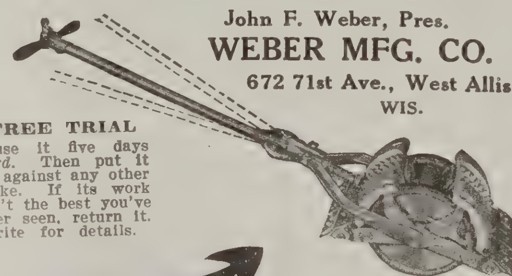

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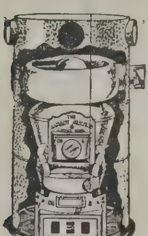

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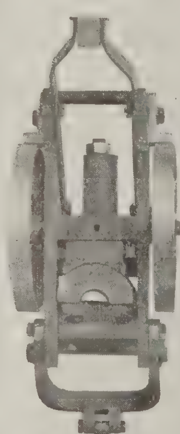

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The knife will adjust itself to any floor, and is attached to the shaft, which lets it give in the frame.

The "BOSS" is the only floor scraper made that will plane a floor without leaving a square cut.

The "BOSS" can be set for any thickness of shaving. It also can be set for any shearing, right or left, up or down, to suit the kind of lumber.

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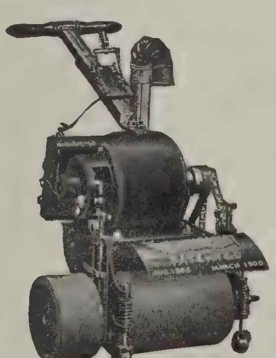

Made in three sizes; 8x18, 8x15, and 8x12 in. Roller. Edge Roller easily adjusted to either side.

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This machine is built on the only correct principle. It is guaranteed to be **The Best** machine with which to produce an even, smooth surface on any kind of large or small wood floor, old or new, hard or soft, and in all buildings: Residences, Stores, Factories, Bowling Alleys, Roller Skating Rinks, Reception and Dance Halls, Etc.

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Wherever they have been adopted, they have always given satisfaction. The great railroads and corporations re-order time after time, because they are SURE of the results.

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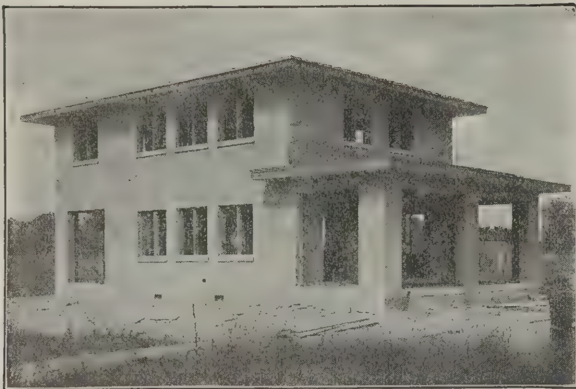

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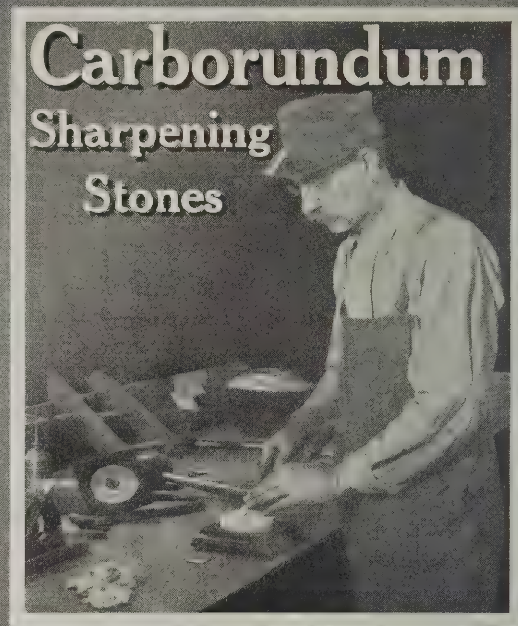
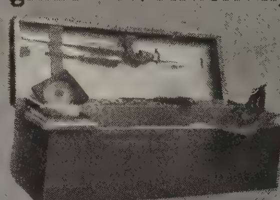


Are found on the benches and in the tool kits of more good carpenters than any other sharpening stones sold—and why—it's because a good carpenter appreciates the value of a good sharpening stone—one that will give a tool a keen, smooth edge quickly.

