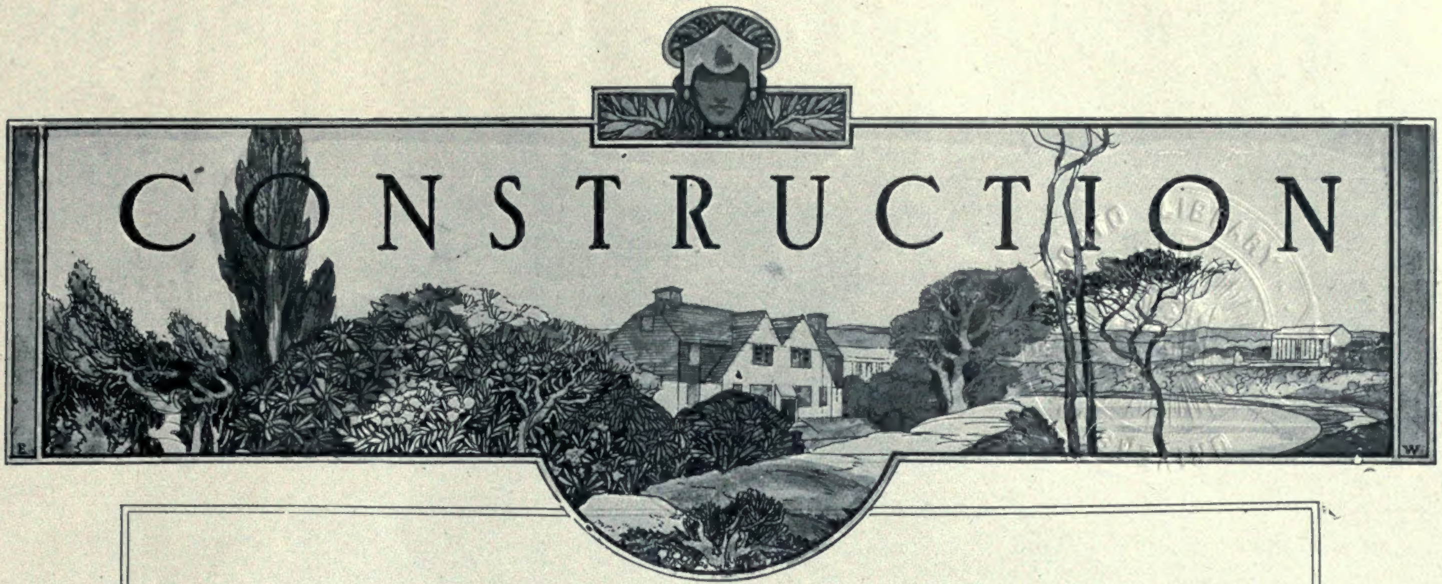

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Full Page Illustrations

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MAIL ORDER BUILDING OF THE ROBERT SIMPSON COMPANY, TORONTO.

VIEW ALONG THE MUTUAL STREET FRONT.

N. MAX DUNNING, ARCHITECT, BURKE, HORWOOD & WHITE, ASSOCIATES.

Robt. Simpson Company's Mail Order Building

By THOMAS D. MYLREA

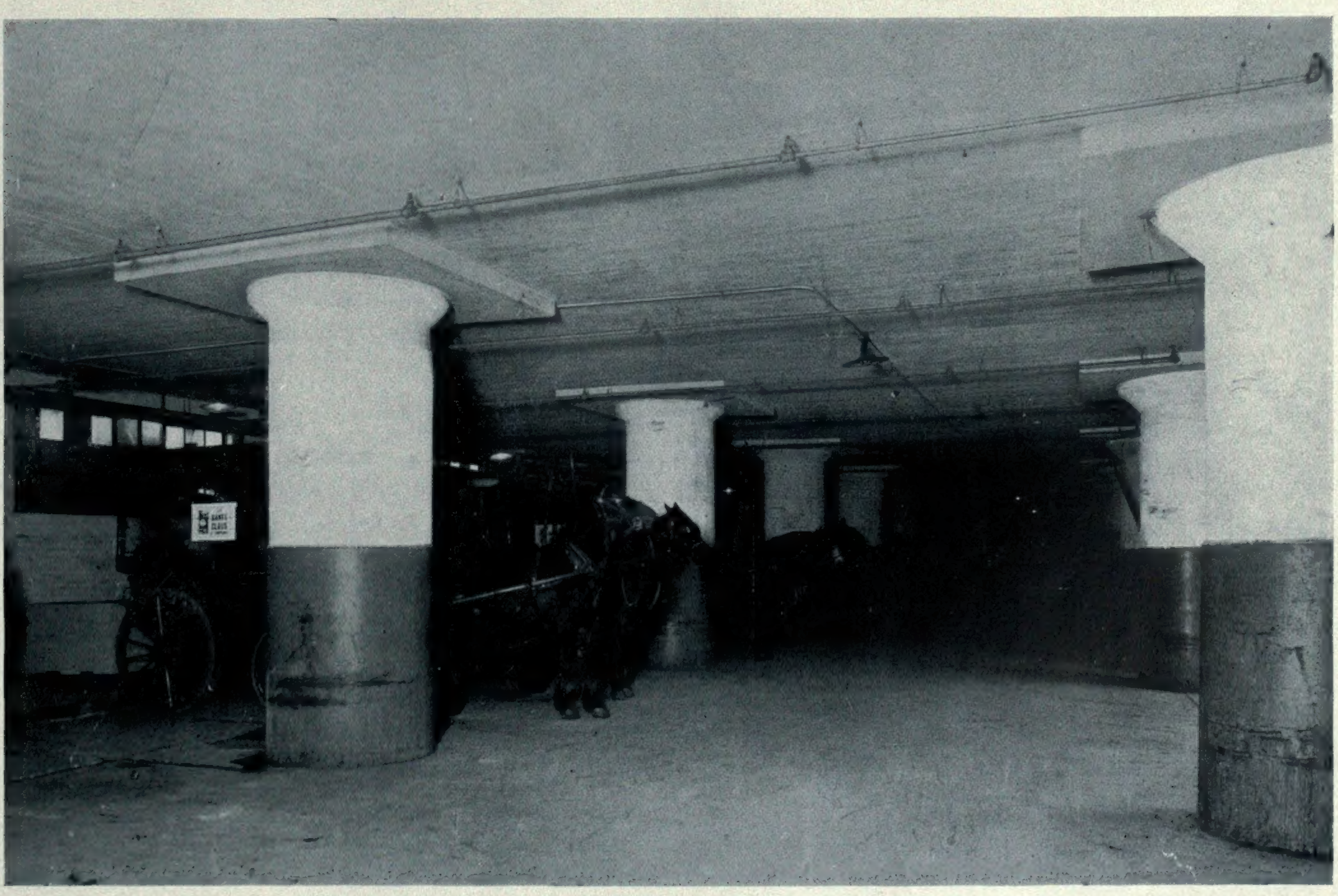
NOTABLE among the buildings constructed in Toronto during 1916, is the Robert Simpson mail order building on Mutual street, near Wilton avenue. Eleven stories and basement in height, it has a frontage of two hundred and seventy-nine feet, and a depth of one hundred and fifteen feet. With the exception of the spandrel walls, which are of brick, and the staircases, which are of steel, the entire structure is reinforced concrete. The architect in his design has made no attempt to disguise the mode of construction, but has developed a motive in concrete which presents a pleasing appearance, at the same time being distinctively concrete. The measure of his success may be appreciated from a consideration of the front elevation, and from the view taken from the southwest, in which both the new building and a previously existing structure may be seen.

The facade over each main entrance on Mutual street, together with the panel on each side of it; the frontage of the lower two floors and the parapet wall on this street, as well as the lane to the south, are treated entirely in concrete. During the construction, recesses were left in the panels beneath the window sills, and ornamental blocks of pre-cast colored concrete were secured in place.

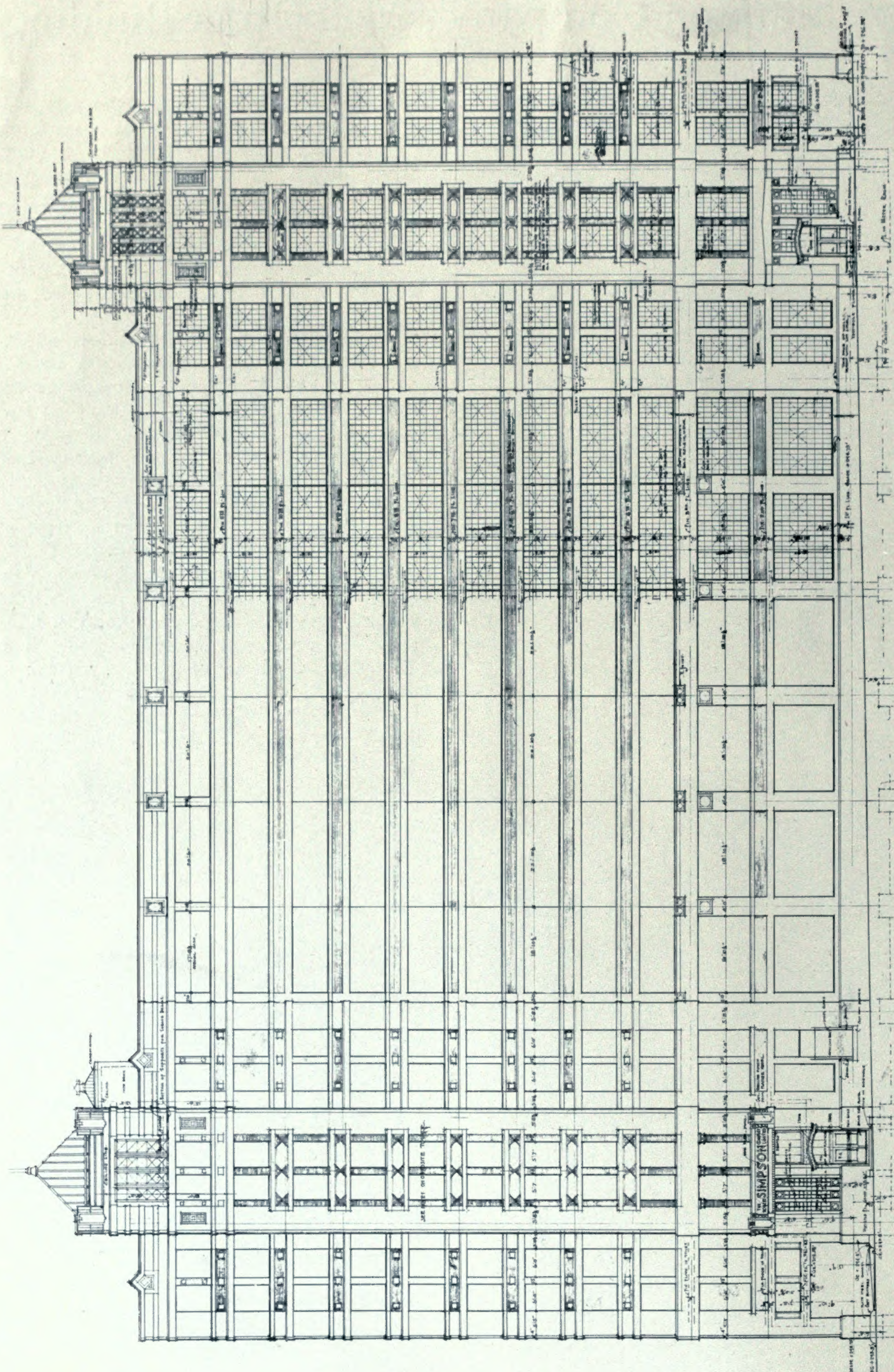
The method of interior illumination adopted is rather unusual, all wall columns being kept back from the outer surface and the window sash run continuously past them. By this means the amount of light obstructed by the wall columns is reduced to a minimum. In addition the panes in the upper half of all windows are made of prismatic glass, which refracts the light striking them horizontally to the innermost parts of the building.

After extensive tests as to the nature of the soil and its bearing strength, the engineers decided that it would be more economical and would give a more substantial structure if the column loads were carried by means of caissons down to rock—a very firm shale being found at about fifty feet below grade line. Details of these caissons are given in an accompanying schedule.

As speed of construction was an exceedingly important element, the contractors resorted to a scheme whereby excavation might proceed in a maximum number of caissons simultaneously. Over each hole a tripod was erected in which was framed a windlass operated by a cable-driven sheave. At one end of the building a hoisting engine was installed, driving the cable, which passed from tripod to tripod, making a



DRIVEWAY UNDER BUILDING AT GROUND FLOOR LEVEL, ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.



MUTUAL STREET ELEVATION,
THE ROBERT SIMPSON MAIL ORDER BUILDING,
TORONTO, CANADA.

N. MAX DUNNING, ARCHITECT,
BURKE, HORWOOD & WHITE,
ASSOCIATES.

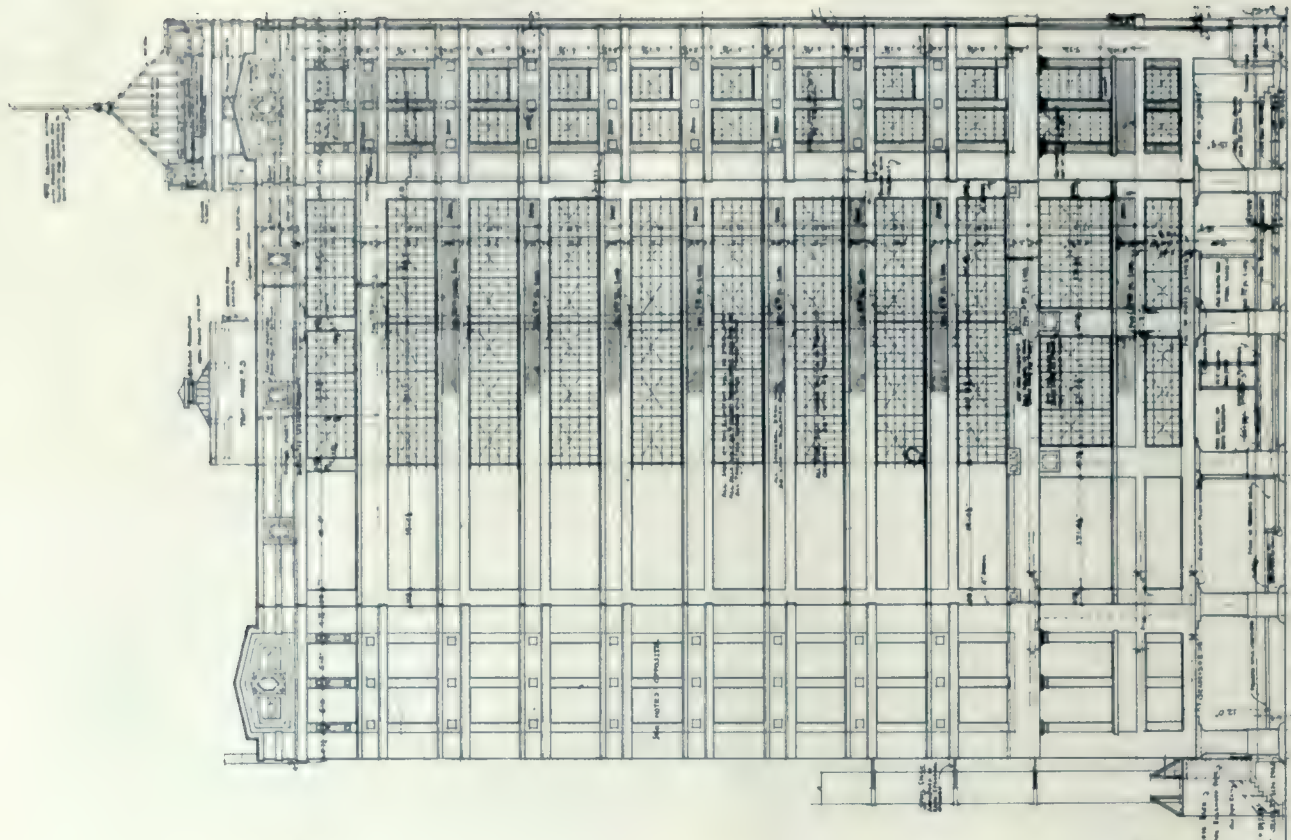
SOUTH-WEST VIEW, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.

loop about each sheave in turn, so that all windlasses were continuously revolving. A crew of two men worked at each caisson, one down in the hole, and one at the top. The workman at the bottom filled a bucket with the material he excavated, and at a signal the workman at the top passed a loop of the hoisting rope around the revolving windlass head and brought the loaded bucket to the surface, whereupon it was emptied and lowered again into the excavation. As work could thus be carried on in a great number of caissons at the same time, and as the soil was easy to excavate, and no water encountered, the sinking of the caissons and their filling with concrete occupied but a very short period of time.

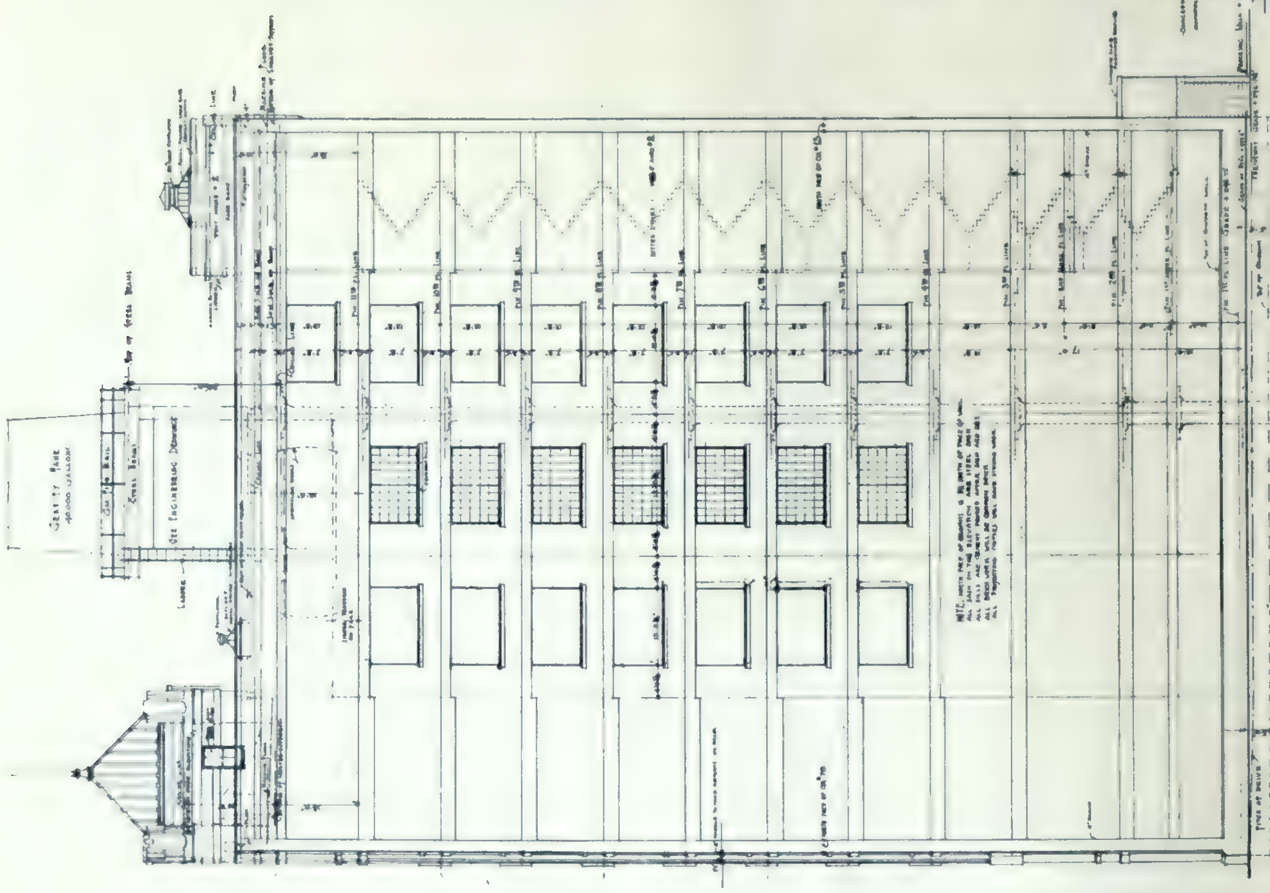
Above the caissons the structure was a typical four-way flat slab type, supported on reinforced concrete columns, these columns being carefully doweled into the upper portion of the caisson. As few changes as possible were made from story to story in the column diameters in order to reduce to a minimum the number of forms required, the additional bearing area on the lower sections of the columns of a given diameter being secured by increasing the amount of longitudinal reinforcement. Circular columns were adopted, both for the sake of appearance, and for their adaptability to being reinforced with spiral hooping without loss of area. Adjustable metal forms were used, which could be struck as soon as the column was sufficiently hard, and re-used in other parts of the structure. In casting the column the form was filled to a point where the upper part of the column began to flare out, and after this portion had secured its initial set, with consequent change in volume, the flared-out head and floor slab were cast. Owing to the fact that the concrete in the column had not completely set, an effective bond was thus formed, which was not ruptured by the change in length of the hardening column.

Work was carried on from both ends of the building at the same time, a one-yard mixer and concrete hoist being installed at each end of the Mutual street front, each in charge of a separate foreman. While under the general supervision of one carpenter foreman, the form work was built by two distinct gangs of carpenters, each in charge of a sub-foreman. In this manner a spirit of friendly competition was secured which greatly hastened the ultimate completion of the building. At this time supplies were fairly easy to secure, and, aided by an almost unbroken spell of fine weather, the construction from the top of the caissons to the last concrete in the roof slab occupied but fifty-five working days.

On the Mutual street front there are two main staircases. Each stair hall communicates with the several floors through a stair vestibule, as may be seen on the typical floor plan. This does away with direct communication, and affords an



SOUTH ELEVATION.



NORTH ELEVATION.

THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.

N. MAX DUNNING, ARCHITECT; BURKE, HORWOOD & WHITE, ASSOCIATES.

additional safeguard in case of fire. At the northwest corner of the building is a similar staircase, opening on to each floor through a vestibule as before, and at the southwest corner of the building is an open-air staircase fire escape. The view of the building taken from the southwest shows this fire escape clearly. Alongside of each stair hall is a freight elevator, and at the south main entrance are two passenger elevators communicating with the office on the top floor.

A unique means of collecting parcels from the various departments has been installed. An endless belt close to the ceiling in each story from the third to the ninth inclusive, travels from end to end of the buildings in the centre aisle, and directly above it in each bay a hole is provided in the floor slab through which parcels may be deposited upon the moving belt. These conveyors carry the packages to a spiral chute at the end of the building, through which they descend by gravity to the shipping department on the lower floors.

Owing to the fact that the old building adjoining the new one on the west already contained a boiler room, it was thought to be more economical to enlarge this plant than to instal a new boiler room in the new building, and, as shown in one of the illustrations, four one hundred and fifty horse power boilers, heated by a fuel oil system, furnishes steam for both buildings.

At the close of construction operations the City Architect's Department required a test of the floor slab, and four panels were loaded to double the nominal capacity of the floor. The test load in place is shown in one of the accompanying views, and it may be stated that the tests proved highly satisfactory.

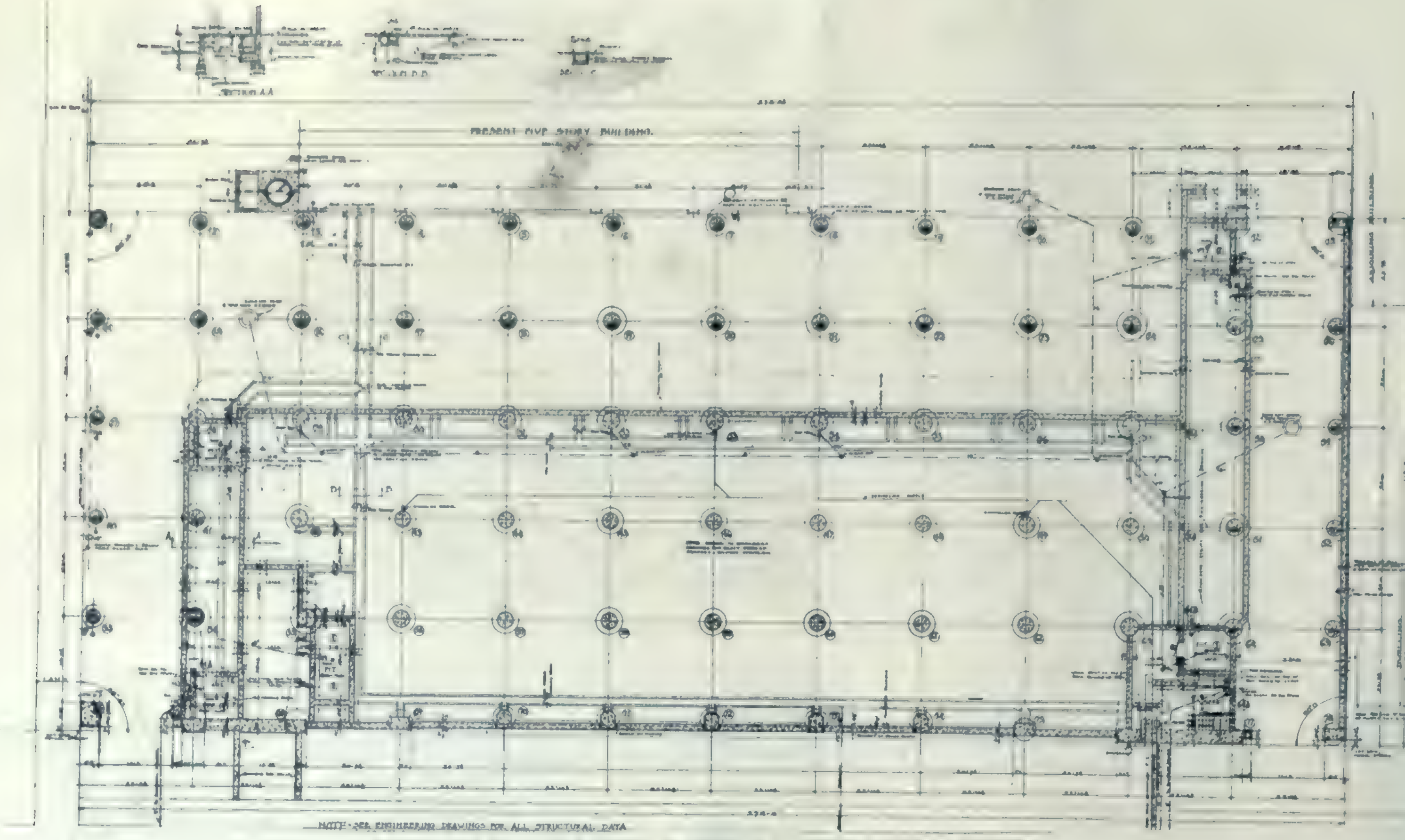
WORKING SYSTEM.

As its purpose would indicate, the building was especially designed to handle the many thousand mail orders which are received daily from out-of-town customers. The eleventh floor, or

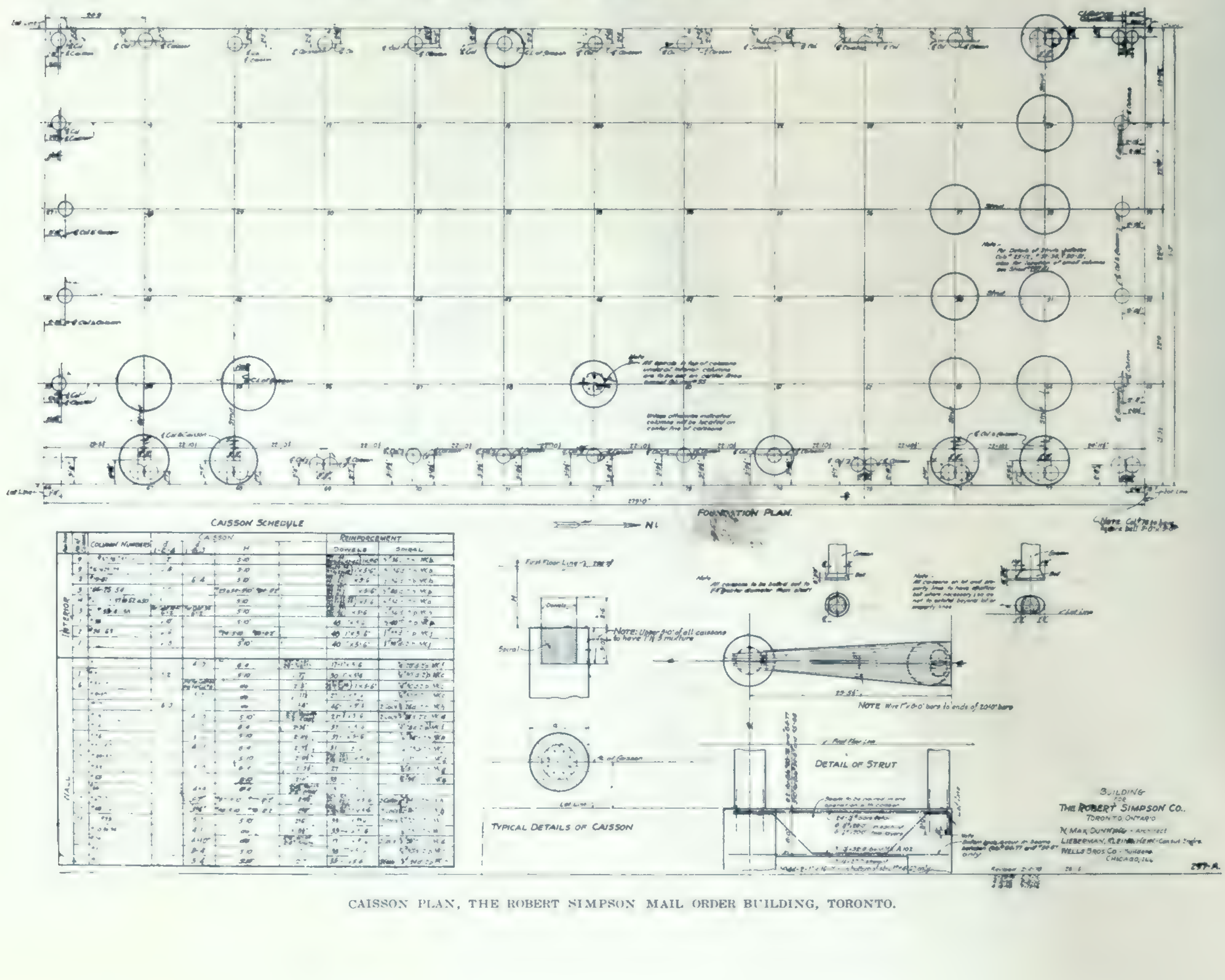
MEZZANINE VIEW SHOWING CONVEYOR AND PARCEL CHUTE.

CONVEYOR BELT AND PARCELLING BINS, MAIN FLOOR.

MAILING DEPARTMENT, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.



FOUNDATION PLAN, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.



CAISSON PLAN, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.

thirty-two thousand square feet of floor space, is taken up by offices which handle each order in its proper sequence.

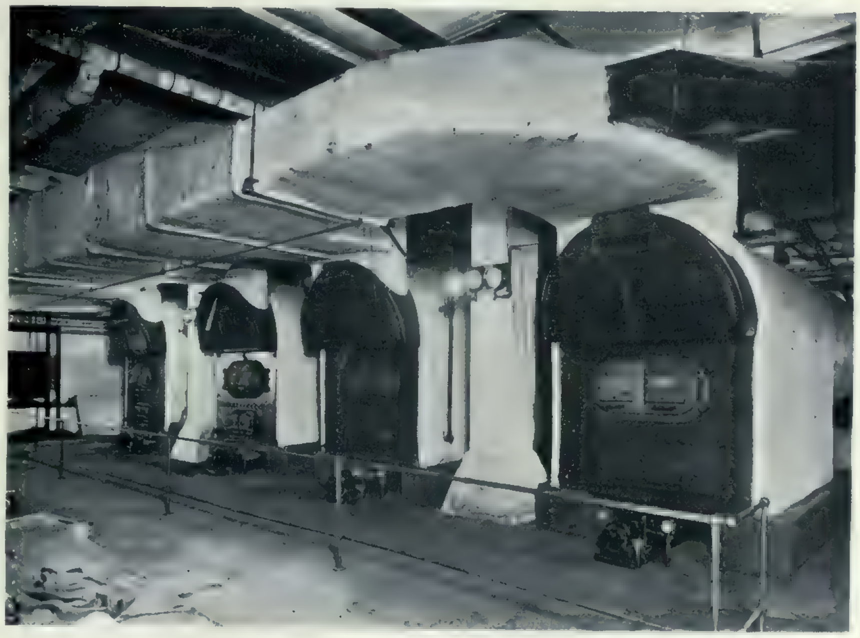
The lower floors are given over to the housing of the enormous stocks of merchandise which are carried so that all orders may be shipped promptly. These stock floors are divided longitudinally, the west half of each floor being occupied by tiers of lattice work shelves, or reserve bunks, on which are stocked by catalogue number the vast bulk of goods carried. On the east half of each floor are the forward or active stock bunks, numbered so as to correspond with the reserve bunks, and designed to carry the smallest working minimum of stock. All orders are filled from the forward or active bunks, and replenished from the reserve shelves as needed. This effects a well organized working arrangement, and saves unnecessary steps and time on the part of the clerk filling the order.

All of this necessarily involves a general plan, arrangement and equipment which successfully coordinates all departments and branches of the work.

Each department has its bundling desk, where all out-going merchandise is wrapped to keep it clean in handling. Back of these desks are the chutes through each floor which deposit on the belt conveyors previously described, and which discharge into the spiral chute, and from thence on to a lower belt conveyor which brings the merchandise to its destination on the shipping floor.

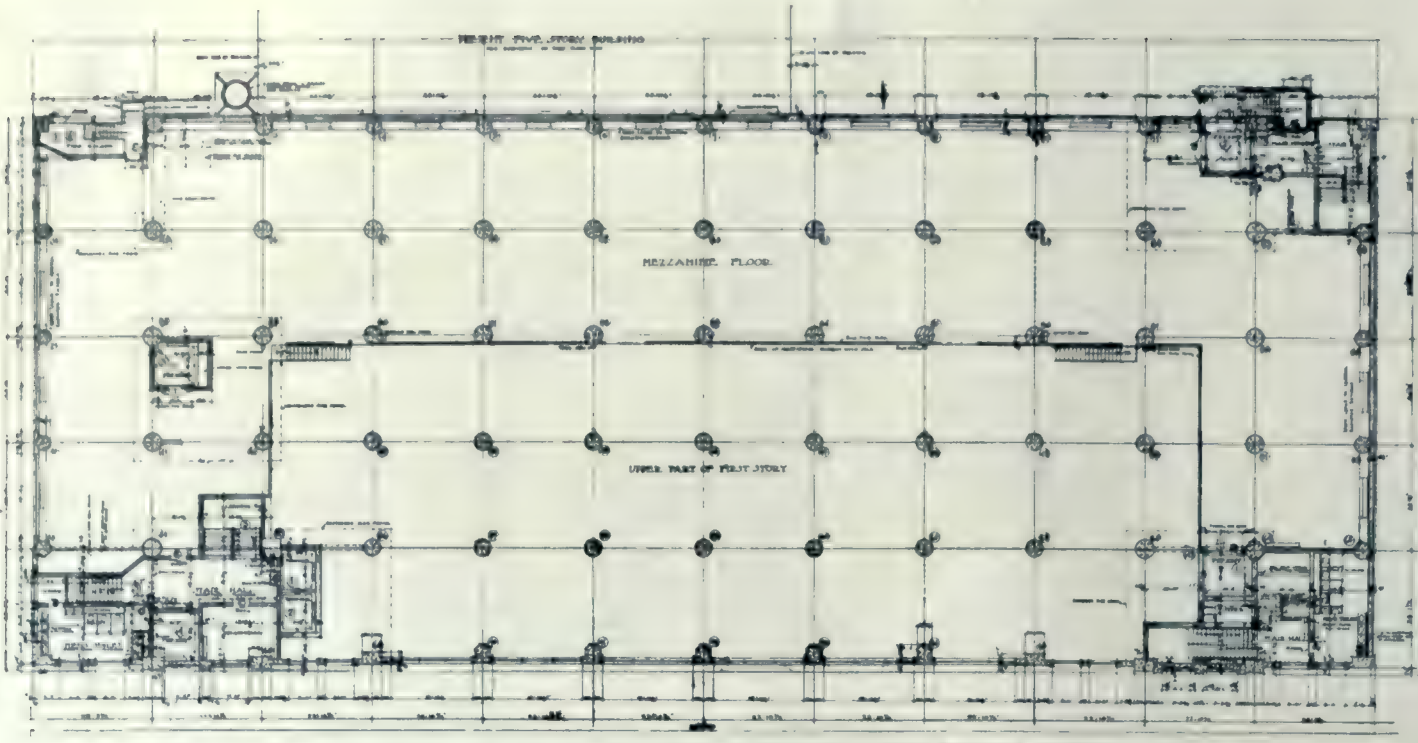
All orders received in the eight o'clock mail are opened by eight-thirty, read, totalled and audited, and the amount received credited on the purchaser's letter. In the meantime a shipping bill with a registered number printed on it is attached to the customer's order and passed to the recording section, where a record of all orders received is kept by province and town, and the customers' names listed alphabetically. By nine-thirty, or within an hour's time, the order has been sent to the

EMPLOYEES' DINING HALL.



BOILER ROOM.

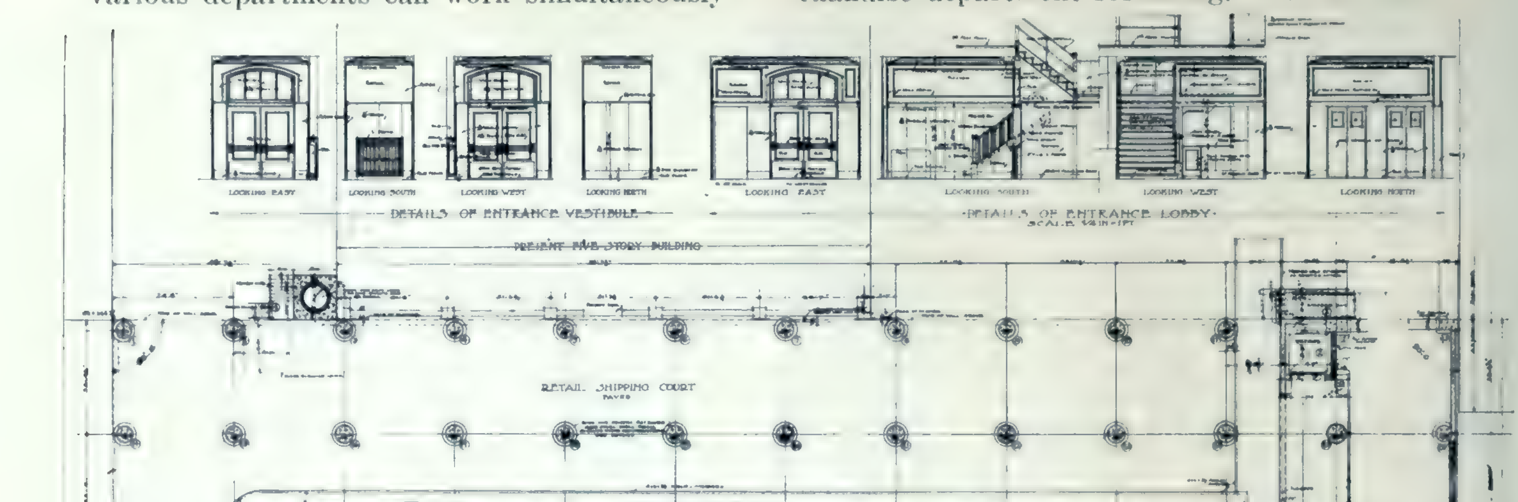
STABLES, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.



MEZZANINE OVER FIRST FLOOR, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.

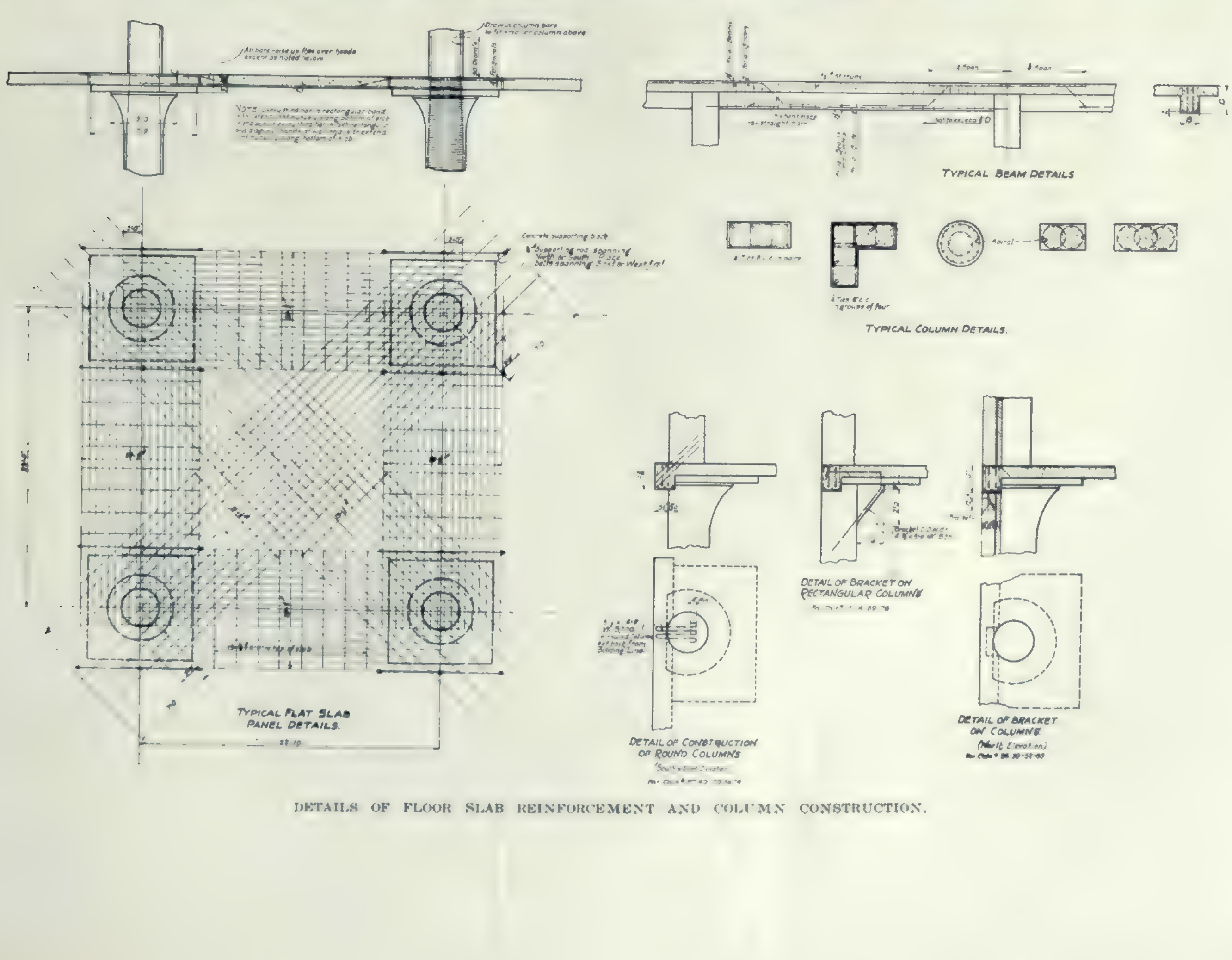
buying or copying section. If it is found that the goods are wanted from three different departments located on three different floors, the items are copied on the three order sheets, and the number of same marked on the back of shipping bill, all of which is put through the schedule machine, which stamps the assembly time on all orders received. This is done so that the various departments can work simultaneously in filling the complete order. The stamp shows the date, the assembly time, the assembly section numbers, and the numbers on the basket in the section into which all three items eventually find their way on the shipping room floor.

The "house purchase" transaction is completely in hand by eleven o'clock, and timed for two-thirty, two hours being allowed to the merchandise department for filling. As the items



FIRST FLOOR PLAN, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.

WOMEN EMPLOYEES' REST ROOM, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.



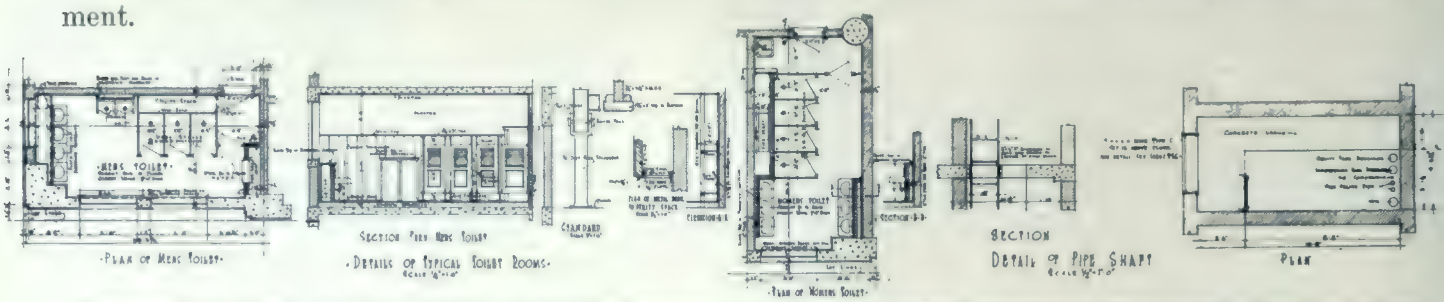
DETAILS OF FLOOR SLAB REINFORCEMENT AND COLUMN CONSTRUCTION.

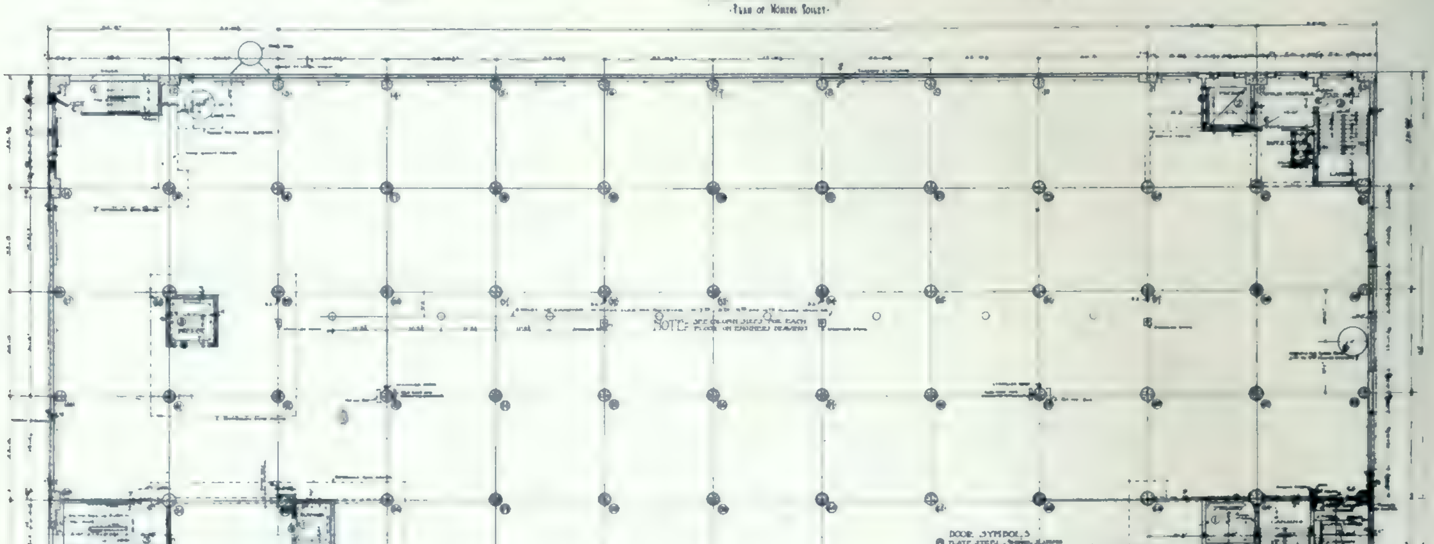
UPPER FLOOR OFFICE CORRIDOR.

AISLE THROUGH TYPICAL STOCK ROOM.

are filled and parcelled they are sent via belt conveyor and spiral chute to the shipping room floor, where, at the time designated, the various items are assembled in their assigned section and basket, and rechecked against the customer's original letter, and finally packed for shipment.

The completed package is then sent on to the end of the conveyor belt, where it is weighed, and the necessary postage applied. From here the package is turned over to the Canadian Postal Service, which maintains a branch post office in the building to facilitate the handling

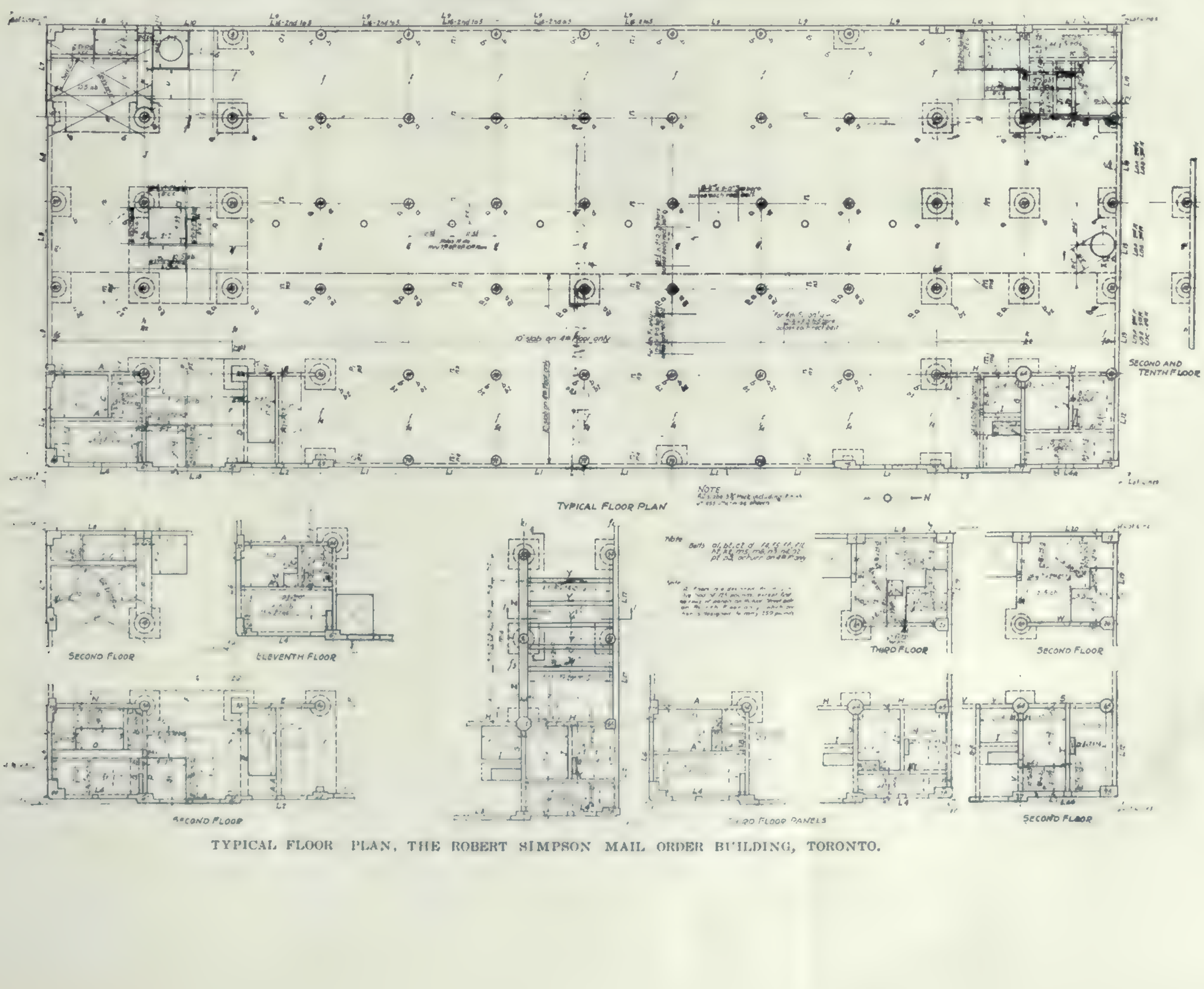




TYPICAL UPPER FLOOR PLAN, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.

TEST OF FLOOR SLAB LOADED TO DOUBLE THE NOMINAL CAPACITY, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.

of the vast volume of orders which are shipped daily. In this department the orders are sorted according to the various train runs, bagged and sealed and sent by auto trucks to out-going trains. This saves lost time to the Toronto post office service, which under other circumstances would be bound to occur in the busy season.



TYPICAL FLOOR PLAN, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.

NEW FACTORY OF THE GOODYEAR TIRE AND RUBBER COMPANY, NEW TORONTO.

New Factory of Goodyear Tire & Rubber Co.

THE new factory of the Goodyear Tire & Rubber Company is located in New Toronto, immediately north of the Toronto & Hamilton Highway, and is the first unit of what will eventually be a group of several buildings devoted exclusively to the manufacture of this concern's products. In order to provide for future extensions, a site nearly square, of approximately twenty-six acres, has been acquired, with direct track facilities on both the G.T.R. and C.P.R. railways. The main factory is located near the east end of the property, and about five hundred feet north of the highway mentioned. This allows for the erection of two more buildings the size of the present one, together with a large office building, as conditions warrant; while the entire layout as just described can be duplicated on the west half of the property as a final development of the contemplated general scheme. Further immediate improvements will consist of the laying out of a large athletic field and the treatment of the site to make the grounds generally attractive; the necessary grading operations and the planting of trees, shrubs, etc., to start in the spring as early as weather conditions will permit.

In addition to the main factory, the present plant comprises a power house, two cement buildings, and a storage water reservoir, all of which are situated just north of the main building. All of these buildings have ideal track facilities, being served from a siding on Ninth street, which forms the eastern boundary of the property, and from which a track runs in north of the power house for the convenient handling of coal. Two other tracks are laid between the main factory building and the power house and cement buildings, and will be used for receiving and shipping materials to and from the factory, as well as for handling future machinery for the power house. Another track is also planned to run parallel to Ninth street, along the east end of the factory, but this will not be installed at present, because of the fact that the building will not be entirely completed until another one hundred feet has been added to the east end of the present structure.

The main building consists of four floors and basement, and is at present four hundred and sixty feet long by one hundred feet wide. The basement is twelve feet high, the first floor twenty-two feet, the second and third fifteen feet each, and the fourth floor twelve feet to the lower chord of roof truss. The roof trusses are approximately five feet high. A double pitch monitor twenty feet wide at the base and ten feet high extends the entire length of the building. Each pitch of the monitor carries three rows of sash, two of which are equipped with operators for raising and lowering same. The construction of the building is of brick and steel, with the columns spaced twenty foot centres each way. The wall columns are bricked in, and all interior columns are encased in concrete.

Modern steel sash is used in the structure throughout, the bays on each floor, including the basement, containing a frame approximately seventeen feet wide by from eight to fifteen feet high. Each sash is equipped with swinging ventilators to the extent of about thirty per cent. of the sash area, these ventilators being operated independently by cords from the floor. The sash area for this building alone totals approximately forty-five thousand square feet.

The basement extends under the entire building with the exception of about one hundred feet at the west end, and the floor here consists of an eight-inch concrete slab laid on the shale, with two-ply waterproofing and one and one-half inches of mastic asphalt over the concrete. A complete network of drainage tile under the floor, together with floor drains spaced every forty feet, insures a perfectly dry basement. A noticeable feature is the entire absence of such obstructions as foundation piers; all the heavy machinery on the floor above being carried on large steel girders, which are in turn supported by the main building columns. All other floors are constructed of two by four-inch boards, laminated with a maple finish, excepting the section of one hundred feet in length on each floor at the west end of the building. The floors in this section are either of cement, wood block or mastic, depending on the amount of heat or water in different departments.

The roof is of two by six-inch boards, dressed and spiked to nailing strips on the channel purlins, and has a cover of felt and pitch. The felt is protected by about one inch of slag brushed into the pitch as it was poured, making a much more homogeneous mass than is possible in cases where the pitch is applied with a mop. The parapet wall extends around the entire building, and the roof is drained by conductors spaced forty feet apart on each side. These conductors are carried down inside the building through the basement and to the sewers which run the entire length of the factory in the centre of the building and under the basement floor.

The height of the main floor, which, as previously stated, has a twenty-two-foot ceiling, permits of a mezzanine floor being installed when required, and at the same time gives plenty of height for ventilation in the departments on this floor requiring this feature.

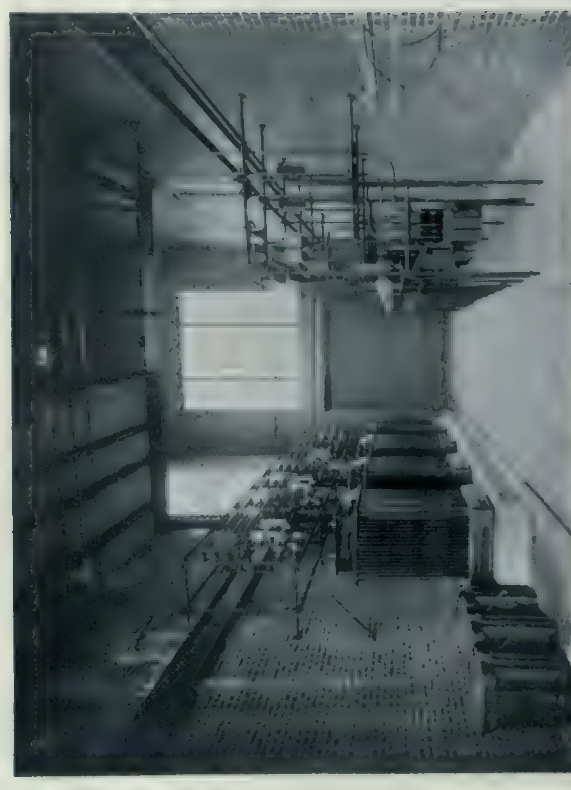
At the west end the building is narrowed in for a distance of eighty feet above the second floor ceiling to a width of sixty feet; twenty feet being taken off at either side. A monitor similar in

MILL ROOM, GOODYEAR TIRE AND RUBBER COMPANY'S NEW FACTORY.

CURING ROOM, GOODYEAR TIRE AND RUBBER COMPANY'S NEW FACTORY.

BUILDING AND FINISHING ROOM, GOODYEAR TIRE AND RUBBER COMPANY'S NEW FACTORY.

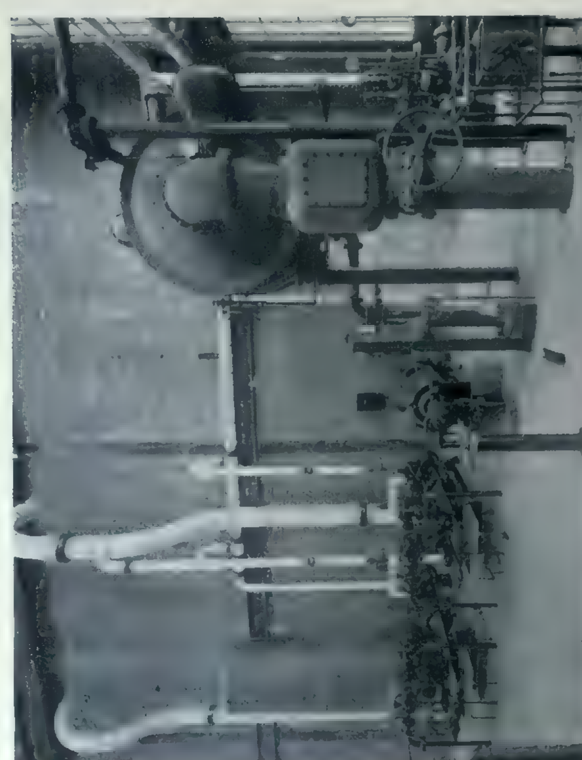
SWITCH BOARD.



TRANSFORMER.

GOODYEAR TIRE AND RUBBER COMPANY'S FACTORY, NEW TORONTO.

PUMP ROOM.



HOT WELL.

design to the main monitor, but somewhat smaller, is built the entire length of the lower projecting twenty by eighty-foot strips. These monitors serve as ventilators for this part of the second floor, and are designed to relieve the departments located here of excessive heat and steam from vulcanizers which are installed in this section.

The plant is at present equipped with three elevators, and provisions have been made for the installation of two others in the wells at the centre and east end of the building. Each elevator has a platform of approximately eight by eleven feet, and a capacity of six thousand pounds. These elevators are installed in towers which are built outside the main walls, and are placed to conveniently serve all parts of the factory; one being situated on the north side one hundred feet from the west end of the building, another on the same side at a position of what will eventually be one hundred feet from the east end wall; while the third is installed at the south side in the centre. These towers form twenty-foot projections on the north side, each forty feet across; and one on the south elevation of the same depth extending sixty feet across. A section twenty feet square in each of these towers is devoted to stairways and lavatories, thus affording three fireproof stairways, as well as three lavatories on each floor. The south tower being sixty feet in length, will also allow for a twenty-foot passage way to the next building when same is erected. The lavatories are supplied with hot and cold water, with liquid soap to each bowl from a small overhead tank; and two very complete shower bathrooms are also provided for the working staff.

In addition to the factory working space, a well-equipped machine shop, wood shop, pipe shop, and tin shop, occupy the west end of the first floor; while the west end of the basement is devoted to a complete electrical shop and store room. An interesting

CAFETERIA, GOODYEAR TIRE AND RUBBER COMPANY'S NEW FACTORY.

BOILER ROOM, GOODYEAR TIRE AND RUBBER COMPANY'S NEW FACTORY.

EMPLOYEES' ENTRANCE, GOODYEAR TIRE AND RUBBER COMPANY'S NEW FACTORY.

feature of the building is the cafeteria, which is seemingly becoming a more important factor in industrial structures. Here it is possible to seat several hundred employees at one time, while a first-class *a la carte* service at modern prices is maintained for the benefit of both day and night staffs. The kitchen is equipped with large modern steel ranges, provided with approved ventilating hoods, and has all up-to-date utensils and labor-saving devices; while adjoining are the refrigerating facilities with complete cold storage installation.

The building is heated by a vacuum return system. The distributing mains are installed just below the third floor, and the floors above are fed by risers from this main. The lower floors, including the basement, are supplied by drop-risers. Approximately one hundred feet of radiation is installed under each window on all floors, with the exception of the basement, where the radiators are extended from the ceiling. Heating coils are also installed at the foot of the monitor to prevent condensation, and returns from all radiators are carried back to hot wells in the power house.

Protection from fire is provided by a sprinkler system consisting of four separate risers connected to the main yard piping and carried from the basement to the top floor. Each riser is controlled by its own post indicator valve, and branch lines are run from these risers to all parts of each floors, including the stairways, lavatories and elevators. Six sprinkler heads are provided to each twenty-foot square bay throughout the building.

The entire interior of the building is painted white, with a five-foot dado blue border on all walls and columns. All of the piping is painted, a different color being used, so that the water lines, air lines and steam lines of the different pressures can be recognized instantly in any part of the building. The entire sprinkler system is painted a deep red for the same purpose.

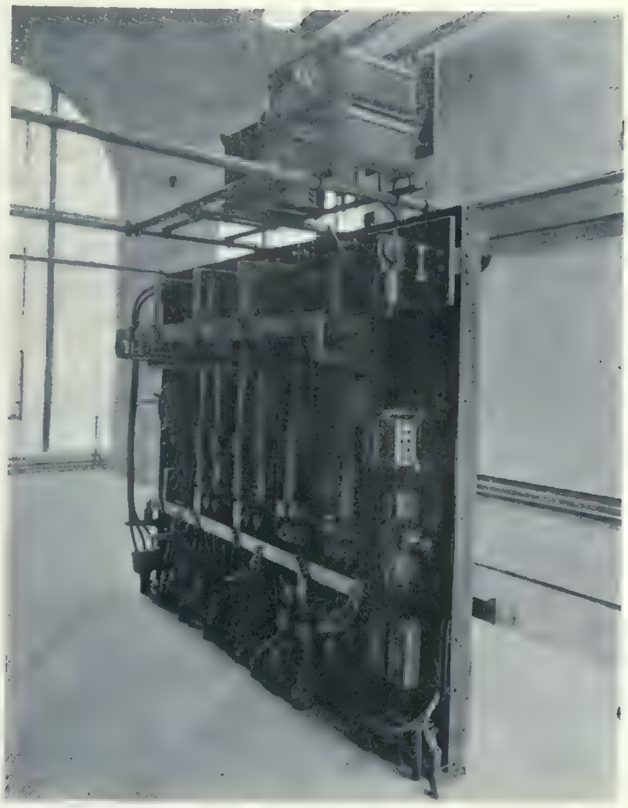
ENCLOSED STAIRCASE. GOODYEAR TIRE AND RUBBER COMPANY'S NEW FACTORY. POWER HOUSE.

POWER HOUSE.

The power house, which is approximately forty feet high, is also of brick and steel construction, and is divided into four rooms, namely: the boiler room, fifty-eight by eighty-eight feet; pump room, forty by sixty-six feet; motor generator room, thirty-six by sixty-six feet, and transformer room, twenty-two by sixty-six feet. There is also a sixteen-foot basement under the boiler room and a twelve-foot basement under the pump room section. All these rooms are much larger than is required at present, allowing for considerable expansion before additions to the building will be necessary, and the plan is so arranged that future extensions can be made without interfering in any way with the operation of the present plant.

All structural features in this building have been very carefully considered. Modern steel sash is used throughout, circular heads being used where practical; while the arches are trimmed with cut stone keys and jammed blocks; cut stone also being employed to cap the pilasters, which are of generous size.

The roof is constructed of two-inch reinforced concrete, with ferro-inclave, which is plastered

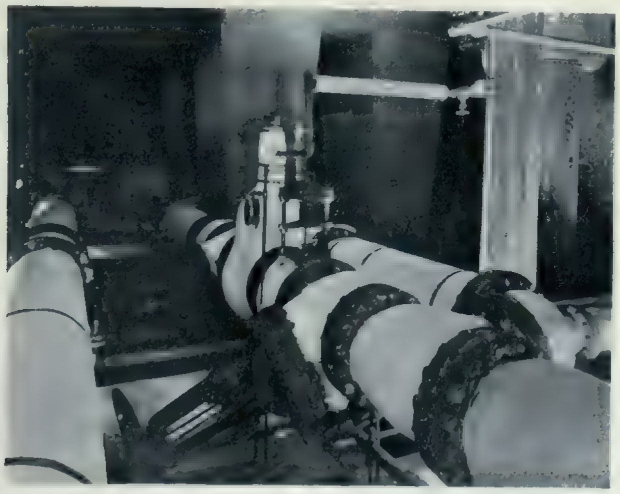


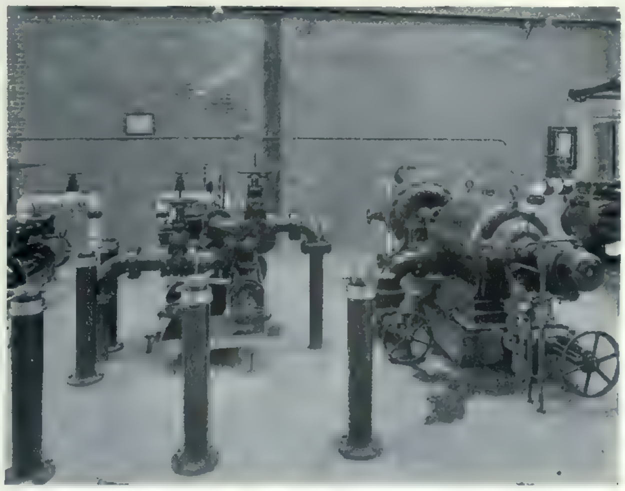
VENTURI METER. GOODYEAR TIRE AND RUBBER COMPANY'S NEW FACTORY. SWITCH BOARD.

on the inside. On this concrete is laid wood roofing two inches thick, and over this four ply of felt, the latter being protected with slag. This concrete covering makes the power house entirely fireproof, while the wood roof above keeps the concrete from sweating.

There is a monitor in the roof similar to that in the main building. The steel columns in the boiler room are made of ample size to allow for the construction of a large coal storage bin for the boilers at a future date. There are installed at the present time two boilers of the three-drum, four-pass type, rated at six hundred horse power, with a capacity of twelve hundred horse power constant load. Provision has been made for an additional boiler of like capacity in the present room. A notable feature of these boilers is the distance from the grate to the first row of tubes, which is twelve feet. This distance allows for complete combustion of the gases before striking the tubes, and adds materially to the efficiency of the boiler. Each boiler is equipped with seven retort stokers, and has a force draft supplied by a fan in the basement. The boilers are designed for one hundred and seventy-five pounds working steam pressure, and one hundred degrees of super-heat. No super-heater, however, is installed at the present. The blower is directly connected to two engines, either of which is of sufficient capacity to drive the blower, and in addition the stokers. This leaves one engine constantly in reserve. The engines are automatically controlled by the steam pressure by means of a regulator controlled inlet valve.

The boiler foundations are of concrete, built





STEAM PIPES. GOODYEAR TIRE AND RUBBER COMPANY'S NEW FACTORY. MAIN VALVE STEMS.

up from the basement floor. The burned gases from the boiler enter a large duct in the concrete foundation, and are carried directly to the stack. A large ash pit is also built in the foundation directly under the grates. It can easily be understood that the heat from these ashes and from the gases passing to the stack would tend to cause considerable expansion in the concrete foundations. These were, therefore, designed with expansion joints, exactly the same as are used in laying the brick for the boiler settings, and, of course, had to be made absolutely airtight where opening up into the smoke duct. The ashes are removed by a steam jet ash conveyor system, whereby the ashes are raked from the ash pit to small hoppers opening up into a duct, and are carried by steam to a storage in the yard.

The stack is constructed of radial brick, and is two hundred and fifty feet high and fifteen feet inside diameter. It is located adjacent to No. 1 boiler of the present installation, assuring the most direct route for the burned gases from the boiler. Two smoke duct openings are built into the stack, one for the two boilers in use at present, and for the third when same is installed; and the other for a battery of four boilers at a future date on the opposite side of the stack. A division wall thirty-five feet high is built up in the stack between these two openings.

Provisions for extensions of this room, both in width and in length, have been made. The basement walls on these two sides, while acting as retaining walls, are built of brick, so as to be easily removed at the time of extension.

PUMP ROOM.

All of the pumps for the various requirements throughout the plant are installed in the pump room, and are laid out so as to provide a wide aisle-way through the centre of the room. This tends toward easy operation, and also makes each unit easily accessible in case of overhauling or repairing. On one side of the room are installed two hydraulic pumps, working in connection with an accumulator, one motor-driven boiler feed pump, one boiler feed water heater, and two heater feed pumps. On the opposite side of the room are two vacuum pumps, one air compressor, two low pressure hydraulic pumps, a booster pump and a fire pump, in addition to a steel settling tank for settling sand and sediment in the water when same appear in objectionable quantities. The main valves are equipped with extended stems, and are operated from stands on the pump room floor. A ten-ton hand-operated crane is also installed in this room.

All of the piping for these pumps is carried underneath the floor or under the ceiling of the basement below. As stated above, the basement is twelve feet high, which gives ample head room under all piping, and makes same easily accessible. Two hot wells, built of reinforced concrete, are provided in one end at the basement level, and take all hot returns from the factory; these wells being cross connected and so piped up as to allow for either to be taken out of service at any time for cleaning or repairs.

All water for the plant is pumped from the lake, and is delivered to the power house in a twelve-inch main. Two centrifugal pumps, driven by twenty-two hundred voltage motors, have been installed in the pumping station at the lake for this purpose, and connections are taken off the twelve-inch main to supply the fire protection piping in case of necessity, and also for filling the storage reservoir just outside of the power house.

The two feed water heater pumps in the pump room previously referred to are of the horizontal duplex type, and take their water from either the hot wells or from the supply main direct discharging into the heater, which is of four thousand horse power capacity. An exhaust steam main carries all exhaust steam to the heater, and thence to the atmosphere. There is also provided a by-pass for cutting the heater out of service.

The boiler feed pump is a three-inch, four-stage centrifugal pump, directly connected to a twenty-two hundred voltage meter. The heater from which this pump takes its water is installed at such an elevation as to give a head of approximately six feet on the pump suction. This pump is also connected so as to take water from the hot well direct or from the main supply line, or even from the storage reservoir in the yard. A Venturi meter is installed in connection with the discharge line to the boiler, and the discharge is also so arranged that this pump may be used for low pressure hydraulic service in the factory.

The two hydraulic pumps are horizontal, duplex, outside packed. They supply water to the presses in the plant and operate in conjunction with an accumulator. The suctions of the pumps are so installed that water can be taken from either the main supply line, the storage reservoir, the settling tank, or from the discharge from the low-pressure hydraulic pumps. It is also possible to take water from either of the above sources with one pump, and at the same time from any of the other sources with the other pump.

The fire pump is a horizontal duplex pump operating at one hundred pounds pressure, and is connected so as to take water from the main service line, or from the storage reservoir, and discharge into an elevated tank for fire service, or to the fire lines direct.

The booster pump is a centrifugal pump directly connected to a steam turbine. It is installed primarily to boost the service pressure to the factory if for any reason the main supply line pressure should be low. In addition to this, however, it is so connected as to take the place of the fire pump in case the latter is out of service when needed.

The two low pressure hydraulic pumps are horizontal duplex, and are used for raising the presses throughout the plant. Water can be taken by either or both of these pumps from the main supply line, the storage reservoir, the settling tank, or either of the hot wells, and can be discharged to the presses or to the boilers. A balance tank is installed in the discharge line to the presses.

The air compressor is cross compound steam driven, and takes air from the motor generator room adjoining, which air is supplied to all parts of the factory. An air reservoir is installed on the line, and air is also connected to the balance tank working in connection with the low pressure hydraulic pumps. The two vacuum pumps are used on the heating system, one pump being a spare.

A motor-driven vertical centrifugal bilge pump is installed in the basement, and is used for raising all drains about the power house from a sump in the basement to the outside sewer, the basement being below the sewer level. It is automatically operated, the electric control for same being installed on the main floor above. There is also a pump for raising the hot water returns from the hot sump to the hot wells, in case difficulty is experienced at any time in carrying these returns direct to the wells. This pump is also automatically operated.

While super-heated steam is not being used at present, the steam piping has been designed for its use at some future time. For all pressures above one hundred pounds, steel pipe with special joints is used. Steam leaves the boilers at one hundred and seventy-five pounds pressure. The three drums in each boiler are connected by means of a one-piece header made up of long sweep bends and oxy-acetylene welded, and a long sweep bend carries the steam from this header to the main steam header. At the highest point in the line from each boiler to the main header are a gate valve and an automatic non-return stop valve. The leads from the main header rise from the top of same and are carried by long bends into the pump room and down the wall to the basement, and thence to the pumps or to the factory. The steam fed to the pumps is one hundred and seventy-five pounds pressure, while the steam to the factory is reduced to one hundred pounds pressure. It is then carried through a tunnel, through which all piping to the main building is carried, and at the factory end the pressure is reduced to thirty pounds, and then again to two pounds. This makes the three pressures easily available for the several operations in the plant. Each regulator is equipped with by-pass, and a large relief valve is installed at each point when the pressure is changed.

It will be seen from the foregoing that the piping system is very flexible. As an example of this flexibility, it has been shown that the boiler can be fed from any one of these pumps, and that any of these pumps can be used for low pressure hydraulic service; also that each of these pumps can take water from any one of seven sources. Another instance is that all of the requirements of the fire pump can be readily taken care of by the booster pump. This flexibility has been gained without undue complexity in the piping system.

All steam lines throughout the plant are covered, eighty-five per cent. magnesia being used on lines of one hundred pounds pressure, and asbestos air cell on low pressure lines.

ELECTRICAL INSTALLATION.

The plant receives a three-phase, twenty-five cycle current at twenty-two hundred volts from the Hydro sub-station, located adjacent to the property, the lines entering the power house at the east end in the transformer room. The main disconnecting switches are installed immediately under the point of entrance of the lines to the building, and are operated from a gallery about twenty-five feet above the main floor. A set of electrolytic lightning arresters for protecting the system are installed on this gallery floor.

The lines are carried from this point to the twenty-two hundred volt switch structure at the opposite side of the room, this structure being supported on a pipe framework. All oil circuit breakers for twenty-two hundred volt feeders to the factory, and also the primaries to the transformer bank, are fed from a copper bus supported on this framework, each breaker being furnished with separate disconnecting switches. The twenty-two hundred volt bus is fed through a main oil breaker equipped with no voltage release. All oil breakers are D. C. remote electrically controlled, control switches being installed on switch-board on gallery of motor generator room. All the feeders are equipped with a set of series transformers, and all switching equipment is protected by a set of electrolytic lightning arrestors installed at the end of the switch structure.

On the opposite side of this room a bank of four one hundred and fifty K. V. A. O. I. S. C. transformers is installed. These are connected in delta, leaving a spare in case of trouble developing at any time. The primary side of these transformers is twenty-two hundred volts, the secondary being five hundred and fifty volts, which feeds various circuits throughout the factory. The primary and secondary leads of these transformers are tapped off the high and low tension busses through a set of disconnecting switches.

GENERATOR ROOM.

In this room the equipment consists of a syn motor generator set, a turbo-generator set, and alternating current and direct current switchboards. The motor generator set is used for transforming the alternating current to direct current, which is used extensively throughout the factory on direct current apparatus. The turbo-generator set is used for control and emergency lighting in case of power interruption. The alternating current switchboard consists of nine panels for controlling the various feeders and on which are mounted the different meters for power calculations. The direct current switchboard consists of six panels for controlling the direct current feeders, and is likewise equipped with meters for power calculations.

FACTORY EQUIPMENT.

All the cables from the power house feeding the factory pass through an underground duct system to a brick cable vault in the basement of the main building. From here the various circuits are distributed in conduit throughout the factory. The factory machinery is all motor-driven. The alternating current motors range from one-eighth horse power to four hundred horse power, and the direct current from one-eighth horse power to one hundred horse power. All alternating current motors are equipped with starters of various types, and the direct current motors with Cutler hammer controls mounted in panels.

The lighting of the factory is controlled by its own sub-station. This station consists of a bank of transformers and a switch-board. The transformers are twenty-two hundred to two hundred and twenty-one hundred and ten volts.

The switchboard controls all the various lighting circuits in the factory. The lighting of the power house is controlled from the main switch-board, a separate bank of transformers being installed to take care of same.

The storage reservoir previously mentioned is located immediately east of the power house, and has a capacity of approximately two hundred thousand gallons. It is covered level with grade with a reinforced concrete slab capable of carrying five hundred pounds per square foot, which allows of this space being used for storage of castings, etc. Above this reservoir is built a seventy-five thousand gallon sprinkler tank for fire purposes, an overflow line from this tank dropping directly to reservoir below.

The cement building consists of two brick houses, one thirty by thirty-three feet, and the other thirty by fifty-nine feet. Each building is of one story, the distance from floor to roof trusses being fourteen feet.

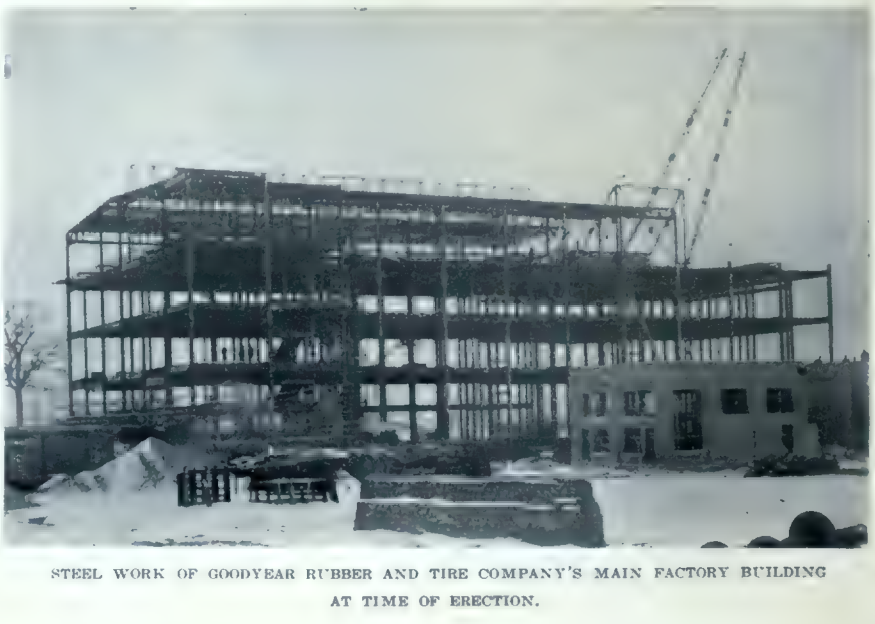
These houses are connected to the main building basement by means of a tunnel, a hydraulic elevator being installed at the cement house end.

ERECTION OF STEEL FRAMEWORK.

The structural steelwork for the main building was erected by using two five-ton derricks, with seventy-five-foot booms mounted on a traveller on which was also placed all the hoisting equipment. The traveller ran on the fourth floor steel frame, and erected all the steel up to and including the fourth floor ahead of it. When the traveller was moved forward, then the rear derrick placed the roof columns, the three lines of roof trusses and the purlins.

The derricks were so placed on the building that either one could lift the steel from the cars on the siding at the north side of the building. This method of erection proved very efficient, and enabled the steel contractors to erect all the framework in record time.

It is estimated that fire losses in Canada and the United States during 1917 will reach a total of from \$240,000,000 to \$250,000,000. This is considerably higher than the total for each of the two preceding years. It must be expected that Nero will fiddle just as long as material of the nature of fuel are being used in buildings.



STEEL WORK OF GOODYEAR RUBBER AND TIRE COMPANY'S MAIN FACTORY BUILDING AT TIME OF ERECTION.

Contracting Side of Structural Steel Business

By CHARLES H. MARRS. C. E. *

IT is not the purpose of this article to advertise fabricated structural steel by enlarging upon its uses and giving its advantages over other building materials, but it is the intention to merely mention some facts and make a few suggestions in connection with the contracting end of this business which may be of interest to those who have occasion to deal with it; for the development of this industry has been one of the remarkable achievements of the age, and almost every modern structure has some steel in its make-up.

There are many stubborn facts and changeable conditions in connection with any fabricating business, and especially is this true of structural steel, which is used in such varied form in building construction.

It is used in railway bridges, highway bridges, mill buildings, high office buildings, factories, power plants, steel mills, towers, and miscellaneous buildings of every description, and from the character of these structures it is evident that heavy loads and stresses are necessarily involved, and it is imperative in the interests of public safety that no element of chance or uncertainty should be permitted to enter into their construction.

In the case of railway bridges each railroad has its own specifications and standards to govern, and has also a staff of engineers to see that these are complied with, and the result is, that after the general outline of a bridge is settled, any bridge company is able to make complete designs which only require minor changes, if any, before being approved, and in this way these bridges are always built in accordance with the best practices known.

In the case of highway bridges there is likewise little variation in the design of the most important bridges which are usually under government control. In the lighter bridges, however, such as township spans where the purchasing is in the hands of inexperienced persons, who may be farmers by occupation, there is a possibility that some unreliable company might supply a structure considerably lighter than desirable.

In the design of large building structures there is usually little uncertainty, as competent architects and engineers are engaged to prepare plans, either alone or working in conjunction with some structural steel company, and the records show that the failures of steel structures built under competent supervision have been remarkably few.

The cases where failures are more likely to occur are in connection with more simple building structures, where plans are prepared by incompetent persons, or where no plans are made at all. It is common practice for a carpenter or builder to use his judgment, gained by experience, in deciding the size of wood beams which he will use for various conditions, and it is when this same practice is followed in connection with longer spans under heavy loads requiring steel beams, that the element of chance is certain to be present, because a designer with years of experience would not attempt to use this rough method of guessing at the required sections; yet it frequently happens that customers order steel beams, of a fixed depth, on the recommendation of their carpenter, when one double the size may be required, or perhaps one half as strong might answer the purpose. Sometimes, too, customers write to structural steel companies and ask for a price on steel beams, and merely state that they are to be a certain length and to carry a brick wall, and they omit to describe the walls or mention any floor or roof loads which may have to be supported by these beams.

The above rough methods usually exist in towns where there is little or no building inspection, and while structural companies employ experienced designers whose duty it is to try and get complete information before recommending the sections to be used, there often exists the uncertainty as to whether all particulars have been fully described by the customer.

In a great many cases small architectural firms are engaged to prepare plans for buildings in which structural steel is required, and there is no reason why good results should not be obtained if the architect is competent, even though he may not be a structural engineer. The architect is best able to decide the general arrangement, and the type of construction which, at a limited cost, will give a satisfactory layout, and usually is able to calculate imposed loads, and by the use of handbooks decide on sections suited to the load, but in some cases he is not qualified to make a design of the general structural steel in the building.

The most competent structural designers are only developed after years of training along that special line, and it is not expected that all men who practice architecture have these qualifications or find it profitable to engage an assistant who has.

It is always possible for an architect to get advice from the designing engineers employed by structural steel companies without any extra cost to himself or his client, and this should always be an advantage, as these men are constantly in close touch with the trade. The con-

* Assistant Chief Engineer, Hamilton Bridge Works Co., Ltd.

ditions in the steel market are continually changing, and new shapes are often being introduced, and shop practices and erection methods are always being improved, and these changes are all accompanied by improvements in designs of structures.

For the last few years, under war conditions, old customs have been particularly upset and the conditions at the mills have been such that some sections could not be procured at all and others have had to be on order for a year or more before deliveries could be made, and it has been necessary for structural steel companies to rely on their own stock, and designs have had to be made in accordance with same where quick delivery was wanted.

Since the outbreak of the war most of the structural steel business has been confined to munition buildings and steel plants, all of which have been wanted in a rush and some remarkably quick deliveries have been made, but it has been necessary to make the designs to suit the stock of the fabricating company.

Anyone connected with the contracting business is aware that there are frequently disasterous financial losses, and one of the most important phases of the structural steel business is that there should be a thorough understanding of the limits, and the details of contracts undertaken.

There is more money lost by an imperfect knowledge of the obligations of contracts than in any other way, and this more usually happens when there is obscurity in the specifications and plans which are furnished steel companies when they are asked to tender on work, and on which specifications and plans the contract is later based.

In connection with all tenders the principle of honor and the spirit of frankness should always maintain between contractor and customer. This is not always the case, and often specifications for structural work to-day are faulty, and very important clauses are not only put in obscure places, but are deliberately written in uncertain terms. Sometimes specifications are so drawn up that it is evident that the man who wrote them deliberately used terms which made them obscure, so that if he desired, the extreme of the contract could be demanded, whereas if he did not care to do so he could be satisfied with something a great deal less.

Another important feature is where tenders have to be made from drawings which are made to cover all trades in connection with the building, and where it is sometimes very difficult, if not impossible, to be sure of all steel required, and where a considerable amount of steel may be covered by a little obscure note which is easily missed, but which material is intended to be supplied later under the contract. These drawings, too, are often made to a small scale without dimensions being noted and it may easily follow that beams which should have sixteen inches bearing on the walls, may only get half that amount.

Still another custom that is open to criticism is that consulting engineers often prepare complete designs and specifications on complicated structures which may even have operating machinery in connection with them, and after tieing the contracting company down rigidly in all details, they insert a clause in the specifications making the contractors guarantee the structure for a period of years, and these companies have often to take such chances to secure the work.

Again a further confusing habit is that some standard form of specification is often submitted with requests for tenders and these specifications may not be suitable to the particular job; and the result is that the contractor has to take a lot of things for granted and uncertainty necessarily exists as to what is required.

While the above questionable methods are sometimes used by customers, there are on the other hand companies with unscrupulous salesmen, who in their anxiety to obtain work will often obligate themselves as regards contracts, the conditions of which they are morally certain they cannot fulfil, and take a chance of crawling from under afterwards.

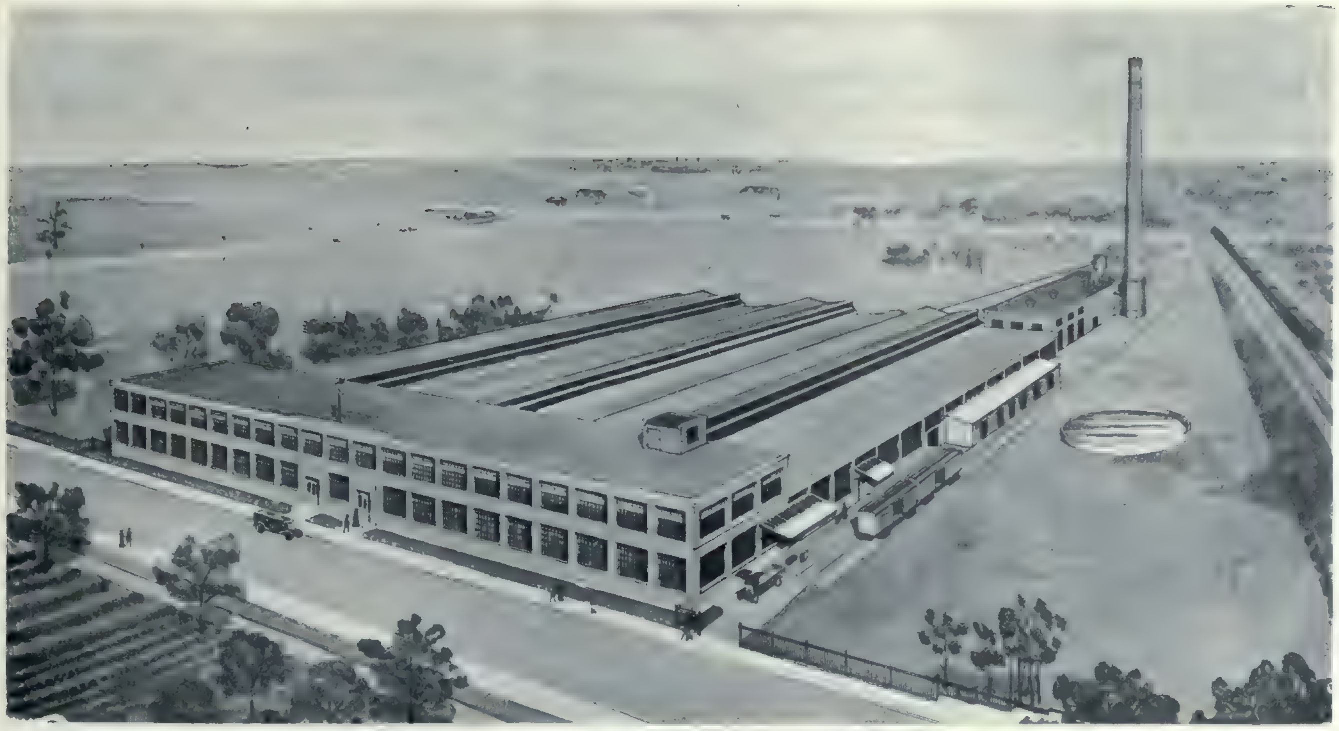
Therefore it is important that the contractor and customer make sure in the first place what is expected under the contract and be satisfied that there is a reasonable chance that it can be fulfilled, and if all information is clear, then speed and proper sequence in the work usually follows.

After a contract is under way changes are sometimes necessary through the uncertainty of customers, and in these cases, all instructions should come through the same hands as the original contract so that extras in cost may be adjusted beforehand and various officials may have full knowledge of the final conditions of contract.

Changes should of course be avoided where possible, because there is always deep disgust pervading the shop when they have to work on contracts with a large number of changed drawings, and considerable delay always results and mistakes are more likely to be made.

An interesting feature of the structural steel business is that in the old days material was fabricated, shipped and possibly erected before being examined at all, but to-day nearly all important work is over seen by competent inspectors and the fabricating shops that deliberately set out to do poor work at less cost, only fool themselves and injure their reputation.

While it is recognized that most of the points noted in this article are the comparatively simple features which have been noticed before by those intimate with the structural steel business it has been the intention to convey information to those less familiar who may have occasion to deal in this product.



PERSPECTIVE VIEW OF CANADA CYCLE AND MOTOR COMPANY'S PLANT, WESTON, ONT. PRACK & PERINE, ARCHITECTS.

New Cycle and Motor Works, Weston, Ontario

THE plan and arrangement of the new plant of the Canada Cycle & Motor Company at Weston, Ontario, was determined mainly by the extent of the site which allowed sufficient ground area to permit of the erection of an almost entirely one-story building. As a result, the various working departments are organized so that the factory operations are conducted altogether on the ground floor level. The only part of the building rising above this height is a two-story section across the front, in which the general offices and storeroom are located. This part of the building is two hundred and eighty feet long by fifty feet deep, while the factory portion occupies the remaining space of two hundred and eight feet by one hundred and fifty-eight feet.