The Carborundum Stone is positively uniform—it wont fill or glaze—wonderfully durable—it cuts the edge on the tool.



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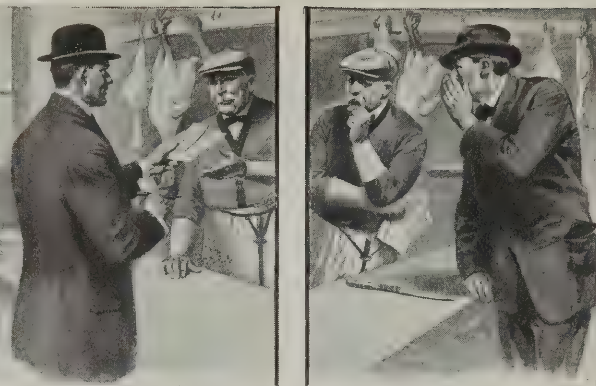

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Buck Bros. Tools include bevel edged chisels, socket and tang butt chisels, gouges, plane irons, drawing knives, nail sets, screw driver bits, and carving tools. Catalogue explains—get it at once.

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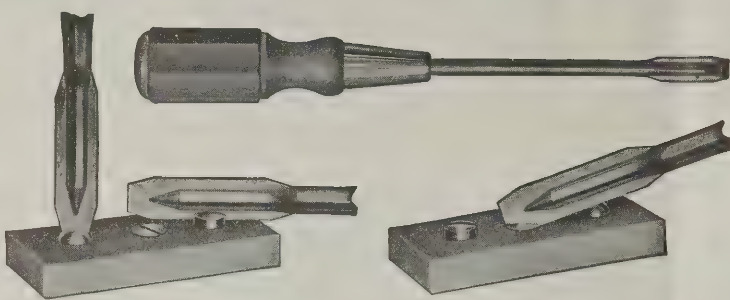

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It will do its work better than the old style wedge-shape bit. Can be used in places where no other style can do the work as shown in cuts.

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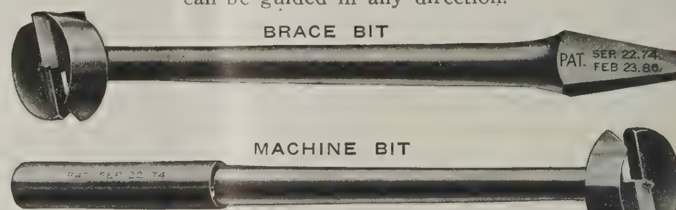

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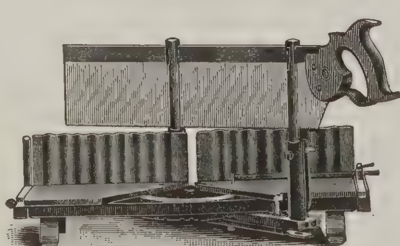

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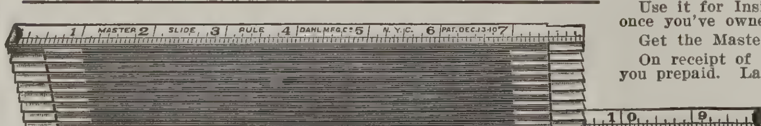

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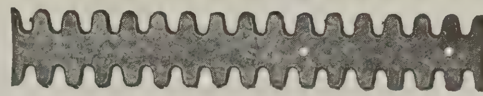

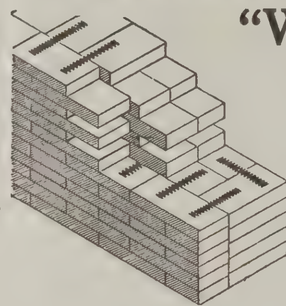

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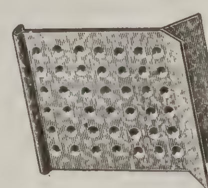
for building into Brick, Stone or Concrete Walls as a base for Nailing.



Can be put in place in one-tenth the time it takes to dig out mortar and drive in a wooden plug, is fourfold more secure, and will last as long as the building.

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Manufacturers of Hardware Specialties,
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By the PETTYJOHN SYSTEM

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Let us send you our guarantee and booklet No. 11

Making ready to insert the floor beams.

Van Guilder Hollow Wall Concrete Machine—Continuous Air Chamber from Cellar to Roof

Steel Reinforced Throughout

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The labor employed for making building material, such as blocks, brick, tile, etc., we utilize to erect the building.