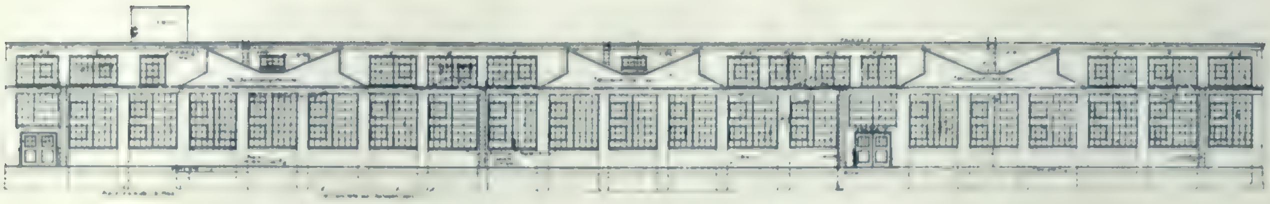
The continuous unbroken area thus available obtains both efficiency and economy in the process of manufacture; all operations, from the receiving of the raw material to the finishing stage, being carried out in a systematically arranged order, and without the necessity of raising or lowering any part of the work from one floor to another.

The general office section is built of fire resisting materials, with concrete foundation piers and reinforced concrete columns for the first floor. These columns are fourteen inches square, and placed at sixteen-foot intervals. Concrete is also employed in the girders, fourteen by thirty inches, which support the ten-inch hollow tile and concrete joist floor of the second story. The enclosing walls are of brick and the roof is flat, consisting of wood sheeting on steel wall-bearing girders, and covered with prepared roofing. The floors are finished with cement or linoleum.

Two entrances at the front give access to the building, one being used by the male help of the factory and the other by the office staff and female employees. The general offices and storeroom are on the second floor, while modern locker rooms, an emergency hospital, and lunch and rest-rooms for the women staff are provided on the ground floor level.

One interesting feature of the entire building is the fenestration, whereby almost the entire wall area is taken up by a system of outside windows. As a result an abundance of light is obtained from all sides, and this is further supplemented by specially designed roof monitors which admit of an additional inflow of direct natural light immediately over the factory proper.

The factory section of the building is of steel frame construction, supported by concrete piers with spread footings carried down to a minimum depth of three feet six inches, and with the bearing strength varied to suit the loading requirements. The outside columns are supported on continuous foundation walls of concrete with spread footings, on which the outside brick walls are built up. The columns are placed at sixteen-foot intervals in one direction and forty-foot intervals in the other, with steel roof trusses spanning the long bays. The brick exterior walls are nine inches thick between the columns and thirteen inches at the columns, the

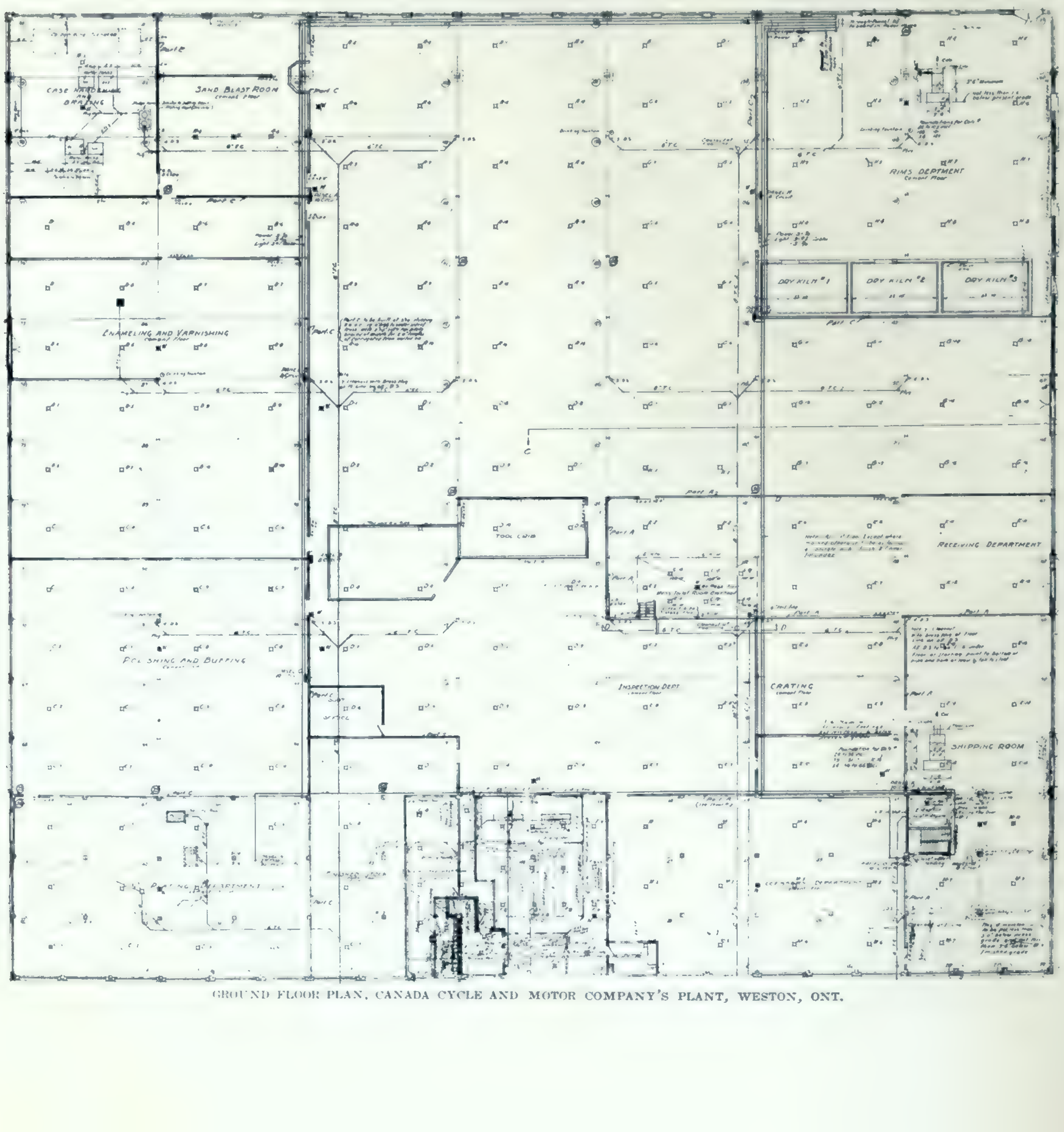


REAR ELEVATION, CANADA CYCLE AND MOTOR COMPANY'S PLANT, WESTON, ONT.

FRONT ELEVATION, CANADA CYCLE AND MOTOR COMPANY'S PLANT, WESTON, ONT.

metal sash of the windows extending from the sills to the eaves. The roof is of two and three-quarter-inch tongue and groove sheeting on six by ten-inch rafters, being supported by the steel trusses previously mentioned. Drainage is carried through interior down-pipes and outside eaves. The floor of the factory is of four-inch concrete on a two-inch cinder base, with a one-inch cement coat finish.

The power house forms a separate unit, and is approximately thirty by sixty-two feet in dimensions, with a stack one hundred and twenty-five feet high and five feet six inches in diameter at top. The walls are of brick, and the roof is carried on wall-bearing steel sections. Two return tubular boilers of three hundred horse power capacity are at present installed, and provision is made for the addition of two simi-



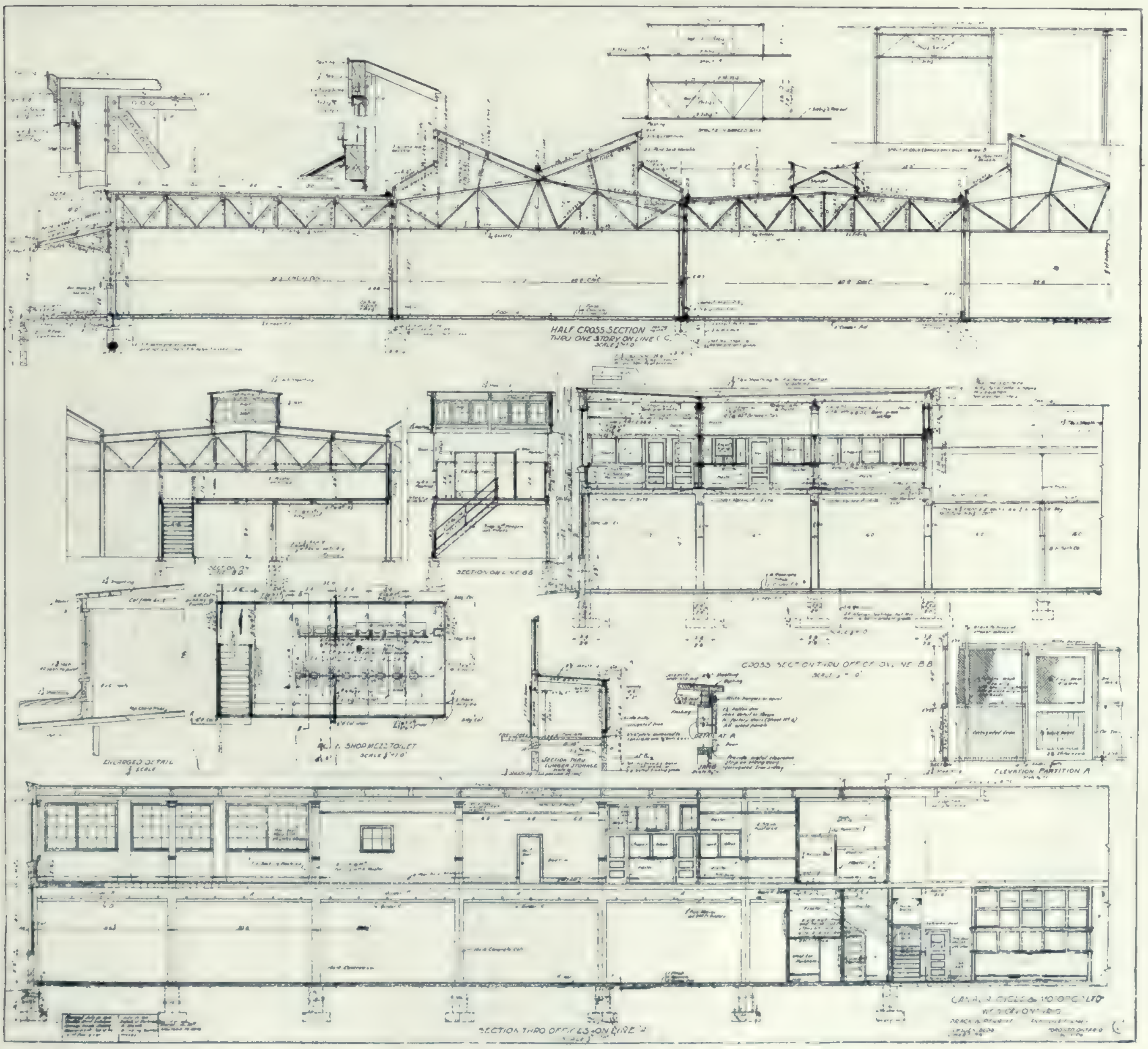
GROUND FLOOR PLAN, CANADA CYCLE AND MOTOR COMPANY'S PLANT, WESTON, ONT.

lar units at a future time. A steam-driven air compressor furnishes compressed air for brazing, sand-blast, and other shop processes. Additional equipment consists of a fire pump, which connects with a one hundred thousand gallon underground tank of reinforced concrete, fifty-two feet in diameter, which can be utilized in case of fire in the case of a breakdown in the local waterworks system.

The plant is equipped throughout with a sprinkler system, and an indirect heating system with a series of three operated fans and ducts supplies warm air to all parts of the workrooms.

The office section is heated by direct radiation, the exhaust steam being used for this purpose. Steam is also used for heating the dry kilns and enamelling ovens; while the various machines throughout are driven by electric motors.

Mr. Joseph Hobson, one of Canada's most noted civil engineers passed away recently in Hamilton, Ontario, in his 84th year. Two great engineering achievements stand to his credit, both parts of the Grand Trunk main line: the railway tunnel under the St. Clair River, near Sarnia, and the rebuilt Victoria bridge from the Montreal side of the St. Lawrence to the southern shore of that river. Mr. Hobson was born near Guelph, Ontario, in 1833, and was educated professionally in Toronto. Whilst still a young man, he joined the firm of contractors that built the section of the main line of the Grand Trunk Railway from Toronto to Guelph. In 1870 he was appointed bridge engineer of the southern division, formerly the Great Western Railway, and in that capacity he had charge of the construction of the international bridge from Buffalo to Fort Erie, and of the replacement of the old Suspension Bridge below the Falls of Niagara. For ten years he held the position of Chief Engineer of the Grand Trunk Railway System, from 1896 to 1907; since which latter date he had been consulting engineer.



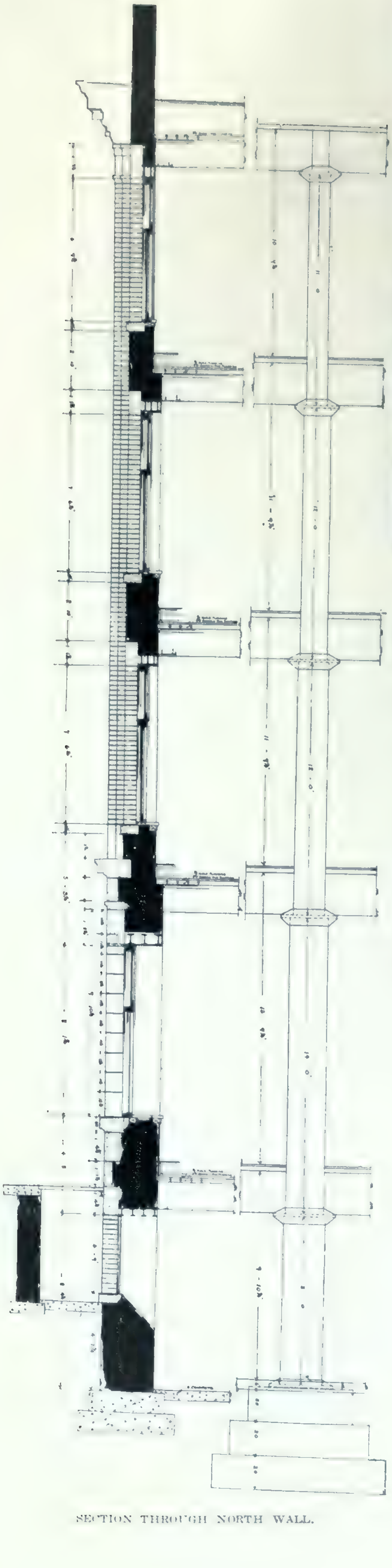
CANADA CYCLE AND MOTOR COMPANY'S PLANT, WESTON, ONT.

GENERAL VIEW.

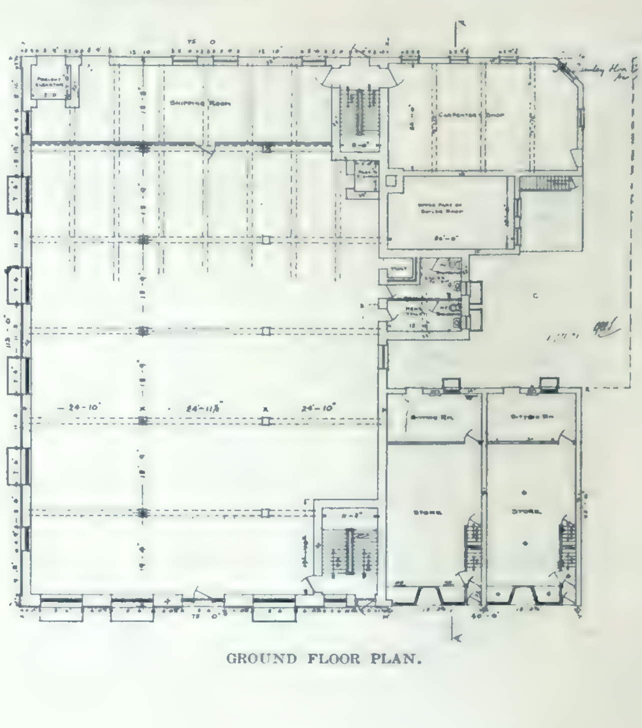
CROMPTON CORSET
COMPANY'S BUILDING,
TORONTO.

MAIN ELEVATION.

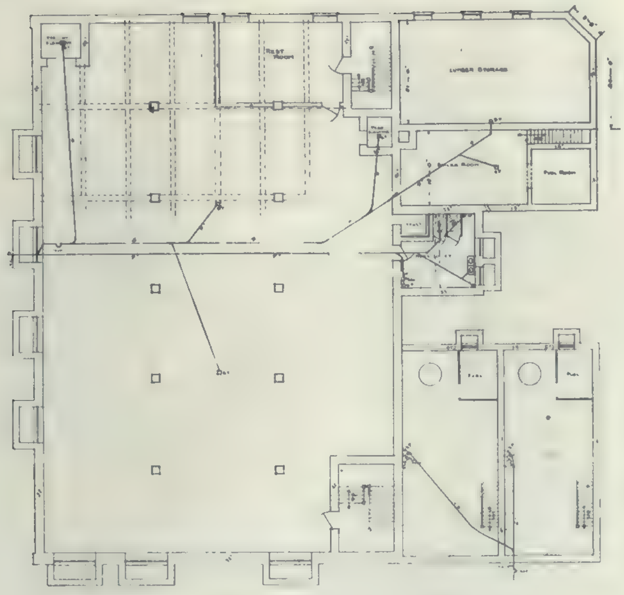
A. R. DENISON &
STEPHENSON,
ARCHITECTS.



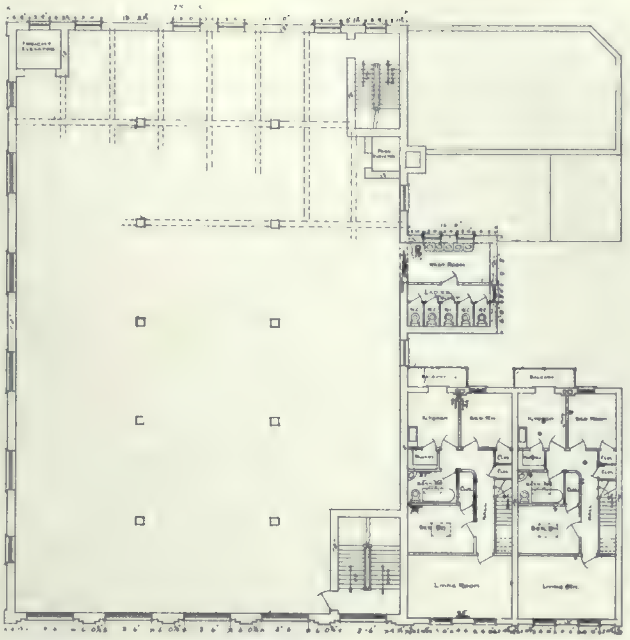
SECTION THROUGH NORTH WALL.



GROUND FLOOR PLAN.



SECOND FLOOR PLAN.



BASEMENT PLAN.

CROMPTON CORSET COMPANY'S WAREHOUSE, TORONTO

Mill or slow burning construction offers certain advantages in initial cost and insurance which influences its adoption in a large number of commercial buildings; and especially when equipped with modern sprinkler system, metal sash and other like features, it makes a most substantial structure compatible with the outlay from the standpoint of investment.

The warehouse of the Crompton Corset Company, at the southwest corner of College Street and Palmerston Avenue, is of this character and it represents to a large extent the type of commercial buildings erected during recent developments in the west College Street district.

The building is four stories high exclusive of basement, and occupies frontages of 113 feet on Palmerstone Avenue and 75 feet on College Street, with an additional 40 foot extension for stores. Light is obtained on all four sides of the structure, the large windows on the street elevations being of the wooden casement type, while the remaining windows throughout have steel sash. The walls are of dark purple stock brick set in colored mortar with the entire ground floor faced with blue Ohio cut stone; the latter material also being used for the window heads, sills, etc. above moulded cornice band. The upper cornice is of galvanized iron painted and sanded to match the stone work. The interior is of heavy mill construction, the floors consisting of 2¾ inch Georgia Pine planks covered with ⅞ inch maple flooring, and are designed to carry a safe live load of 150 lbs. per square foot. The beams and posts are of British Columbia fir with caps and bases of heavy cast iron.

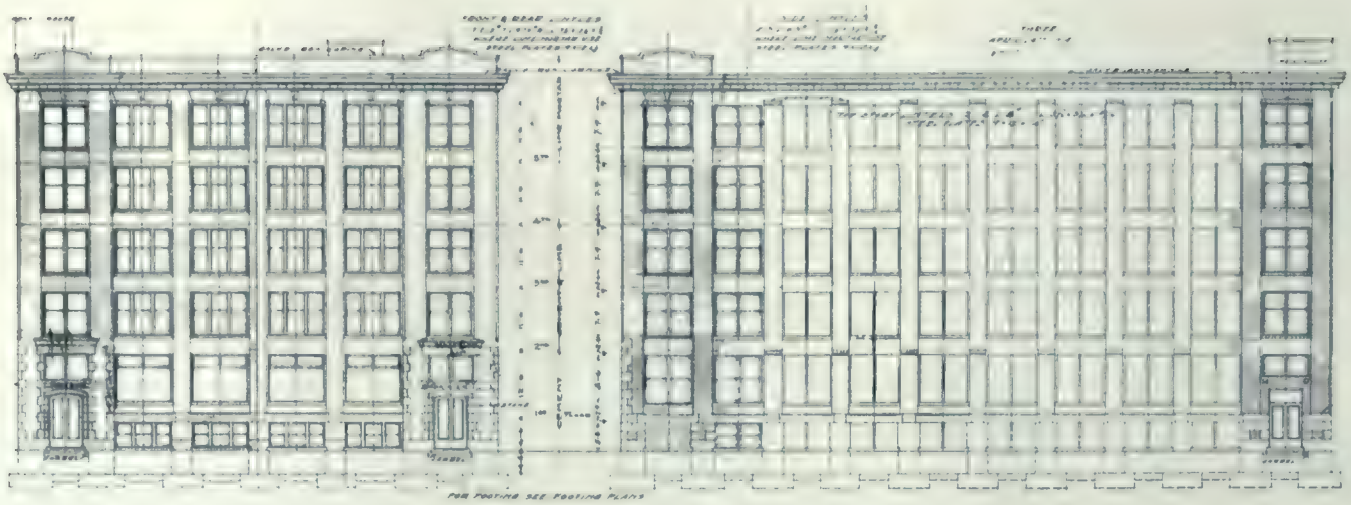
The front portion of the main floor is laid out in offices, and the balance of building devoted entirely to wareroom and working space. There are two wide stair-cases enclosed with brick walls, connecting the various floors; while both the passenger and freight elevators are likewise protected with similar brick enclosures.

A lane extending around the building at the rear gives excellent facilities for receiving and shipping and is served by the freight elevator direct.

Instead of the living apartments above the stores on the College Street extension, the space here is devoted to a large modern rest room and lunch room decorated and furnished to attractively fulfil its purpose. This change in the plan was decided upon during the time the building was in the course of erection and an opening was consequently cut through the wall to connect this part directly with the main portion of the structure; thus making it a convenient feature of the company's policy in regard to the comfort and welfare of its employees.

LADIES' WEAR LIMITED, TORONTO

The site of this building is at the south west corner of College Street and Manning Avenue and was selected to afford the greatest amount of air and light for the employees. A 15 foot lane was left to the east and this together with a 25 foot lane to the south gives light to all four sides of the building. The windows on the east and south are metal with ventilators in each sash. The exterior walls are finished with red pressed brick with artificial stone cornice and trimmings. Mill construction is used throughout, the posts, beams and heavy 4 inch floors being of Douglas fir, with ⅞ inch maple finish floor, except over the boiler room where the

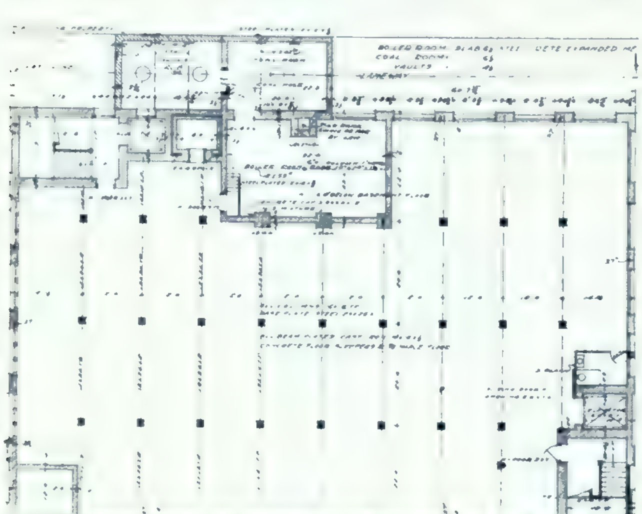


FRONT AND SIDE ELEVATIONS, PREMISES OF LADIES' WEAR, LTD., TORONTO.

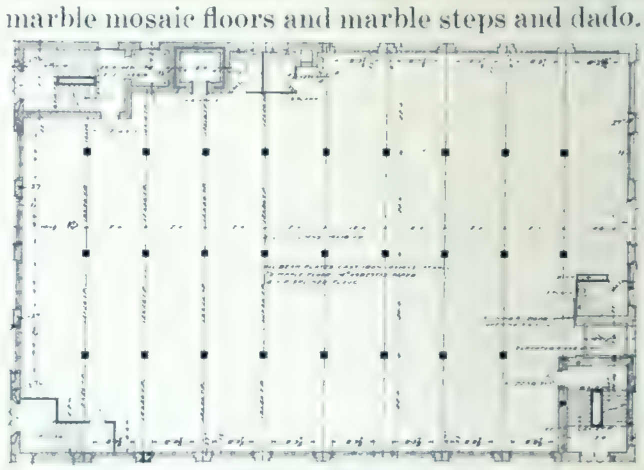
flooring is of maple over reinforced concrete. The basement floor consists of a layer of pitch and felt on concrete, over which is laid a ⅞-inch pine floor on cedar sleepers, and finished on top with a ⅞-inch maple floor. A battery of three boilers is used to heat the building, and the coal bin is situated under the lane east of basement, and has a carload storage capacity.

The stairs are enclosed with brick walls and kalameined doors, and are arranged to afford easy exit. In addition to the usual passenger and freight elevators, a spiral gravity parcel conveyor running from the fourth to the ground floor relieves traffic on the freight elevator and permits of the handling of goods with convenience. Tank of sprinkler system is connected with water curtains on the outside of east and south walls; this, with a signal system, permits of exceptionally low insurance. The main entrance is finished in marble, with marble mosaic floors and marble steps and dado.

PREMISES OF LADIES' WEAR, LTD., TORONTO. J. L. HAVILL, ARCHITECT.



BASEMENT PLAN.



GROUND FLOOR PLAN.

New Birks Building at Vancouver

LOCATED on one of the many business corners in Vancouver, B.C., the new Birks Building was erected from plans drawn by Somervell & Putnam of that city. The building is one hundred by one hundred and twenty feet with ten storeys and basement, and the upper eight floors having thirty-one offices.

The building has an attractive appearance on Granville and Georgia facades, being of light cream color terra cotta with bases of British Columbia granite.

The main entrance is finished with panelled marble wainscotting and highly ornamental plaster ceiling of caen stone finish.

The corridors are floored with terra cotta, and stair treads and base boards throughout the building are of marble. There are tiled lavatories for each sex on every floor. The woodwork throughout the building is of oak and the office floors of British Columbia fir.

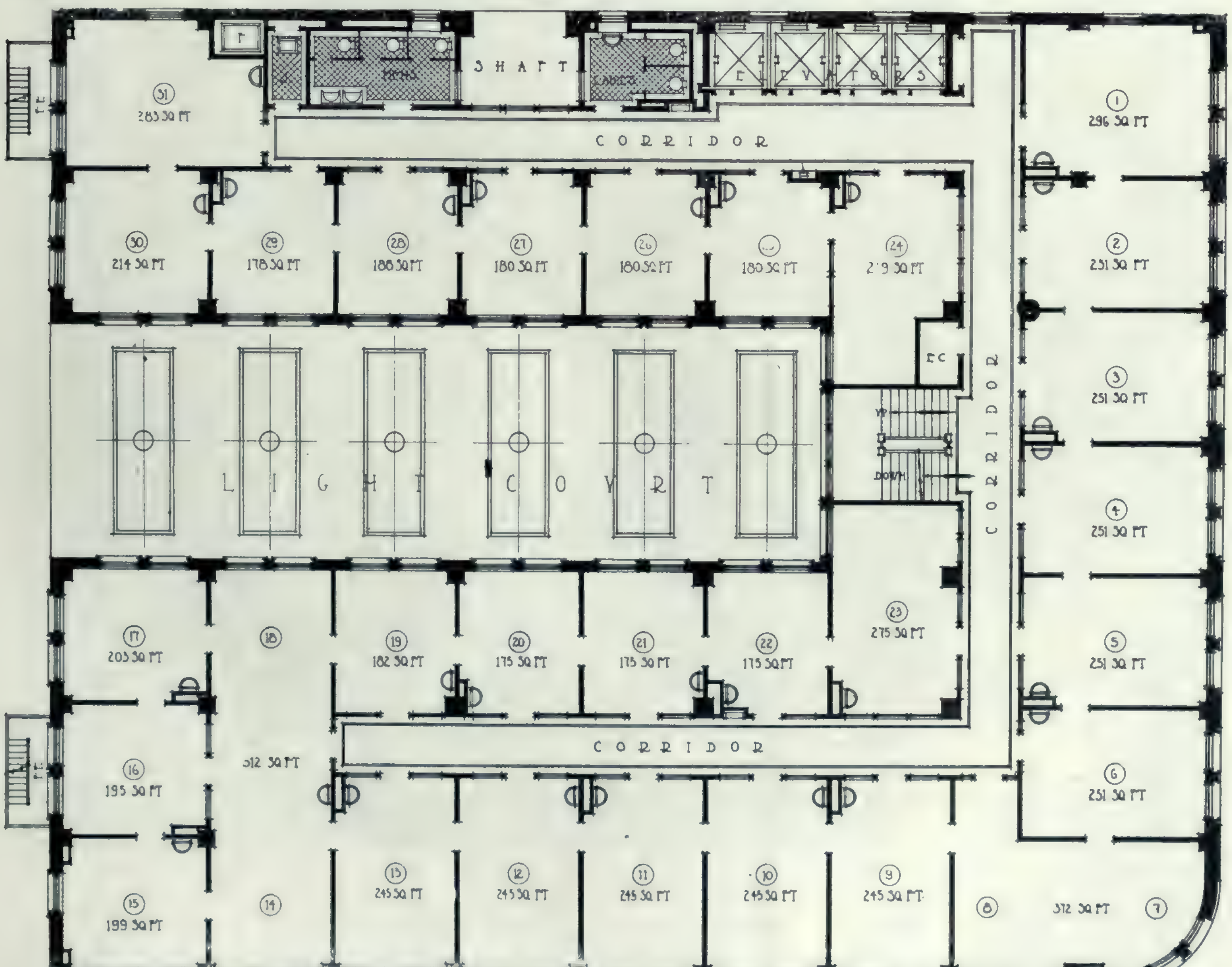
The structure is fireproof, being of reinforced concrete with terra cotta partition walls. Each floor is equipped with fire hose and two fire escapes, and metal windows throughout, which will close automatically in event of fire.

The first five floors are specially laid out for doctors and dentists with necessary water, gas and electrical connections installed in the base boards. The Webster method of circulation steam heating is used with duplicate boilers. The vacuum cleaning system and mail chute and modern elevators are also installed.

The first floor, ground floor and basement of the building are used by the owners as a jewelry store. The interior finishing of the ground and mezzanine floors being of marble, mahogany and bronze.

A large elevator is installed to enable the motor delivery trucks to be lowered to the basement, which is used for storage and shipping. The heating equipment is located in the sub-basement.

In pouring the concrete the gravity system was used. The cement and sand were mixed on the ground and conveyed by an elevator to a height of about twenty feet, where it was to be used. It then flowed by gravity through tubes into the moulds.



TYPICAL FLOOR PLAN, BIRKS BUILDING, VANCOUVER, B.C.

SOMERVELL & PURNAM, ARCHITECTS, VANCOUVER, B.C.

BIRKS BUILDING, VANCOUVER, B.C.

SOMERVELL & PURNAM, ARCHITECTS, VANCOUVER, B.C.

CONSTRUCTION

A · JOURNAL · FOR · THE ARCHITECTURAL ENGINEERING · AND · CONTRACTING INTERESTS · OF · CANADA

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CONTRIBUTIONS.—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and returned.

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WESTON WRIGLEY, Business Manager
FRED. T. HOLLIDAY, Advertising Representative

Vol. XI Toronto, January, 1918 No. 1

The Building Outlook

While building operations are not to be compared with the heavy volume of work carried out in the pre-wartime period, the year just closed has, nevertheless, seen a fair demand for certain lines of materials. At least it can be said that since the slump occasioned by the outbreak of hostilities in 1914, the situation has recovered to a point at which it has remained more or less constant as regards the total annual investment. This has been due in a large measure to the increase in military hospital units, aviation buildings, and additions which have been made necessary to meet the requirements of manufacturing plants; and it is altogether likely that considerable additional work of this character will be undertaken in the period immediately ahead. There has also been a fair amount of activity in the erection of theatres and schools, as well as low-cost residential structures, while the establishing of shipyards and like industries has also been a contributing factor. The complete figures are not as yet available for the twelve months of 1917, but even when these are compiled, the indications are that if any decrease is noted it will not amount to more than a small percentage at the outside. Activities have perhaps shifted around to an extent in some certain districts, and consequently some sections have suffered, while others are ahead, but on the whole the total expenditure for the country held fairly steady to the previous year's mark.

As to the outlook it is difficult to prophesy, other than to say no adverse change is expected. True, word comes from Ottawa that Mr. Carvell, the new Minister of Public Works, has ordered a curtailment of work coming under his authority, and will confine expenditures altogether to necessary repairs and maintenance. But this, it is understood, is not to include work on the new Parliament Buildings, and is more in regard to harbor improvements, docks, etc., which, as far as expenditures are concerned, only involves certain basic materials. In fact, aside from the new Parliament Buildings, the government's programme in the past year has provided for very little in the way of new buildings or improvements to existing structures, so that the announcement is not as unfavorable as it perhaps might appear. On the other hand, there is considerable talk of starting a number of deferred projects of a private character, and a likelihood that considerable more will be done in the better class of residential work. There is nothing to indicate any appreciable drop in prices for some time to come, and many owners who are reconciled to this fact will likely be influenced to proceed with contemplated work without further delay. In addition, there is a pressing need in a large number of communities for school buildings, and houses to accommodate the working class, and this, together with a continuance of industrial and military work mentioned, should offer a fair amount of business prospects.

The Late R. Mackay Fripp, F. S. A.

The sudden passing away of Mr. R. Mackay Fripp, F.S.A., at Vancouver, B.C., on December 15, has deprived the architectural profession of one of its most highly respected members, as well as a practitioner of prominent standing in the Pacific coast district. Mr. Fripp was a designer of marked ability, and possessed a personality which won for him the admiration of both his confreres and a wide circle of personal acquaintances. At the time of his death he was President of the Architectural Institute of British Columbia, and his counsel and active interest in its affairs will be greatly missed at the regular meetings. The resolution adopted by that organization indicates the lofty esteem in which he was held by his fellow members, and is expressive to a large extent of the sentiment of all who knew him. The resolution reads as follows:

Resolved—That we, the members of the Architectural Institute of British Columbia, do herewith instruct and authorize our Honorary Secretary to insert in the minutes of the transactions of the Institute, an expression of our deep regret at the death of our President, Mr. R. Mackay Fripp. We feel that his whole-hearted support of any movement which in the past was calculated to raise the dignity of our profession in the eyes of the public, his keen and active interest in educational matters, and in the highest ethics of the profession as a whole, and the example of his own disinterested and blameless life, are all assets to the profession which we can ill afford to lose, and that the memory of his activities amongst us will always be gratefully cherished.

Canadian Building and Construction News

BUSINESS BUILDINGS.

Galt, Ont.—Schultz Bros. Company, of Brantford, have the general contract for the erection of a new building to cost $50,000, at Main and Water streets, for the Merchants Bank of Canada. It will be a two-story structure, 45 x 53 ft., with Ohio sandstone exterior, and modern equipment throughout.

Guelph, Ont.—Tenders were recently closed for remodelling the heating system in the Ontario Savings Society Building on Wyndham street. The existing system will be remodelled on the first floor, and new equipment will be installed on the second and third floors. W. A. Mahoney, Quebec street, is the architect.

Kinmount, Ont.—The old hotel property on Main street has been acquired by Doherty Bros., who will remodel same into a modern store building this coming spring. Information is desired on heating system, vaults, freight elevators, sprinkler system, plate glass and refrigerators.

Ottawa, Ont.—Architect W. E. Noffke, 45 Rideau street, has closed tenders for a new store front and general alterations to store building on Bank street, for Foley & Gleason, Central Chambers.

Quebec, Que.—Architect Pierre Levesque, 115 St. John street, has completed plans for alterations to the Banque Nationale. The work will include a new mezzanine, plastic relief, marble work, structural steel, ornamental iron, metallic lath, fireproofing and reinforced concrete. Tenders will be called almost immediately, and close about February 15. Cost $10,000.

Sarnia, Ont.—John Elnor has the contract for new show and warerooms to be erected on Quebec street for the Auto Sales, Limited. The building will cost $10,000.

Toronto, Ont.—Yolles & Rottenburg, 302 Confederation Life Building, are the owners and general contractors for a new building to be erected at the corner of Danforth and Logan avenues, at a cost of $15,000. The structure will be of brick, and modernly equipped, and contain stores on the ground floor, with a hall above.

Toronto, Ont.—The Dickie Construction Company, Ryrie Building, have the general contract for altering premises at 279-83 Yonge street into restaurant and offices for the Childs Company, Toronto and New York City. The work will cost $60,000 and will involve the entire renovation of the building, including considerable tile and marble work, iron stairs, steam heating, and up-to-date equipment. J. C. Westervelt, 36 West 34th street, New York City, is the architect.

CHURCHES AND SCHOOLS.

Barries, Ont.—Plans prepared by Architects Ellis & Ellis, Manning Chambers, Toronto, have been approved by the ratepayers for a new school to cost $100,000. The Ball Planing Mill Company, a local concern, has the general contract, and is now ordering material, etc., with a view to starting the work immediately.

Fingal, Ont.—The Board of School Trustees are contemplating the erection of a new $20,000 building to replace structure recently destroyed by fire. Dr. Smith can be addressed.

Kingston, Ont.—Steps are being organized towards the erection of a "Union Building" in connection with Queen's University, as a memorial to the students of that institution who have given their lives in the service of the Empire. Work will not be started until after the war.

Port Hope, Ont.—It has been decided to raise funds for the erection of a junior school in connection with Trinity College, as a memorial to graduates who have fallen in the present war.

CLUBS AND HOSPITALS.

Chatham, Ont.—Robert Grey has purchased the Algonquin Hotel, which he intends to remodel for Y.M.C.A. purposes. Work will include the installation of a swimming tank, gymnasium and bowling alley equipment, and general renovations to the building. It is reported that operations will start shortly.

Clarkson, Ont.—The Lake Shore Country Club, with offices in the Lumsden Building, Toronto, has purchased a site with the intention, it is understood, to erect new buildings.

London, Ont.—Work is started on a one-story frame addition for military hospitals purposes. Cost $3,000.

Ottawa, Ont.—The upper floor of the east wing of the General Hospital has been damaged by fire to the extent of $50,000.

Toronto, Ont.—It is reported that the premises of F. B. Robins, Ltd., Victoria and Richmond streets, will be taken over by the Y.M.C.A. and equipped as an annex to increase the accommodation for soldiers in connection with the Triangle Club.

FACTORIES AND WAREHOUSES.

Chatham, Ont.—Work is to start at once towards the rebuilding of the plant of the Canadian Des Moines Steel Company at this place, which was recently destroyed by fire. Cost $15,000.

Hamilton, Ont.—The Canada Steel Goods Company have started work on a frame storage building to cost $3,000, on Arthur street.

Hamilton, Ont.—The Hamilton Bridge Company is erecting a structural steel frame extension to their girder factory on Depew street; the company doing the work with their own staff and supplying all necessary materials. Cost $20,000.

Ingersoll, Ont.—The plant of the Ingersoll Gas Company has been almost entirely destroyed as a result of explosion and fire.

Kapukasing, Ont.—The tender of Mundy & Stewart, 84 King street east, Toronto, has been accepted by the Ontario Government for the Kapukasing timber limits. It is obligatory on the part of the purchaser to establish a pulp and paper mill, to cost $1,000,000.

Lindsay, Ont.—The general contract for the proposed Allenbury factory has been awarded to Irwin Simpson, 326 Seaton street, Toronto, Ont. The company is an English concern which manufactures infants' food products, and is represented in Canada by Lloyd Wood, wholesale druggist, Church and Gerrard streets, Toronto. The building will be three stories, 60 by 100 feet, of brick construction, and cost $50,000.

Niagara Falls, Ont.—Operations on the proposed $30,000 factory for Lundy-Scott Company, Limited, have been postponed until spring. The building will be two stories and basement 60 x 100, of brick construction. G. H. Gardner, 10 Merrick street, Welland, Ont., is the general contractor.

Owen Sound, Ont.—The ratepayers have voted in favor of a by-law guaranteeing the bonds of the King Shoe Company, 130 Wellington street west, Toronto. Work is already started on the remodelling of an existing structure which the company will use for manufacturing its products. Power and process machinery will be installed.

Porcupine, Ont.—It is the intention of the Davidson Gold Mines, Limited, to proceed at once with the erection of a new ore mill.

Sault Ste. Marie, Ont.—The Algoma Steel Corporation has let a contract for installing twenty-five by-product coke ovens, together with by-product equipment.

Toronto, Ont.—The T. Eaton Company, 190 Yonge street, is contemplating the erection of a mail order building, 200 x 200, at Bayside Park. Estimated cost, $1,000,000.

Toronto, Ont.—Tenders will be received until January 30, for the erection of a two-story addition, 75 x 30 feet, to the factory of the Cecilian Company, Limited, Defoe and Stafford streets. Oborn & Ellis, 22 College street, are the architects.

FIRE LOSSES.

Baden, Ont.—The woolen mills owned by Elias A. Brubacher, at this place, have been destroyed by fire. Loss $7,000, partly insured.

Cornwall, Ont.—The Tardiff block, on Montreal road, has been destroyed by fire; loss not stated.

Gananoque, Ont.—The axle department of the Ontario Steel Company's factory has been damaged by fire to the extent of several thousand dollars.

Hamilton, Ont.—Fire recently destroyed the cooperage building of the Steel Company of Canada on North Wellington street. Cost $10,000.

Norwich, Ont.—The plant of the Wood Flour Mills at this place have been totally destroyed. Loss not stated. Partly insured.

Ottawa, Ont.—The premises containing stores and warerooms owned by S. & H. Borbridge & Company, Rideau and Mosgrove streets, have been heavily damaged by fire. Loss on building and contents between $75,000 and $100,000.

Peterboro, Ont.—The factory of the Peterboro Canoe Company has been destroyed by fire. Loss on building and machinery, $30,000.

Peterboro, Ont.—The building occupied by the Boston Cafe has been entirely destroyed, and Elliotts' Departmental Store heavily damaged, as a result of a fire which caused an estimated loss of $50,000.

Sault Ste. Marie, Ont.—The building and machinery of the Pearl Laundry Company have been destroyed by fire. Loss $50,000.

Simcoe, Ont.—The store house of the Simcoe Wool Stock Company (Harry Brooks, proprietor) has been destroyed by fire. Loss, including contents, $25,000; partly insured.

Toronto, Ont.—The dock and buildings of the Toronto Ferry Company at the foot of Bay street, have been damaged by fire to the extent of $55,000. Insured.

Windsor, Ont.—The three-story building of the Studebaker Automobile Company on Chatham street, as well as the two-story structure owned by W. C. Kenney and C. S. King, and occupied by the Hydro-Electric Commission, have been heavily damaged by fire. Total loss estimated at $75,000.

MISCELLANEOUS.

Clarendon, Ont.—The station and agent's residence of the C.P.R., which was recently destroyed by fire, is shortly to be rebuilt.

Hamilton, Ont.—Tenders will be received by the Board of Control until January 21, for supplying asphalt cement and refined asphalt for the year ending 1919.

Niagara Falls, Ont.—The Ontario Hydro-Electric Commission has awarded the contract for the construction of a thirteen and one-half foot flume in connection with the development of an additional 50,000 horse power at the Ontario Power Company's plant. Turbines and generators will be installed.

Shelburne, Ont.—The Shelburne Agricultural Society is contemplating the erection of an exhibit building 50 x 32 feet. The town and municipality will be asked to bear part of the necessary expense.

Toronto, Ont.—The Loew Syndicate, head office, New York City, is contemplating the erection of a theatre on Bloor street near Yonge, to cost $200,000. Building operations will likely be started during the present year.

Toronto, Ont.—The Trustees of the Board of Education are again discussing the need of additional school accommodation. Nothing has been decided on, but it is likely that this subject will receive further consideration in the near future.

RESIDENCES.

Hamilton, Ont.—The following contracts have been awarded for the erection of a two-story brick building on Main street east for Miss Gage, 1045 Wellington street east: General contractor, Mitchell & Riddell, 45 Head street; carpenter, L. J. Beatty, 175 Emerald street north. Cost $12,000. G. J. Hutton, Bank of Hamilton Bldg., is the architect.

London, Ont.—G. A. Wardell, 5 Rector street, is erecting a two-story frame residence on Delaware avenue. To cost $3,000.

Niagara Falls, Ont.—Work has started on a $10,000 residence to be erected at the corner of McRae and Victoria avenues for Arthur Buckley, Welland avenue: General contractor, G. A. Dingwall, 133 Wilmot street; painting and glazing, Wm. Mullen, 322 Victoria avenue; heating, Payne & Nesbit, 122 Main street. C. M. Borter, Main street, is the architect.

Niagara Falls, Ont.—Work has started on the erection of a brick and frame residence for Geo. Jackson, Third avenue: General contractor, G. A. Dingwall, 133 Wilmot street; painting and glazing, Wm. Mullen, Victoria avenue; electric wiring, Carter Electric Company, Geary avenue; heating and plumbing, W. J. Crawford, Buckley avenue. Cost $10,000.

Niagara Falls, Ont.—The following contracts have been awarded in connection with the erection of a brick residence to cost $12,000, at the corner of Victoria avenue and Stanford street, for Daniel O'Donnell, McRae street: General contractor, Wm. Harry, Second avenue; carpenter, G. A. Dingwall, 133 Wilmot street; painting and glazing, Wm. Mullen, Victoria avenue; electric wiring, Carter Electric Company, Geary avenue.

Ottawa, Ont.—M. C. Neate, Rockcliffe, Ottawa, will erect a row of six houses of brick veneer and stucco construction on Joy avenue. Total cost $4,800.

Renfrew, Ont.—Wilfred Bolam will erect two brick veneer houses on Jennette street. Cost $5,000.

Renfrew, Ont.—Felex Lidtky will erect a two-story bungalow, 24 x 26, of brick construction, on Parry Sound street. Cost $3,000.

Renfrew, Ont.—Work is in progress on a three-story brick residence for Wm. Howard, in the Plaunt Park subdivision. Brick veneer, frame construction, hot air heating. Cost $2,000.

Toronto, Ont.—Plans have been completed for a two-story brick residence to be erected by S. B. Green, 40 Woodside avenue. Owner is the general contractor. Cost $3,500.

Toronto, Ont.—Tenders have been received by Architects Gordon & Helliwell, Confederation Life Building, for a two-story brick residence on Mount Clair avenue. Cost $4,000.

Toronto, Ont.—Plans have been completed for two brick houses to be built on Gothic avenue, near Quebec avenue, for Lowery & McIlroy, 105 Clendennan avenue. Hot water heating will be installed. Cost $6,000.

Toronto, Ont.—H. A. Johnston, 84 Normandy Boulevard, has the general contract for the erection of a two-story brick residence on Kingswood road, for Wm. Barber, 106 Roncesvalles avenue. Cost $3,500.

Toronto, Ont.—Plans have been completed for a two-story brick residence to be built on Gillard avenue, near Danforth avenue, for C. S. Lucas, 2 Lipton avenue. Owner is general contractor. Cost $3,000.

Toronto, Ont.—Excavating tenders have been received in connection with three houses to be built by Wm. Gordon, 36 North Shaw street. The structures will be brick, and modernly equipped. Cost $3,000 each.

"TILE CRAFT."

Some very interesting suggestions as to the use of tile construction are contained in the December bulletin issued by the Associated Tile Manufacturers, Beaver Falls, Pa. The bulletin contains a series of short contributions by men who represent firms specializing in the production of tile, and are presented so as to make each subject of interest to the reader. There is also a cash prize offer by the company for photographs of tile work; as well as a list of the various firms producing faience, porcelain and tile who are members of the Associated Tile Manufacturers' organization.

"DIFFUSELITE" BLINDS.

The J. G. Wilson Corporation, 8 West Fortieth street, New York City, claim that their "Diffuselite" blinds mark an advance in mechanism and construction over the formerly used Venetian blind. In a series of bulletins issued by this company the statement is made that "Diffuselite" blinds are readily installed, do not easily get out of order, do not block air and light, and are comparatively inexpensive.

The attempt to find a method of painting blinds which would partially absorb and diffuse the rays of light resulted in the manufacture also by this corporation of their own special makes of white and green colors. Their claims would seem to deserve investigation.

"STEAM CONDENSATION."

The above is the title of a fifty-page booklet written by Wm. H. Rose, Consulting Engineer, and issued by Geo. W. Cole, Ltd, 838 Dundas st., Toronto, and is replete with valuable information in reference to this subject. The text explains what steam condensation is, and the correct methods of handling and utilizing same—showing that to allow the natural law to have full sway, the difficulties met with may be easily remedied. The booklet is in the nature of a treatise reaching too high a plane to be confounded with anything in the way of a trade catalogue. It is issued by the above concern in an endeavor to answer the question: "Does the Steam Cost Too Much," and is written in a manner which avoids unnecessary use of technical terms, so that anyone can understand from reading the book whether fuel losses are due to ignorance or carelessness, and how these losses may be located and recovered. The booklet is of interest to architects, engineers, and steam plant owners, and a copy will be sent to anyone desiring same on application to the above firm.

CEMENT COATINGS.

In an attempt to overcome certain difficulties attending cement construction, the firm of Wadsworth, Howland & Company, Inc., Boston, Mass., have brought forward a new product.

The use of concrete they claim has been subject to two serious drawbacks—a tendency to absorb moisture, and an unattractive, monotonous color. Experiments have convinced this firm that the only solution of the problem is through the use of a waterproof coating which not only does away with the difficulties, but aslo serves to prevent the cement from disintegrating. Sixteen years' use of the "Bay State Brick and Cement Coating" has attested its merits, its manufacturers claim. In a booklet issued by this company detailed information is given in regard to their product, and also a list of buildings where it has been used with apparent satisfaction.

Wadsworth, Howland & Company manufacture also a cement floor coating and two grades of enamel finishes.

IN A PASEDENA GARDEN, CALIFORNIA.

CATALOGUES and BOOKLETS

Sanitary Metal Specialties.—Messrs. Drummond-Reeves, Ltd., Mail Building, Toronto, successors to the Black Building Supply Company, are handling the complete line of sanitary metal specialties manufactured by the Knapp Bros. Manufacturing Co., of Chicago, Ill. These include sanitary metal cove base and attachments, base grounds, picture moulds, feather edge and bull-nose corner beads, metal cove grounds for internal plaster corners, Thomas flush door casing, stiffened steel studs, metal chair rails, etc. A catalogue illustrating and describing the above lines will be sent upon request to architects and interested parties.

Specifications of Paint and Paint Materials.—Complete information on the specification of paint and paint materials for manufacturing plants, storage buildings and power houses, is contained in a booklet issued by the Detroit Graphite Company, Detroit, Mich. The data covers maintenance of concrete and wooden floors and walls, ceilings, roofs, and exterior walls, structural steel, iron work, piping covered and uncovered, galvanized surfaces, steel or wood tanks, boilers and machinery and radiators. Photographic illustrations and color charts are distributed throughout the text. A convenient feature of the publication is the alternate blank pages left for the making of notes on the various questions treated in the reading matter.

Largest Dye Plant in America.—A large bird's-eye view of the works of the National Aniline & Chemical Company, at Buffalo, N.Y., is illustrated in an attractive folder which is being sent out by the Barrett Manufacturing Company. This plant, which is the largest dye works in America, comprises a group of buildings giving twenty acres of floor space, all of which are covered with Barrett Specification roofs and protected by the company's twenty-year guarantee. There are 201,300 square feet of this particular roofing used on this one job alone, and it represents one of the many important recent contracts carried out according to the Barrett Specification. The folder itself is a splendid artistic achievement, being printed in blue, black and white on a grey tinted background, and with convincing text; and full credit is certainly due to whoever is responsible for the layout and copy.

Window Hardware.—A thirty-two page catalogue issued by the Russell & Irwin Mfg. Co., of New Britain, Conn., describes a most complete line of elevating sash fixtures, which are claimed to be the most effective devices made for vertically hung sash, opening in or out. These fixtures were formerly the product of the Taber Sash Fixture Company, Newark, N.J., but are now being manufactured exclusively by the above-named concern. They are said to have two great advantages over competitive lines in that sash equipped with these fixtures are (1) absolutely weatherproof, and (2) absolutely burglar proof, as the sash cannot be forced or jimmied from the outside. In addition to a large number of illustrations showing various attachments, there are also a number of full page details of sash construction, showing in a practical way the application of different fixtures to which the catalogue relates.

Ferro-Concrete.—Some very excellent suggestions, as well as much useful information on this subject is contained in a twelve-page booklet (magazine size) issued by Mouchell & Partners, of London and Paris, who are represented in Canada by Mr. F. G. Engholm, 304-5 Excelsior Life Bldg., Toronto. The object of the booklet is to call attention to the advantages of the Hennebique System of reinforced concrete, which has been quite universally employed throughout Great Britain and Continental Europe, and to a more limited extent in Canada, where it has only recently been introduced. It is claimed that over 35,000 structures have been designed and built according to this system in the past twenty-five years; and that during the ten years immediately preceding the war the number of undertakings thus erected averaged over 2,000 structures per annum. Recent Canadian examples in which the Hennebique System is used are the new Trust and Guarantee Building, and Masonic Temple, Toronto; several bridges on the Toronto & Hamilton Highway; a number of bridges for the City of Montreal; Birks Building, Vancouver; Vancouver Club; and a number of other structures in the Canadian West and Pacific Coast districts. A copy of this booklet is available to any interested party on application to Mr. Engholm at the above address.

CONTRACTORS and SUB-CONTRACTORS

As Supplied by The Architects of Buildings Featured in This Issue

The Robt. Simpson Company's Mail Order Building, Toronto.

Brick, Interprovincial Brick Co.
Boilers, Kewanee Boiler Co.
Carpets, Rugs and Linoleum, Robt. Simpson Co.
Casements and Window Construction, Henry Hope & Son.
Clocks, International Business Machines, Ltd.
Chimneys, Toronto Iron Works, Ltd.
Cement, Canada Cement Co.
Crane, Thomas Elevator Co.
Electric Fixtures, Robt. Simpson Co.
Electric Wiring and Apparatus, Bennett & Wright.
Elevators and Hoists, Otis-Fensom Elevator Co.
Fire Alarm System, Purdy-Mansell, Ltd.
Fire Doors, A. B. Ormsby, Ltd.
Fire Escapes, Canadian Ornamental Iron Co.
Fire Hose (fittings), Wilson-Cousins Co.
Flooring, Laidlaw Lumber Co.
General Contractors, Wells Bros. Co. of Canada, Ltd.
Glass, Imperial Glass Co.
Hardware, Vokes Hardware Co.; Aikenhead Hardware Co.
Heat Regulators, Webster Thermostatic Valves.
Hollow Tile, Don Valley Brick Works.
Interior Woodwork and Decoration, R. Laidlaw Lumber Co.
Inter-phone System, Bell Telephone Co.
Kitchen Equipment, Gurney Foundry Co.
Lockers, Durand Steel & Locker Co.
Marble, Canadian Marble & Tile, Ltd.
Oil Feed, Fess Oil Burners of Canada, Ltd.
Ornamental Iron, Canadian Ornamental Iron Co.
Painting, F. G. Roberts Co.
Plaster Work, A. D. Grant.
Plumbing, Purdy-Mansell, Ltd.
Radiators, Dominion Radiator Co.
Refrigeration, Canadian H. W. Johns-Manville Co.
Refrigeration Equipment, Canadian Ice Machine Co.
Refrigerator, John Hillock & Son.
Reinforcing Steel, Burlington Steel Co.; Trussed Concrete Steel Co.
Roofing, Canadian H. W. Johns-Manville Co.
Sand and Gravel, Rogers Supply Co.
Scales, Canadian Fairbanks-Morse Co.
Spiral Chute, Canadian Matthews Gravity Carrier Co., Ltd.
Sprinkler Equipment, Purdy-Mansell, Ltd.
Structural Iron and Steel, Reid & Brown.
Tanks, Chicago Bridge & Iron Co.
Vaults, J. & J. Taylor.
Ventilating System, Canadian Sirocco Co.
Water Tank, Toronto Iron Works Co.

Goodyear Tire & Rubber Company's Factory, New Toronto.

Air Compressors, Laidlaw Dunn Gordon Co.
Boiler Feed Pump, Epping Carpenter Pump Co.
Boilers, International Engineering Co.
Brick, Ontario Brick Co.
Cement, Rogers Supply Co.
Chimneys, Custodis Canadian Chimney Co.
Clocks, International Business Machines, Ltd.
Concrete Work, Dominion Construction Co.
Crane, Northern Crane Works.
Electric Wiring and Apparatus, Geo. J. Beattie Co.
Elevators, Otis-Fensom Elevator Co.
Fire Doors, A. B. Ormsby Co.
Fire Hose, Goodyear Tire & Rubber Co.
Fire Pump, Blake Knowles Co.
Floor Covering (mastic), Construction Supply Co.
Floor Covering (wood block), Creosoted Block Paving Co.
General Contractors, Dominion Construction Co.
Glass, Pilkington Bros.
Heat Regulating System, C. A. Dunham Co., Ltd.
Inter-phone System, Bell Telephone Co.
Metal Sash, Steel & Radiation Co.
Paints, Sherwin Williams Co.; Glidden Varnish Co.
Plumbing Contractors, Keiths, Ltd.
Plumbing Fixtures, J. L. Mott & Sons.
Motors, Canadian Westinghouse Co., Ltd.
Radiators, Dominion Radiator Co.; Steel & Radiation, Ltd.
Reinforcing Steel, Burlington Steel Co.
Scales, H. G. Vogel Co.
Stokers, American Engineering Co.
Stone, John Vokes.
Structural Iron and Steel, McGregor & McIntyre Co.
Vacuum Traps, C. A. Dunham Co., Ltd.
Water Tank, Chicago Bridge & Iron Co.
Water Heater, Hopper Heater Co.

Canada Cycle & Motor Company's Factory, Weston, Ont.

Boiler Feed Pump, Bawden Machine Co.
Boilers, John Inglis Co.
Brick, Port Credit Brick Co.
Chimneys, Canadian Custodis Chimney Co.
Contractors, Deakin Construction Co.
Dry Kilns, Clark Machinery Co.
Electric Wiring and Apparatus, Toronto Electric Light Co.
Elevators and Hoists, Turnbull Elevator Co.
Enameling Ovens, Brantford Oven & Rack Co.
Expanded Metal, Pedlar People, Ltd.
Feed Water Heater, Canadian Allis-Chalmers Co.
Fire Doors, A. B. Ormsby Co.
Fire Pumps, Canadian Allis-Chalmers.
Hollow Tile, Canadian National Fireproofing Co.
Plaster Work, General Contractors.
Plumbing, Drake & Avery.
Radiators, Dominion Radiator Co.
Roofing, Canadian H. W. Johns-Manville Co.
Shavings Exhaust System, Sheldons, Ltd.
Sprinkler Equipment, Adam Clarke.
Steel Sash, A. B. Ormsby Co.
Stone, Scott Bros.
Structural Iron and Steel, McGregor & McIntyre Co.
Vacuum Pump, C. A. Dunham Co.
Ventilating System, Canadian Blower & Forge Co.
Varnish, Glidden Varnish Co.
Vaults, J. & J. Taylor.

Crompton Corset Company's Building, Toronto.

Boilers, Spencer Heater Co. of Canada.
Brick, John Price Co.
Casements and Window Construction, Doors and Window Trim, Douglas Bros., Ltd.
Electric Fixtures, Canadian Electric Fixture & Contracting Co.
Elevators and Hoists, Turnbull Elevator Co.
Expanded Metel, Douglas Bros., Ltd.
Fire Alarm System, Dominion Messenger & Signal Co.
Flooring, J. C. Scott Co., Ltd.
Inter-phone System, Northern Electric Co.
Painting, A. E. Phillips.
Plumbing, A. Welch & Sons
Plumbing Fixtures, Jas. Robertson Co.
Radiators, Dominion Radiator Co.
Roofing (felt and gravel), Douglas Bros, Ltd.
Sprinkler Equipment, Purdy-Mansell, Ltd.
Vaults, Goldie & McCulloch.
Water Tank, J. C. Scott Co., Ltd.

Ladies' Wear Building, Toronto.

Boilers, Spencer Heater Co.
Brick (common), Ontario National Brick Co., Ltd.
Brick (pressed), Don Valley Brick Co.
Galvanized Iron Work, Feather & Roadhouse.
Concrete Work, Walter Davidson & Co., Ltd.
Elevators and Hoists, Otis-Fensom Elevator Co.
Fire Doors, Feather & Roadhouse.
General Contractors, Walter Davidson & Co., Ltd.
Glass, Fred J. Cox.
Hardware, Canada Hardware, Ltd.
Marble, Canada Glass Mantels & Tiles, Ltd.
Metal Sash, Steel & Radiation, Ltd.
Painting and Glazing, Fred J. Cox.
Plumbing, F. R. Maxwell & Co.
Roofing (felt and gravel), Cruise Bros.
Sprinkler Equipment, General Fire Equipment Co.
Stone (artificial), Artificial Stone Co.
Structural Steel, Hepburn & Disher, Ltd.
Tile, Canada Glass Mantels & Tile Co.
Vault doors, J. & J. Taylor.

RUSSIAN ECCLESIASTICAL ARCHITECTURE OF FOUR CENTURIES.

If architecture is the reflection of civilization in stone, Russian architecture should enable us better to realize the gulf which lies between Russia and the peoples of the West. The earlier foreign influence affecting the area now known as European Russia was that of Byzantium, and the first Russian churches are very crude variants of the churches of the Eastern Empire. Even these show an enormous modification of type, the low, wide-spreading Byzantine dome, often covered by a flat roof of tiles, becoming transformed into a series of low, towerlike forms frequently surmounted by semi-bulbous domes, the whole conveying an impression of the East absent from the work of the prototype. The old churches of Russia must possess undoubted picturesque quality and antiquarian value, but from all we have seen must be almost wanting in architectural merit apart from their decoration in the form of painting and ornament. It is difficult to discover, even in these earlier and, we might say, better examples of Russian architecture, any sign of that so often strongly marked sense of architectural dignity which distinguishes so many of the buildings of the eleventh century in England and in Western Europe. The application of ornament, where it exists, appears to be more in the unmeaning and indiscriminate sense that we are used to in Hindu and Burmese buildings, and the thought and subtlety of Byzanine work are entirely wanting. Russia suffered, alone among European peoples, from a long period of Tartar rule, in which her people and the rulers of the various principalities were held in subjection by the Grand Khan. How far the result of this period of subjection has affected the character of a whole people it would be hard to say, but judging by contemporary architectural work, later Russian types in building appear to be increasingly Oriental in their character. Judging by the illustrations given in "L'Art et les Artistes," and the interesting article which accompanies them, by M. Louis Reau, the former Director of the French Academy of Petrograd, we should be justified in saying that Eastern influence had made a deep and wide impression on the character of Russian building. It is true that M. Reau emphasizes the argument that the later buildings, many of which were carried out in wood, are more typically Russian than the earlier and more Byzantine ones; a fact which does not militate against the impression that they are also far more Asiatic in type, and far more akin in form to the Dravadian buildings of Southern India, and what we know of Burmese and Siamese buildings, than to general European art. The Church of the Transfiguration at Ostrovo, and that of Vasili Blajennof at Moscow, both dating from the sixteenth century, have the characteristics we refer to, and both are built up of forms like the Dravadian temples, purely meant for purposes of external display, and both are distinguished by an absence of architectural dignity. They are, in fact, a crude jumble of incongruous forms. The Church of the Intercession of the Virgin, at Fili, near Moscow, is built of wood, and, like many of the Russian churches of later date, is placed on a raised terrace and approached by flights of steps. The retreating stages give it somewhat of a Chinese character, but the subtle artistic sense which runs through the buildings of China finds no echo in the monstruous mixture of forms, which is more like some structure hastily put together for exhibition purposes than a serious work of architecture.

From M. Reau's article we gather that the influence of the clergy was always directed towards the maintenance of the Byzantine type with five domes, but the natural taste of the Russians and the prevalence of wooden construction led to the adoption of a pyramidal type wherever it was possible. The most dignified of the buildings is the Kremlin at Rostov, where the long lines of plain walling relieve the effect of the heightened mass in the centre crowned by its five domes. The five fortified churches which surround the Palace of the Metropolitan are dedicated to the Resurrection, the Saviour, St. John the Evangelist, St. Gregory of Nazianze, and the Virgin Hodigitria of Smolensk. M. Reau claims, and we think fairly, for Russian art an individuality of its own which borrows little from Byzantium, and certainly nothing from Western Europe. Whether the originality of conception is a thing to be grateful for, or to regret, is another matter, but all who have any sense of the meaning of architectural style must feel that the people who found their natural expression in such forms are divided in many other ways from the customs and ideals familiar to us in the West. The little window looking on to Europe, which Peter the Great made when he founded the city which bears his name, was not a wide enough opening to effect a fundamental change in a country distinguished by the strongest individuality, and which, in spite of the enormous number of races which it contains, is probably more homogeneous in general character, from the Baltic to the Pacific, and from the Arctic Ocean to the borders of India, than any other great nation except that of America. The homogeneity has been shown in the past by the ease with which the Turcomans and other races have been assimilated; and whether the Russia of to-morrow is to remain one power or a group of states, it will probably always be a land apart from others, despite the veneer of modern buildings of a purely Western type built in its great centres of population.—'Builder.'

February, 1918 Volume XI, No. 2

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Full Page Illustrations

H. GAGNIER, Limited, Publishers

GRAPHIC ARTS BLDG., TORONTO, CANADA

BRANCH OFFICES

MONTREAL NEW YORK

NEW ALLEN THEATRE,
TORONTO.

VIEW OF FOYER.

C. HOWARD CRANE, ARCHITECT.
HYNES, FELDMAN & WATSON, ASSOCIATED.

The New Allen Theatre, Toronto

C. HOWARD CRANE, Architect
HYNES, FELDMAN & WATSON, Associated

IN describing the new Allen Theatre it is necessary to dwell a little on the why and wherefore of operating a modern motion picture theatre in order to intelligently present the reasons for the unusual plans and layout of this building.

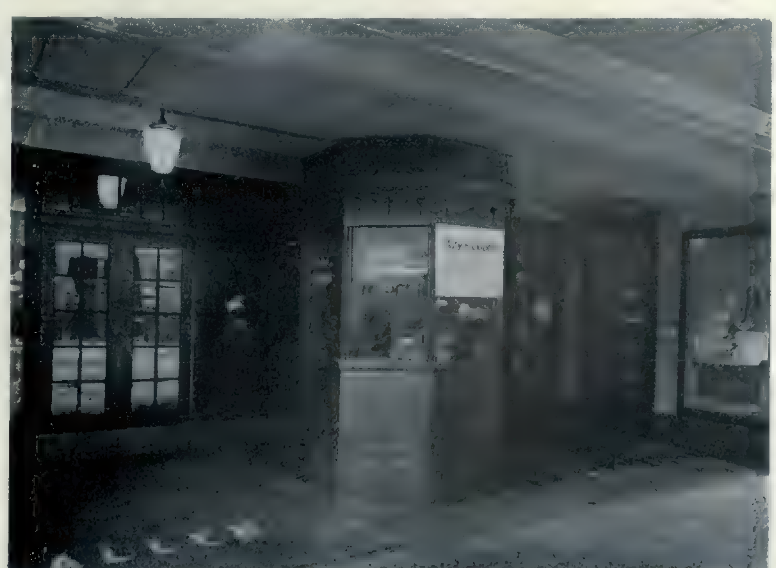
At the outset it can be said that this is a day of architectural specialties, and the planning of complicated buildings, such as theatres, has been taken up by certain architects as a separate branch of the profession, and every detail and angle entering into this type of building has been carefully studied out. In other words, experience is the best teacher, and it directs the architect through specialization in the development of each succeeding scheme of a particular class of building so as to obtain the best possible result. The success of a motion picture theatre depends, of course, on its location, the class of its attractions and the manner in which it is operated. Assuming that it is well located, and that it has the best attractions and is well managed, the fact that it is only fairly successful or entirely successful depends upon three things for which the architect is more or less responsible:

1. The essential of seeing that the rent expense is reduced to a minimum.

2. That as much seating capacity is obtained as possible.

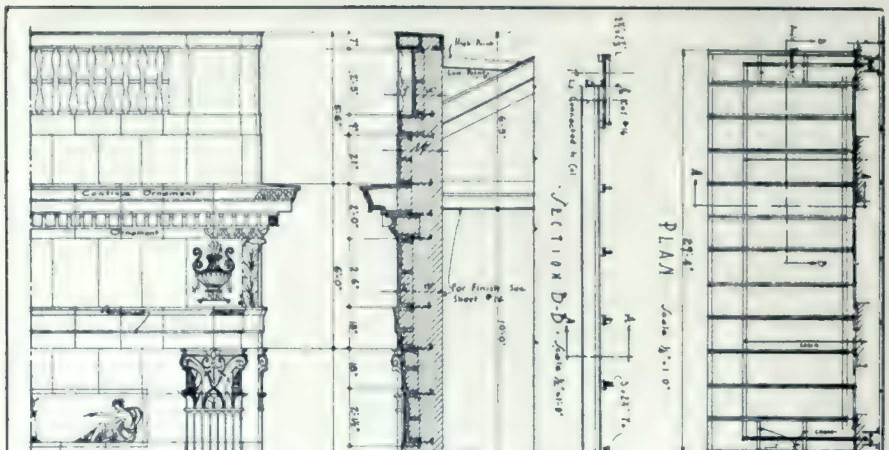
3. That the building is so planned that the smallest number of employees are needed, thus reducing the inevitable overhead.

Naturally the lease value or factor of rental for a piece of property such as a theatre is usually located on is extremely high. How to reduce this first big expense is to determine just how much space can be spared for stores and offices, which, of course, would be calculated to bring large returns, located as they would be adjacent to a theatre, bringing thousands of people to their doors each day. Arising at the



BOX OFFICE, NEW ALLEN THEATRE, TORONTO.

NEW ALLEN THEATRE, TORONTO.



DETAIL OF EXTERIOR, NEW ALLEN THEATRE, TORONTO.

same time is the question as to how much seating capacity the theatre is going to lose on account of this space being taken off. In the ordinary planned theatre the loss of this space would be fatal, in that it would offset the advantage in revenue which is otherwise derived.

Again, there is the question of balcony seats, which, it is claimed, in a moving picture theatre are never desirable. It is said to be the experience of most managers that it is difficult to get people to go up into a balcony. A great deal of space is also lost in the really valuable space of the first floor in order to provide proper foyers and stairways. In addition to these objections the matter of a balcony entails an expense out of proportion to the extra revenue that it would obtain. The theatre would, of course, have to be made much higher to accommodate it, thereby entailing an item of cost which, added to the actual cost of the balcony itself, would mean a considerable additional investment. The larger investment the larger the rent, and as the additional seats thus obtained would give very little extra accommodation, and as these seats would be the cheaper ones, the revenue thus derived would not justify the expenditure.

The new Allen Theatre is, therefore, interesting as a successful solution of this problem. The scheme involves a somewhat entirely new idea, and it represents the first building of its kind in Canada as regards certain features of design. The accompanying plans and sections show how seven good sized stores and several spacious offices have been obtained without the loss of a single square foot of seating capacity, at the same time giving a theatre that, for fineness of sight lines and proper acoustics, leaves little to be desired. It both meets the question of low rent and solves the problem of obtaining a large seating capacity.

VIEW SHOWING INCLINE OR RAMP, NEW ALLEN THEATRE, TORONTO.

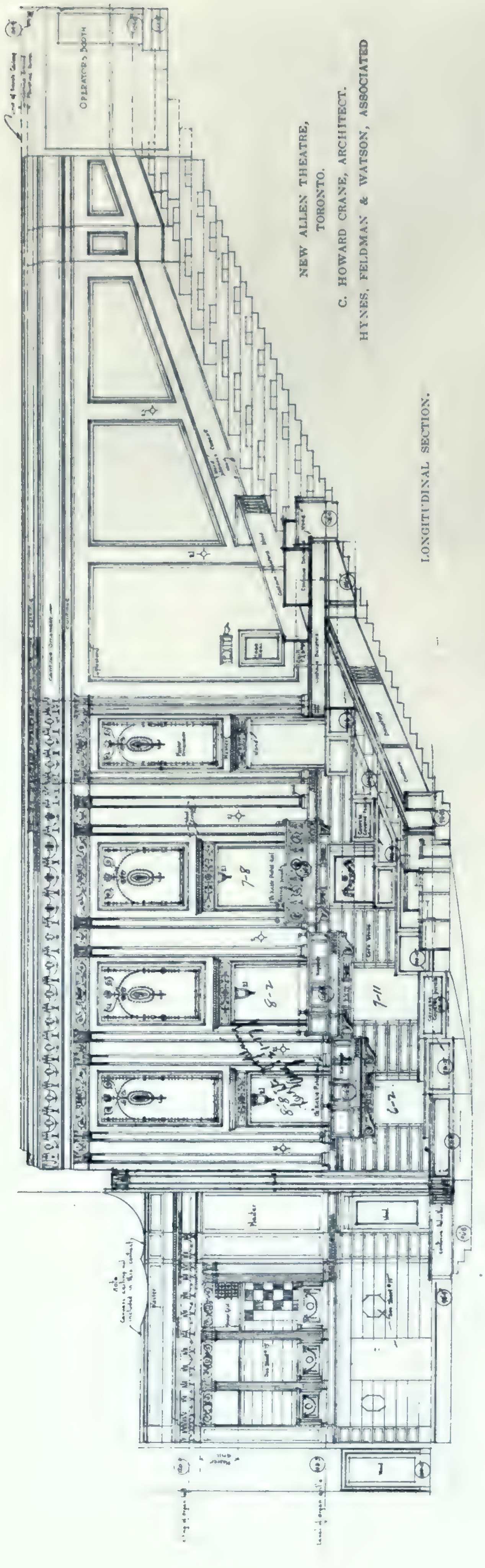
On entering the theatre you pass from the outer lobby into a spacious foyer off from which are ladies' and gentlemen's retiring rooms and toilets conveniently arranged, also check rooms and manager's office, while in the centre, directly opposite the entrance, is an attractive lounge, or "rendezvous," as it is called. This room is used by parties to meet in, or by people who wish to wait before entering the theatre, rather than to be seated while the feature picture is being shown. This space is luxuriously furnished, as is also the foyer, which gives additional space to patrons who are desirous of waiting for the beginning of a picture in case a film has already been partly run.

The furnishing of these rooms supplies no small part of the decorative scheme, and with such innovations as singing birds, beautiful plants and flowers, and the use of Oriental rugs, affords a charming, as well as a delightful approach to the auditorium itself. The entrance to the theatre proper from this foyer is obtained through archways into the lower portion, and by wide inclines on each side of the foyer to the upper portion. These four points of entrance lead to four separate and distinct portions of the auditorium, so that there is very little distance to be travelled by any one to reach a seat from any of these points. The confusion of people passing in and out constantly, as is usual in a theatre of this kind, is also reduced to a minimum by this arrangement.

The theatre itself is designed after the Adams style, which is very decorative, at the same time light and airy, and quite a change from the usual heavy, oppressive ornament that one is accustomed to see in buildings of this type. The amphitheatre arrangement of the seats gives an air of festiveness to the whole that is at once noticeable, as everyone is not only in fine view of the stage, but of each other as well.

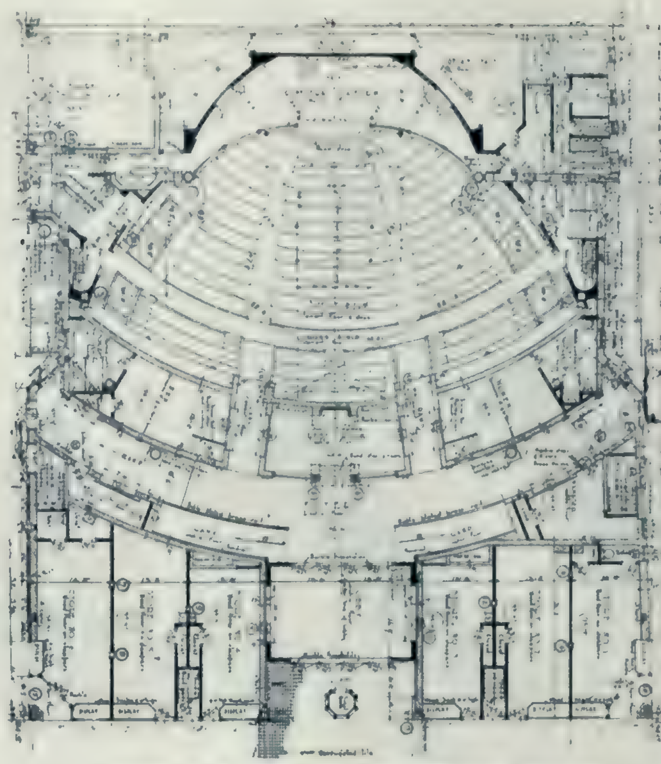
The arrangement of the boxes and the loges is attractively done, and the furnishings in these have been carried out in harmony with the balance of the theatre. Although this theatre was not designed for vaudeville or plays, it has been

LOUNGE, NEW ALLEN THEATRE, TORONTO.



NEW ALLEN THEATRE, TORONTO.
C. HOWARD CRANE, ARCHITECT.
HYNES, FELDMAN & WATSON, ASSOCIATED

LONGITUDINAL SECTION.



GROUND FLOOR PLAN, NEW ALLEN THEATRE, TORONTO.

built so that at any time it can easily be converted at very small expense. The future proscenium arch has been built in, as are also the back stage lofts and gridirons, and future dressing rooms. A stage setting of more or less permanent nature has been built on what would be the future stage, in such a way as to form a very attractive setting for the picture, and at the same time giving the theatre an appearance of greater size. Additional seats are also thus obtained, and the orchestra so placed that its presence is felt and appreciated more by the audience than were it to be placed in the usual orchestra pit. The decorative use of ferns and plants, and the terracing of the orchestra platform all tend to make this portion of the theatre extremely attractive.

One of the hardest things to accomplish in a modern motion picture theatre is the proper lighting of same; that is, to have at all times a sufficient amount of equal light all over the auditorium so that people can see their seats and walk about without groping, at the same time having the light so arranged that it does not affect the clearness of the picture. This has been very successfully accomplished in the Allen by a system of diffused lighting. That is, the light is diffused or directed in equal shafts in a downward direction in such a manner that no rays of light come in contact with the picture screen. This downward light illuminates perfectly the aisles and seats, and at the same time gives a warm, even glow over the entire auditorium.

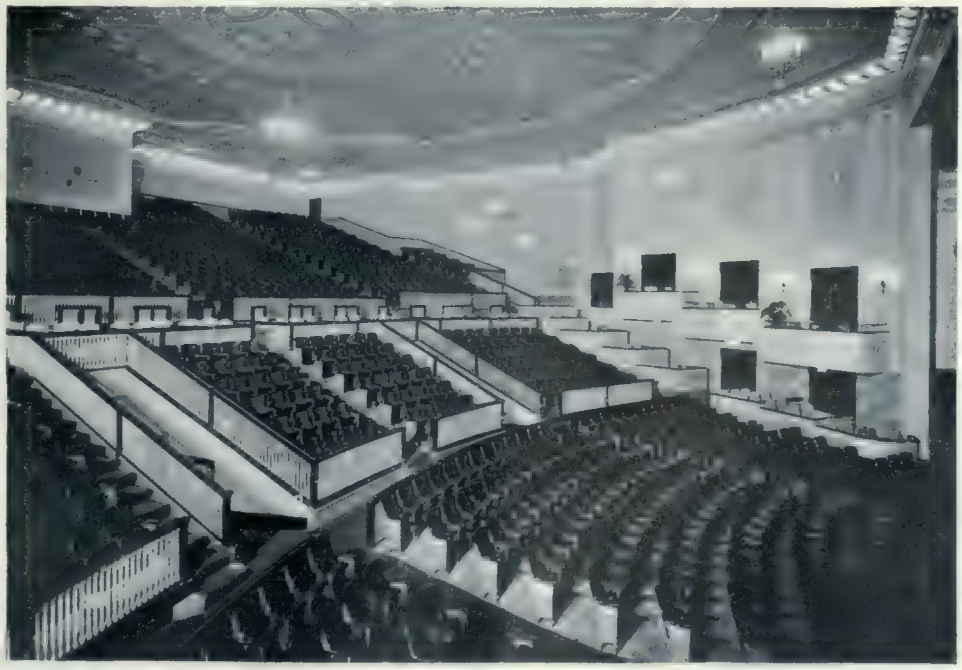
Great care and study was also given the problem of heating and ventilating. A theatre used as constantly as this type must be well

AUDITORIUM, TOWARDS STAGE, NEW ALLEN THEATRE, TORONTO.

ventilated. Ordinarily an audience in a poorly ventilated auditorium becomes so affected with the impure air as to become heavy and hard to amuse or interest, with the result that business is finally bound to suffer. It is not necessary to mention how important to the success of a theatre it is to have it properly ventilated, and especially cool, during the hot summer days. The best possible washed air system has been installed. One thing that a good washed air system of ventilating does for a theatre is that it keeps the draperies and decorating in a better condition, as all of the dirt and impurities are removed from the air before entering into the auditorium.

There are a great many other details that entered into the general scheme of things in the laying out of this successful theatre—comfortable seats, well spaced, proper exits and wide aisles, but it is also the little conveniences, like telephones, check rooms and clever furnishings which impress the patrons and give an air of coziness to the place. In a word, all of these things have been thought of and embodied in the Allen, to a degree which not only makes it the last word in the development of the modern motion picture playhouse, but which is bound as well to attract patronage to its doors.

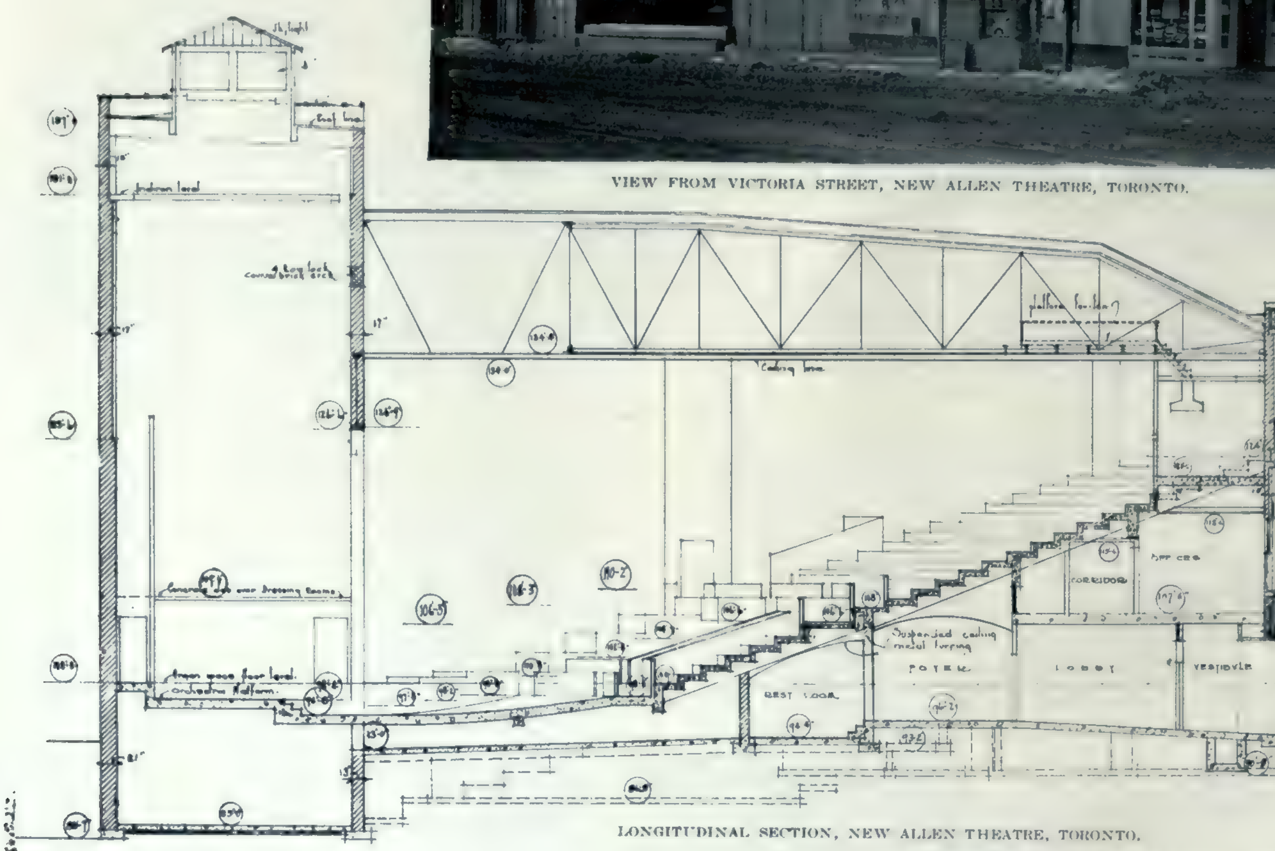
The use of old tracings for bandages has proved so successful that the Red Cross has



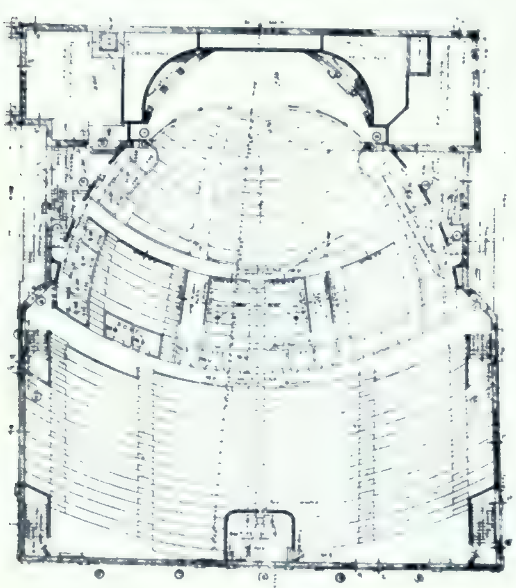
AUDITORIUM, UPPER SEATING, NEW ALLEN THEATRE, TORONTO.

asked its 3,000 chapters throughout the United States to co-operate in the work. Tracing cloth is a very fine quality of linen, and is easily made available for bandages by putting it through a laundry. Business concerns with drafting offices are asked to gather up their discarded tracings and send them to the nearest Red Cross branch. It is one of the new and economic uses which the war teaches.

VIEW FROM VICTORIA STREET, NEW ALLEN THEATRE, TORONTO.



LONGITUDINAL SECTION, NEW ALLEN THEATRE, TORONTO.

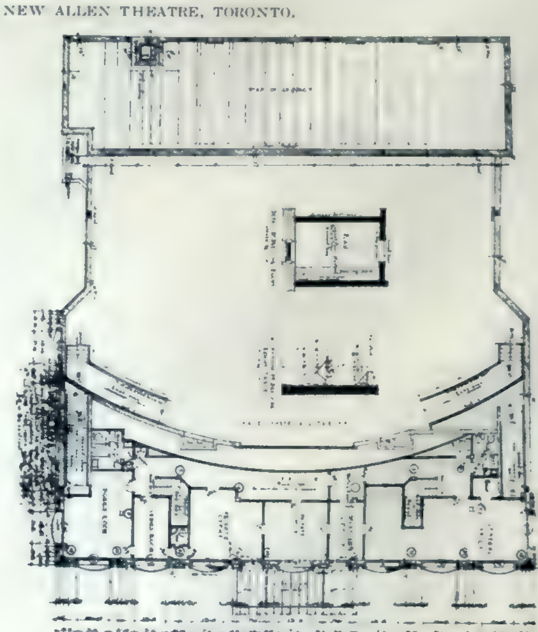


SEATING PLAN.

NEW ALLEN THEATRE, TORONTO.

C. HOWARD CRANE, ARCHITECT.

HYNES, FELDMAN & WATSON, ASSOCIATED.



SECOND FLOOR PLAN.

Loew's Theatre, Montreal

THOMAS W. LAMB, Architect

LOEW'S THEATRE, MONTREAL.

THE several theatres erected on the Marcus Loew circuit in Canada involve a feature of plan which is calculated to realize for the owner the very highest value on the basis of investment. The policy is to build a considerable distance back from the street from which the theatre is entered, with an entrance lobby or passage extending through to the auditorium. The advantage is that an extensive frontage of highly taxable property is avoided, while at the same time direct accessible means are obtained at a central down-town or retail shopping point. Moreover, this arrangement further solves the problem, owing to the limited frontage required, of securing a desirable location in a section where, even at a high offer for property, sufficient ground space for a site directly at the street line, would be difficult to obtain.

The new playhouse of the Loew Syndicate recently opened at Montreal is typical of the scheme usually adopted, having its main entrance on St. Catherine street, with an additional entrance on Mansfield street, and covering an area of over twenty-three thousand square feet. Under the circumstances mentioned, the plan dictates a condition which to an extent subordinates the exterior in the general architectural scheme; but this is done without in any way obscuring the character or purpose of the building.

From the main entrance one enters the lobby vestibule, passing through the outer lobby into the inner lobby, which serves to give an attractive introduction to the interior of the house. The walls are of Botticino marble, flanked with stately pilasters and enriched by two mural paintings. An illuminated central dome and vaulted ceiling springing from an enriched plaster cornice, and done in harmonizing colors, contributes to the splendid general decorative effect. Ascending the stairs of the main lobby, one enters upon an elliptical mezzanine promenade, from which a grand staircase of rich marble leads to the orchestra floor promenade below. The promenade is also accessible from the Mansfield street entrance by passing through the lobby, inner lobby and foyer at this level, where the ladies' rest room and gentlemen's smoking room are also to be found, and which forms a scheme that has been carefully considered to provide luxurious surroundings with every degree of comfort and convenience.

The auditorium proper is rich in its decorative character, showing a clear handling of the Adam style of architecture, and giving to the whole an atmosphere of dignity and refinement; the ornament of the ceiling being so arranged and designed in conjunction with the system of indirect lighting as to unite in producing both an aesthetic and practical result. Accommodation is provided in the orchestra for sixteen hundred people, and approximately fifteen hundred more can be taken care of in the balcony above.

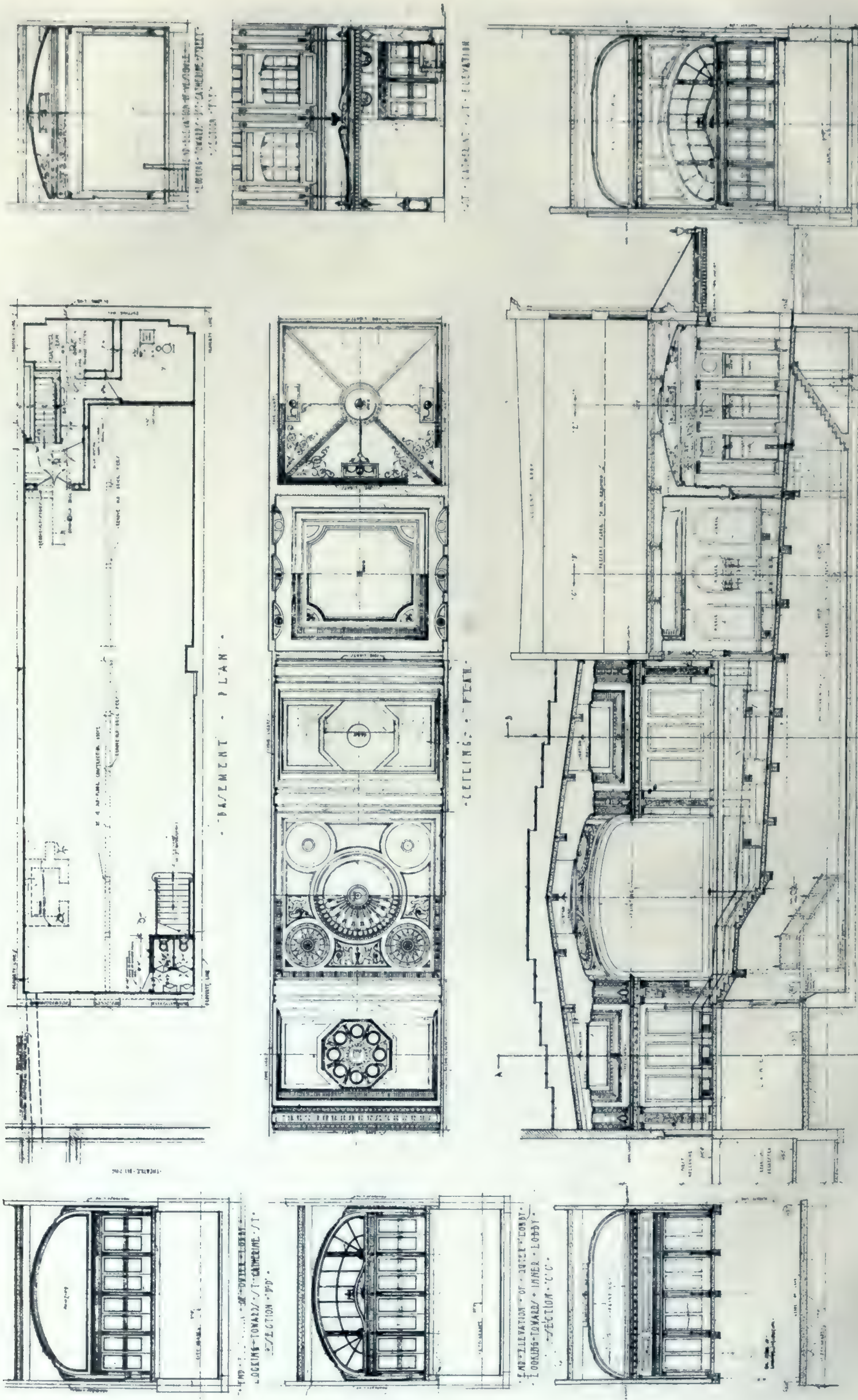
ENTRANCE, LOEW'S THEATRE, MONTREAL.

LOEW'S THEATRE, MONTREAL. DETAIL OF BOXES. THOMAS W. LAMB, ARCHITECT.

MEZZANINE PROMENADE, LOEW'S THEATRE, MONTREAL.

The mechanical equipment of the building includes the most approved appliances, and every device of this character which might add to the comfort of the patrons has been installed. The

GRAND STAIRCASE, LOEW'S THEATRE, MONTREAL. THOMAS W. LAMB, ARCHITECT.

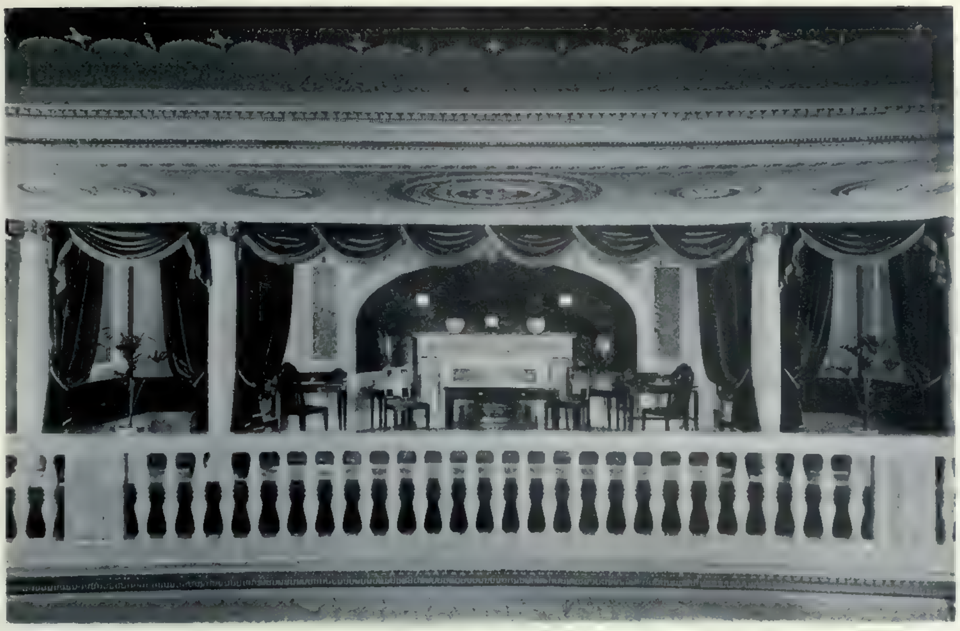


SECTION OF LOBBY AND ST. CATHERINE STREET ENTRANCE.

LOEW'S THEATRE, MONTREAL.

THOMAS W. LAMB, ARCHITECT.

temperature of the building during the summer months is regulated by means of an up-to-date cooling plant, while a modern heating and ventilating system warm the structure when necessary, and furnishes a continuous supply of freshly washed and tempered air to all parts of the auditorium.



REST ROOM, MEZZANINE PROMENADE, LOEW'S THEATRE, MONTREAL.

Scenery and Stage Decoration

Scene painting as we know it is the youngest of the arts. During the two hundred years or so that it has been practised, nine-tenths of it has been purely pictorial. Without, therefore, discussing the pros and cons of purely decorative and symbolic settings, I propose to consider certain phases of pictorial composition as applied to scenic design, my aim being to try to make it clear that the traditions that have developed during the past two centuries are so fundamentally applicable to the problems of to-day as to render it unnecessary and highly undesirable that they should be supplanted by a new set. A study of the various collections of paintings which include French and Italian works of the seventeenth and eighteenth centuries reveals a new point of view, particularly noticeable in France in the work of Claude, Watteau, and Hubert Robert, and in Italy in that of Pannini, Ghisolfi, Maglinolo, Carlevaris, Canali, Visentini, and, perhaps greatest of all in the dramatic power of his composition, Piranesi.

ENTRANCE LOBBY, LOEW'S THEATRE, MONTREAL.

In the works of these masters the picture has become a tableau. The frame is a proscenium through which we look out into a stage setting, theatrically arranged and readjusted in all its parts. The reduction of the relative size of the frame to secure the predominance of the important actors, groups, or objects (one of the most familiar expedients of the painter, both past and present), is no longer resorted to. The human figure is kept small in scale as compared with the total area of the picture, emphasis being secured by carefully arranged areas of illumination, and sometimes by violent contrasts of light and shade. So much emphasis has been laid upon the idea that these features of the later renaissance indicate artificiality and decadence that one is apt to overlook the fact that they also indicate a development of dramatic consciousness under which not merely persons, but trees and

DETAIL OF CEILING, LOEW'S THEATRE, MONTREAL.

are well worth the labor of picking up, piecing together, and going on with. Although the qualities which gave distinction to these "old masters" of scene painting have almost disappeared from scene painting, they are still present in many interesting and varied forms in modern pictorial art. The works of Corot, Boecklin, Gaston La Touche, Rene Menard, and Frank Brangwyn, would furnish inspiration for a whole generation of scene painters, whether in the field of poetic fantasy, vivid impressionism, atmospheric mystery, weird and somber imagery, gracious pastoral simplicity, or vigorous emphasis of reality. If the modern designer can arrive at a definite conviction as to the sentiment to be expressed in a given work, there is no lack of precedents and traditions as to how to achieve the thing he is seeking.

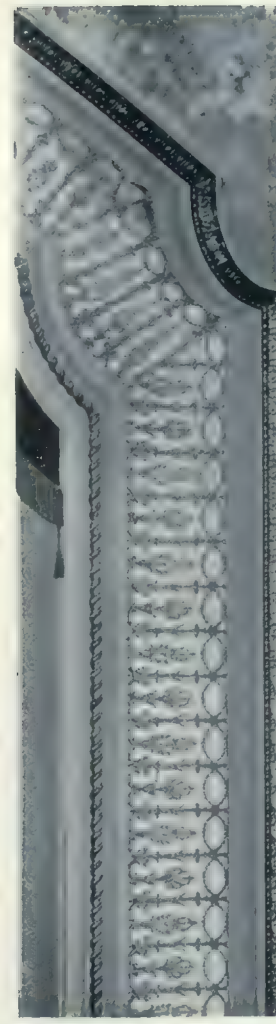
rocks, architecture and sculpture, mountains and rivers, valleys and lakes, were all brought into a studied relation, unreal and theatrical, if you like, but thoroughly in harmony with the theme, beautifully and sympathetically rendered and containing the elements that make for style in decorative art.

Certain of the works of these men who seem to me to have been in great measure the originators of the traditions which, even though they have come down to us in sadly mutilated form,

If scenic design were a matter of composing a single tableau, many of its difficulties would disappear, but a play, and often a single act of a play, is a succession of changing tableaux, some of them formal, static and climacteric,

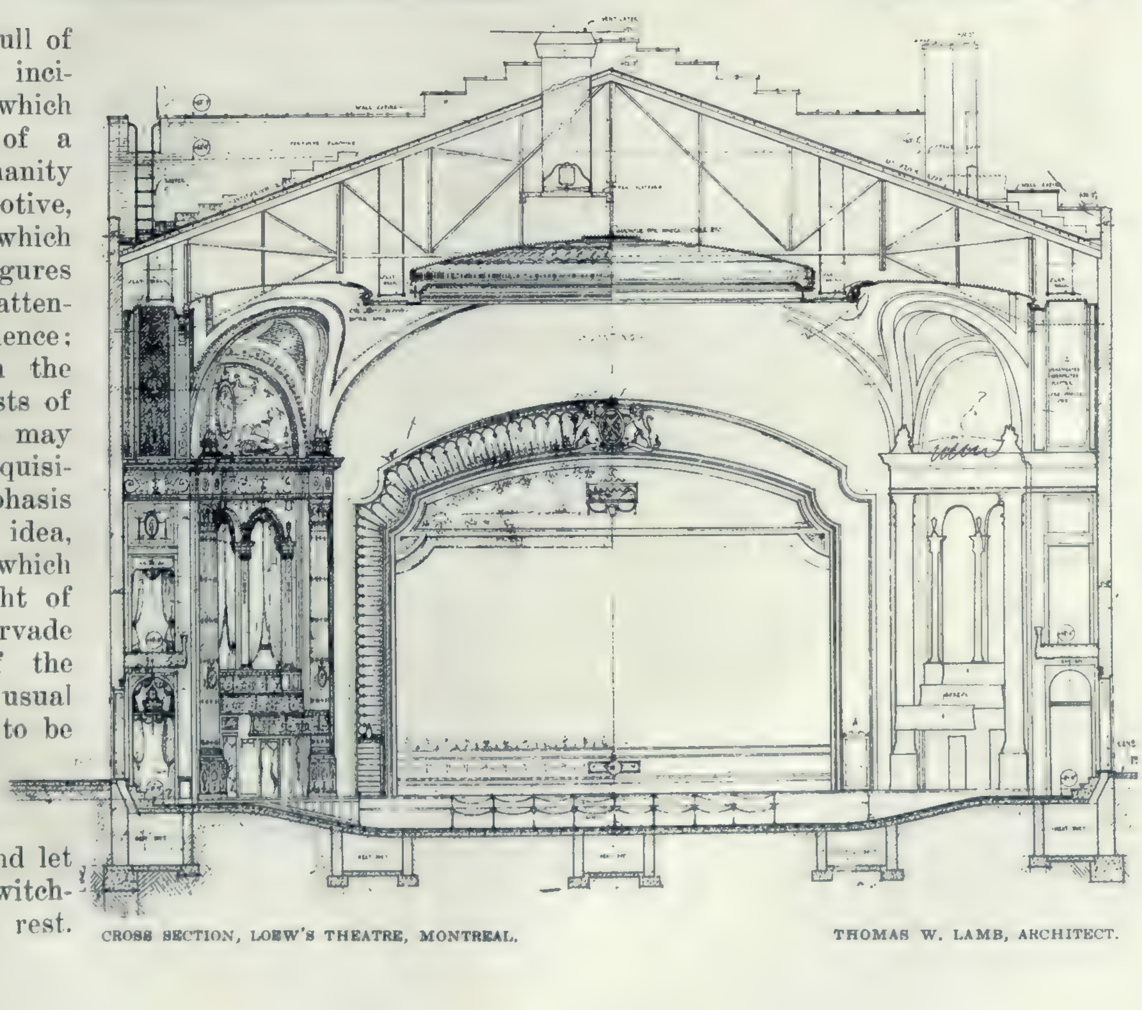
AUDITORIUM, LOEW'S THEATRE, MONTREAL. THOMAS W. LAMB, ARCHITECT.

VIEW TOWARDS STAGE, LOEW'S THEATRE, MONTREAL.



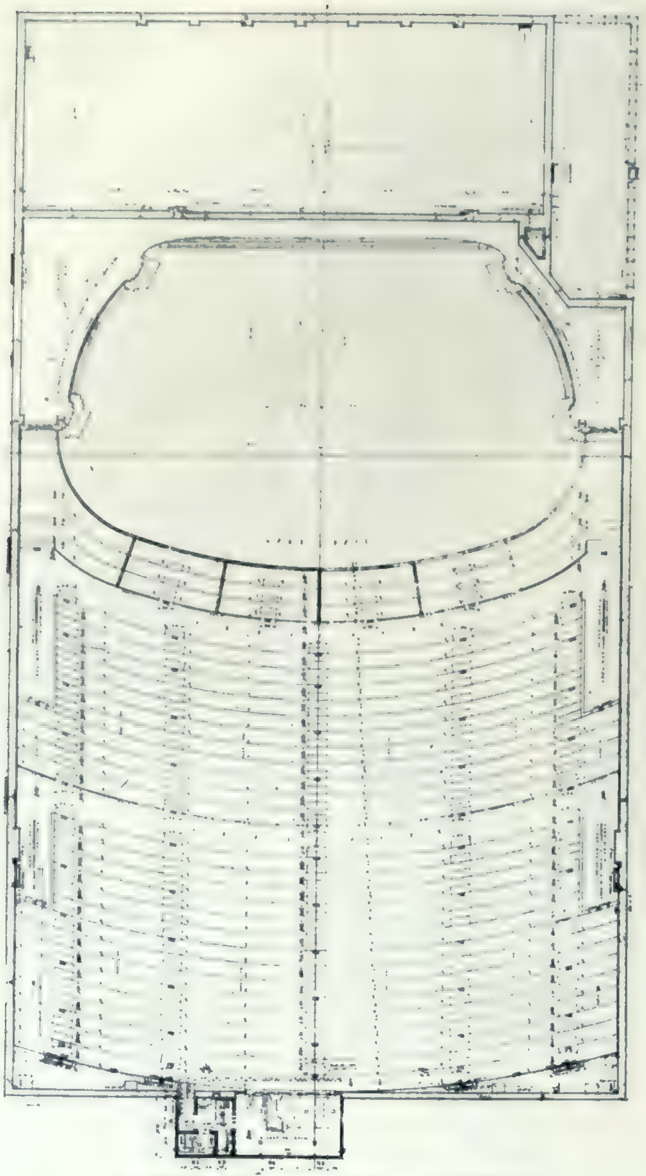
DETAIL OF PROSCENIUM.

others casual, full of movement, and incidental; some in which the grouping of a crowd of humanity supplies the motive, and some in which one or two figures must usurp the attention of the audience; some in which the greatest contrasts of light and shade may be called into requisition for the emphasis of the dramatic idea, and some in which the common light of day must pervade every part of the scene. The usual practice seems to be to design the scene for its most important moment, and let the man at the switchboard do the rest.

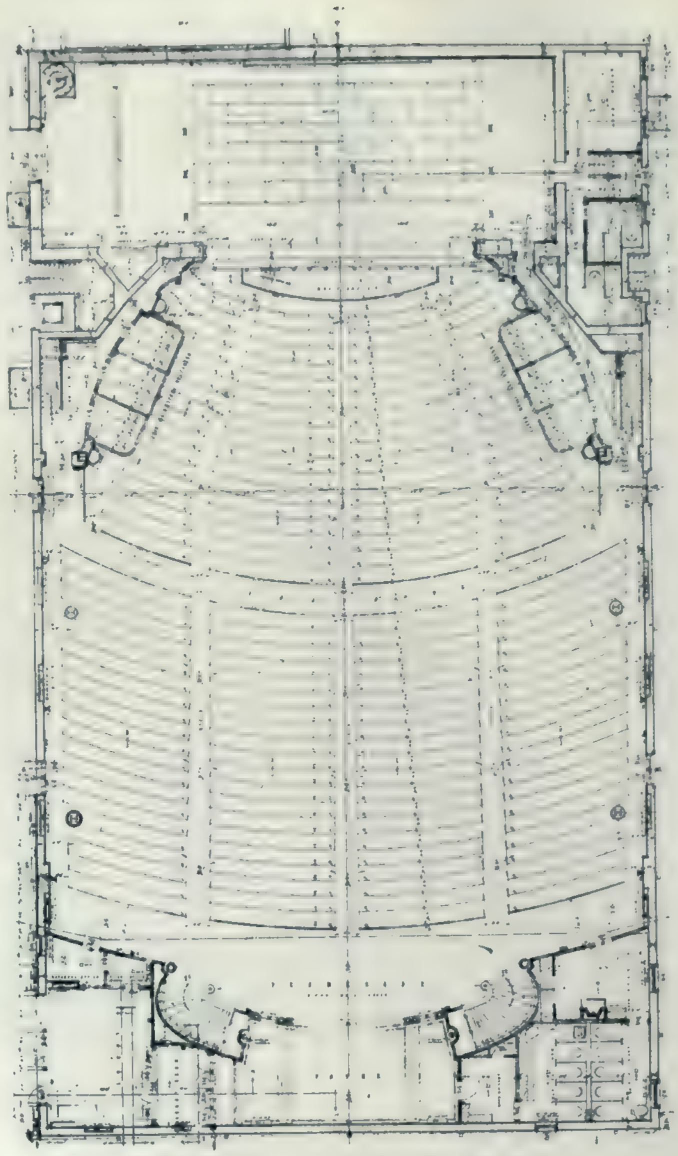


CROSS SECTION, LOEW'S THEATRE, MONTREAL.

THOMAS W. LAMB, ARCHITECT.



BALCONY PLAN, LOEW'S THEATRE, MONTREAL.



ORCHESTRA PLAN, LOEW'S THEATRE, MONTREAL.

This is why the average theatre-goer has ceased to expect real scenic beauty except at those rare moments when the attention of the audience is supposed to be concentrated upon some natural phenomenon, such as the rising of the moon over the garden, or the sunset in the Alps, and when the magic moment has passed the lights are shifted back onto the actors, and the play goes on with little thought of the scenic harmony, that might be a continuing sympathetic element, but is not.

My object is not to attempt to formulate rules, or to go into a detailed discussion of methods, but rather to stimulate an interest in scenic design, and its particular problems, among those whose artistic training in other fields should fit them to become leaders in the development of a saner, more truly modern and logical public opinion in these matters.

If we take as a basis the stage of the average theatre, our stage picture as viewed from the rear seats of the theatre becomes a composition framed by a rectangle of which the width is, say, about thirty-five feet, and the height is about two-thirds of the width. Viewed from that point the back drop fills the frame with little need of any borders or wings to mark the sides of the stage, but the rear seats are not the ones most desired, and from any point in the forward half of the theatre the exaggerated perspective caused by the fact that the back drop is almost twice as far from the observer as the proscenium arch, brings the proscenium arch too near to him to preserve its function as a picture frame, gives to the sides of the stage an importance in the composition relatively greater than that of the back drop, and necessitates the establishment of some features in the composition that will compensate for the loss of its natural frame.

When we consider this violence of the perspective due to the nearness of the majority of the audience to the actors and scenery, it becomes evident that the perspective should not be forced into still greater prominence, but, as far as possible, rendered unnoticeable. There is probably no error more commonly seen or more fatal to the integrity of the stage picture than the effort to make the stage appear larger than it is by a forced and unreal perspective. That

(Continued on page 56.)

Loew's Theatre, Hamilton, Ontario

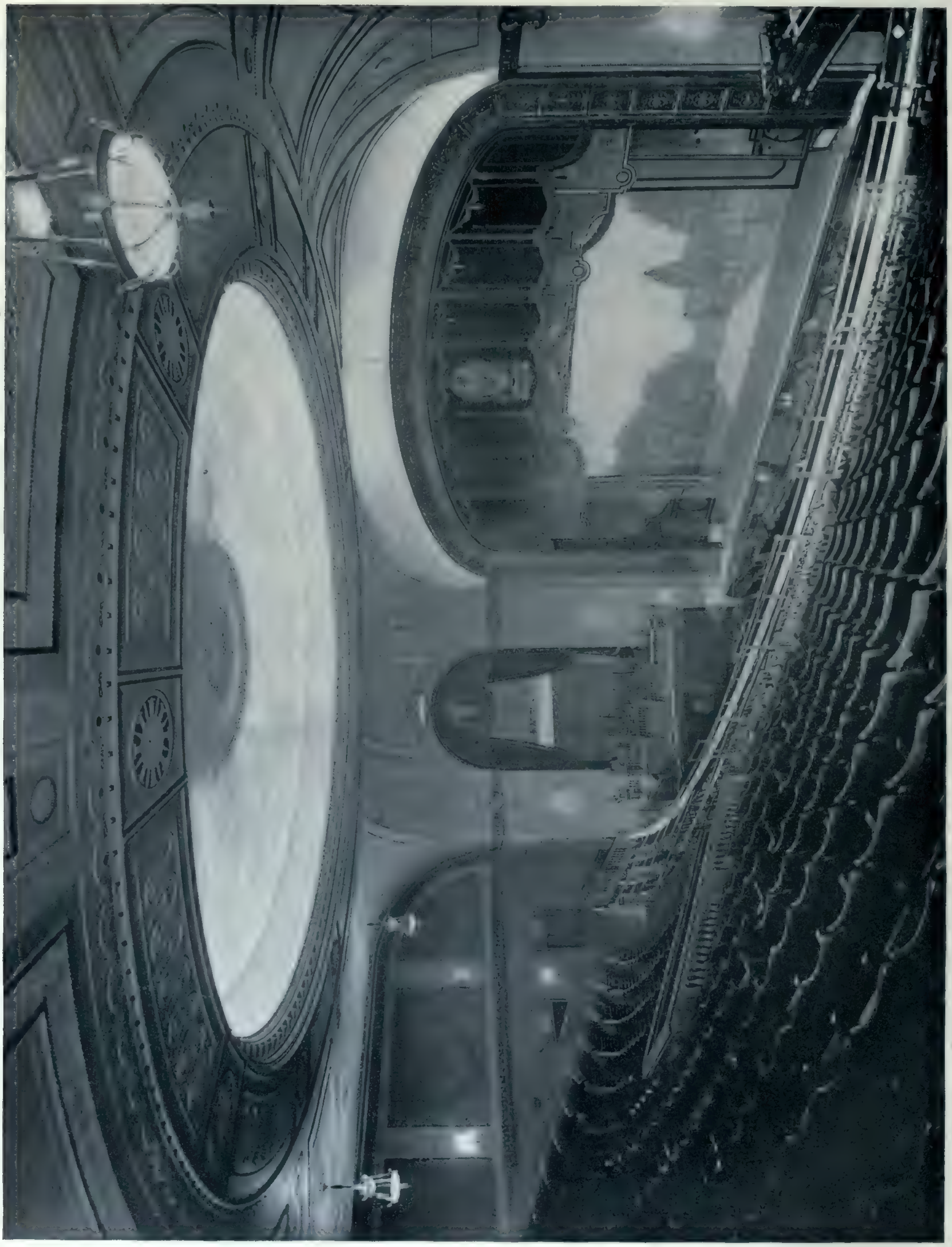
THOMAS W. LAMB, Architect

SITUATED opposite the Royal Connaught Hotel in the heart of the down town district, the new Loew's Theatre recently opened at Hamilton is indicated more by the street canopy and electric sign, than by any external architectural prominence. Like the play-houses on this circuit at both Toronto and Montreal, the exterior is of secondary importance to the interior architectural scheme, and merely serves as a street entrance running through to a rear auditorium. This feature of the general plan is illustrated in the accompanying progress view, which shows the entrance, or outer lobby, extending from the street to the building itself. The length of the lobby is one hundred and forty feet, by a width of only twenty feet, but the decorative treatment is such as to make it both distinctive and interesting in character. The walls are of Caen stone set in with mirrors in ornamental frames, and, together with the vaulted ceiling and decorative plaster work and rich colors of the mosaic floor, presents an attractive approach to the interior.

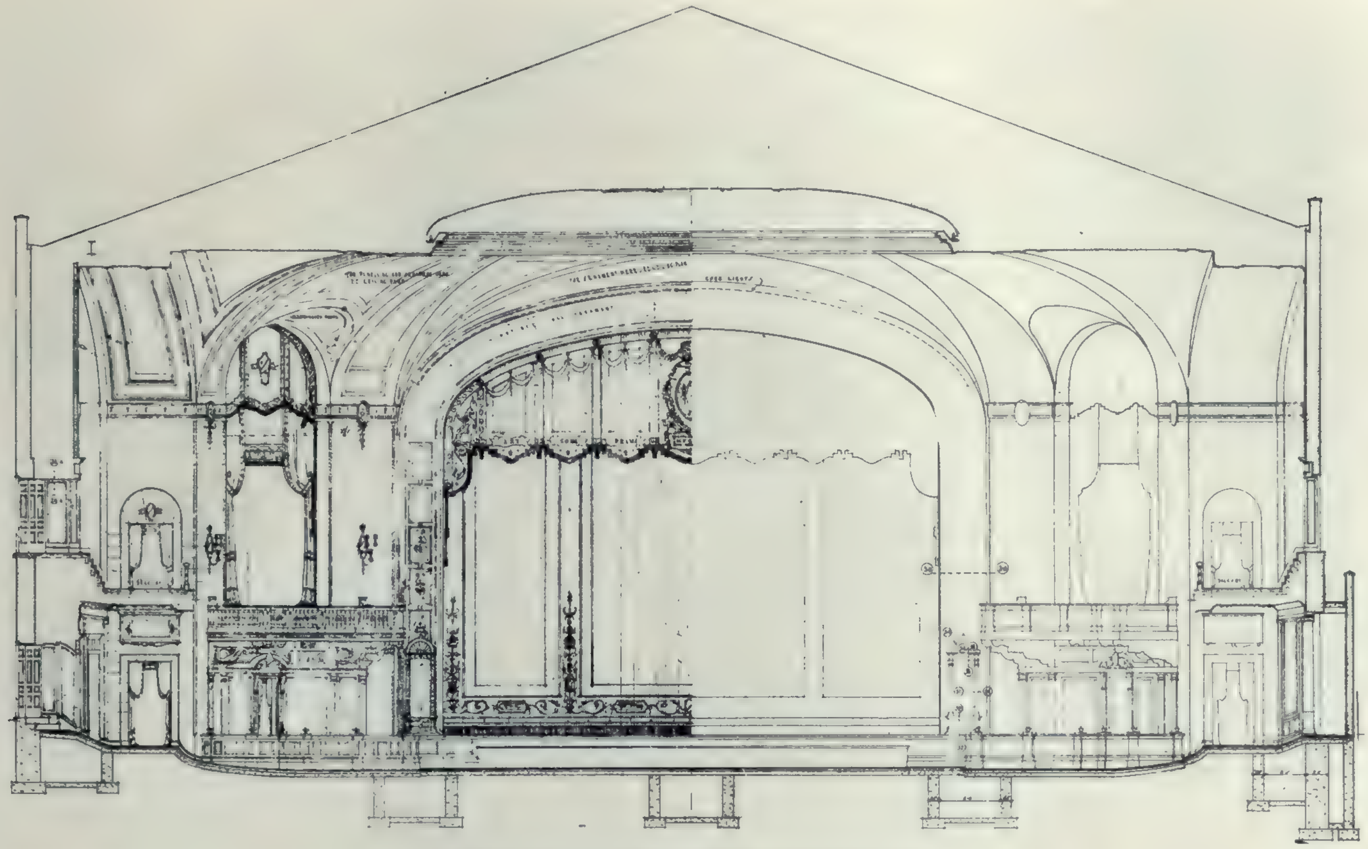
At the end the lobby connects with a spacious foyer situated on the mezzanine floor, and having as a feature a balustraded light well opening to the floor below. This foyer communicates

PROGRESS VIEW SHOWING APPROACH FROM STREET.

ENTRANCE LOBBY, LOEW'S THEATRE, HAMILTON, ONT. THOMAS W. LAMB, ARCHITECT.



LOEW'S THEATRE, HAMILTON, ONT. VIEW OF AUDITORIUM. THOMAS W. LAMB, ARCHITECT.

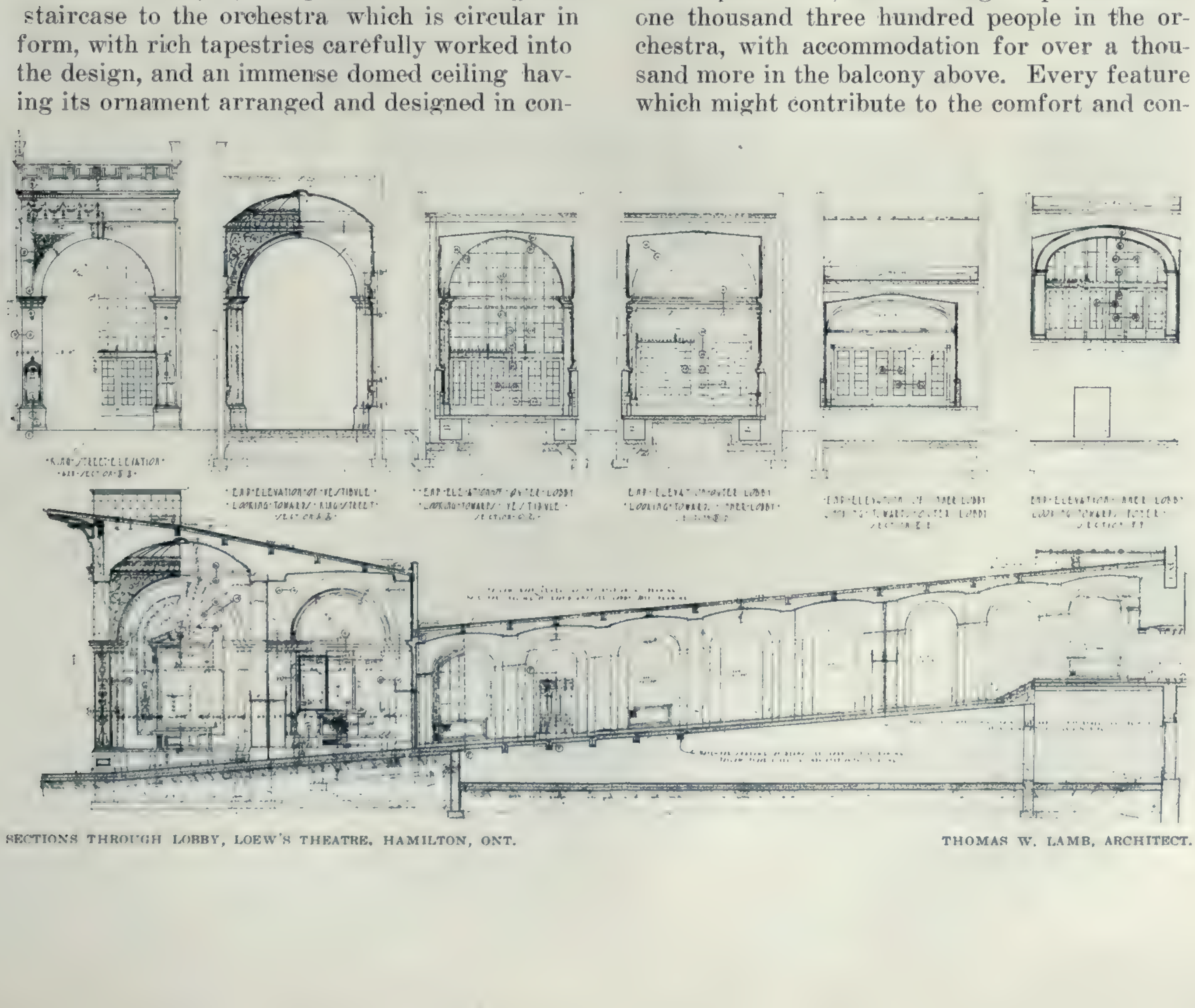


CROSS SECTION, LOEW'S THEATRE, HAMILTON, ONT.

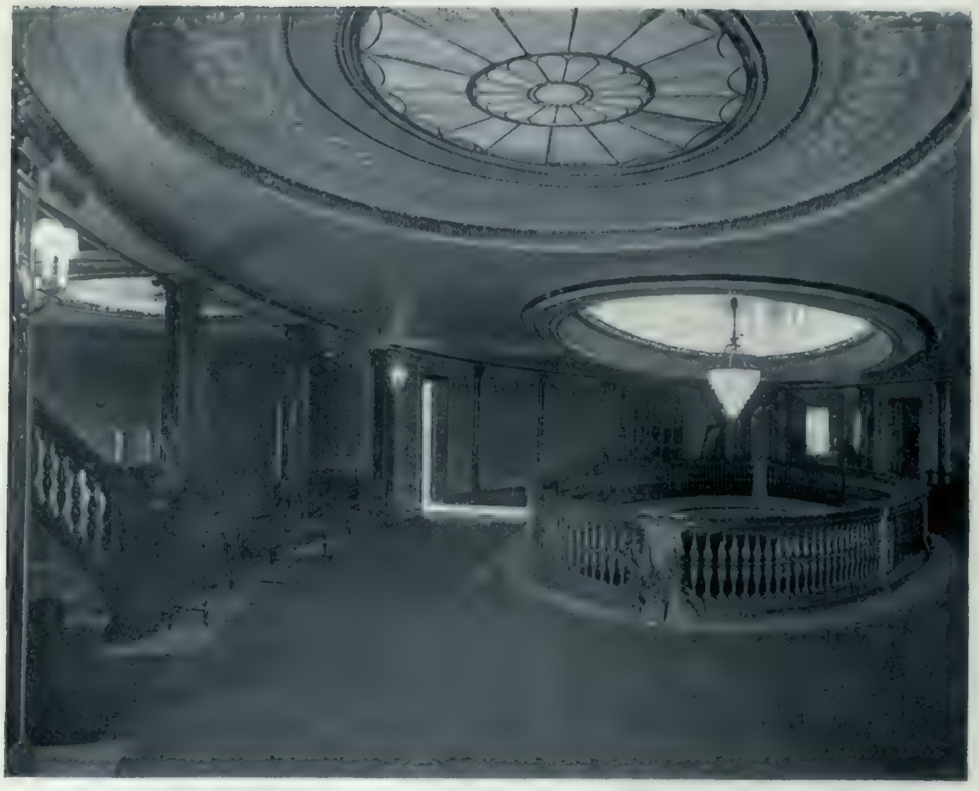
ing as a feature a balustrated light well opening to the floor below. This foyer communicates with the orchestra and balcony with equal convenience of access to both the upper and lower parts of the house.

From the foyer, one passes down the grand staircase to the orchestra which is circular in form, with rich tapestries carefully worked into the design, and an immense domed ceiling having its ornament arranged and designed in conjunction with a system of indirect lighting. The treatment is in modernized Italian, intermingled with the Adam style, and so handled as to give the whole a luxurious and refined character.

The auditorium proper covers sixteen thousand square feet, and seating is provided for one thousand three hundred people in the orchestra, with accommodation for over a thousand more in the balcony above. Every feature which might contribute to the comfort and con-



SECTIONS THROUGH LOBBY, LOEW'S THEATRE, HAMILTON, ONT. THOMAS W. LAMB, ARCHITECT.



MEZZANINE FOYER, LOEW'S THEATRE, HAMILTON, ONT.

venience of the patrons has been provided, with special attention being paid to the system of heating and ventilating, which is in keeping with the most modern approved methods.

In addition to the main foyer, a secondary foyer and lobby give access to the theatre from King William street, with ample rest rooms, toilets and smoking-room adjoining, the arrangement and decoration of which shows the same care to detail that has produced such an excellent result of the aesthetic and practical in the general scheme throughout.

The necessity of designing a building that would adapt itself to the irregular angles of the site presented an interesting problem, and has produced a plan which is somewhat unusual. The scheme is indicated in the accompanying floor plans which show a circular auditorium with a rather ingenious and compact general arrangement.

Scenery and Stage Decoration

(Continued from page 52.)

portion of the stage which is to be used by the actors should be treated in all its parts, from front to back, absolutely in scale with the living figures that are to occupy it. The adoption of this principle of scene composition results in establishing a very definite distinction between the foreground and the background, and greatly simplifies the problem of arranging a definite line of demarcation between the "practical" scene building of the foreground and the pictorial treatment of the background. If we once lose the sense of scale in a stage setting the loss is irreparable, and there is nothing that has so frequently caused us to lose it as the introduction of a middle ground, accessible to the actors, and used by them, but designed in a reduced scale as a transition between the foreground and the background.

The greatest single problem of scenic design is the preservation of the relative importance of the actors as compared with the great space which comes within the field of vision. There are three distinct methods by which this can be accomplished —light, color, and pictorial composition. Light and color are most frequently relied upon, but to accomplish that result by these means frequently involves the sacrifice of other qualities which for the moment may be of more

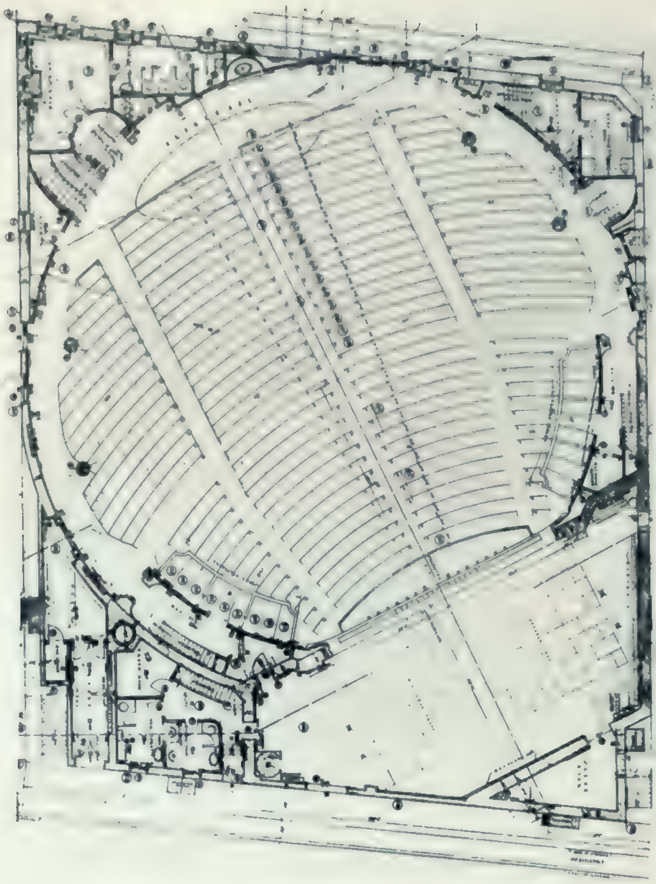
STAIRCASE TO ORCHESTRA, LOEW'S THEATRE, HAMILTON, ONT.

REAR AUDITORIUM VIEW, LOEW'S THEATRE, HAMILTON, ONT. THOMAS W. LAMB, ARCHITECT.

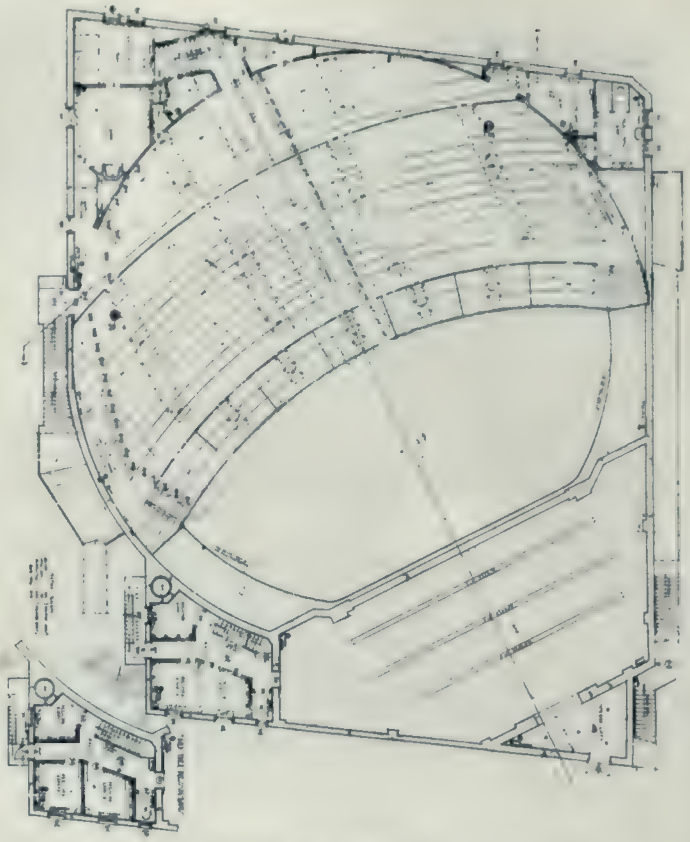
importance to the general effect desired, whereas, if it can be achieved definitely by the arrangement and massing of the composition, it will persist through all the changes of lighting, color and grouping of figures that the exigencies of the production may demand.

In connection with this point it should be remembered that the average size of a theatre and the consequent size of the stage (for the size of the stage is the direct resultant of the size of the theatre) is not determined by any sense of just proportion between the size of the stage and the performances to be given upon it, but is a severely practical matter dictated by the box office. It is probably no exaggeration to say that six out of every ten dramatic productions could be presented upon a much smaller stage than that used, with a marked improvement in the integrity of the performance. If there is one dominant characteristic of the modern play as compared with the older works, it is the intimacy of its conception, the extent to which the action centres in a few important personalities, yet a proper concentration of scenic interest is one of the rarest qualities in a modern stage setting, and when this quality is achieved it is apt to be by means of great empty spaces which are not mysterious and stimulating to the imagination, but merely blank. Right here the work of the eighteenth century is full of suggestion. When the decorator of that period wished to introduce a pictorial composition of great daintiness into a space so large as to be entirely out of scale with it, he created a vignette, a passpartous, a frame within a frame, thus merging the pictorial interest by proper graduations into an outer zone of greater simplicity, but neither empty nor devoid of interest, increasing the

LADIES' REST ROOM, LOEW'S THEATRE, HAMILTON, ONT.



BALCONY PLAN, LOEW'S THEATRE, HAMILTON, ONT.



ORCHESTRA PLAN, LOEW'S THEATRE, HAMILTON, ONT.

importance of his picture and causing it to dominate an entire wall without enlarging its scale or losing the intimacy of its appeal. In scenic design this outer zone becomes of vast importance, especially to those in the front seats. It is the "tormentors," the "borders," the "wings," the "grand draperies," that are the most prevalent causes of trouble. If used intelligently they may become the means whereby the pictorial interest of the stage expands, and, as it were, envelopes the audience, or they may serve equally well the opposite function and carry the simplicity of the theatre walls in beyond the curtain line to meet and merge into the stage picture. In most cases they are an inharmonious element related neither to the theatre nor the stage setting, and their only excuse is the practical service they perform in masking the gridiron, border lights and stage walls.

I have spoken of the advantages of a small stage in preserving the proper dominance of the actors. During the past year or two there have been several interesting experiments in this direction, but those that I have seen have erred through the endeavor to compress too much material into the limits of the small stage, instead of using the reduced size as an opportunity to eliminate unnecessary things, and maintaining the full scale of the essentials that are preserved. In this matter the reform has to begin with the writer of the play. Playwrights seem deficient in the constructive imagination that is requisite to formulate stage directions that can be carried out with dignity and simplicity. Anyone who has ever been connected with the preparation of an elaborate production in which the directions of the playwright have been scrupulously followed, will remember the exodus of van loads of useless "truck" which takes place about the time of the final rehearsals, due to the simplification and elimination which is inevitable under competent management and stage direction, but which, if it had taken place at an earlier stage of the proceedings, might have imparted directness and vigor to the result, instead of leaving it meager and unfinished in spots. — *J. Monroe Hewlett, in "The American Architect."*

REAR VIEW, LOEW'S THEATRE, HAMILTON, ONT.

Heating and Ventilating of Theatre Buildings

By N. A. KEARNS [*]

ALTHOUGH the heating and ventilating of public buildings has always been a subject of paramount importance, it has only been in recent years that the public in general have taken any considerable interest in the heating and ventilating plants installed in these buildings. Perhaps this is due to the fact that designers of the mechanical equipment of buildings have endeavored to make their work as inconspicuous as possible, and it was only when the occupants of a building were blissfully unconscious of such things as atmosphere and temperature that the designers of the plant felt that they had scored a decided success.

The public have been educated by their visits to the higher grade theatres to expect some degree of comfort in the cheaper theatres, and no longer are they satisfied to sit in poorly heated and ventilated buildings.

It is in the choice of heating and ventilating equipments for these buildings that the information contained in this article may be of some value. All theatre buildings do not require the same equipment, and, in providing a method of supplying the necessary heat and pure air to the building, we must be in a position to know to what extent we are justified in spending money on such refinements as duplicate parts, air washers, coolers, humidity and temperature control, etc., etc.

It is not our intention to present in this article any of the formulæ generally used in the design of heating and ventilating plants, nor to take the position of advocating any one type of apparatus, but rather to give in a general way descriptions of the various installations found in well ventilated and heated buildings. It must be borne in mind that different types of theatre buildings require different designs of heating and ventilating plants. For instance—a moving picture house that is in almost constant use requires a ventilating system designed along somewhat different lines to that of a theatre used only for a few hours each day.

The requirements of a heating and ventilating plant in a theatre building are:

A temperature of 65 to 70 degrees Fahr. above zero in the coldest weather, and a fresh air supply of from 1,200 to 1,800 cubic feet of fresh air per occupant per hour, together with a relative humidity of 35 per cent. to 60 per cent., depending on the temperature of the air. The item of air supply depends on the method of distribution. With a uniform distribution of air, the lower figures may be used. The ventilating may be made an integral part of the heating system, or it may be installed as a separate unit, but the ventilating system should be so designed that it may be used for the purpose of heating the building in the spring and fall. No natural or gravity system for the successful ventilating of theatre buildings has yet been designed. It is therefore necessary to ventilate the building by means of fans. These fans may be installed as exhausters of foul air or as pressure fans driving fresh air into the building. Frequently a combination of pressure and exhaust fans are installed in large buildings, and generally this combination gives satisfactory results.

In the pressure or "Plenum" system, fresh air is drawn in through outside openings, preferably situated high enough to be above street dust. The air is drawn through a heater made up of pipe coils, or cast iron radiators with extended heating surfaces, where it is heated to the desired temperature and passes to an electric or steam driven fan that drives it on to the distributing ducts. These ducts may be in the form of plenum chambers having openings with mushroom heads situated under the seats, or the ducts may connect with flues in the side walls, or at such other convenient points as the conditions of the design may prescribe. If the fresh air enters the auditorium close to the floor, the exhaust openings may be situated in the side walls with ducts leading from thence to the exhaust openings in the roof, or the vent faces may be incorporated in the ornamental design of the ceiling. These vent outlets may be connected to an exhaust fan. The exhaust fan may be omitted where the theatre is not used for any considerable time at a stretch.

Where the air is used for heating the building it is necessary to drive the air into the audience room above the heads of the occupants, and draw the cold air out at the floor line. Some provision must be made for the returning of air to the point where the air is heated in the basement, so that when the building is unoccupied the same air may be used over and over again. This will effect a considerable saving in fuel, as well as providing a more rapid method of heating than could be secured by means of direct radiation only. The heat given by circulation seems to be more pleasant in its effect than that given by radiation.

The downward extraction of foul air does not work as well during the hot summer months as it does during the winter, so it is necessary to arrange a system of valves at the fan room and the return air ducts, so that the current of air may travel in a reverse direction to that dur-

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[*] Heating and Ventilating Engineer with The Spencer Heater Company of Canada, Limited.

ing the winter months. This means that during the summer months the foul air is taken from the building at the ceiling line, and the fresh air is driven into the building at the floor line.

Some theatre buildings are heated and ventilated by means of direct-indirect radiators and an exhaust fan. The direct-indirect radiators are placed at intervals along the outside walls and these radiators are fitted with special bases to permit a varying amount of cold air to enter from the outside, the air being heated by the radiator as it passes to the auditorium. Foul air vents are located at the ceiling line for summer use, and a system of compensating valves, etc., provide for the closing of the ceiling vents when the floor vents are open, and vice-versa. The vent faces are connected to the exhaust fan situated in a small room in the space between the roof and ceiling. Although the exhaust fan may be proportioned with its connecting ducts, etc., to handle a fixed amount of air, it has generally been found difficult to control the quantity of air flowing through the opening at each radiator. Every opening in the building also allows air to leak through to the auditorium, thus making it almost impossible to control the supply or the temperature of the incoming air.

Cloak-rooms, closets, etc., should be connected to an independent exhaust fan entirely separate from the balance of the ventilating system in the building. The machine booth should have an outside air supply and a small exhaust fan that is directly under the control of the occupant of this room, as these men are generally better satisfied when they have the control of the heating and ventilating in this part of the theatre entirely in their charge. This is the only portion of the building where an employee outside of the regular boiler attendant should be permitted to touch the heating and ventilating equipment.

Referring back to the "Plenum" system of ventilation, we will take up the matter of the fresh air entry. This entry, as we have recommended before, should be situated above the dust line. It should be fitted with bird-proof screens, weather-proof louvres and doors for the closing of this opening. Dust may be removed from the fresh air by passing it through a dry cheese-cloth screen. This cheese-cloth is fastened to small sash convenient for handling. These sash are set in rabitted frames with chicken netting behind, to prevent the bagging of the cloth. A large area must be arranged for this form of filter, so that the velocity of the air passing through it will not exceed 100 feet per minute. A duplicate set of sash and screens must be always held in readiness, so that the screens may be removed and cleaned at frequent intervals. A filter made up of cheese-cloth in the form of bags may also be used instead of the sash filter described above.

Where a theatre building is situated in a district free from dust and smoke, filters or washers are not always required. Very often they are installed never to be used, so it is always advisable to consider this item carefully before specifying any type of filter. But where there is much smoke or dirt an air washer must be installed. There are several of these washers on the market, some of them being simply perforated sprinkler pipes, while others are fitted with special nozzles that make a spray that no air can pass through without being thoroughly washed. In washing the air during the winter months, it is generally the practice to heat the incoming air before it is washed to a temperature of about 54 deg. Fah. above zero, this being the dew point of 70 degree air at 59 per cent. relative humidity. The air passing through the spray chamber, becomes thoroughly humidified before it enters the eliminator, when it has any entrained water separated from it by the baffle plates. The air then passes to the secondary heater, where it is raised to a temperature of 70 degrees. The relative humidity of the air can be approximately fixed by the temperature of the air entering the spray chamber and by the installation of a differential thermostat, or a thermostat situated in front of the pre-heater and one in front of the secondary heater.

Air Heaters.—The heaters used for warming the air may be split up into sections or they may be built in one bank. Where air washers are used it is necessary to arrange a portion of the heater stack as a preliminary heater, so that there will be no danger of the washer freezing. Where no air washer is used the stack may be arranged in one bank, in three, four or five sections deep according to the temperature required. The width of this stack is controlled by the amount of radiation and the free air way required, the free air way being proportioned to the velocity and the quantity of the air passing through the stack per minute. The installation of these radiators requires the greatest amount of care. The first section condenses steam much more rapidly than the sections farther back and this often results in the condensation from the warmer stack backing up into the stack close to the fresh air entry. The matter of removing air from these heaters, is also another point of importance, for if the air is not entirely removed, it greatly reduces the efficiency of the heating surfaces. There must be sufficient radiation installed in these heaters to heat all of the air required without having recourse to high pressure. Engineers know that the transference of heat is more active with low than with high steam temperatures, and therefore with no form of radiator is it advisable to use steam at a higher pressure than is necessary to obtain a circulation throughout the system.

Some attempts have been made to cool the air during the summer by using the hot blast coils as cooling surfaces, running city water through these coils. An arrangement of ice shelves may be built in front of the fan so that the incoming air may come in contact with blocks of ice placed on these shelves or pipe coils containing brine or other refrigerating liquids may be arranged as cooling surfaces. The cooling of the air by ice is a very expensive item, and when a cooling plant is installed, it is better to provide a small refrigerating machine with a brine pump attached, or to install so-called de-humidifiers. Ordinarily the air washer will reduce the temperature several degrees, but as a great deal of the discomfort of summer weather is due to excessive humidity, the ordinary air washer cannot always be used to advantage. The de-humidifier is a special form of washer. This is generally operated in two sets of sprays, one using cold city water and the other refrigerated water. With such an apparatus, any desired dew point or per cent. of relative humidity may be obtained. Air may be delivered as low as 39 or 40 degrees Fah. above zero.

Fan.—The supply and exhaust fans should be large enough to run at as low a velocity as is consistent with proper pressure conditions so that the noise of the fan will be reduced to a minimum. If the fan is placed on a well insulated base with galvanized iron ducts leading from the fan connected to the fan by flexible connections, there is no danger of noise in the building. Where fans are installed and are not giving satisfaction it is generally due to the fan being too small and having to be run at an excessive speed.

Direct Radiation.—Generally when a ventilating system is installed in connection with a pressure fan, direct steam radiators are used for heating purposes. In a theatre building, these radiators are generally concealed behind wrought iron grills. In the Allen Theatre, illustrated in this number of "Construction," the direct radiators are in the form of pipe coils with extended heating surfaces. With this type of radiation more surface may be installed in radiator recesses than with the ordinary type of cast iron radiator.

In placing radiation on the stage the comfort of the occupants of the front seats of the theatre must be provided for. This necessitates the placing of most of the radiation high up in the fly gallery and on the rear walls, but in addition to this there should be a certain amount of radiation placed on the floor of the stage or otherwise the performers coming from warm dressing-rooms will find the stage cold or rather it will seem to be cold although the thermometer may indicate that the stage is as warm as the rest of the theatre. The dressing-rooms being small, are generally too warm. It is for this reason that almost an excessive amount of radiation must be placed upon the stage floor.

Where direct steam radiation is used for heating the building the radiators are located along the outside walls, in the entry and at other places subject to the cooling effects of drafts. etc. The system of supplying steam to these radiators and returning condensation to the boiler may be any of the following:

The One Pipe: In this system the radiator has one tapping and that at the bottom. The steam is admitted into the radiator and condensation returns to the steam main through the same opening. The main is simply a complete circuit from the feed opening of the boiler to the return opening. The steam that is generated in the boiler passes up into the main and thence to the radiators. The condensation returning, flows by gravity to the return opening of the boiler. When the pipes are arranged with sufficient fall and are of ample size a fairly satisfactory system of piping may be obtained in this way. The one-pipe system is the cheapest form of pipe installation and for a building not requiring very long runs can be installed to advantage. The average journeyman is more familiar with this system of piping than with almost any other.

Some of the objections to the one-pipe system are: The radiators must be turned either all off or all on. If there is a full pressure on the boiler and the valve of a cold radiator is turned on, the condensation that is in the radiator meets the incoming steam and causes a hammering noise, which is annoying to the occupants of the room. The system of venting the radiators is generally by means of automatic air vents. These vents are fitted with expansion members so that the air can escape from the radiator, but steam expands this member and prevents the steam from escaping. In many of these vents, no provision is made to prevent the air from returning to the radiator. When the pressure drops the air rushes back into the radiator through the vent openings, and before the radiator is filled with steam again this air must be displaced. Some air vents are connected with an air line leading either to a hydraulic pump or electric pump in the basement, or to a free vent into the chimney. With a pump system there is a vacuum created in the radiator, and this means that steam will be generated in the boiler at a lower temperature than where the weight of the atmosphere must be displaced. In course of time the expanding element in the air vent becomes defective thus requiring adjustment. Some air vent manufacturers make these vents so that they cannot be opened by an unauthorized person thus making for a long and effective service.

The best air vent is none too good, and cheap air vents should never be used except on temporary work.

Two-pipe System. — In two-pipe pressure systems and also two-pipe vacuum systems, the installations are made, as the name would imply, by means of two pipes, one pipe supplying the steam and the other carrying away the condensation and in vacuum systems, also the air from the radiators. Some of these systems have the feed pipe at the top of the radiator and some at the bottom of the radiator. but in all cases the return pipe is at the lower end of the radiator, and opposite to the feed end. There are so many two-pipe systems on the market under different names and differing somewhat in principle, that an extensive explanation or even a slight mention of the same, is almost out of the question within the space that is at our disposal.

The two-pipe pressure system is generally installed with a valve at the feed and return. The venting of the radiator being effected by means of the ordinary type of air vents. With some systems the return valve is in the form of a trap, on the flotation or expansion principle. There are many thousands of installations of this type in use in connection with pumps as vacuum systems, also to a limited extent installed as gravity systems. For large installations these pump systems are highly recommended, but for small installations, where the services of a competent attendant cannot always be obtained, it is better to have some of the gravity system of steam circulation installed.

There are several modifications of the vapor and vacuum vapor systems on the market. All of these systems have their merits, but they are not *all* suitable for theatre work. In some of these systems, the chief specialty is in the return trap. These traps are placed on the return end of the radiator and fitted with a flotation or expansion member. The steam is admitted into the radiator at the end opposite to the trap. The air that is in the radiator is driven ahead of the steam and passes by way of the trap to the return line. The condensation also follows this same passage. When the steam strikes the trap, the trap closes, thus preventing the escape of steam to the return line. The air is vented from this line into the atmosphere and the condensation is returned to the boiler. If there is sufficient head-room for the boiler and this system is properly proportioned, it works well, but if there is not sufficient head, there is danger of the system finding a dead center and becoming inoperative.

There is also a system on the market that makes use of various sizes of feed valves, these valves being proportioned so as to admit only enough steam to the radiator to fill the radiator. The principle of this system is that the steam before it reaches the return end of the radiator is entirely condensed so that there is very little chance of steam entering the return line unless excess pressure is developed in the boiler. The return valve on the radiators in this system is simply a water-seal with a by-pass for air. The return valves connect to an air line in the basement. This line vents to the atmosphere and is also connected to the boiler below the water-level. The boiler when installed with this type of system must be equipped with a very sensitive automatic damper regulator, so that at no time will very much pressure be developed. Otherwise, the seal on the traps are blown out and steam enters the return line and escapes to the atmosphere.

There is also another system where the return end of the radiator is fitted with an elbow with a small check contained therein. The check prevents the return of steam or condensation to the air line from a radiator that may be turned off. This system, inasmuch as the return line vents to the atmosphere, is open. The end of the line is equipped however with an expansion member or controller, so that if steam enters the line when pressure is generated in the boiler the expansion member is closed and there is no danger of steam escaping from the system.

All of the systems mentioned as "vacuum vapor," work on the principle of the graduated valve. The valves must be installed in accordance with well defined rules. Otherwise the systems will not give satisfaction.

In some localities preference is given to hot water heating systems and there are certain outstanding merits of this system that can hardly be offset by any defects of the same. The principle defect of the hot water system is that there is so much water to heat that it is impossible to get quick response to firing. There is also danger from frost and the radiating surface must be much greater than with steam systems, but the quality of heat from hot water radiation is much more pleasant than from steam radiators Where a fan system of ventilating is installed the radiators for heating the incoming air must be of steam. Direct radiation in the building however, can be in the form of hot water radiators by using a generator in connection with a steam boiler. Steam is supplied direct to the ventilating coils, this being the only place where steam is used as a direct heating medium. There is also a main connecting the boiler to the generator. This generator is made of copper tubes. The steam passes through these tubes and surrounding the tubes there is a body of water. The generator is supplied with a feed pipe to the radiators and a return pipe from the same. Many of these systems have been installed throughout the Dominion of Canada and are giving excellent results. The system of hot

(Continued on page 65.)

New Princess Theatre, Toronto

C. HOWARD CRANE, Architect
CHARLES J. READ, Associated

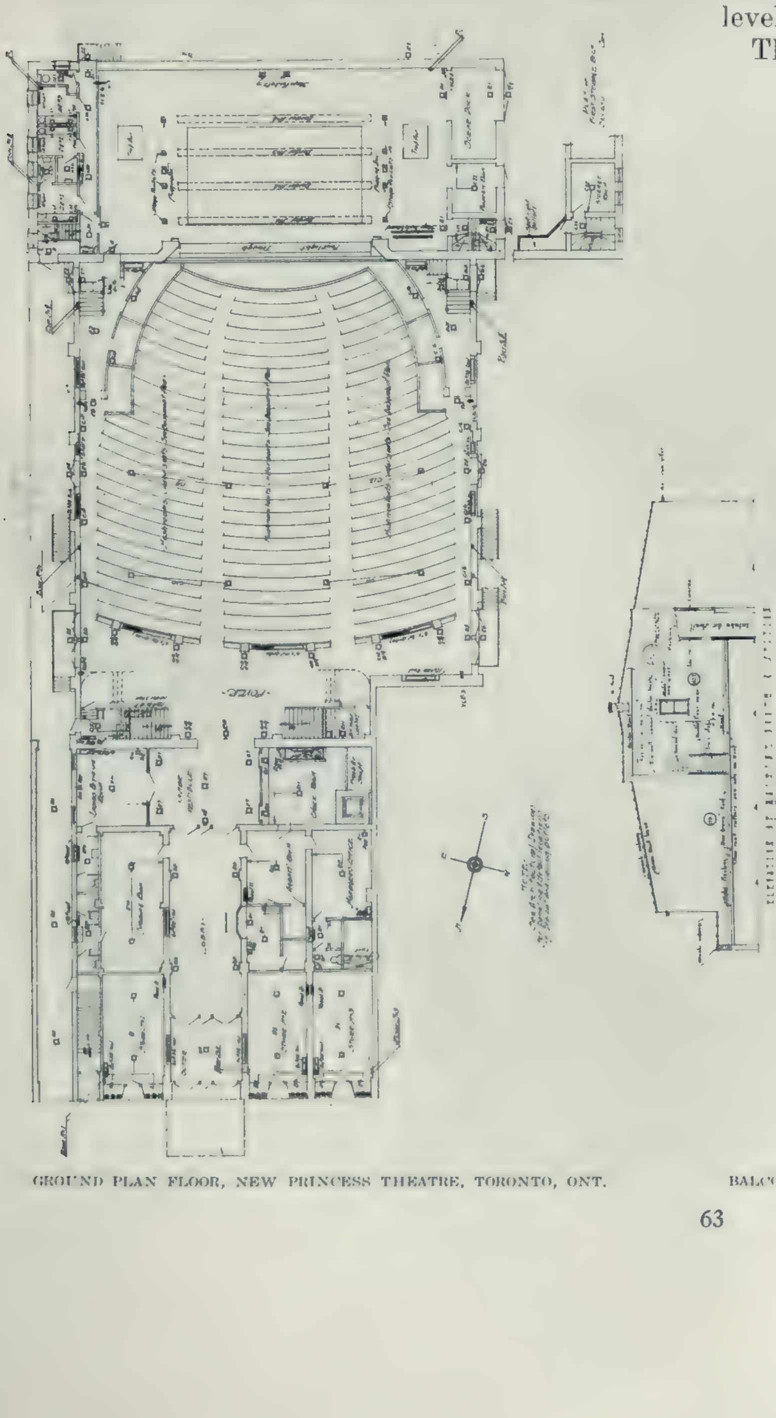
THE new Princess Theatre emerges from the charred ruins of its predecessor a much better playhouse than the building it replaces. It is much more attractive in decorative scheme, more luxurious in its furnishings, and better considered from the standpoint of convenience and comfort. In the reconstruction of the building, the somewhat uninviting aspect of the old theatre has disappeared. The old building was built a number of years back, and represented little of the modern thought and artistic feeling in theatre design. The new playhouse therefore presents an entirely different environment which its patrons will welcome, and which is more in keeping with the high-class plays and attractions the management offers.

In utilizing the former site the external dimensions of the building remain substantially the same, the main approach being from a marquise entrance through an outer lobby floored with tile and with walls and dados of marble. This lobby is seventy-two feet long by twenty-eight feet wide, with the box office and a large smoking room on opposite side and connecting at the end with the main foyer having the ladies' waiting room and check room adjoining.

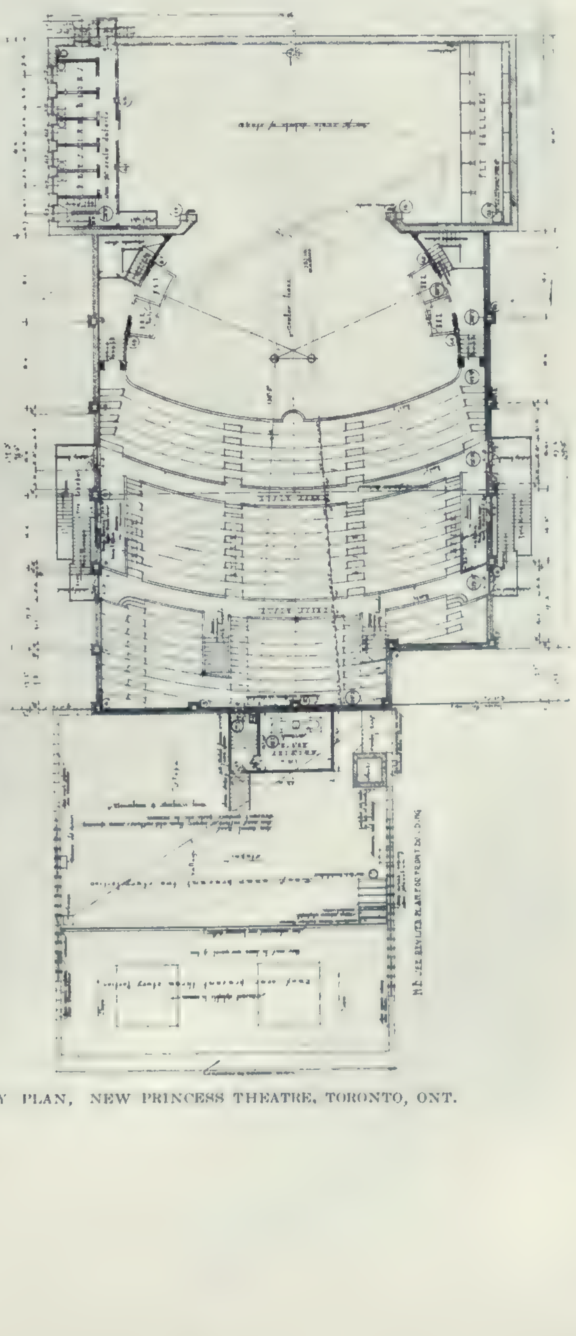
The auditorium which is approximately one hundred by eighty-two feet, is done in a scheme of harmonizing colors with a decorative ceiling treatment, a plaster enrichment with velvet draperies being used for the proscenium and boxes and simple ornament to define the panelling of the walls. Further decorative features consist of suspended ceiling lights and inverted globes set in circular ornament beneath the balcony, which together with the wall brackets give an evenly diffused light over the entire auditorium.

A stair-case on either side of the foyer leads to a mezzanine and from there to the upper portion of the balcony, the lower part being entered from ramps on each side at the mezzanine floor level.

The balcony, which is seventy-two feet deep,



GROUND PLAN FLOOR, NEW PRINCESS THEATRE, TORONTO, ONT.



BALCONY PLAN, NEW PRINCESS THEATRE, TORONTO, ONT.

NEW PRINCESS THEATRE, TORONTO, ONT.

AUDITORIUM.

C. HOWARD CRANE, ARCHITECT; CHARLES J. REED, ASSOCIATED.

ENTRANCE LOBBY, NEW PRINCESS THEATRE, TORONTO, ONT.

is carried by a steel girder weighing twenty tons and eighty-four feet in length to which the load is transferred by steel beams. Additional support for the balcony is also provided by means of a smaller girder and two transverse girders by which the former is carried. The transverse girders are in turn each supported at one end by the main girder and at the other end by one of the steel columns. This does away with the necessity of supporting columns and gives an entirely unobstructed view from any part of the house.

The auditorium, which includes ten boxes, gives total seating accommodation for approximately seventeen hundred people. The building is of steel and hollow tile construction with concrete floors throughout except in the entrance rotunda, where a hollow slab type floor has been laid with two inches of concrete above. The stage is of solid reinforced concrete construction except for a removable wood portion in the centre, this latter provision being necessary for certain stage productions. In addition to every precaution being taken to make the structure modern throughout, there are also excellent facilities as regards the matter of ready egress. Besides the main entrance there are ten exits, three of which are located on either side of the auditorium at the ground floor, and two on each side of the balcony opening onto steel fire escapes. All these exits are equipped with fire-proof doors and lead to open courts directly communicating with the street.

Heating and Ventilating of Theatres

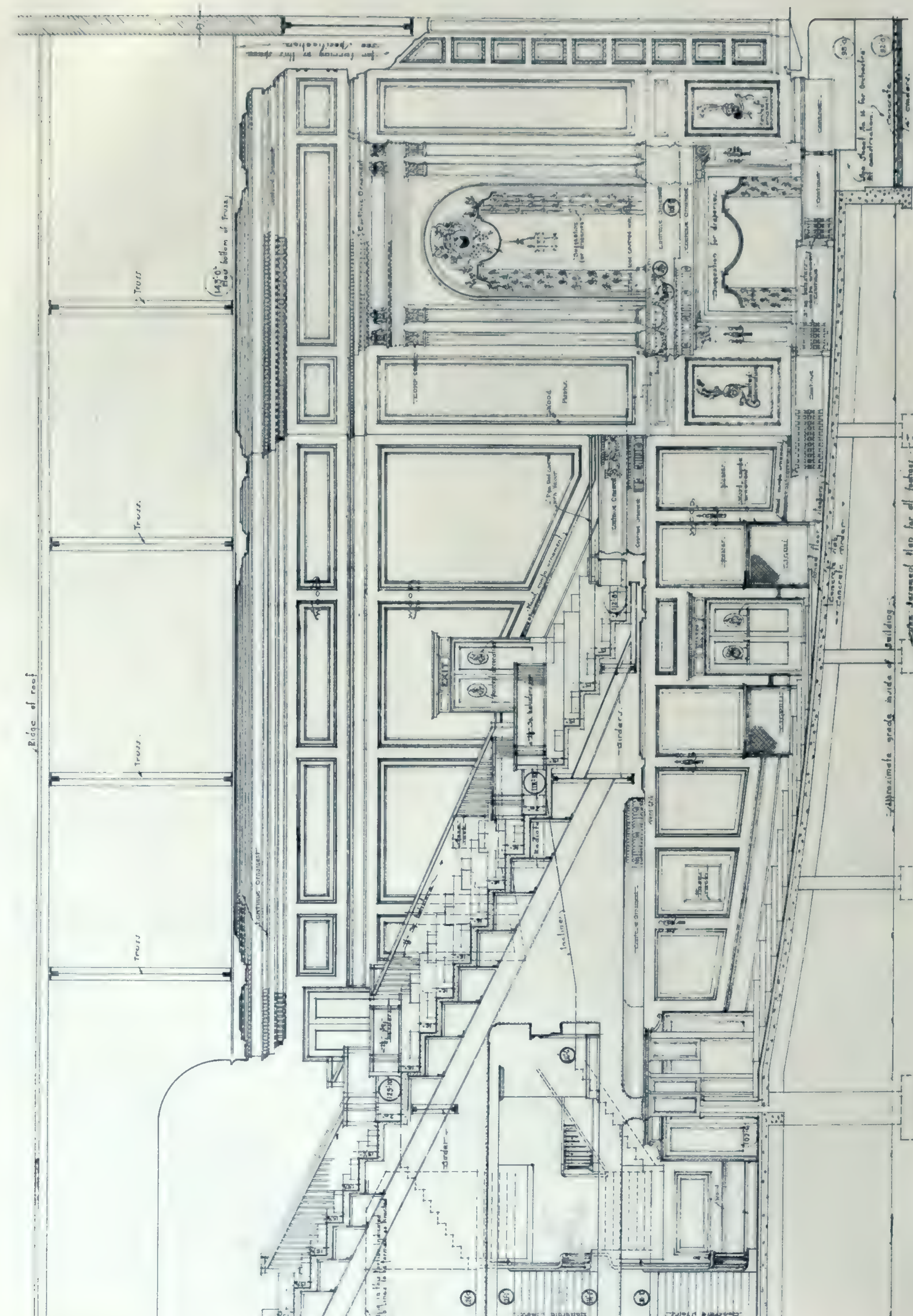
(Continued from page 62.)

water circulation in small buildings may be by gravity, but where the building is very large, it is necessary to instal a circulating pump. With a circulating pump, the size of the piping and radiators may be materially reduced from that used in connection with gravity systems.

In designing a heating and ventilating equipment for a building, care should be taken in the selection of an apparatus so that a break-down will not cripple the plant or discontinue the operation of the same. Reliability of service and economy of construction and operation, seem to call for a number of small units rather than one large unit, and a duplication of parts should be provided for wherever possible. Heating and ventilating systems in theatre buildings are not often in charge of mechanics. Therefore it is necessary to instal a system that will work under the most adverse conditions.

Boilers.—In selecting a boiler for a theatre building, many things should be taken into con-

FOYER, NEW PRINCESS THEATRE, TORONTO, ONT.



LONGITUDINAL SECTION.

NEW PRINCESS THEATRE,
TORONTO, ONT.

C. HOWARD CRANE, ARCHITECT;
CHARLES J. REED, ASSOCIATED.

sideration. It is worthy of note that a boiler that may be entirely satisfactory with some other type of building, would not be suitable for a theatre. There are various types of boilers on the market, many of them differing only in name, and not in construction. In general, it may be said that it is not advisable to instal a soft coal burning boiler in a theatre building, because even where these boilers are equipped with smoke-consuming devices, the dust caused by soft coal is a very objectionable feature. If the boiler is situated in a separate building at some distance from the theatre, the soft coal nuisance is not so evident as where the boiler is situated close to the building.

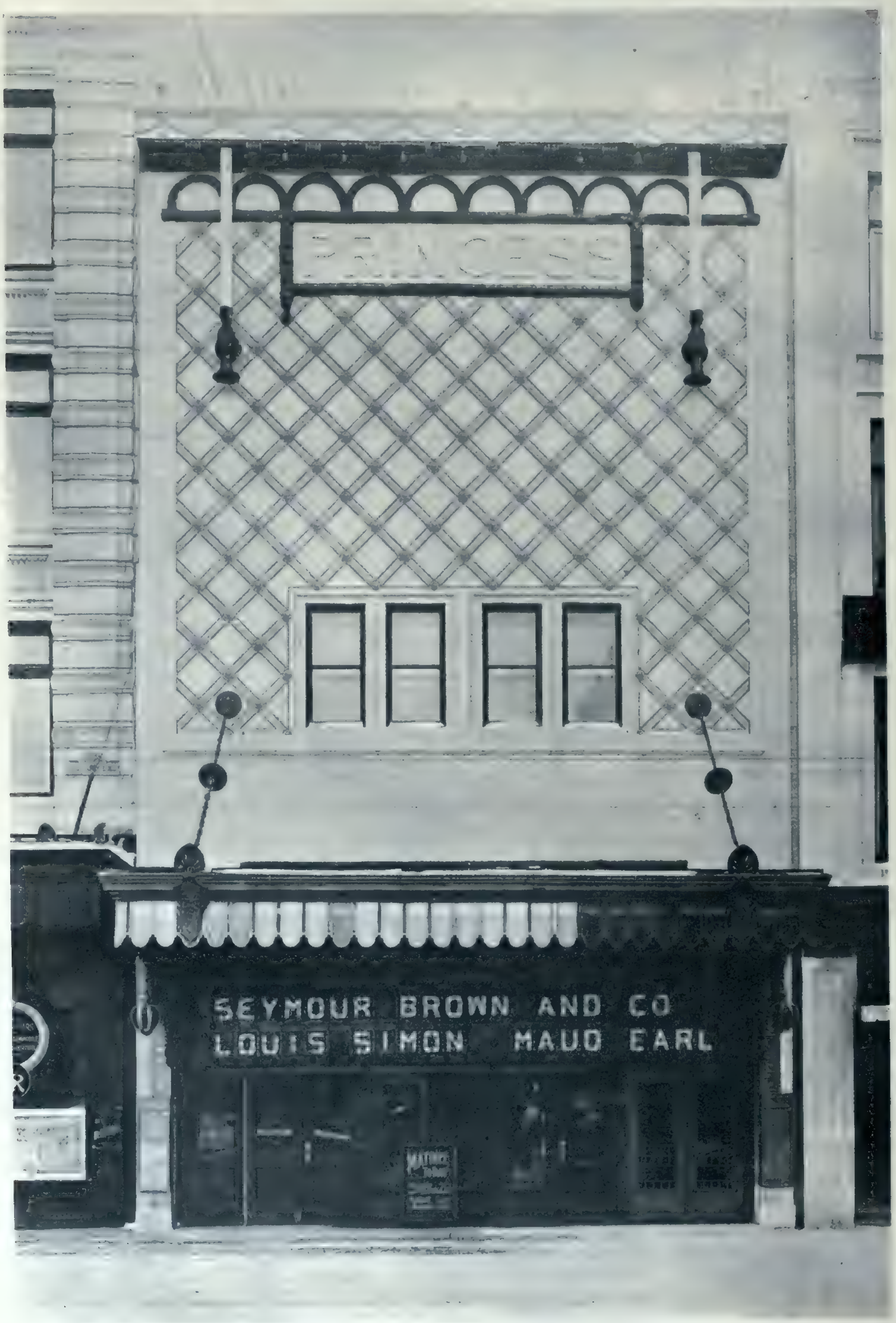
VIEW FROM STAGE, NEW PRINCESS THEATRE, TORONTO, ONT.

In an installation where the funds are sufficient, a water tube boiler should be installed. One square foot of heating surface in a water tube boiler is of much greater value than a square foot of heating surface in a return tubular or firebox boiler. All of the heating surfaces in a water-tube boiler are direct, whereas with a return tubular boiler, most of the heating surface is indirect. Boiler inspection concerns note that where accidents have occurred with water-tube boilers, it is only to the extent of the rupturing of a tube. Of course with low pressure work there is no great danger of violent explosions with any type of boiler, because the Government regulations set the safety valves at 10 pressure. Still, with a water-tube boiler the accident is only to the extent of a tube starting, whereas with a tubular boiler it may be that the whole boiler will be wrecked.

Automatic control of the temperature of the building is greatly to be desired. If the funds will permit of the complete installation, an automatic heat controlling system should be used, but here is one point where the designer cannot attempt to economize by eliminating certain features that are absolutely necessary, and unless the funds are sufficient to cover not only the control of the radiators in the building, but also the individual control of the fresh air supply, the money is thrown away in attempting to instal an automatic temperature controlling system. The control of the radiators should be on a thermostat controlling the fresh air supply. It is manifestly impossible to control the temperature of a room by the radiators only when air is coming into the building at a relatively high temperature.

A contractors' section, of which J. H. Garden is chairman and G. E. Mackenzie is secretary, has been formed in connection with the Calgary Board of Trade. Matters of interest to contractors are discussed and a central office is available where plans may be seen. It represents a progressive step which other Canadian cities might do well in following.

VIEW FROM BALCONY, NEW PRINCESS THEATRE, TORONTO ONT.



NEW PRINCESS THEATRE, MONTREAL. D. J. SPENCE, ARCHITECT.

THE NEW PRINCESS THEATRE, MONTREAL

D. J. SPENCE, Architect

The accompanying views of the Princess Theatre, Montreal, give a very excellent idea of this playhouse as it appears in its rehabilitated form. The exterior exhibits a decidedly modern influence, and is a departure from the more or less orthodox treatment to which one is accustomed, the light terra cotta and style of the design being in marked contrast to the adjoining buildings and readily attractive to the passerby.

The interior which follows the usual plan is conveniently arranged and comfortable in its furnishings and appointments. Considerable plaster ornament is used in the decorative scheme the motif of the facade being repeated in the arching and splay of the boxes.

The building has the best type of mechanical equipment and is well planned as regards exits. It was built to replace the old theatre of that name which has long been the home of the legitimate drama and the better class of musical productions. A special feature of the decorative scheme is a painting by F. S. Challenor, F.S.A., the well-known Canadian artist, which occupies the sounding-board over the stage, and depicts a woodland scene with semi-nude and draped figures typifying the spirit of music and enchantment.

DETAIL OF BOXES, NEW PRINCESS THEATRE, MONTREAL.

Anglo-French Town Planning in 1298

When Henry II. of England married Eleanor of Provence, the union brought certain French territory under his crown. In succeeding years Henry was continually struggling with Louis IX. for supremacy in Southern France, and both monarchs planned and founded new towns as bases for military operations.

In 1298 Edward I. wrote from Bordeaux to London, asking the authorities to send them four competent town planners—"those who best know how to divide, order, and arrange a new town in the manner that will be most beneficial to us and the merchants."

Montpazier, in the department of the Dordogne, is said to be the best example of these towns—and others laid out by Edward were Libourne, Sauveterre, Monsegur and LaLuide.

In Canada, where the two peoples have enjoyed the entente cordiale and have intermarried and contributed to each other's genius and strength over so many centuries—with sundry and passing breaks caused by political ambition and not by racial animosity—may we not derive inspiration from the early Anglo-French town-planners of old France, and seek to "divide, order and arrange" our cities and towns in the manner that will be most beneficial to the commonwealth.—"Conservation of Life."

Meeting of Clay Products Association

A number of very excellent papers were presented at the annual meeting of the Canadian National Clay Products Association held recently at the Prince George Hotel, Toronto. These related principally to the technical side of the industry in reference to economy of production of clay products, and the discussions which took place at the well attended daily sessions showed an interested and wide awake spirit on the part

VIEW OF STAGE, NEW PRINCESS THEATRE, MONTREAL. D. J. SPENCE, ARCHITECT.

of the members in the affairs and objects of the Association.

The Secretary-Treasurer presented an excellent report which showed a satisfactory working balance on hand. The annual banquet, as usual, was a big social success, and was presided over by Mr. Joseph Russell, M.P.P., with Mayor Church, Rev. A. Logan Geggie and Miss Margaret Davidson as the evening's guests.

The officers of the Association for the following year are as follows: Past President, A. F. Greaves-Walker, Baltimore, Md.; President, Thomas Kennedy, Swansea; 1st Vice-President, Wm. Burgess, Todmorden; 2nd Vice-President, Ryland H. New, Hamilton; 3rd Vice-President, G. Angus German, Toronto; Secretary-Treasurer, Gordon C. Keith, Toronto.

Councillors — Chas. B. Lewis, Toronto; John S. McCannell, Milton; J. Edward Frid, Hamilton; Walter Clark, Corunna; N. T. Gagnon, Montreal; T. H. Graham, Inglewood; Andrew Dods, Mimico; and Chas. A. Millar, Toronto.

Chairman Technical Education Committee — Millard F. Gibson, Toronto.

Chairman Entertainment Committee—Charles A. Millar, Toronto.

AUDITORIUM, NEW PRINCESS THEATRE, MONTREAL.

CONSTRUCTION

A · JOURNAL · FOR · THE ARCHITECTURAL ENGINEERING · AND · CONTRACTING INTERESTS · OF · CANADA

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CONTRIBUTIONS.—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and returned.

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Modern Theatres

One hardly subscribes to the opinion of the Manitoba censor who would delete comedy from the movie and immure us with sober and tragic themes to bring us more in accord with the grim aspect of transpiring events. The active and healthy mind in fact demands a certain amount of diversion and entertainment to keep it at its best; and especially in distressing times such as the present whatever form of wholesome recreation and amusement the stage offers, serves to lure us momentarily at least from too deep a state of morbid realism.

Briefly, it is its great scope for variety as well as its purely educational side which makes the theatre a great institution and of sufficient civic importance to entitle it to the fullest architectural investment. Fortunately, the present adverse conditions have not altogether deterred its development, but rather has a number of noteworthy structures for this purpose been erected in Canada during the war. Several of the more recent of these are illustrated in this issue of CONSTRUCTION, and represent the legitimate drama, vaudeville, and the above phase of histrionic art, the movie. In part at least these subjects show a very clear grasp of the problems involved, and a understanding of the underlying principles of design to obtain an atmosphere of refinement and convenience and comfort in plan and furnishings. Certain of the schemes in fact strike a new note in theatre construction, not so much in the sense of something absolute new or revolutionary in character but in certain adjustments of plan and decorative treatment. The very character of these new playhouses will, undoubtedly, exert a stimulating influence on the popular mind. They will likewise prove a handsome source of revenue to the Government in the way of war tax which the people seem willing to pay, and are interesting to say the least, as indicating progress in modern theatre design.

P. Q. A. A. Annual Meeting

The annual election of officers for the Quebec Association of Architects has resulted as follows: President, Mr. J. A. Monette; 1st vice-president, Mr. J. A. LeBon; 2nd vice-president, Mr. D. Norman McVicar; secretary, Mr. J. Emile Vanier; treasurer, Mr. D. M. Miller; members of Council, Messrs. U. J. Asselin, A. Beaugrand-Champagne, Herbert Raine, G. R. Macdonald and L. A. Auger.

It was decided at the meeting to approach the Montreal Legislative Committee in reference to the long deferred building by-laws, with a view to having the new regulations passed and made effective. The acceptance of an invitation from the Board of Control to meet with representatives of that body to discuss matters of mutual interest was also approved and a committee appointed for that purpose.

Toronto Exchange Elects Officers

The following were elected officers for 1918 at the annual meeting of the Toronto Builders' Exchange held on January 21st: President, W. E. Dillon; past president, S. R. Hughes; vice-president, Walter Davidson; 1st vice-president, A. D. Grant; treasurer, John Aldrich; directors, Geo. Oakley, Chas. Bulley, Wm. Clark, Jr., E. Geary, Jas. Munro, Geo. Gander; auditors, Arthur N. Dancy, Jas. Barnes; secretary, D. J. Davidge.

In addition to a discussion of the Compensation Act and Lien Law and the transaction of general business, the meeting was also made the occasion of the presentation of a steamer trunk, club bag and purse of money to Mr. Geo. McSweeney, late secretary, who is now a member of the R. N. F. Corps. It was also decided to inaugurate a campaign to increase the membership and a committee consisting of Messrs. Jas. Munro, C. T. Penn, W. J. Nicholson, R. Falkiner, A. D. Grant, H. Feather, J. Scott and H. Jennings, was appointed for this purpose.

Owing to the fact that the entire building at the corner of Richmond and Simcoe Streets will be required by the Goodyear Company, the Exchange has been forced to vacate these premises and is now located on the second floor of the Land Security & Savings Building, at the south west corner of Adelaide and Victoria Streets where very central and desirable quarters have been secured.

Canadian Building and Construction News

BUSINESS BUILDINGS.

London, Ont.—The Italian Mosaic & Marble Company, Crown Tailoring Building, Toronto, have been awarded the contract for the tile work in connection with the new $100,000 Hydro Office & Sales Building, now in course of construction on Dundas street. L. B. Carrothers, London, is the architect.

London, Ont.—Architects Watt & Blackwell, Bank of Toronto Building, have completed plans for a branch building to be erected on Market Square for the Huron & Erie Loan Company, 142 Richmond street. Work on the building, which is to be a three-story structure, will start shortly. It will cost $30,000.

Ottawa, Ont.—A nine-story Government office building, to cost $1,000,000, is to be erected on the old Museum site on O'Connor street. Plans are now being prepared by the Department of Public Works, of which Hon. F. B. Carvell is Minister, and tenders will be called shortly. The old buildings on the property are being demolished.

Sudbury, Ont.—Plans have been completed for a three-story building, to contain stores and apartments, for P. Bertram, to replace the structure recently destroyed by fire. The building will be of brick construction, modern throughout, and cost $20,000. P. J. O'Gorman is the architect.

Toronto, Ont.—The following contracts have been awarded for a new restaurant building to be erected at the corner of Young and Wilton avenue for the Childs Company, Yonge and Richmond streets: Steel Reid & Brown, Esplanade East; plastering, R. C. Dancy, 153 Spadina road; glass, Hobbs Mfg. Co., 279 King street west; painting, J. McCausland & Son, 11 Nelson street. J. C. Westervelt, 36 West 34th street, New York City, is the architect. Work of dismantling the old building on site is now in progress. The new structure will cost $60,000.

CLUBS AND HOSPITALS.

Kitchener, Ont.—The Kitchener & Waterloo General Hospitals has been damaged to the extent of $4,000.

Lindsay, Ont.—Architect I. Hornsby has completed plans for improvements to the Great War Veterans' Association Club House. The building will be newly decorated and provided with electric fixtures, new furniture and modern bathroom facilities.

Toronto, Ont.—James, Loudon & Hertzberg, Excelsior Life Building, have completed plans for an addition to the National Cash Register Company's building on Christie street, which has been acquired by the Military Hospital Commission for hospital purposes. The new part will consist of a two-story addition, 220 x 40 ft., together with a wing 200 x 40. The construction will be of brick, steel and concrete, and the equipment will be modern throughout. McGregor & McIntyre, 1139 Shaw street, and the Dominion Bridge Company, Imperial Oil Building, have a joint contract for the steel work. It is understood that the other trades will be carried out by the staff of the Hospital Commission.

FACTORIES AND WAREHOUSES.

Chatham, Ont.—Work is in progress in rebuilding the factory of the Canadian Des Moines Steel Company, recently destroyed by fire to the extent of $15,000.

Fort William, Ont.—Tenders have been received for a shipbuilding plant, 220 x 200, to be erected for the Canada Car & Foundry Company.

London, Ont.—Work is in progress on general alterations to the warehouse of the London Shoe Company. Cost $3,000.

London, Ont.—The Utilities Board will erect a two-story brick addition, to cost $60,000, to the local Hydro station. L. B. Carrothers is the architect, and work is to start in the spring. The necessary machinery has been ordered from the Canadian Westinghouse Company, Hamilton, Ont.

Renfrew, Ont.—Work is in progress on the erection of a three-story grain elevator of frame construction for the Interprovincial Milling Company. M. J. O'Brien has the general contract. Cost $2,000.

Toronto, Ont.—The T. Eaton Company, Limited, 190 Yonge street, is contemplating the erection of a distributing warehouse in the west end of the city. Site not yet selected.

Toronto, Ont.—Tenders have been received for the erection of a two-story, 75 x 30, brick addition to the Cecilian Company's factory, corner of Defoe and Stafford streets. Oborn & Ellis, 22 College street, are the architects.

Toronto, Ont.—Architects Hynes, Feldman & Watson, 105 Bond street, have received tenders for a four-story, 56 x 135 ft. reinforced concrete warehouse to be built on Wellington street, near Portland street. A sprinkler system will be installed and the equipment will be modern throughout.

Toronto, Ont.—Operations are to start shortly on the new $1,000,000 warehouse to be erected at Bayside Park, for the T. Eaton Company, Limited, 190 Yonge street. The structure will be eight storys, 408 x 242 ft., and will be fireproof throughout. The necessary steel required for its construction is now being rolled, and the excavating of the site will likely be undertaken without delay. It is understood that two additional buildings of equal size will be built at a future date. Graham, Anderson, Provost & White, Railway Exchange Building, Chicago, Ill., are the architects, and Sproatt & Rolph, Ryrie Bldg., Toronto, associates.

MISCELLANEOUS.

Corunna, Ont.—Robt. Irvin, Sarnia, has the contract for a frame boathouse and garage to be built at this place for Geo. McCormack, London, Ont. Cost $5,000. W. G. Murray, Dominion Savings Building, London, is the architect.

Halifax, N.S.—The Public Works Department, Ottawa, has just closed tenders for the reconstruction of the steel roof in connection with the drill hall at this place.

London, Ont.—It is understood that the Marcus Loew Syndicate is contemplating the erection of a new theatre building at this place.

Brantford Township, Ont.—The Township Council will shortly erect two reinforced concrete bridges.

Ottawa, Ont.—The time for receiving tenders for rolled steel casements and bronze covered frames and sash, required in connection with the new Parliament Buildings, has been extended until March 18th.

Ottawa, Ont.—Tenders will be received until March 18th for the heating and ventilating equipment required in the reconstruction of the Parliament Buildings. Full information may be obtained from the general contractors, P. Lyall & Sons Construction, Ottawa.

Renfrew, Ont.—The British Explosives, Limited, is changing the power in its condensor plant from steam to electricity.

Saskatoon, Sask.—Tenders will be received by the Department of Public Works, Ottawa, until March 4th, for supply and installing a freight elevator in the Post Office, Saskatoon. Plans are on file at the office of Clerk of Works, Regina; Post Master, Saskatoon; Resident Architect, 802 Lindsay Building, Winnipeg, and at the above Department, Ottawa.

RESIDENCES.

Barryvale, Ont.—M. J. O'Brien, contractor, Renfrew, will build an additional story to his summer residence at this place. Cost $3,000.