Completely revolutionizing building methods.

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build the best silo walls in the world. Continuous air space. No freezing of ensilage. No vermin. New Special Machine for Cold Storage, 3 wall construction—2 continuous air chambers. No repairs. Stand forever.

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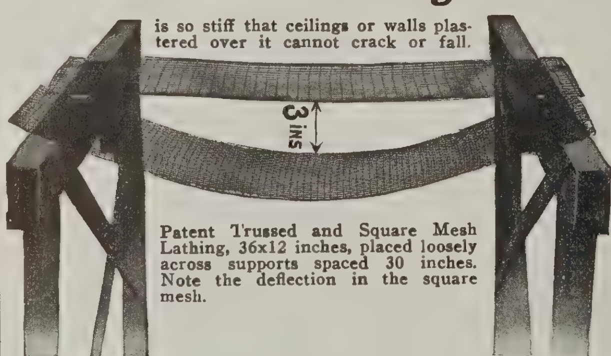
Greening's Trussed Steel Wire Lathing

is so stiff that ceilings or walls plastered over it cannot crack or fall.



Patent Trussed and Square Mesh Lathing, 36x12 inches, placed loosely across supports spaced 30 inches. Note the deflection in the square mesh.

And of greater importance to builders, the "scratched coat" can be worked on easier, has a surer grip and cannot be scraped off, as is possible with other forms of lathing.

It will sustain a load of 3½ times greater weight than any square mesh cloth of similar weight per square foot.

Requires no furring, as it can be nailed directly to studs or joists.

Greening's Patented is the Lathing that lasts.

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because the reinforcement was laid behind the carpenters and in front of the cement workers and it only takes *one man* to lay it.

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ECONO STEEL REINFORCING made this economy possible because it comes in flat sheets that are easy to handle and do not require tying or stapling to hold them in place, and because it does away with the stretching of long strips that are subjected to the wear and tear of the workers who are just in front of the cement gang.

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Put Utility Wall Board on right over the studding. Do away with all the muss and dirt and bother of lath and plaster. And you will have walls and ceilings that will last as long as the house stands.

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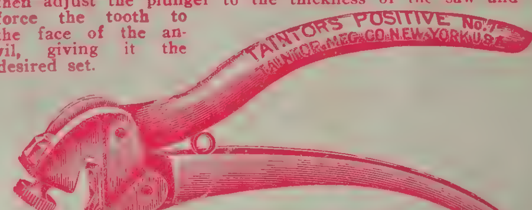

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Anvil is numbered, so that any setting may be returned to, but the numbers do NOT indicate the number of teeth to the inch.
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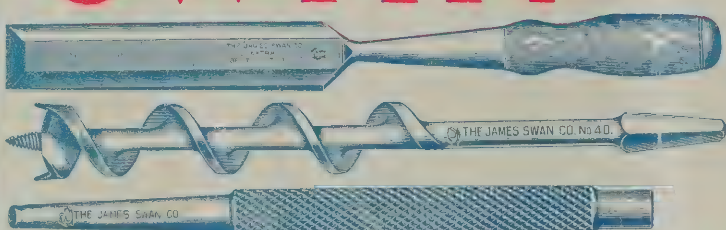

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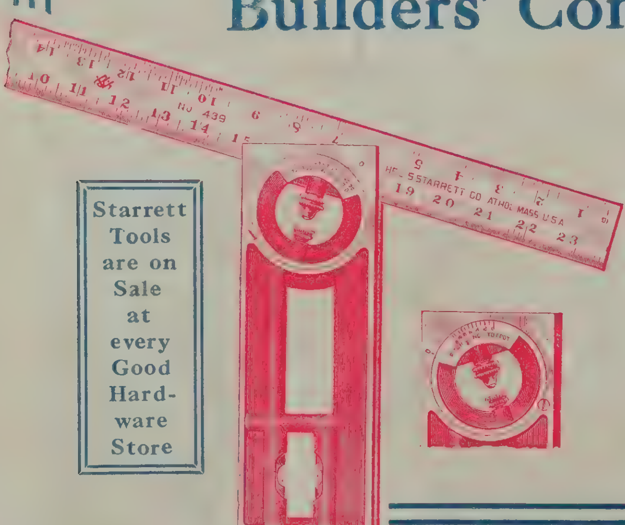

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