Burlington, Ont.—J. B. Gillies, 55 Burton street, Hamilton, Ontario, is contemplating the erection of a large modern residence on the Lake Shore road.

Calabogie, Ont.—The Calabogie Light & Power Company will erect one detached and one double house for their employees, at a total cost of $9,000. M. J. O'Brien, Renfrew, Ont., is the general contractor.

Eagle Lake, Ont.—The new residence being erected for Sir Sam Hughes, Lindsay, will be finished with stucco work in the spring. It is understood that the structure will be converted to club purposes. Furniture and equipment are still to be installed. Total cost $30,000. Col. Bob Lowe, Ottawa and Halifax, is the architect and general contractor.

SCHOOLS.

Cobourg, Ont.—Tenders have closed for the erection of an addition to the public school. It is understood that the work will cost in the neighborhood of $30,000. Chapman & McGiffin, 95 King street east, Toronto, are the architects, and H. Boggs, Secretary of the Board.

Lorne Park, Ont.—The Board of School Trustees (Mr. Addison, chairman) is contemplating the erection of a new school.

Toronto, Ont.—The Board of Education, 155 College street, is contemplating the erection of a twenty-nine-roomed school on Glengrove avenue, North Toronto. Work will start in the spring.

March, 1918 Volume XI, No. 3

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THE T. EATON COMPANY'S NEW FACTORY, TORONTO. WM. STEELE & SONS COMPANY, ARCHITECTS

HONOR ROLL

ONTARIO

NAME	CITY	RANK AND UNIT	FIRM
Anderson, C. P.**	Toronto		Sproatt & Rolph
Baldwin, L. C. M.**	Toronto		Sproatt & Rolph
Barber, A. H.*	Toronto	53rd Battery	
Beattie, J. Lindsay **	Toronto	Pte.	Hynes-Feldman-Watson
‡Beckett, S.*	Toronto	Lt.-Col., 75th Bn.	Chadwick & Beckett
‡Beckett, S.*	Kingston		E. R. Beckwith
Beggs, Neil G.*	Toronto	Lieut., Can. Engineers	Neil G. Beggs
Bishop, R. H.**	Toronto	Lieut., Can. Engineers	Sproatt & Rolph
Booth, H. H.**	Toronto	Flight Lieut., R.N.A.S.	Sproatt & Rolph
Boyd, James **	London		W. G. Murray
Brewster, Cyril J.**	Fernvale, B.C.	Canadian Engineers	E. G. Bird
Bridge, Arthur B.**	Toronto	Corporal, 95th Bn.	Chapman & McGiffin
Burden, H. J.**	Toronto	Lieut., 75th Bn.	Sproatt & Rolph
Burritt, C. J.*	Ottawa	Lt.-Col., R.C.E.	
†Cauchon, J. E. J.*	Port Arthur	Capt., 52nd Canadians	
Chadwick, Vaux *	Toronto	Lt.-Col., 124th Bn.	Chadwick & Beckett
Collier, P.**	London	Corpl., Signal Section	Watt & Blackwell
Connor, John **	London		W. G. Murray
Craig, J. H.	Toronto	Capt.-Adjutant, 127th	Craig & Madill
Darrach, Neil R.	Regina	Pte., 68th Bn.	
Davidson, Ernest **	Toronto	Lieut.	Hynes-Feldman-Watson
Dillon, Murray **	Toronto	Lieut.	Hynes-Feldman-Watson
Evans, Geo. Thos.*	Hamilton	Lt., C.A.S.C.	
Everett, Arthur J.*	Toronto	Lt., Cavalry	
Fryer, S. F. J.*	Hamilton		
George, Allan	Toronto		
Godwin, A. H.**	Toronto	Pte., P.P.C.L.I.	Sproatt & Rolph
Godwin, H.**	Toronto		Sproatt & Rolph
Green, Ed. L.		Lt., Artillery	
Grenville, Joseph **	London		
Higginbotham, H. T.**	Toronto	Lieut.	Sproatt & Rolph
Howland, W. Ford *	Toronto	Maj. (Intelligence O.)	Langley & Howland
Jacques, G. J. P.*	Windsor	Lt., 11th F. Co., C.E.	G. Jacques & Co.
Lawson, T. Irving **	Toronto		
Leighton, J.**	Windsor		J. C. Pennington
Lennox, Charles	Toronto	Corp., 3rd Bn.	E. J. Lennox
Livingston, H. L. D.*	North Bay	125th Bn., Brantford	
Logan, W. McGregor **	Hamilton	Sapper, Can. Div. Sig.	Stewart & Witton
MacMurchy, Wm. C.**	London	Pte., 3rd Division	Watt & Blackwell
Madill, H. H.*	Toronto	Lt., Staff, School of Inf.	Craig & Madill
Martin, A. N.**	Toronto		Sproatt & Rolph
Martin, Ellis **	London		Watt & Blackwell
Masson, Geo.**	Windsor		J. C. Pennington
Marani, F. H.**	Toronto	Captain	Sproatt & Rolph
McConnell, A. Wellesley	Toronto	Major, 116th Bn.	Toronto University

‡Killed. §Died of Wounds. †Wounded. ¶Prisoner of War.

ONTARIO—*Continued*

NAME	CITY	RANK AND UNIT	FIRM
‡McDougal, E. A.**	Toronto	Major, 9th Battery	Sproatt & Rolph
McGiffin, Robert P.	Toronto	Major, R.C.E.	Chapman & McGiffin
Meredith, C. P.	Ottawa	Lt.-Col.	Colborne P. Meredith
Molesworth, G. N.	Toronto	Major, 124th Bn.	Geo. N. Molesworth
Moorehouse, W. N.	Toronto	Lieut., C.M.R.	
‡Morham, J. B.**	Toronto	Royal Scots	Sproatt & Rolph
Motyer, W. E. P.**	Toronto	Corp., A.S.C.	Sproatt & Rolph
Murray, J. J.**	Guelph		Tanner & Tanner
Page, Forsey C.*	Toronto	Lieut.	Page & Warrington
Pomphrey, —**	Toronto	Sergt., 48th Highland's	Sproatt & Rolph
Raymond, F. C.**	London	Sergt., Engineers	J. M. Moore
Rennie, Gordon **	Toronto	Lieut.	Eden Smith & Sons
Rhodes, W.**	Toronto	Trooper, Colonial Corps	Sproatt & Rolph
Richardson, Geo. B.**	Toronto	Lt., 75th Battery	Stevens & Lee
Riddell, Bruce**	London		Watt & Blackwell
Robinson, N.B.**	Toronto	Signal Corps	Board of Education
‡Rutter, Guy W.**	Toronto	Lieut., 4th C.M.R.	Sproatt & Rolph
Shaver, W. T.**	Toronto	Pte., 4th Gen. Hosp.	Stevens & Lee
Smith, H. Eden*	Toronto	Maj., 3rd Bn., 1st Div.	Eden Smith & Son
Smith, Sanford*	Toronto	Lt.-Col.	Bond & Smith
‡Soper, R. W.	Sarnia		Russell Wright Soper
Spencer, A. F.**	Toronto	Lieut., 95th Bn.	Sproatt & Rolph
‡Stewart, Walter W.*	Hamilton	Lt.-Col., 86th M.G. Bn.	Stewart & Witton
Sutherland, Alex.**	Port Arthur		Wm. Hood
†Sutherland, G. M.**	Toronto	Sgt., 48th Highlanders	Sproatt & Rolph
Symons, W. L.	Toronto	Capt. (Mil. Hosp. Com.)	Symons & Rea
Tennison, H. H.**	Toronto		Chapman & McGiffin
†Thomson, John G. **	Port Arthur		Wm. Hood
Warrington, Stanford*	Toronto	Lt.	Page & Warrington
Watson, A. E.	Toronto	Pte., Signal Corps	Hynes-Feldman-Watson
Watson, S. H. P.**	Toronto		Wm. R. Gregg
Watt, John M.*	London	Capt. (Active Service)	
¶Watt, Robert J.	London	13th Bn.	Watt & Blackwell
West, Gordon M.	Toronto	Captain, 124th Bn.	
Wilkes, J. H.**	Toronto	Lieut., C.M.R.	Sproatt & Rolph
Zeigler, Karl **	London	Lieut., 18th Bn.	Watt & Blackwell

*Member of Ontario Association of Architects. **Draughtsman.

BRITISH COLUMBIA

Beetson, J. D.	Vancouver	6th D.C.O.R.	Jones & Beetson
Bird, A. J.*	Vancouver	C.A.S.C.	A. J. Bird
Blackadder, H.	Vancouver	Engineers	Blackadder & MacKay
Birds, S. B.*	Vancouver	72nd Bn.	S. B. Birds
Berill, R.**	Victoria		Percy Fox
‡Bowie, G. P.*	Vancouver	B.C. Horse	G. P. Bowie
Cross, Franklin	Vancouver		Franklin Cross
Dalton, A. T.*	Vancouver	68th Batt., C.F.A.	Dalton & Eveleigh
Culhurn, H.**	Vancouver		J. Bowman
Davie, H. S.*	Vancouver	B.C. Horse	Doctor, Stewart & Davie
Day, J. C.*	Vancouver	B.C. Horse	Parr, Mackenzie & Day
Downing, M.*	Vancouver	Motor Boat Patrol	G. P. Bowie
‡Fox, C. C.*	Vancouver	East Surrey Regt.	MacClure & Fox

‡Killed. §Died of Wounds. †Wounded. ¶Prisoner of War.

BRITISH COLUMBIA—*Continued*

NAME	CITY	RANK AND UNIT	FIRM
Fraser, Kenneth	Vancouver	Engineers	Kenneth Fraser
§Fripp, Geo. M.*	Vancouver	B.C. Horse	R. Mackay Fripp
Gardiner, Wm. F.	Vancouver	6th D.C.O.R.	Wm. F. Gardiner
Helyer, M.	Vancouver	62nd Bn.	Helyer & Archer
Hope, A. C.	Vancouver	Western Irish	A. Campbell Hope
‡Jamieson, Douglas*	Vancouver	62nd Bn.	Barker & Jamieson
Kayll, S. A.*	Vancouver	68th Battery, C.F.A.	R. Mackay Fripp
Mawson, J. W.	Vancouver	68th Battery, C.F.A.	T. H. Mawson & Son
Perry, R. T.	Vancouver	C.A.S.C.	Perry & Fowler
Sharp, G. L. T.	Vancouver	62nd Bn.	Sharp & Thompson
Stewart, W. F. T.	Vancouver	Forestry Battalion	Doctor, Stewart & Davie

*Member of Architectural Institute of British Columbia. **Draughtsman.

SASKATCHEWAN

Albrechtson, H. C. A.*	Prince Albert	Lt.-Col., 223rd Bn. (Scandinavians)	
Albrechtson, Oluf	Prince Albert		Oluf Albrechtson
Archibalt, L.	Regina		Reilly, Dawson & Reilly
Bissett, Fenton*	Regina	Capt., Brit. Territorials	Reilly, Dawson & Reilly
Buchanan, A.*	Regina	Lt., Engineers	[Colthurst
Colthurst, G. B.*	Saskatoon	Munitions	Thompson, Daniel &
Crockhart, J.*	Saskatoon	Munitions	Thompson & Crockhart
Clemesha, F. C.*	Regina	Capt., 46 Batt, 11 Bde.	Clemesha & Portnall
Greenwell, A.**	Regina		Storey & Van Egmond
Illingworth, A. J. A.*	Regina	Capt., 46th Batt.	
Johnston, E.**	Prince Albert		Oluf Albrechtson
Knight, F. W.*	Regina	Q.M.S., 68th Bn.	
Morrison, J. M.*	Prince Albert	Sergt., 243rd Bn.	J. M. Morrison
McLean, J. A.*	Saskatoon		J. A. McLean
O'Leary, F. J.*	Saskatoon	Staff-Capt., 11th Bde.	O'Leary & Delay
Owen-Lloyd, H. E.*	Moose Jaw		
Pickering, A.**	Regina		Reilly, Dawson & Reilly
Puntin, J. H.*	Regina	Capt., Engineers	J. H. Puntin
Portnall, F. H.*	Regina	Lt., 46th Bn.	Clemesha & Portnall
‡Ponton, J. R.*	Moose Jaw	Lt., 45th Bn.	J. R. Ponton
‡Richardson, Alan*	Saskatoon	Lt., Artillery	
Roy, Frank**	Saskatoon		R. M. Thompson
Stephenson, Geo. J.*	N. Battleford	Lt., A.S.C.	Stephenson & Evans
Stewart, Hugh**	Moose Jaw		R. C. Bunyard
Storey, S. E.*	Regina	Mech. Tsp., A.S.C.	Storey & Van Egmond
Thompson, R. M.*	Saskatoon	Lt., Engineers	R. M. Thompson
Smith, A. H.**	Regina		Storey & Van Egmond
Smith, Sholto*	Moose Jaw	Lt., 28th Bn.	Sholto Smith
Turnbull, F. L.*	Saskatoon	Lt., Engineers	Buganhagen & Turnbull
Webster, D.*	Saskatoon	Lt., Engineers	D. Webster
Whiddington, W. A.*	Swift Current	Artists' Rifles	

*Member of Saskatchewan Association of Architects. **Draughtsman.

MANITOBA

Barand, H. J.**	Winnipeg		James Chisholm & Son
Chivers, C. W. U.*	Winnipeg		C. W. U. Chivers
Hawker, J. W.	Winnipeg	Major	James Chisholm & Son

‡Killed. §Died of Wounds. †Wounded. ¶Prisoner of War.

MANITOBA—*Continued*

NAME	CITY	RANK AND UNIT	FIRM
Holman, H. G.*	Winnipeg		H. G. Holman
†Kirkpatrick, J. H.**	Winnipeg		James Chisholm & Son
Limnell, H. R.*	Winnipeg		J. D. Atchison
Marshall, D.*	Winnipeg		
Mitchell, J. B.*	Winnipeg		
McLaughlin, W. H.**	Winnipeg		James Chisholm & Son
MacMurray, W. A.**	Winnipeg		James Chisholm & Son
Mounsey, C. H.*	Winnipeg		
Northwood, Geo. W.*	Winnipeg		Geo. W. Northwood
Powell, T. T.**	Winnipeg		James Chisholm & Son
Ross, D. A.*	Winnipeg		Pratt & Ross
Rugh, H. B.*	Winnipeg		H. B. Rugh
Semmens, J. N.*	Winnipeg		J. N. Semmens
Shillinglaw, W. H.*	Brandon		W. H. Shillinglaw
West, J. P.*	Winnipeg		

*Member of Manitoba Association of Architects. **Draughtsman.

QUEBEC

Adamson, J. E.*	Montreal		J. E. Adamson
Blackader, G. H.*	Montreal	Capt.	Barott, Blackader & [Webster
‡Buce, —**	Montreal		Francis S. Swales
Bush, —**	Montreal		Francis S. Swales
Campbell, K. M.**	Montreal	Lieut.	D. H. McFarlane
Carless, Wm.*	Montreal	Lieut.	Turner & Carless
Colville, D.**	Montreal	Lieut.	D. H. McFarlane
‡Desqueyroux, E. A.**	Montreal		Viau & Venne
Fetherstonhaugh, H. L.*	Montreal	Capt.	J. Cecil McDougall
Findley, F. R.*	Montreal		
‡Fyson, —**	Montreal		Francis S. Swales
Gell, —**	Montreal		Francis S. Swales
Harkness, —**	Montreal		Francis S. Swales
Imray, —**	Montreal		Francis S. Swales
McLeod, —**	Montreal		Francis S. Swales
Nobbs, P. E.*	Montreal		Nobbs & Hyde
Peck, Hugh*	Montreal		
Prowse, —**	Montreal		Francis S. Swales
‡Romney, Wm. F.**	Montreal		Viau & Venne
‡Rutledge, —**	Montreal		Francis S. Swales
Rotier, A. C.*	Montreal		
‡Richardson, A. I.*	Montreal		
Shorey, H. E.*	Montreal		H. E. Shorey
‡Sowerby, D.** (a)	Montreal		Francis S. Swales
Swales, S. F.**	Montreal		Francis S. Swales
‡Thompson, —**	Montreal		Francis S. Swales

(a) M.C., Croix de la Guerre.

*Member of Quebec Association of Architects. **Draughtsman.

ALBERTA

Adams, A. S.*	Edmonton	Lieut.	
Armour, J. G.**	Edmonton	Lieut., 202nd Bn.	Provincial Government.
Basevi, —**	Calgary	Lieut., 50th Bn.	Holman & Gotch

‡Killed. §Died of Wounds. †Wounded. ¶Prisoner of War.

ALBERTA—*Continued*

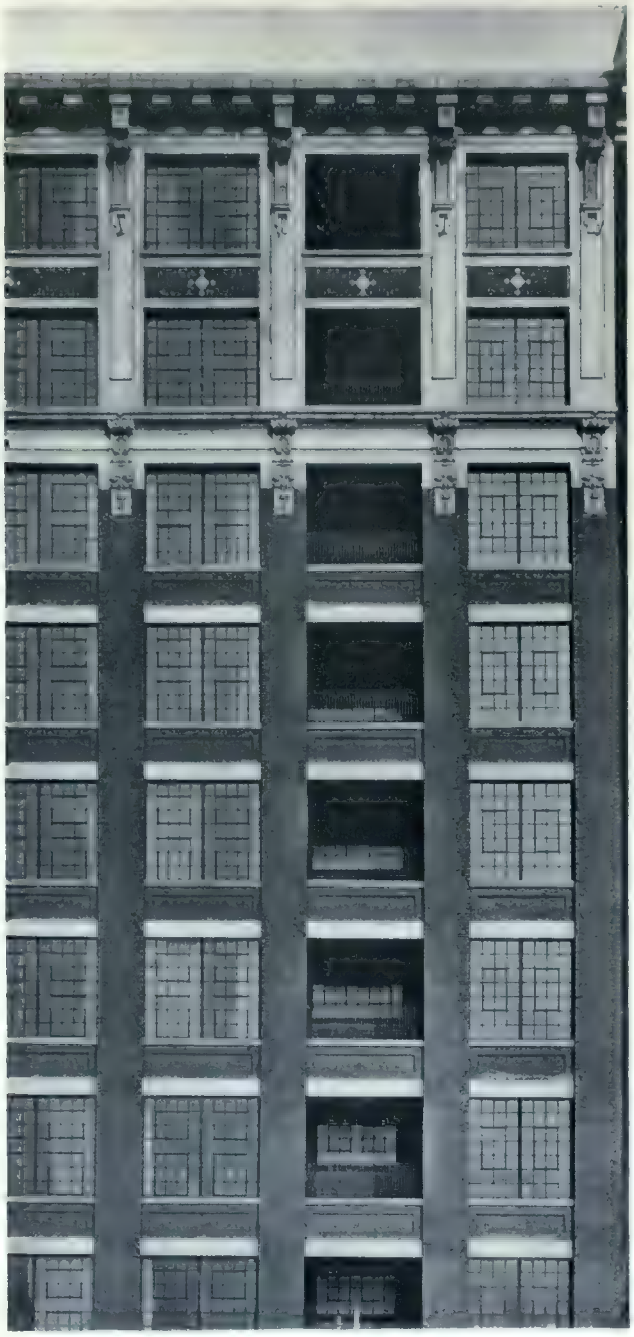
NAME	CITY	RANK AND UNIT	FIRM
Beattie, —*	Calgary	Lieut., A.S.C.	Hodgson, Bates, Beattie
‡Beswick, Cecil E.*	Edmonton	Lieut.	
Boyd, David **	Edmonton	Royal Engineers	J. Henderson
‡Buckton, A. Scott **	Edmonton	Captain	Provincial Government
Burgess, C. E.*	Edmonton	Captain, 196th Bn.	Alberta University
Calderon, A. M.*	Edmonton	Captain	
‡Campbell, Thomas **	Edmonton	Princess Patricia's.	City Offices
Cauchon, J. E.*	Edmonton	Captain	J. E. Cauchon
†Collin, P. B.**	Calgary	Lieut., 31st Bn.	Holman & Gotch
Eccles, Erskine**	Calgary	Lieut., 31st Bn.	Holman & Gotch
Fry, C. H.**	Edmonton		R. W. Lines
German, H. V.**	Medicine Hat	Sergt., M.R.	Mr. Williams
Gibbs, Lionel C.*	Edmonton	Q.M.S., 196th Bn.	Barnes & Gibbs
Gotch, L. M.*	Calgary	Capt., I.S.	
‡Hall, Norman **	Edmonton		
Healing, J. B. (Ass.)	Edmonton	19th Alberta Dragoons	
Hardy, Philip **	Edmonton	Lieut., Tank S.	
Hunt, Oliver **	Edmonton	Lieut., Royal Lancs.	R. W. Lines
‡Lines, Rowland W.*	Edmonton	Captain, R. E.	R. W. Lines
Langley, Robert **	Edmonton	Lieut.	
‡Lawson, F., Jr.**	Calgary	Lieut., 82nd Bn.	Lawson & Fordyce
Lowe, Cecil **	Edmonton		R. P. Barnes
McClinton, A. Norman **	Lethbridge	Lieut.	
†McNicol, David **	Edmonton	Lieut., 63rd Bn.	Provincial Government
Oliver, Frank **	Lethbridge		
Phillips, A. T.**	Calgary		Holman & Gotch
†Tricker, Bert.**	Edmonton		J. Henderson
‡Walker, H. N.**	Edmonton	Lieut., S. Staffords	Provincial Government
¶Wigsell, Norman **	Edmonton		R. W. Lines

*Member of Alberta Association of Architects. **Draughtsman.

‡Killed. §Died of Wounds. †Wounded. ¶Prisoner of War.

T. Eaton Company's New Factory, Toronto

THE type of construction employed in the new factory recently completed for The T. Eaton Company differs in certain respects from the usual method of reinforced concrete design, in that the slab system throughout the entire lower eight floors is supported by steel cored columns instead of the more customary mono-



OPENING OR AIR SPACE ADJOINING ENCLOSED STAIRCASE.

lithic type. It also differs somewhat in the type of floor slab adopted, in that the reinforcing consists of short straight bars so employed as to entirely eliminate the necessity of any bends. While this method has been employed to some extent in certain of the American cities, its introduction in Canada is comparatively recent.

The photographic illustration and diagram on page 81 explains this system quite clearly. It shows an arrangement which obtains with the use of short bars, a four-way reinforcement for the main panel and a two-way reinforcement for the column head. Diagonal and rectangular bands placed in the lower part of the slab take up the main slab stresses, while a separate mat consisting of a cross bar frame is placed over the column head to reinforce the slab against the negative moment. The average panel measures 20 feet square, and the columns, which are circular in design, are provided with capitals and drop heads 5 inches deep and 8 feet square. The columns all have steel cores, with the exception of the upper four floors, which are of concrete. The steel cores consist of heavy 12-inch H members, reinforced with plates and built around with concrete to a diameter ranging from 22 to 28 inches. By using these steel cores a column of much smaller diameter than would otherwise be required is made possible.

The building itself is twelve storeys high, covering an L shaped site, with approximate frontages of 228 ft. and 166 ft., on Alice street and Downey lane respectively. The first floor level is 5 ft. below grade, and the height of the various floors is 14 ft., with the exception of the basement, which has a 13 ft. clearance, and the first two storeys, which have a height of 15 ft.

The floor slabs are quite heavy, varying in thickness according to their relative loading. Especially is this the case as regards the second floor, which is designed for a live load of 350 pounds per square foot, and which is $11\frac{1}{2}$ inches in depth, with $1\frac{1}{2}$-inch finish. The third floor slab is 9 inches thick, and is designed for 250 pounds per square foot, while the typical floors, $7\frac{1}{2}$ inches in depth, are designed to carry 150 pounds per square foot.

All of the reinforcing steel consists of $1\frac{1}{2}$-inch square twisted rods, arranged as previously stated, in rectangular and diagonal bands, and so placed as to extend from column to column without protruding beyond the limits of one panel. The position of the bars in the slabs, as graphically indicated in the accompanying diagram or schedule, which also shows the number and length of the rods used. Only short, straight bars are employed, and in no case are the rods bent. The rectangular bands for the interior panels comprise 13 bars, 13 ft. in length, spaced 9-inch centres. Each band lays on three $\frac{3}{8}$-inch rods, 10 ft. long, held by 1-inch chairs, and placed at right angles to the band rods, with one inch of concrete underneath.

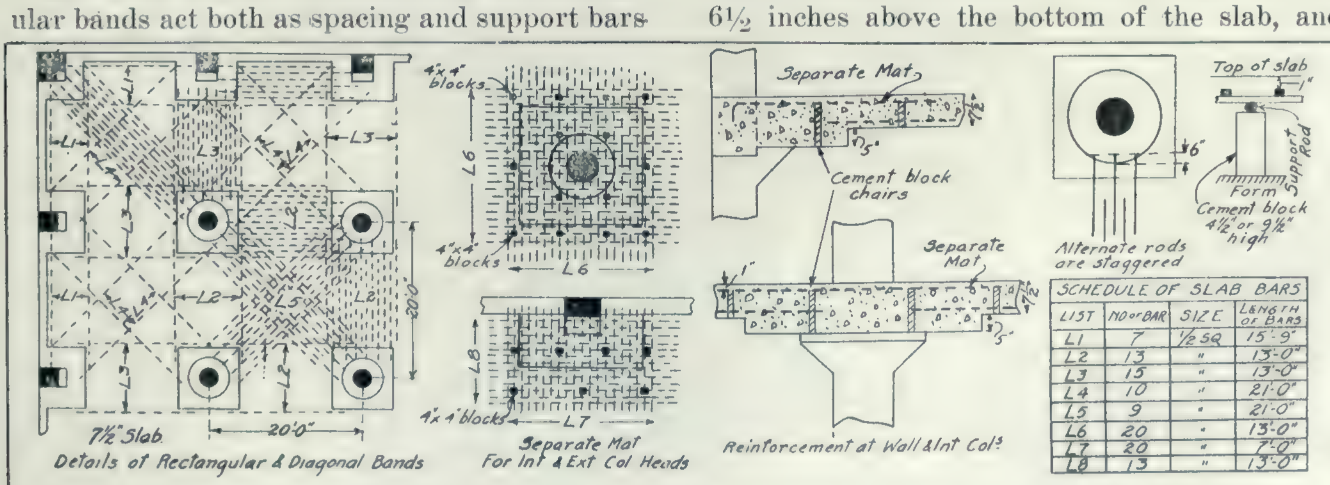
VIEW SHOWING SLAB REINFORCEMENT AND STEEL CORES OF COLUMNS, THE T. EATON COMPANY'S NEW FACTORY, TORONTO.

The diagonal rods are 21 ft. long, spaced 10-inch centres, and are likewise wired together and supported on chairs. Both the rectangular and diagonal members are staggered so that alternate bars extend 6 inches over the column head.

In the exterior panels, the rectangular bands have 15 rods with $8\frac{1}{2}$-inch spacing, while the diagonal bands have 10 bars with 9-inch spacing. The straight wall bands of the exterior panels consists of 7 bars, 15 ft. 9 in. long, spaced $8\frac{1}{2}$ inches apart.

The three support rods carrying the rectangular bands act both as spacing and support bars and to take the temperature and shrinkage stresses.

The rods comprising the mats which take up the moment at the column heads are placed in opposite directions. Twenty rods 13 ft. long are used each way. They are tied together at from 4 to 6-inch spacing, and have four $\frac{3}{4}$-inch round steel supporting rods 10 ft. in length, which rest on concrete blocks 4 x 4 in section. The concrete blocks are $4\frac{1}{2}$-inch or $9\frac{1}{2}$-inch deep, according to their position in the main slab, or in the drop head. Allowance is made for one inch of concrete over the mat, which fully protects the steel. This brings the mat $6\frac{1}{2}$ inches above the bottom of the slab, and



SCHEDULE OF SLAB BARS			
LIST	NO OF BAR	SIZE	LENGTH OF BARS
L1	7	½ SQ	15'-9"
L2	13	"	13'-0"
L3	15	"	13'-0"
L4	10	"	21'-0"
L5	9	"	21'-0"
L6	20	"	13'-0"
L7	20	"	7'-0"
L8	13	"	13'-0"

DETAILS OF FLOOR SLAB REINFORCEMENT, THE T. EATON COMPANY'S NEW FACTORY, TORONTO.

VIEW SHOWING TYPICAL FINISHED COLUMNS, THE T. EATON COMPANY'S NEW FACTORY, TORONTO.

leaves about 5 inches between the mat and bottom steel. As regards the exterior columns, which are square and provided with brackets and drop heads, a half mat is used. This consists of 13 longitudinal rods 13 ft. long, and 20 transverse bars 7 ft. long, having 3-inch right angle hooks to bond into the wall lintels. These rods are spaced at 6 inches, two support rods of $\frac{3}{4}$-inch round steel 10 ft. long being used with cement block supports.

ENCLOSED STAIRCASE, THE T. EATON COMPANY'S NEW FACTORY, TORONTO.

The building rests on one hundred and ten, 4 x 4 ft., concrete footings, 4 ft. deep, and spreading to 16 ft. at base. These footings are reinforced four ways with mats employing six 1-inch rods 14 ft. long in longitudinal and transverse directions in the two lower mats, and diagonally placed rods $1\frac{1}{4}$-inch in the two upper mats, four rods 18 ft. long being used in one mat, and eight rods 15 ft. 3 in. long in the other. The weight of the columns in each case rests or bears on a grillage of I-beams, which distributes the load over the concrete footings.

While the type of construction adopted miminizes any risk from fire, an extra measure of safety is provided in the outside openings, or courts, on each floor leading to enclosed fireproof stairs situated at both the east and west ends of the building. This feature of the plan is demanded as a necessary provision in factory construction by the building regulations by the city of Philadelphia, and is something which gives promise of being more widely adopted. Not only does it form an outside air space, separating the stair well from the main portion

VIEW FROM TRINITY SQUARE OF THE. T. EATON COMPANY'S NEW FACTORY, TORONTO. WM. STEELE & SONS COMPANY ARCHITECTS.

of the building, but serves at the same time to more completely isolate the latter without in any way making it less accessible. The staircases have been carefully planned, and are built of reinforced concrete. They consist of a double stairs 7 ft. wide, provided by a metal rail and leading to a landing, and from there on to 3½ ft. single stairs, turning to right and left to the floor below. This arrangement serves to divide the crowd and prevent congestion in case of emergency.

The exterior of the building is of brick with stone and terra cotta trimmings, most of the wall space being taken up by windows set in metal sash.

PENT HOUSE, SHOWING ELEVATOR MACHINERY, THE T. EATON COMPANY'S NEW FACTORY, TORONTO.

The Function of An Architectural Society *

By MR. SIDNEY WEBB

MAY I explain, at the outset, that I make no pretence at knowing anything whatever about architecture, or about the history of architecture? The suggestions I have to make come from another standpoint altogether. I have, as some of you know, written a sketch of your Institute as a professional association*; but I did not write it out of particular interest in your profession, nor from any interest in its subject of architecture. My business is public administration, and I took up your Institute as one of a number of similar bodies to see how the professional associations have developed during the present century; what work they have done, what have been their successes; the points on which they, I will not say have failed, but have laid themselves open to criticism; and to try to discover from the past history of the professional association what is the part it has to play in the world; what it can do, and what it ought not to do. I was interested in that subject because, twenty-five years ago, my wife and I spent six years in studying trade unionism; and in writing our books on this subject we stated, somewhere, that it was just as important that somebody should investigate the brain-workers' associations; and we suggested that they should be investigated. A year ago we took up the job for another purpose. The reason we took it up was that during the past ten or twenty years there has been a great revival and expansion of what I will call vocationalism in the world, especially in France, in this country, and in America. I mean by vocationalism the feeling that the vocation, the occupation, the trade to which a man belongs, is a much more important thing than is the parish, or the city, or the county, or even the country, to which he belongs; and that, therefore, he ought to associate very much more with people of his own craft, his own vocation, than merely with his geographical neighbors. And, moreover, it is the feeling that the part which he has to play in government, in democracy, ought, to a very large extent, to be played through his vocational organization. That feeling for vocationalism has been becoming stronger and stronger during the present century; you see it in all sorts of forms, good and bad alike. It would seem to lie at the back of the outbreak of Syndicalism in France; it lies at the bottom of the activities of the Industrial Workers of the World in the United States. You see it cropping up a great deal in French literature with regard to the brain-workers. We call it, for short, the Functional State, the idea being that the organization of the community ought to be based upon function, not, as it is almost entirely at present, upon geographical constituencies. I say no more about that.

But you will see that, in view of this feeling in the countries of the world, the structure and function of such professional associations as exist do become of considerable interest to more than their own members; and that is why I have ventured to lay hands on the history of your Institute to see what it would yield in the way of inspiration, or suggestion, or warning, upon the subject of professional associations.

I shall not say anything to-day about the stages of growth of your association. It is interesting that it began in 1834, after some forty years of feeble forerunners of one kind and another. That is interesting to me because all the professional associations began since the beginning of the nineteenth century; practically all the voluntary organizations of the brain-working professions can be included in the nineteenth century. Some of them are only now forming; such newer professions as the Accountants and the Secretaries are only now getting organized. And the yet newer professions, like the Managers in Industry, are still not yet organized. Your professional association began at the same time as some others; and it began, like many others, not as a professional association in the ordinary sense, but as what may be called, technically, a "subject association." The business of the Institute when it started was not to look after architects; it was to promote architecture, and therefore it included not only architects, but other people interested in architecture. And the reason why your Institute was so largely composed of amateurs at the beginning of its work was that it was a subject association, not a professional association. Its interest was in architecture, and amateurs who were interested in it not only had as much right in the association as the professionals, but they contributed quite a special element—an advantageous element, which, in becoming a mere professional association, you may have lost. You, like other professions, have devoted a good deal of time to professional education; and you, like other professions, have devoted much thought to the subject of professional registration. It is astonishing how alike all these professional bodies are, just as every trade is like every other trade—if its own people only knew it; they are deluded by differences in names, and each man thinks his own trade is peculiar. Every trade union is like the others, with the same veil over it; and so every brain-working

*Address delivered before the Royal Institute of British Architects.

profession has much in common with other brain-workers' associations. It is only a difference in technique and in nomenclature which obscures that likeness. I, standing outside, can see the points of resemblance, perhaps, better than the points of difference. And you, like other professional associations, are gradually elaborating your special code of professional ethics. Some have done it to a greater, others to a less extent. There is nothing peculiar in that, and I hope you will not think I am criticising your association when I say there is nothing peculiar in it—that it is strictly as a type of professional associations that I am able to take it.

What is the origin of these professional associations? We distinguish three impulses, as we call them, which have led the brain-working professions, historically, to associate themselves. The first is what we call the creative impulse; it is the desire to promote the art, or the science, to develop, extend and advance it in all directions. That is really akin to the artist's feeling and desire for creation, and the members of a profession come together and unite their efforts deliberately to advance the technique—the science and the art—of their vocation. This creative impulse lay at the root of most of the professional associations.

At the beginning of the nineteenth century professional association was looked very much askance at; it was regarded almost as a conspiracy against the public; and, consequently, this extremely admirable impulse of improving the technique of the profession provided an eligible starting ground. And along with that was the fellowship impulse, the desire of every man to associate with his kind. As a professional man becomes conscious of himself as such, he tends to come into relationship with other professionals. And out of that has grown not only good fellowship at social meetings, but also benevolent funds, and the other things which characterize most professions. The third impulse—not quite so wholly good—is what we call the possessive impulse. It is the desire of each profession to get out of the community as much as it can for the collective service of its members. This is not altogether to be objected to; each profession must stand up for its own, and see to its own defence against the unconscious oppression of the mass of the community—the ignorant oppression. But that impulse does have its invidious side; and, in one profession after another, it has led to various attempts at larger remuneration and easier conditions of service, which are only human nature, but are, perhaps, not in the public interest. It is these three impulses which have given rise to your Institute, and to other professional associations.

I come now to the results of the professional association—and I want to put this very briefly. I think that in your Institute, as far as I can see, as in other brain-working professions, the result of the professional association has been a very considerable elevation of the profession. It is interesting to notice, in the history of professional associations, that in the early days of each one you do not find the "swells" of the profession very sympathetic with it; they do not see the need for any professional association. So you do not find the biggest people in the profession taking a very active part in such association. But the rank and file feel the need for raising the profession in the public estimation. And presently they are joined by the leaders of the profession, and the profession stands together in seeking to take a better place in the estimation of the community. I do not want to go into particulars, but I think there can be no doubt that the architectural profession stands very much higher than it did fifty or a hundred years ago in the estimate of the nation. And I think it owes a great deal of that to the long-continued efforts of the Institute. I do not want to say anything about improvement in architecture—on which I am not qualified to judge, still, one cannot help noticing that the efforts of the Institute over architectural education have, at any rate, left their mark, and that the rank-and-file architect has, I venture to say, so benefited that he is considerably better educated than was the rank-and-file architect of a hundred years ago. But my opinion upon that is worth nothing. I do not want to criticise the bad effects of the possessive impulse in your case—I do not know enough about it. Perhaps you will allow me to say one thing, as it occurs to me. I have never yet seen my way out of the dilemma of the architect in respect of his charge by a percentage on the gross cost of the building. I have no reason in any way to complain of architects, or to criticise architects in that respect; but, logically, it is a very awkward dilemma to be put in. As one architect said to me once: "I have had a very hard day's work. I have been from morning to night up and down a building, and the result is I have knocked at least £20 off my remuneration." You will understand that. I think the profession does stand in a somewhat illogical position, shall we say, in reference to the method of its remuneration. And I have nothing to suggest to you as an alternative.

I would make a criticism, not on the architects, but generally on the brain-working professions, to which architects are probably less exposed than others, though about that I do not know. The ordinary type of brain-working professional is a man who works for what we call a fee, for a succession of clients, by himself, for himself. And therefore all professionals tend to think that they should be regarded as alike, as it were, and interchangeable. And you know how far the doctors have gone in assuming that all doctors are interchangeable. In modern times there is much to be done by what is called scientific management, what I may call "team work." Let me give you a case in point concerning dentists. We want ten times as many dentists to do the work of dentistry as we have got. But I do not know that we want every one of them to be an M.D. in order to specialize in dentistry. If you are to have enough dentists for the population, you may have to have four or five grades of dentists: one man for extracting, one for conservation work, one as a consultant, and so on. Doctors and dentists would be much opposed to that. I do not know if we shall ever get sufficient of them to serve the whole community, instead of only the richer fraction, if we insist that each professional must be self-contained. If we are to get the work of the community properly done, for the whole of the community, we shall have to have, generally, more team work in the professions. I do not know how to apply that to architecture; I throw it out as a suggestion.

The chief fault of a professional association is its approach to exclusiveness. As soon as it gets into the saddle it wants to make arrangements about entry into the profession, the length of servitude or apprenticeship. You cannot help detecting a trail of a tendency to exclusiveness in nearly all professions: I will not say anything about architects at all. That exclusiveness takes certain forms. One profession says it will not allow anybody in who has not been apprenticed at a high fee to one of its own members, and the result is it makes its membership extremely profitable because people are willing to pay the high fee to get into the profession. I think that is invidious. Architects are not guilty of that, but I draw your attention to one particular form of exclusiveness from which it is difficult to get away, and it is one which is injurious. Has it ever occurred to you that we have been, and are, drawing practically all our statesmen, our lawyers, our doctors, our ministers of religion, for that matter, our authors, our editors, our architects, from about ten per cent. of the population, namely, the ten per cent. whose parents are able to give them some sort of secondary education in adolescence? Only ten per cent. of the community can give their sons secondary education at present, and therefore all the professions which make a secondary education a condition of entry—and it seems obvious they must exact some amount of education for entry—are necessarily excluding from their profession potential geniuses who are born in the general population. That is a dilemma which I do not think, in any one profession, can be got over; it can only be got over by such an extension of the means of secondary education that the whole population can have it, so that you will be able to draw your potential architects and doctors from the hundred per cent. of the population, instead of from only ten per cent. And, it seems to me, we have allowed a very large amount of potential professional skill, if not genius, to go to waste because we have shut the door in the face of ninety per cent. of the population by this requirement of secondary education. This inevitable exclusiveness is rather serious, and it behooves every profession not to make it worse. You must insist on a certain amount of education, on a certain amount of apprenticeship training, but it is to be detected in professions that they rather want to make that training long, and they insist on keeping up the length of the servitude, irrespective of whether it is necessary or not. For instance, you cannot become a doctor in this country under five full years of academic professional training. Even though you may be a genius and can scamper through the instruction in three years and pass the examination with flying colors, you are kept down to the pace of the average man. You notice how, necessarily, that increases the expenses of the young man who wants to be a doctor, and so it has an invidious exclusiveness. Therefore, in arranging a curriculum and arranging the length of training—to say nothing of the fees—the tendency to exclusiveness has to be watched. The natural tendency is to keep it all up; and it is a very reasonable thing to want to advance the profession and maintain the standard of qualification, and all the rest of it, but it has the adverse effect of producing exclusiveness.

A much more serious exclusiveness, really, is this. You know, every profession tends to be governed by the people aged fifty-eight—(*I* am fifty-eight)—by the elders in the profession; it is inevitable. I used to think it was a bad arrangement; but being fifty-eight myself now, I perhaps take a different view. But the result is that it is governed by men who were brought up thirty years ago, whose technique is the technique of thirty years ago, whose knowledge of education relates to the education of thirty years ago. I suggest that there is a tendency in professional associations to ignore, honestly to ignore, the new technique, new methods, which the average elderly member is not personally acquainted with. I do not want to talk about architecture, but I can see it in other professions very obviously; that the elderly man in the profession cannot believe in the necessity or the excellence of what is new, of what was unknown when he walked the hospitals, or when he was apprenticed or served his articles. That tendency to be bounded by the current technique, which is generally the technique of the old generation, is apt, in an advancing avocation, to produce undue resistance to the incoming of the new technique. I do not know what the buildings will be made of in the next generation of the new England after the war; it may be that they will be built of aluminum or of basic slag. But I very much suspect that the new material, whether it be basic slag or aluminum, will have to overcome a certain amount of prejudice before it is cordially accepted by the rank and file of the profession. This tendency towards conservatism needs to be watched and overcome.

Now to the point which I ought to have begun with: What is the proper sphere of an architectural society? You will have gathered from what I have said that it is founded on the creative impulse. It ought to aim at promoting its vocation. It is strengthened by the fellowship impulse in the way of social intercourse and benevolence. It is, I fear, always subject to the possessive impulse: its members will endeavor to get as much, collectively, for the vocation from the community as they can. All that they are entitled to from the community is enough to maintain their services at the highest point of efficiency. But in the estimate of what that is their bias will be to get as much as they can. That fellowship and creative impulse I need not say much more about; fellowship I need say no more about. The creative impulse must be the fundamental purpose of the professional association, to promote its art, its vocation, in all sorts of ways. A legitimate part of the possessive impulse is its defence, defence both of individual practitioners against the lay community, and of the profession as a whole against that lay community. It must stand up for the profession. It must insist on the profession having its proper place in the world; otherwise it will be steam-rollered by other interests.

Now I come to my three things which may be more new to you. The association is entitled to claim participation in the government of the profession. Every profession needs to be regulated in all sorts of ways—conditions of entry, conditions of training, ethical code; it may be registration or what not. And the professional association is undoubtedly entitled—it does not do its duty unless it claims to be entitled—to participate largely in the government of the profession. But I do not think that, from the standpoint of political science, the profession can be allowed to govern itself. There I differ from the vague functionalism or vocationalism which I said was prevalent. I do not think any profession can be allowed to govern itself. Take a case. It cannot be allowed to determine the conditions of entry; otherwise it makes the profession a monopoly. We want it to help in deciding what ought to be the conditions of entry, but the State could not allow any profession to exclude any people it chose to exclude, under any conditions it chose. It must help the State to fix the conditions of entry, but the State cannot allow it to fix the conditions itself. Otherwise the teachers might say: "No one shall come into the teaching profession except the sons of teachers," or it could be made very much more onerous to enter the profession. That has been done in other occupations in the past. Similarly about the training. A professional association ought to take a large part in prescribing the conditions of training, but you cannot give it complete power. And that for several reasons. First of all, because the governing body is apt, as I have said, to consist of people of fifty-eight, and you cannot allow older people to settle the conditions of entry, because they are not up to date; nor can you give it to the young, because you cannot trust them. They might prescribe a training which they thought was in their interests, but which ran counter to some other profession, or was against the interests of the community at large. Supposing doctors were to say that the art of doctoring was so wonderful and great that no one should be allowed to practise until he had been under education for ten years; the result would be to limit the number of doctors and send up the price of doctoring. Therefore we could not allow doctors to make a ten-years' limit, nor could we allow architects to put a similar limit upon the period of preparation. And likewise about professional ethics. An ethical code is all very well, but it might take on a form which is inimical to the common weal. Some professions have established codes which are in some respects inimical to the public interest. But the society ought to participate in the government of the profession.

And now I want to mention two other functions which are not generally thought of, and this is serious. I came here, if I may say so, to put this idea to you. First of all, a very large part of the public function of a professional association seems to me to be one which it has not, to any great extent, yet exercised: and that is, it ought to claim the right and the duty of criticism of everything that is done by the Government, or, for that matter, by any public authority, in the lines of its own profession. It ought not merely to make that criticism in an irresponsible way, but it ought to regard it as its duty to inform the Government of the day of the professional opinion upon every kind of act which is done by the Government, or left undone, on which the profession has a distinct opinion. One of the very worst elements of our present Government, of what we call bureaucracy, is the secretiveness of official administration, and the suppression by that official bureaucracy, as far as possible, of any professional criticism of its work. Any architects who are in the Government service are not allowed to criticise the decisions or acts of their Government Departments from the point of view of architecture. There is a curious difference in this respect between the municipal and the Central Government services. The local government service does have a lot of professional criticism. The Institute of County and Municipal Engineers, for instance, is always full of criticism in its "Proceedings," its publications; and at its meetings it has papers criticising this or that drainage scheme, or electric light works, from a professional point of view. It does not hesitate to say that plan has such and such faults. But you find nothing of that kind from the professionals in the Central Government; they are not given an opportunity, they are not allowed, to give that sort of criticism of the work of the Central Government Departments. Perhaps that regulation is necessary; I do not know. But if it is, it makes it all the more necessary that some professional criticism of the Government service should be supplied by the professional association. And I would like to see it the duty of a professional association to keep constant supervision, and a very critical supervision, over all the acts of the Government, or any Government Department, or any public authority, falling within the realm of its profession; and to put that criticism publicly on record, and bring it definitely to the notice of all the Government authorities with the view to supplementing the, perhaps necessary, secretiveness of the bureaucracy, and at any rate supplying that criticism without which a bureaucracy can never really be healthy. I would go further, and say that I think the Government, either particular departments, or the Government as a whole, ought to have professional advice and counsel in each vocation. And I would have each Department arrange to have a standing body of professional advisers to whom I would give no power whatsoever. Let it express its views freely and publicly on all the projects and doings of the Government; in a report which should be laid before Parliament and definitely published, and, of course, in an uncensored form. I think every Ministry ought to have an advisory professional council of the profession with which its work is concerned. And whilst that advisory council should have no power whatsoever, it should have a free initiative to say what it liked, the power of publishing its reports, when it thought fit to do so, in an uncensored form.

My third point is this. It seems to me that it is the duty of a professional association—and this is a duty which, I think, no professional association, except one, has yet seriously undertaken at all—to bring to the public notice, and to agitate for, the supply of a sufficiency of its service to the community as a whole. Let us begin with the doctors. The professional associations of the doctors have looked after the interests, as they thought, of individual doctors, and they have done their best to get individual doctors properly treated, and the profession as a whole properly treated. But the medical profession has not made its voice heard with regard to the service which it has to render to the community as a whole; it has not clamored for seeing that there was a proper professional medical attendance and treatment supplied to the whole community. I hope I am not saying anything too hard, but practically the brain-working professions began as the body servants of the rich, and they have not yet sufficiently realized that it is their duty to have developed out of that to become the servants of the community; they have not yet managed to make their service available for the whole of the community which needs their service. They still serve, on the whole, Mammon, and Mammon alone. And, unfortunately, the great mass of the community still has to go without the services which the professions do render to the rich, and ought more and more to render to the community in its collective capacity.

If you ask me to apply that to architecture, I am in a difficulty. I cannot help noticing that in the early days of your association—to go back to the early Victorian times—architecture was thought of only as a luxury for the rich, and, even to the end of the nineteenth century, that it could be said that ninety per cent. of buildings did not require an architect; only those buildings which it was expected or desired should be beautiful required an architect. And that seems to be a totally unworthy view of architecture. It is the duty of architects to claim that they shall be responsible for all buildings, including town-planning. And when you consider the awful buildings and the awful town-planning to which the great mass of England is still subject, the need for more architecture and better is surely very obvious. It should be the aim of the architectural profession to claim that the service which it can render, the service of architects, should be supplied in sufficient quantity to be available for all the buildings and all the town-planning of England. It is a reproach to the profession that any town should be badly laid out. I do not say it is the fault of the profession, but I hold it up, as an ideal, that its business, as an association, is to demand that such arrangements shall be made as may be possible so that the service which the profession can render to the community should

(Concluded on page 93.)

POWER STATION OF DOMINION POWER AND TRANSMISSION COMPANY, HAMILTON, ONT. BERNARD H. PRACK, ARCHITECT.

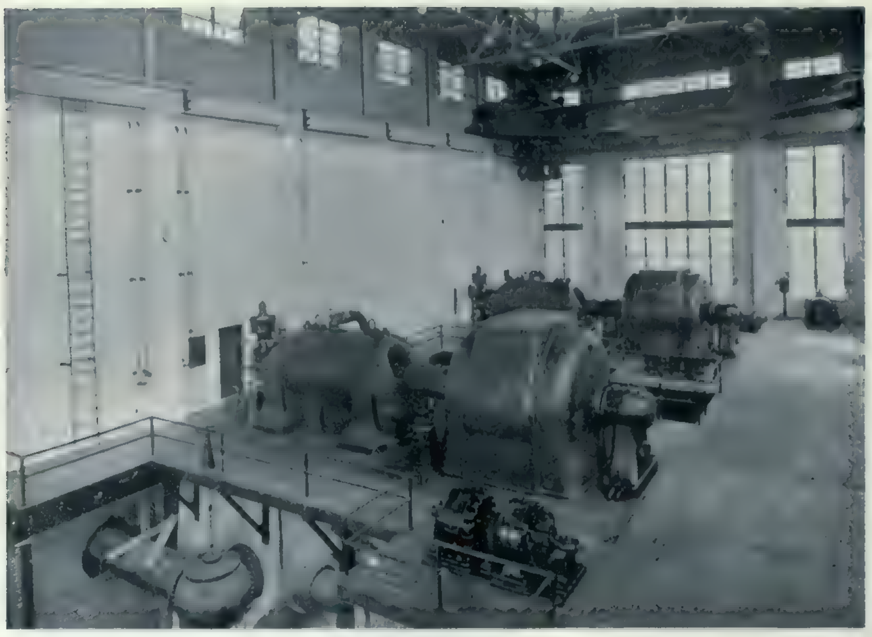
Dominion Power and Transmission Co's Plant

INCREASED production due to materials required for war purposes, together with certain disadvantages arising through the recent fuel shortage, emphasizes the importance of electrical energy in Canada's present industrial activity. The restrictive measure now in force in Ontario, both limiting the number of municipal street lights and prohibiting the illuminating of retail shop windows in order to conserve power thus derived for operating manufacturing plants, is also an indication of the extent to which electricity is being used for the purpose mentioned. In addition to the hydro electric system of the Ontario government to which the steady policy of expansion had directed public attention, there are also several important privately controlled service corporations which are heavy producers of power for industrial and other purposes, and these likewise have been placed under the necessity of constantly increasing their plant equipment.

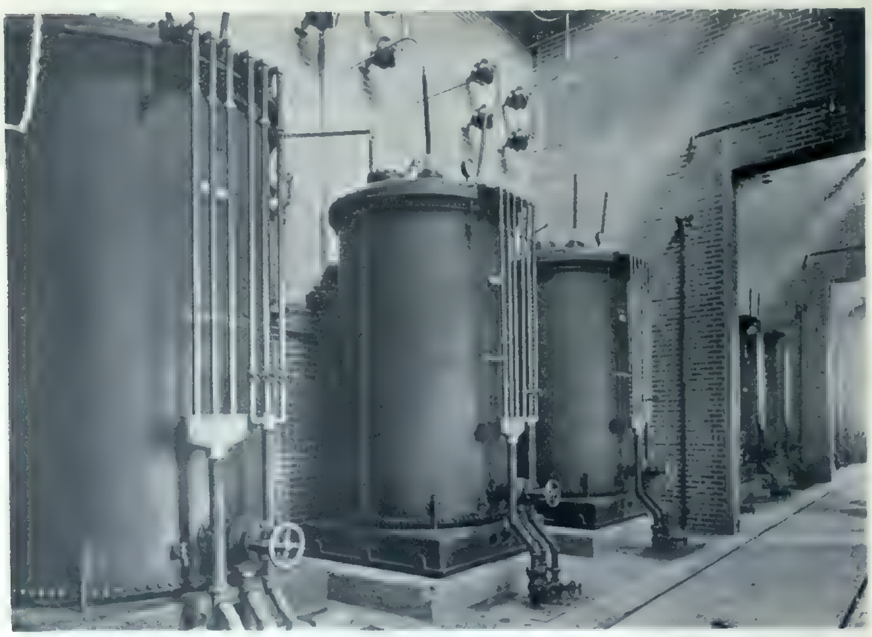
Particular reference in the latter case can be made to the Dominion Power & Transmission Company whose recently completed power station at Hamilton represents in the plan of the building itself, and in the character of its installation, a notable achievement in modern power house design. It is a steam operated plant situated on Burlington Bay just outside the eastern boundary of the city, and is designed to have an ultimate capacity of 75,000 K.V.A., of which 25,000 has been installed up to the present time. The output is delivered at a voltage of 42,000 to the high tension lines of the company, whose main source of supply is their hydraulic plant De Crew Falls, 34 miles distant from Hamilton.

In order to provide for additional machinery equipment necessary for the contemplated increase in capacity mentioned, the plant is so arranged to admit of a duplication of the present building which will be carried out as the need for expansion arises. In addition to its generating capacity, the steam plant is designed to act as a step down transformer station of 25,000 K.V.A. capacity to transform the high tension current to 13,200 volts for distribution to neighboring manufacturing plants. One half, or 12,500 K.V.A., of this step down capacity is included in the present installation.

The intention here, however, is not to touch upon the technical side of the service installation except in a general way, but rather to indicate by the use of photographic illustrations the character of the plant and to show how its various departments have been successfully coordinated to obtain the greatest operating efficiency. This is explained in the accompanying cross section which gives a very complete idea of the general working arrangement. Examin-



GENERATOR ROOM.



TRANSFORMERS EQUIPMENT.

ENCLOSED SWITCHES.

ing it from right to left it shows the position of the coal handling plant, boiler house, engine room, control station, switching and transformer rooms, and delivery outlet for distributing current, all of which are arranged in the order named.

The coal handling plant at the right has a storage capacity of 1,250 tons. The coal is dumped directly from the cars either into the hopper of the coal crusher below the car tracks, or placed in a reserved supply. After being crushed the coal is delivered by an enclosed bucket elevator to a bunker situated between the stacks, and from thence to an overhead larry in the boiler room which weighs the coal and delivers it via chutes to stoker hoppers. The two chimneys or stacks which take off the fuel gases are of radial brick construction, and each 240 ft. high above foundation, ranging in diameter from 22 ft. 2 inches at base to 12 ft. internal top dimension. The four boilers, which are arranged in single settings, are of the inclined tube type and have an individual capacity of 1,050 H.P. These are equipped with mechanical stokers each having eleven retorts with a total length and depth of 19 ft. 6 in. and 8 ft. $3\frac{1}{2}$ in. respectively. Beneath the boiler room floor is a space on each side for the removal of cinders which are dumped into cars running on tracks to the outside.

The generator department comprises three floors, the main or operating floor on which the generating units are placed being on a level with the boiler room floor. On the ground floor below are the condensers and auxiliary equipment together with the foundations on which the turbo-generator above rests. The basement or floor level forms the pump well for the condensed circulating pumps.

The present generator installation consists of two turbo-generators of 10,000 equivalent K.W. capacity, delivering 3-phase current at 6,600 volts; 1,100 amps. per terminal; 66 2-3 cycles. The generators are of the four pole type and run at 2,000 revolutions per minute. This equipment will ultimately be increased so as to include in all six turbo-alternator units, each of a maximum rated capacity of 12,500 K.V.A. giving a total station capacity of 75,000 K.V.A. or an equivalent at 60,000 K.W. at a power factor of 80 per cent.

Connected to each generator is a bank of three, single phase transformers which step up the voltage from 6,600 to 42,000 volts. These are installed in a room adjoining the high tension switch room and separated from the latter by a brick wall. The machine together with the transformer constitutes a unit and these units are electrically connected only on the 42,000 volt bus, thus introducing two banks of transformers between machines to serve as buffers to the short circuit current, in the event of trouble in one.

Step down transformers for distributing current to near-by factories are located at the north end of the system and are connected on the high tension side to disconnecting switches and G. A. type circuit breaker to the 42,000 volt bus.

The low tension 13,000 volt bus is at the north end of the 6,600 volt bus, as are also the switching apparatus, choke coils and lighting arrestors for the feeders.

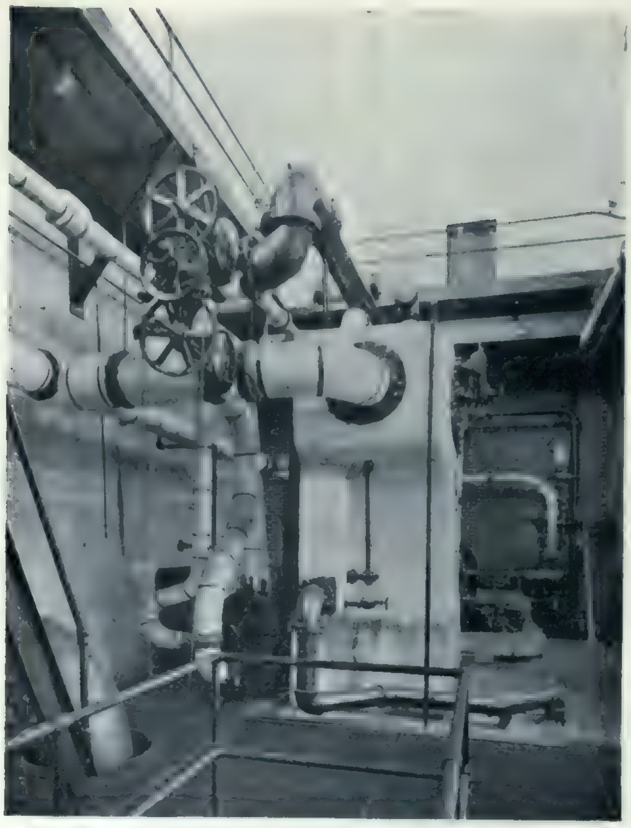
A special feature of the plan is the control room on the second floor, which derives outside light from three sides and has a supervising bay directly overlooking the turbine room.

The building is of steel frame construction with concrete foundation, floors and roof and red pressed brick exterior walls, the latter being finished with light cream terra cotta trimmings. The inside engine room walls from the second floor line to the terra cornice are faced with enamel brick, coved bricks being used at the floor line and rounded corners for pilasters, window jams and sills. The floor here is of red Welsh quarry tile, while in the entrance vestibule and halls the floor is of marble tile with border and inlaid

BOILER ROOM.

PARTIAL VIEW OF 6,600 VOLT BUS STRUCTURE.

CONTROL STATION.



AUXILIARY HOT WELL AND PUMP EQUIPMENT.

OIL SWITCHES AND BUSES FOR 42,000 VOLT CURRENT.

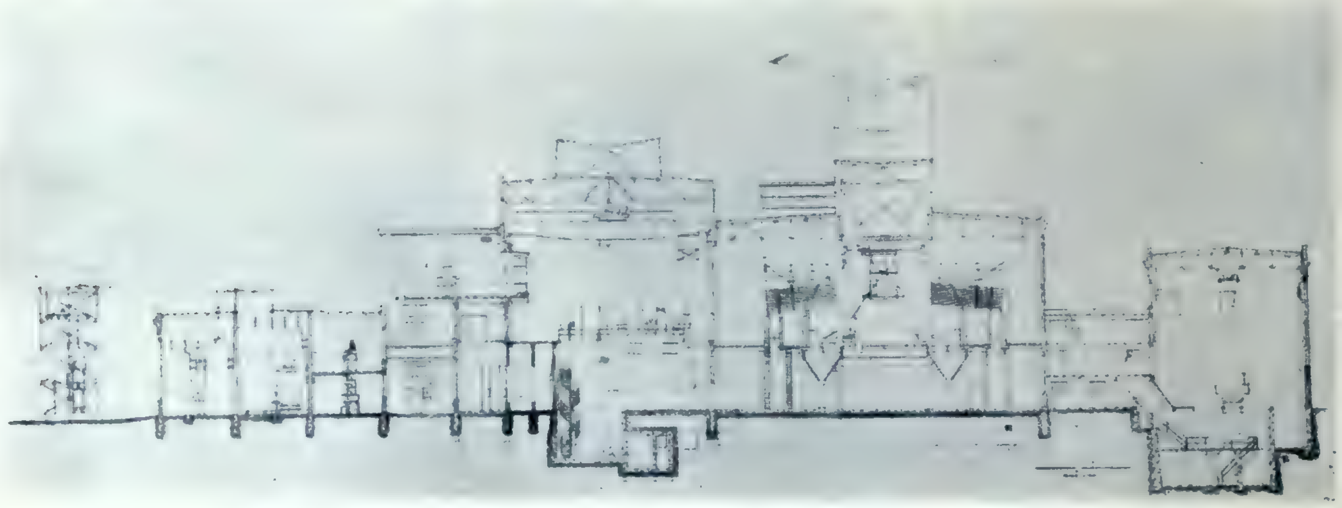
centre ornament. All the main partitions throughout are of brick or hollow tile and the others of plaster on metal lath and steel studdings.

A unique feature in connection with the installation of the boilers was their complete insulation against loss from radiation. In the walls between the fire brick and the outer course of common brick, was inserted a layer on nonpareil insulating brick, while the top surfaces of the boiler drums were insulated with these brick also. It is said that one layer of this brick will retain as much heat as ten layers of common brick. This naturally results in a considerable saving in fuel and better working conditions for the men. These brick are made of diatomaceous earth or kieselguhr, and are very light weighing only 1½ lbs., although they have a crushing strength of 140 lbs. to a square inch.

All of the steam piping and heaters were insulted with nonpareil high pressure covering. On high pressure lines 2 in. thickness covering was used, and on low pressure lines 1 in. covering. Provision was also made for repairs to flanges by the application of insulated flange casings so constructed that they can be readily taken off and replaced.

British Housing Plans After The War

The matter of devising ways and means to overcome the present great shortage of houses in the United Kingdom is an after-the-war problem to which serious attention is being given by the authorities. While it is held that



SECTIONAL ELEVATION, DOMINION POWER AND TRANSMISSION COMPANY PLANT, HAMILTON, ONT.

existing conditions must be borne until the close of hostilities, there is plenty to indicate that the Government is fully alive to the fact that immediately at the end of the war a comprehensive programme must be undertaken to solve this important problem. Circumstances bearing on the present situation are indicated in a recent report of the United States Consul at London, which states that the Technical Committee set up by the National Housing and Town Planning Council has now submitted its interim report to the Local Government Board. The committee took as the basis of its inquiries the statement by the president of the Local Government Board that 300,000 houses for the working classes should be built by the State in England and Wales alone. This estimate does not cover the pressing needs of Scotland. It is said that in order to carry out this programme the organizing ability of at least one-half of the employers in the building trades and the labor of 400,000 men will be required. The committee points out that if 200,000 urban and 100,000 rural houses are erected, this will do no more than to make up for the shortage of new houses directly due to stoppage of building during the war, and will leave untouched the general housing problem, with overcrowded dwellings in town and country.

The report says it will be necessary at the close of the war to ask the tenants of the new houses to pay higher rents than those current before the war. For this reason the houses must be made attractive to be well worth the extra rent charged. The following points to be observed in all plans adopted by local authorities for cottage building are presented:

The houses should be broad rather than deep, to secure ample light.

Back extensions are better avoided; all the rooms should be brought under the main roof.

Three bedrooms should be provided in all the new houses.

The houses should, as a rule, be provided with parlors.

Each house should have a bath, with hot water.

Ample window space should be given and windows carried as near to the ceiling as possible.

A layer of concrete or other approved impervious material should be laid under all floors to prevent damp rising, and a proper damp-proof course should be provided in all walls.

The level of the ground floor should be above the level of ground immediately surrounding.

DOMINION POWER AND TRANSMISSION COMPANY PLANT, SHOWING STEEL FRAME AT TIME OF ERECTION.

The assistance of women with close knowledge of household economy should be sought in regard to details of interior construction, such as the design of the stairs and the provision of cupboards, larders, and storage accommodation.

It is recommended that the Government should furnish money for these projects only when the general plan of the housing estate or area meets with the Local Government Board's approval. The areas should be laid out on modern town-planning lines, and the number of houses per acre in urban districts should not exceed twelve.

Function of An Architectural Society

(Continued from page 88.)

be available in sufficient quantity, and of sufficient quality, for the benefit of every person in the community, and not merely as a luxury for a rich class. That is a very big claim to make for a professional association. I am asking that the professional association should not only have this work of elevating the profession, looking after the profession, regulating the profession, as much as it is allowed to do, but I have said it should claim a large participation in the government of the profession, but not the sole government of the profession; that it ought to make it its business to conduct a regular, authoritative, public, responsible criticism of everything that the Government does, that any public authority does, in the sphere of its profession. And, above all and supremely, it ought to regard it as its duty to claim, in season and out of season, that the services which the profession can render the community should be available in quantity sufficient to enable every person in the community to get the benefit of the service.

Housing For The New Industrial Town

By A. V. HALL, Landscape Architect

THE subject of housing may, for our purpose, be divided into three divisions, namely, municipal housing, which may cover the work of municipalities, and private enterprise for the betterment of conditions in congested areas in the city or large town. Next suburban housing, which may include the activities of private or industrial enterprise that aim to deal with the problem in the small towns or in the immediate surroundings of the large city; and last, housing as applied to new settlements about the plants of the new power developments, mining companies, and the pulp and paper industries.

The considerations involved in recommendations for the above divisions differ in direct proportion to the class of tenant for which it is planned, and to the land values of the district under consideration. It is the purpose of this article to deal only with the last division, now that so many new industries are facing a problem of inducing labor to forego suburban advantages for the new settlement. These industries have the opportunity to benefit by the examples of the older concerns which have only to-day emerged from expensive experimentation.

In the new town site successful provision for housing, and the plan for the town itself, are interdependent to such an extent that neither can be economically considered apart from the other. The plans for the town layout and housing should be prepared at the time of planning the plant. A new industry should organize a department, or a separate company, which would handle the construction of streets, service, etc.; the erection of houses, and all that pertains to the development of the new town. This department can call for expert advice on the varied problems of planning, construction and maintenance, and so have houses for employees before the plant is in operation. At the close of this first period of construction it will have the results of this expert advice represented in figures of actual cost on which to base plans for extensions and future maintenance.

After the planning expert has laid down the street lines, lot lines, and the park and playground areas on his preliminary plan, the original cost of the land should be charged against the number of lots, or saleable area. Estimates should be carefully prepared for the cost of constructing streets and service, with pavements, sidewalks, planting, etc., and sewer, water and light, for the total area, as well as for maintenance, interest and the overhead charges of the department. This total for development

Fig. 1—Type of House Erected by the American Woollen Mills Company, Lawrence, Mass.

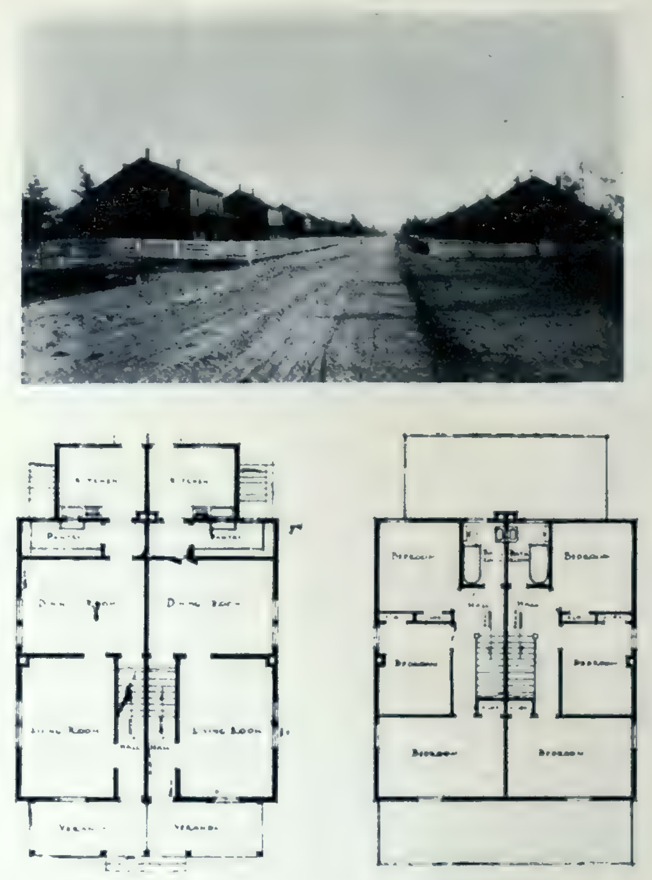


Fig. 2—Two-family Semi-detached Houses Erected by the Cleveland Cliffs Iron Company, at Gwinn, Mich.

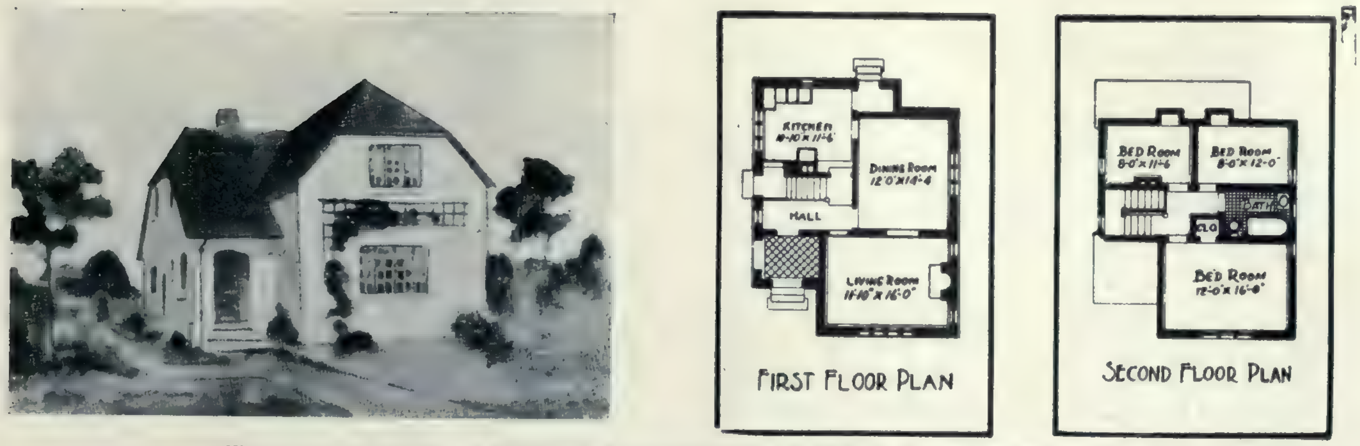


Fig. 3—One of the Houses Erected by the Goodyear Tire & Rubber Company at Akron, Ohio.

should also be charged to the lot, which will give the average *improved cost* per lot. The difference between the *original cost* and the *improved cost* should not run over six or eight cents per square foot. The architect should at this time estimate the total cost of the various types of houses, and include in his estimate the cost of walks, finished grading, seeding, etc.

With the above figures, the rates of rental or sale necessary to retire the capital invested in a given term of years may be ascertained. If the town and the houses have been economically planned, and no profit is figured for the company, the rental or sale prices will be low; if not, a new preliminary plan should be made at once. To illustrate this we are quoting the figures that the Goodyear Rubber Co., of Akron, Ohio, placed before their employees who purchased:

ORIGINAL COST OF PROPERTY:—

100 acres at $300.00		$30,000.00
Cost of Improvement:		
Excavating 100,000 yds. (est.)	$27,175.00	
Curb for brick pavement, 11,796 lin. ft.	3,538.00	
Gravel roads, 36,078 sq. yds. (est.)	16,235.00	
Curbs and gutters for gravel roads, 35,958 ft.	21,574.00	
Sanitary sewer system, (est.)	21,000.00	
Storm sewer system, (est.)	8,000.00	
Main drain	8,510.00	
Bridge, (concrete)	9,729.00	
Planting trees and shrubs (est.)	2,500.00	
Office and Engineering expense, Arch. fees	21,000.00	
Blue Pond drain	2,932.00	
Instruments	445.00	
Sidewalk, 265,531 sq. ft. (est.)	23,153.00	
Grading about houses, top soil seeding (est.)	13,000.00	
Miscellaneous, ditches monuments, etc.	1,882.00	$180,675.00
		210,675.00

Number of Lots 430, average area 6250 sq. ft.

Origina Cost per lot	$ 70.00
Cost of improvement per lot	420.00
Total improved cost	490.00

Successful industrial housing can only be obtained where the project is self-supporting after it is provided. This method of estimating the financial aspect will tend toward the elimination of theory and false ideals, and will place the whole project on a practical basis. If the rental seems unduly low the standard of the development indicated by the size of the lots, the design and materials used for the houses, may be raised accordingly. After this preliminary plan has been made and adjusted to the financial requirements the houses themselves may be considered in detail.

TYPES OF HOUSES.

There are usually three types of houses to be provided for. The first will be the house for the laborer, who receives the smallest wage; the second the house for the mechanic, who is accustomed to expect the average city living conditions, and the third, and the least considered in

Fig. 4—Two Bungalows Erected by the United States Steel Company, in one of their permanent new towns.

this article, are the houses for the officials, who may have to spend all or part of the year near the plant.

Class "A"—Laborers' houses usually provide for five to seven rooms per house. This type of house is usually subject to rental, and may be built in the detached or semi-detached style. In the new town, where the land is cheap, each house should have sufficient area for a small garden, and for plenty of light, so that the above types seemed to be the only ones to meet the requirements. The semi-detached type is often placed with the dividing partition on the property line, which gives the maximum amount of open area to the lot (See Fig. 6).

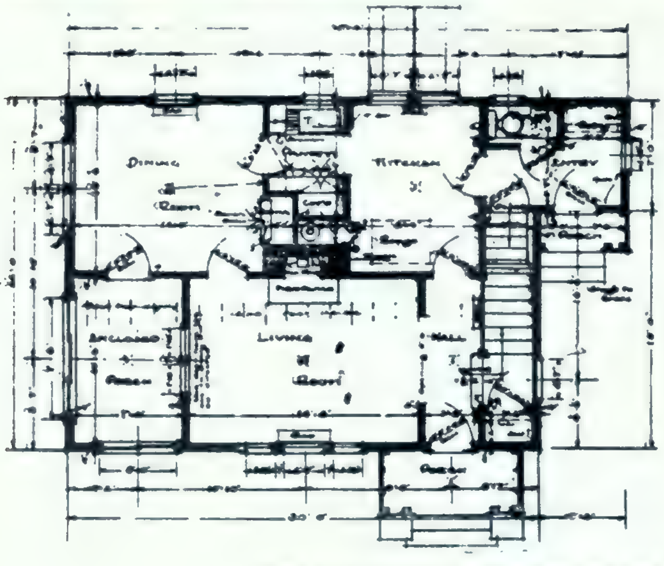
Plans should be prepared for several different elevations, which could be alternated to avoid the too frequent recurrence of the same elevation upon a given street. Where a company expects to erect a considerable number of houses the first year it should let contracts for several houses, each of three or four different designs, and by "wholesale building" secure a better price per house. The cost of this type of house should range from 12 to 15 cents per cubic foot, or from $250.00 to $350.00 per room.

Figures 1-2 illustrate by photograph and a typical plan two houses of this type.

Class "B"—The size of this class house should be from six to eight rooms. The general plan should, as in the case of Class "A," be very simple, but the architect is able here to have a slightly wider range in materials, finish, etc., as this type of house will stand an increased expenditure as against that of Class "A." The lots on which classes "A" and "B" may be erected should be of practically the same size. Slight variances in the outline of the lots tend to add rather than to decrease their attractiveness. The cost of this house might be between 12 and 15 cents per cubic foot, or $300.00 to $500.00 per room.

Figures 3-5 show photographs and plans of three houses which have been erected by separate companies. These illustrate fairly well the house that can be erected under the conditions outlined above.

Class "C"—Houses of this type will be situated on lots of larger area, which will have been especially provided in the plan of the town, and will, wherever possible, have the advantage of the finest outlook. The plan of the houses themselves will be governed largely by the desires of the purchasers, and the company will consider



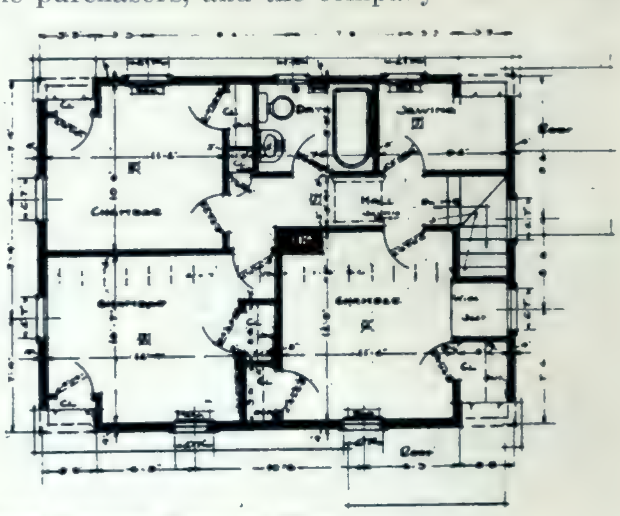


Fig. 5—One of the Houses Erected by the Norton Company, Worcester, Mass.

each house separately as occasion arises, which is usually after the first period of development.

Construction—In a housing development of this nature a fatal mistake has often been made in letting the work to unreliable contractors under insufficient supervision. No matter how simply the houses are planned, or what materials are used, the erection itself must be done

Fig. 6—Plan of a Portion of the Town Site of Gwinn, showing the Arrangement of the Semi-detached Houses Upon the Lots. Longer Views are Obtained Between Houses by Altering or Staggering the Houses on Either Side of the Street.

under responsible supervision, whether by the architect or by some representative of the company who is a practical builder.

Where the houses are rented the return for good workmanship is immediate through a reduction in maintenance, and in the case of sale the company are free from the prejudice arising from selling a poorly constructed house to an employee.

In the case of the Canadian town, for the paper industries especially, the most economical construction is likely to be that of wood, such as is shown in the accompanying photographs.

Sale or Rental—There are two methods of handling the houses after they are built. One is for the company to adopt the fixed policy owning them and renting them to their employees, and the second is, to encourage every man to own his own home. In the first instance many companies, especially those located near cities, have adopted this method to prevent outsiders from gaining ownership in their community and benefiting by their efforts. The objection is, that first there is always the spirit of landlord and tenant; second, we usually find additional effort necessary on the part of the company to furnish incentive in matters of maintenance, beautification of grounds, and civic interest; and third, the company has to plan to carry this feature as a permanent part of its organization.

The provision for the ultimate sale of the property after the plan of a real estate development encourages the employee to own his home. This feeling of ownership tends to make his interest in the welfare of the town more permanent, and it also allows the company to withdraw from its housing activities at such a time as the town itself has sufficient numbers to obtain a charter. This feeling of permanency makes an additional inducement for tradesmen to buy and erect their own stores and business buildings. It has been found that the buyers do not object to the necessary restrictions, which in the case of the new town, cover a wider field than where municipal ordinances exist. Rentals are, of course, necessary under this plan also, but the company while still controlling the property for a considerable period after the sale, encourage civic pride, and the responsibility which differentiates the permanent employee from the drifter.

After the construction work is completed in a growing section, and the houses are ready for occupancy, a certain amount of attention should be given to each lot on which a house is built. Several concerns have at the beginning of construction established a nursery, which has in two years' time developed plants and trees of sufficient size to make the necessary plantations of shrubs and fruit trees on each lot, as well as shade trees along the streets. This method saves nearly 50 per cent. in the cost of the plants, and saves the necessity of the semi-

Fig. 7—Reprehensible Housing Methods at the Lackawana Steel Plant. One (?) House for 2000 Employees. Note the Unsightly Condition of the Grounds.

annual planting orders, losses from shipping, etc.

Purchase—The method arranged for the purchase by the employee has taken several forms. The Norton Co., of Massachusetts, make, in brief, the following arrangement:

The purchaser pays 10 per cent. down, and the conveyance of the property is made at once. For the balance, the purchaser gives two notes, the first of $1,000.00, is payable in twelve years at 5 per cent. The second is payable on demand at 5 per cent., and both notes are secured by money mortgage.

The purchaser makes supplementary agreement to purchase five shares in a co-operative bank, and to continue payments thereon until his deposits have matured a sum of $1,000.00, which takes nearly twelve years. In consideration of the agreement the company agrees not to make demand on the demand note as long as the purchaser continues his payments at the co-operative bank. The company itself insures the life of each purchaser, and in this way is able to agree that if he shall die or be incapacitated within twelve years it will accept the value of his co-operative bank share at that time in full payment of the time note.

By this arrangement the purchaser is assured of ownership of the property in twelve years, or at the time of his prior death, with the exception of a first mortgage covering a demand note which is less than 60 per cent. of the value of his house.

To carry the payments on a house costing $3,800.00 the total monthly payment, covering interest, taxes, insurance, bank shares, etc., is $20.00, the house in this case is sold at cost to the company, the lot on which it stands contains 6,850 square feet. The cost figured from purchase of the land and its share of the town development added is 10 cents per square foot, or $585.00.

The Goodyear Company purchased land at $300.00 per acre. This land subdivides into four house lots per acre after the deductions for streets, parks, etc., have been made. The improved cost per lot was $490.00 on an average. Their arrangement for the purchase required no initial payment down. The first mortgage is in this case carried by a large life insurance company, and the second by the company themselves, with interest at 6 per cent. in both cases.

Semi-monthly payments are arranged which pay the second mortgage in twelve years, and the first mortgage in three years more.

To prevent speculation 25 per cent. is added for the cost price of each lot at the time of sale, and is credited the purchaser after he has carried his payments for five years' time. The *semi-monthly* payments required to purchase a house valued at *cost* at $2,860.00 if no initial payment is made, $16.54 for the first five years, $10.26 for the next seven years, and $5.22 for the last three years, when the house is entirely clear. The company allows the employees, if they desire, to arrange for a larger payment at specified time. The company has also arranged that if the purchaser wishes he may by adding an average of 50 cents per thousand to his semi-monthly payments to carry a life insurance which will free his home in case of death.

The nature of each industry and each town site require a special adaptation of the general principle stated above. No industry can undertake housing with the expectation of having its capital earn what it might elsewhere, but it has been proven that provision can be made to give attractive conditions to permanent labor at no cost other than the difference in interest rates. The fact that such houses as those shown in the accompanying cuts have been built in this way should encourage Canadian industries to attempt a similar solution for their labor problem.

Dry Rot

Dry rot is a misnomer. According to an article on this subject by C. Waterton in the "Architect and Contract Reporter," this disease in timber ought to be designated a decomposition of wood by its own internal juices, which have become vitiated for want of a free circulation of air. If you rear a piece of timber, newly cut down in an upright position in the open air, it will last for ages. Put another piece of the same tree into a ship or into a house, where there is no access to the fresh air, and ere long it will be decomposed. But should you have painted the piece of wood which you placed in an upright position, it will not last long, because, the paint having stopped up its pores, the incarcerated juices have become vitiated, and have caused the wood to rot. Nine times in ten wood is painted too soon. The upright unpainted posts in the houses of our ancestors, though exposed to the heats of summer and the blasts of winter, have lasted for centuries, because the pores of the wood were not closed by any external application of tar or paint, and thus the juices had an opportunity of drying up gradually. On making some alterations in a passage, I put down and painted a new plinth made of the best and apparently well-seasoned foreign deal. The stone wall was faced with wood and laths, and the plaster was so well worked to the plinth that it might be said to have been air-tight. In about four months a yellow fungus was perceived to ooze out betwixt the bottom of the plinth and the flags, and on taking up the plinth, both it and the laths and the ends of the upright pieces of wood to which the laths had been nailed were found in as complete a state of decomposition as though they had been buried in a hot-bed. Part of these materials exhibited the appearance of what is usually called dry rot, and part was still moist, with fungus on it sending forth a very disagreeable odor. A new plinth was immediately put down, and holes one and a half inch in diameter at every yard were bored through it. This admitted a free circulation of air, and to this day the wood is as sound and good as the day on which it was first put down.

CONSTRUCTION

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CONTRIBUTIONS.—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and returned.

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Honor Roll

Paucity of numbers alone as regards the membership of the profession in a young country such as Canada makes the enlistment of architects and draughtsmen noted in the honor roll published elsewhere in this issue both an enviable and conspicuous achievement. It reveals both principals and juniors actively aligned in support of the ideals and objects for which the Allies are contending, in whatever capacity their services can be used. Many in the list have attained military positions of rank and distinction, practically all have seen active field service, and some, as the casualties indicate, have made the supreme sacrifice, including several members of high professional standing.

Yet, as representative as the list would seem, it does not constitute an entirely complete record of the active participation of Canadian architects in the present war. There are still a number of names unobtainable at the moment which it will be necessary to add at a future time, as well as perhaps certain inaccuracies as to units and branches of service which will require adjustment before the list appears in its finally revised form. It is also incomplete in the sense that it does not take into account members of the profession who, while not actively engaged in military life, are neverthless doing important and necessary war work. This refers to the establishing of hospitals, training camps, and aviation buildings, for which the services of a number of architects and draughtsmen are constantly required.

Superficial facts, such as these, while related are however unnecessary. The Honor Roll speaks eloquently for itself, denoting a splendid response to the call and a spirit of courageous and self-sacrificing loyalty. In compiling this list CONSTRUCTION is indebted to Mr. Alcide Chausse, Honorary Secretary of the Royal Architectural Institute of Canada, as well as to the secretaries of the certain provincial bodies, for much of the information published. It is to say the least an illuminating and inspiring record, one which Canada can proudly regard and which, through the magnificent spirit shown, does marked honor to the profession it represents.

Manitoba Association of Architects

The Monday luncheons of the Manitoba Association of Architects are now being held each week at the headquarters of the architectural department of the Manitoba University, Winnipeg, where accommodations have been provided by Prof. Stoughton, who has also invited the members to freely avail themselves of the books, plates and periodicals in the University Architectural Library, especially since the library of the association was lost in the recent burning of the Enderton Building, where the Association's rooms had been located for some years.

On the suggestion of Mr. W. P. Over, the association has decided to take up the question of memorials which will be promoted by public and private endeavor to commemorate incidents of local or national interest in the present war. In this connection the council has been directed to report on proposals of this kind as they arise, with a view to offering the co-operation of the association to existing and newly formed organizations having as their object the establishing of war memorials or the creation or stimulation of public sentiment regarding same.

Officers of the association for 1918 are: President, D. W. Bellhouse; vice-president, A. H. Wills; secretary-treasurer, E. Fitz Munn. Members of executive council: C. S. Bridgman, W. Fingland, L. H. Jordan, H. E. Mathews, W. P. Over, R. B. Pratt, and J. H. G. Russell.

The association will continue to send parcels to its members serving with the expeditionary forces in France as heretofore. There is also a probability of steps being taken toward establishing a foundation for a scholarship in connection with the University architectural course.

New York Store as Aerial Station

Aside from being responsible for the general introduction of hangars and other necessary types of field buildings, the war has so hastened the progress of aviation that the adoption of the aeroplane for practical utility and service other than that of a military character, gives rise to speculation as to what will be its ultimate effect on architecture, particularly as regards the congested areas of towns and cities.

More than ordinary interest, in fact, is attached to the official announcement that the United States Government will inaugurate its aerial mail delivery on April 1st, and this in turn has been promptly followed by the announcement of Gimbel Bros., New York, of their readiness to make the roof of their large departmental store at 33rd street and Sixth avenue available as a landing place for aeroplane conveyances. According to the management, the Gimbel roof is easily convertible for an aeroplane station as soon as an overhead route is established, and that the architect in planning the building had this idea stored for future application.

While plans have not as yet been drawn for the proposed station, it is nevertheless stated by the firm that the station is soon to be a reality. With the promises of certain revolutionary changes in delivery systems following the war, present conjectures are fast being shaped into tangible working schedules. The company's store is located in the heart of the shopping district, and its roof affords a large flat area adaptable for gliding and landing purposes.

Although a certain amount of enthusiasm on the part of the management which is displayed in the original news text of the announcement mentioned might be discounted on the grounds of advertising, there is plenty to indicate that the influence of the aeroplane on architectural possibilities has at least arrived. It indeed takes but little stretch of the imagination to mentally picture the aerial station and delivery system as an accomplished reality; and designers of more than ordinary vision have already given the subject a greater amount of thought and study than might at first seem apparent. At any rate the new Government aerial mail delivery venture will be well worth following, and may prove highly interesting in the changes it may lead to in the plan of future buildings.

Becomes Managing Director

Walter Baker Champ, who has for many years been secretary-treasurer of the Hamilton Bridge Works Co., Ltd., and who was last week elected managing director and secretary of the company, was born in Hamilton, March 23rd, 1874. His entire business career has been with the Hamilton Bridge Works Company, having

WALTER BAKER CHAMP, NEW MANAGING DIRECTOR HAMILTON BRIDGE WORKS CO.

joined that firm when he was only 17 years old. He was appointed treasurer of the company when only 24 years of age, and seven years later he was made secretary-treasurer. Mr. Champ has been a director of the company since 1910. He is a member of the Hamilton Board of Trade, and was president of that organization for the year 1909. He is a member of the Canadian Manufacturers' Association, and served on the executive council of that association from 1909 to 1912. As managing director of the Hamilton Bridge Works Co., Mr. Champ succeeds the late R. Maitland Roy, Men. Can. Soc. C. E. Mr. Champ has been acting manager of the company since Mr. Roy's death, in July, 1916.

Obituary

The death of Howard C. Stone, architect, which occurred at Montreal from pneumonia on February 14th, is a matter of deep regret to the architectural profession and his many personal friends. Mr. Stone was a native of Northampton, Mass., and came to Canada twenty years ago after first practicing in New York City. He enjoyed the confidence of a large clientele, and was responsible for a large number of commercial structures of diversified character. Among other buildings, he designed the head office of the Royal Bank of Canada, the Coristine and the Commercial Union buildings in Montreal, and the Maisonneuve factory of the United Shoe Machinery Company of Boston, Mass., and had charge of the remodelling of the head office of the Molsons Bank, and the Canada Steamship Company's office on Victoria Square, Montreal.

BELL MEMORIAL, BRANTFORD, ONT. WALTER S. ALLWARD, SCULPTOR.

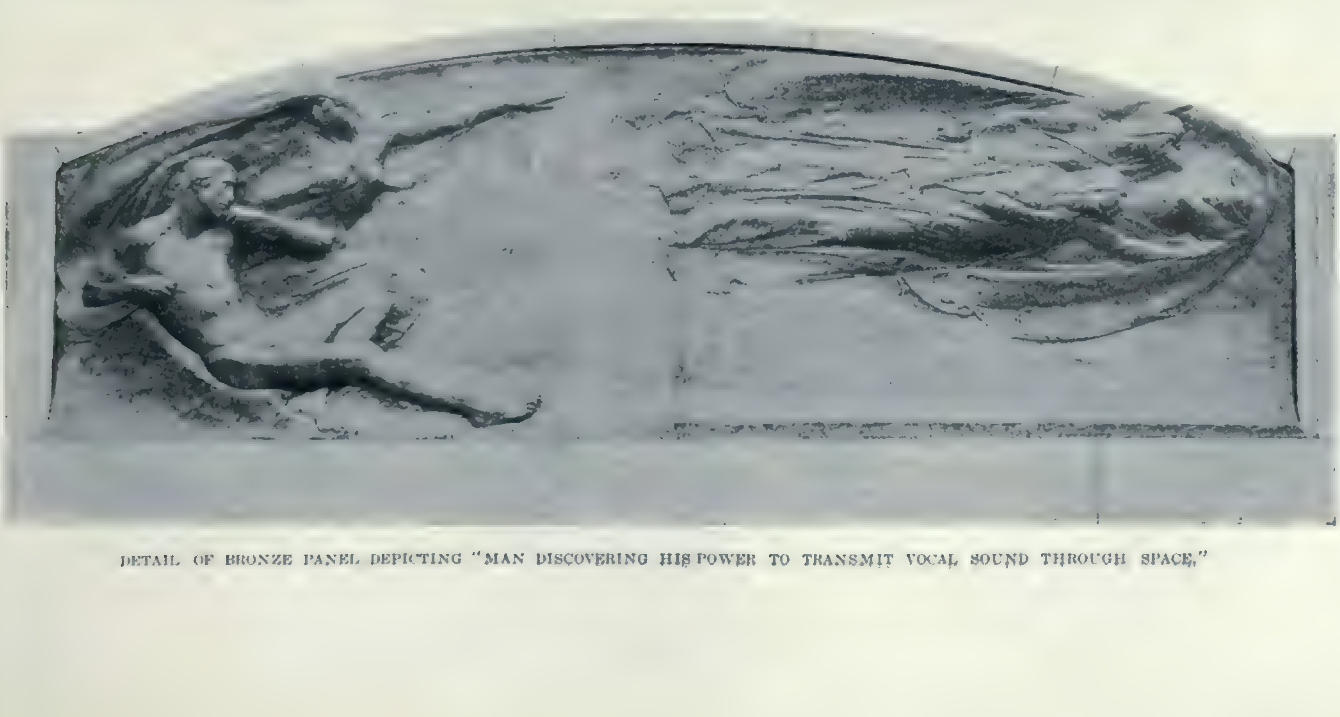
The Bell Memorial, Brantford. Ont.

As an example of public monument design it would be difficult to find anything which shows a more interesting grasp of theme or a more artistic development of the subject than the work of Mr. Walter S. Allward, the eminent Canadian sculptor, as seen in the Bell Memorial recently unveiled at Brantford, Ontario.

One has been quite prepared through the previous efforts of Mr. Allward, such as his South African Memorial at Toronto, with its vigorous heroic figures, to expect something of unusual merit in anything he does; and this is strikingly manifest in this allegorical representation commemorating the great service which has been rendered to mankind through the invention of the telephone.

As a work of imaginative art it stands as an exceptionally noteworthy production. The two figures in bronze, at either side, represent "Humanity" sending and receiving messages, while the bronze panel depicts "Man discovering his power to transmit vocal sounds through space." "Man" is surmounted by a figure symbolic of "Intelligence" with three floating messengers, "Knowledge," "Joy" and "Sorrow," completing the idea.

The unveiling of the monument at which His Excellency, the Duke of Devonshire, Governor-General of Canada, officiated, was the occasion of a notable gathering, including Dr. Alex. Graham Bell, of Washington, D.C., the inventor of the telephone. It not only establishes the claim of Brantford as being the birth-place of the telephone, according to Dr. Bell's own testimony, but gives to the place a public monument of which its citizens can be justly proud.



DETAIL OF BRONZE PANEL DEPICTING "MAN DISCOVERING HIS POWER TO TRANSMIT VOCAL SOUND THROUGH SPACE."

Canadian Building and Construction News

BUSINESS BUILDINGS.

London, Ont.—Smallman & Ingram, Dundas Street, will install an ornamental steel and iron balcony around the ground floor of their store. Cost $5,000.

London, Ont.—Hyatt Bros., 288 Egerton Street, have the general contract for rebuilding business block recently damaged by fire at 1147 Dundas Street. Mrs. M. Barnes is the owner.

Montreal, Que.—Work is in progress on alterations to La Banque National, Montreal, to cost $12,000. Alfred Mecure, Montreal, is doing the plaster work, joinery and decorations, and Jobin & Genois, Quebec, Que., have the contract for the marble work. P. Levesque, 115 St. John Street, Quebec, Que., is the architect.

Moose Jaw, Sask.—Architects Storey and Van Egmond, Regina and Saskatoon, will invite tenders about April 1st, for the erection of a modern store building at this place to cost $20,000.

Ottawa, Ont.—General alterations including the installation of a new shop front are at present being carried out for F. W. Carling, 126 Sparks Street. Richards & Abra, 126 Sparks Street, are the architects, and A. Christie & Sons, 358 Elgin Street, the general contractors. Cost $3,000.

Pembroke, Ont.—A site has been purchased by the Merchants Bank of Canada for the erection of a building to cost $20,000. It is understood that work on the structure will start this spring.

Toronto, Ont.—Work has started on a store and residence of brick construction to be built on Queen Street near Bellefair Avenue, for G. E. Young, 2010½ Queen Street East. Cost $5,000.

CHURCHES AND SCHOOLS.

Almonte, Ont.—Tenders have been received by B. Williams, Chairman of the Property Committee of the School Board for the installation of a steam or hot water system to heat eight rooms and two halls at the Martin Street School.

Brantford, Ont.—The Public School Trustees and the City and County Councils are considering the establishing of a number of continuation schools through the county.

Highland Creek, Ont.—James, Louden & Hertzberg, Excelsior Life Building, Toronto, have completed plans for a two-roomed school of brick construction, 64 x 40, to be erected by the local School Board. The building will cost $12,000, and the brick has already been purchased.

Mimburn.—Alta.—Tenders have just closed for the erection of a brick veneer church for the Mimburn Union Congregation.

Mount Dennis, Ont.—Tenders will be received until March 27th, for the erection of a six-roomed brick school addition for School Section, No. 28, York. Ellis & Ellis, Manning Chambers, Toronto, are the architects. Secretary S. McCormack, Silverthorn Avenue, Sub. Station 72, Toronto, can be addressed.

Pabos, Que.—Architect Pierre Levesque, 115 St. John Street, Quebec, Que., has completed plans for a presbytery to be erected for the Rev. Victor Case. The building will be of brick construction, modernly equipped and cost $8,000.

St. Pamphile, Que.—Architect Pierre Levesque, 115 St. John Street, Quebec, Que., has completed plans for a frame addition to the Roman Catholic Church at this place, to cost $12,000.

St. Catharines, Ont.—Plans are being revised and new tenders will be called shortly for the proposed brick church and Sunday School to be erected by the Niagara Street Methodist Congregation. T. W. Wiley, is the architect.

Thornhill, Ont.—The Board of School Trustees are contemplating the erection of a three-roomed brick school to cost $15,000. Plans for the structure have been completed by architects James, Louden & Hertzberg, Excelsior Life Building, Toronto. The work will likely start this spring.

CLUBS AND HOSPITALS.

Brantford, Ont.—The erection of an addition to the nurses home of the General Hospital, is contemplated.

Fort Qu' Appelle, Sask.—Tenders are to be called this month for several new buildings to be erected in connection with the Saskatchewan Tuberculosis Sanitarium. These will include an infirmary, three cottages, pavillions, together with the installation of new steam boiler, engine and generator. Estimated cost of improvements, $250,000. Storey & Van Egmond, Regina and Saskatoon, are the architects.

Hamilton, Ont.—Supplementary estimates submitted to the Ontario Legislature include the following items for improvements to the hospital for Insane: $40,000 for erecting new addition; $10,000 for new boiler house; $3,000 for fire alarm system.

Petrolia, Ont.—The Petrolia Hospital Trust, has just closed tenders for the erection of a brick hospital addition to cost $15,000. J. M. Moore, 418 Richmond Street, London, Ontario, is the architect.

Woodstock, Ont.—Estimates submitted to the Ontario Legislature include two items providing for the erection of the following buildings in connection with the Woodstock Epileptic Hospital; $41,000 for the work-shop and store-room; $10,660 for laundry.

FACTORIES AND WAREHOUSES.

Brockville, Ont.—Tenders have closed for a printing plant to be erected on King Street West, for the Recorder Printing Company. B. Dillon, Brockville, is the architect.

Campbellford, Ont.—The Northumberland Paper & Electric Company, will remodel and enlarge building recently damaged by fire.

Guelph, Ont.—Work is in progress on a brick factory addition for the White Sewing Machine Company of Canada, Suffolk St., to cost $12,000. Geo. A. Scroggie, 400 Woolwich Street, has the contract.

Listowel, Ont.—Plans have been completed for a one-story, 50 x 100, dye house to be erected for the Perfect Knit Mills Company. Cost $50,000.

London, Ont.—The London Soap Company, Ottawa Avenue, will erect a brick factory addition to cost $3,000.

London, Ont.—Architect A. E. Nutter, Dominion Savings Bldg., has completed plans for a factory addition of brick construction for the Peerless Hosiery Company. Cost $20,000.

Omemee, Ont.—Plans have been completed for remodelling tannery at this place for Chas. Parson & Son, 79 Front St. E., Toronto. The alterations to building and new machinery equipment will cost in the neighborhood of $100,000.

Tillsonburg, Ont.—The Huntley Mfg. Company will immediately rebuild their plant recently destroyed by fire. The loss on building and machinery is estimated at $100,000.

Toronto, Ont.—Work has started on the erection of a four-storey warehouse of mill construction on Orillia Street for Bowes & Company, Limited, 74 Front Street East. Thos. Essery, Confederation Life Building, has the general contract. Cost $25,000.

Toronto, Ont.—Architects Hynes, Feldman & Watson, 105 Bond Street, have awarded the following contracts for a four-storey, 56 x 135, reinforced concrete warehouse to be erected at Wellington and Portland Streets: Mason, H. N. Dancy & Sons, C.P.R. Building; carpenter work, Fred Wilson; sheet metal, A. Mathews Company, 256 Adelaide Street West; steel sash, Trussed Concrete Steep Company, 34 King Street West; painting and glazing, R. A. Dale, 98 Castle Frank Road; elevators, Turnbull Elevator Company, 126 John Street.

MISCELLANEOUS.

Fort William, Ont.—Supplementary estimates submitted to the Ontario Legislature, provide for improvements and additions at Industrial Farm, $3,000; improvements to camp buildings, $15,000; improvements to water supply and sewerage disposal system, $2,500; improvements in heating to Court House and Jail (Re-vote) $2,500.

Hamilton, Ont.—The City Council has voted to rebuild the Market Hall recently destroyed by fire. The walls of the old building will be utilized and refrigerating machinery will be installed.

Ingersoll, Ont.—M. J. Clear, will erect a two-storey brick and cement garage at King and Oxford Streets, to cost $10,000.

Kenora, Ont.—Supplementary estimates submitted to the Ontario Legislature includes the following items for improvements at this place: repairs to court house, jail and registry office, $1,450; painting exterior and interior of court house, $1,000.

London, Ont.—Tenders are to be invited immediately for the erection of a modern bank and office building for the Huron & Erie Corporation Company. Watt & Blackwell, are the architects.

Ojibway, Ont.—The Canadian Steel Corporation, will construct an independent water works system having a daily capacity of seven million gallons.

Ottawa, Ont.—Tenders will be received until March 26th, by the Board of Control, for safety gates in connection with the Pretoria Avenue Bridge.

Ottawa, Ont.—Plans have been completed for a two-storey brick dwelling to be erected on Broadway, for W. H. Lee, 36 Barton Street. Cost $4,500.

Ottawa, Ont.—Tenders will be received until March 25th, for supplying switch boards, panel board and transformers, required in the reconstruction of the Parliament Buildings.

Ottawa, Ont.—A. Proul, has the contract for general alterations including a new roof to stores and apartments on St. Andrews Street, for W. J. Baskerville, 58 George Street. Cost $9,000.

Ottawa, Ont.—N. Hollister, 512 Bay Street, has the contract for altering a dwelling into apartments at the corner of Slater and Bay Street. Cost $10,000. Dr. Jurvet, Canada Life Building, is the owner.

Ottawa, Ont.—Alex. Garvock, 136 Lewis Street, has the general contract for the erection of a reinforced concrete warehouse to cost $50,000 for A. L. Florence & Son. Millson & Burgess, Union Bank Building, are the architects.

Ottawa, Ont.—The Department of Public Works, will receive tenders until April 11th, for the electric wire and cable required in the reconstruction of the Parliament Buildings. Specifications may be obtained at the office of P. Lyall & Sons, Construction Company, Ottawa.

Toronto, Ont.—Tenders will be received until March 30th, for the following water works materials required by the Township of York, 420, twelve-inch cast iron pipes; 1000 six-inch cast iron pipes; 200 cast iron specials; 112 hydrants; 15 twelve-inch gate valves; 1000 six-inch gate valves. Further information may be obtained from Frank Barber, Engineer, 40 Jarvis Street.

PUBLIC BUILDINGS.

Ottawa, Ont.—The Department of Public Works will receive tenders until April 2nd, for the construction of the proposed Government Office Building, to be built on O'Connor Street, at a cost of $1,000,000. Plans, etc., may be obtained at the office of the Chief Architect of the above department; Overseer of Dominion Buildings, Central Post Office, Montreal; and at Postal Station "F," Toronto.

Farnham, Que.—Tenders closed March 14th, for an addition and alterations to the post office building at this place.

RESIDENCES.

London, Ont.—Plans have been completed for a $3,000 frame residence to be erected for J. Hancock, Briscoe Street.

Ottawa, Ont.—Roger Lean, 357 Arlington Avenue, has had plans prepared for a two-storey, 16 x 34, brick veneer residence to be built on Bronson Avenue.

Renfrew, Ont.—Henry David, 465 Raglan Street, will erect a dwelling on Lochiel Street, to cost $5,000. A residence is also to be built by Chas. McD. Logan, of the Renfrew Knitting Company, at the corner of Hinch and Victoria Streets, to cost $3,000.

Barrett Specification Roofs

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TAKE any Canadian or American city, single out the leading modern buildings, and you will usually find a Barrett Specification type of roof on top of practically every one of them.

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20-YEAR GUARANTY BOND

The 20-Year Guaranty is now given on all Barrett Specification Roofs of fifty squares and over in all towns with a population of 25,000 and over, and *in smaller places where our Inspection Service is available.*

Our only requirements are that The Barrett Specification, dated May 1, 1916, shall be strictly followed and that the roofing contractor shall be approved by us.

The Barrett Company
LIMITED

MONTREAL TORONTO WINNIPEG VANCOUVER
ST. JOHN, N.B. HALIFAX, N.S. SYDNEY, N.S.

The buildings illustrated are the Toronto Stock Exchange, Royal Bank Building, Toronto, Atlantic Sugar Refining Co., St. John, N.B., all covered with Barrett Specification Roofs.

Toronto, Ont.—J. Cooper, 51 Fulton Avenue, will erect a duplex house and garage of brick construction on Jackman Avenue, to cost 5,000. P. H. Finney, 79 Adelaide Street, is the architect.

Toronto, Ont.—Architect P. H. Finney, 79 Adelaide Street East, has completed plans for a four-storey brick apartment house to be erected on Tennis Avenue, for the City Homes Limited, 58 Hogarth Avenue.

THEATRES AND HOTELS.

Moose Jaw, Sask.—Architects, Storey & Van Egmond, Regina and Saskatoon, have received tenders for removing stage and making general alterations at the Allen Theatre. The work will cost $5,000.

Regina, Sask.—Architects Storey & Van Egmond, have just closed tenders for a $40,000 addition to be built to the Kitchener Hotel. New steam boiler, elevator, pneumatic pressure tank, steam heating, plumbing, laundry and kitchen equipment will be installed.

LATE BUILDING ITEMS.

Guelph, Ont.—A. B. Clark, 40 Omar street, has the contract for erecting a brick residence on Paisley street, for J. A. Johnson, Tipperary Place. Cost $5,000.

Guelph, Ont.—A. B. Clark, 40 Omar street, has the contract for the erection of a brick residence on Hearn avenue, for John Henry, Edinburgh road. Cost $3,000. The contractor will also erect a brick house for himself on Paisley road.

Horton Township, Ont.—Oliver McQuitty, Renfrew, R.M.D., will erect a brick veneer residence to cost $3,500.

Kingston, Ont.—The Central School an Sydenham street, has been damaged by fire to the extent of $7,000.

London, Ont.—The Western Fair Board, Dominion Savings Building, will invite tenders about April 1st, for the erection of a concrete viaduct to cost $10,000. A. M. Hunt, Secretary.

London, Ont.—The Bank of British North America will shortly erect an addition to their premises at Market Square to cost $25,000. J. N. Moore, Richmond street, is the architect.

London, Ont.—John Hayman & Sons, 432 Wellington street, will shortly erect a four-story apartment house of brick construction to cost $50,000. The owners are the general contractors.

London, Ont.—Architects Watt & Blackwell, Dominion Savings Building, have plans ready and expect to call for tenders shortly for the erection of a building for the Huron and Erie Mortgage Company.

Ottawa, Ont.—J. C. Lowe, 358 Lisgar street, has the contract for constructing a new roof and making general repairs to store building on Sparks street, owned by the H. R. Brennon Estate. Cost $3,000.

Renfrew, Ont.—Alex. W. Eastman is contemplating the erection of a bungalow of brick construction on Lyn street to cost $3,500.

Renfrew, Ont.—Harry Totten is contemplating the erection of a brick veneer residence at Jermain and Arnprior streets to cost $4,500.

Toronto, Ont.—Plans have been prepared for a modern gve-storey building to be erected on Yonge street, near King, for Fairweather's, Ltd., 84 Yonge street. Charles S. Cobb, 71 Bay street, is the architect.

Toronto, Ont.—The Toronto and Hamilton Highway Commission, 49 Wellington street east, will receive tenders until April 2nd, for the erection of bridge over Mimico Creek, Etobicoke Creek, Credit River and Bronte Creek. Tenders will be received on both concrete and steel structures. Plans are on file with Chief Engineer at the above address, and at the office the City Engineer, Hamilton.

OPEN MONTREAL SALES OFFICE.

MacKinnon, Holmes & Co., Limited, of Sherbrooke, Que., have opened a sales office at 404 New Birks Building, Montreal, Que. Mr. W. J. Lochhead being in charge.

CATALOGUES and BOOKLETS

CATALOGUES WANTED.

The Vocational Training Branch of the Military Hospitals Commission, Toronto, is desirous of obtaining catalogues covering the various lines of building materials, equipment, and appliances. Address, C. M. Canniff, for Vocational Officer for Ontario, Military Hospitals Commission, Toronto.

VOKES HARDWARE COMPANY EXPANDS.

The Vokes Hardware Company, Toronto, have purchased the entire stock of mantels, tiles and grates carried by the T. Eaton Company, Toronto, who have been important contractors in this field for several years. This addition to the Vokes Hardware Company's already well established fireplace business will give them front rank among Canadian firms in this branch of building work.

"PUMPS FOR ANY SERVICE"

This is the title of an 84 page catalogue just issued by Darling Brothers, Limited, Engineers and Steam Specialists, 120 Prince Street, Montreal. It describes in detail, both in illustrations and text, the many and varied lines of pumps and compressors manufactured by this firm. It also contains several pages dealing with important information for the benefit of intending purchasers of pumps. The book is excellently printed and is a credit in every way to the above firm.

THE DIGEST.

This is the title of a most complete little house organ which has just been received from Darling Bros., Limited, Montreal. It is a carefully edited, attractively printed, fourteen-page magazine containing much useful information and is to be published hereafter by the company monthly. The present issue has a department of live editorial comment and instructive articles on "Relative Merits of Hot Water and Steam Heating," "Pushing Production," and other subjects. Judging from the appearance of No. 1, volume No. 1, "The Digest" will prove of constant value to architects and others interested in steam appliances and future numbers will likely be in considerable demand.

SANITARY CONSTRUCTION.

The extent to which sanitary features enter into the construction of modern hospitals, factories, hotels, restaurants and other types of buildings naturally creates a demand for any material which can be successfully used for this purpose. Because of this "Vitrolite" lays claim to special attention and this seems justified by the many evidences of its advantages and widespread application. It is produced with a natural fire polished surface that is non-porous and will not craze, and its depth of rich, white color gives it an appearance of wholesome cleanliness that completes its sanitary qualities. In modern hospitals where there is an insistent demand for asepsis in the wall surfaces and equipment of operating, diet, and utility rooms it admirably fulfills every requirement. "Vitrolite" is also largely used for toilet and shower partitons, wainscoting in offices, public buildings and residences, and for sanitary factory purposes.

One advantage is that it can be installed in large slabs so that seams and joints are reduced to a minimum. It can also be supplied in decorative and color effects for friezes and borders in restaurants and lunch rooms, and produces an artistic and pleasing appearance. A large number of illustrations showing the practical application in buildings of various types together with valuable information relative to its many excellent qualities, is contained in a twenty-four page booklet issued by the Vitrolite Company, Chamber of Commerce Building, Chicago, and will gladly be sent to any interested party.

CONTRACTORS and SUB-CONTRACTORS

As Supplied by The Architects of Buildings Featured in This Issue

Dominion Power and Transmission Company's Power Station, Hamilton.

Air Blast Piping, Thos. Irwin & Sons.
Air Washers, Carrier Air Conditioning Co.
Asbestos Barriers, Canadian H. W. Johns-Manville Co.
Boilers, Edge Moor Boiler Co.
Brick, American Enamelled Brick Co.
Brick, Canadian Pressed Brick Co.
Brick, Kittaning Brick & Fire Clay Co.
Cement, Alfred Rogers.
Cement, Canada Cement Co.
Cole Elevators, C. O. Bartlett & Snow Co.
Conduits, Crouse-Hinds Co.
Electrical Equipment, Canadian Westinghouse Co.
Expanded Metal, Trussed Concrete Steel Co.
Feed Water Heaters, Canadian Allis Chalmers Co.
Fire Brick, Elk Fire Brick Co.
Fire Doors, Jos. Riddell & Sons.
Floor Tiling, Kent-Garvin Co.
General Contractors, Dominion Power & Transmission Co.
Glass, Hamilton Mirror and Plate Co.
High Pressure Piping, Canadian Kellogg Co.
Hollow Tile, National Fire Proofing Co.
Insulating Brick, Armstrong Cork and Insulating Co.
Insulators, Canadian Porcelain Co.
Locomotive Crane, Brown Hoisting Co.
Metropolitan Roofing, Keystone Fire Proofing Co.
Oil Treating Outfit, S. F. Bowser Co.
Paints, Jas. Langmuir Co.
Pipe Covering, Armstrong Cork & Insulating Co.
Radiators, Dominion Radiator Co.
Roofing, F. W. Bird & Son.
Roof Insulator; Ohio Brass Company.
Small Pumps, Smart Turner Machine Co.
Smoke Stacks, Canadian Kellogg Co.
Steel Sash, A. B. Ormsby Co.
Stoker, American Engineering Co.
Structural Steel, Hamilton Bridge Co.
Terra Cotta, North Western Terra Cotta Co.
Travelling Crane, Cleveland Engineering Co.
Valves, Chapman Valve Co.
Valves, Jenkins Bros.
Water Treating Equipment, W. B. Scaife & Sons.

The T. Eaton Company's Factory.

Brick contractors, Thompson Bros.
Brick, exterior, Price Bros.
Brick, interior, Don Valley Brick Works.
Cement, Canada Cement Co.
Concrete Stairway, Mason Safety Tread.
Concrete Work, Raymond Construction Co.
Conduits, Crouse-Hinds Company.
Door Checks, Yale & Towne Ltd.
Elevators, Otis-Fensom Elevator Co.
Elevator Equipment, Canadian Elevator Equipment Company.
Fire Doors, A. B. Ormsby Co.
Fire Extinguisher, Victor Fire Extinguisher Co.
Floor Hardener, Master Builders Co.
Flooring, Seaman-Kent Co.
Floors, terrazzo, Italian Mosaic & Tilre Co.,
Fuses, Detroit Fuse Mfg. Company.
Glass, Imperial Glass Co.
Iron Railings, etc., Architectural Bronze & Iron Works.
Kalamined Doors, A. B. Ormsby Co.
Marble, Vermont Marble Co.
Motors, Canadian Westinghouse Co.
Plastering, A. D. Grant.
Plumbing, Keiths Limited.
Radiators, Dominion Radiator Co.
Refrigerating equipment and sterilizing water plant, Canadian Ice Machine Co.
Reinforcing Steel—Baines & Peckover.
Roofing, A. B. Ormsby Co.
Steel Sash, A. B. Ormsby Co.
Stone contractors, Nicholson & Curtiss.
Stone, Indiana Limestone Co.
Stone, Queenston Quarry Company.
Sprinkler equipment, Canadian General Fire Extinguisher Co.
Structural steel, McGregor & McIntyre.
Terra Cotta, Atlantic Terra Cotta Company.
Time clocks, International Business Machines.

April, 1918 Volume XI, No. 4

CONTENTS

Full Page Illustrations

H. GAGNIER, Limited, Publishers
GRAPHIC ARTS BLDG., TORONTO, CANADA
BRANCH OFFICES
MONTREAL NEW YORK

CANADIAN BANK OF COMMERCE, QUEBEC CITY. V. D. HORSBURGH, F.R.I.B.A., ARCHITECT.

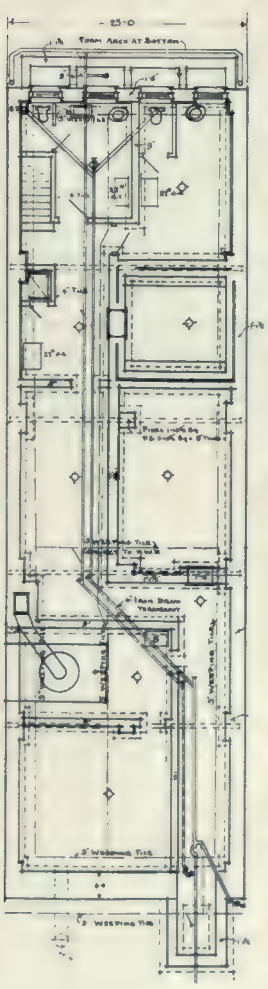
Recent Canadian Branch Banks

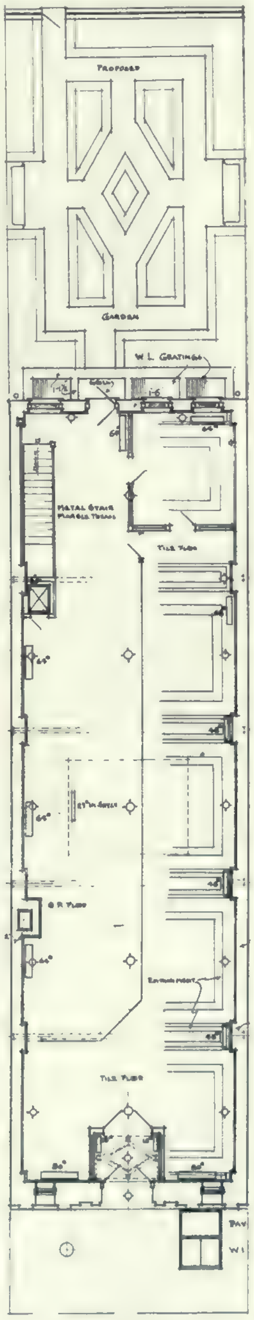
THE various banking institutions in Canada through their branch offices have not only encouraged a general spirit of thrift in the way of saving deposits, but have given to practically every community in the country and to every section in the larger cities, convenient facilities for the direct transaction of banking business. Moreover, it is to the credit of the banks that they have adopted a policy of housing their branches in buildings worthy of so laudable an enterprise.

Present figures place the total number of buildings erected in Canada for this purpose at close to four thousand. The fact that approximately two-thirds of them have been built in the past ten years, bears evidence to a marked period of expansion and is convincing as to the country's commercial and industrial growth and importance.

Naturally the development of one particular class of building to this extent follows a certain standard of plan based upon a practical working arrangement adaptable to different localities, but in a large number of cases the design and disposition of the various departments are quite individual in character and show the solution of interesting problems of plan.

In fact owing to the class of materials and workmanship usually demanded and which requires an outlay in excess of what as a rule is expended on other types of buildings of similar size, these branches represent one of the best and most satisfactory phases of our building progress, giving both a sense of importance to the smaller towns and a feeling of dignity in the various districts of the larger business centres, which is at least an incentive to better design in the erection of business and mercantile structures.





BASEMENT. BRANCH OF ROYAL BANK, TORONTO. F. S. BAKER, F.R.I.B.A., ARCHITECT. GROUND FLOOR.

BANKING ROOM, BRANCH OF ROYAL BANK, TORONTO. F. S. BAKER, F.R.I.B.A., ARCHITECT.

A number of recent examples of this class of work are illustrated in this issue, most of which represent structures erected during the war and which have been the means of considerable business and employment to the various building interests. Many of these subjects are quite noteworthy productions, and taken collectively, are not only interesting on account of the diversity of designs but as indicating the manufacturing and natural resources of the country and the general confidence which have justified the erecting of these premises during the present distressing times.

New Branch of Royal Bank, Toronto

This branch of the Royal Bank of Canada was opened for business in the latter part of March, and was designed to provide an ample and wholesome office, which would have an appearance of dignity and size, although composed of only one storey.

The vaults, cloak rooms, lavatories, etc., all being in the basement, which is reached by a marble stairs and an hydraulic elevator, the banking floor is clear of obstruction.

The public space has a marble mosaic floor with dados and counters of oak panelling, at the end of which the manager's office is placed. At this point also is an entrance through which customers may reach the safety deposit vaults located in the basement.

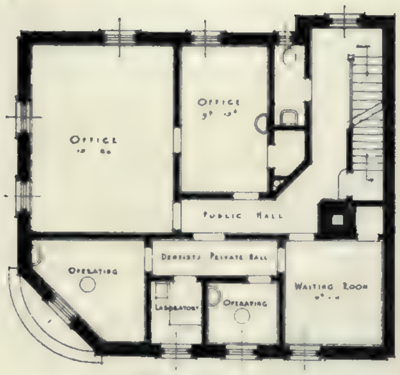
The large divided circular headed metal window sash at each end of the banking room with the central skylight of leaded glass in the vaulted ceiling twenty-five feet above the floor, provides the day lighting, while the one hundred and sixty electric lamp and wall reflectors concealed in the cornice shining on the white ceiling and supplemented by wall brackets and desk lamps, indirectly illuminate the room.

The general color scheme of the interior is a light yellowish cream with walls below of dull gold and deep brown oak woodwork.

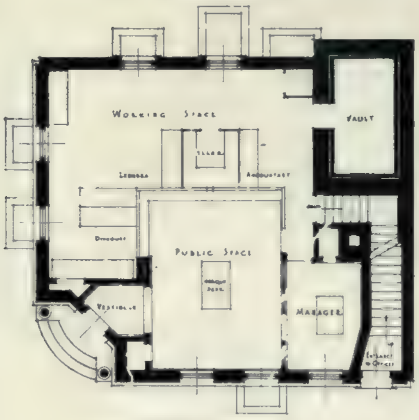
The exterior is of rubbed Indiana limestone ashlar with some carving and mouldings, including a main cornice and ballustrade of fair proportions.

The facade is in the form of a triumphal arch as built in Rome or Naples and detailed in the Italian Renaissance style. Although contructed in war time and during a very severe winter, the building was completed without a hitch in any department within eight months by local contractors.

A small garden at the rear of the banking premises was originally contemplated, and while this has not been carried out, it is something which can quite easily be developed at any time. The accompanying ground floor plans indicate the proposed layout at this point, and should the suggestion be adopted by the management later on it will not only result in rather a somewhat unusual feature, but will also provide direct ingress to the banking room to clients who might wish to save time by entering from the rear street.



UPPER FLOOR.



GROUND FLOOR.

BRANCH OF BANK OF BRITISH NORTH AMERICA. QUEEN STREET AND BEECH AVENUE, TORONTO.

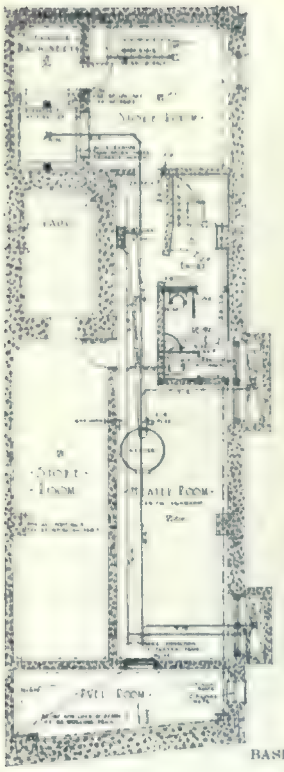
New Branch of Bank of British North America

One of the conditions in the erection of this building was speed of construction, since it was necessary for this branch to move out of temporary rented quarters across the street August 15th, 1917. Excavation was begun on April 3rd, 1917, the brick work completed May 18th, the banking room finished and occupied by the staff July 25th, and the entire building completed August 31st. The whole work except fittings and fixtures was let on a cost plus percentage basis, with a guaranteed maximum price and a bonus for any amount saved from that price.

The site is 40 feet on Queen street east, by 60 feet on Beech avenue, with a 23 feet boulevard on Beech avenue, and a drop of 7 feet 6 inches from the north-west to the south-east corners. The owner asked for a corner entrance at the street level, and an entrance to the offices upstairs from Queen street. Consequently, although the grade to the west was much reduced, the banking room floor is below the grade along the west and north walls, and the entrance to the offices is 2 feet 3 inches below the banking room floor.

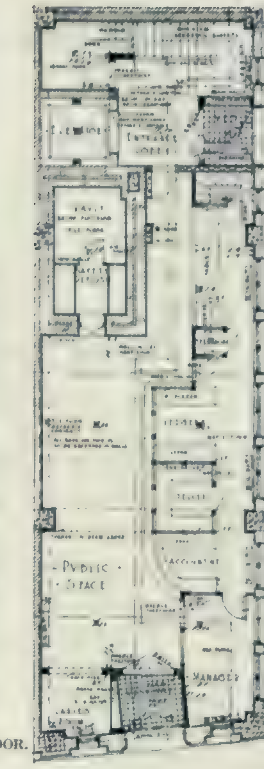
The exterior is of a simple Georgian character. The outside walls are of interlocking tile, faced with red stock brick laid in Flemish bond below the water table, and in English bond above that point. The water

DETAIL OF ENTRANCE. SHEPARD & CALVIN, ARCHITECTS.



BASEMENT.

HURON AND ERIE BUILDING, WINDSOR, ONTARIO. WATT & BLACKWELL, ARCHITECTS.



GROUND FLOOR.

table and the sills are of Indiana limestone, the main entrance steps of grey Stanstead granite, and the woodwork painted white with applied hand-made wood letters painted dark green forming the inscription on the cornice.

The general arrangement is explained in the accompanying plan. The banking room has a red quarry tile floor in the public space, while the remainder of the floors throughout are maple. The banking room fittings are of birch finished a dark brown tone; and the walls below the chair rail are covered with burlap finished to match the fittings, and are light green above on sand stucco finish. The ceiling has a simple moulded cornice and is done in cream color. The dentist's suite upstairs was laid out in consultation with the prospective tenant and the firm supplying his professional equipment. The trim throughout on this floor is of pine.

The building proper cost 29 cents per cubic foot, and complete with fittings, blinds, awnings, weatherstrips, sodding, lettering on windows, etc., 33.7 cents per cubic foot.

Huron and Erie Building, Windsor

The Huron and Erie Building recently completed at Windsor, Ontario, serves as a branch of the Huron & Erie Mortgage Corporation and Canada Trust Company, with head office at London, Ontario.

The frontage is 27 feet on Ouellette avenue and 72 feet on Pitt street; entrance to the banking room being from the former thoroughfare, and to the upper offices from the latter.

As the building is situated at one of the most central business intersections, it makes the location most desirable for modern office accommodations, and the walls have therefore been designed for a future addition of four more storeys.

While this will eventually add to the prominence of the building, the present exterior which is of Bedford stone, is noteworthy on account of its symmetrical lines

BANKING ROOM, HURON AND ERIC BUILDING, WINDSOR, ONT.

which give a feeling of dignity and strength.

In the banking quarters the treatment is carried out along very simple lines, the walls being of Caen stone and the only enrichment consisting of a cornice. The floor is of sand brown Grueby tile, 2 x 1 inch, laid herring-bone with green inserts. The woodwork is of quartercut oak in dull finish; and the color scheme such as to give a pleasing and restful general effect.

Office suites are on the two upper floors; these being served by an elevator and stairs having a wainscot of marble.

The building is fireproof throughout, and cost, inclusive of the site, $35,000.

In the basement are large storage rooms, boiler room, elevator machinery, lower vault, fuel room and toilets for the staff, all of which are grouped in a compact and convenient arrangement.

MERCHANTS BANK OF CANADA, WINDSOR, ONT. HOGLE & DAVIS, ARCHITECTS.

New Branches of The Merchants Bank

In pursuance of its policy of housing its branches in buildings worthy of its own standing and the importance of the various towns in which they are located, the Merchants Bank of Canada has lately erected new branch banks at Kitchener and Windsor, Ontario, and on Harvard avenue, Montreal.

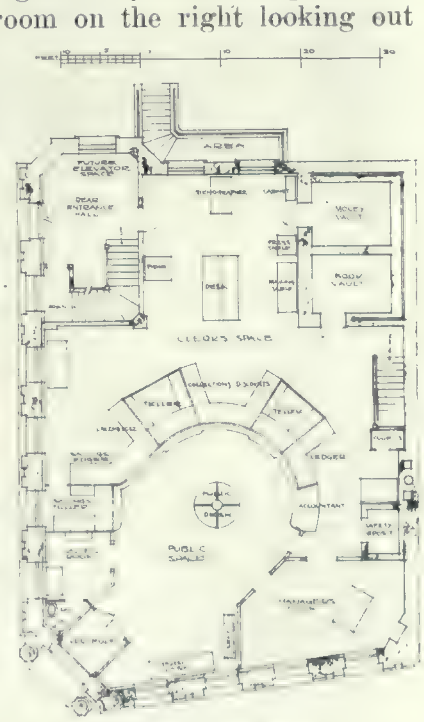
The chief idea followed in planning these three buildings was to give the maximum amount of space for the banking room. This was obtained by enclosing the managers' rooms with wood and glass screens instead of solid plaster partitions, and by putting the vaults, stairs, etc., in subsidiary positions.

The buildings at Kitchener and Windsor are three storeys in height so as to conform with the other adjacent buildings and also with the object of renting the upper floors for offices.

The building on Harvard avenue, Montreal, is situated in a new suburb where height is not required and where offices would be of little or no value. It is therefore only one storey high with the clerks' quarters consisting of two rooms and a bathroom on a mezzanine floor at the rear.

The sites of the three buildings differ widely from one another. The branch at Kitchener is rectangular with a frontage on two streets. As the side street is not of great importance the bank entrance was placed in the centre of the principal facade, with the office entrance on the side street. This gives a symmetrical plan with the manager's room on the right looking out into the two streets, and the ladies' room on the left. Between these two is semi-circular marble counter with the vault doors in the rear.

At Windsor the building fronts on two streets which meet at an acute angle and has the entrance across the corner of the structure. By forming a circular counter



GROUND FLOOR PLAN

BANKING ROOM, MERCHANTS BANK, WINDSOR, ONT. HOGLE & DAVIS, ARCHITECTS.

with the manager's room on one side and the ladies' room on the other, it was possible to obtain a well co-ordinated scheme giving a symmetrical and impressive effect.

The building on Harvard avenue, Montreal, faces on two streets forming an obtuse angle with the entrance placed in the centre of the Sherbrooke street front. A good size manager's room is obtained in the acute angle of the banking room front and party walls.

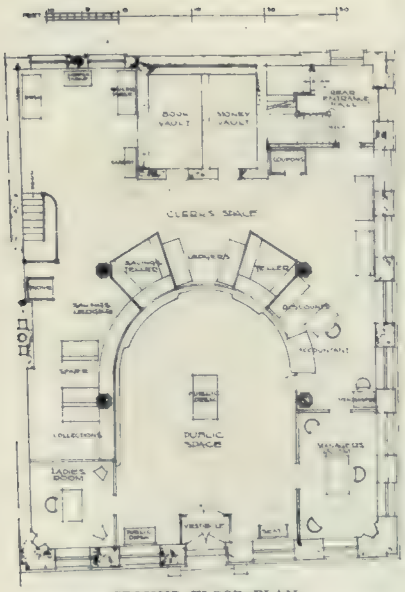
Windsor and Kitchener Branches

Both the Windsor and Kitchener branches are of stone in classic Italian design, the rear walls being of buffed brick harmonizing with the stone with plain stone sills, band courses, etc.; the one at Windsor having a base course of polished granite. In both cases the portion of the facade enclosing the ground or banking room floor, is treated in a distinctive manner from the two upper storeys, a strong cornice at the first floor level accentuating the banking quarters and a deep frieze with "The Merchants Bank of Canada" in high relief and an Ionic cornice and open ballustrade completing the upper scheme.

Entrance to the Kitchener branch is through a mahogany doorway having an ornamented fan-light. This door is in two leaves, each leaf consisting of one long glass panel covered with an ornamented grille. At Windsor the door is of iron with inner doors of mahogany and glass. These doorways lead through mahogany and glass vestibules into the banking rooms.

A somewhat similar treatment has been adopted for the interior of the banking rooms of both of these structures. The walls are panelled in Caen stone or plaster with ornamental panels at intervals around the room. The ceilings are beamed or coffered with enriched ornament. The building at Kitchener has four columns and the ceiling beams and cornice are treated in classic Doric. There are no columns at Windsor, and the ceiling is treated as one surface with deep octagon coffers, a small moulding forming the juncture of the ceiling and walls.

The public space of the banking rooms is laid with white Italian marble tiles in simple "masonry" pattern. The counters are of Botticino marble and are semi-circular in design, and the woodwork and the manager's screens and fittings is of mahogany. White ceilings and light colored walls with the buff marble and the small amount of mahogany used, together with the exceptionally large window space, make the interior of these banking rooms noticeably light.



GROUND FLOOR PLAN.

MERCHANTS BANK OF CANADA, KITCHENER, ONT. HOGLE & DAVIS, ARCHITECTS.

The counters are all open with low screens in front of the "Ledgers," "Collections," etc., and have high screens only in front of the tellers' cages. These tellers' cages are kept fairly low and are simple in design so that the fittings do not detract from the spacious open appearance of the banking room.

Desks fitted with thick plate glass tops, with glass divisions below for cheques, drafts, etc., are provided in the public space, as are also special tables and chairs for the women clients of the bank.

The vault accommodation is exceptionally large. Both money and book vaults are provided on the ground floor and large storage vaults are situated in the basement. In the Windsor branch a special safety deposit vault is provided adjacent to the manager's room and opposite to the gate between the clerks and the public space. This vault is equipped with special safety deposit boxes, and has a heavy vault door and day gate. At the Kitchener the safety deposit boxes are placed in the main vault, with special coupon boxes conveniently placed for the use of the customers.

The upper floors of these buildings are reached by broad and easy staircases, and in the Windsor premises space is provided for a passenger elevator if such should be found necessary at any future time.

Harvard Avenue Branch, Montreal

In the interior of this branch of the Merchants Bank, the scheme to a certain extent follows the above description, only here, instead of marble, the counter is of mahogany with a Botticino base. The general treatment gives a spacious effect, and the public and clerks' space is exceptionally well lighted.

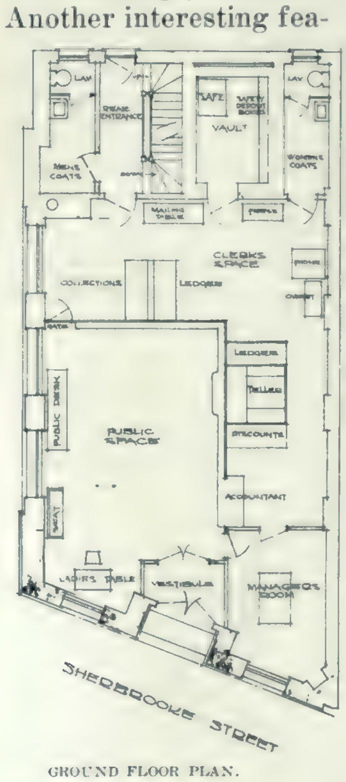
This building is in buffed brick with sandstone trimmings, and a feature of the facade is the large semi-circular doorway, which is deep-

BANKING ROOM, MERCHANTS BANK, KITCHENER, ONT.

MERCHANTS BANK OF CANADA, HARVARD AVENUE, MONTREAL. HOGLE & DAVIS, ARCHITECTS.

ly recessed to give a deep shadow. The windows on the Harvard avenue side have similar semi-circular heads, but are not so deeply recessed. Another interesting fea-

BANKING SPACE, MERCHANTS BANK, HARVARD AVENUE, MONTREAL.



GROUND FLOOR PLAN.

BANKING ROOM, MERCHANTS BANK, VANCOUVER, B.C. SOMERVELL & PUTNAM, ARCHITECTS.

ture is a comfortable suite on the mezzanine floor over the vaults and lavatories, which is occupied by one of the bank staff. By this arrangement the bank is not left unoccupied at night, and it does away with the necessity of providing a large and expensive upper floor.

The electric fittings in all the three buildings above described are in bronze, and of simple design. Large ornamental lanterns are provided outside the different structures emphasizing the entrances. All three buildings are heated with hot water.

The Merchants Bank, Vancouver

One of the more noteworthy of the Western branches of the Merchants Bank of Canada is the recently completed building at Granville and Pender streets, Vancouver, B.C. This building is three storeys high with frontages of 50 and 104 ft. and is of reinforced concrete construction with stone, terra cotta and brick walls. The exterior is of Haddington Island stone backed with brick and terra cotta trimmings, the whole resting on a grey granite base course 5 ft. in height. The stone is very white in color and is exceedingly well matched by the terra cotta courses. There is a projecting stone cornice at the first floor level and a terra cotta cornice at the roof level surmounted by a parapet with hammered copper cresting. The ground floor windows have ornamental iron frames 19 ft. 6 inches in height by 8 ft. 6 inches in width and are glazed with plate glass. Similar frames are also used for the upper storey windows with cast iron facias at the second floor level. The treatment of these window openings produces the general effect of a building with two high storeys rather than that of a three storey structure.

Richly carved stone work encloses the opening of the main entrance. The doors here are of cast bronze and are 12 ft. in height. These doors fold back into pockets in the vestibule in the day time and the service doors to the bank at the inner wall of the vestibule are double-acting. Over the entrance doors on a black and gold marble slab is a cast bronze bas-relief of the crest of the institution. The walls and floors of the vestibule are laid in French marble and the whole effect is unusually satisfying and pleasing.

The entire ground floor of the building is given over to banking purposes with the exception of a small area serving as entrance to the stairs and elevator to the upper offices. In addition to the ground floor space there are two mezzanine floors situated at the rear, each giv-

MERCHANTS BANK OF CANADA, VANCOUVER, B.C. SOMERVELL & PUTNAM, ARCHITECTS.

CLERKS' SPACE, MERCHANTS BANK, VANCOUVER, B.C.

ing an additional working area of some 450 sq. ft. The upper mezzanine floor serves as a guard room while the lower is given over to the stenographers' toilets and filing space. Provision has also been made in the framing of the building for a future mezzanine floor over a portion of the present working space in the banking room at the present upper mezzanine level. This mezzanine will allow for an additional working area of 1,300 sq. ft. along the south side of the banking room. Access to same will be obtained by the present stairs to the upper mezzanine, and it will, owing to the banking room ceiling being fully 35 ft.

high, be placed 20 ft. above the main floor, and will therefore not materially detract from the present pleasing general effect of the banking room.

DOMINION BANK, DUNDAS AND MEDLAND STREETS, TORONTO. JOHN M. LYLE, ARCHITECT.

In dimensions the banking room is 84 ft. in length by 46 ft. in width, with a clear height of ceiling from floor to the underside of lowest beam of 29 ft. 6 inches. The natural light is excellent, being obtained from eight windows, each with a clear glass area of 8 ft. by 19 ft., and by three sky-lights in the light court over the south side of the room, which has a total glass area of 250 sq. feet. The colors of the walls and ceilings tend to reflect this light to the best advantage. The walls are of Caen stone of a pale buff shade jointed in courses 15 ft. high; and the ceiling, which is coffered, has been left white. The floor of the banking room is of marble of a pale grey shade with borders and base of a black and gold color setting off the grey. The counter and wainscots are in Botticino marble with Tavernelle panels, and Botticino marble is also used for the pilasters. Both these marbles are of a creamy buff shade and harmonize well the treatment of the wall.

Bronze in antique statuary finish is used for the tellers' cages, counter screens and other metal work in this room. The cages are a special feature, the upper portions being made of cold drawn steel piano wire, plated in bronze and drawn very tight in a diamond pattern making a strong but light appearing snatch proof cage. The fixtures and the wainscot of the working space is of quarter-sawed white oak finished in a grey shade in tone with the other materials.

Quarter-sawed white oak similarly finished is also used for the screen of the manager's office. This office is a well contained department in itself. In addition to the usual flat top desk, is a built-in standing work desk on either side of which are built-in cupboards containing standard filing equipment. One side has letter files with book case above, while the other side has letter files with report files above, made to take standard report forms.

Under the counter at the accountant's space are built-in spaces for all special forms to be kept under lock and key as well as a keyboard for all duplicate keys to the building and safety deposit boxes.

The whole working space is inter-connected with a complete buzzer system and inter-communicating telephone. The artificial lighting is derived from wall brackets and desk lamps, each

BANKING ROOM, DOMINION BANK, DUNDAS AND MEDLAND STREETS, TORONTO.

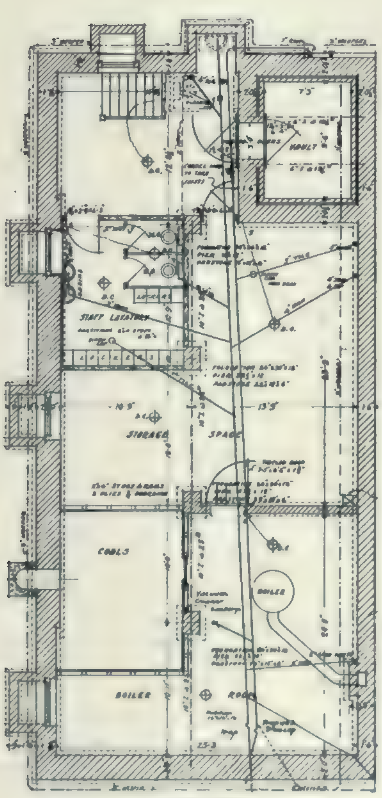
DETAIL OF ENTRANCE.

BANK OF TORONTO, ARTHUR STREET AND OSSINGTON AVENUE, TORONTO.

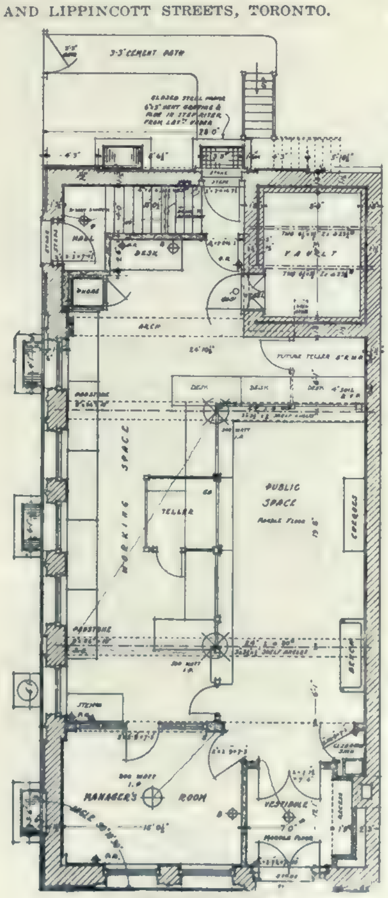
equipped with an individual control switch. The two ceiling fixtures over the general space are 7 ft. in diameter, and each carry one hundred and six lamps controlled by seven circuits. Two-thirds of the lamps in each fixture are

BANKING ROOM, BANK OF TORONTO, ARTHUR STREET AND OSSINGTON AVENUE, TORONTO. JOHN M. LYLE, ARCHITECT.

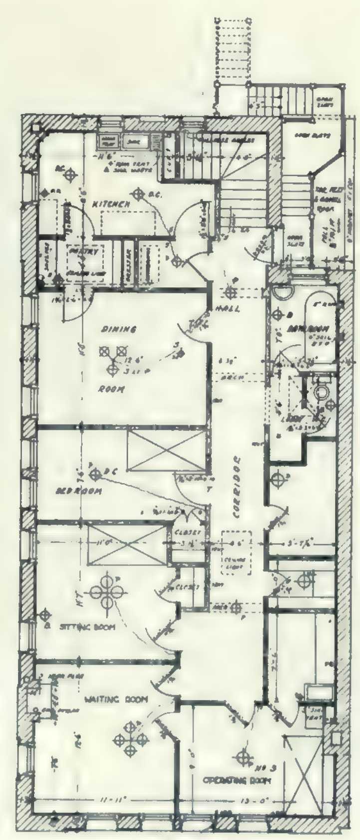
BRANCH OF CANADIAN BANK OF COMMERCE, BLOOR AND LIPPINCOTT STREETS, TORONTO. V. D. HORSBURGH, F.R.I.B.A., ARCHITECT.



BASEMENT.

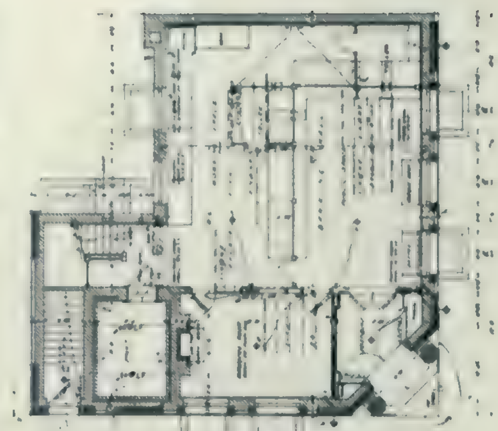


GROUND FLOOR.

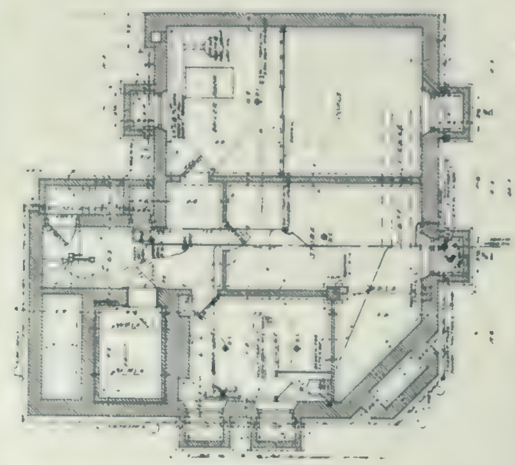


UPPER FLOOR.

EARLSCOURT BRANCH, CANADIAN BANK OF COMMERCE, TORONTO. V. D. HORSBURGH, F.R.I.B.A., ARCHITECT.



GROUND FLOOR.



BASEMENT.

straight reflected direct lighting. By the skillful placing of concealed reflectors, practically all of the light from the indirect lamps is directly reflected from the ceiling with the exception of very few lamps whose function is to relieve shadows in the fixture itself.

Practically three-quarters of the entire basement area is devoted to the bank's needs; the remaining portion being taken up by the boiler room, switchboard room and similar offices. The accommodations here include the book and cash vaults and storage space and toilet and locker room for the male staff. A staircase at the rear gives direct communication with the banking room, and there is also a hydraulic book-lift serving the book vaults.

The safety deposit vault is on the ground floor of the public space with an alcove adjoining for the private examination of papers. The vault is constructed of reinforced concrete eighteen inches thick with heavy modern steel door equipped with double combination and a grille day-gate. The vault walls and door are completely protected with electric

BRANCH OF CANADIAN BANK OF COMMERCE, DANFORTH AND BROADVIEW AVENUES, TORONTO. V. D. HORSBURGH, F.R.I.B.A., ARCHITECT.

CANADIAN BANK OF COMMERCE, BARRIE, ONT. V. D. HORSBURGH, F.R.I.B.A., ARCHITECT. CANADIAN BANK OF COMMERCE, STRATFORD, ONT.

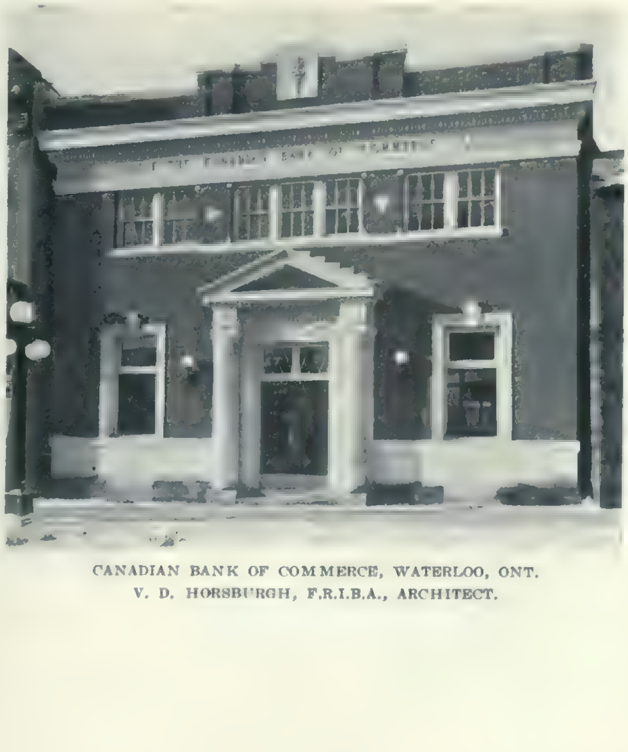
steel linings. There are three hundred and twenty safety deposit boxes installed in this vault.

The book vault in the basement occupies 240 sq. ft. of floor space, and is enclosed in double brick walls with an air space between connected to a ventilating fan. The cash vault covers an area of 81 sq. ft. and has walls 2 ft. thick of reinforced concrete, this material also being used for the floor and roof of vault. The inner lining of this vault consists of ½-inch steel plate with solid angle corners, and the outer door is 6 inches thick, consisting of five layers of chrome and open-hearth steel placed alternately. In addition there is an inner door three inches thick also made of alternate layers of chrome and open-hearth steel. The outer and inner doors are each equipped with two combinations and are time-locked with a quadruple action time-lock; there being twenty-four 2-inch bolts on the outer door and a heavy pressure system on both this and the inner door. The weight of the doors and frames is 30,000 pounds.

Canadian Bank of Commerce Branches

Among the subjects in this issue are a number of illustrations comprising a representative selection of the usual branch buildings erected by the Canadian Bank of Commerce, during the past five or six years. The most notable of these is at Windsor, Ontario, where the business of an important frontier point requires a commodious building of the best class. The restricted but valuable corner site, and the necessity for placing the entrance at the corner, led to the planning of an octagonal banking room with concentric counters. The building is of first-class fireproof construction, and contains in addition to the ordinary equipment of such branches, specially heavy vault doors and linings. It is also provided with a separate safety deposit vault, an electric elevator, and a blower ventilating system.

The building at Danforth and Broadview avenues, Toronto, which is now with the opening of the viaduct coming into due prominence, is



CANADIAN BANK OF COMMERCE, WATERLOO, ONT.
V. D. HORSBURGH, F.R.I.B.A., ARCHITECT.

CANADIAN BANK OF COMMERCE, WINDSOR, ONT. V. D. HORSBURGH, F.R.I.B.A., ARCHITECT.

a noteworthy combination of buff Indiana stone and local brick. The plan is an interesting solution of a problem involving the adjustment of a building to a triangular site.

The branch at Nanaimo, B.C., is also on a triangular lot, which accounts for the peculiar curved plan of the entrance front, although the structure otherwise is rectangular in plan; the exterior materials consisting of terra cotta and coast brick.

In the Earlscourt branch, Toronto, situated at the corner of St. Clair and Dufferin streets, the exterior has been given a very broad treatment in artificial stone and tapestry brick for the purpose of giving an important intersection of a street so wide as St. Clair avenue due emphasis without exceeding the limit of size appropriate to an outlying suburban branch.

The branch at Bloor and Lippincott streets, Toronto, is typical of the ordinary city branch on a corner lot of moderate width. The exterior exhibits a successful combination of tapestry brick and terra cotta in unusually dark tones.

The street front of the bank at Barrie, Ontario, is faced with a very light unglazed cream terra cotta. The jointing in this case is close and accurate far beyond what is usually expected in this material. This building is roofed with red tile.

An example where the front is wholly erected of Bedford stone is seen in the branch at Stratford, Ontario. The banking room of this structure is very large and is top lighted, the upper floors being confined to a restrictive area at the front.

The branch at Waterloo, Ontario, is mainly notable for the emphasis given to the entrance doorway and the unassuming treatment of the other parts of the front.

The East End Branch, Vancouver, B.C., is constructed of reinforced concrete with granite and terra cotta. It is quite a good sized building, and in keeping with the policy of this institution of erecting buildings consistent with the importance of the city or district in which they are located.

The chief interest in the branch at Ayers' Cliffe, Quebec, lies in the fact that it is an ex-

CANADIAN BANK OF COMMERCE, FORT FRANCIS, ONT. V. D. HORSBURGH, F.R.I.B.A., ARCHITECT.

ample of a design which has been worked out with great exactness for small towns and villages. It has been repeated at a number of points in different materials. The building at Briercrest, Saskatchewan, is of this type, but of frame construction.

One of the most important structures in the group is the imposing building at Quebec, P.Q., which is erected in Deschambault limestone. The site was at one time the river beach twenty feet below the existing street grades. A rigid foundation was secured by using concrete pedestal piles. The cellar floor is several feet below spring tide level, and the water was found to flow freely through the made-up soil. This condition was successfully met by the construction of the continuous floor slab and foundation walls of sandwich formation with a membrane of felt and asphalt.

CANADIAN BANK OF COMMERCE (EAST END BRANCH), VANCOUVER, B.C.
V. D. HORSBURGH, F.R.I.B.A., ARCHITECT.

The Archives Buildings at Toronto and Vancouver, have been erected for the custody of old ledgers and vouchers. The upper part of both buildings comprises a lofty stack room several tiers in height. The stacks are strongly but simply constructed of steel angles and gas pipe, and are reached by steel plate gangways at each tier level. The Toronto building is of steel frame construction, and that at Vancouver of reinforced concrete. Both are first-class fireproof buildings, and are planned for convenient shipping and handling of heavy goods. The Toronto example contains a shredding and baling plant for the destruction of books which need not be preserved after a certain time and for the disposal of the shredded product.

CANADIAN BANK OF COMMERCE, NANAIMO, B.C. V. D. HORSBURGH, F.R.I.B.A., ARCHITECT.

The British-American Nickel Refining Co., which has been negotiating for property on which to erect a refining plant for some time, has decided to locate on the Hull side of the Ottawa River. It is understood that representatives of the company have purchased the property known as the old Conroy piling grounds at Deschenes, upon which a nickel refining plant, to cost in the neighborhood of $1,000,000, will be erected.

CANADIAN BANK OF COMMERCE, TABER, ALBERTA.
V. D. HORSBURGH, F.R.I.B.A., ARCHITECT.

"Where The Great City Stand"

A book written by C. R. Ashbee, an Englishman, under the above title, contains the several following axioms. While these in one or two certain minor respects may not meet with a full concurrence of opinion they nevertheless epitomize a set of principles which will be more or less generally accepted.

Axiom I.—Modern civilization rests on machinery, and no system for the encouragement or the endowment or the teaching of the arts can be sound that does not recognize this.

Axiom II.—The crafts cannot be learnt in the school; the crafts can only be learnt in the life of the workman at the workshop.

Axiom III.—The purpose of the arts and crafts (understood as an aesthetic movement), is to "individualize," to set up a standard of excellence in all commodities into which the element of beauty enters. The tendency of machine industry is to "standardize"—that is to say, to create as many pieces of any commodity to a given type as is economically possible.

CANADIAN BANK OF COMMERCE, AYER'S CLIFFS, QUEBEC.
V. D. HORSBURGH, F.R.I.B.A., ARCHITECT.

Axiom IV.—There is a Gresham's Law in the industrial arts as there is in coinage. In the latter the bad coin tends to drive out the good. In the former the bad product tends to drive out the good product, the unskilled workman and the machine tend to drive out the skilled craftsman.

Axiom V.—Machinery is neither all good nor all bad. An intelligent community will distinguish which is which, and the aesthetic education of the community in our day should be directed towards the distinction between the good and the bad.

Axiom VI.—The distinction between what should and what should not be produced by machinery has in many trades and crafts now been made. This has been the discovery of the last 25 years.

Axiom VII.—The new relationship of man to life which machine industry has brought with it finds its fullest expression in the new life of our city. This implies that through the city and its proper adjustment to mechanical conditions will man realize again those purer values which the arts bring into life. Through the city we focus civilization.

Axiom VIII.—Man's control of mechanical power has yet to be made effective. The making it effective is not a matter of inventing or exploiting new processes, it is the discovering of means whereby mechanical powers shall best be used in the public service—in other words how it shall be "socialized," and not merely used to help men to exploit each other. As Hellenic civilization made the gentleman with the aid of the slave, so we may make the gentleman with the aid of the machine.

Axiom IX.—The arts, postulating as they do the motive of joy in their creation, and the freedom of the individual to go on creating, do not flourish under conditions where men think it right to exploit them for profit.

Axiom X.—In an industrial civilization the reconstructed city cannot be stable without a corresponding reconstruction of the country. Town and country should be correlated to react upon one another. This correlation is a necessary consequence of the conditions of machine industry.

Engineers' New Title

Sir Herbert Ames' bill changing the name of the Canadian Society of Engineers to "The Engineering Institute of Canada" has been adopted by the Private Bills Committee of the House of Commons.

ARCHIVES BUILDING, TORONTO.

ARCHIVES BUILDING, VANCOUVER, B.C.

RECENT BUILDINGS ERECTED
BY THE
CANADIAN BANK OF COMMERCE.

V. D. HORSBURGH, F.R.I.B.A.,
ARCHITECT.

BRANCH AT PRINCE ALBERT, SASKATCHEWAN.

BRANCH AT BRIERCREST, SASKATCHEWAN.

BRANCH AT RADVILLE, SASKATCHEWAN.

Fire Protection and Prevention

THE fact that the loss from fire on this continent annually amounts to approximately $225,000,000, or more than the combined losses of all other countries put together, is sufficiently startling to make any effort to reduce this enormous waste a matter of first importance. The report recently issued by the Committee on Fire Prevention of the American Society of Municipal Improvements, of which Mr. Alcide Chausse, City Architect, Montreal, is chairman, is therefore of interest, in that it summarizes what is being done in this direction.

Reference is made to last year's meeting of the National Fire Protection Association, held at Washington, at which attention was called to the new and unusual hazards to life and property created throughout America by the present war, and which demands the utmost vigilance and initiative, not only from those in authority, but from the private citizen as well. It was urged at the time that every individual should consider himself a fire warden of the nation at this critical time, and should equip himself to serve his country by safeguarding to the extent of his intelligence and ability every form of natural and creative resource.

In its warfare against the sacrifice of human lives and property by fire the association advocated the following measures:

1. The adoption by municipalities of the standard building code of the National Board of Fire Underwriters, to the end that fire-resistive building construction may be encouraged, use of inflammable roof coverings prohibited, adequate exit facilities assured, and interior so designed and fire-stopped as to make easy the extinguishment of fires therein.

2. The adoption by all States of minimum building requirements for the protection of State and county hospitals, asylums and similar institutions outside city limits, and of small communities in which the establishment and enforcement of a building code is impracticable.

3. The enactment by each State of the fire marshal law advocated by the Fire Marshals' Association of North America, to the end that official investigation may be made of the causes of all fires, preventable fires eliminated by public education, and the crime of arson stamped out.

4. The adoption of the association's suggested ordinance providing for the systematic inspection of all buildings by city fire marshals or local firemen, to insure the vigorous enforcement of rules for cleanliness, good housekeeping, and the maintenance of safe and unobstructed exits, fire-fighting apparatus and other protective devices.

5. The enactment of ordinances similar to that of Cleveland, Ohio, fixing the cost of extinguishing preventable fires upon citizens disregarding fire prevention orders, and a more general legal recognition of the common law principle of personal liability for damage resulting from fires due to carelessness or neglect.

6. The wider general use of the automatic sprinkler as a fire extinguishing agent and life saver, and the more general adoption of the fire division wall as an important life-saving exit facility.

7. A careful study of the technical surveys of cities made by the engineers of the Committee on Fire Prevention of the National Board of Fire Underwriters covering the items of water supplies, their adequacy and reliability, fire department efficiency, fire alarm systems and conflagration hazards; and of the possibility of co-operation among neighboring cities through mutual aid and the standardization of hose couplings.

8. The adoption of the association's suggested laws and ordinances for State and municipal regulation of the transportation, storage and use of inflammable liquids and explosives.

9. The universal adoption and use of the safety match, and legislation prohibiting smoking in all parts of factories, industrial and mercantile buildings, except in such fireproof rooms as may be especially approved for the purpose by fire departments.

10. The education of children and the public generally in careful habits regarding the use of fire.

11. The co-ordination of all these activities, through a central administrative officer or body of the State or city having primary jurisdiction, for the purpose of promoting uniformity of action and efficient co-operation.

In the furtherance of these objects the association appealed for the co-operation of all citizens. It asked them to help in the dissemination of its valuable literature, and in the use of the standards of fire protection so carefully worked out by its committees to the end that the lives and substance of our people shall not continue to be dissipated by a reckless and easily preventable waste.

Coupled with the foregoing reference is also made to the Building Officials' Conference held in Washington at the same time. At this meeting a motion for the creation of a number of standing committees to consider structural standards and practices, permissible use of specific materials and modifications of building requirements in reference to the installation of fire control equipment, particularly automatic sprinklers, was referred to the Executive Committee with power.

FLOOR OPENINGS.

Mr. Chausse's report also directs attention to the Kansas Bureau, which has adopted the following recommendations for improvements regarding stairways, elevators, hatchways, chutes and dumb-waiters, advocating that these when not in a standard fireproof or semi-fireproof constructed shaft, should be cut off at each floor opening by traps, as herein specified, viz.:

(a) Traps to be made of ⅞-inch kiln-dried matched pine, or other non-resinous wood, free from unsound knots and sap; to be securely nailed to battens with No. 13 gauge flat head, full barbed wire nails two inches long, driven in flush and clinched so as to leave a smooth surface on both sides. Battens to be ⅞-inch thick, not less than six inches wide, and not more than three feet on centres. Traps to be covered on under side with tin sheets fourteen by twenty inches, not less than one hundred and seven pounds to the box of one hundred and twelve sheets, all joints single locked; covering to lap top side of trap not less than four inches, and nail heads not to be exposed except where covering laps on top side. Traps to lap openings at least three inches. Hinges to be substantial wrought iron of "T" or strap type, with non-corrosive pins, securely bolted to trap, and if possible bolted to floor. Nails not to be used for hinge fastenings.

(b) Traps to be made similar to (a) in all respects, except that trap is to be made of two thicknesses of ⅞-inch with boards laid at right angles, or single thickness of 1½-inch matched pine or other non-resinous wood.

(c) Traps to be made of two thicknesses of ⅞-inch, otherwise same as (b), except that trap is to be without battens and entirely covered with tin, as per requirements for standard fire doors. All traps to close automatically by fusible link or electric attachments; details covering location of links and thermostats may be obtained upon application, and to be subject to the approval of this office. All traps on one shaft to be operated by the fusing of any one link or thermostat; all wires, chains and pulleys to be protected if necessary against mechanical injury by substantial guard strips, or from being rendered inoperative by piling stock or other material against same. All weights to be boxed in if outside of shaft, and so arranged that one side of boxing can easily be removed for accessibility. Traps to be provided with automatic flaps for covering all cable, guide and counterweight openings when same are closed; a spring must be put on the back of all flaps for closing same when the traps are released.

Note.—In buildings of ordinary joisted construction, stairway enclosure of plaster or matched flooring of same thickness as floor, with door of same construction and self-closing with metal rope and weight or suitable spring attachment, may be accepted for stairway cutoffs. Door to be provided with a suitable snap-catch to hold same rigidly closed. Windows or transoms, if any, to be stationary and of approved wired glass.

STATE REGULATIONS.

It is pointed out that a fire prevention code containing requirements governing construction and hazards of occupancies, was passed by the 1916 session of the Louisiana Legislature, which has invested power in the State Fire Marshal for its enforcement throughout the entire State. Regular inspections of special hazard occupancies are also made whenever possible by the Chicago Fire Prevention Bureau, covering dry cleaning establishment, garages, motion picture theatres, opera houses, the examination of sprinkler systems, etc.

In Minnesota the law provides stringent rules and regulations governing the construction and use of motion picture theatres, the authority for enforcement also being in the hands of the State Fire Marshal. The statute in this State includes complete specification for booth construction and electrical equipment, prohibits the exposure of inflammable films except while being transferred from the two magazines, and sets forth complete regulations governing exits, aisles and seats. Schools and churches are exempted by the Act, where motion pictures are to be used for charitable, benevolent and educational purposes, and are not used regularly, but only on special occasions, and in these cases only when a representative of the local fire department is present. The powers of the Minnesota State Fire Marshal are further extended by a new Act granting the authority to condemn buildings in dilapidated condition where so situated to endanger life.

Other States which have adopted legislation and are giving serious consideration to the subject of fire protection are Michigan, Indiana, Massachusetts, Connecticut and Texas. In some instances the regulations are quite mild and leave room for considerable improvement. The tendency is, however, to make measures of this kind more drastic; and even in their present form they are at least an evidence of the result of the propaganda which has been carried on in the interests of fire prevention and improved building conditions.

The report concludes by entering quite extensively into the matter of defective chimneys, declaring that it is essential that furnaces should be properly installed with reference to the kind of fuel to be used, and giving a large amount of valuable information in reference to fire prevention as relating to this subject.

Efficient Safeguarding of Electrical Installations

By TIRRELL J. FERRENZ, Architect and Structural Engineer

EFFICIENT safeguarding of electrical installations is a subject which presents many features of interest to architects. This is attested to by the increasing emphasis placed upon the necessity for safe construction of all forms of electrical appliances and for careful inspection of their installation. It is therefore the purpose of this article to call attention to some of the more common defects of ordinary electrical installations and to point out approved methods for their elimination, so that anyone interested, although unskilled in electrical matters, may obtain a fair idea of the subject.

THE ARCHITECT'S LIABILITY.

It is generally recognized that upon the architect rests the primary responsibility for the success of any structure; it is his duty to see that the building which he designs is as safe as care and forethought can make it. This liability becomes of special importance with respect to electrical installations when we consider that its evasion or neglect may result in serious accidents which frequently entail loss of life and property.

The attention which this matter warrants, however, has seldom been bestowed upon it by architects and designing engineers in the past. And while it is not the purpose here to contend that the architect should become an expert on electrical installations, since this would be manifestly impossible without doing injury to his primary vocation as a creative artist, yet the fact should be faced that it is essential for the architect to give full recognition to the demands made by subjects of this character.

STATUS OF THE ARCHITECT.

It has been said that to be truly successful the modern architect must be an artist, a scientist, and a commercialist. The present tendency seems to be for the architect to ignore the latter two of these functions to a considerable degree. There is a positive danger to the profession in this since the thorough and comprehensive nature of the modern contractor's organization appears to be slowly, though surely, leading to the relegation of the architect from the position of supreme arbiter of building affairs to that of an employed practitioner.

Tendencies of this nature have been prevalent in other professions for some time past and have become firmly established. In the architectural profession, they have been given considerable impetus recently by a decision of the Illinois Supreme Court in which it is held that the Architects' License Act of that state permits the practice of architecture by corporations, so long as the corporation employs a licensed architect. It is with the seriousness of these tendencies before us that we urge upon the architect a closer personal interest in those technical matters which enter into the design and construction of every building.

ELECTRICAL HAZARDS.

It will be conceded at the outset that the installation of electrical conductors into a building results in the introduction of hazards of various kinds. It is consequently the part of wisdom to investigate these hazards in order that proper precautions may be taken to eliminate them or at least to reduce them to a minimum.

The principal hazards arising from electrical installations are (1) the personal injury hazard, (2) the fire hazard, and (3) the danger of injury to equipment, with its resulting break in the continuity of service. The extent of these hazards varies considerably, and depends to a large degree upon whether the current being used is of low voltage or high voltage and whether it is direct or alternating current.

Direct current voltages generally used are either 115 or 230 volts in size. Alternating current, which is used for the supply of ordinary lighting and power systems, commonly has potentials amounting to 2300 volts; these are in most instances stepped down to 115 or 230 volts before being taken into a building. If the current used is supplied from a central generating station, the danger is somewhat greater than where an independent local power plant supplies the needs of the building. In the latter case the hazard is limited to the low voltage system; in the former, there is the liability of the low voltage lines coming in contact with, and being charged from, the high potential lines which carry the supply current to the building.

Such a condition as that just mentioned may arise from several different causes, but usually occurs where wires of deficient insulation become crossed. The writer has in mind a recent incident where a high potential city arc line fell across a signal wire, which was connected to an electric clock in a nearby building. The signal wire became charged with the high voltage and an arc took place between the wire and the metal casing of a window, thus originating a serious fire.

Another characteristic situation is presented by the ordinary transformer, which consists essentially of two coils, both of which are wound on the same core. The 2300-volt alternating current from the central station is changed here into 115 or 230 volts for use in residences or other buildings. This change is the result of magnetic induction, the two coils being separated from each other by thorough insulation. It is possible that this insulation may become disrupted, and in order to prevent the higher voltage from crossing the gap and entering the building, good practice demands that both the transformer case and the neutral wire on the consumer's line shall be grounded, thus greatly reducing this hazard. The ground connection is usually made by an iron pipe running down the pole from the transformer into the ground. However, it is by no means unusual for this pipe to be burned off at the ground level by lightning discharges, thus removing the outside protection from the building circuit.

THE PERSONAL INJURY HAZARD.

Electrical injuries may be divided into two classes: First, those due to flashes or arcs which occur when direct or alternating currents are broken or momentarily short-circuited; and second, the various kinds of shocks which are the result of contact with charged conductors or exposed apparatus.

The size of a flash or an arc which is set up when a switch is opened is governed by the magnitude of the load being carried and the inductive nature of the circuit. Flashes are often the cause of bad burns; these are very painful and are difficult to heal. Injuries to the eyes, frequently resulting in loss of sight, are very common and may occur either from the flash itself or the consequent sputtering of molten metal.

The extent of the injuries chargeable to shocks depends upon a variety of circumstances, the most important of which may be listed as follows: (1) Magnitude of voltage; (2) Physical condition of the injured party; (3) Area and location of contact; (4) Duration of contact.

Where potentials of 500 volts or more are in use, the danger of fatal shocking is a constant menace, and great care must be exercised at all times in the handling and protection of equipment.

On 115 and 230-volt circuits the hazard of loss of life is not an important factor. While it is true that electrocutions have been caused in some cases, yet they are of infrequent occurrence. There are, however, many minor dangers of accidents due to shocks and burns from coming in contact with exposed parts. Ordinary shocks are not in themselves of a very serious nature, but usually manifest their dangerous character by causing a workman to be thrown from a ladder or into the moving parts of a machine. A slight shock to any one with a weak heart would prove serious; it has also been observed that in gripping a conductor, the muscles of one's hands may become so violently flexed as to prevent him from releasing himself, in which case continuing to receive the current would soon result in death.

One of the most important factors entering into the danger of electric shocks is the magnitude of the resistance of the human body and particularly the contact resistance at the points where the current enters and leaves the body. This resistance varies over wide limits. If a particularly good contact is made, the surface resistance will be relatively small and consequently the flow of current through the body correspondingly large.

With respect to these physiological effects of the electric current, the following quotation is of interest, being taken from the report of the Commission on Resuscitation from Electric Shocks, presented at the thirty-sixth convention of the National Electric Light Association, in Chicago, June, 1913:

"The electric current may kill either by temporarily paralyzing the nervous control of the muscles of respiration, or by stopping the regular beat of the heart. When the heart is seriously affected it ceases to contract as a whole, but continues to contract in parts here and there, so that it appears to quiver. It is then said to 'fibrillate.' In this condition the heart fails to keep the blood circulating and death quickly results. At present no practical procedure has been discovered which will restore the regular beat of the heart in man after it begins fibrillating. Hope of resuscitation is now restricted to proper treatment of the cases of paralyzed respiration; and since deprivation of oxygen for about ten minutes injures irremediably some of the nerve centers of the brain, it is particularly important that measures for resuscitation be applied immediately and continued until natural breathing returns. In some instances, however, the heart may be merely weakened without being made to fibrillate; in such cases artificial respiration may be of vital importance, because a greatly weakened heart leads to impairment or total stoppage of respiration, which in turn destroys the last vestige of the heart-beat. In all cases, therefore, an attempt should be made to restore natural breathing."

THE FIRE HAZARD.

We may judge of the importance of this phase of our subject by consulting fire insurance statistics which show that approximately 5 per cent. of our annual fire loss of nearly a quarter of a billion dollars is contributed by fires of electrical origin. The most prolific source of electrical fires is defective wiring. This hazard is prevalent principally in those cities and smaller communities where electrical codes and fire protection ordinances are not in use, although it is by no means confined to these localities.

There are three systems of wiring which are ordinarily met with; namely, (1) exposed knob-and-cleat, (2) concealed knob-and-tube, and (3) conduit. Many defects are common to the first two of these systems, and on this account they are prohibited in some of the larger cities. These defects may be enumerated as follows:

1. *Overloading of circuits.* This results from the ease with which open wiring may be extended by incompetent persons to include additional lights or other services. In order that the additional load may be carried, the circuit requires a heavier fuse than is in keeping with proper protection, thus increasing the heating and deterioration of the insulation and the danger of serious arcing.

2. *Insufficient insulation.* The insulation on the conductors may wear through, due to swinging, jerking or other movement. Either the insulation catches fire or an arc takes place which results in igniting adjacent inflammable material. This is very likely to occur where wires passing through wooden joists or partitions are not provided with proper bushings, and especially where they are attached directly to wood or metal.

3. *Mechanical injury.* Owing to its exposed nature open wiring may be pulled off its supports and come in contact with other wires or conducting substances such as gas pipes, and thus set fire to combustible material. Concealed wiring is not subject to this objection to the same extent after the building has been completed, but it is liable to be damaged in many ways during the course of construction.

4. *Splices.* These may be improperly made or may be pulled loose, thus giving rise to dangerous arcing. Corrosion may also take place where moisture is prevalent.

From the list of hazards enumerated above, it is evident that it is unwise to permit any open or concealed wiring of the types referred to. The only method by which a satisfactory degree of safety, convenience and economical operation can be secured is by enclosing all conductors in conduits of metal pipe.

Conduits are not considered as an insulation but as a mechanical and fire protection only; consequently wires installed in conduit must be covered with proper insulation as usual. It is important that conduits be provided with suitable fittings to protect the service wires and prevent the entrance of moisture; the interior should also be free from burrs to avoid possible abrasion of the insulation on the wires. However, if the conduit system itself is properly grounded, the possibility of danger is practically eliminated even though leakage from the wires should take place.

In addition to defective wiring, other sources of electrical fires are open knife switches, current breakers, and exposed fuses. When an unprotected switch carrying a load is opened, the arc set up is likely to prove a serious fire hazard by igniting adjacent inflammable material. Mechanical injury is also likely to result in short-circuits or grounds which may originate fires. The blowing of an exposed fuse is always attended with danger, and may develop into an additional hazard through the common practice of replacing the blown fuse with a piece of copper wire or a new fuse which is several times too heavy. Naturally this procedure gives no protection whatever, but instead overfuses everything beyond, and may result in overheating the circuit, serious arcing, or damage to equipment. As the fuse is a safety feature which is designed to furnish protection against abnormal conditions of current, it is most important to guard against these dangerous practices.

DAMAGE TO EQUIPMENT.

The hazard of damage to equipment usually manifests itself by burning out the armatures of motors. This may be due either to a short-circuit or ground caused by a hand or a piece of metal coming in contact with an unprotected switch, or else to an overload or surge in the current which would be possible under circumstances of improper fusing as set forth above.

However the damage to equipment is not the only aspect of the situation to consider. Far more serious is the resulting interruption of service where various utilities are interfered with, such as elevators, lighting systems, water supply, refrigeration, etc.

SAFEGUARDS.

The first point to be considered in the discussion of safeguards is the necessity for keeping the voltage as low as is consistent with the working requirements of the equipment and apparatus to be used. This not only reduces the various hazards above referred to but also results in a reduction in the original cost of installation. It is also essential that the rules and regulations of the National Board of Fire Underwriters, which are embodied in the National Electrical Code, should be followed wherever possible. The principal function of this code is to minimize the fire hazard, and it should therefore be supplemented by the National Electrical Safety Code which emphasizes the elimination of the personal injury hazard.

It is evident that the interests of safety to life, prevention of fire, and continuity of service are best promoted when all electrical apparatus is properly guarded or enclosed. The importance of installing all wires in conduits of metal pipe has already been referred to. The danger of mechanical injury is thereby eliminated, and internal trouble that may develop is confined, and should the conductors become defective for any reason, or should it be desired to extend the system, the existing wires may be withdrawn from the conduit and new and larger ones substituted.

In addition to unprotected wiring, we have also observed that the manner in which electrical accidents occur is distributed among many other causes, the principal ones being unguarded knife switches, circuit breakers and fuses. For the following reasons equipment of this nature should be installed in properly designed metal cabinets:

1. To furnish protection from shocks and burns due to accidental contact with current-carrying parts.
2. To prevent tampering.
3. To eliminate the risk of fire.
4. To protect switches, etc., from mechanical injury, dust, oil and other foreign matter.
5. To prevent a break in the continuity of service due to broken circuits and burned out motors.
6. To improve appearance.

These hazards are most efficiently eliminated by enclosing switches, or both switches and fuses, in metal cabinets so arranged that access to the interior cannot be had except when the switch is in the off position. This may be accomplished by providing a switch operating handle on the outside of the housing together with an arrangement for interlocking the door latch and the switch handle. For additional security it is desirable to ground the cabinet so that a shock would be impossible in case any live part accidentally came in contact with the cover.

The hazards due to transformers are usually minimized by locating such apparatus on poles adjacent to the building. Transformers should not be attached to the building under any condition. When installed inside the building, it is of extreme importance that they should be isolated in separate and enclosed vaults of fireproof construction, which are thoroughly ventilated through a chimney or flue to the outside air.

Proper attention to the various safeguards outlined above will go far toward the elimination of the many hazards incident to the installation and use of electrical equipment. Too much dependence should not be placed on a general reference to ordinances or codes. While it is proper to be guided by these, as noted above, yet the fact must not be overlooked that in many localities the rules and regulations laid down therein do not receive the recognition which they deserve. This further emphasizes the fact that the full measure of protection can be obtained only by definite specifications and efficient supervision.

Jails and Almshouses

Outside cell or inside cell—which? The architect of New York City, Alfred Hopkins, recently made a personal investigation of English, Dutch and German jails and prisons to study the outside cell. As a result he believes in the outside cell, in spite of the fact that the majority of American jails are built on the inside cell principle. The newest jail plans favor the outside cell.

An interesting exhibit of plans of county jails as well as an exhibit of plans of county almshouses will be held in connection with the next annual meeting of the National Conference of Social Work, the most important meeting of the kind scheduled for this year, at Kansas City, May 15-22. The exhibit of almshouse plans will be competitive, and the plans will be discussed in connection with the section of the programme entitled "Standards of Administration of the Almshouse," by George S. Wilson, secretary, Board of Public Charities, Washington, D.C., and D. L. Edson, Agent, State Board of Charities and Corrections, Jefferson City, Mo.

The special exhibit of county jail plans comes in connection with a discussion on "Standards of Administration of the County Jail," by Dr. Hastings H. Hart, Director, Department of Child Helping, Russell Sage Foundation.

A New Commissioner

Mr. W. F. Tye, the well-known consulting engineer of Montreal, has been appointed a member of the Commission of Conservation in the place of the late Sir Sandford Fleming.

Removes Office to Halifax

A. Graham Creighton, who has been practising architecture for the past ten years at Prince Albert, Sask., has removed his office to the "Chronicle" Building, Halifax, N.S., where it is requested that all communications should be sent.

Imperial War Graves Commission

A news item in the "Architect and Contract Reporter" of London, says that the plans of the Imperial War Graves Commission for marking and caring for the graves of our fighting men are now assuming definite shape. The cost of the scheme is to be borne by the Government, and a meeting of the Commission considered and generally approved a report from Lieut.-Colonel Sir Frederic Kenyon, Director of the British Museum, setting out certain recommendations with regard to the provision of memorials in the cemeteries. The general supervision of such constructional work is to be given to three distinguished architects—Mr. Reginald Blomfield, Sir Edwin Lutyens, and Mr. Herbert Baker.

CONSTRUCTION

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CONTRIBUTIONS.—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and returned.

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Canada's Adverse Trade Balance

Information emanating from Ottawa and intimating that the Dominion Government was about to award contracts to alien firms for a certain building or public improvement without even calling attention to Canadian firms that plans were being figured, has lately aroused a justifiable protest among the building and engineering interests against any such unwarranted action on the part of the Government as this would indicate.

As to whether this is based on fact or is to be ascribed to mere rumor it is impossible to say just at the moment; but in view of what has previously happened as in the case of the Lindsay Arsenal, such a thing is not altogether beyond the realm of possibility. In fact the employment of alien architects, engineers, and contractors on both public and private work in Canada has long exercised a pernicious economic influence and particularly since the outbreak of the war has assumed proportions that are seriously detrimental to the country's best interests. In this manner sums of money amounting high up into the thousands and which should remain in Canada are continually going out of the country in the way of architectural and engineering fees and profits on contracting work and materials to firms who have absolutely no community interest in the Dominion whatever.

That the Government should on its own accord countenance a policy of this kind, or permit of it being practiced by business and industrial firms who ignore Canadian architectural, engineering and contracting ability while shouting the slogan of Canadian patronage and demanding protection for themselves, is something which can hardly be reconciled to sound fiscal principles. It has been suggested, and wisely too, that the Government should give consideration to this unfortunate state of affairs in connection with its present decision to adjust the adverse trade balance existing between this country and the United States. Such a step would represent a consistent economic measure far in excess of any consideration of advantage to the important interests directly affected. The present regulations relate only to prohibiting the importation from the United States of a number of manufactured articles. "To no less a degree," it is pointed out, "does the employment of foreign construction agents lead to a reversal of the trade balance against Canada, and it is something which should have the immediate careful discriminating attention of the Government."

As to the question of competency there is little grounds for discussion as regards the ability and organization of Canadian firms to meet any given problem and to successfully carry out any project to which they are entrusted. For a specific instance, it is not necessary to turn further than the present reconstruction of the Parliament Buildings at Ottawa, which considering the emergency of replacing the destroyed structure without the slightest delay represents an accomplishment which forcibly denotes the organizing resources and capabilities of Canadian designers and builders. Other evidences are by no means wanting. They are abundantly seen in the large office buildings of our cities, in public, institutional and hospital buildings and in the school and university groups, in fact in every department of work in which Canadian firms have been given a fair opportunity.

The object of adopting some sort of measure to right present conditions would not mean unfriendly legislation to outside firms, but rather the utilization of our own resources, the employment of our own brains and ability, making the interests affected of full service to the state, and in that service finding the opportunity for the fulfillment of all that is expected of them. Such a step would not only be consistent with a sound fiscal policy, but would also be an indication of Canadian self respect.

The First Architect

By Bart Kennedy.

(Reprinted from the "Architect and Contract Reporter.")

I.

A beautiful house is the finest of all the works of art. For it is the expression of a conception based on usefulness. And, despite any shibboleth, a conception that is based on the principle of usefulness is the soundest of all. Even things that are not supposed to have art value are beautiful when they embody this principle in perfection. How beautiful is the oar! And how beautiful is a ship of sails as it goes before the wind.

Man would not have endured but for the house. Or, at least, he would not have attained to a tithe of his present power. He would still have been a savage of the forest and the cave. It might be, indeed, that the lordship of the world would have fallen to the lot of some other earth being.

But the power of embodying the concept of the house saved him. It enabled him to protect himself from the elements. It enabled him to defy the scorch of the heat and the rigor of the cold. It was a bulwark against his enemies. Under its roof he throve and came to the fulness of himself.

The name of the first architect is lost in the mists of the profound past. He was a man of genius—some dreamer who lived doubtless in a dark cave in the depths of the vast forest. And well it may be that the idea of the house came to him as he walked along a path that was sheltered by the meeting overhead of the branches of the lofty trees.

The vision of the house to come flamed suddenly in his imagination.

II.

A house that would at once protect and at the same time allow the coming in of the glorious day.

The house to come!

He had a vision of it, even as some man was destined—in the future far, far out from him—to have a vision of the wondrous sounding chariot that now flies through the air.

III.

That time when the first architect lived was long, long ago. Long before the era of recorded history. Long before the time even of Atlantis—now called fabled. Hundreds of thousands of years ago. Perhaps millions of years ago. For the world is old, and the time when man first appeared is hidden behind an impenetrable veil.

IV.

The house itself is a harmonious blending of many ideas that lead to a common end. It took thousands of years before the concept of it was fully expressed. The savage of genius would see it in a flash of imagination. For such is the way of the constructive mind. It sees at once the picture of the full realizing of the idea that it has evolved. But the road to the attaining of this realization is long.

The journey lasts through many lives.

V.

Doubtless the first architect realized the conceivableness of a house that would at once let in the light and keep out the wind and the rain. But the mystery and the magic of glass would be beyond him.

The wondrous dreams that lie prisoned in great rocks! The columns and the arches and the statues of a house of God! Can it be that he saw these, too, as the concept of the house lived within him? Was he able to see this glorious and splendid house of the profound future? Did he see it clearly through the distance of thousands upon thousands of years to come?

It must have been so. He must have been one whose eyes pierced through futurity.

VI.

He died, but still he lived. The spirit of him passed on and on. And the full realization of the concept of the beginning began to come. The architect gathered unto him the ways of using of forces that would lead to the ultimate expression of the vision that had come to him in the beginning. He used the powers of other men. Iron and wood and stone became his servants.

He builded places immense and strong. Places that could be seen from afar—the tops of which pierced into the heavens. He made the bulwarks of civilizations, the names even of which are hidden from us. He was the founder—the one upon whose genius things rested. Wars came, and destroyed, and passed. But still the architect builded.

VII.

The civilizations sank into the sands in the fulness of time. The erosion of change wasted them. But the mighty foundations of his work endured. They lived in lone deserts.

In many guises did the architect appear. In many guises did his spirit manifest itself. He passed and came, and passed and came again. Within him was the memory of the dream in the vast forest of the world's dawn. And he went along the road that led to the ultimate realization of the dream.

And lo! time went on and artists—men of glorious imaginings—ministered to the needs of the expression of the architect's dream of the profound past. For him they wrought forms divine. For him they painted glorious pictures. For him they carved devices. And to him ministered men of labor. Men who loved the work, and who took joy in it.

Slowly the house arose. Slowly it grew and grew. Carefully was stone laid on stone. For this house was to stand through the fret and the change of the centuries. It was the house that was to picture the splendor and the glory of God. The house wherein man might come for shelter when his spirit was sore and troubled. The house of calm and meditation and prayer.

Slowly it arose. Slowly it grew.

VIII.

And one day it came to pass that the house had attained to the ultimate realization of the dream of the beginning. The long, long journey was over. The goal had been reached.

The architect knelt within this vast, shining house of glory. This place that fulfilled the dream in the forest of the dawn of the world.

Stained Glass Industry in Canada

The Robt. McCausland Company has written to the Toronto Globe to correct certain misstatements in an article appearing in that publication's issue of March 19th. The article in question deals with the " War's Unusual Effect on the Canadian Glass Business," and this concern's reply is directed to certain remarks which refer particularly to the manufacture of stained glass. Attention is called to the fact that instead of being adversely affected by present conditions, this branch of the industry is handling a heavy volume of orders due to the present demand for memorial windows. Also that the matter of obtaining the necessary materials is regulated by the normal methods of ordering supplies well in advance and keeping a large working stock always on hand. In addition, several other phases which are categorically taken up make the subject one of interest. The letter reads as follows:

To the Editor of The Globe: An article entitled " War's Unusual Effect on Canadian Glass Business," in your issue of March 19, makes certain statements in connection with the memorial stained glass business, which are incorrect, and in our opinion, hurtful to local interests. So far wide of the true conditions are these statements that we can only account for them by supposing that someone quite unfamiliar with the facts furnished your correspondent with the information in that part dealing with memorial stained glass windows.

The article speaks of Belgian glass, and implies that Belgium is the main source of supply. So far as we are concerned only English glass is used, and we might further say that for fifty years we have been dealing with the world's greatest maker of "antique," the glass being specially cast and selected for our particular needs.

The statement is made that "prices have trebled," that is, prices of material. In dealing with memorial stained glass windows, the price of material is a very small factor in determining the final cost.

An instance is cited of five months having been taken to get a few cases of glass into Canada. Unless in the case of some very special requirement this delay should not necessarily cause inconvenience. A maker of memorial windows must at all times carry a very large stock of antique glass, not only of various colors, but of innumerable degrees of color. In no other way can one obtain the almost limitless palette so necessary to the successful making of stained glass figure windows, suited to the various conditions of light of different positions. Throughout the war we have had no difficulty in keeping our stock of the choicest antique glass up to normal.

Further, the article states "the stained glass business is at a standstill and no churches are erecting stained glass windows." This statement, in conjunction with former references to memorial stained glass windows, creates a false impression. While it may hold good with reference to plain church windows and plain glazing, it is quite erroneous as applied to memorial figure windows.

In our experience extending over sixty years the demand for memorial windows was never so great, and we have more orders passing through our studios than ever before. War memorials, of course, account for a large proportion of this business, but the regular demand for memorial windows of the highest type is well maintained.

We would ask you to give the above statement equal publicity to that given the article, which we consider incorrect and misleading, in that part which deals with the memorial stained glass business.

ROBERT McCAUSLAND, LIMITED.

Toronto.

On Active Service

The following draughtsmen from the office of P. Lyall & Sons Construction Company, Limited, are now on overseas service:

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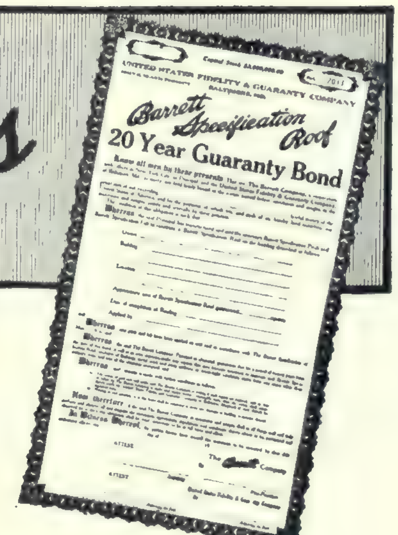
Cecil DeBritgny, Sergeant, 5th Pioneers.

Frederick DeBritgny, Lieutenant, 5th Pioneers.

Another of the Company's draughtsmen, Norman Robertson, Corporal, 14th Battalion, has been killed in action.

Barrett Specification Roofs



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The reasons for their long life are:

First,

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Third,

because under the 20-Year Guaranty Plan the roof must be constructed *under the supervision of our inspectors*, and we know, therefore, it will be constructed right.

That is why these roofs last twenty years and more; that is why we can afford to give a Surety Bond Guaranty with every one.

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Roofers: Hickey and Aubut, Montreal.

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Copy of The Barrett 20-Year Specification and further information promptly furnished upon request.

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Vaults, J. & J. Taylor.

Bank of British North America, Queen and Beech Avenue, Toronto, Ontario.

Brick, John Price Company.
Carpenter work, Smith & Elroy.
Electrical fixtures, F. C. Henderson.
Electric wiring, Geo. J. Beattie.
Fittings, Canadian Office and School Furniture Co.
General contractors, R. Robertson & Sons.
Granite, Stanstead Granite Quarries Co.
Painting and glazing, J. McCausland & Son.
Plastering, T. Gander & Son.
Plumbing and heating, Sheppard & Abbott.
Roofing, Geo. M. Bryan.
Stone, Indiana Limestone Co.
Stone, McIntosh Granite Co.
Structural steel, McGregor & McIntyre.
Tile, Italian Mosaic and Tile Co.
Vault doors, J. & J. Taylor.

Huron and Erie Mortgage Corporation Building, Windsor, Ont.

Bank fixtures, Canadian Office and School Furniture Co., Preston.
Carpenter work, Samuel Willis, London, Ont.
Electric work, McNaughton & McKay, Windsor, Ont.
Elevator, Otis-Fenson Elevator Co., Toronto.
General contractor, John Putherborough, London.
Heating and plumbing, Pennington & Brian, Windsor, Ont.
Lighting fixtures, Barton Netting Co., Windsor, Ont.
Ornamental iron, Canada Wire and Iron Goods Co., Hamilton, Ont.
Plastering, R. C. Dancy, Toronto, Ont.
Tile and marble work, Italian Mosaic and Marble Co., Toronto.
Vaults, Goldie & McCulloch, Galt, Ont.

Canadian Bank of Commerce, Barrie, Ontario.

Bank fixtures, Berlin Interior Hardwood Co.
Heating and plumbing, J. J. Neelands.
Lighting fixtures, McDonald & Willson.
Plaster work, W. J. Hynes.
Roofing, Mound City Roofing Tile Co.
Terra cotta, Northwestern Terra Cotta Co.
Vaults, J. & J. Taylor.

Canadian Bank of Commerce, Windsor, Ontario.

Bank fixtures, Hadley Lumber Co.
Cut stone (Northern Ohio buff standstone), Norcross Bros.
General contractors, Norcross Bros.
Heating and plumbing, Robert Paddon & Co.
Lighting fixtures, Murray-Kay, Ltd.
Plaster work, R. C. Dancy.
Roofing, A. B. Ormsby Co.
Steel, Canadian Allis-Chalmers Co.
Vault, Canadian Fairbanks-Morse Co.

Canadian Bank of Commerce, Stratford, Ontario.

Bank fixtures, Hadley Lumber Co.
Heating and plumbing, J. R. Myers.
Lighting fixtures, F. C. Henderson.
Plaster work, W. E. Loeder.
Steel, McGregor & McIntyre.
Roofing, J. R. Myers.
Vaults, Goldie & McCulloch.

Canadian Bank of Commerce, East End Branch, Vancouver, B.C.

Bank fixtures, Chalmers Cabinet Works.
Clock, Seth Thomas Co.
Elevator, Otis-Fensom Elevator Co.
General contractors, Baynes & Horie.
Grills, P. E. Harris & Co.
Lighting fixtures, F. C. Henderson.
Lighting fixtures, McDonald & Willson.
Steel, Baynes & Horie.
Steel sash, Henry Hope & Sons, Limited.
Terra cotta, Federal Terra Cotta Co.
Vaults, J. & J. Taylor.

Canadian Bank of Commerce, Danforth and Broadview Branch, Toronto, Ontario.

Bank fixtures, Hadley Lumber Co.
Brick, Don Valley Brick Works.
Cut stone, Buff Indiana Limestone.
General contractors, Harris & Harris.
Heating, Fiddes & Hogarth.
Lighting fixtures, direct, McDonald & Willson.
Lighting fixtures, indirect, Jas. Devonshire, Ltd.
Plaster work, W. H. Addison.
Plumbing, Fiddes & Hogarth.
Roofing, G. M. Bryan.
Vault, Goldie & McCulloch Co.

Canadian Bank of Commerce, Bloor and Lippincott Branch, Toronto, Ontario.

Bank fixtures, Hadley Lumber Co.
Brick, Black Building Supply Co.
General contractors, R. Robertson & Sons.
Heating, Fred Armstrong Co., Ltd.
Lighting fixtures, F. C. Henderson.
Plaster work, T. Gander & Son.
Plumbing, Robert Jordan.
Terra cotta, New York Architectural Terra Cotta Co.
Vaults, J. & J. Taylor.

Canadian Bank of Commerce, Waterloo, Ontario.

Bank fixtures, Barton & Baldwin.
Brick, Black Building Supply Co.
Cut stone, Geo Oakley & Son.
General contractors, Dickie Construction Co.
Heating and plumbing, Weichel & Son.
Plaster work, W. J. Hynes.
Steel, Dominion Bridge Co.
Vaults, J. & J. Taylor.

Canadian Bank of Commerce, Earlscourt, Toronto, Ontario.

Bank fixtures, G. E. Lindsay Co.
Brick, Fiske Tapestry.
Cut stone, Roman Stone Co.
Heating and plumbing, T. G. Barrington.
Heating and plumbing, W. Schulkins.
Lighting fixtures, Canadian Alexalite.
Lighting fixtures, McDonald & Willson.
Plaster work, T. Gander & Son.
Roofing, Geo. N. Bryan.
Vault, J. & J. Taylor.

Canadian Bank of Commerce, Archives Building, Toronto, Ont.

Brick, Don Valley Brick Works.
General contractors, T. Cannon & Son.
Heating, Gurney Foundry Co.
Plaster work, R. C. Dancy.
Plumbing, Bennett & Wright.
Roofing, G. Duthie & Sons.
Special equipment, Logemann Bros.
Steel, McGregor & McIntyre.
Steel sash, Lupton Rolled Steel Sash.

Dominion Bank, Dundas and Medland Streets, Toronto, Ontario.

Bronze and iron work, Architectural Bronze Works.
Carpentry, J. C. Scott Co., Ltd.
Cut stone, Fred Holmes & Sons, Ltd.
Electric fixtures, F. C. Henderson.
Electric fixtures, Mott Company, Limited.
Electric wiring, Toronto Electric Co.
Galvanized iron, W. E. Dillon Co., Ltd.
Grill work, etc., Dennis Wire and Iron Works, Ltd.
Hardware, Rice Lewis & Son, Limited.
Interior fittings, Office Specialty Co., Ltd.
Masonry, Albert Webb.
Marble and tile, T. Eaton Co., Ltd.
Name plates, etc., Patterson & Heward.
Painting, J. R. Robinson.
Plaster work, Wm. Blayborough.
Plumbing, Fred Armstrong Co., Ltd.
Sign, H. M. Stevenson.
Vault, J. & J. Taylor.
Weatherstrip, Chamberlin Metal Weatherstrip Co.

Bank of Toronto, Ossington Avenue and Arthur Street, Toronto, Ontario.

Bronze letters, W. H. Stevenson.
Carpentry, A. Weller & Co., Ltd.
Cut stone, Scott Bros.
Electric fixtures, McDonald & Willson.
Electric wiring, Harry Alexander.
Interior fittings, S. R. Hughes.
Hardware, Hardware Company of Toronto.
Iron grills, Canadian Ornamental Iron Co.
Lathing and plastering, Andrew Petrie & Co.
Marble and tile work, Italian Mosaic and Marble Co.
Masonry, James A. Wickett, Limited.
Office furniture, Office Specialty Mfg. Co.
Ornamental bronze work, Dennis Wire and Iron Works.
Painting and glazing, Hughes & Co.
Plumbing and heating, Purdy-Mansell, Limited.
Roofing and metal work, G. Duthie & Sons, Ltd.
Vault, Goldie & McCulloch Co., Ltd.

Merchants Bank, Windsor, Ont.

Bank fixtures, Canadian Office & School Furniture Company.
Composition flooring, Geo. Bertini.
Cut stone, Ritchie Cut Stone Company.
Electric wiring, Lyons Electric Company.
General contractors, P. H. Secord & Sons, Brantford, Ont.
Heating, Windsor Hardware Company.
Hollow tile, National Fireproofing Company.
Iron stairs, Dennis Wire & Iron Works Co.
Lighting fixtures, McDonald & Willson, Ltd.
Marble work, Standard Marble & Tile Company.
Painting, Wm. Laessar.
Plaster work, Harry L. Wood.
Plumbing, Windsor Hardware Company.
Roofing, Windsor Hardware Company.
Steel, Sarnia Bridge Works Co.
Steel sash, Trussed Concrete Steel Co.
Vaults, J. & J. Taylor.

Merchants Bank, Kitchener, Ont.

Bank fixtures, Berlin Interior Hardwood Co.
Electric wiring, Lyons Electric Company.
General contractors, P. H. Secord & Son.
Heating and plumbing, Wm. Knell & Co.
Lighting fixtures, Galt Electric Fixtures Co.
Marble work, Standard Marble & Tile Co.
Painting, Weber Bros.
Plaster work, Harry L. Wood.
Radiators, Clare Bros.
Roofing, Brown-Jarvis Roofing Company.
Steel, Dominion Bridge Co.
Vault boxes, Office Specialty Mfg. Co.

Merchants Bank, Harvard Avenue, Notre Dame, Montreal.

General contractors, A. F. Byers & Co.
Bank fixtures, Canadian Office & School Furniture Co.
Boilers, Warden-King Limited.
Brick, Interprovincial Brick Co.
Door grills, Fred G. McKay.
Electric fixtures, Booth Bros.
Marble, Walker Hardware Co.
Plastering, Watson & Wilson.
Plumbing and heating, W. J. McGuire, Limited.
Roofing, Geo. W. Reed.
Vaults, J. & J. Taylor.

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H. GAGNIER, Limited, Publishers

GRAPHIC ARTS BLDG., TORONTO, CANADA

BRANCH OFFICES

MONTREAL — NEW YORK

THE ART MUSEUM OF TORONTO.
PRESENT ENTRANCE CORRIDOR LEADING FROM "THE GRANGE" TO COMPLETED PORTION OF GALLERY.
DARLING & PEARSON, ARCHITECTS.

Toronto's Art Museum

THE formal opening of the new Civic Art Gallery, or according to its proper title, "The Art Museum of Toronto," contributed in a large measure to make the recent exhibit held under the joint patronage of the Royal Canadian Academy and the Ontario Society of Artists, an event of more than usual importance.

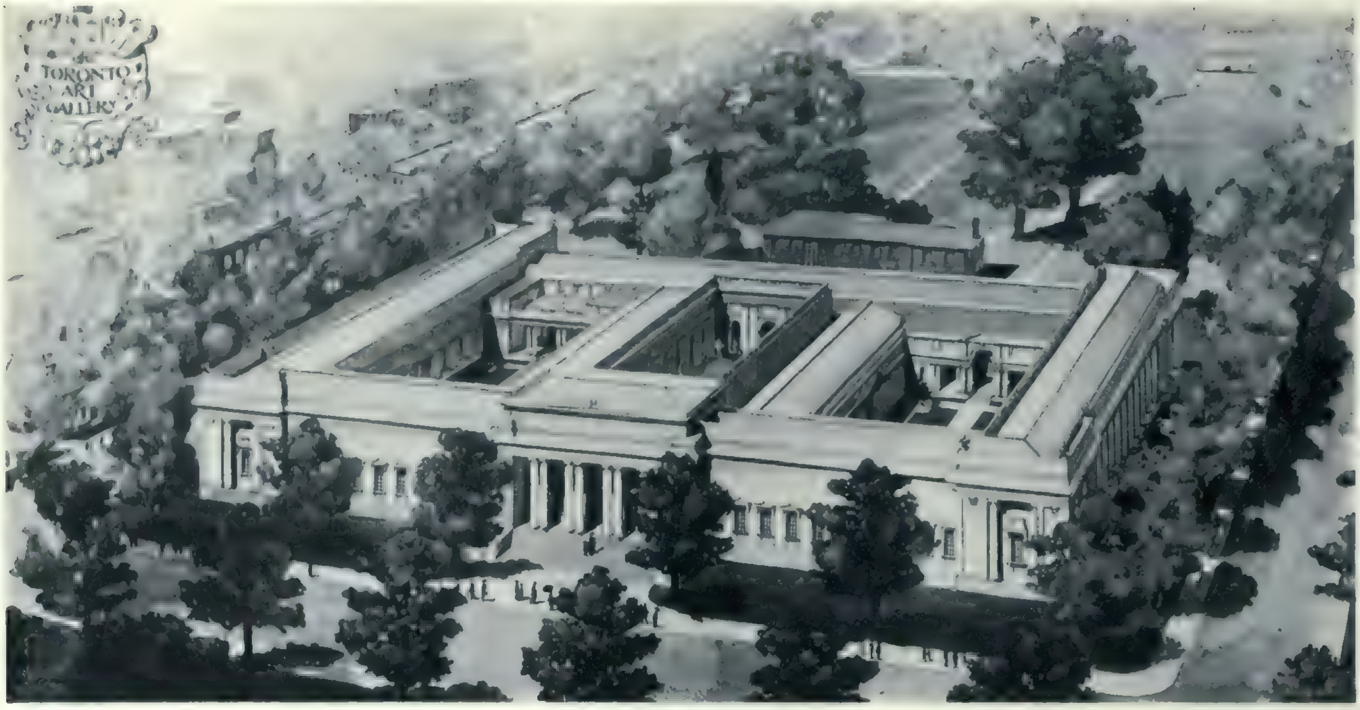
Although only a small part of the contemplated building scheme has as yet been completed, it at least rewards in tangible form the efforts of those who have patiently labored to bring this much needed institution into existence. Its present realization is primarily due to the magnificent generosity of the late Mrs. Goldwin-Smith in bequeathing to the city the property known as "The Grange," so rich in the recollections of the name and personality of her deceased illustrious husband. The famous old homestead on the grounds will be preserved intact, and at the present time serves as an entrance to the existing galleries.

To the north of the property the city has purchased the parcel of land extending through to Dundas street, which will permit of carrying out the necessary future extensions. The completed scheme will result in an impressive stone building covering an area of approximately three hundred and seventy feet by two hundred and twenty-five feet, and having its main approach through a portico entrance from the latter thoroughfare. Not only will it give Toronto a notable structure to house her civic art treasures in, but it will be about as noteworthy a building of its kind as will be found in any city of like size on this continent.

The exhibition just held within the finished portion of the structure proved a most interesting inaugural, representing a collection of the most recent work of Canadian artists; and from now on there will be a series of art exhibits to meet the desires of Toronto's growing population of picture lovers. That the gallery fills a long-felt want was clearly indicated by the large average daily attendance, and it is evident that it will be well patronized by the general public.

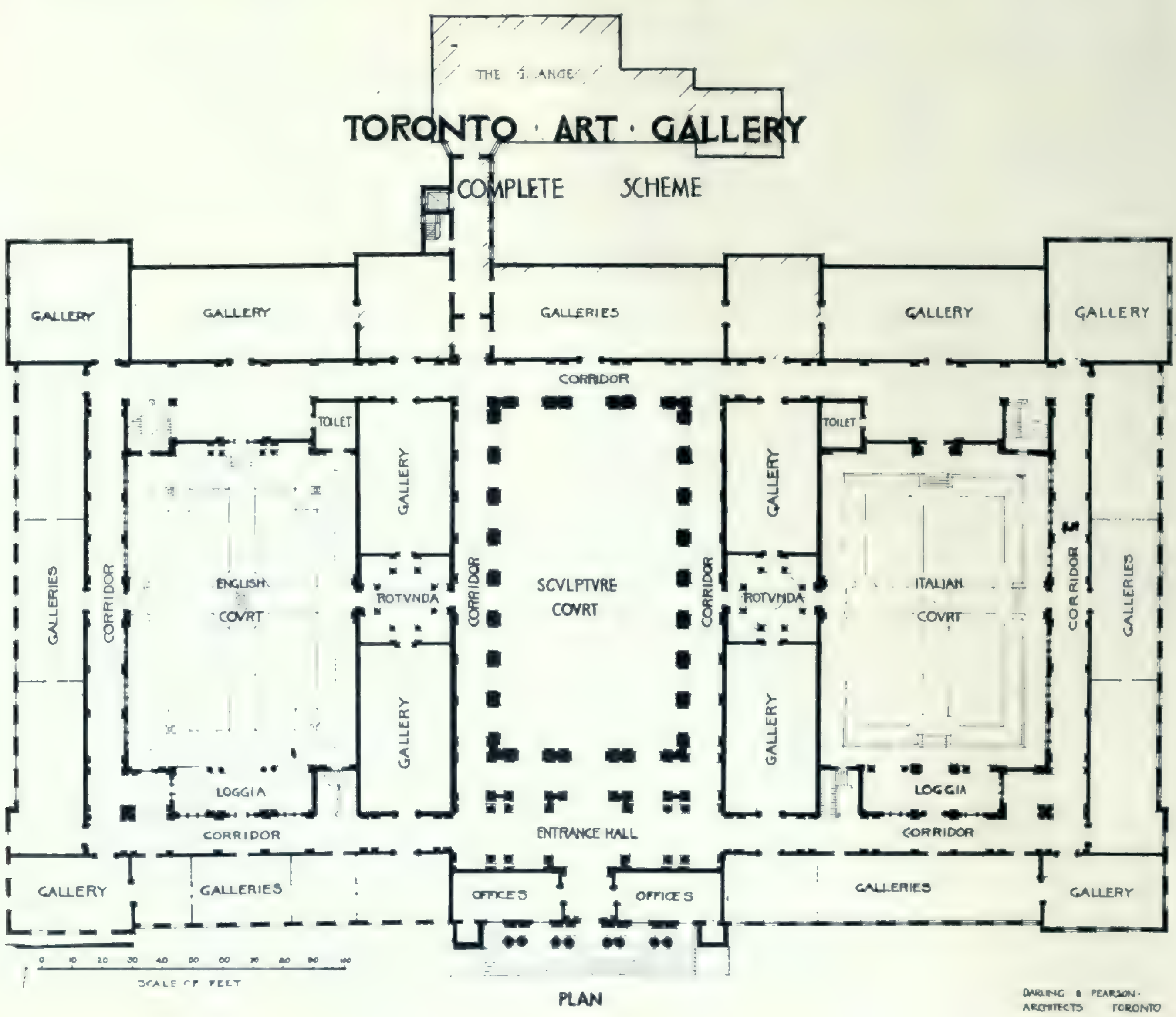
Only about one-twentieth of the general scheme has as yet been completed. The remaining portion will likely not be built until after the war. The present part runs parallel to "The Grange" on its north side, and is approximately one hundred and fifty-five feet long by forty feet wide, exclusive of the portion of the structure which connects "The Grange" to the gallery itself. All further developments will be made on this side, extending towards Dundas street, and will eventually result in a quadrangular structure with two central divisions forming three large open inner courts. The central one of these courts will be "The Sculpture Court," and the other two will be desig-

CORNER OF PRESENT WEST GALLERY, TORONTO ART MUSEUM. DARLING & PEARSON, ARCHITECTS.



TORONTO ART MUSEUM, SHOWING THE FINISHED BUILDING AS IT WILL APPEAR WHEN THE ENTIRE SCHEME IS CARRIED TO COMPLETION.

DARLING & PEARSON, ARCHITECTS.



PROPOSED ITALIAN COURT, TORONTO ART MUSEUM. DARLING & PEARSON, ARCHITECTS.

nated the "English" and the "Italian" courts.

An idea as to the comprehensiveness of the scheme, as it will finally appear, is obtained in the accompanying perspective and general plan. These show the grouping of the various courts and galleries and an arrangement which gives direct accessible means of communication from one part of the building to the other.

The general construction will conform to the present completed section, having reinforced concrete floors and exterior walls of stone backed by brick and a course of hollow tile. The inner walls of the existing galleries are finished with boards instead of plaster, and will be covered with canvass or linen tinted a soft neutral tone. This forms a most suitable backing for the hanging of pictures, as nails can be driven at any desirable point with little or no perceptible damage to the walls themselves. Underneath the gallery is a full sized basement containing the boiler room and large storage space and connecting with the upper floor by both a freight elevator and staircases.

When the building is entirely finished, the old homestead on the property known as "The Grange" will constitute a rear annex and the outside walls will be renovated to architecturally conform with the Museum premises. The present connecting corridor which gives entrance from "The Grange" is finished with a vaulted ceiling and marble wainscotting and floor. In the exhibit rooms the ceilings consist entirely of skylights carried on a heavy plaster wall cornice.

An especially interesting feature of the gallery is the system of artificial lighting, of which an accompanying view is shown. This is situated above the lower skylight, and consists of a frame of metal conduits carrying a series of nitrogen lamps of one hundred and fifty candle power each. These lamps have blue colored bulbs, and are set in deflectors arranged in rows on either side of the skylight. The light rays are projected down through the skylight at an angle directed towards the opposite walls, and the result is a perfect even diffusion of light in the gallery below, eliminating all shadows and giving a remarkable daylight effect.

The Art Museum's Lighting System

By GEO. J. BEATTIE

It cannot be denied that daylight is generally the proper quality of light for illumination of objects in art gallery—more particularly pictures. There may be considerable divergence of opinion as to whether the light from the northern or southern exposure is the better, but even here the opinion of the majority of artists and others qualified to judge is that the southern

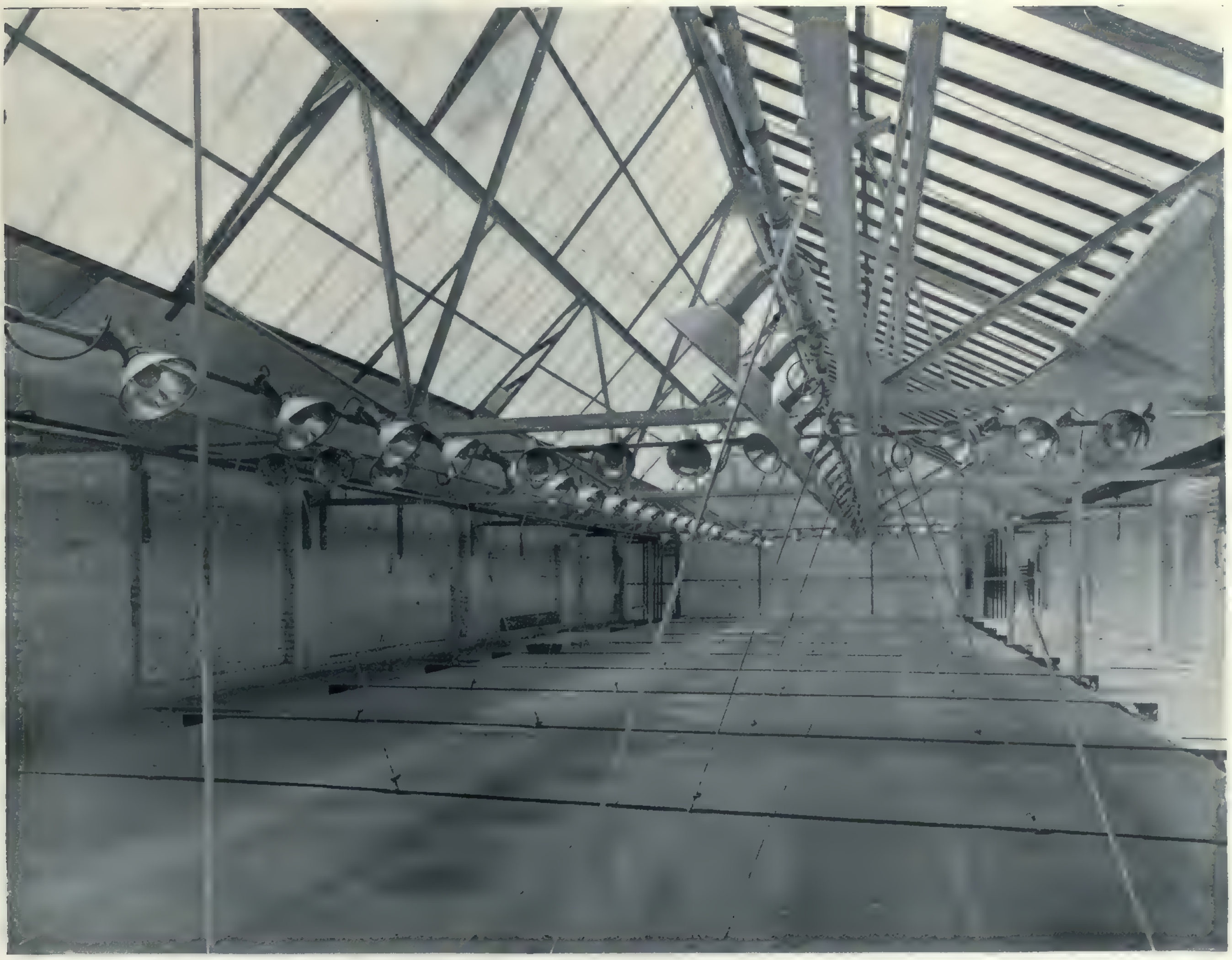
PRESENT MAIN GALLERY, TORONTO ART MUSEUM. DARLING & PEARSON, ARCHITECTS.

exposure is the best. Of course, quality and consistency have weight in arriving at this decision, and the warmer tones of the southern exposure seem to be preferable. Consequently, it is often advisable to warm up the light that enters north windows by means of light tints of yellow in the curtains or draperies which cover the window.

VIEW OF ABOVE INTERIOR TAKEN AT NIGHT BY ARTIFICIAL LIGHTING SYSTEM INSTALLED.

The problem of artificial lighting in the Toronto Art Museum, therefore, resolved itself into installing a system which would most nearly approximate daylight from a southern exposure. The success of the result can best be judged from the opinions of those best qualified to criticize, and it seems to be the general expression that the effect produced is even better than that of daylight.

The success of the installation is due to a very great extent to the thoroughness with which the architects and the Museum authorities considered this



SKYLIGHT AND OVERHEAD LIGHTING SYSTEM, TORONTO ART MUSEUM. DARLING & PEARSON, ARCHITECTS.

particular part of the work; and also to their willingness to adapt the building construction to the necessities of the lighting system itself. As a result, Toronto has one of the most satisfactorily lighted art museums in America, if not in the world. The lighting system was built into the building, and was not, as is often the case, an afterthought. Even the color of the floors has an effect on the result, as will be seen later.

In the lighting of picture galleries there are other fundamental considerations besides a daylight quality of light. These may be summed up as follows:

(1) That the brightness of the floor and ceiling should not be disproportionately large in comparison with the brightness of the area upon which pictures are to be hung.

(2) That the amount of downward light should not be disproportionately large in comparison with that directed toward the important wall space.

(3) That there should be no reflective of bright portions of the skylight from the glazed or varnished pictures into the eyes of an observer standing at reasonable distance from the pictures.

(4) That the lighting equipment should be entirely concealed so as not to mar the beauty of the galleries.

(Concluded on page 152)

END OF PRESENT ENTRANCE CORRIDOR, TORONTO ART MUSEUM.

NEW NORLITE BUILDING, OTTAWA, ONT. RICHARDS & ABRA AND C. P. MERIDITH, ASSOCIATE ARCHITECTS.

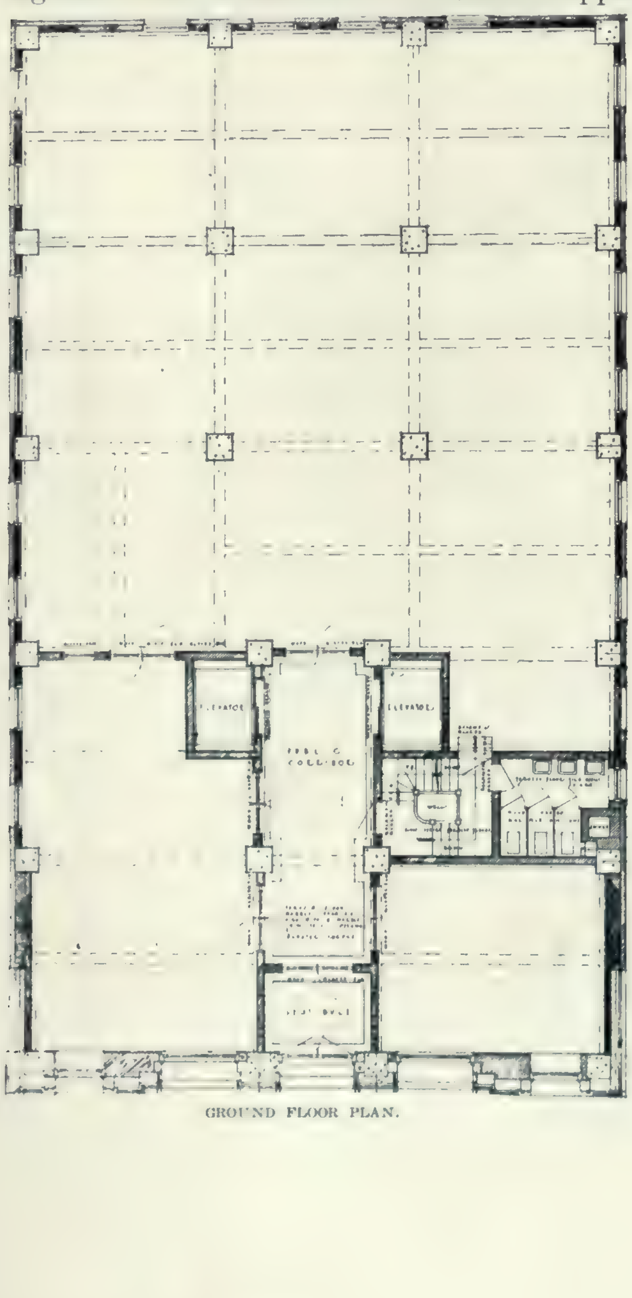
New Norlite Building, Ottawa

TO the advantages of modern office accommodations, the new Norlite Building, recently completed on Wellington street between O'Connor and Bank streets, Ottawa, gives to its tenants the advantage of an ideal location. It is one block west of the Langevin Block (a Government departmental building), and is strictly within the area known as the Government office district.

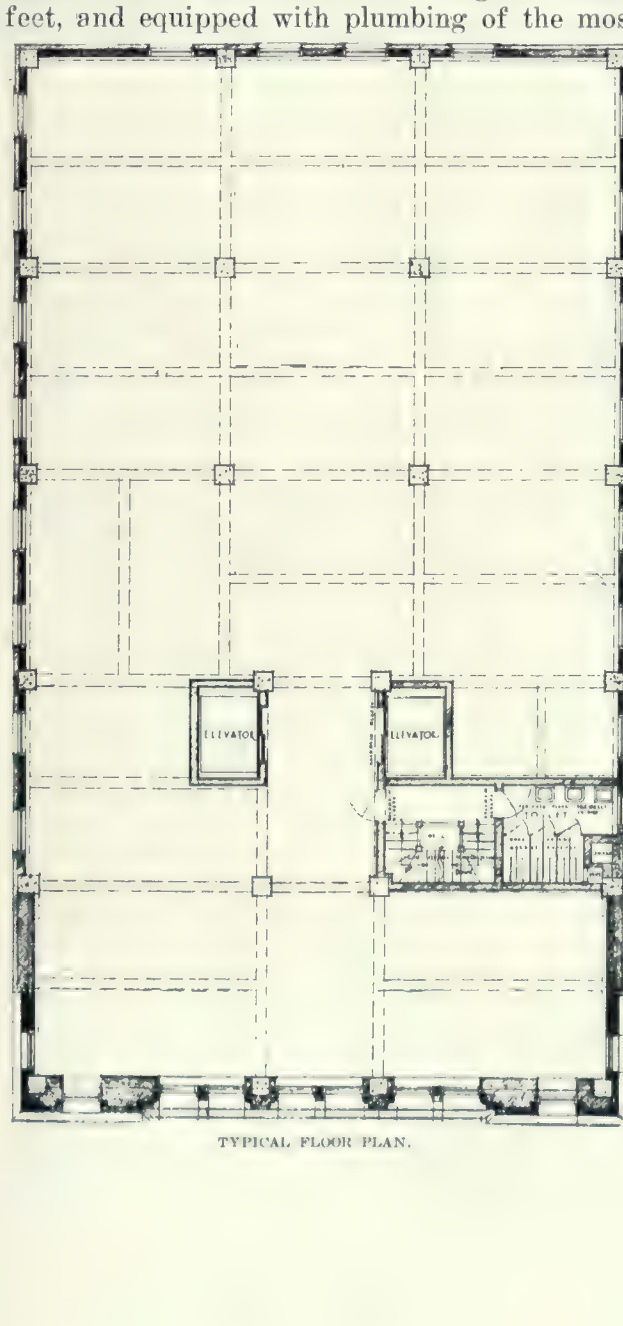
Besides the location, which makes the building decidedly suitable as office quarters for either professional or governmental purposes, the building is exceptionally well lighted, deriving direct outside light on all four sides. On the east side there is a large lawn between the structure and the Bank of Montreal; on the west side is a lane and a large open space belonging to the North-West Mounted Police Department, while at the rear is an open space about twenty by thirty feet separating the structure from the Booth Building.

The front of the building faces north, overlooking the large lawns of the Parliament Buildings and the Ottawa River. From the upper floors there is a beautiful view of the Laurentian Mountains and the surrounding country and rivers. The construction is fireproof throughout. The exterior is built of Indiana limestone, light cream terra cotta and brick to harmonize in color with these two materials. There are no inside offices, all the rooms being arranged to have direct outside light.

On the ground floor the entrance and elevator corridor is finished with marble wainscotting and ornamental plaster cornice at ceiling. The elevators have heavy, bronze copper doors with bronze grilles and glazed with close wire polished plate glass. All the interior trim is of hardwood, finished in dull polished mahogany. The floors throughout the building are of white marble terrazzo. The stairs are of metal with terrazzo treads, and are enclosed with fireproof materials from basement to roof with fireproof doors at each floor landing. Toilet and lavatories are provided on each floor in the space adjoining the stair hall. These rooms are finished with tile and marble to a height of seven feet, and equipped with plumbing of the most



GROUND FLOOR PLAN.



TYPICAL FLOOR PLAN.

ENTRANCE CORRIDOR, NEW NORLITE BUILDING, OTTAWA.

approved modern sanitary type.

Two high-speed electric traction passenger elevators give service to the various floors, and are ample to meet the requirements of the building in a quick and efficient manner. Each elevator car is constructed of bronze with a brass rail, and has accommodation for twenty-four passengers.

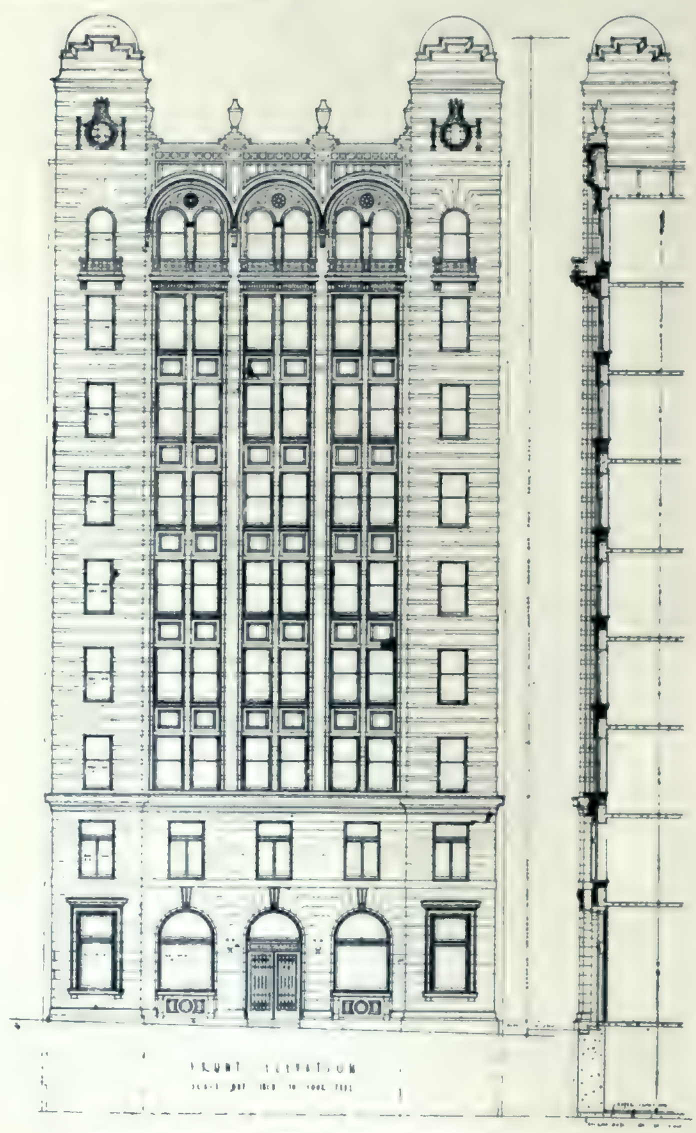
The heating comprises an up-to-date steam system with temperature regulators giving individual control in each of the various offices; and the electrical layout has been arranged so as to take into account the subdividing of any space, so that all interiors will be abundantly lighted.

Obituary

Mr. James A. Smith, a pioneer architect and well known as a designer of churches, recently passed away, in his eighty-seventh year, at his late residence on Woodlawn avenue, Toronto. Mr. Smith was one of the founders, and for many years secretary-treasurer of the Royal Canadian Academy of Art. He had practised as an architect in this city for about forty-five years, during which time he built over ninety churches in Toronto. He was the architect of the old Knox College on Spadina avenue, and of the Church of the Redeemer. Mr. Smith was the second son of James Smith, native of Fordyce, Banffshire, Scotland. He was born in Marduff, Scotland, April, 1832, and came to Toronto about 1850.

Housing Scheme For Colored Labor

The war, with its increased opportunities for work in the big industries, has brought eighteen thousand to twenty thousand negroes into the district of Pittsburg, Penn, and housing conditions, even with alleged greatly inflated rents, have practically broken down, the City Council, sitting as the Committee on Public Safety, was told by a delegation from the Urban League of Pittsburg for Social Service Among Negroes. To relieve the overcrowding the council was asked to urge the Government to build homes for colored industrial workers.



FRONT ELEVATION, NEW NORLITE BUILDING, OTTAWA.

VIEW ALONG CORDOVA STREET, C.P.R. STATION, VANCOUVER, B.C. BAROTT, BLACKADER & WEBSTER, ARCHITECTS.

C. P. R. Station, Vancouver

THE new C.P.R. terminus at Vancouver is the fourth station which this company has built since it ran its first train over a single track into Vancouver about thirty-two years ago. It therefore denotes the rapid and substantial growth of the city in the intervening period and the increased transportation and traffic facilities which have been made necessary to meet the present industrial and commercial requirements.

The work of reconstructing the station was commenced in March, 1913, and completed about two years later. The exterior is of red brick construction with terra cotta and limestone trimmings and the character and equipment of the building is modern throughout.

Along the track side the structure is six storeys high and extends four hundred and eighty feet, or practically two blocks. On Cordova street, which forms the main facade at a higher level, the elevation is approximately four storeys. The main entrance consists of a colonnade of ten large Ionic columns. This entrance leads straight through the main waiting room to the exit to the tracks; while from the Granville street entrance at the west end of the building is a wide corridor extending through to the Plaze at the east end of the station. There is also another entrance on Cordova street, and one on the track side for third-class passengers from the wharves and trains, making six entrances in all. A retaining wall has been erected to support the tracks which have been raised four feet above the old level. A covered passenger bridge thirty feet wide leads from the main waiting room on the track side to the platforms below, while the stairs leading down to the platform from both sides of the passenger bridge are six feet wide.

The two floors below the street level on the track side of station are given over to the baggage and express departments, the lower floor being used mostly for heavy and bonded baggage. The mail room, where all the business mail of the company is handled, is also on this floor, together with the telephone exchange, general service rooms, part of the dining car service department, and boiler and pump rooms. The boiler room contains three one hundred and fifty horse-power boilers, which supply all heat to the station and wharves, a modern steam system being installed for this purpose. On the lower mezzanine floor are the kitchen, auxiliary store room and baggage rooms.

The general waiting room which occupies the central portion of the main floor is sixty feet wide by one hundred and fifty feet long, and has Ionic columns and pilasters marking the divisions of the walls, and an enriched coffered ceiling forty feet above the floor. All the floors,

MAIN WAITING ROOM, C.P.R. STATION, VANCOUVER, B.C. BAROTT, BLACKADER & WEBSTER, ARCHITECTS.

with the exception of the offices, are of granolithic composition, with the base course of the walls consisting of marble. On this floor are also situated the restaurant and lunch room, railway and steamship offices, women's waiting room, and smoking room. The ticket offices consist of eight booths. A large lobby opens off from the general waiting room for the use of first and second class passengers, separate accommodations being provided for third class travellers, including a separate waiting room entrance and other features of convenience.

The upper storeys of the building accommodate the various offices of the company, and are finished with hardwood floors, while the lavatory facilities of the building and other features of service are the most modern throughout. A master clock, operated by the station master, regulates every clock in the station, and the arrangements of all departments is such as to facilitate the handling of passengers and traffic business in the most convenient and direct way.

TRAIN SHEDS, C.P.R. STATION, VANCOUVER, B.C.

Further improvements to the terminal facilities of the C.P.R. at Vancouver have been carried out in the reconstruction of Pier "D," to which an extension of five hundred and thirty-seven feet has lately been added. This pier is on Burrard Inlet, just at the foot of Granville street, and the extension, which now gives it a total length of about nine hundred and fourteen feet, has been made necessary in order to meet the growth of both coastwise and trans-Pacific traffic.

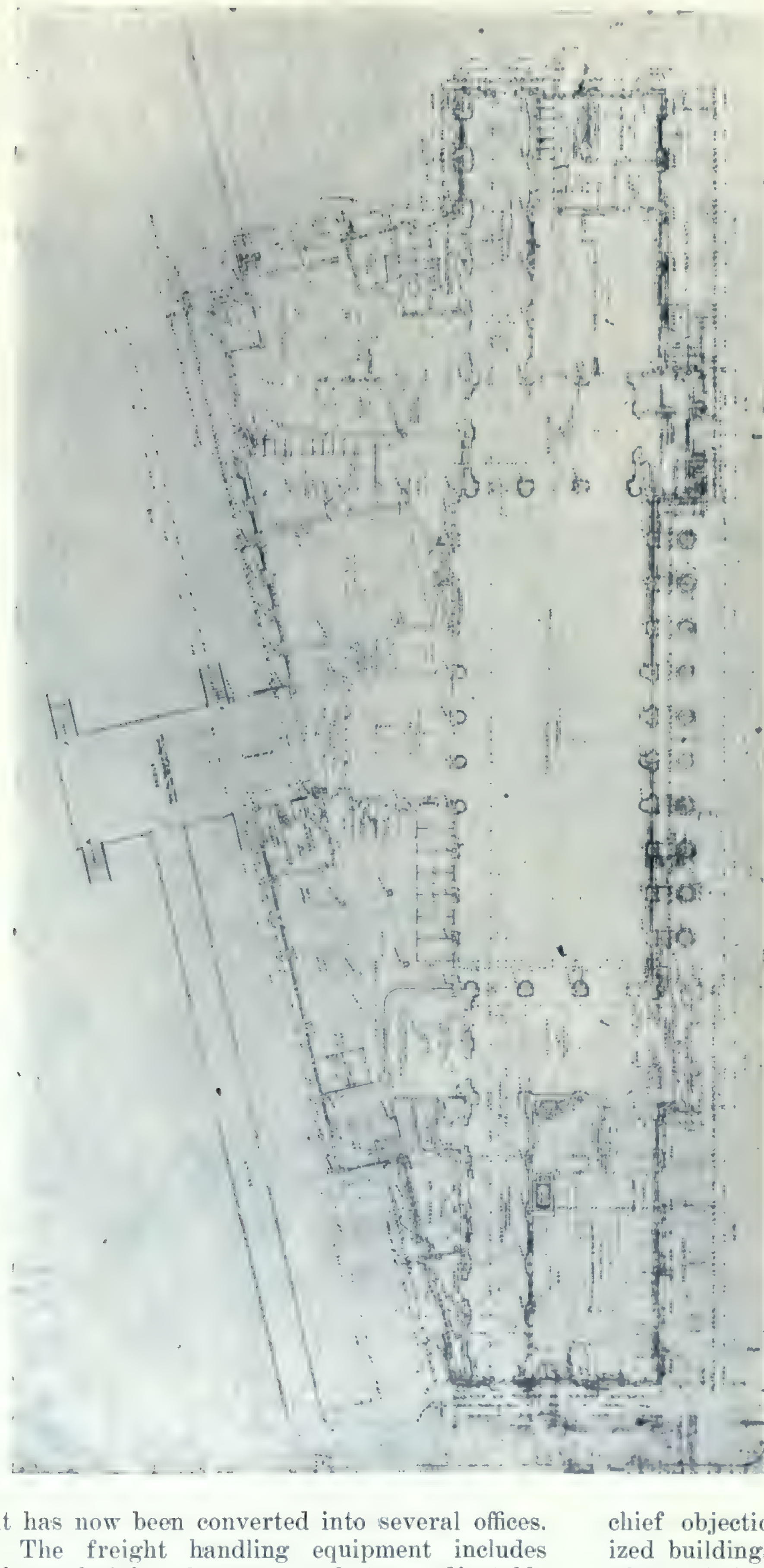
As a result of the new improvements, facilities are now provided on the west and north side of the pier for berthing four coast boats at one time, with separate ramps or staircases for taking the passengers direct from the boat to the upper floor level without interference with the handling of freight shipments. On the east side, where the trans-Pacific boats dock, continuous sliding doors give openings to the shed at all points along the pier. There are two adjustable freight slips and a standard gauge railroad track which makes it possible to deliver car shipments of freight right to the ship slings.

On the newly added section of the pier is a one-storey shed of heavy mill construction continuing from and conforming to the general width of the building on the old portion of the pier, and supporting in turn a covered promenade which runs along both outer edges of the shed at the roof level. This promenade, which is six feet in width, is used both for passenger traffic and sight-seeing purposes, and affords a splendid view of the surrounding harbor. It is connected by staircases to the lower outside dock level. The total width of the shed is one hundred and thirty-six feet, or one hundred and sixty feet including the outside dockage. Removable sections of railing on the east side of the promenade give a direct landing at the upper level, and entirely avoid the movement of passengers through the freight section at the dock level below.

In addition there is a depressed railway track of standard gauge extending through the centre of the shed for the full length of the pier. This depression brings the floor of the cars even with the freight deck level, and greatly facilitates the loading and unloading of all goods in transit. There is also a heavy removable gangway run on the east side railroad track which is provided with adjustable landing gangways on each side between itself, the ship, and the promenade. The passenger bridge, which was originally on the east side of the pier, has been removed to the west side. The space formerly occupied by

MAIN ENTRANCE, C.P.R. STATION, VANCOUVER, B.C.

MAIN WAITING ROOM LOOKING TOWARD TICKET BOOTHS, C.P.R. STATION, VANCOUVER, B.C.



GROUND FLOOR PLAN, C.P.R. STATION, VANCOUVER, B.C.

BAROTT, BLACKADER & WEBSTER, ARCHITECTS.

it has now been converted into several offices.

The freight handling equipment includes three freight elevators and two adjustable freight slips. These slips are crossed by the east side track, and consequently it has been necessary to work out an arrangement which allows this section of track to operate on a turntable. When the slip is up, the track is locked in place and supported rigidly on the pile bents. When the slip is down, the track is given a quarter turn, so that the rails lie parallel to the slip axis, and can be readily trucked over. Each slip is operated by two worms and gears on a common shaft with endless hand-chain attachments. The slips are supported by steel hooks, which drop back when the slip is to be lowered, by means of a lever pulled from the deck level.

The centre depressed track is fitted with an electrically driven car-haul, with a capacity of ten loaded cars. Its use will avoid the presence of any steam locomotives inside the pier, with their attendant fire risk and smoke.

Recently discussing the question of standardization in reference to the designing of railway buildings, Mr. C. Gordon Mitchell, architect, representing the Canadian Northern Railway, said: Standardization at first glance appears very attractive from the economical viewpoint; but does it bear close scrutiny? Firstly, standardization suggest similar condition and demands a unit system of designing. Can a unit system be applied successfully throughout? I am of the opinion that it can only be applied partially, even to what might appear to be stereotyped building of the commercial class—*e.g.*, workshops, warehouses and freight sheds. The chief objections, in my opinion to standardized buildings are as follows: In every case where a building is necessary the conditions are different. In attempting to make the standard suit the varying conditions it will mostly be found that so many variations occur that little of the standard plan remains, and possibly better results will be obtained by ignoring it.

History and Properties of Paint *

THE use of paint for decorative and for preservative purposes dates far back into history; but in the brief space at our disposal we will only consider some of the more prominent types of modern paints and their most important properties.

Paint is described, in a general way, as the mixture of finely divided particles of solid matter called the "pigment" in a liquid called the "vehicle." Asphalt paint is merely solid asphaltum dissolved in benzine or some other vehicle.

The pigment functions to hide the surface over which the paint is applied, to resist the action of weather and wear, and to give color. The selection of the most suitable pigment, or combination of pigments, depends very largely upon the relative importance of these functions under the conditions for which the paint is intended to be used.

The vehicle functions as the carrying and cementing body, and dries and binds together the solid particles of pigment in somewhat the same way that Portland cement and water unite sand and broken stone to form concrete.

The types of paints best known are three, differentiated by the vehicles used to carry and cement their pigments. The most important are the oil paints; but the enamel paints are now used quite extensively, and cold water paints are daily becoming more popular for interior walls.

Asphalt paint is really a varnish. The varnishes differ from the paints in that they do not ordinarily have a pigment, though occasionally a little is added to give color, and we then approach what is known as "enamel paint."

The oil paints consist of pigment ground in a paint mill with oil as a vehicle, to which is added a small proportion of Japan drier to cause a fairly rapid solidification when the paint is applied.

Linseed oil, which is pressed from flaxseed, is the best known vehicle used in the oil paints. Until recent years it was employed for all the better paints of this type, but it has the defect that a film of it is readily penetrated by water.

Other vehicles, as substitutes and improvements, were diligently sought, because of this unfortunate non-waterproof property of linseed oil. Among others, fish oil, Soya bean oil, and corn oil have been carefully tested and successfully used under certain conditions, but the greatest advance has been made by using China wood oil.

China wood oil, when properly manufactured, is very resistant to water, and it is largely employed at the present time in the manufacture of both paints and varnishes.

The enamel paints consist of pigment ground in a vehicle of varnish which consists ordinarily of gum or resin, oil and turpentine. The evaporation of the turpentine leaves the gum and oil as a strong cementing medium for the pigment. Some of these enamels are very serviceable and resistant to weather, and the coating dries with an excellent gloss.

Cold water paints consist of pigment combined with gum, caslin, etc., that dissolves in water to form the vehicle at the time of application. The evaporation of the water leaves the gum to serve as the cementing medium for the pigment. Some paints of this type have very fair weather resistance.

White lead pigment is one of the oldest and best known. It was originally made from pieces of metallic lead called "buckles," that were corroded to form the white powder termed "basic carbonate," and known as "white lead." This process is largely used at the present time, though other methods have been adopted to shorten the period required for manufacture and to improve the product. White lead, as first produced, is purified, dried and powdered before being sent to the paint mill.

White lead paint, when the pigment is properly ground with an oil vehicle of good grade, has very great covering and hiding qualities. Unfortunately it also has certain disadvantages. It is very poisonous, and on exposure to weather it has the property of "chalking." When one's hand is rubbed over a board which has been painted with it for a year or more, the hand becomes coated with a white powder.

Chemical action between the white lead and the oil causes the change in a white lead paint film; and this action is so marked that in the course of a few years the house which has been covered with an excellent quality of white lead paint may be but poorly protected, especially if it is exposed to salt sea air.

Fig. 1 shows the general appearance of this condition when examined with a magnifying glass, while Fig. 2 shows the condition, in contrast, of a better proportioned paint subjected to exactly the same exposure and use.

Zinc oxide pigment is another which is well and favorably known. Owing to its non-poisonous properties it is more desirable than white lead for interior work. This pigment used alone is also unsatisfactory, as it produces a brittle coating that is liable to crack, as illustrated by Fig. 3.

Other pigments commonly used are red oxide

*Lecture delivered by Robert Job, vice-president Milton Hersey Company, Limited, before the Extension Course on Industrial Chemistry at McGill University.

Figure 1.—White lead paint showing chalked condition.

of iron, ochre, sienna, ultramarine, Prussian blue, chrome yellow, lamp black, and many besides too numerous to mention.

Co-operation is as effective in promoting efficiency with pigments as with people, and by far the best results have been obtained with paints in which suitable pigments have been properly combined.

Little was known about the reactions between pigments and vehicles, or the reasons for good or bad service of paints made from given materials, until comparatively recent times. Certain bad combinations were shunned from sad experience. It was learned, for instance, that white lead paint mixed with ultramarine blue will darken, owing to the formation of black sulphide of lead, and that a sign coated with white lead paint will sometimes change from white to yellow within an hour if exposed to the sulphur fumes from a locomotive.

The study of paints was given great impetus about the year 1890 through the published investigations of Dr. Charles B. Dudley, for many years the able, widely known and respected chemist of the Pennsylvania Railroad. In his studies, among other things, the properties of paint materials were systematically investigated, and what was learned brought about radical changes in the composition and manufacture of paints.

Figure 3.—Zinc oxide paint showing cracked condition.

The Pennsylvania Railroad gained much valuable information as the result of Dr. Dudley's work. It was clearly realized, for example, that the effectiveness of a paint did not by any means depend upon its cost per gallon or pound. As a matter of fact, it was proven that some of the most durable paints could be obtained at a minimum cost.

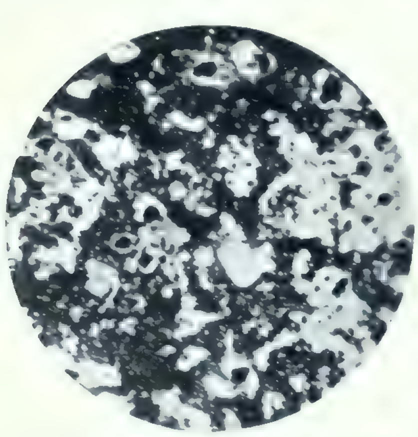


Figure 4.—Short-lived coarse-particled pigment paint.

Other railroads were not slow to follow the lead of the Pennsylvania, one of the first to start on this work being the Philadelphia and Reading, now known as the Reading Railway. The results of some of these investigations were presented by the writer before the Franklin Institute, and elsewhere.

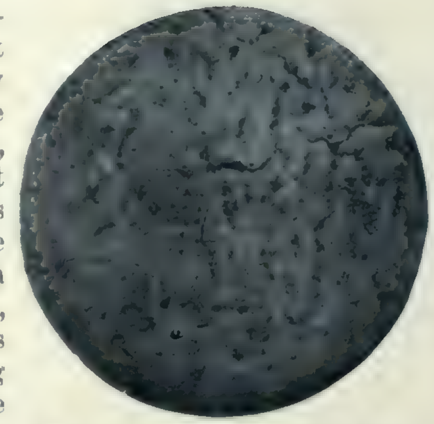


Figure 2.—Better proportioned paint in contrast.

The size and form of the particles of the pigment were shown to have a great influence upon the life of a paint coating, though this subject had not previously received any attention. A brief description of a case that clearly illustrates this point may be of interest:

Two bridge paints had been used upon the lines of the Reading for a period of about ten years. These paints were made by the same manufacturer, and contained almost the same proportions of the same materials. Though they were exposed side by side and under like conditions all along the road, one of them became known for its good service, and the other for very poor service. The life of one was twice that of the other.

The difference between the service rendered by these paints was so marked that we determined to get at the real causes, so as to bring the quality of all our paint deliveries to the same high standard of durability represented by the better paint.

The discovery that the main difference between the two paints was in the relative size of the particles of the pigments results from this investigation. In the long-lived paint these particles ranged from two to ten ten-thousandths of an inch in diameter, with comparatively few of the maximum sizes, while in the short-lived paint the diameters ranged from two to one hundred and eighty ten-

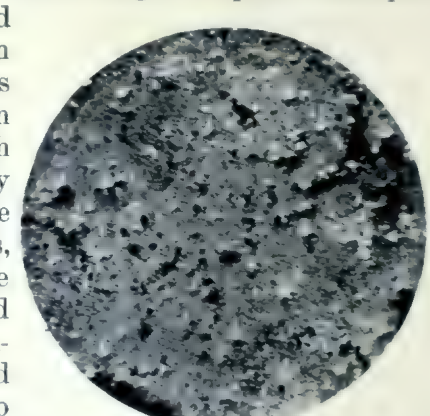


Figure 5. — Long-lived, fine-particled pigment paint.

Figure 6.—Coarse and fine particled pigment paint in contrast.

thousandths of an inch. The average diameter, as nearly as we could estimate, of the particles of the pigment of the satisfactory paint was four ten-thousandths of an inch, against eighty ten-thousandths of an inch for the unsatisfactory paint; and, as the volumes of spheres are to one another as the cubes of their diameters, it follows that the average particle of the pigment of the good paint was eight thousand times smaller in volume than that of the bad.

The composition of these two paints was about twenty-five per cent. oxide of iron combined with inert matter, such as clay and gypsum, as a filler, ground in pure linseed oil, with a small proportion of Japan drier, as a vehicle. The details of the investigation may be found in the journal of the Franklin Institute for July, 1904.

The reason why this difference in the size of the particles of pigment makes so marked a showing in the service of the two paints is that where the particles are coarse, relatively large oil spaces surround them; and as linseed oil is by no means waterproof, as we have mentioned, the effect of the weather is soon noticed in such paints.

Surface tension also operates in favor of the paint having the finer-particled pigment, on the same principle that causes fine sand, when wet, to hold together, where coarse sand or gravel will not.

Fig. 4 shows the appearance of a paint film of the short-lived coarse-particled pigment paint, and Fig. 5 shows that which had fine-particled pigment and was long lived.

Fig. 6 shows a portion of a bridge after the paints upon it had been exposed for four years. The upright column had been coated with the bad paint, and the horizontal railing with the good. Fig. 7 is another part of the same bridge in which the upright post was coated with the good paint and the horizontal railing with the bad. In both pictures and in both positions, the paint with the fine-particled pigment is seen to be in good condition, while the other is not.

These tests demonstrate that some of the most durable paints were composed of the simplest and least expensive of pigments, and created a good deal of interest because the findings ran counter to the preconceived ideas of many who had assumed that in order to be really good and give long service a paint must be composed of one of the more expensive pigments such as white lead, and that those which contained the so-called "inert materials" were to be looked upon as "doped" products.

Because of misbranding and wholesale and indiscriminate adulteration, the manufacturers were, in some cases, to blame for this. For example, we have seen a supposedly oil paint that contained thirty per cent. of water. Another paint labeled "pure white lead" contained no white lead. Many other cases could be cited, and it is small wonder that such abuses led to a public outcry and legislation that was sometimes carried too far.

It became necessary, because of these conditions, to determine the truths about the properties and characteristics of the different paint materials, and the work was finally undertaken by the Scientific Section of the Paint Manufacturers' Association of the United States.

A fence was built at Atlantic City, and several hundred panels were coated with paints of different formulae in order to determine the value under exposure to the weather at the sea shore of the more important materials used as pigments, and also to show the most durable combinations of the various pigments under such conditions. Exposures were made on both iron and steel panels as well; and, subsequently test fences were erected in other parts of the country in order to get varying climatic conditions.

The tests were made under the supervision of the American Society of Testing Materials, and

Figure 7.—Coarse and fine particled pigment paint in contrast.

a vast fund of information regarding the service value of various compositions and combinations was obtained. Materials that many considered as adulterants not long ago are now known to have a definite value in the design of high grade paints.

Misrepresentation still exists under the stress of competition, but the general plane of the paint industry is distinctly better for the simple reason that the principles of manufacture, the relation between cause and effect as applied to paints, and the properties of paint materials are all far more thoroughly understood than was the case even at the beginning of the twentieth century.

It will be clear from what has now been said that in order to be serviceable, a paint must be composed of a pigment that is of a character well adapted to the conditions under which it is to be used, that this material must be in the most effective physical condition, and must be carried in a vehicle which will form an effective bond between its particles and at the same time be as nearly weatherproof as possible.

The spreading quality is a factor that should be very carefully borne in mind when purchasing paints. That having the pigment composed of the most finely divided particles, other things being equal, will spread farthest.

Specific gravity is another important factor, and should be studied accurately by the purchasing agent who is buying by the pound. The paint of the least specific gravity will be the greatest in bulk; and it is bulk, not weight, that counts in determining the spreading capacity of paints.

The labor cost of applying the paint is usually far greater than the cost of the paint itself; and it is important to remember this as a special incentive for the purchasing of the most durable paint for the purpose.

Specifications for various types of paints were the natural outcome of all the foregoing investigations and experiments with paints and paint materials. Such specifications have been drawn by the writer and others to cover paints for use under many different conditions, and these can be filled by any manufacturer who is willing to give care and attention to the work. Some of them, in fact, now carry these preparations in regular stock.

By purchasing wisely under carefully drawn specifications, real competitive prices that represent the true market value of the paint materials plus a reasonable allowance for the costs and profits of manufacture, can be secured.

Marked economies have been effected by some of the principal railroads and by many smaller users of paints, through lowered costs and increased service as a result of working along these lines.

Large purchasers know they can not afford to do otherwise than buy according to specifications specially drawn to cover the needs of the service. It would be much to the advantage of many of the smaller purchasers who use quantities that would warrant the small expense connected therewith, if they would do likewise.

Final testing is, of course, absolutely necessary, for it is useless to buy according to specifications, or even on promises, unless the paints actually delivered are tested to determine whether they are as specified or represented.

The Art Museum's Lighting System

(Continued from page 141)

In order to comply with the first demand, the brightness of the floor was reduced to its proper value by using woods of a dark color having a very low reflection factor. This, by the way, will be materially improved as the floors age and darken in tone.

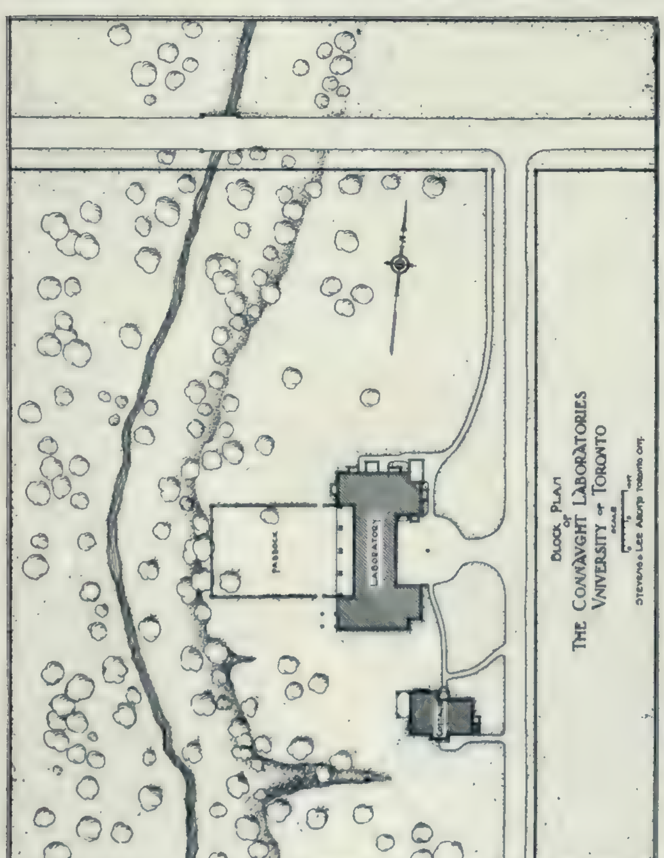
In order to comply with the second demand, it was necessary to use a glass which was not too diffusing, and while bending the ray slightly, did not alter its direction. Syenite, an irregular crystal, was found to be most generally satisfactory, as it not only concealed the beams, etc., in the attic space so that the daylight effect was uniform, but it eliminated any unavoidable irregularities in the illumination on the walls.

In order to comply with demand number three, the simple law of reflection was applied. The average eye level may be taken as five feet above the floor, and it can be quite easily seen that at this height there would be little, if any, specular reflection.

The entire lighting equipment was concealed in the attic space, or, as it may be more properly termed, light-loft, as had it not been for the lighting requirements, this space would have been materially reduced.

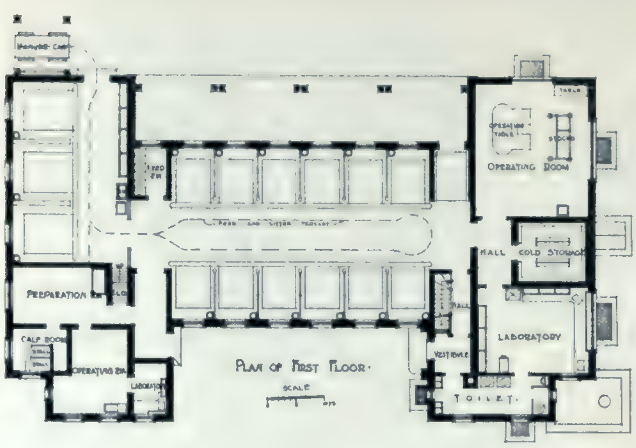
The artificial daylight was produced by means of which is known as the mazda C.[2] lamp, which produces light almost approximately that of daylight.

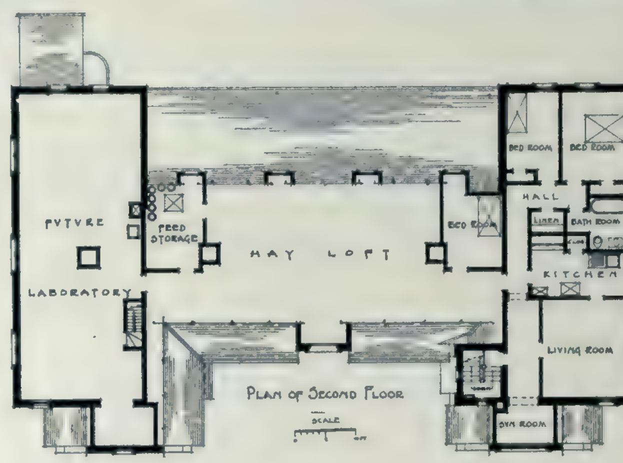
The artificial daylight units were placed in the light-loft as shown in the accompanying photograph. The units, of which there are one for each three to four feet of lineal wall space, consists of a special projector unit placed above the skylight as the photograph illustrates. A special holder was designed which made it possible to adjust each unit to the desired angular and focal positions. Very great care was necessary to adjust these units in order to secure satisfactory illumination of the principal wall area, and in order to facilitate this the lamps were slightly frosted to give more spread reflection.



THE CONNAUGHT LABORATORIES, UNIVERSITY OF TORONTO. GENERAL VIEW AND BLOCK PLAN. STEVENS & LEE, ARCHITECTS.

MAIN BUILDING, CONNAUGHT LABORATORIES, UNIVERSITY OF TORONTO. STEVENS & LEE, ARCHITECTS.





Connaught Laboratories, University of Toronto

THESE buildings, constructed through the generosity of Col. Albert E. Gooderham, and presented by him to the University of Toronto, are of special interest at the present moment. Here are made the antitoxins used by the Province of Ontario for free distribution to those in need of them, who cannot afford to pay, such as tetanus, typhoid, diphtheria, etc. These serums are also used to immunize our soldiers against the ravages of disease, great quantities being used both here in Canada and also being sent overseas for use at the front, where many thousands of lives have been and are being saved from the deadly lockjaw by the immediate injection of the tetanus antitoxin in the front line trenches. Horses are mainly used for the propagation of the serums. There was an initial provision for fifteen of these, but on account of the war and other causes, the demand has become so great that there are at present over fifty horses on the farm, the surplus being provided for in the old barn and temporary stables at the rear of the property.

There are at present two buildings, the main building housing the stables, laboratory and other service rooms, and a cottage, which is provided to house part of the staff. The main building is built of fireproof material throughout, with the exception of the roof beams and boarding, which are of wood. The walls are of interlocking tile, with stucco slap-dash finish on the exterior. The floors are of steel and concrete, and the roof is slate. The interior walls of the stables are lined to a height of six feet with a vitrified glazed brick. This terminates in a coved granolithic base flush with the brick. The walls of the operating room and laboratories are finished with hard wall plaster and enamel paint.

On the ground floor are twelve stalls and three box stalls. In the case of the former, the divisions are of cast-iron posts and pipe rails, and of the latter vitrified brick. The feed buckets are nickel-plated and supported in iron rings, and are removable for cleaning. The feed room is provided with bins for the different kinds of feed, and chutes from the upper floor where the main supply is kept. A manure trolley, hung

VIEW SHOWING ARRANGEMENT AND EQUIPMENT OF STALLS, CONNAUGHT LABORATORIES, UNIVERSITY OF TORONTO. STEVENS & LEE, ARCHITECTS.

from the steel beams above, carries the manure outside, where it is dumped directly into the manure pit. In front of the box stalls is a small unit for making of smallpox vaccine. This consists of two stalls for calves and a preparation room, where the calves are bathed and cleaned, an operating room with tilting table, and a small laboratory for the vaccine work only. On the north side of the building is the operating room. Here the bleeding of the horses is done. This room has a terrazzo floor and coved base, together with a surgeons' sink, having elbow valves. There are also stocks and a tilting table to hold the horses quiet while being operated upon. Between this room and the laboratory is a cold storage room constructed of two thicknesses of two-inch cork tile, where the product is kept at a temperature of about forty degrees until it is ready for refining. This room is equipped with metal shelving. The laboratory is finished like the operating room, and is equipped with sinks, work tables and cupboards. Here also are the sterilizers and other apparatus used in the work. In front of this is a wash room for the use of the staff.

On the first floor over the rooms just described is a suite for the laboratory man and his family, consisting of living room, kitchen, two bedrooms and bath. In the centre of the building are the hay loft and feed store. The south part of this floor is used as a laboratory for tetanus work. In the tower is the water tank, from which the water is pumped from an artesian well. The basement is excavated only under the north wing. Here is located the necessary machinery for the operation of the

VIEW FROM PADDOCK, CONNAUGHT LABORATORIES, UNIVERSITY OF TORONTO.

OPERATING ROOM, CONNAUGHT LABORATORIES, UNIVERSITY OF TORONTO. STEVENS & LEE, ARCHITECTS.

buildings. Heat is supplied from two upright hot water boilers by a two-pipe system to radiators. This also serves the cottage, to which the pipes are carried in split tile conduit under the ground. Domestic hot water is supplied from a jacket heater to the different fixtures.

All sewage is taken to the west of the buildings in cast-iron pipe, where is located a two-compartment septic tank with automatic valves. The ground drops away at this point, and on the lower level is placed the disposal bed in two sections, with a diverting chamber, so that each section may be used alternately. A small gas machine is used for supplying the Bunsen burners.

There is farm land of about fifty acres around the buildings. This is used for grazing and for the growing of feed of various kinds for the animals.

Electric light and power is generated by a modern automatic plant, consisting of a gas engine with direct connected generator, which starts itself automatically when required. There is also a battery to maintain a twenty-four-hour service without the engine constantly running. This engine also operates the compressor or the cold storage plant which serves the large cold room on the ground floor, and the small box in the kitchen on the floor above. The well pump is driven by an electric motor.

A Lesson From Halifax

In commenting editorially on the recent disaster at Halifax, the "American Architect" says that it developed many interesting things worthy of attention. That many hundreds of people should be made blind would not be expected, but such was the deplorable result. The calamity was the result of two explosions in the harbor; the first and lighter one caused many persons to go to the windows through curiosity, and the second was of sufficient force to blow the glass inward, resulting in the mutilation and blinding of hundreds of persons.

It would not be reasonable to expect buildings to be constructed so as to safeguard their occupants against the effects of such a visitation, as they are very fortunately of infrequent occurrence. The frequent occurrence of minor disturbances, however, justifies the application of these lessons to minor uses. It can readily be seen that if all of the windows in Halifax had been glazed with wire glass the attendant mutilation and blinding, due to the use of ordinary glass, would not have occurred. The use of this glass as a precaution against damage caused by the usual accidents is a desirable thing.

The availability and value of wire glass as a fire retardant is well understood, and for such purposes municipal ordinances require its use. These requirements are often of limited scope, and then the rate of insurance, due to its omission, forces its use. But moving parts that are glazed, such as doors, openings into rooms where explosions can occur, automobiles, passenger coaches and other things subject to collision shocks and flying missiles, can be rendered much safer by the use of this material. In windows and doors that are liable to be entered by burglars this glass will afford a considerable resistance to such trespassers.

A new housing scheme is to be developed at Brantford, Ont., by the Dufferin Parks, Limited, of which the Dominion Steel Products Company is the holding company. A tract of land, comprising thirty-five acres, will be laid out according to plans prepared by H. Dunnington Grubb, landscape architect, and one hundred attractive homes will be erected, with all conveniences, at a minimum cost of $3,000 each. These houses will be sold to employees of the steel works on the easy payment basis.

OFFICE BUILDING, BROWN COPPER AND BRASS ROLLING MILLS, NEW TORONTO.

New Offices of Brown Mills

Further evidence of the growth which within a few years has transformed New Toronto into an important manufacturing centre, is seen in the office building recently erected for the Brown Copper and Brass Rolling Mills. This concern, which has been prominently identified with the town's industrial development, gives employment to a large number of hands, and has found it necessary within the past year to erect this building for the sole accommodation of its executive and business staff.

The new building stands directly on the Toronto-Hamilton Highway, and is of brick and hollow tile construction, with oak trim throughout. In addition to the modernly equipped plant completed about a year ago for the manufacture of their products, the company has also been actively engaged in the development of a neighborhood housing scheme to provide dwelling accommodation for its employees. The office building is connected to the various working departments by an inter-phone system, which permits of the entire plant being brought directly under executive control. While the present plant is quite an extensive one, the company's business is constantly increasing, and it is understood that further additions are being planned with a view to their erection at a near future date.

STAIRCASE.

GENERAL OFFICE VIEW. HENRY SIMPSON, ARCHITECT.

A New Wrinkle

A subscriber to "Concrete" writes that pencil drawings on tracing paper can be made twice as fast as with ink on cloth, but that the blue prints from same are very poor. This, however, can be overcome by using black carbon paper behind the tracing paper, placed so that the carbon impression comes on the back of the tracing. This reinforces the pencil drawing and permits of good blue prints being made.

Recent Industrial Buildings

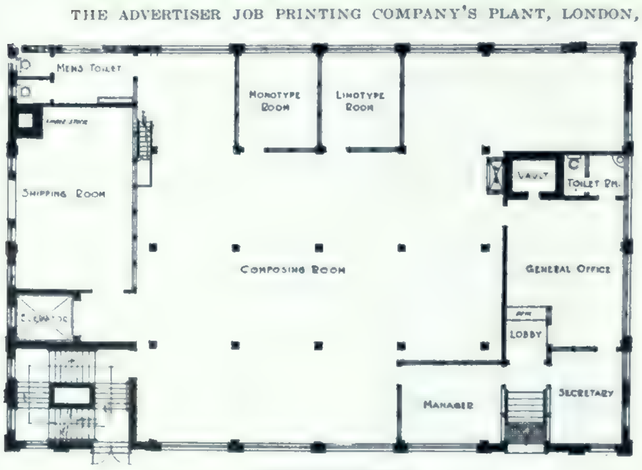
THE monolithic character of concrete makes it adaptable to virtually every type of industrial buildings, but particularly in the construction of printing plants does it appear to be an excellent choice. In structures used for this purpose there is always a more or less heavy floor load and considerable vibration due to the operation of heavy presses and other like machinery. Concrete properly reinforced adequately meets the former condition, and reduces vibration perhaps better than any other material. It is likewise adaptable, owing to the large paper stock usually carried in such buildings, in that it affords a desirable degree of fire protection.

In the Advertiser Job Printing Company's building, forming one of the two subjects illustrated herewith, the practical use of this material is clearly indicated in the exterior design. The lot on which the building stands is one hundred feet square, which amply allows for a proposed future addition. The present structure is sixty by ninety feet, and it is the intention later on to build a thirty foot extension, making the premises ninety by ninety feet, and also to erect two more storeys to the superstructure.

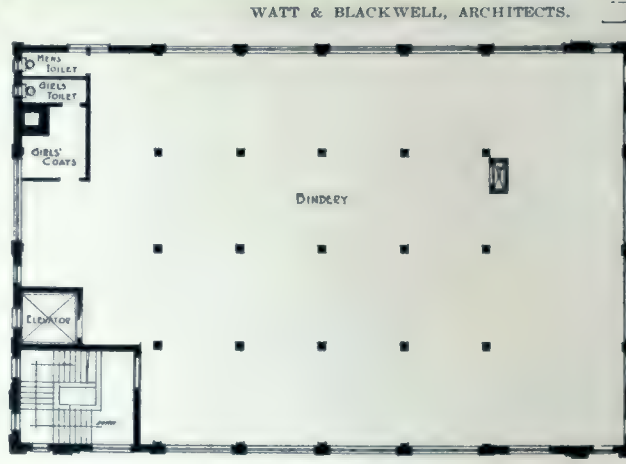
The construction throughout is of reinforced concrete with the exception of the outside brick walls. Wide column spacing gives sufficient space for the convenient installation of presses and other equipment. The floors have been designed to carry a live load of two hundred and fifty pounds per square foot. The ceilings are high, and with the walls and columns are enamelled white, making an excellently lighted interior.

The general and private offices, together with the composing, linotype and monotype rooms, occupy the ground floor; the cutting rooms and

THE ADVERTISER JOB PRINTING COMPANY'S PLANT, LONDON, ONT. WATT & BLACKWELL, ARCHITECTS.



GROUND FLOOR.



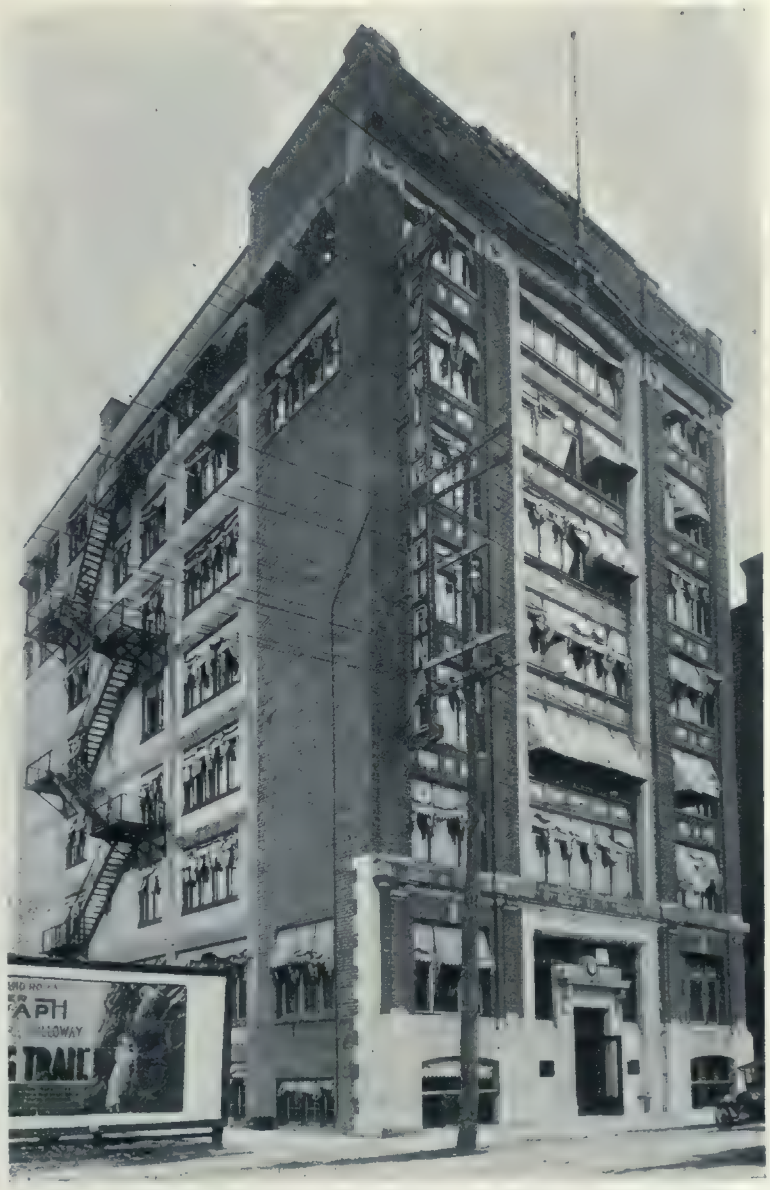
UPPER FLOOR.

BUSINESS OFFICE.

bindery are on the second floor, and the presses are all placed in the basement where, owing to an extra ceiling and special form of construction, direct outside light is obtained to a degree which renders artificial illumination quite unnecessary.

The Journal Printing Company's plant at Ottawa is a nine-storey building of the same construction, only here concrete is not only used for the floors and columns, but for the side and rear walls as well. The accompanying interior illustrations show the business office, linotype and a section of the composing room. The scheme is simple and practical, necessitating but little expense for upkeep, and the general character of the building is such as to make the structure a good commercial investment.

Another quite recent industrial building is the new Palmolive Company's plant, Toronto. In addition to employing reinforced concrete as a basic material, concrete in the



JOURNAL PRINTING COMPANY'S PREMISES, OTTAWA, ONT.
MILLSON & BURGESS ARCHITECTS.

LINOTYPE MACHINES.

SECTION OF COMPOSING ROOM.

form of art stone is used to give a decorative effect to the exterior of the building where twin pilasters of the latter material form panels at either end of the principal facade.

FACTORY OF PALMOLIVE COMPANY OF CANADA, TORONTO. BERNARD R. PRACK, ARCHITECT.

The present building, which is on Natalie street, is eighty by one hundred feet, and two stories and basement in height. Eventually four more stories are to be added to the superstructure, and a duplicate of the entire structure then built immediately on the adjoining property extending toward Carlaw avenue.

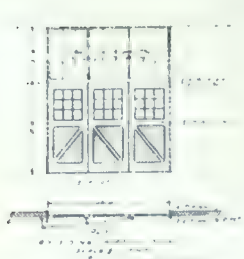
One particularly interesting feature of the plan is the railway track or siding for receiving and shipping goods which comes in under the building on a curvilinear line, the shipping room being on the same level as the floor of the cars.

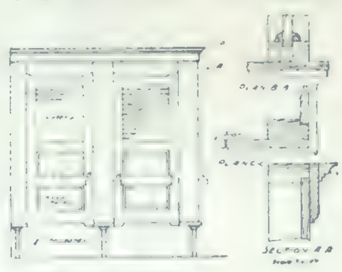
The structure is of the flat slab reinforced type, with large wall areas of steel sash, allowing for a maximum degree of natural light. In the basement are ten soap kettles, necessary pumps and heating plant. The kettles extend up through the first floor. There is also an opening in the first floor for the large oil tanks.

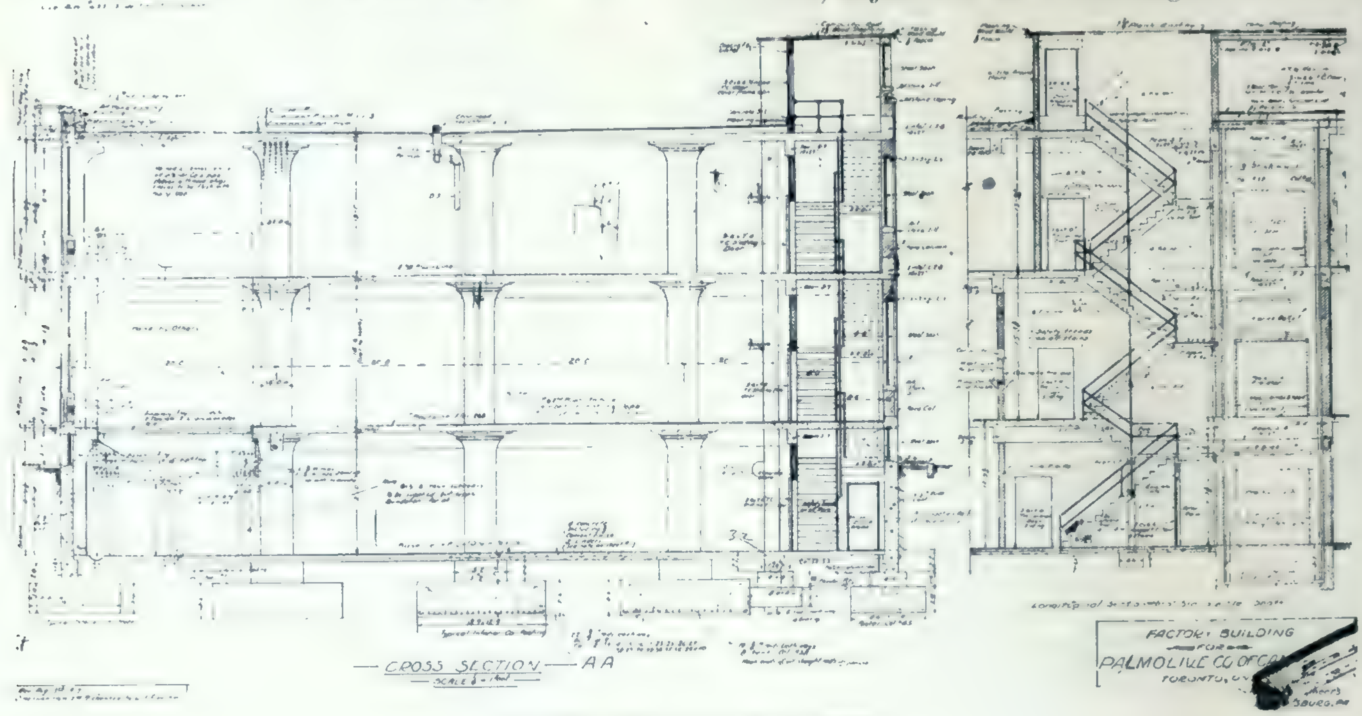
On the second floor are the general offices at the front of the building, soap cutting, packing, perfume departments, etc. Box and barrel chutes carry articles to the shipping floor. The factory is equipped with passenger and freight elevators, sprinkler, system, lavatories on each floor, etc.

The building is covered with a composition roof of one inch concrete over a cinder fill which covers nine and three-quarter inch concrete. This nine and three-quarter inch concrete will be the floor of the third storey when the factory is extended.

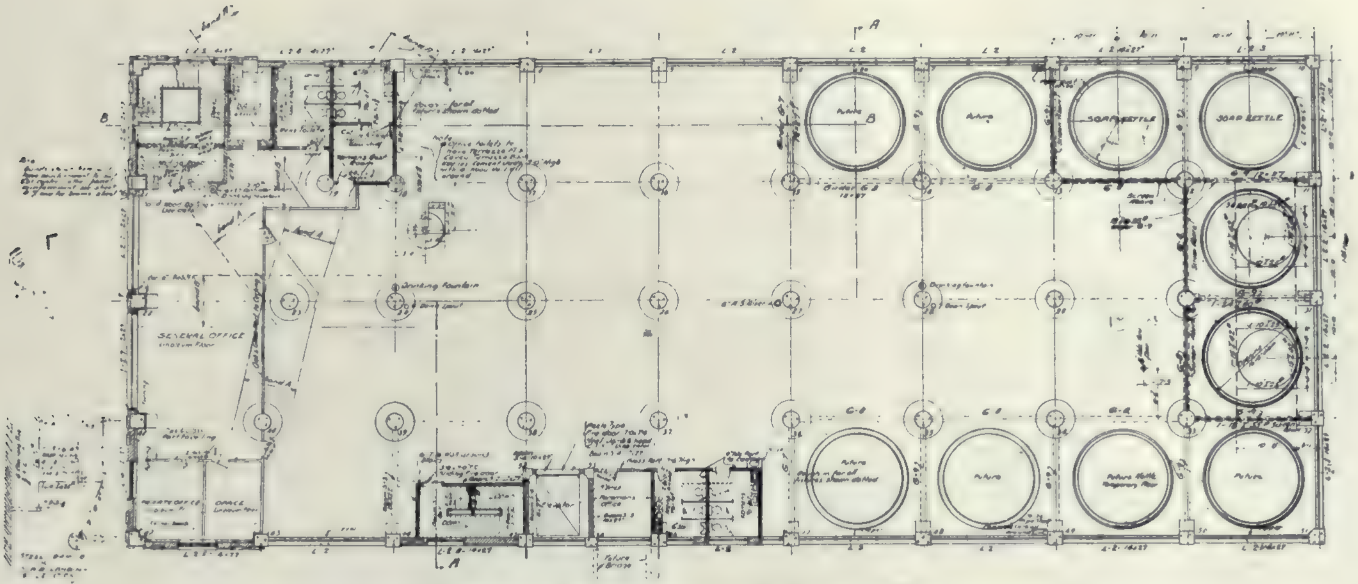
A modern power house, twenty-six by forty-five feet, adjoins the main building.







PALMOLIVE COMPANY'S FACTORY, TORONTO.



SECOND FLOOR, PALMOLIVE COMPANY'S PLANT, TORONTO.

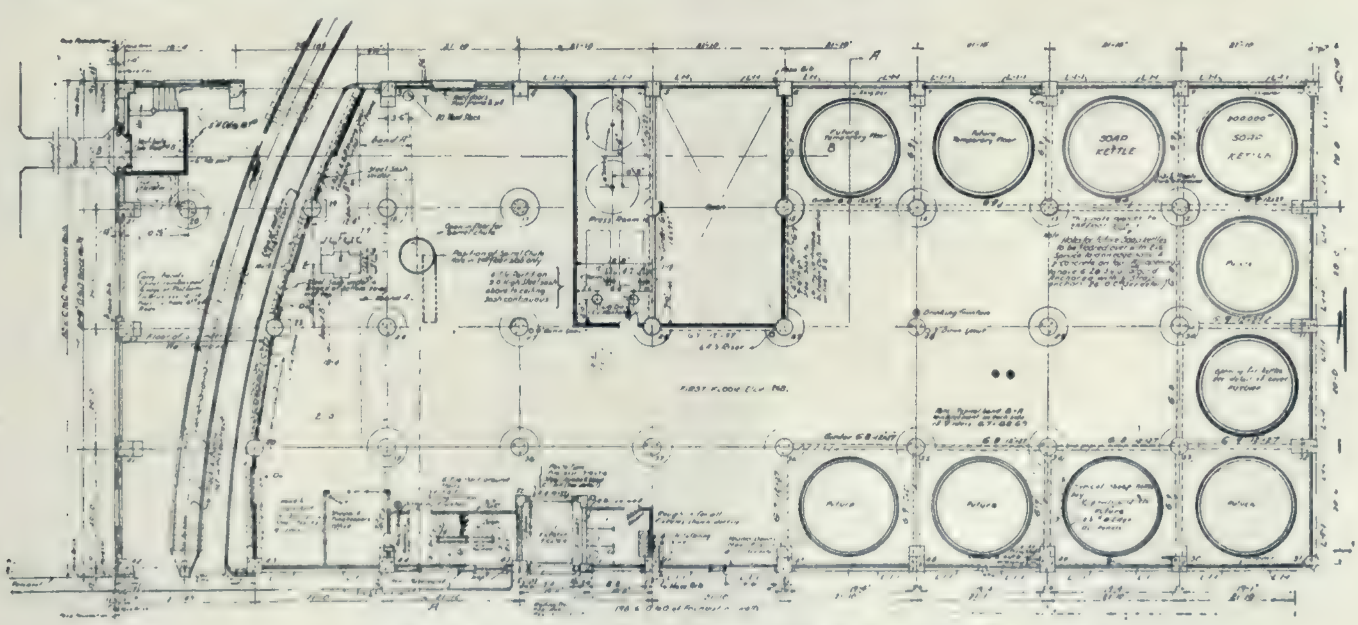
The Tower of Babel

Recent translations of old Assyrian records would seem to indicate that the Tower of Babel was only one hundred and forty feet in height, but that it was built upon an elevated foundation, and was the loftiest object in the city of Babylon, a city of low buildings spread over a flat plain.

The tower was a temple, and the architectural pride of Babylon. The lowest of its seven storeys was two hundred and seventy-two feet square. The structure was built of the only available material, sun-dried brick. It was probably topped with an astronomical observatory, or rather one for the use of astrologists.

Babylon at that time, with a population of two million, was the metropolis of the world, and its great area, twice that of London, was encircled by a wall fifty-five miles in length. The Tower of Babel was a temple containing the art treasures of the world, and it was in attempting to describe these that the tongues of men were confused.—"Illinois Society Bulletin."

INTERIOR VIEW, SHOWING TYPE OF COLUMNS.



GROUND FLOOR PLAN, PALMOLIVE COMPANY'S PLANT, TORONTO.

CONSTRUCTION

A · JOURNAL · FOR · THE ARCHITECTURAL ENGINEERING · AND · CONTRACTING INTERESTS · OF · CANADA

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WESTON WRIGLEY, Business Manager
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ARCHITECTS AND THE WAR

In the course of his address before the recent convention of the American Institute of Architects, and which in every way was a masterly review of the activities of that body, the retiring president, Mr. John Lawrence Mauran, made the rather important statement that both the British and French Commissioners had warned the United States Government against committing the error of sending technically trained men to the trenches. The substance of the British Commissioner's statement, to quote direct, was: "We should indeed be fortunate if to-day we had in technical service one-tenth of the architects who laid buried in foreign soil." This is not to be construed as exempting architects from the hazardous duties of war, but rather as indicating that their services are needed both for immediate and related work brought about by conditions which are the direct outgrowth of the war and which will have to be continued even subsequent to its conclusion. In other words, it places an appraisal on technical skill as representing one of the most important and necessary assets of a nation, and recognizes the value of services which governmental authorities can ill afford to ignore. There is at least evidence of the British Government giving some measure of recognition, where at the beginning of the war the profession was practically excluded from any consideration whatever. From the yearly official report of the Council of the R.I.B.A., recently published, we learn that a number of architects have been appointed to positions in various departments of the Government, notably the Local Government Board, the Ministry of Munitions, the Ministry of Reconstruction, the Ministry of Works, the Board of Trade, and the Ministry of National Service. According to the Council's report, Mr. Ernest Newton, A.R.A., has been transferred to the Ministry of National Service, where he is in charge of the branch dealing with building licenses, and where the President of the Institute is filling the position of Technical Adviser to the Building Section. Also, that various inspectorships in Mr. Newton's department are held by architects. Moreover, on the nomination of the President, which was made at the request of the Local Government Board, Sir Ashton Webb has been appointed representative of the Institute of the Advisory Council set up by the Government to consider the questions of building construction and methods of securing economy and despatch in the building of working-class houses that will be needed after the war. Another instance is the appointment of H. D. Searles-Wood as Adviser to the Board of Trade on the Reconstruction of the Building Industry; while the same party, together with Professor Beresford Pite, Mr. S. Perkins Pick, and Mr. W. R. Davidge, have been appointed to give evidence on Building By-laws before a committee of the Local Government.

This perhaps might not appear to represent much at first thought, but the very fact that architects of such prominence have been called upon to help out on the problems with which the Government has to deal, seems to be most important. It at least implies a more favorable condition, and gives them an opportunity to impress upon the authorities the real value of professional advice and service by virtue of the appointment which they hold.

Canada could also profit by making full use of the architectural and technical skill at its command, and it would indeed be an advantage to both the Dominion and the provincial authorities and a genuine benefit to the country if a complete survey was taken on this point. This country is as yet in its early throes, and there is a period of great upbuilding and constructive work ahead. The success with which this development will be carried out will depend on the men who are entrusted to do the work. The best results will come from a proper recognition by the Government in conserving the opportunities for technical practice in Canada for its bonafide subjects who are qualified to do the work and whose direct interest in the country entitles them to every consideration that the Government can bestow.

Advertising and The Signing of Buildings

THE fifty-first annual convention of the American Institute of Architects, which was recently held at Philadelphia, dealt, among other things, with two subjects which have also received a certain amount of attention by members of the profession in Canada. These relate to the question of advertising and what is termed the signing of buildings.

The former subject, to quote from the "American Architect," which reports the proceedings quite fully, proved an all-absorbing question, and was strenuously debated. According to this contemporary, an opportunity was afforded the onlooker during this discussion to study the various types of temperamentality that has, in recent years, been developed in those who practice architecture. Naturally the most energetic and persistent advocates of a revision of the present code as referring to advertising were men representing the Chapters of the Middle West, where the demand for revision had its origin. These men very forcefully, in a most practical way, and with characteristic Western abruptness, laid their case before the convention. The Eastern men, with good logic and a fine sense of parliamentary usage, advanced their arguments. While it could be noted that, judged by rules governing debate, there was difficulty in arriving at a fine point of decision between those for and against this measure, the impartial observer could detect that the argument of the Western element was based on a logical and clear-headed interpretation of the things that surround architectural practice now; while those from the older sections of the country, while equally strong, were based on a shrewd conservatism and a disposition to believe that old or present rules governing advertising should not be disturbed without the most careful consideration. The outcome of the debate between two such groups of equally matured opponents, although schooled in different localities of the country, was one of considerable interest, as it foreshadowed, in a sense, the probable attitude of the majority, not only toward the question under debate, but also toward other important matters that will come up for action during the forthcoming year.

The debate centered upon that part of the report of the Committee on Advertising calling for restriction of advertising contained in Section 4 of the Canon of Ethics, which calls advertising unprofessional and imposes a penalty for its use. This canon was repealed. By vote of the convention Article 10 of the Advice on Practice was referred back to the Board of Directors to be phrased so that it would be in harmony with such repeal.

Reduced to simple terms, this action on the part of the convention practically removes the ban on advertising, and permits architects to place their services before the public in such proper manner as their education and a due regard for their professional dignity might suggest. While no steps were taken to replace the discarded canon with one declaring for advertising, by accepting the report of the committee, the Institute goes on record as favoring advertising by its members. This report says in part:

"Is there any valid reason why, in this age of democratic endeavor, the American Institute of Architects should cling to this or any other relic? Is it not time that we consider carefully, not only the abolition of the canon on advertising, but how many more of the worn-out rules, undemocratic distinctions and un-American assumptions that we can get rid of?"

It pointed out that by elevating the dignity of advertising in their code of ethics the worst feature to be anticipated would be "advertising too generally, prompted by honest, if stupid reasoning—a result not without advantages, for in more general use of the harmless sort, the vicious sort would lose its effectiveness, due to the comparative isolation it now enjoys because of the sweeping restrictions in our canon."

Signing of Buildings.

Closely related to the report on advertising, and inevitably bound up with any discussion of it, is the request made by the Illinois Society of Architects, and later reinforced by several Chapters of the Institute, relative to "signing of buildings" in course of construction, embodied in the following resolution:

"*Resolved,* That the Board of Directors of the Illinois Society of Architects request the Board of Directors of the American Institute of Architects to consider and report at the next convention of the Institute upon the advisability of amending Section 13 of 'A Circular of Advice Relative to Principles of Professional Practice' regarding 'signing buildings,' so as to provide that it is recommended that every member of the Institute display upon every building under construction his name and rank in the Institute, with the further suggestion that a committee be appointed to recommend the form of sign to be used by all members of the Institute."

The Board did not deem it necessary or desirable to comment at length on this suggestion, believing it was better for the *pros* and *cons* to be developed from the floor of the convention, and so it was referred to the convention without recommendation.

Professional Treatises.

Another closely related matter is that involved in the addition to Section 9 of the same "Circular of Advice," which the Board of Directors at its meeting in January, 1918, voted to present to this convention for consideration. Section 9 is entitled "On accepting commissions or favors," and now reads "The architect should not receive any commissions or any substantial service from a contractor or from any interested person other than his client." The addition the Board suggests is as follows:

"The issuance by an architect of a professional treatise or a monograph of his work, in the form of a book or pamphlet, which is supported by advertisements, whether privately printed or published through regular channels, tends to lower the dignity and standing of the profession and is to be condemned."

The Board believes there is no sound argument to the contrary and advises such amendment of the circular.

REGISTRATION LAWS.

On this subject the Directors' Report drew attention to the fact that fourteen States have passed laws for the regulation of the practice of architecture, four having done so since the last convention, and also that there are others having similar laws in preparation. At the fiftieth convention it was

"*Resolved,* That the regulation by law of the practice of architecture is neither advocated nor opposed by the Institute, which believes that the desirability of such legislation is a matter for each State to determine for itself."

While the Board still holds to the second part of this resolution, and does not believe that the Institute should at this time actively advocate the passage of a registration law in every State, it is in agreement with the present committee in feeling that the Institute should without further delay adopt a standard form of registration law to serve as a model for future legislation, and to determine a standard of academic training and practical accomplishment, which should be required of those admitted to practice under the title of architect.

The committee presented for the consideration of the convention a first draft of a model law. The determination of minimum requirements for educational and practical proficiency, according to the report, would be far more difficult than the drafting of a good model registration law. It is a fit subject for the joint labors of the Committees on Education and Registration, and it is the hope of the Board that the next convention may have for consideration not only a definite set of values but a practical method for testing them.

More Color For To-day's Architecture

War ravages are largely responsible for the almost total absence of color in the present-day exterior architectural embellishment, according to Leon V. Solon, fellow of the Royal Society of British Artists and of the British Ceramic Society, in a recent address at the Art Institute of Chicago.

Mr. Solon spoke on "The Greek System of Architectural Polychrome" before the Illinois Chapter of the American Institute of Architects. He said that, contrary to the general assumption, the classic Greeks, instead of working pure white or gray outdoor material, had an elaborate system for utilizing color effects, but that the knowledge had been lost for centuries owing to the general destruction of Greek temples and other public buildings during the Teutonic drives, which practically overwhelmed Greek civilization in the third century A.D.

Despite the hampering effects of the present military upheaval, Mr. Solon said, researches were now bringing to light perfection of the classic Greek color system, and he predicted a wider interest in color for architectural purposes.

Influence of Conquest on Building

Wherever Arabian conquerors have prevailed, declares a writer in the "Magazine of Decoration," they have utilized the conquered artists and artisans to create household furnishings and all the decorative objects for their mosques. Their principal mosques were designed and built by Christians. Even the holiest of all Islam's buildings, the Kaabah at Mecca, was built by a Coptic architect named Dokhoun, according to the Arabian historian, El-Umany, and a great portion of the building materials employed were originally prepared for a Christian church the Copts had intended to construct in Abyssinia. Mahomet himself worked as a mason on the Kaabah, and possibly as an overseer of the rebuilding of the great Moslem shrine at Mecca. But Mahomet labored under Christian direction on this work. The original shrine had been half tent and half constructed of inflammable materials. It was burned down two years before Mahomet began preaching, and before Islam was established.

A most important fact for students of Oriental art to remember is this very curious and remarkable circumstance that the most holy of Moslem temples was erected by a Coptic captive, who gave lessons in church architecture to the mighty founder of Islam's power. This Christian architect, named Dokhoun, who laid out the general plan for Moslem mosques which finally prevailed from Cordova in the west to the furthest cities of mysterious India, was one of the oppressed, unnamed great artists and craftsmen of a misunderstood and unappreciated misnamed epoch in the great history of art.

Canadian Building and Construction News

BUSINESS BUILDINGS

Collingwood, Ont.—Tenders have just closed for alterations and improvements to the proposed new premises of the Merchants Bank of Canada. The work will consist of remodelling hotel building into modern banking offices. Hogle & Davis, Montreal, and John Wilson, Collingwood, are associated as architects on the job.

London, Ont.—Plans have been prepared and work will start shortly on the erection of the proposed addition to the premises of the Bank of British North America, Market Square. Cost, $25,000. J. N. Moore, Richmond street, is the architect.

London, Ont.—It is understood that work will proceed shortly on the proposed three-storey building to be erected for the Huron & Erie Mortgage Company, 442 Richmond street. The structure will be three storeys, of brick and stone, with marble interior work and modern equipment. Cost, $30,000. Watt & Blackwell, Bank of Toronto Bldg., are the architects.

Ottawa, Ont.—Taylor & Horwood, architects, Castle Bldg., have completed plans for an additional storey 65' x 54' to office building of Elgin Realty Company. Alex. Christie & Son, 359 Elgin Street, are the general contractors.

Ottawa, Ont.—Architect J. E. Ewart, Booth Building, has let the following contracts for the proposed stores and offices to be erected for the H. H. Brenan Estate, at a cost of $25,000: Masonry, T. C. James, 140 Flora Street; carpentry, W. G. Anderson, 126 Sparks Street; plastering, Murphy & Morrow, Billings Bridge.

Ottawa, Ont.—Contracts have been awarded the following parties in connection with the erection of a $75,000 store and office building for A. Fournier, Wellington Street: painting and glazing, W. J. Carson, 293 Laurier Ave. West; plumbing and heating, J. A. Langelier, 310 Wellington Street; plastering, Murphy & Morrow, Billings Bridge; roofing, McFarlane-Douglas Company, 250 Slater Street; electrical work, S. Lewis, 168 Cartier Street.

Toronto, Ont.—The Merchants Bank of Canada is contemplating the erection of a modern four-storey building on King street west, near Yonge. The building will cost $200,000.

Watford, Ont.—Work has started on the erection of a new building for the Merchants Bank of Canada, to cost $25,000. Sheppard & Calvin, Excelsior Life Building, Toronto, are the architects. The following contracting firms are doing the various trades: Masonry and carpentry, Schultz Bros., Ltd., Brantford; structural steel, Hamilton Bridge Works, Hamilton; cut stone, Ritchie Cut Stone Company, Hamilton; roofing, Brantford Roofing Company; plastering, Taylor & Nesbitt, Toronto; painting and glazing, Fred G. Roberts, Toronto; plumbing and heating, Anguish & Whitefield, Brantford; electric wiring, Harris & Marson, Toronto; bank fittings, Canadian Office & School Furniture Company, Preston; electrical fixtures, F. C. Henderson, Toronto; linoleum, Robt. Simpson Company, Toronto; hardware, Canada Hardware, Ltd., Toronto; vault doors, J. & J. Taylor, Toronto.

CHURCHES AND SCHOOLS.

Brantford, Ont.—The Grace Church congregation will erect a Sunday School and Parish Hall to cost $30,000. Plans for the structure are now being prepared.

Fort William, Ont.—The Board of Education has just closed tenders for the erection of a reinforced concrete Collegiate Building to cost $75,000. R. E. Mason, Victoria Block, is the architect.

Halifax, N.S.—Work is to start shortly on repairs to the various city schools, aggregating in cost to approximately $100,000.

Hamilton, Ont.—Architects Scott & Wardell, Sun Life Building, have completed plans for a church to be erected on Barton street east for the R. C. Polish congregation. The structure will be 60 x 100 feet, of steel, concrete and stone construction. Cost, $50,000.

Oakville, Ont.—Architects, Sheppard & Calvin, Excelsior Life Bldg., Toronto, have let the following contracts in connection with the erection of a students' residence to cost $35,000 for the Appleby School, Lake Shore Road: Masonry, J. Robert Page, 18 Toronto St., Toronto; carpentry, A. Weller & Co., Ltd., 54 Tecumseh St., Toronto; plumbing and heating, A. H. Read, 692 Shaw St., Toronto; sheet metal, W. E. Dillon Co., Ltd., 183 George St., Toronto; plastering, R. C. Dancy, 153 Spadina Road, Toronto; wiring, Harris & Marson, 81a Parkway Ave., Toronto; linoleum, R. Simpson & Co., Yonge St., Toronto; painting and glazing, G. Clemence & Son, Bronte.

Pabos, P.Q.—Architect Pierre Levesque, 115 St. John street, Quebec, P.Q., has awarded the contract for a new presbytery to be built for the Roman Catholic parish at this place, to J. H. Morin & Son, Trois Pistoles, Quebec. Cost, $11,200.

St. Romuald, Que.—P. Levesque, Architect, 115 St. John Street, Quebec, has completed plans for alterations to the Roman Catholic Church at this place. Cost $10,000.

Windsor, Ont.—Plans have been completed for the erection of a Sunday School in connection with All Saints' Church. Cost $30,000.

CLUBS AND HOSPITALS

Fort Qu'Appelle, Sask.—Tenders have just closed for the erection of an infirmary building, four help cottages, four convalescent pavilions, greenhouse, poultry house and piggery, with connecting tunnels, conduits, and piping to be erected at The Saskatchewan Sanitarium. Estimated cost $200,000. Storey & Van Egmond, Regina and Saskatoon, are the architects.

Toronto, Ont.—It is announced that the Club House of the Royal Canadian Yacht Club, recently destroyed by fire will be rebuilt at once. The loss on destroyed structure is estimated at $100,000. Fully insured.

Toronto, Ont.—St. Andrew's College in North Rosedale is to be expropriated by the Dominion Government for the Military Department. The present property comprises twenty-five acres and several valuable buildings. It is understood that it is the Government's intention to use these for hospital purposes and also to erect new buildings, involving an expenditure in all between $1,000,000 and $2,000,000.

FACTORIES AND WAREHOUSES

Dundas, Ont.—A. B. Nicholson, Ltd., Bank of Hamilton Bldg., Hamilton, Ontario, has the contract for a large reinforced concrete grain elevator at Dundas for the Kerr Milling Company, Limited.

Forest, Ont.—Plans have been completed for an addition to cost $5,000, to be built to the flax mill of Howard Fraleigh.

Galt, Ont.—Newlands & Company have acquired additional property on Chapman Street with the intention, it is understood, of enlarging their factory.

Galt, Ont.—Tenders have just closed for the erection of an addition to the plant of the R. McDougall Company. The structure will be three-storeys, 120x64 ft., and will form a continuation of the present pump shop and also give additional accommodations for machine shop purposes.

Galt, Ont.—The Galt Brass Works Company will erect an addition to their plant on Macadamized Road to accommodate a new department to be devoted to the manufacture of vitro lavatory tanks. These tanks are now being manufactured in Cluff Bros., plant, Toronto, but this department is to be transferred to the local works. The new addition will comprise a finishing room, one storey, 50x100 ft.; a press room, 40x42 ft. and a two-storey structure, 22x22, to accommodate the elevators and stairways. J. E. Evans is the architect and tenders have just closed.

Hamilton, Ont.—Contractor W. H. Yates, Jr., 24 Leeming Street, has started work on the erection of an additional brick storey, 75x80, in connection with the factory of Wagstaffe Limited, Maple and Gage Avenues. Cost $20,000. A. W. Pene, Clyde Block, is the architect.

Lachine, Que.—The Crane, 836 North Michigan Ave., Chicago, intend to establish a manufacturing plant at this place.

Leamington, Ont.—The Imperial Tobacco Company, Montreal, intends to erect a new factory at this place, to cost $50,000.

London, Ont.—Work is to start immediately on the plant of The T. M. Knowles Company.

London, Ont.—Plans have been prepared for a brick and concrete factory addition, 80x100 ft., to be built in connection with the plant of the London Art Woodwork Company, London.

London, Ont.—Contracts have been awarded for the erection of a three-storey 40x60, brick addition to the Peerlesss Hosiery Company's factory, Adelaide Street. Cost $10,000. A. E. Nutter is the architect.

London, Ont.—The saw-mill of D. H. Gillies & Company, Bathurst and Adelaide streets, recently destroyed by fire, is to be rebuilt at once. The company will require new machinery, boilers, steam plant, and everything in the way of saw-mill equipment.

Ottawa, Ont.—Alex. Garvock, 136 Lewis Street, has been awarded the contract for the erection of a reinforced concrete factory to cost $50,000, for A. L. Florence & Son. Millson & Burgess, Union Bank Bldg., are the architects.

Peterboro, Ont.—Tenders have closed and work is to start shortly on the erection of a building of brick, steel and terra cotta construction for the Robt. Neill Company, Ltd. Cost $40,000.

Springfield, Ont.—It is the intention of the Springfield Mill Company to erect a brick storage to cost $20,000.

Summerland, B.C.—The shareholders of the Vernon Fruit Union, have decided to form a company to be known as the Vernon Storage Company, Ltd., for the purpose of erecting a big fruit warehouse to accommodate the growing needs of the union. The building will be 250x150 in size, with a frost proof basement and first floor. It will be capable of storing upwards of 250 cars of fruit. Building operations will start at an early date.

Toronto, Ont.—The buildings of the Galena Signal Oil Works, Royce Avenue, recently destroyed by fire, are to be rebuilt at once. H. L. Kelson is the general manager.

Toronto, Ont.—A new $25,000 warehouse is being built on Orillia Street for the Bowes Company, 74 Front St. East. H. N. Dancy & Son, C.P.R. Bldg., is the mason contractor.

Toronto, Ont.—A permit has been issued to the Swift Canadian Company for the erection of an addition to a cattle holding pen, at the corner of Keele Street and St. Clair. Cost $3,000.

Toronto, Ont.—An American concern, represented in Toronto by the Holden-Morgan Company, has purchased three and three-quarter acres in Ward One, as a site for a large ammunition factory. The necessary buildings are to be erected at once and will be ready in about sixty days' time. The machinery equipment will cost in the neighborhood of $360,000, and it is understood that 105 millimeter shells will be manufactured.

MISCELLANEOUS

Guelph, Ont.—Tenders were received up to May 1st by City Clerk, T. J. Moore, for resurfacing and paving certain streets in city of Guelph.

Norwood, Ont.—E. G. Laing will receive tenders up to June 1st for forty-five thousand first quality cedar shingles, delivered at Norwood, Ontario.

Ottawa, Ont.—Tenders will be received until June 15th for supplying and laying 17,500 sq. yds. of brown or green super-quality, battleship linoleum in connection with the reconstruction of the Parliament Buildings, Ottawa. Tenders to be addressed to John A. Pearson, Architect; J. O. Marchand, Associate, Centre Blk. Parliament Buildings, Ottawa.

Walkerton, Ont.—The Saugeen Electric Light & Power Company will receive tenders until May 25th for the construction of a concrete dam to replace their former wooden dam across part of the Saugeen River on the company's property at Southampton. The company will construct a stone coffer upstream above the proposed work, and will furnish electric current for pumping so long as its plant shall continue to run by water power.

PUBLIC BUILDINGS

Ottawa, Ont.—Tenders will be received until 4 p.m., May 27th, for the construction of a Dominion Government office building, O'Connor Street, Ottawa. Plans on file at the office of the chief architect, Department of Public Works, Ottawa; the Overseer of Dominion Buildings, Central Post Office, Montreal, and with the Clerk of Works, Postal Station F., Toronto.

RESIDENCES

Hamilton, Ont.—Work is starting on the erection of two brick residences to cost $3,000 each for J. McNaught, 477 Wilson Street. The contractors for the various trades are as follows: Plastering, H Trewolla, 729 Cannon Street, E.; plumbing, J. H. Kerr, 32 Sherman Ave. North, electrical work, F. Thornton, 174 Balmoral Avenue. The owner will do masonry, carpenter work and roofing.

London, Ont.—Thos. Redge, 286 Huron Street, has the contract for remodelling residence of Edward Shea, 572 Wellington Street. Cost $3,000.

Ottawa, Ont.—W. Villeneuve has the general contract for erecting a brick veneer residence, 1½ storeys, for W. C. Leech, 140 Spadina Avenue. Cost $2,500.

Toronto, Ont.—The three-storey brick and stone residence of E. Taylor, 140 Carlton Street, is being converted into apartments, at a cost of $8,400.

Toronto, Ont.—A permit has been granted to H. Bell, 1847 Dufferin Street, for the erection of three attached stores and dwellings on the north side of St. Clair Avenue, to cost $10,000.

CONTRACTORS and SUB-CONTRACTORS

As Supplied by The Architects of Buildings Featured in This Issue

Connaught Laboratories, University of Toronto

Boiler, Warden King, Limited.
Carpentry, Geo. Sparling.
General contractors, Hoitby Bros.
Electric equipment, R. A. Lister & Co.
Heating, Fiddes & Hogarth.
Hollow tile, Sun Brick Co.
Ornamental iron, Dennis Wire & Iron Goods Co.
Plastering, R. C. Dancy & Sons.
Refrigerator, John Hillock & Sons.
Refrigeration equipment, Linde Canadian Co.
Sheet metal, Geo. Duthie & Sons.
Structural iron, Hepburn & Disher.

Brown Copper & Brass Rolling Mill

Architect, Henry Simpson.
Boilers, Dominion Radiator Co.
Brick, Milton Pressed Brick Co.
General contractors, Hoitby Bros.
Interior woodwork, Jas. McKenzie.
Radiators, Dominion Radiator Co.
Terra cotta, Federal Terra Cotta Co.
Vaults, J. & J. Taylor.

Palmolive Soap Company's Building

Art stone, Cockburn Lumber & Concrete Co.
Brick, Milton Pressed Brick Co.
Electric equipment, E. W. F. Salisbury.
Elevator, Otis-Fensom Elevator Co.
Fire doors, A. B. Ormsby Co.
General Contractors, Russell, Navin Construction Co.
Hollow tile, National Fireproofing Co.
Painting, J. Cohen & Son.
Plastering, E. C. Cates.
Plumbing, Sheppard & Calvin.
Radiators, A. Welch & Son.
Reinforcing, Baines & Peckover.
Roofing, Bird & Son.
Sash, Steel & Radiation Ltd.
Stone, Geo. Oakley & Son.
Structural iron, Dennis Wire & Iron Goods Co.
Vaults, J. & J. Taylor.
Ventilating system, Geo. Matheson.

Norlite Building, Ottawa

Boilers, Weil Bros.
Electric wiring, McCallum Electric Co.
Electric fixtures, McDonald & Willson.
Elevators, A. B. See Electric Elevator Co.
Galvanized iron, McFarlane-Douglas Co.
General contractors, Doran & Devlin.
Interior finish, James Hill.
Marble and tile, Italian Mosaic and Marble Co.
Painting and glazing, J. B. Duford, Ltd.
Marble, Missisquoi Marble Co.
Plastering, Frank Hunt.
Plumbing and heating, Gauthier & Co.
Plumbing fixtures, Cluff Bros.
Radiator traps, C. A. Dunham Co., Ltd.
Radiators, Gurney Foundry Co.
Reinforcing, Trussed Concrete Steel Co.
Terra cotta, Atlantic Terra Cotta Co.
Tile, Denison Interlocking Co.

C. P. R. Terminal, Vancouver

Architects, Barrot, Blackader & Webster.
Elevators, Otis-Fensom Elevator Co.
Generators, Canadian Westinghouse Co.
Glass, Pilkinton Bros.
Heating, American Radiator Co.
Ice machines, Linde Canadian Refrigerating Co.
Ornamental iron work, Mitchell Co.
Paints, Sherwin-Williams Co.
Roofing, Standard Paint Co.
Steel, Coughlan & Son.
Stone, trim, Bedford Stone Co.
Ventilating fans, Sheldons, Ltd.

Art Museum, Toronto

Cut stone, Indiana Quarries.
Electric equipment, Crouse Hinds Company, Squad D Company.
Electric lighting, Geo. J. Beattie & Co.
Elevator, Otis-Fensom Elevator Company
Floors, David E. Kennedy Company.
Floors, Geo. W. Koch.
Glass, Jos. McCausland & Son.
Hollow tile, Denison Interlocking Tile.
Marble, Vermont Marble Company.
Metal skylights, Architectural Bronze & Metal Co.
Roofing, Geo. Duthie & Sons.
Stone contractors, Witchall & Sons.

THE AUTOMATIC TELEPHONE

The need of adequate telephone service has become more emphasized under war conditions than ever before. In this issue are shown cuts and a description of the new office building erected in New Toronto last year by Brown's Copper & Brass Rolling Mills, Limited. This concern have installed a complete private automatic telephone system throughout their offices and works and are now able to keep all departments in instant touch without in any way delaying or interfering with their outside telephone service.

The two interior views of the office both show the location of the telephone switchboard behind a plate glass panel at the side of the stair landing. The motor generator set and storage battery are located in the basement immediately below and the charging of the storage battery is automatically controlled from the switchboard.

Twenty desk telephones are located throughout the office building and from the office building to the plant a lead covered cable is run on a private pole line. Distribution cable is run along the outside wall of the factory on the street side branching into every building to serve the telephones in that section. The factory installation in itself includes thirty desk telephones serving all departments.

The garage telephone is approximately 3,000 feet from the switchboard, but when talking from it to any other part of the plant the voice transmission is just as clear and distinct as if the two phones were in the same room. This is easily understood when it is known that the same equipment is being used for long distance work in Western Canada.

In connection with the automatic telephone, the automatic code system is installed by which the executives can be instantly located no matter where they are in the plant. This code system, it is claimed, is the only one on the market that is tied into the telephone system so that a code call on the separate code bells or horns throughout the plant can be put on from any telephone and answered from any other telephone, thus starting and stopping the code bells and making instant connection for talking. In service, calls are being answered in from 10 to 25 seconds.

To anyone not familiar with automatic telephones their operation is marvellously quick and sure. Take off the receiver at any telephone, dial two figures, and instantly the phone at the other end is being automatically rung, or if busy, the busy signal is given to the calling party and he is locked out from the number he called.

In short the outstanding advantages of the automatic telephone are speed, accuracy, secrecy, availability, service. It is possible to call any phone in three seconds. There is no such thing as getting the wrong number, no false busy signals. Also it is impossible for a third party to "butt in" or "listen in" on a conversation. It is also claimed that an automatic telephone can do anything that a manual phone can do, and when that is done can go a half further in giving extra service to meet the special needs of any business. It gives service twenty-four hours a day seven days a week without an operator.

The system was installed by Signal Systems, Limited, Toronto, who are representatives for Eastern Canada of The Automatic Electric Co., of Chicago, the makers of the equipment.

June, 1918 Volume XI, No. 6

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Full Page Illustrations

H GAGNIER, Limited, Publishers

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BRANCH OFFICES

MONTREAL NEW YORK

VIEW FROM SOUTHEAST. RESIDENCE OF SIR WILLIAM J. GAGE, TORONTO. CHARLES S. COBB, ARCHITECT.

Residential Work in Canada

A COMPARISON, both with contemporary work elsewhere and our own previous efforts, enables us to at least regard our recent domestic work with a certain feeling of complacency. While this is particularly true of the more costly types of town and country homes, it also likewise implies a more wholesome conception in relation to the matter of refinement and good taste even in the more ordinary buildings for residential purposes.

In fact, the matter of expenditure, while a necessary consideration in arriving at certain desired results, is not by any means the determining factor as to the success of the finished building. Contributing rather to this satisfactory phase of our growth is the element of understanding as to what constitutes good design, coupled with a growing disposition on the part of a large number of clients to recognize that the training of an architect gives him special qualifications to decide as to relative fitness of things entering into the composition of his scheme.

As a result, we are entering a period of residential work which has not only already realized noteworthy achievements, but which gives still greater promise as to the immediate future. Even the more progressive speculative builders have come to the realization that by entrusting the designing of their houses to competent architects, they are able to realize results which enhances the value of their investment in the sale of the finished structure; and this, too, is working an influence for good in educating people to demand a better standard of design.

Moreover, a feature of work lately carried out or in process of development, is the attention which is being given to landscape work. Heretofore many a well designed house has been seen to a disadvantage owing to the lack of a proper setting. To-day, however, by enlisting the services of a landscape expert, the architect has a most valuable co-worker to assist in producing a harmonious effect as to the general scheme bringing into relation the house and the grounds. Especially in the planting and lawn and garden treatment of the larger town residences and country estates are evidences of this co-operation to be seen. The effect in most cases is both charming and delightful, and the additional expense more than justified by the results obtained.

While the war has deferred a large amount of important work of this character, a recompense for the deficiency of volume is at least to be found in the satisfactory class of work which is being done. The purpose of this issue is to present photographically a number of recent examples, and we believe in most every case the character of the work illustrated will prove of interest and afford a comparison with earlier subjects as to the progress which is being made.

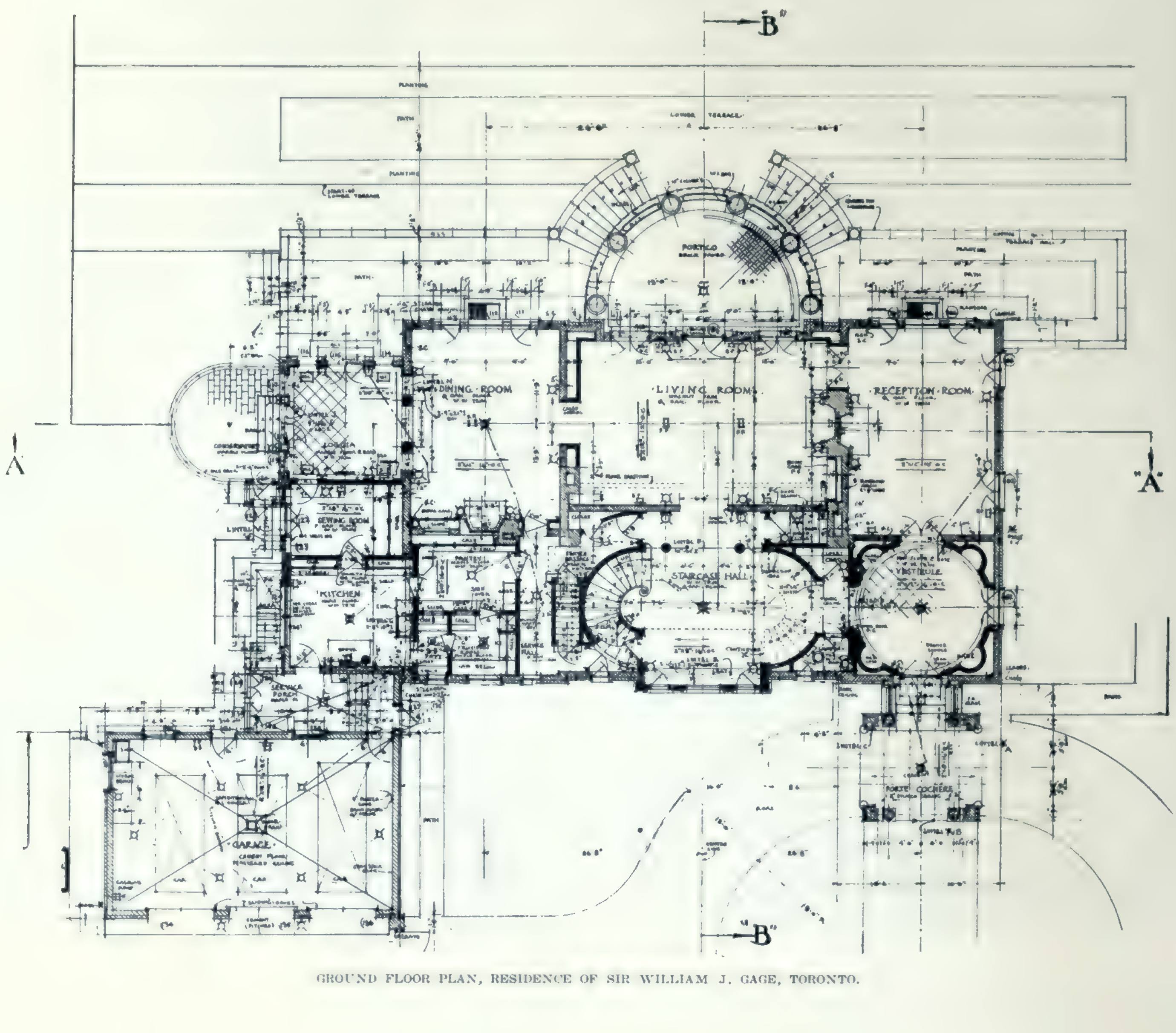
STAIRCASE HALL, RESIDENCE OF SIR WILLIAM J. GAGE, TORONTO.

VIEW FROM NORTH-EAST, RESIDENCE OF SIR WILLIAM J. GAGE, TORONTO.
CHARLES S. COBB, ARCHITECT.

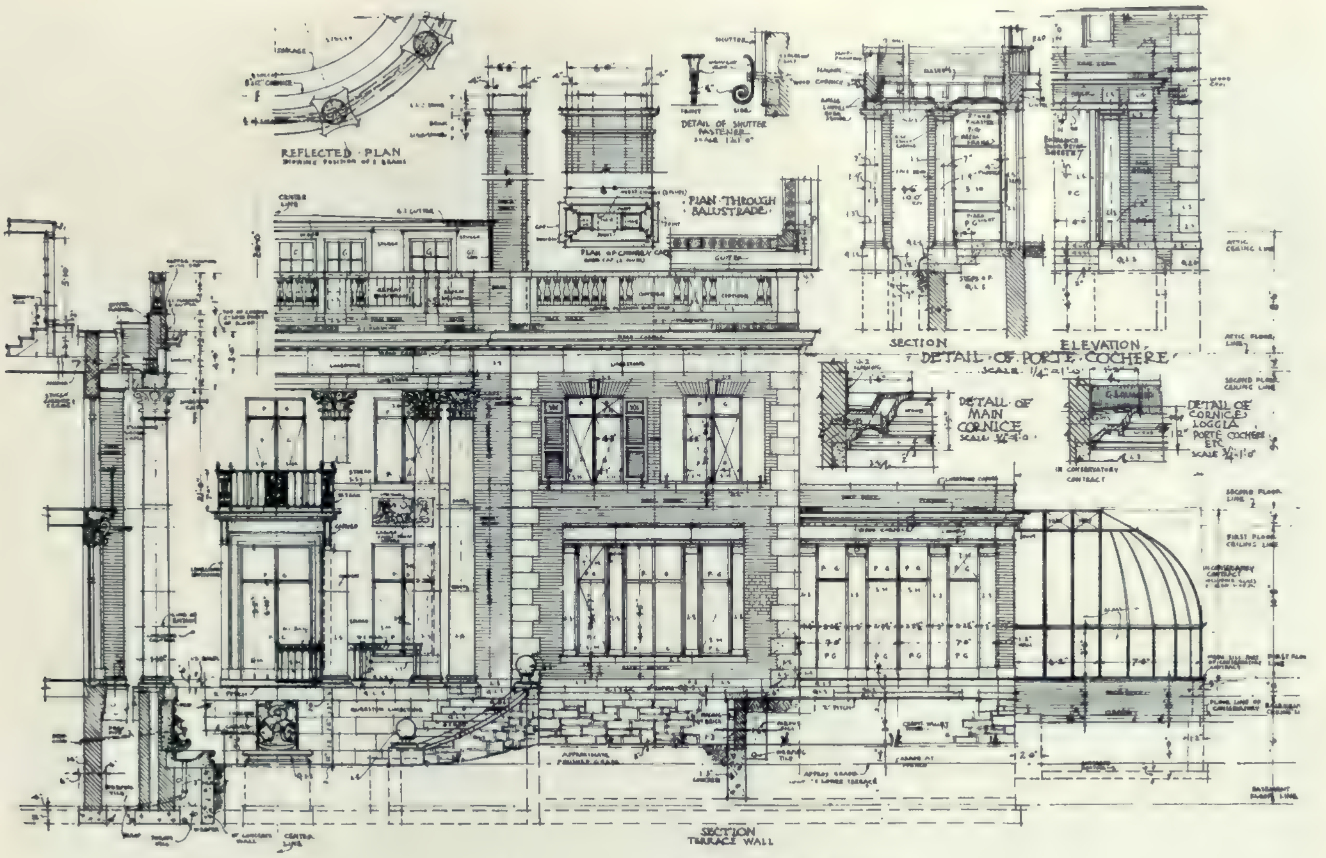
Residence of Sir Wm. J. Gage, Toronto.

Situated upon a finely wooded property and at an elevation to secure an outlook over most of the city, and beyond to the lake in the distance, the residence of Sir Wm. Gage on Davenport road forms a very interesting addition to the many fine residences in this section of Toronto.

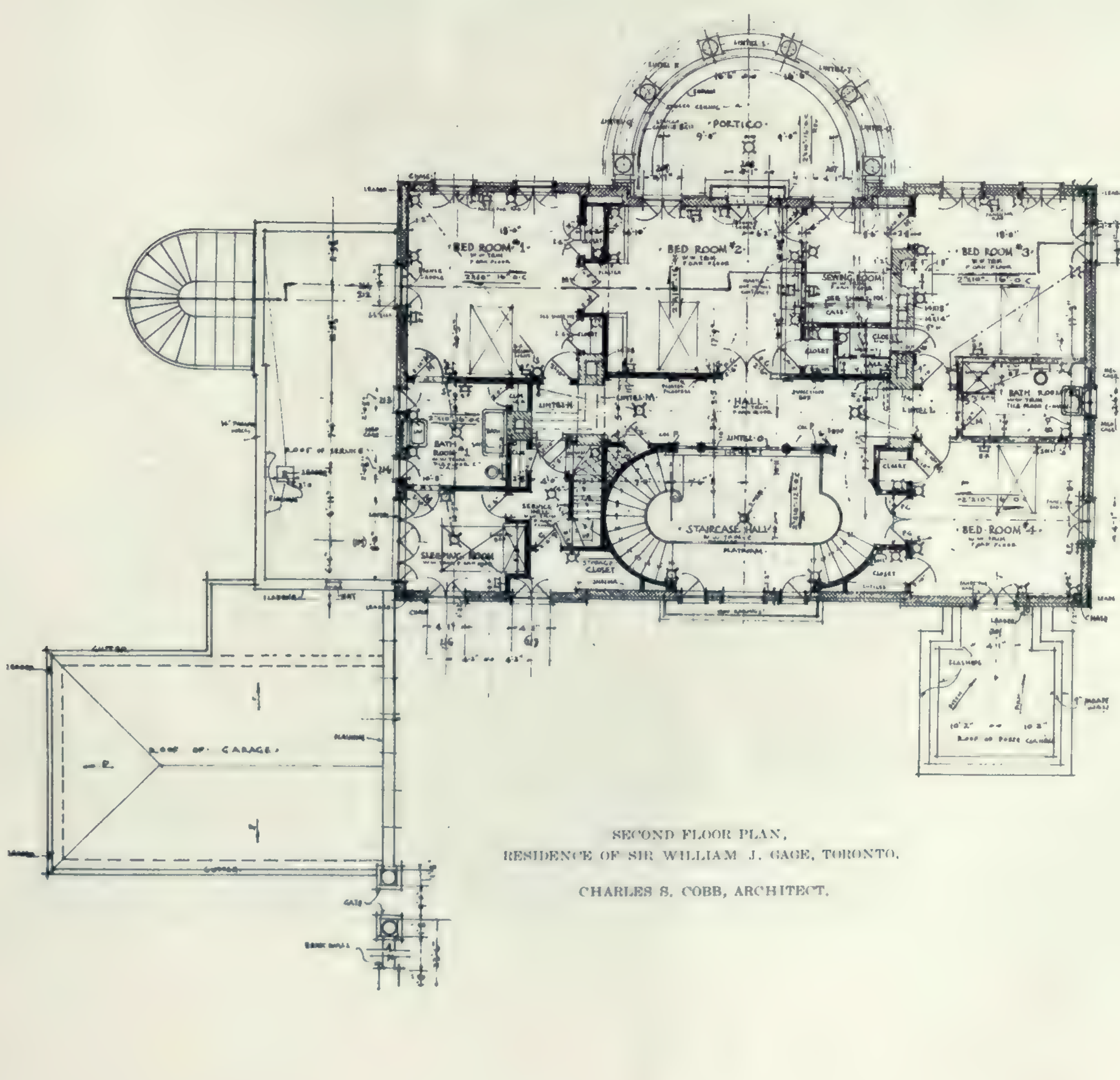
The general scheme of plan is symmetrical with a circular eight column portico as the main exterior feature on the south front. On the main floor the living room, 20 feet x 30 feet, is placed directly behind the portico, and is flanked on the west by the music room and toward the east by the dining room, each 18 feet x 25 feet in size.



GROUND FLOOR PLAN, RESIDENCE OF SIR WILLIAM J. GAGE, TORONTO.



DETAILS, SIR WILLIAM J. GAGE'S RESIDENCE, TORONTO.



SECOND FLOOR PLAN,
RESIDENCE OF SIR WILLIAM J. GAGE, TORONTO.

CHARLES S. COBB, ARCHITECT.

LIVING ROOM, RESIDENCE OF SIR WILLIAM J. GAGE, TORONTO.

The living room is finished with heavy walnut trim and low wainscoting stained a rich brown with wall panels of blue and silver fabric. A delicately modelled plaster ceiling in the Italian spirit with bas-reliefs in its shallow coffers depicting the signs of the zodiac, and the whole colored in soft buff tones, with touches of blue, gray, and rose, forms a very interesting feature of this room. At the west end is a large stone fireplace, a copy of an old Italian piece with heavy carved brackets and a sculptured frieze, from a famous Renaissance plaque by the Italian master Donatello. The floor is of quartered oak parquetry laid in herringbone pattern, and is covered by a fine Donegal rug with a soft blue field and a gray foliage border. A heavily carved walnut table and some fine marquetry pieces are interesting features in this room. The lighting fixtures, consisting of wall brackets in antique gold, are supplemented by a number of portable table

VIEW FROM SOUTH-WEST, RESIDENCE OF SIR WILLIAM J. GAGE, TORONTO.

CHARLES S. COBB, ARCHITECT.

FRONT ELEVATION.

VIEW FROM WEST, RESIDENCE OF MRS. A. D. TURNER, OAKVILLE, ONT. CHAPMAN & MCGIFFIN, ARCHITECTS.

lamps. The hangings are of soft blue velvet.

The dining room is panelled in wood and finished in ivory enamel, with fireplace in Rosetta marble. Opening from the dining room is a loggia with marble floor and formal pilaster wall treatment enamelled similar to dining room. To the east of the loggia, with steps leading down to it, is a small conservatory of glass and metal construction with a circular end, marble floor and fountain.

The music room is treated in French grey enamel with panels covered by a fine cream and grey block paper. The rug has a grey field with a foliage border. The fireplace has carved wood panels and is faced with grey Sienna marble.

Opening from a classic porte-cochere, the circular entrance vestibule is placed at the northwestern corner of the house, with access to the main room and stair hall to the left. The floor is of Botticino and Sienna marbles with formal pilaster wall treatment finished in ivory enamel and light buff. An antique marble table and a quaint alabaster lighting pendant are interesting features of this room. The entrance door, with side lights, are of finely wrought iron.

Next to the entrance vestibule, and directly behind the living room, is the stair hall, 19 feet x 30 feet, with circular ends and staircase. It is treated in the Georgian manner with wood panelling ceiling high, in white enamel.

Five large bedrooms and two baths comprise the second floor. The servants' suite of four rooms and bath occurs in a half story on the roof.

ENTRANCE HALL, RESIDENCE OF MRS. A. D. TURNER, OAKVILLE, ONT.

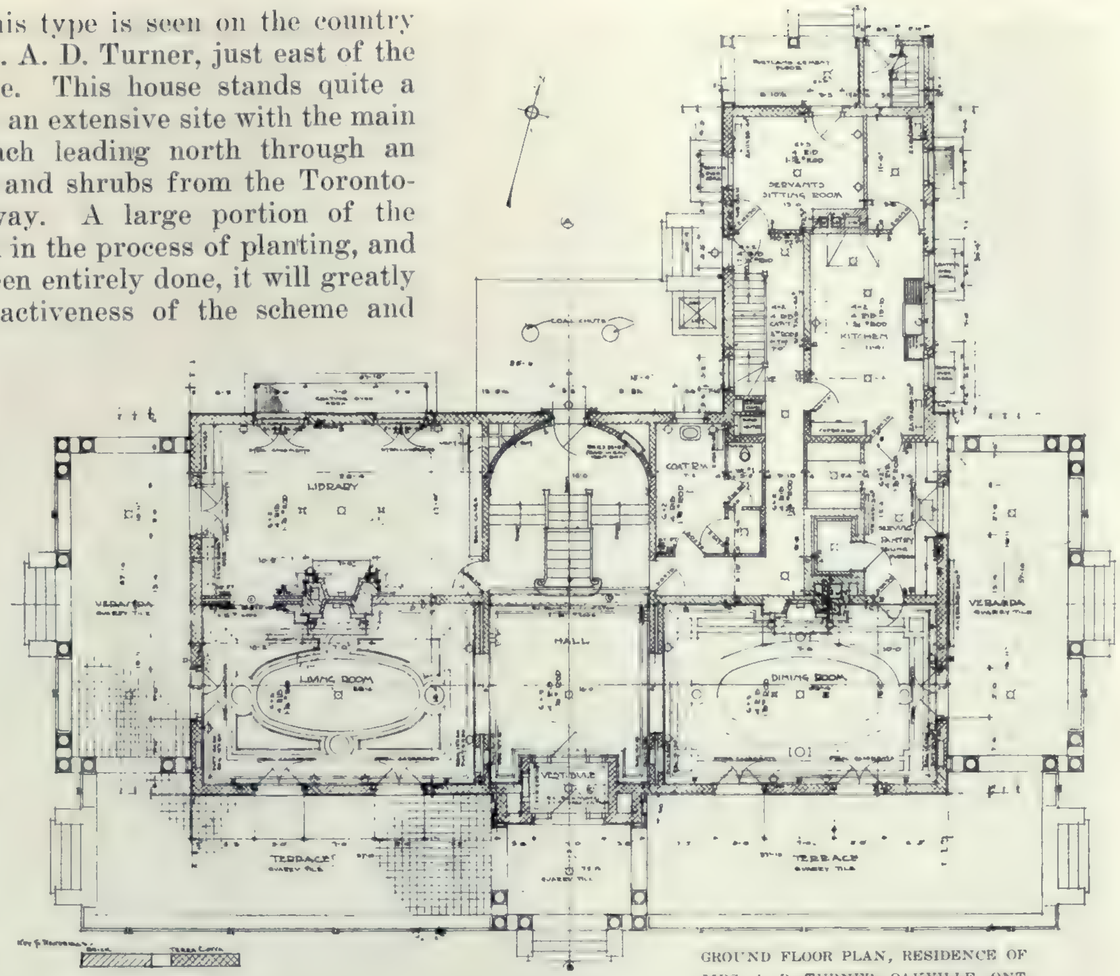
LIBRARY, RESIDENCE OF MRS. A. D. TURNER, OAKVILLE, ONT. CHAPMAN & MCGIFFIN, ARCHITECTS.

The exterior treatment is a modified Georgian with several features of Italian suggestion. The exterior walls are constructed of hollow tile faced with a selected buff tapestry brick trimmed with buff limestone. This same brick laid in a pattern is used for the terrace paving. The shutters are painted a blue green, and the wrought iron rails and balconies a weathered black.

As to the mechanical features of the house, the heating is vacuum steam with all radiators in the principal rooms concealed in the thickness of the walls and behind hinged metal grilles. Automatic temperature regulation is provided throughout the first floor.

TURNER HOUSE, OAKVILLE, ONT.

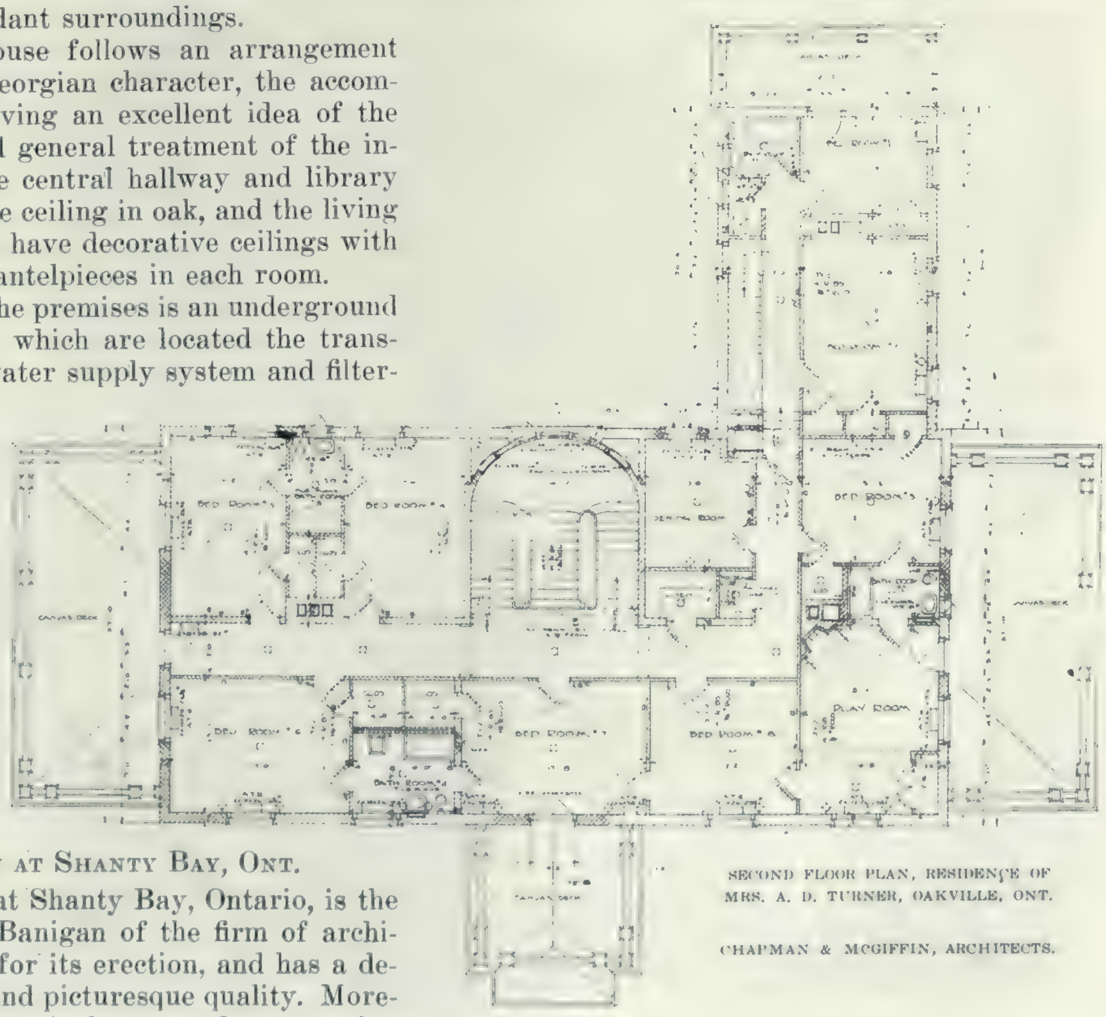
One of the things to be noted in residential work is the more general use of hollow tile, and this invariably implies a stucco exterior. Not only does material of this character make a very permanent form of construction, but when introduced for the floors and partitions, reduces the risk from fire, and in a general way entails but a small outlay for upkeep and repairs. An attractive example of a house of this type is seen on the country property of Mrs. A. D. Turner, just east of the town of Oakville. This house stands quite a distance back on an extensive site with the main carriage approach leading north through an avenue of trees and shrubs from the Toronto-Hamilton highway. A large portion of the grounds are still in the process of planting, and when this has been entirely done, it will greatly add to the attractiveness of the scheme and make it one of the most interesting places in a district already noted for its charming garden estates. The distance from the roadway to the position of its site brings the house into a pleasing vista which is rendered additionally effective by the contrast of the stucco walls, red roof and verdant surroundings.



GROUND FLOOR PLAN, RESIDENCE OF MRS. A. D. TURNER, OAKVILLE, ONT

In plan the house follows an arrangement dictated by its Georgian character, the accompanying views giving an excellent idea of the appointments and general treatment of the interior. The large central hallway and library are panelled to the ceiling in oak, and the living and dining rooms have decorative ceilings with richly detailed mantelpieces in each room.

At the rear of the premises is an underground service station in which are located the transformer, pumps, water supply system and filtering tanks; while to the west of this in a separate building is a modern garage with utility and work rooms, providing for the accommodation of several cars and motor accessories.



SECOND FLOOR PLAN, RESIDENCE OF MRS. A. D. TURNER, OAKVILLE, ONT.

CHAPMAN & MCGIFFIN, ARCHITECTS.

Bungalow at Shanty Bay, Ont.

The bungalow at Shanty Bay, Ontario, is the property of Mr. Banigan of the firm of architects responsible for its erection, and has a decidedly pleasing and picturesque quality. Moreover, it involves certain features of construction

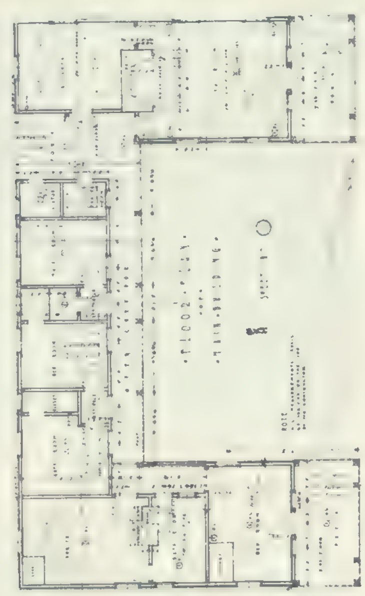
LIVING ROOM. RESIDENCE OF MRS. A. D. TURNER, OAKVILLE, ONT. CHAPMAN & MCGIFFIN, ARCHITECTS. DINING ROOM.

FIREPLACE IN LIVING ROOM.

VIEW AT FRONT.

BUNGALOW AT
SHANTY BAY, ONTARIO.

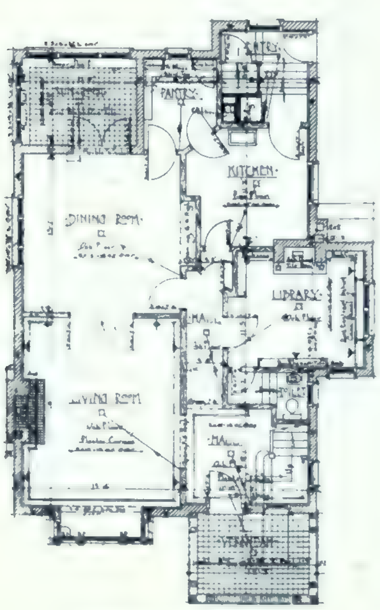
BANIGAN, MATHERS, & THOMPSON,
ARCHITECTS.



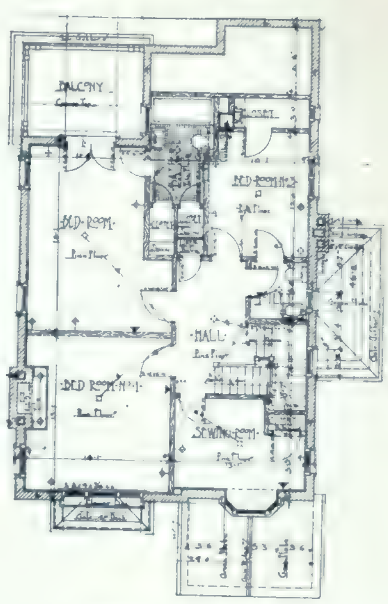
LAKESIDE VIEW.

RESIDENCE OF DR. J. T. GILMOUR, TORONTO.

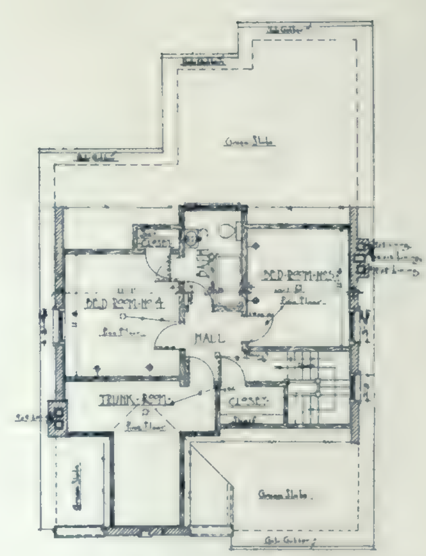
ELLIS & ELLIS, ARCHITECTS.



GROUND FLOOR PLAN.



SECOND FLOOR PLAN.



ATTIC FLOOR PLAN.

LIVING ROOM, RESIDENCE OF DR. J. T. GILMOUR, TORONTO.

which makes it of interest. Patent wall board with stucco finish is used for the exterior and makes a most satisfactory and permanent type of house. The wall board is made with an inverted bevel lathing on one side and furnished in sizes which makes it easy and quickly to apply, thus making it an economical form of construction and at the same time affording a key which securely holds the plaster work in place. Within the past few years quite a number of houses of this type have been erected, and especially in the Ottawa district some very interesting examples are to be seen, including several houses which different architects in that locality have built for themselves.

Residence of Dr. J. T. Gilmour, Toronto.

The design is a modern adaptation of Early English style, which was deemed best suited to the character of the site and to give the owner the type of dwelling which he had in mind. Both the house and the garage are constructed of dark red stock brick with sandstone trimmings. The exterior woodwork is stained a seal brown with white painted sash, and the roof is of green slate.

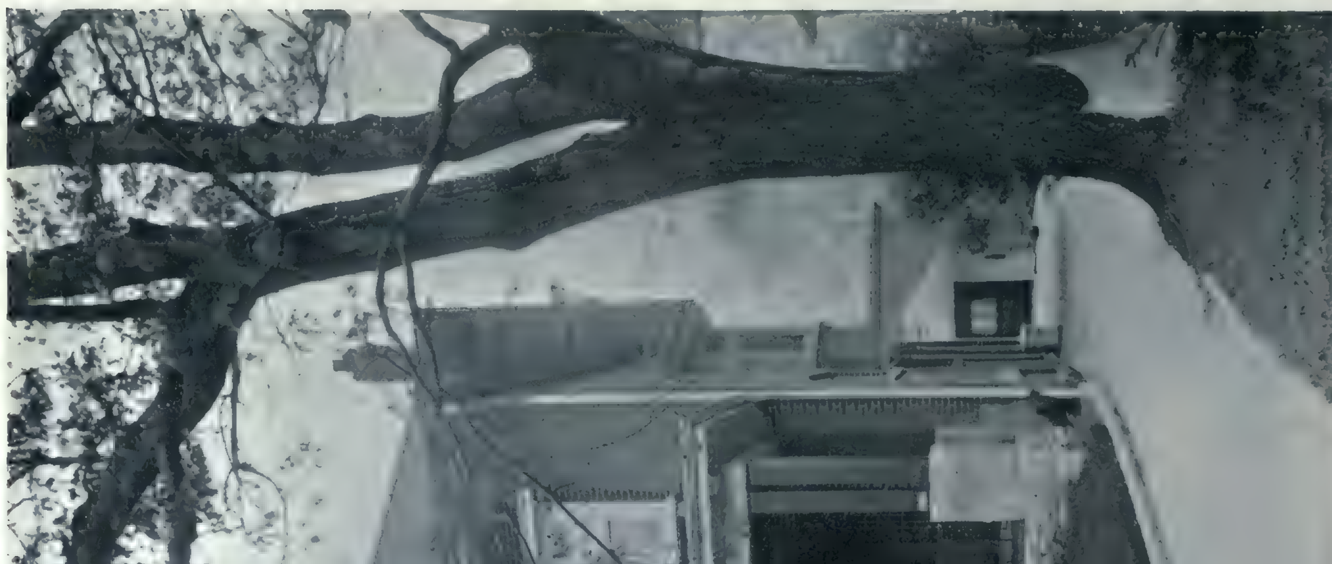
All of the rooms on the ground floor are of good size, the living and dining room being arranged en suite, with a conservatory or sun room opening off the latter. Easy access to all parts of the house is obtained from the entrance hall. This hallway, and the principal lower floor rooms, with the exception of the library, are finished in selected quarter sawn oak with panelled dadoes. In the library, which has a large tapestry brick fireplace, the walls on all sides are shelved to the ceiling in British Columbia cedar, while opening off this room is a fully equipped lavatory which conveniently utilizes the space under the main stairs.

On the second floor is a sitting room and sewing room, in addition to bedrooms connected to tiled bathrooms and showers, all of which are conveniently placed. The attic floor contains the servants' quarters, with separate lavatory and bath accommodations. These floors are finished throughout in white enamel, with mahogany doors, and all rooms have outside light and get the direct rays of the sun at certain portions of the day.

A fine old tree at the front of the property has been retained, alongside of which passes the driveway at the east of the house to the garage at the rear. The structure is heated by a modern hot water system, and a fully equipped butler's pantry connecting the dining room and kitchen facilitates the matter of service.

SECOND FLOOR PLAN.

GROUND FLOOR PLAN.



RESIDENCE OF W. J. NEELY, TORONTO.

R. J. EDWARDS & EDWARDS, ARCHITECTS.

NEELY HOUSE, TORONTO.

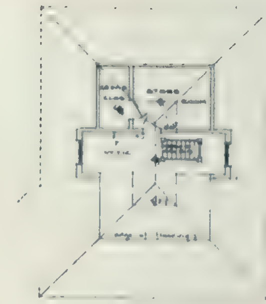
A liberal amount of stone is used in irregular courses in the lower storey, and cut stone sills and coping are employed throughout. The brick work is laid up with a wide mortar joint, and is much more effective than the photograph indicates.

As will be noted from the floor plan, the kitchen space is reduced to the minimum consistent with the household culinary requirements. In this connection attention may be drawn to the means provided for the removal of refuse, and for the cleaning and receiving of ice.

The front porch, sunroom terrace, the two bathrooms and one basin recess are tiled, as shown in the plans. There is a large billiard room, with an ample fireplace in the basement. There is also a large fireplace in the living room for burning coal and wood, and three electric fireplaces in other rooms of more limited size. This form of adding "cheer" to small rooms is, of course, quite modern, and equally, of course, excites the ridicule of some. These heaters can be installed under windows if other places are not available, and they require no flues. They are quite convincing as to the increasing general use of electricity for heating domestic buildings, and have the additional virtue of both saving labor and of banishing ashes and dust, which otherwise accumulate.

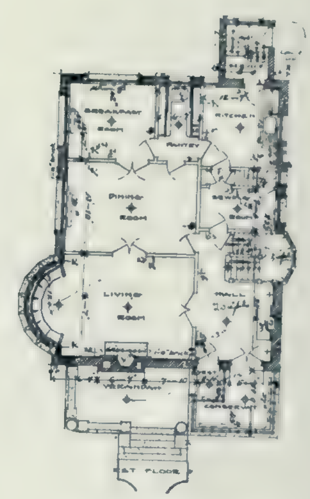
The entire lower floor of the house, including the stair-hall, is trimmed with oak finished with a brown stain but not too deep in tone. In the upper floor rooms delicate wall patterns are used which give a light, airy, appearance, the general treatment being pleasing and restful.

LIVING ROOM. RESIDENCE OF W. J. NEELY, TORONTO. ENTRANCE HALL.



ATTIC FLOOR PLAN.

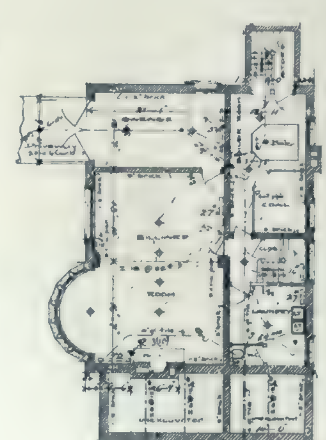
SECOND FLOOR PLAN.



GROUND FLOOR PLAN.

RESIDENCE
OF
T. J. MEDLAND,
TORONTO.

J. A. MACKENZIE,
ARCHITECT.



BASEMENT FLOOR PLAN.

ENTRANCE
HALL.

FIREPLACE IN LIVING ROOM, RESIDENCE OF T. J. MEDLAND, TORONTO.

A Mediaeval Method of Dismissing An Architect.

Few architects, comments "Building News," escape troublesome clients, and many no doubt have had their worries in the law courts, but few have shared the fate of the famous French architect, Langfred, in Norman days, whose tragic end was brought about at Ivry la Battaile, west of Paris, the scene of the victory of Henry IV. over the Duc de Mayenne and the Army of the League, in 1590. Considerable remains are still visible of the great fortress which was demolished by Dunois in 1449. The early Norman records of Ivry are concerned, among others, with Raoul Count of Ivry, son of the Duchess Esprista and her second husband, Sperling, a rich miller of Vandreuit. Ivry had a famous tower attached to it, built by Albereda, Countess of Bayeaux. The citadel was long held against the Duke of Normandy by Hugh, Archbishop of Rouen. The Countess, who erected it, employed Langfred, and she created him Master of Works after building the Pithiviers. Langfred's far-reaching repute seems to have caused his lady client to become exceedingly jealous of him because of the likelihood of his obtaining further buildings to carry out of similar consequence, and without more ado she cut short his professional career by chopping off the unfortunate architect's head, a poor reward for all his labors and devotion. Retribution, the MS. says, awaited the Countess in the end, inasmuch as she was slain by her own husband, whom she had vainly conspired against to prevent him from occupying this same fortification of Ivry.

There was recently outlined in the British House of Commons, according to the "American Architect," a state scheme for providing 300,000 houses for the working classes after the war on a basis of a partnership system between the state and local authorities. In the scheme proposed, the state will provide 75 per cent. of the estimated deficit on the annual balance sheet. The houses would be valued at the end of seven years, and, of any excess of debt outstanding for loan purposes, the Government would provide 75 per cent. The remaining 25 per cent. would be borne by the ratepayers.

DINING ROOM, RESIDENCE OF T. J. MEDLAND, TORONTO. J. A. MACKENZIE, ARCHITECT.

LIVING ROOM.

VIEW THROUGH HALL.

RESIDENCE OF R. J. GRAHAM, BELLEVILLE, ONT.

EUSTACE G. BIRD, A.R.I.B.A., ARCHITECT.

DINING ROOM.

VIEW FROM LIVING ROOM.

RESIDENCE OF R. J. GRAHAM, BELLEVILLE, ONT. EUSTACE G. BIRD, A.R.I.B.A., ARCHITECT.

R. J. Graham's Residence, Belleville, Ont.

This house is situated four miles from Belleville, overlooking the Bay of Quinte, and commands a delightful view of Lake Ontario and Prince Edward County.

The design and layout of the house is an adaptation of the Colonial style and feeling, and the general appearance of the interior is one of spaciousness and at the same time is very homelike. The general layout is so arranged to reduce service to a minimum. The house is finished in what might be called the orthodox style of Colonial house modernized.

On entering the main door, a reception hall is encountered, flanked by a large living room to the left and staircase hall to the right, off which the dining room is situated.

The main loggia is paved with quarry tiles, and the interior finish comprises generally quarter cut oak floors, white panel work, mahogany railings, etc. The dining room, however, is panelled to the ceiling in quarter cut oak, cathedral finish. The entire service department is in a separate wing north of the dining room. The fireplaces and hearths are built of foreign marbles, and the kitchen bathrooms, vestibules, etc., are lined with tile and marble. The billiard room is in the basement.

The second floor is divided into suites of two rooms and bath, and all the main rooms open on to the upper loggia, which can be used for outside sleeping.

The building is heated by twin hot water boilers, and all the water for the house is supplied from the lake automatically.

A Picturesque Oakville Estate.

Those who motor along the Toronto-Hamilton Highway find an added feature of interest in the magnificent country estate which is being developed for Major W. F. Eaton, just east of the town of Oakville. This district is already noted for its many fine homes, and the project which is now being carried out for the above owner gives promise of resulting in one of the most delightful and charming spots to be found along the lake shore. A sunken garden, rose arbor, tennis court, bowling green, and outdoor swimming pool will be features of the general landscape scheme. These will be located on the side of the house facing toward the lake, and will be hidden from the main approach by the structure itself. On the site are a number of native trees and shrubs, including some tall, stately pines, and these will be preserved in the transplanting which is at present being done with a view to co-ordinating the ground treatment with the architecture of the buildings.

The house, for which the excavation has already been taken out, will be a sixty-three room structure, designed in the Tudor style, and having a broad tiled terrace extending across the garden front. The only buildings so far completed are the stables, garage, lodge-keeper's dwelling and greenhouse, which are effectively grouped close to the stone wall enclosing the grounds along the main highway. Entrance to the property is directly from the roadway through heavy wooden gates finished in a rich black and white effect, with hand carved crests, and swung from high cut-stone posts. From this point carriage and pedestrian paths lead to the service buildings to the right, and down through the grounds to the entrance to the house, which will be an imposing residence.

A feature of interest is the concrete sea-wall protecting the property on the lake front, in that the face of the wall is designed with a curved or concaved surface to meet the shock of a heavy sea. This throws the water up and back from the wall, and breaks the impact of incoming waves, thereby preventing damage which might otherwise ensue. Wide concrete steps lead down at the centre to a large boat landing, where an excellent bathing depth is also to be obtained. During the severe weather of the past winter the sea-wall was subjected to a rigorous test, which it withstood most successfully, and in view of the destruction of property along the shore line is an expedient which other nearby owners will likely adopt.

CONCRETE SEA-WALL, MAJOR W. F. EATON'S ESTATE, OAKVILLE, ONT.

MAKING WOOD FIRE RESISTING

Experiments to give fire-resisting properties to wood are being conducted in the United States with certain satisfactory results. According to the "American Architect," shingles sufficient to cover two small panels were fireproofed by the Forest Products Laboratory of the Forest Service and sent to Seattle for fire tests to be conducted by the West Coast Lumbermen's Association. Shingles for one panel were painted with two coats of zinc borate paint, and the other shingles were given a zinc borate injection. Samples of these shingles tested in the inflammability apparatus at the laboratory indicate that the treatment and coating are effective.

STABLE AND GARAGE, MAJOR W. F. EATON'S ESTATE, OAKVILLE, ONT. MUNRO & MEADE, ARCHITECTS.

Recent Domestic Work in Montreal District

THE first three houses illustrating this article are interesting examples of the varied and different types of domestic work that an architect may be called upon to design at one and the same time.

The house at Beaurepaire is a typical summer residence, that at Carleton avenue gives an example of a house erected in the favorite residential district of Westmount, and the Ainslie avenue residence is the home of one of the well known French-Canadian families of Montreal.

614 Carleton Avenue, Westmount.

This house is situated on the higher level of Westmount and on the west side of the above-mentioned avenue. The site has a frontage of 50 feet, and provision is made on the south side for a roadway leading to the garage, which is conveniently placed under the kitchen and south gallery adjoining. The house, though not a large one, contains a considerable number of rooms, and a great deal of study was given to obtain the accommodation required.

One of the most satisfactory features on the upper floor plan is the sun room, which, being heated, is used as a living room all the year round. The dumb waiter is planned so as to be in close proximity to this room, and admits of convenient service from the kitchen if desired.

The upper floor has accommodation providing for four bedrooms, sitting room and two bathrooms, and on the second floor are also three bedrooms, bathroom, linen and cedar cupboards.

The large front sitting room on the ground floor is panelled in American white wood with a silver grey finish and an old rose color material for the frieze. The delicate enrichment on the ceiling of this room is finished a shade of ivory white, as are also the tiles to the fireplace.

The entrance vestibule, hall and staircase are panelled simply in red oak, with a plain balustrade of a diaper pattern. The large window is glazed with different types of white glass in an effective pattern of lead work, the family coat-of-arms being placed in the centre.

The dining room is of birch stained a dark mahogany with tapestry frieze. The tiles around the fireplace are grey-green in color. Built into the wall, and occupying the whole width of the end of the room, is a series of cupboards with lead glazed panelled doors and adjustable plate glass shelves.

Below these cupboards are drawers and flaps above, which can be drawn out as required. This arrangement takes the place of the more ordinary dining room buffet. The two end doors of this series of cupboards when opened provide a serving hatch to the china pantry beyond. Leading off the dining room is the flower room and gallery; while approached from the staircase hall is a billiard room in the basement, which also contains the laundry, garage, cool room, etc.

22 Ainslie Avenue, Outremont, Montreal.

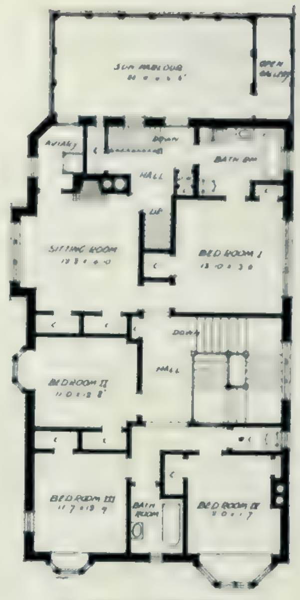
This house is the residence of Rodolphe Tourville, Esq., M.P.P., and has a frontage of 46 feet and a depth of 67 feet 6 inches. The base of the building is of Montreal limestone, the walls above the plinth are faced with iron spot bricks with trimmings to the quoins, doorways and windows of Queenstown limestone. The roof is of unfading green slates, and has copper flashings. The interior has been richly panelled and decorated throughout; the entire details of which were prepared personally by Mr. William Carless, of the firm of architects, before leaving for overseas.

On entering the hall from the vestibule, three

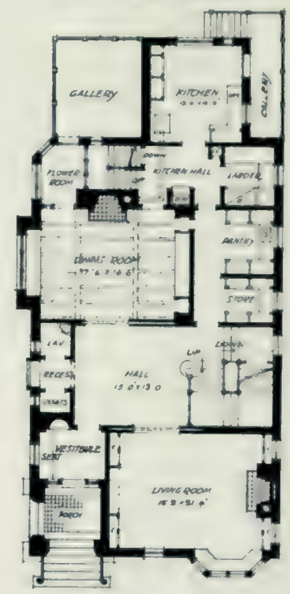
DINING ROOM, HOUSE AT 614 CARLETON AVE., MONTREAL.

SUN ROOM, HOUSE AT 614 CARLETON AVE., MONTREAL.

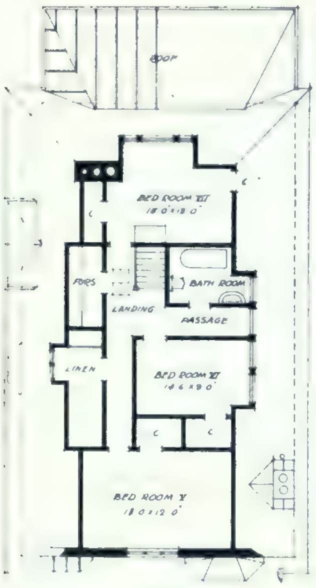
HOUSE AT 614 CARLETON AVE., MONTREAL.



SECOND FLOOR PLAN.



GROUND FLOOR PLAN.



ATTIC FLOOR PLAN.

TURNER & CARLESS,
ARCHITECTS.

STAIRCASE, HOUSE AT 614 CARLETON AVE., MONTREAL steps, emphasized by an oak screen, lead up to the staircase hall, whilst the fireplace upon which is the motto "Dulce Domum," stands immediately opposite.

The approach to the main staircase is purposely kept out of direct view from the entrance doors. This staircase of the Elizabethan period and of quartered cut oak, is one of the principal features of the interior, the design of which is based on that at Temple Newsam in Yorkshire, England.

The living room on the left of the entrance has panelling and woodwork of oak also, and is 25 feet by 15 feet 6 inches, designed in the Georgian period with an enriched plastered ceiling. It has a handsome segmental window to the front, with fireplace on one side and a seat recess on the other.

The boudoir to the right of the hall is of the Louis XVI. style in character, and is carried out in American white wood painted white.

Sliding doors having bevelled glass panels at the end of the living room, are placed at the top of three wide steps giving access to the corridor. The dining room also opens off the corridor, which is connected with the hall. A flower window at the end of this corridor gives a pleasing vista when seen from the staircase.

The dining room is panelled in mahogany in the Georgian manner with wide panels in crotch veneer work. The ceiling has exposed beams.

Leading from the dining room again is the sun room, which is tiled and panelled in quartered cut gum wood finished a natural color tone.

An interesting view taking in the entire length of the house is obtained from the sun room to the front of the house, the difference in level at the living room adding additional charm to this feature.

RESIDENCE BEAUREPAIRE, P.Q.

This country house is situated on the shores of Lake St. Louis about 18 miles from Montreal on an undulating site 300 feet long, and was completed in 1916. The entrance front is placed 120 feet from the present main road and parallel with a fine avenue of trees, which originally formed the old Lake Shore road. The south side overlooks the water, the ground from this level falling down with a steep grass slope and terrace to the shore.

LIVING ROOM, HOUSE AT 614 CARLETON AVE., MONTREAL.

The sun room and sleeping gallery are important features on this plan, as a magnificent water view is obtained from these rooms, looking across to Dowkers Island and beyond to the junction of the St. Lawrence and Ottawa rivers. The windows in these two galleries are so arranged, that when not required they can be let down into pockets in the thickness of the walls, where they are hidden from view; wire screens being then placed to occupy these openings.

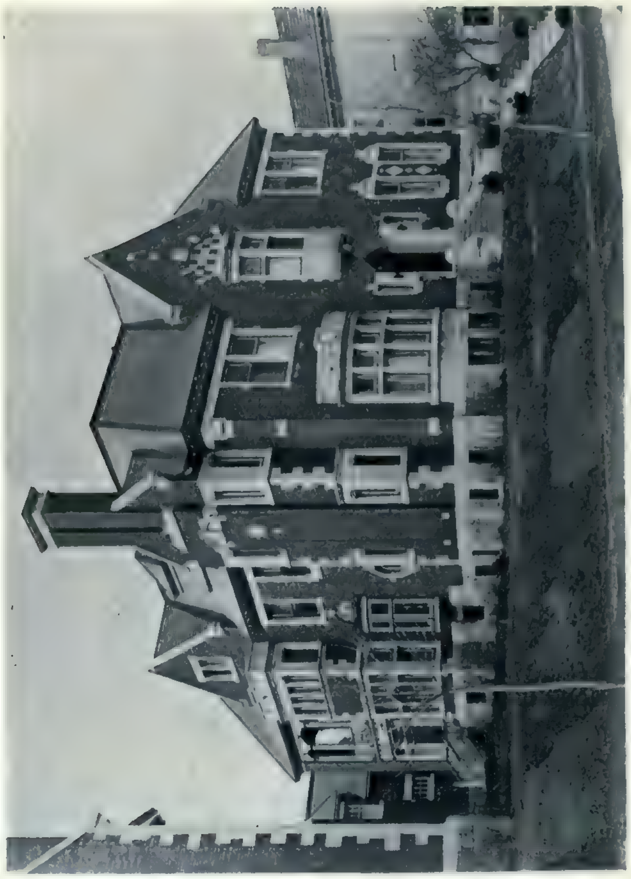
The living room is a large room 22 feet 6 inches by 19 feet panelled in chestnut and stained a silver grey. In the south-east corner is an octagon bay window from which a magnificent view across the water can be obtained.

The dining room is of birch, stained mahogany color, with peacock blue panels of Japanese cloth, and in the lead glazing of the window has been worked the coat-of-arms of the owner.

The exterior of the house is treated in white cement rough cast on metal lath to the ground floor, with shingles stained a light buff to the upper walls and a chestnut brown roof.

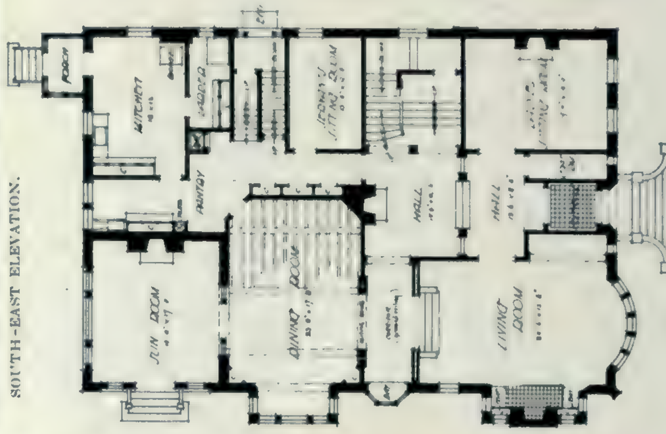
The chimney and piers of the porte cochere, built in local field stone, present pleasing features on the front elevations.

All of the three foregoing houses are interesting in their diversity of character, each representing an individual problem which has been worked out to obtain the most satisfactory results, and considering the quality of material and equipment used, without any undue lavishness or extravagance as to expenditure. The plans of all three houses are effectively grouped, and the arrangement such as to give direct means of convenience and comfort. One must consider the climatic conditions to which Montreal and vicinity are subjected, and which involve a long and severe winter season. As a consequence it is necessary to build against



SOUTH-EAST ELEVATION.

SECOND FLOOR PLAN.



GROUND FLOOR PLAN.

FRONT ELEVATION, HOUSE AT 22 AINSLIE AVE., MONTREAL.

TURNER & CARLESS, ARCHITECTS.

LIVING ROOM, HOUSE AT 22 AINSLIE AVE., MONTREAL. TURNER & CARLESS, ARCHITECTS.

the more rigorous weather, and this demands certain structural considerations and features of equipment which are perhaps unnecessary in more southerly localities. This has all been taken into account in the three residences mentioned, and they are typical of the better class of domestic work to be seen in the Montreal district, being substantially built and equipped with such devices as will economize steps and labor in the performance of household duties.

STAIRCASE HALL, HOUSE AT 22 AINSLIE AVE., MONTREAL.

LIVING ROOM FIRE PLACE.

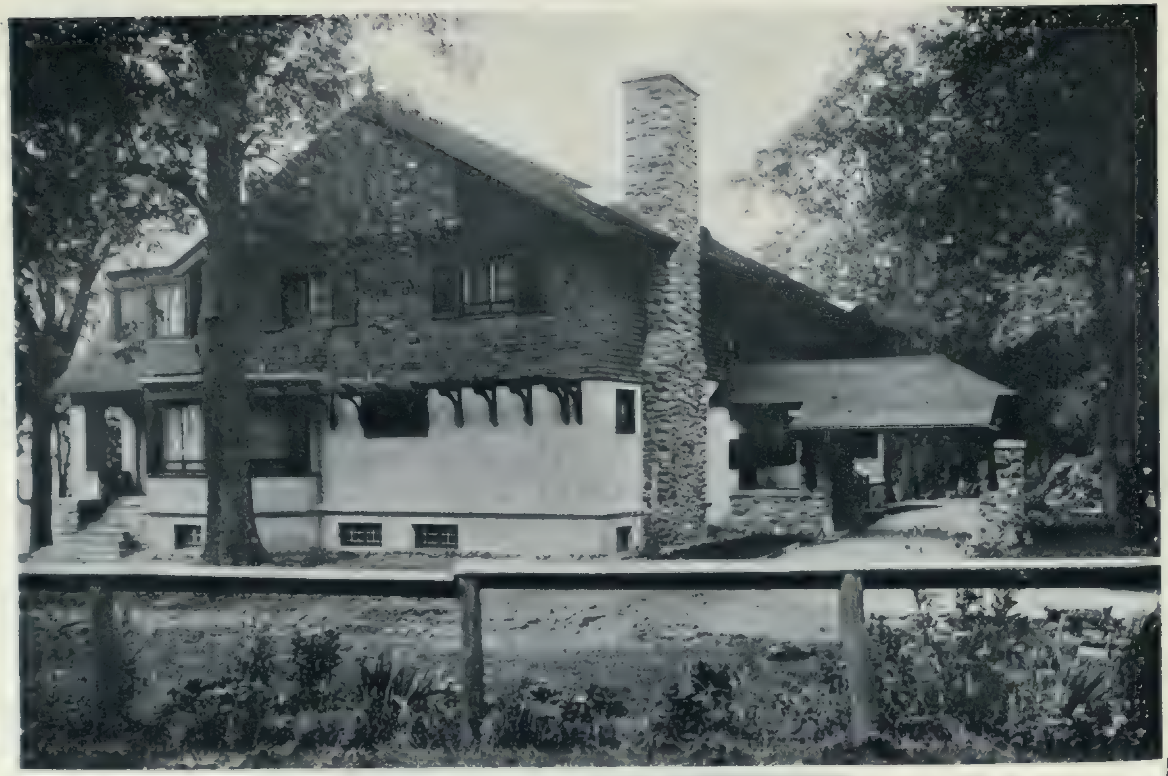
CORNER IN SUN ROOM.

HOUSE AT 22 AINSLIE AVE., MONTREAL.

TURNER & CARLESS, ARCHITECTS.

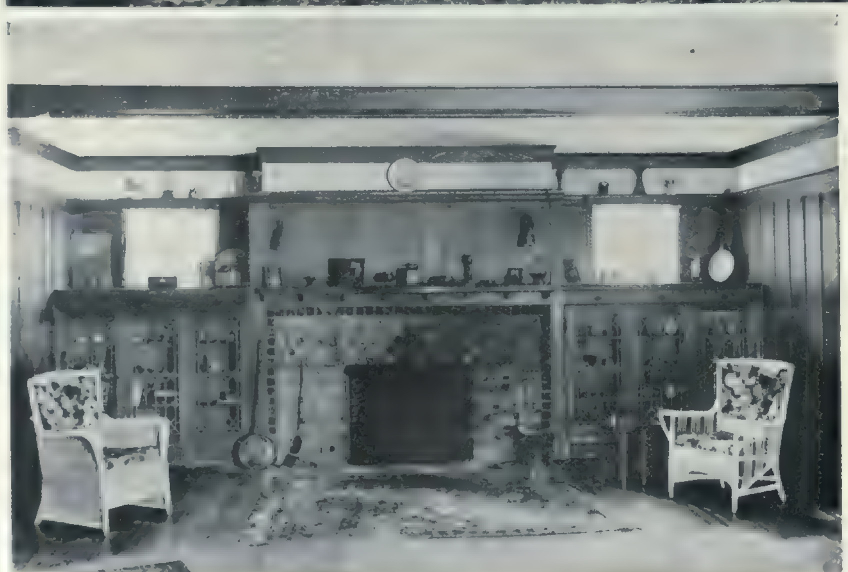
BOUDOIR.

DINING ROOM.



GROUND FLOOR PLAN.

SECOND FLOOR PLAN.



LIVING ROOM FIREPLACE.

HOUSE AT
BEAUREPAIRE, P.Q.

TURNER & CARLESS,
ARCHITECTS.

SUN ROOM.

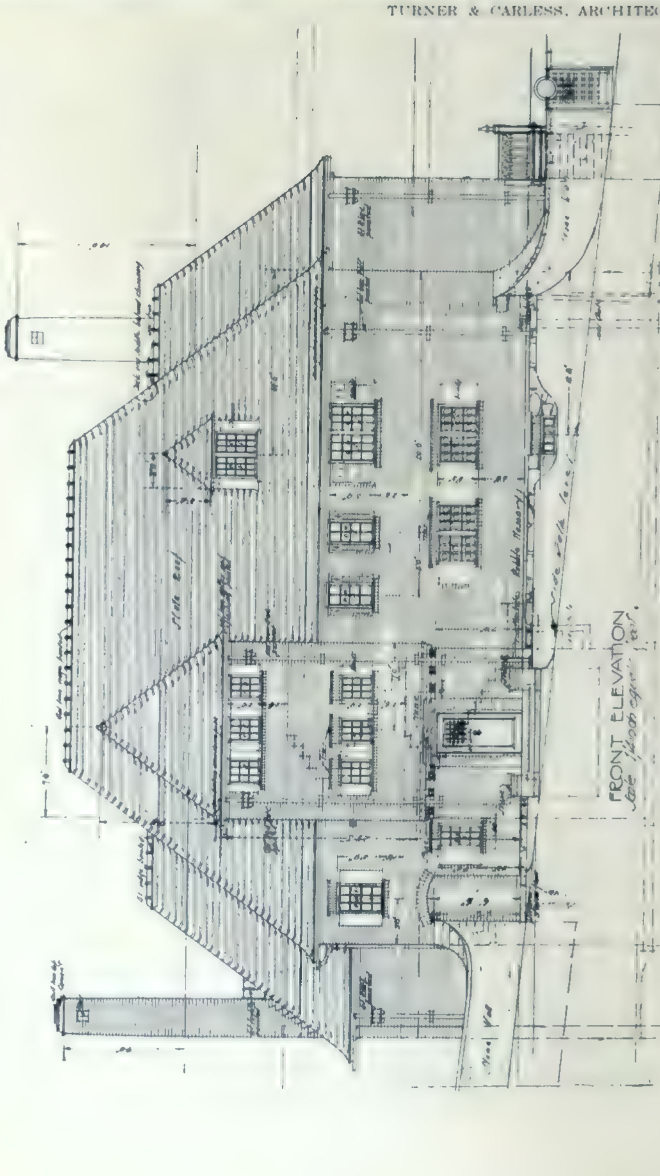
DINING ROOM, HOUSE AT BEAUREPAIRE, P.Q. TURNER & CARLESS, ARCHITECTS.

The Tatley House, Westmount, P.Q.

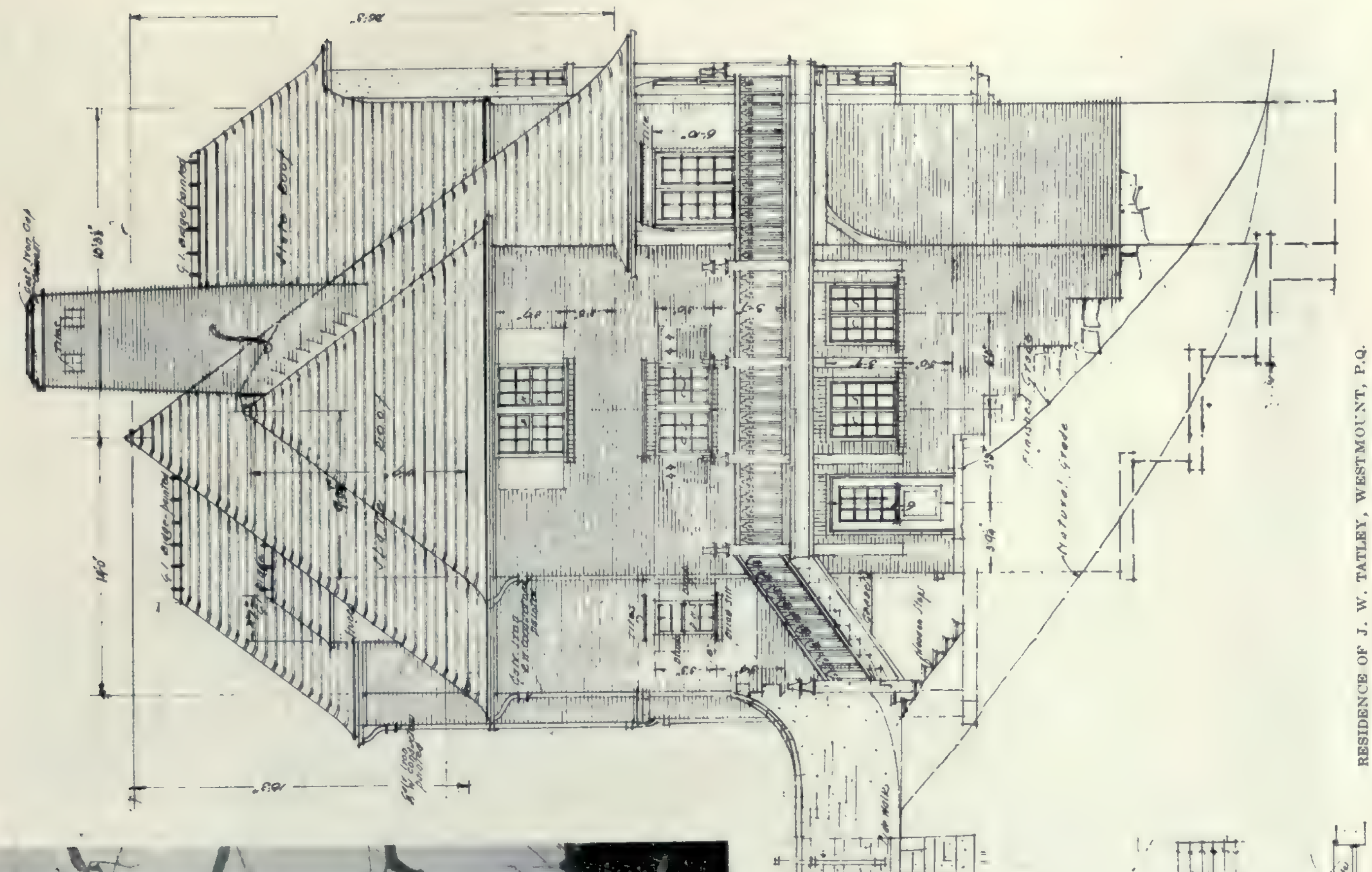
Westmount enjoys the distinction of being a city within a city, in that it is both contiguous to and partly surrounded by Montreal proper without any apparent line of demarcation. Its chief prominence lies in its many fine homes, to which the three accompanying examples, designed by Messrs. Hutchison, Wood & Miller, architects, have been recently added.

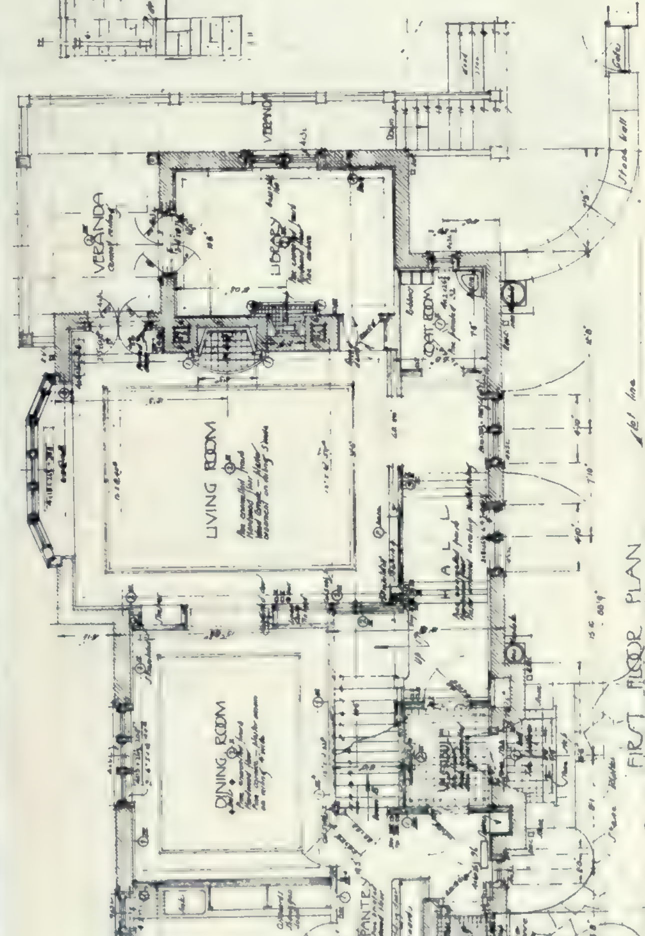
The Tatley residence is built on a small lot, and the fact that the site is on the side of a very steep hill presented a somewhat interesting problem. As a result the main floor, which is entered from Belvedere road, is at a point about half way up the extreme height of the building. The exterior is built of red plastic brick, with all wood trim stained a rich brown, the roof consisting of black slate. The interior is very simply carried out in white enamel, with all detail of the Georgian period, the rooms generally being quite large, and the ceilings throughout about eight feet high, giving a very cosy and home-like appearance.

As will be seen from the plan, the entrance is placed on the side of the house toward the street, which also forms a sharp incline. The other side of the house affords an interesting and pleasant outlook, and the plan is so arranged to preserve this advantage by locating all living rooms so as to get the direct benefit of the views to be obtained. The flooring of the house is



RESIDENCE OF J. W. TATLEY, WESTMOUNT, P.Q.





RESIDENCE OF J. W. TATLEY, WESTMOUNT, P.Q.
HUTCHISON, WOOD & MILLER, ARCHITECTS.

RESIDENCE OF LIONEL J. SMITH, WESTMOUNT, P.Q. HUTCHISON, WOOD & MILLER, ARCHITECTS.

simple beech battens, stained and varnished; the lower portion of the base of the rooms being carried out with a plain finish, at which all the white enamel trim is set.

The house is fitted with a built-in vacuum system, with the machine in the sub-basement; the furnace also being at this level. The first basement is utilized for maids' quarters, laundry and billiard room.

Residence of Lionel J. Smith, Westmount, P.Q.

Belvedere road also gives entrance to the residence of Lionel J. Smith, which is very happily placed on the curved portion of this street, with the main views from the house overlooking the city. The entrance is by a flight of stone steps with a good-sized terrace enclosed with brick piers and balustrade of stone, the terraces being tiled with red quarry tile. The brick is pressed Scotch firebrick of Roman size, and the roof of the house is of red slate. The entrance hall is finished in white quartered oak, and the living and dining-room in mahogany. These rooms have oak floors, and the balance of the floors are in birch. The bedrooms in the upper floor are finished in white enamel.

House of Thomas Arnold, Westmount, P.Q.

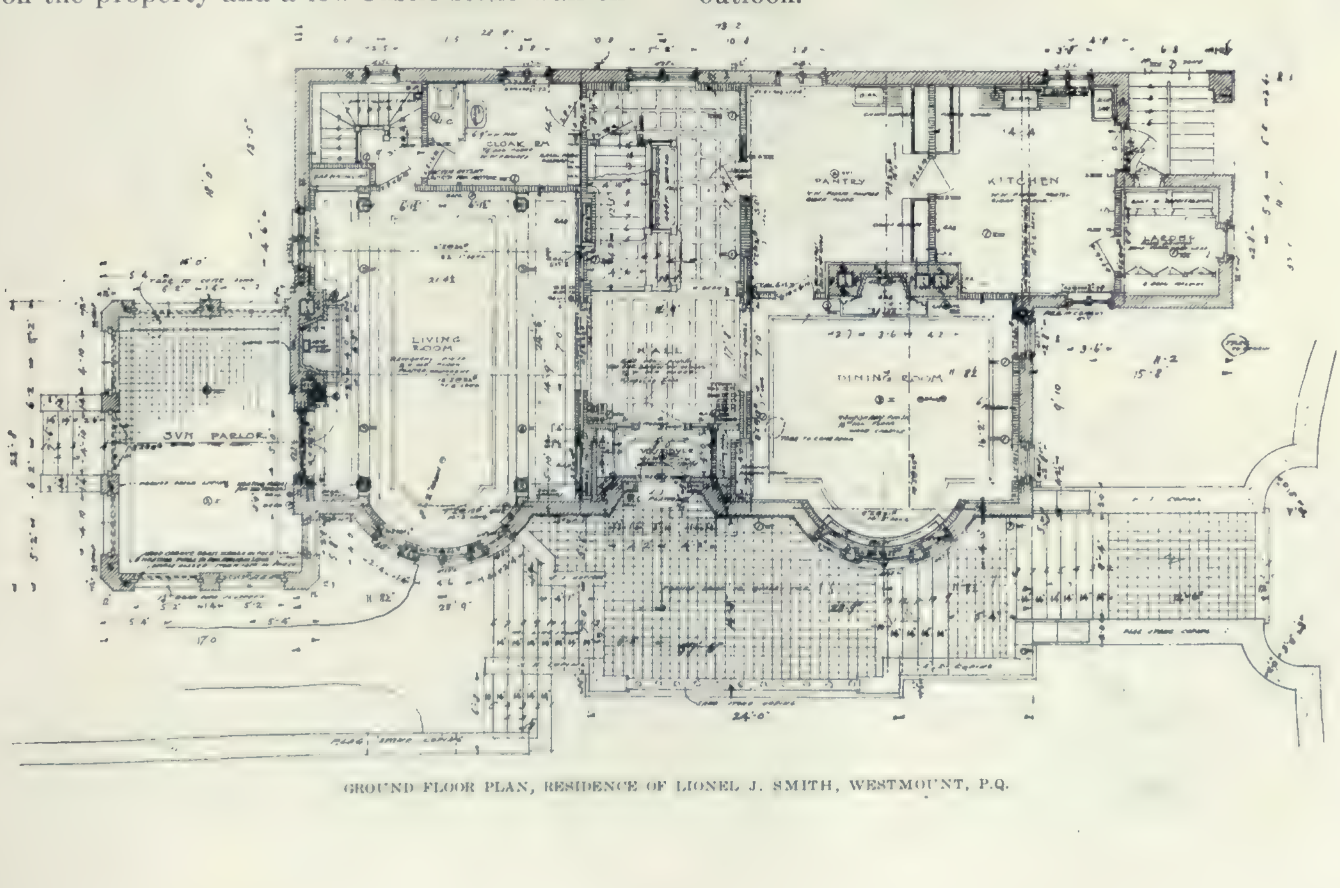
The Thomas Arnold house is situated on Montrose avenue, Westmount, and is set well back from the street, with a drive leading to the garage, crossing the front of the lot diagonally. The entrance steps, as well as all trim of the exterior, are of Wallace sandstone. The bricks are of greenish shades, and are most excellent in color, and the roof of the house is of black slate. All the wood trimmings, blinds, etc., are of a lighter shade of buff than the stone trimmings.

The entrance hall, drawing-room and sunroom are finished in white enamel, the dining-room being in mahogany, carried to a height slightly above the doors. Chestnut trim is used in the library, which has a mantel of Wallace sandstone, with a mural decoration above by Maurice Cullen, the well-known Canadian artist. The walls of this room are covered with blue grass cloth, which harmonizes exceedingly well with the dark stained chestnut. Parquetry flooring of $\frac{7}{8}$-inch white quartered oak is used throughout on this floor, the general finish in the hall and drawing-room being decidedly in Georgian character. In the drawing-room the walls are carried out with a striped paper in two tones

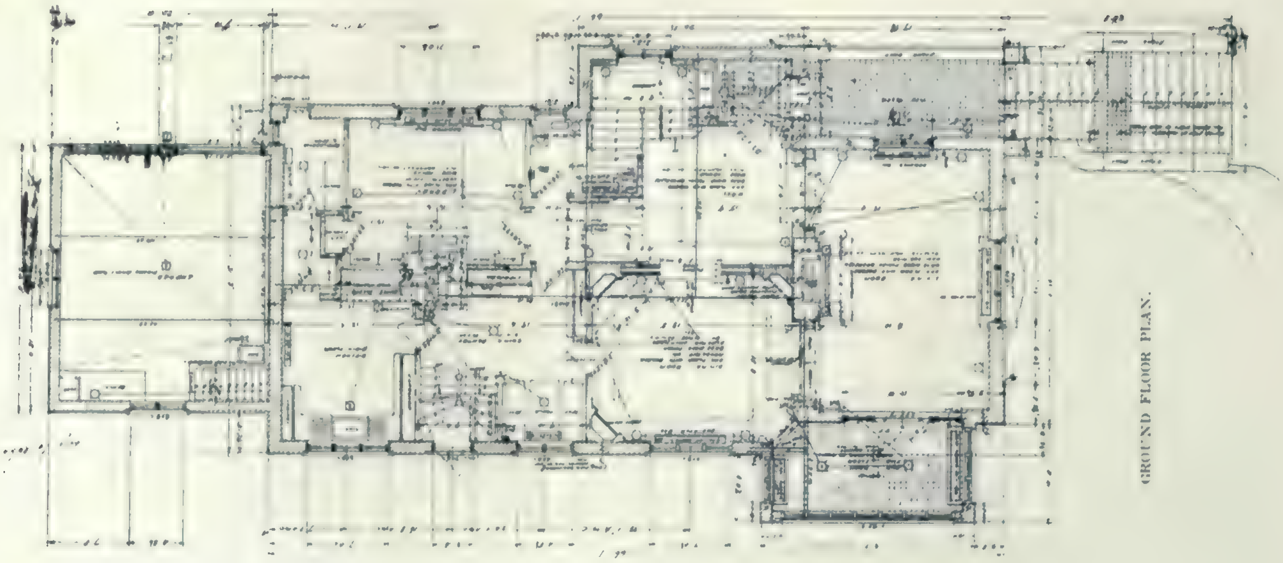
RESIDENCE OF LIONEL J. SMITH, WESTMOUNT, P.Q. HUTCHISON, WOOD & MILLER, ARCHITECTS.

of grey, thus keeping the color of the room quiet, while the furniture is covered with a bright chintz.

As will be seen in the exterior view, a very pleasing relation exists between the grounds and the building itself. There are several fine trees on the property and a low rustic stone wall enclosing the premises. Stone flagging is also used for the terrace steps, while a driveway leads to a spacious garage connected to the house at the rear. Both the entrance approach and the sun room have tile floors, and all the main rooms are placed so as to have a very fine outlook.



GROUND FLOOR PLAN, RESIDENCE OF LIONEL J. SMITH, WESTMOUNT, P.Q.



GROUND FLOOR PLAN.

RESIDENCE OF THOMAS ARNOLD, WESTMOUNT, P.Q.

FRONT ELEVATION.

REAR ELEVATION.

Vancouver Permits Show Improvement

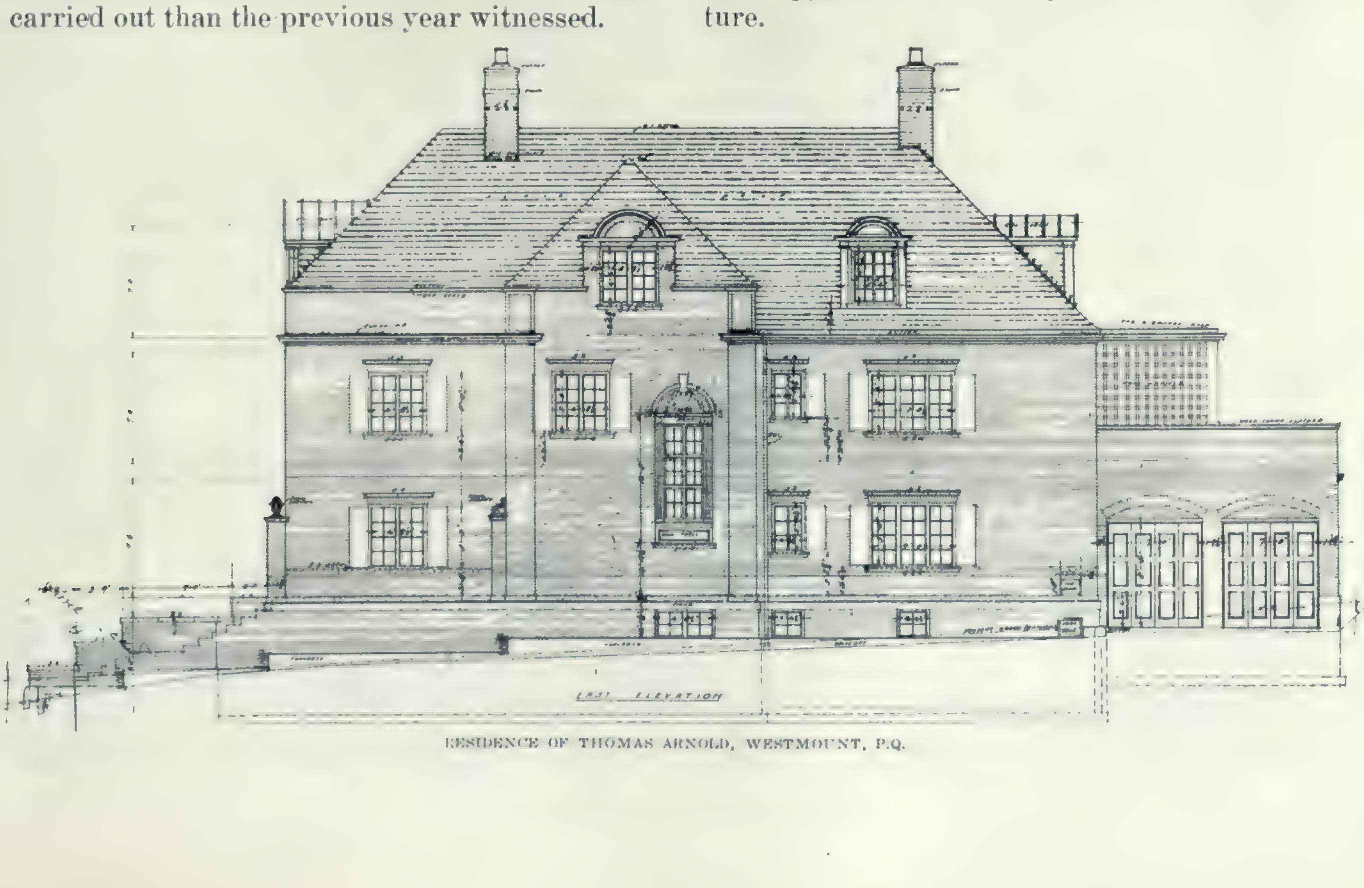
A decided improvement in the building situation is noted at Vancouver, B.C. The total value of permits issued for the first five months of this year is $606,555, as against $281,339 in the previous corresponding period. In the month of May work was started on projects amounting in value to $261,845, as compared with $47,975 in the same month last year. The difference in the amounts, coupled with the fact that sixty-seven permits were issued in the latter month, as against fifty-four permits during May, 1917, denotes that a much better class of work is being carried out than the previous year witnessed.

Increase in Montreal Permits

Permits for building operations in Montreal during the month of May amounted to $658,680, as against $490,054 in the same period of the previous year. This represents an increase of approximately thirty-five per cent. in the comparison of the totals noted.

Appointed to Assistant Professorship

Mr. Philip J. Turner, F.R.I.B.A., architect, of Montreal, and special lecturer in professional practice and building construction in the department of architecture, McGill University, has been appointed assistant-professor of architecture.



RESIDENCE OF THOMAS ARNOLD, WESTMOUNT, P.Q.

LIVING ROOM. RESIDENCE OF THOMAS ARNOLD, WESTMOUNT, P.Q. HALLWAY.

DINING ROOM.

LOOKING INTO SUN ROOM.

INTERIOR OF SUN ROOM.

RESIDENCE OF THOMAS ARNOLD, WESTMOUNT, P.Q. HUTCHISON, WOOD & MILLER, ARCHITECTS.

STONE FLAGGING
TO CHILDREN'S ENTRANCE.

VIEW OF PERGOLA
FROM BREAKFAST ROOM.

HOUSE AT WESTMOUNT, P.Q.

SEPTIMUS WARWICK, F.R.I.B.A.,
ARCHITECT.

REAR VIEW
OF PERGOLA.

GARAGE

FRONT VIEW OF PERGOLA, HOUSE AND GARAGE, WESTMOUNT, P.Q. SEPTIMUS WARWICK, F.R.I.B.A., ARCHITECT.

Landscape Work at Westmount House

Photographs of this house, together with a plan of the proposed garden, were illustrated in our last House Number, issued in June, 1917. As a good portion of the work has since been completed we herewith present further views of the garden and garage.

The stone walls to the garden are built of rough field stone excavated on the site, and the stone flagging and steps are of Rochester tile. The pergola is carried out with wood columns painted white, with a stone flagged pavement.

The garage forms part of an existing stable, one-quarter of which was retained, with new windows and red brick facings on the old walls, the remainder being pulled down and a formal garden planned on same, bounded by dwarf walls with carved vases on the corner piers. The circular bay contains a spiral staircase leading to the old basement of the stables, which have been transformed into sleeping quarters for the chauffeur.

A view is also shown of the sun room, which is paved with red quarry tiles and Missisquoi marble and skirting, the ceiling and walls being covered with a trelliage pattern painted green. A wall fountain is provided on the rear wall, and the radiators are covered with an iron grille painted green, with flower boxes designed to match the trellis work of the walls.

The location is on a very interesting site at the juncture of Westmount Boulevard and Edgehill road. It commands magnificent views over the St. Lawrence River, the house being set out to obtain the greatest advantage from the location, all the principal rooms getting the benefit of the outlook to the river.

The landscape work formed a part of the contract for the house, and was entirely carried out under the architect's supervision.

ENTRANCE DRIVE.

Canadian Houses

Sometimes we have a poor opinion of ourselves, in fact, perhaps too often; so it is both pleasant and encouraging to have others pay us a compliment on our efforts. In speaking of our domestic work and as to how it is possibly regarded in the popular mind abroad, the "Slate Trade Gazette," published in England, says:

"Ask the average school boy (in England) to describe a Canadian house, and he will give you a word picture of a sort of 'little old log cabin down the lane.' This might be somewhere near the mark for the backwoods, but it is wrong when applied to houses in or near the cities. In point of fact, the latter class are much more up-to-date than most houses in this country, and give evidence of much more thought in their inception. They are greatly superior to ours in labor-saving devices. In a Canadian kitchen, for instance, everything is near at hand. It is planned to save every unnecessary step and every second of time. The plate rack is over the sink, which is of leadless glaze china, and easy to clean; the taps are all nickel-plated. Large bins for flour, sugar, etc., are placed under the kitchen table, which is a fixture, and is within easy reach of the range. It is not necessary to run here and there to get small quantities of this and that ingredient to do the cooking, and the pastry board and rolling-pin are fixed to the table side.

SUN ROOM, HOUSE AT WESTMOUNT, P.Q. SEPTIMUS WARWICK, F.R.I.B.A., ARCHITECT.

"In all the living rooms and bedrooms upstairs, the fire-places have, underneath the fire basket or grate, a shaft in the chimney, which is opened or shut with the poker. All the ashes are pushed down this shaft every morning, and they collect in a stone well in the basement, which is opened and emptied about twice a year. This device saves all the trouble of emptying the grates, and as all the grates are made of armor bright, they require no cleaning; relaying a fire is a few seconds' work. Then there is the admirable device of the fitted washing basins in the bedrooms, with hot and cold water laid on—a rare luxury in England, but a commonplace in Canada.

"We may think we are a progressive nation, but a few countries can give us points in house building and beat us. We have yet a great deal to learn in this art."

While this may not fully apply in its general relation to all our domestic work, it nevertheless is close to the mark, and it can at least be said that we have taken into consideration the essentials of equipment and are building better than we sometimes appreciate as regards the matter of convenience and comfort. In this respect, at any rate, we can feel that we are progressive.

Montreal Architect in United States War Work.

Mr. Harry Edward Prindle, architect, whose offices up to last year were at 915 New Birks Building, Montreal, has entered the service of the United States Government, having been appointed supervisor of housing at Bristol, Pa., for the Emergency Fleet Corp. From the designing of terminal stations to work at a great plant like Bristol is quite a change, but there is a feeling of satisfaction in knowing that one has an active part in carrying out necessary war work.

CONSTRUCTION

A · JOURNAL · FOR · THE ARCHITECTURAL ENGINEERING · AND · CONTRACTING INTERESTS · OF · CANADA

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CONTRIBUTIONS.—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and returned.

Entered as Second Class Matter in the Post Office at Toronto, Canada.

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The Housing Situation in Canada.

The fact that steps are being formulated to bring about an improvement in the present situation shows that serious consideration is being given by public officials and others to the growing scarcity of houses in our cities and industrial districts. One evidence of this is the proposal put forth in Toronto to relax the building regulations so as to permit of the erection of small three-storey apartments in present restricted areas, as well as to sanction the remodelling of existing buildings into apartments where such changes are now prohibited by regulation. It is pointed out that unless some measure is taken to insure the provision of more housing accommodations now, the city will be confronted with a condition many times more serious after the war. Toronto alone expects an increase this year of thirteen thousand to her present population, and it is estimated by those best competent to judge that within the next three to four years from twenty to twenty-five thousand additional houses will be necessary to meet the city's growing requirements.

That the situation is an acute one in a general way is also indicated in the report of the executive committee presented at the recent convention of the Canadian Manufacturers' Association, and likewise in the action of the Ontario Government in appointing a committee under the chairmanship of Sir John Willison to investigate housing conditions throughout the province.

According to the report of the manufacturers, accommodations for housing the working class, which were far from being satisfactory in pre-war days, have in the last three years grown steadily worse. This is due among other causes to the fact that Government factories have been erected in Canada without provisions being made to house the workers, and also to the fact that large war orders have resulted in private corporations increasing the population of certain districts without any corresponding development in the establishment of housing facilities.

Taking these circumstances into consideration and recognizing that private enterprise for obvious reasons, is not building houses anywhere in proportion to present needs, a condition exists which is forcing a large portion of a growing population to occupy overcrowded and unsanitary habitations, and these are available only at increased rentals to what the tenants should be expected to pay.

Just how the problem can best be met is something which remains to be seen. It looks as though it is something with which both the Government and municipalities will have to earnestly deal, and in which the manufacturers in their own interest will in all likelihood show a willing disposition to co-operate. Conditions in Canada are not unlike those in England and the United States, where both the Government and factory owners are aiding and financing housing developments in the industrial areas. Even this has already been done by certain manufacturers in Canada on a small scale.

The main thing in solving the present problem is to deal with it intelligently, and there is a promise of this in the committee which the Ontario Government has appointed. In Sir John Willison the committee will have a capable chairman gifted with observation and executive ability, who will be able to give the committee the benefit of his counsel and experience in similar work. It is likewise fortunate in having as a member Mr. Frank Beer, who will bring to the board a practical knowledge gained as president of the Toronto Housing Company, which has previously dealt with similar problems. Other members include progressive citizens and representatives of the laboring interests, giving the committee a personnel which should enable it to decide on a policy based upon sound and definite conclusions.

The A. I. A. Housing Competition

THE Journal of the American Institute of Architects has organized a competition to be held along new lines, and by means of which it is hoped that there may be created a more fundamental knowledge of all the factors which govern the problem of decent houses for all workers.

In order that this knowledge may have the widest possible diffusion, the Journal has arranged with the Ladies' Home Journal for the publication of the winning solutions of this competition in its pages as well as in those of the Journal of the Institute. The competition will be in three parts:

Part I.—The Social Purpose.
Part II.—The Economic Method.
Part III.—The Physical Plan.

All competitors will be required to submit the following:

Under Part I, a Thesis in which there shall be set forth the social purpose which house-building should seek to attain.

Under Part II., there must be described the proposed economic method of financing and administering the community to be created and maintained without likelihood of slums and the general deterioration which usually has accompanied unchecked private development.

Under Part III., there shall be submitted a rough sketch plan to show the physical scheme of the proposed development. The prizes, which are offered jointly by the "Journal of the American Institute of Architects" and the "Ladies' Home Journal," are as follows:

The Winning Solution	$1,000.00
The Second Prize	500.00
The Third Prize	250.00
The Fourth Prize	150.00
The Fifth Prize	100.00

OPEN TO CANADIANS.

The competition is open to all citizens of the United States and Canada, who may enter singly or in groups as they desire. All treatises and plans must be sent prepaid to the office of the "Journal of the American Institute of Architects," The Octagon, Washington, D.C., on or before October 31, 1918. No submissions will be accepted unless the requirements as to the three parts are fully complied with. A detailed programme will be sent on receipt of request.

Toronto Draughtsman Killed

Reported in the recent casualties is the death of Lieutenant George Pierce, who was killed in action two months after arriving in France as a member of the British aerial force. The deceased aviator, who enjoyed a large acquaintanceship and popularity with the younger element of Toronto, was thirty years of age, and the son of Henry W. Pierce, 165 Bleecker street, that city. He went overseas three years ago,

THE LATE LIEUT. GEORGE PIERCE, TORONTO.

and served in the Divisional Cyclist Corps, until about a year ago, when he was given a commission in the R.A.F. Before enlisting, he was a draughtsman in the Provincial Public Works Department, and had previously been employed in the architectural office of Henry Simpson, Toronto, and with the firm of Otis & Clark of Chicago, Illinois. He was a member of the Y.M.C.A. and of St. James basketball team, and has his name upon the honor roll of Holy Trinity Church.

Lieut. Albert Pierce, of the R.A.F., a brother of the late airman, went overseas at the same time, and was wounded at Zillebeke.

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As Supplied by the Architects of Buildings Featured in This Issue

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Boilers, Gurney Foundry Company.
Brick, Fiske & Company.
Bronze door, Toronto Brass Manufacturing Company.
Hardware, Yale & Towne.
Hollow tile, National Fireproofing Company.
Interior woodwork, Thos. Painter & Son.
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A copy of The Barrett 20-Year Specification, with roofing diagrams, sent free on request.

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Painting, Fred G. Roberts Company.
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Plumbing, McNaughton & McKenzie.
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Painting and glazing, G. E. Blackwell.
Plaster work, Watson & Wilson.
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Painting and glazing, Alex. Craig Limited.
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Steel work, National Bridge Co., Ltd.
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RESIDENCE OF THOS. ARNOLD, WESTMOUNT, P.Q.

Electric wiring, McDonald & Willson Co., Ltd.
Fly screens, The Window Strip & Supply Co.
Gasoline tank, S. F. Bowser Company.
Grounds, grading, etc., Thomas Barnes.
Hardware, Durand Hardware Co., Ltd.
Iron work, John Watson & Son, Ltd.
Marble and tile work, James Walker Hardware Co.
Mason and brickwork and carpentry, A. K. Hutchison.
Painting and glazing, R. E. Jones.
Plaster work, R. George Hamilton.
Plumbing and heating, John A. Gordon.
Roofing, Geo. W. Reed & Co., Ltd.
Steel work, Phoenix Bridge & Iron Works.

HOUSE AT 614 CARLETON AVENUE WESTMOUNT, P.Q.

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Boilers, Taylor Forbes Company.
Carpenter and joiner, T. S. Hudson & Co.
Composition flooring, Marbleoid Co. of New York.
Electric wiring and fixtures, McDonald & Willson Co., Ltd.
Hardware, Jas. Walker Hardware Co.
Mason, Fussing & Jorgenson.
Ornamental glass, J. C. Spence & Co.
Ornamental Metal Sash, Fred MacKay.
Painting and glazing, W. J. Ryan.
Plate glass, Pilkington Bros.
Plumbing and heating, Hickey & Aubut.
Roofing, Richardson, Simard & Co.
Wire screens, Window Strip & Supply Co.

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Electric wiring, McDonald & Willson Co., Ltd.
Furniture, G. H. Randall Co.
Furniture, Period Furniture Co.
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Joinery and cabinet work, G. H. Randall Co., Ltd.
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Ornamental plaster work, G. H. Randall Co., Ltd.
Painting and glazing, Henry Morgan & Co.
Plumbing and heating, J. & C. Brunet Co.
Roofing, J. & C. Brunet Co.
Tile work, G. R. Locker Co., Ltd.

HOUSE AT BEAUREPAIRE, P.Q.

Boiler, Taylor Forbes Co.
Electric wiring, McDonald & Willson Co., Ltd.
General contractor, Ed. Garrigan.
Ornamental glazing, J. C. Spence & Co.
Plumbing fixtures, The Mott Co., Ltd.
Tile work, G. R. Locker & Co.

July, 1918 Volume XI, No. 7

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BRANCH OFFICES
MONTREAL NEW YORK

NEW PARK SCHOOL, TORONTO. J. C. PENNINGTON, ARCHITECT.

New Park School, Toronto

TORONTO has not only maintained an expansive policy in the establishing of educational buildings, but has recently completed the largest public school building erected in Canada. This is the new Park School which contains thirty-four rooms and provides accommodation for seventeen hundred pupils. It is built on a site adjoining the old school of that name on Sydenham street between Sumach and Sackville streets, and gives vastly superior accommodation for the building it replaces.

The object foremost in mind in designing the building was to provide a modernly equipped structure which would adequately and efficiently serve a thickly populated section, without attempting any elaboration which would require an unnecessary expenditure. Special care has been given to the subject of heating and ventilation, and the lighting of the classrooms which are placed on either side of wide fireproof corridors extending to eight separate entrances at both ends and the centre of the building. The structure is three stories high, two hundred and seventy-two by seventy-two feet, with a rear extension fifty-five by seventy-two feet, and the total cost of its erection was $188,000, which brings the cost to approximately $5,500 per classroom.

Besides the regular classrooms, there are two larger and special rooms to accommodate the departments of household science and manual training. A kindergarten room, double the size of the ordinary rooms, is located on the ground floor, and so arranged that it can be thrown open in combination with a large hall space, thus providing a large audience room without the cost of making part of the building exclusive for that purpose. This combination has been made a feature of the Toronto public schools for a number of years.

By placing the principal's office and waiting room ensuite in the front projection a scheme results which divides the main entrance into two separate vestibules with hallways leading to the main corridor. This makes a convenient and practical arrangement which is further carried out in the mezzanine immediately overhead which provides a kitchen and lunch and rest rooms for the teaching staff.

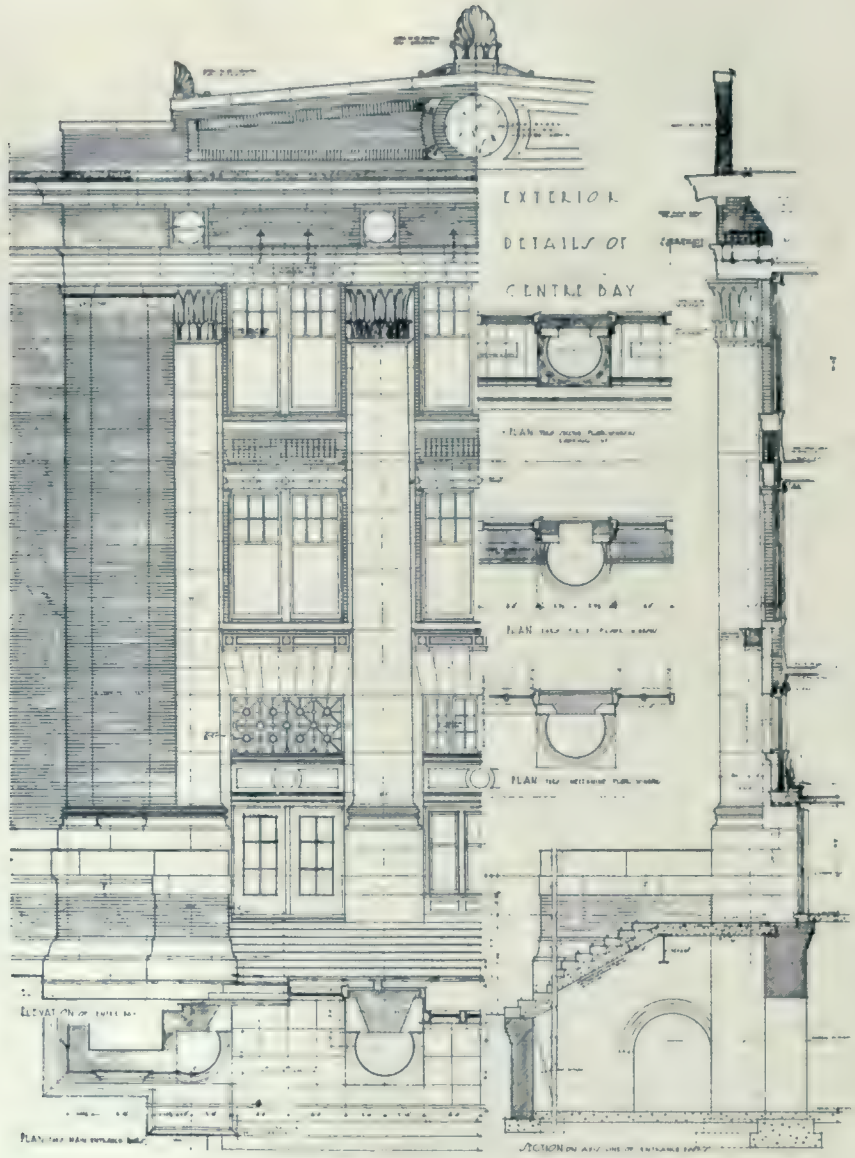
The exterior of the school is quite simple in treatment and free from any ornate effects except in the heavy columns of the entrance. The walls are of red stock brick trimmed with New Brunswick sandstone, and rest upon concrete foundations.

While the construction is termed "second class," the structure is protected by fireproofing at all essential points. The corridor floors are of terrazzo laid over a four-inch concrete slab with "I" beams spanning from wall to wall. These are connected from floor to floor with a system of iron stairs. The main partitions range in thickness from fourteen and a half inches below to nine inches in the upper storey, and are built of solid brick. The secondary partitions dividing the principal's office and waiting room, lavatories, manual training room and domestic science room, are of four and six inch hollow tile.

In the classrooms wood joist construction is employed with maple super-floors. These classrooms, which are twenty-four by thirty-nine feet in size,

MAIN ENTRANCE, NEW PARK SCHOOL, TORONTO.

DETAILS OF MAIN ENTRANCE.



DETAILS, NEW PARK SCHOOL, TORONTO.

VIEW OF CORRIDOR, NEW PARK SCHOOL, TORONTO.

have accommodation for fifty pupils each, and are lighted by large group windows which bring the light into the room on one side only, to the left of the student, as approved by authorities on school building design in reference to the subject of outside illumination.

Modern lavatories for both pupils and staff are provided on all floors, including the basement. The basêment is well above the grade, and is hence both well lighted and ventilated. It contains girls' and boys' assembly rooms and a large drill hall, and has several separate exits direct to the outside grounds. The boiler room floor is five feet below the general basement floor level.

The plumbing, heating and ventilation represent a very complete installation, embodying the most approved principles as regards design and sanitary equipment. The classrooms, in addition to being heated with a direct steam radiation, are ventilated with a modern system of forced fresh, warm air, which is originally derived from intakes located at the sides of the main entrance.

The plan also provides for the usual medical inspection rooms and similar offices, and there are spacious wardrobe compartments in connection with each of the classrooms on all three floors.

TYPICAL CLASS ROOM, NEW PARK SCHOOL, TORONTO.

Personality in Decoration

If there is one profession in which the personal equation holds sway to a remarkable extent, says the "Decorative Furnisher," it is certainly the profession of interior decorating.

A decorator is weak or strong, in his work, according to whether his personality is weak or strong. The more decided his characteristics are, the more definite and peculiar unto itself will be his work.

The man who has no definite likes and dislikes is quite apt to be a poor decorator. His thoughts do not express themselves, materially, in any unique desirable, concrete way; they are more apt to be vacillating, in fact, and the resulting schemes that grow from them will possess neither charm nor individuality.

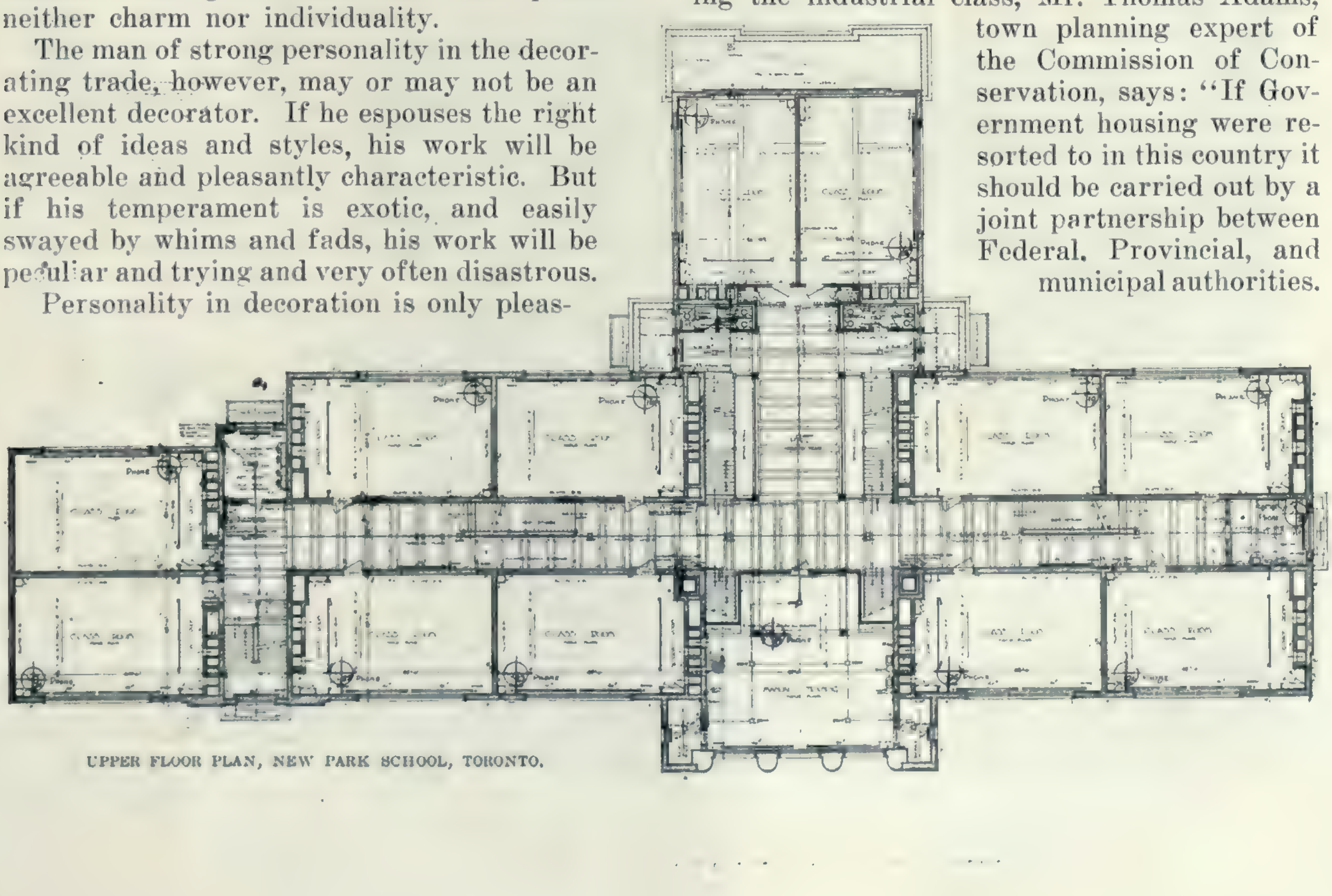
The man of strong personality in the decorating trade, however, may or may not be an excellent decorator. If he espouses the right kind of ideas and styles, his work will be agreeable and pleasantly characteristic. But if his temperament is exotic, and easily swayed by whims and fads, his work will be peculiar and trying and very often disastrous.

Personality in decoration is only pleasing when it develops accepted schemes to a remarkable degree of richness and charm. Good taste is only satisfied when it feasts on decoration that measures up to and beyond the standard of usage and good custom.

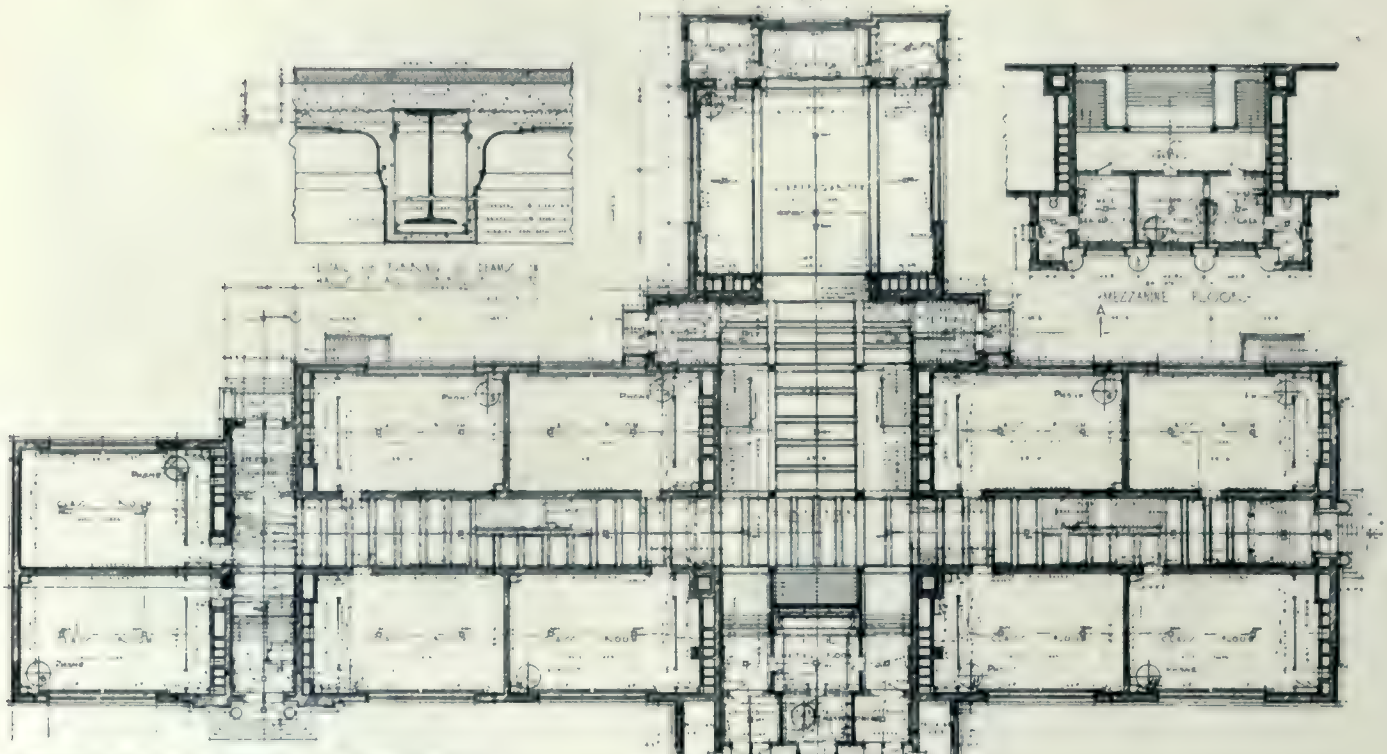
Personality that is individual, because it departs from the accepted canons of art may appeal for a short time, because it is striking, but it is never lasting nor satisfying.

Canada's Industrial Housing Situation

In commenting on the housing situation, which still continues a subject of wide discussion in many parts of the country, vitally affecting the industrial class, Mr. Thomas Adams, town planning expert of the Commission of Conservation, says: "If Government housing were resorted to in this country it should be carried out by a joint partnership between Federal, Provincial, and municipal authorities.

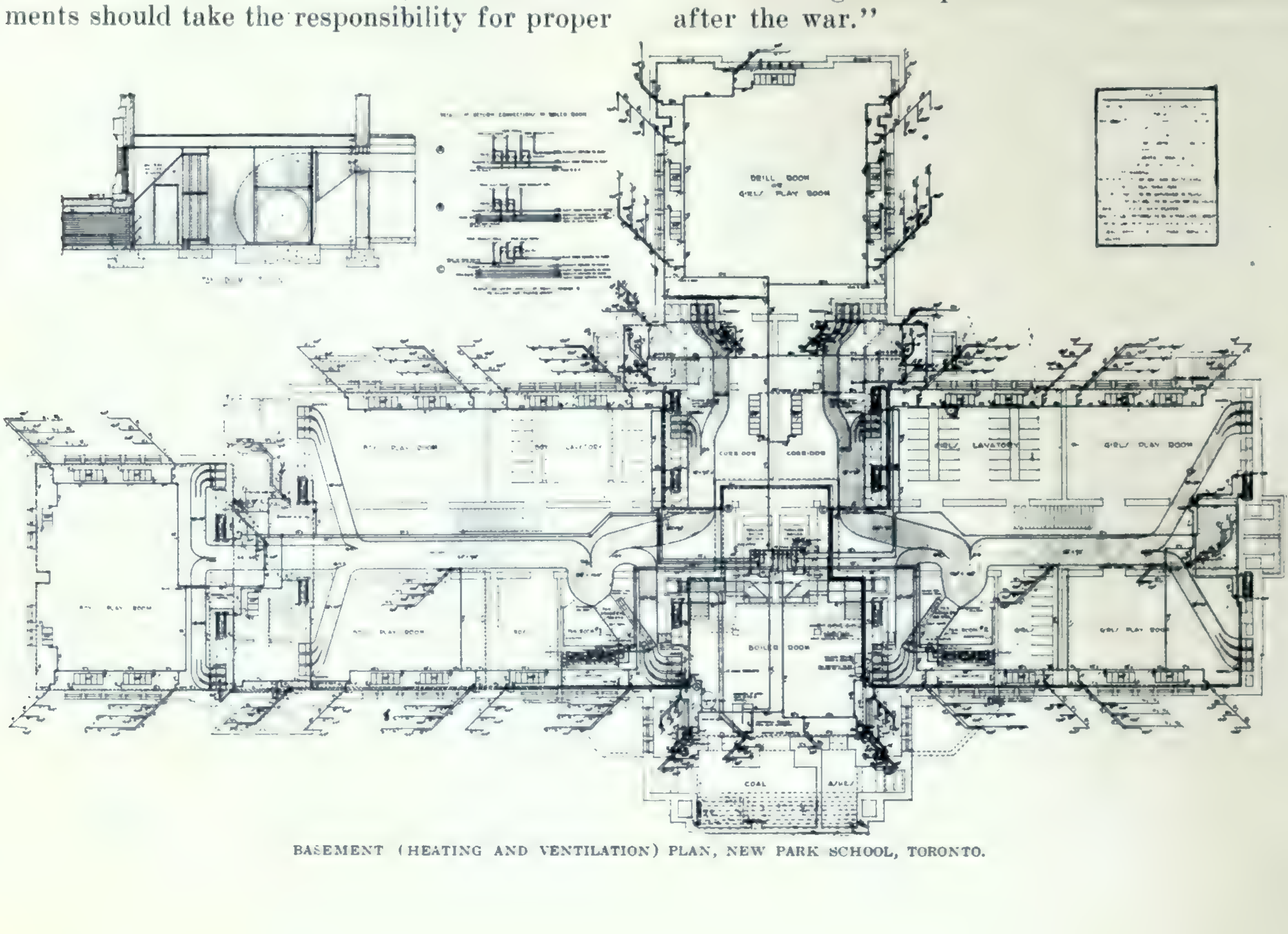


UPPER FLOOR PLAN, NEW PARK SCHOOL, TORONTO.



GROUND FLOOR PLAN, NEW PARK SCHOOL, TORONTO.

The Federal Government should provide the funds and set up a Central Expert Advisory and Supervisory Board. It should not build houses directly under its own control except for employes in Government factories, arsenals, naval establishments, or railroads. In all other cases housing operations in connection with war industries and returned soldiers should be carried out by the municipalities, with the aid of funds and expert advice provided by the Federal Government, through the agency of Provincial Governments. Department of Provincial Governments should take the responsibility for proper housing schemes, under the regulations of the Federal Government and subject to its supreme control in matters of finance. For the present no housing scheme should be carried out with the aid of public funds unless for some purpose directly connected with war production, but all such schemes should consist of permanent buildings, so as to make them contribute to the solution of the general problem of reconstruction after the war."



BASEMENT (HEATING AND VENTILATION) PLAN, NEW PARK SCHOOL, TORONTO.

SECTION OF NEW WING, COLLEGIATE INSTITUTE, WINDSOR, ONT. J. C. PENNINGTON, ARCHITECT.

Collegiate Institute, Windsor, Ontario

THE enlarged Collegiate Institute at Windsor, Ont., which was formally opened in February of this year, provides facilities calculated to meet the present needs of a growing population and the increasing demand for commercial and vocational training. In addition to the complete high school curriculum there are class accommodations for the teaching of household science and manual skill, including a department of mechanics of benefit to students who are desirous of qualifying to enter any of the several large local automobile industries.

The general scheme of the building preserves the old school facing Ann street, which was erected thirty years ago, and to which a four-room addition was built in 1906. To this the new part, conforming in plan to the letter I, gives increased accommodation more than doubling the previous classroom capacity, in addition to providing a large auditorium and gymnasium for assembly purposes and physical development. The practical work of the manual training classes is carried out in shops located in the east end of the new section. These shops are

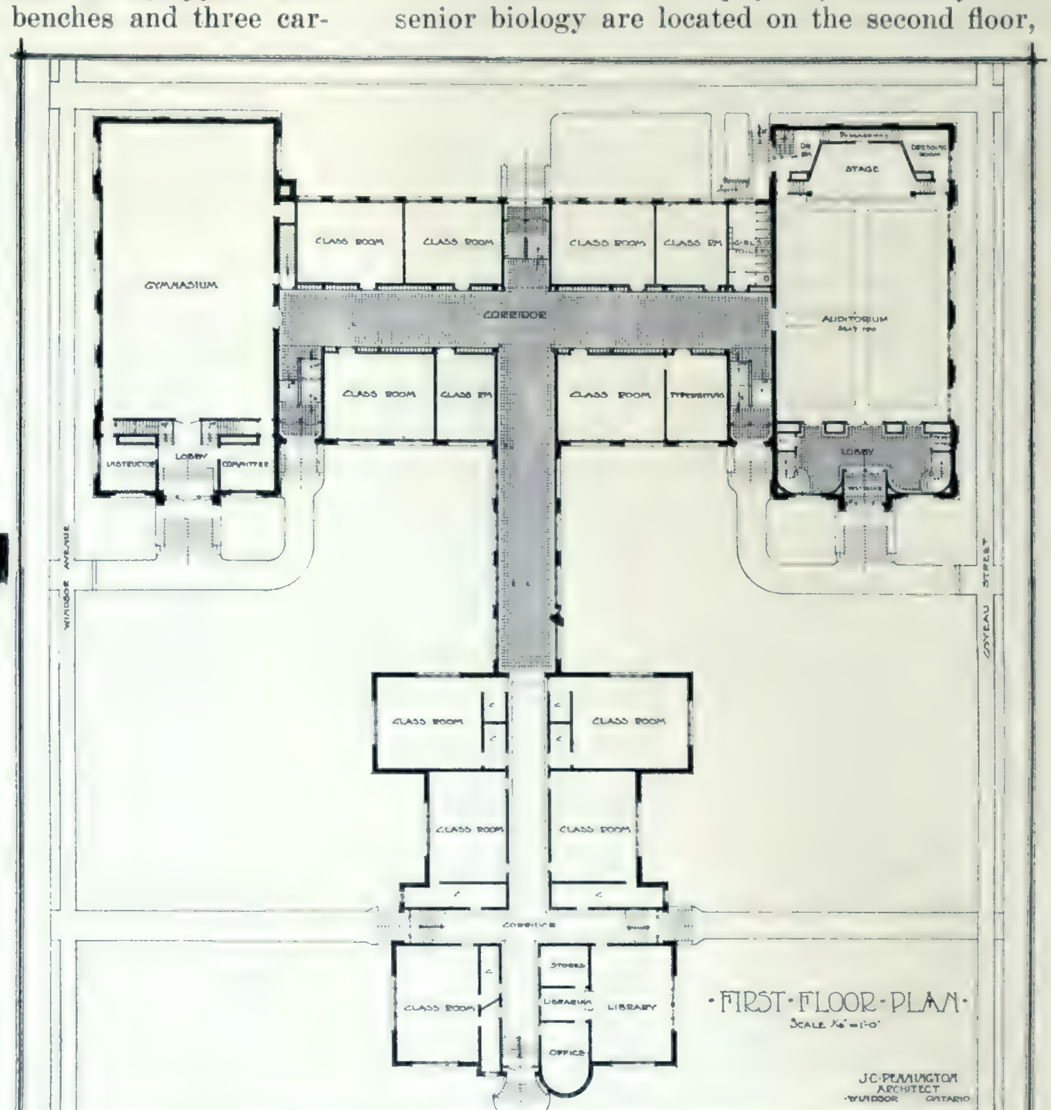
ENTRANCE TO AUDITORIUM, COLLEGIATE INSTITUTE, WINDSOR, ONT.

SOUTH ELEVATION, COLLEGIATE INSTITUTE, WINDSOR, ONT.

underneath the auditorium. These shops are underneath the auditorium so that the noise of the workshops will not disturb the other classrooms. The bench room is equipped with twenty-four individual benches and three carpenter benches, and is provided with six speed lathes and a band saw, all separately motor driven. Individual motors are also used to operate the equipment in the mill room, which includes a surfacer, a variety saw, a jointer and a boring machine. as well as two forges, while in the sheet metal and plumbing room modern tools and appliances are available for instructions in these two particular trades.

Spacious corridors and separate entrances at the front, sides and rear enable the students to enter or leave the building without the slightest semblance of crowding or disorder. Arranged along the corridors, which are 16 feet wide, are a system of metal lockers built directly into the wall, thereby eliminating any projection and contributing to the general appearance of neatness.

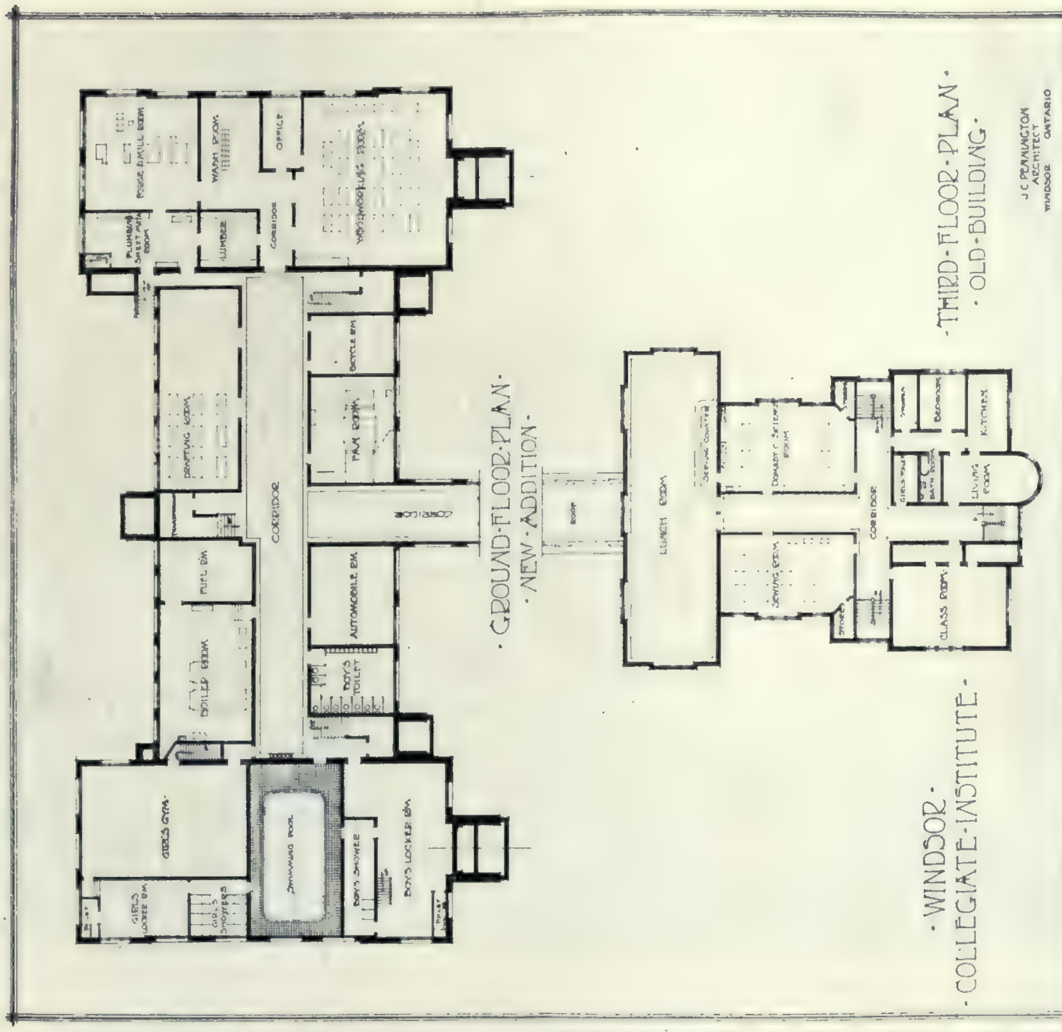
The laboratories for physics, chemistry and senior biology are located on the second floor,

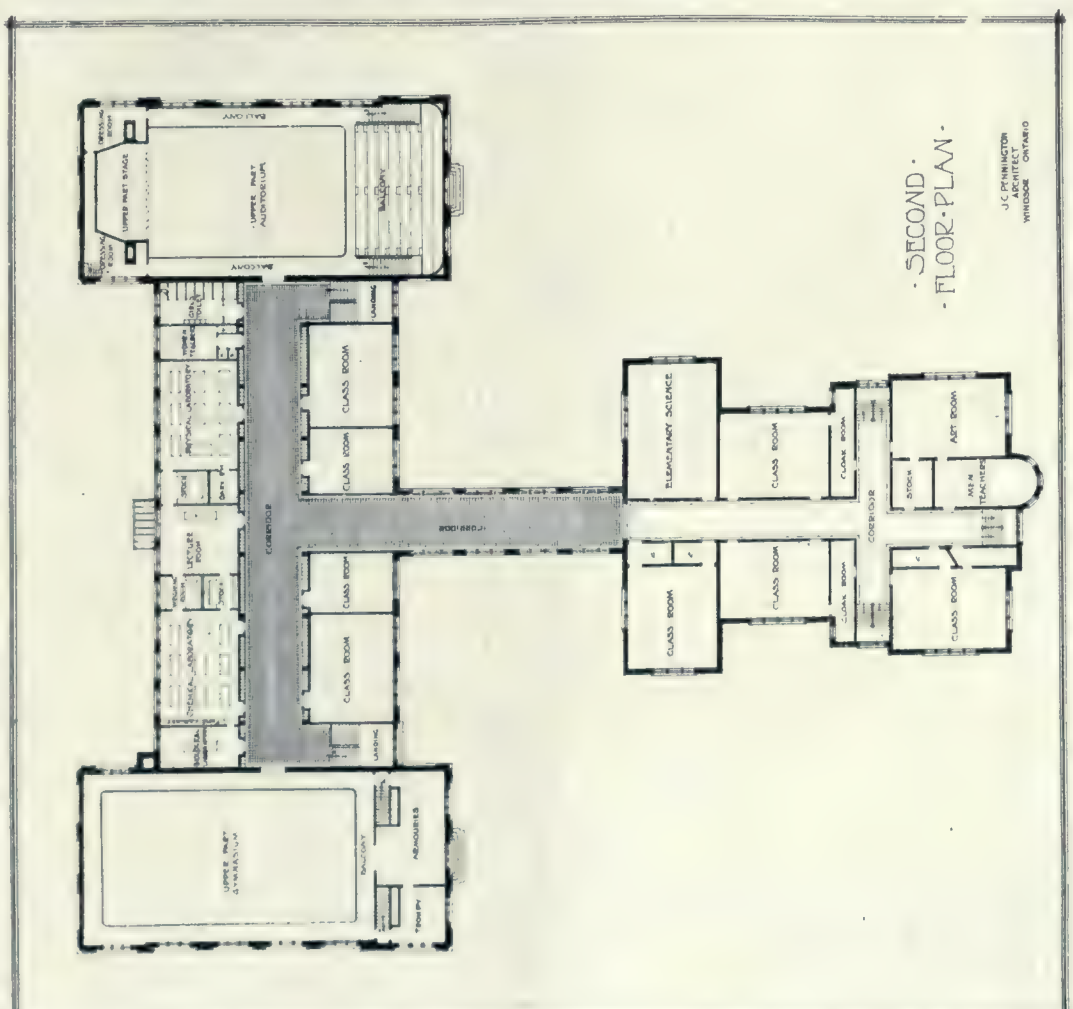


COLLEGIATE INSTITUTE, WINDSOR, ONT. J. C. PENNINGTON, ARCHITECT.

with doors between the laboratories and stock rooms, affording communication to the entire suite. The tables in the physical laboratory are provided with electric terminals, connected to the switchboard so that either alternating or direct current may be supplied to the student as needed. A 7 K.W. motor generator set and storage battery provides D.C. current of any voltage or amperage, within certain limits. The tables in the chemical laboratory are supplied with gas and hot and cold water, while an electric fan is employed to ventilate the fume cupboards.

The construction of the new part is of reinforced concrete, with outside brick walls, terrazzo corridor floors and oak trim generally where wood is used. The auditorium is finished in Caen stone and mahogany woodwork. The auditor-





COLLEGIATE INSTITUTE, WINDSOR, ONT. J. C PENNINGTON, ARCHITECT.

VIEW OF CORRIDOR, COLLEGIATE INSTITUTE, WINDSOR, ONT. J. C. PENNINGTON, ARCHITECT.

ium is 53 x 107 feet, and has a seating capacity of 750, and is so arranged that pupils may enter it for assembly from the first and second floors. It is designed with an outside entrance, so that it can be used without opening the remainder of the building, and is thus available as a community centre for general culture purposes.

The gymnasium is also 53 x 107 feet, with the floor space entirely free from obstructions for class training and games. On the ground floor are the locker room, shower bath and swimming pool. There is also a smaller gymnasium for the physical training of the girls, with its own locker room and shower baths. At certain times the girls also have the use of the larger gymnasium.

In the part constituting the old building the whole of the top floor has been rearranged for the teaching of domestic science and arts. The class kitchen for teaching cookery is a large, airy and well-lighted room, with places for twenty-four students. The kitchen is furnished with electric plates for individual work, modern cooking utensils, a gas range, refrigerator and sink. The sewing room, in which designing, cutting, dressmaking, etc., are taught, is equipped with tables, sewing machines, electric irons, fitting room and cupboards. There is also a model apartment, consisting of dining-room, kitchen, bedroom and bathroom, in which the students are given practical lessons in furnishing, decorating and managing a house.

The building is heated by steam, and the temperature is automatically controlled by thermostats. Ventilation is provided by a fan system, in which the air, taken from the outside of the building, or from the interior, is washed and heated to a fixed temperature.

Secondary clocks controlled by a master clock in the office give the time in each classroom. This master clock also controls the signal system for changing classes.

In addition to the day classes, the school is open practically every evening of the week for instruction in subjects of industrial value to persons employed in the trades and industries. The Board of Education is willing to teach any subject of industrial or educational value if a class of fifteen persons apply for it and it is at all practicable to do so.

Antique Statue of Pentelikon Marble

In the course of his excavations on the Palatine, Commendatore Giacomo Boni, the celebrated Italian archæologist, has just unearthed a magnificent statue of Victory, carved from marble from the renowned ancient quarries of Mount Pentelikon, near Athens, which dates from the fifth century before Christ The figure is eighty-five centimeters (nearly three feet) high, and is very pure, simple and majestic in style, corresponding in pose to the celebrated Torso of Victory by Phidias, now in the British Museum. Friezes from the Parthenon and other works of the most perfect Greek style have also been discovered.—"Stone."

The Small Country Schoolhouse

By Creighton Barker, M.D., Bureau of Municipal Research, New York City.

IT is scarcely possible to imagine a more unfortunate environment for the formative mind of the school child than that presented by the traditional country school. However, it may be said to the credit of the rural communities that many of them are eager to better existing conditions.

In many communities the school buildings not only house under compulsion twenty per cent. of the total population for eight hundred hours each year, but they also serve as chapels and general meeting places for the people in social and quasi-political gatherings. This community-centre function has only been partially developed, but it is actually a service that the schoolhouse should render and that is quite as important as housing the classes in the three R's. In the past, home and school were total strangers. The reasons for the estrangement between these two principal centres of education are to be found, on the one hand, in a misconception as to the school's object and, on the other, in social conditions.

The school, it was held, had no other duty toward the community than to supply the children with book knowledge. That a sound and natural development of community spirit and social betterment should go together with the intellectual development of the children, and form a natural foundation for all education, the school never considered. To fulfill its purpose completely the school must extend its influence beyond its walls into the homes of the community and into business and social intercourse.

There is at present a very commendable tendency in certain localities to consolidate a group of adjacent district schools under one roof and to transport the children from their homes to the school in omnibuses or automobiles. Such a plan not only insures improved accommodations for the school children, but also effects economies in teachers' salaries, heating and repairs. Various schemes have been followed out in making this consolidation. If it be a group of schools within the same township, the so-called union school has been constructed; and the various districts pay per capita rate for the children attending the school. If, however, the children are drawn from two or three townships, frequently the towns will co-operate in constructing the building and then pay the educational costs proportionately, or one town may erect a building independently and per capita costs are paid by the other towns. When such a building is contemplated a more pretentious and completely equipped plant is possible than was ever afforded by the familiar one-room rural schoolhouse.

It is scarcely possible to outline a definite plan for such a building, since many variations must be considered in each locality, such as site, structural materials and capacity. There are, however, certain fundamental standards which must be taken into consideration, and should be adopted everywhere without variance.

LIGHTING.

The subject of illumination is highly technical, and the practical application of the principles involved, in so far as daylight illumination is concerned, is not easy, due to the absence of working standards. Recently, however, certain requirements for the daylight illumination of classrooms have been deduced. The object of these requirements is:

1. To insure a maximum of light from the right direction.

2. To insure a maximum diffusion with avoidance of objectionable glare.

3. To make suitable provision for regulation of the light by increasing or diminishing the amount admitted, as necessity may demand.

In order that sufficient light may enter the classroom properly to illuminate all desks, certain standards have been adopted.

The most widely accepted standard is the one which requires the glass area of classroom windows to be not less than one-fifth of the floor space of the classroom. This standard, however, does not cover all the factors which should be taken into consideration. In order to have each desk properly illuminated, it has been suggested that the child sitting at the desk should be able to see a part of the sky vault from the seat, and that this visible sky surface be measured by a reduced solid angle of not less than fifty square degrees. This presupposes that the angle of incidence of luminous rays—that is, an angle formed by a plane from the upper surface of the desk cutting the upper edge of the window and another plane from the same point cutting the lower edge of the visible sky surface—should not be less than five degrees, which is best effected by extending the windows as nearly as possible to the ceiling. This and other arbitrary standards of illumination demand wide modification, because they take into consideration direct light only without reference to the factor of reflected light from any source.

The most rational illumination standard is the actual measurement of light by the illuminometer at each desk. The illuminometer reading at each desk should not be less than ten foot candles under all conditions

Not only is an abundance of light necessary, but it must be admitted from the proper direction if the maximum effect is to be secured with

ELEMENTARY SCHOOL, SUTTON COLDFIELD, ENGLAND. *From The Builder.* CROUCH, BUTLER & SAVAGE, FF.R.I.B.A., ARCHITECTS.

BOROUGH OF SUTTON COLDFIELD, ENGLAND, TECHNICAL SCHOOL. *From The Builder.* CROUCH, BUTLER & SAVAGE, FF.R.I.B.A., ARCHITECTS.

the least discomfort to the eye. Unilateral window arrangement to the left of the pupils is generally adopted in this country. Frequently the shadow of a very stout child seated between the window and the desk occupied by a child who is much smaller reduces the illumination of the latter's desk. In addition to this objection, whenever unilateral illumination is practiced the desks immediately adjacent to the windows frequently receive illumination of too great intensity, which is hard to regulate without throwing a part of the classroom in shadow. Two-sided classroom illumination, with windows on the left and in rear of the pupils, is to be preferred. The only reasonable objection to this arrangement is the annoying effect on the teacher, who is seated facing the rear windows. There is no valid reason for this location of the teacher's desk, and the disadvantage is readily obviated by placing the teacher's desk diagonally across the left hand front corner of the classroom.

The illumination of the classroom is frequently defective, because measures have not been taken to secure a maximum diffusion of light. The diffusion of light depends upon the fact that all materials affect light and under carrying conditions scatter it to a greater or lesser degree.

Glare is observed when light rays are nearly parallel to the eye level. Therefore, light sources situated above this level are more likely to be free from glare. For this reason the lower edge of the classroom windows should be well above the visual level of the seated pupils.

Certain polished surfaces, largely through their color, reflect a dangerous glare. For this reason the side walls of the schoolroom should have a mat surface free from gloss. In the case of the ceilings, however, no such objections exist, because the light reflected from them is at the greatest possible angle to the visual level and is not likely to produce a glare. Classroom walls should be colored in a manner to obtain reflection with a maximum of diffusion—shades of the primary colors, yellow and green, are to be selected, because they not only have a high reflection coefficient, but also absorb other rays, not concerned in illumination, which may be injurious to the sight.

The regulation of intensity of light should receive careful attention. The most effective means for such regulation is the use of translucent window shades backed by an opaque shade to shut out direct sunlight. The shade fixtures would be of a type to permit the adjustment of the shades from either the top or the bottom of the window.

HEATING.

Under the conditions ordinarily encountered in rural schoolhouse construction the problems of heating and ventilation are so closely allied that they must be considered together. This is due to the necessity of warming the fresh air introduced into the classrooms in cold weather to replace that removed in the course of ventilation. Under ordinary circumstances a stove is the only heating apparatus available for the rural schoolhouse, and from an economic standpoint this is the most effective method for warming a schoolroom, since the modern base-burner stove utilizes seventy or eighty per cent. of the fuel value of coal. There are many defects in the heating with a closed stove, and an attempt to overcome these defects has been made in adapting the jacketed stove. In such a heating apparatus the stove is surrounded by a sheet-iron jacket with a fresh air intake at the bottom which penetrates the wall of the building. Connected with the stovepipe is a perpendicular foul air outlet with an opening at the base, through which the foul air from the lower part of the room is carried out. This outfit serves both as a heating and ventilating apparatus and should provide sufficient change of air.

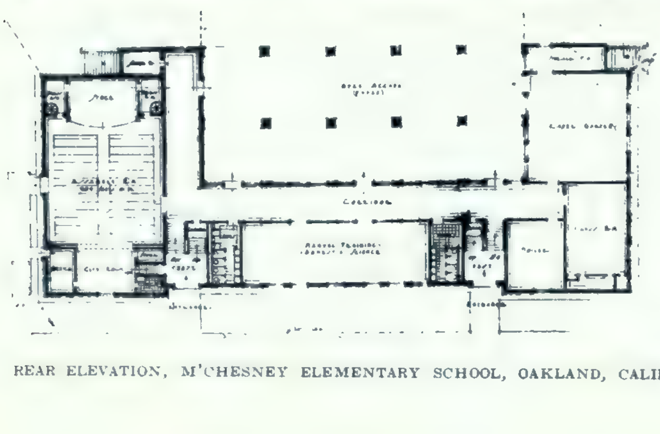
The measure of sufficient change of air is somewhat indefinite, but an arbitrary standard has been accepted which requires fresh air to be supplied in volume sufficient to keep the amount of carbon dioxide down to not more than six parts in ten thousand. Various States have different requirements in regard to the amount of air each pupil should receive per minute. These average about thirty cubic feet per minute or one thousand eight hundred cubic feet per hour. The number of air changes necessary to supply this amount depends upon the cubic capacity of the classroom and the number of pupils. The cubic space allowed each child should be large enough to demand not more than six changes of air per hour in order to avoid drafts, and it may be stated that two hundred and twenty-five cubic feet of space and twenty square feet of floor space should be allotted to each child.

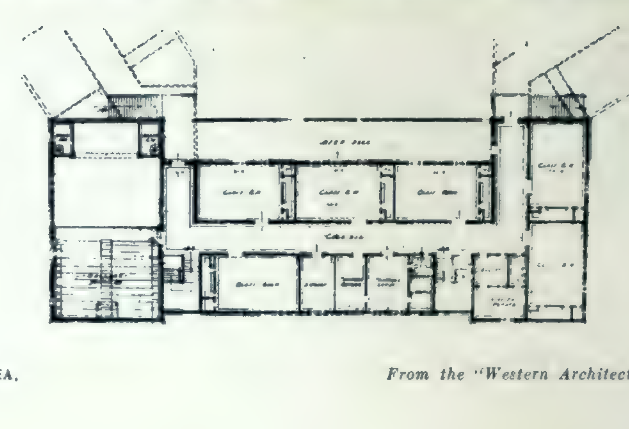
BLACKBOARDS.

Blackboards are an essential for classroom instruction and careful attention should be given to their construction, with consideration as to their distance from the floor level and their location in relation to the windows.

The use of wood can no longer be tolerated as blackboard material. The surface of such boards soon acquires a polish which causes a glare that interferes with vision. Composition blackboards are now on the market, which give good service for a short time. Most of these, however, have no great lasting qualities and soon acquire a roughened surface which interferes with writing and vision. In the end the cheapest blackboard material is slate. To meet the requirements of an ideal blackboard, however, slate must present a black surface and not the usual gray of the cheaper slate. It has been

M'CHESNEY ELEMENTARY SCHOOL, OAKLAND, CALIFORNIA. JOHN J. DONOVAN, ARCHITECT.





REAR ELEVATION, M'CHESNEY ELEMENTARY SCHOOL, OAKLAND, CALIFORNIA. *From the "Western Architect."*

stated that a classroom cannot have too much blackboard space. This statement demands qualification, because it was evidently made without due regard to classroom illumination. Where the demands for large blackboard surfaces are imperative, blackboards may be provided with curtains of light color, by which they may be covered when not in use and thereby obviate the absorption of light by the dark surface.

The location of blackboards is of the utmost importance. They should never be placed between windows nor in obscure parts of the classroom. The best location for blackboards is on the front wall. This space may be supplemented by utilizing the right hand wall if left sided illumination is adopted. In both of these locations the blackboards receive good light and are visible without discomfort to the entire class.

The pupils may be protected to a large extent from chalk dust by the installation of shallow troughs from three to four inches wide, which are placed at the bottom of the blackboards and covered by detachable wire screen of coarse mesh. This arrangement protects the fingers, crayons and erasers from the accumulation of powdered chalk. Dust from this source is irritating to the respiratory mucous membrane. The troughs should receive daily attention and be emptied after school hours.

COATROOMS.

No single feature of rural schoolhouse construction has been so consistently neglected as the proper accommodations for the care of wraps and other articles of extra clothing of the school children. The coatrooms in the country schools should provide ample space for drying wraps.

The most suitable location for a coatroom is open to much argument. Just why the coatroom should open into the classroom, as has been advocated by some, is not apparent, and furthermore there is but little to commend the practice of ventilating the classroom through the coatroom by an outlet placed in the lower part of the communicating door. In general, the coatroom should be easily accessible with an outside exposure to insure the admission of sunlight and window ventilation.

The width usually advised for coatrooms is four feet, with fifty linear feet of wall space for each twenty-five pupils. Suitable pegs or hooks should be provided and located on the walls at various levels for the accommodation of children of different heights. Racks or frames for drying moist clothing are rarely seen, but are a most valuable species of furniture in the coatroom.

The addition to the schoolhouse of a room that will be available as a meeting place for people of the community is an innovation that cannot be too highly commended. Finally, both the auditorium and the surroundings of the schoolhouse should receive careful attention. Flowers and shrubbery should be set out and placed under the care of the pupils.—"Architectural Record."

Research Into Properties of Concrete.

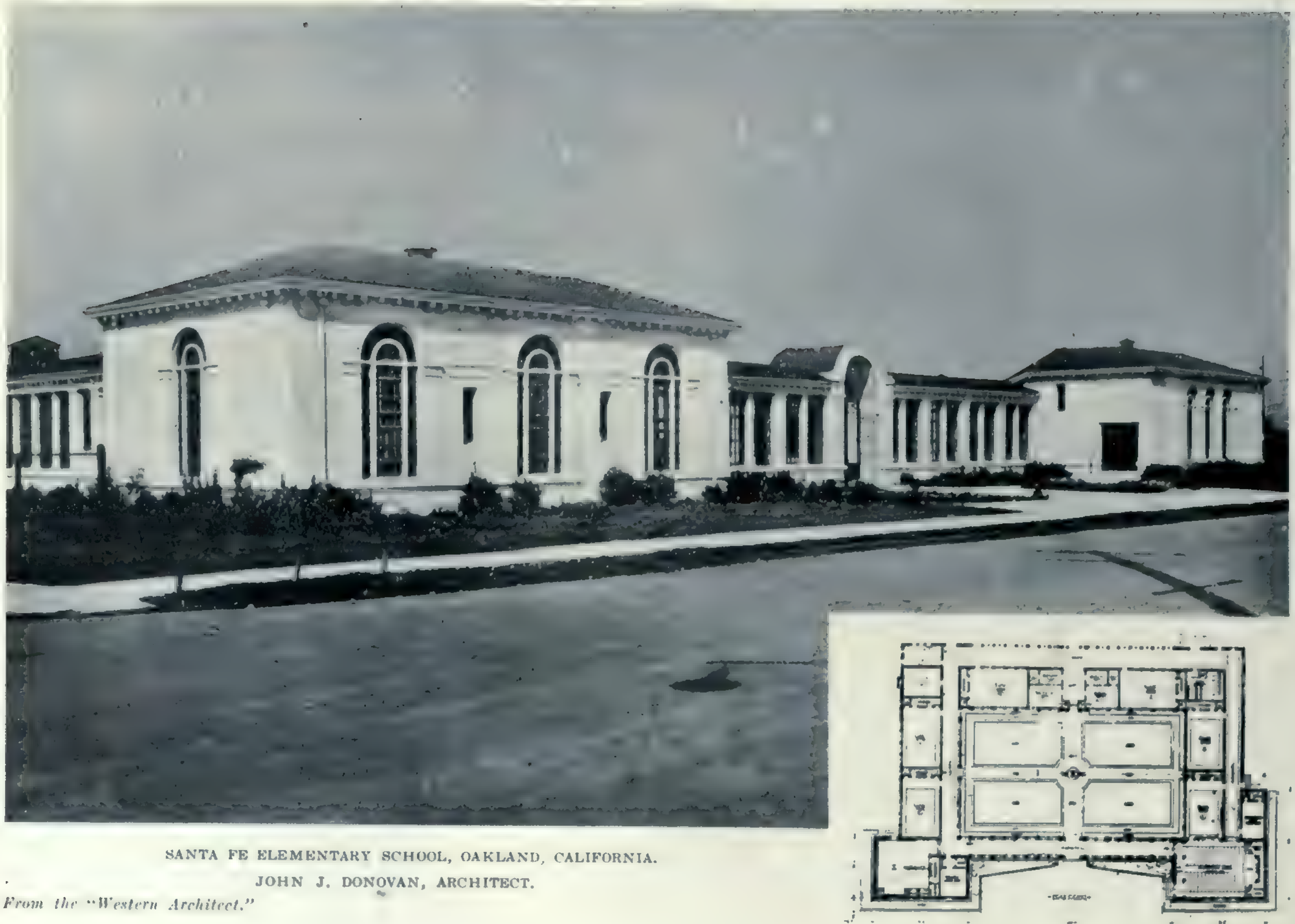
At a recent meeting of the Minneapolis Engineers' Club, Professor Abrams of Lewis Institute, Chicago, delivered an address on "Results of Recent Researches in the Properties of Concrete."

Tests to the number of approximately fifty thousand a year were made to determine valuable data governing concrete construction. The results of many of these tests have never been published. The only public utterances ever made regarding them were in the address of Professor Abrams at the auditorium in the Main Engineering Building at the University of Minnesota, and in a recent similar address at the Lewis Institute before an audience of engineers from twenty-one States.

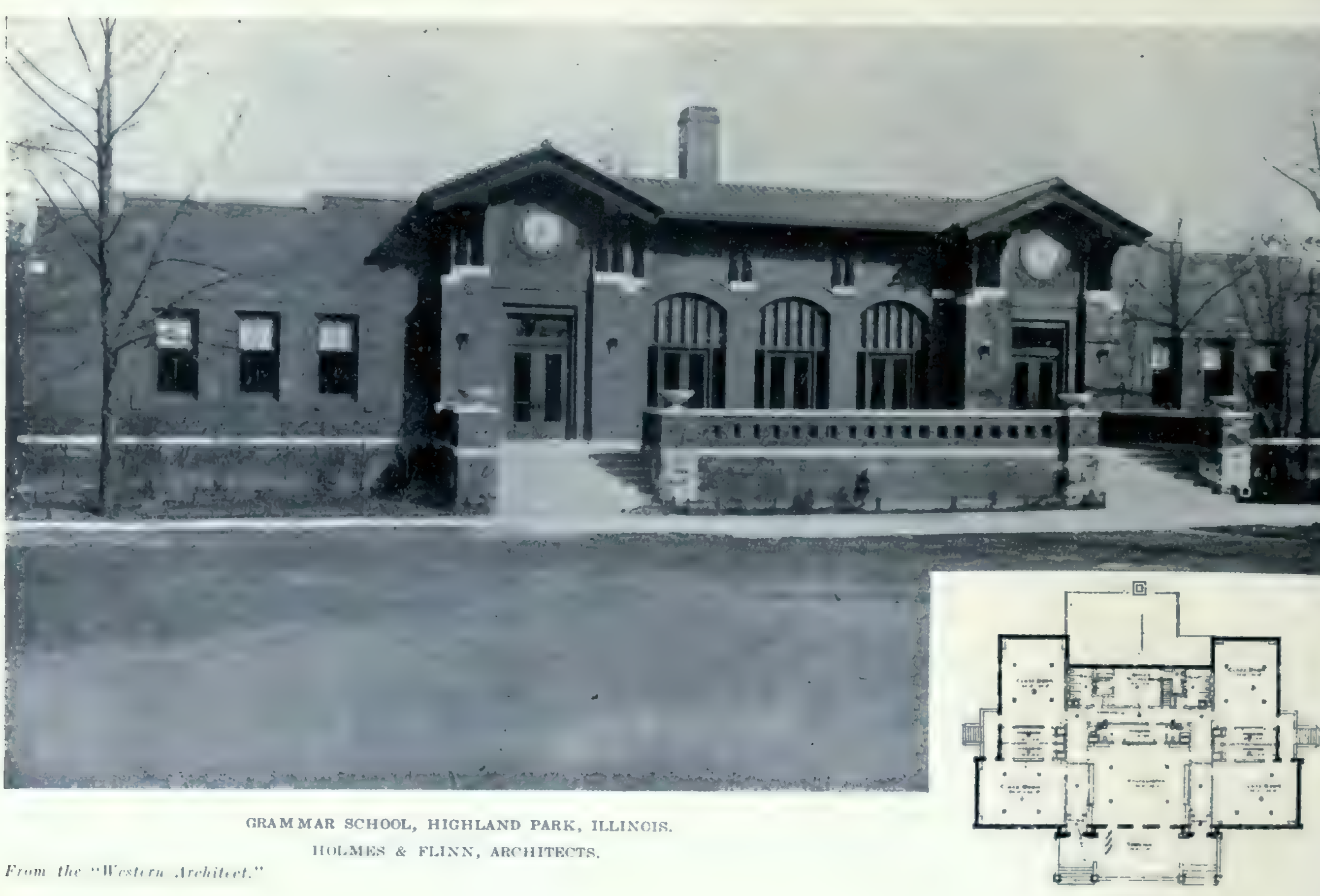
While there is not time in the limits of a single address to go very exhaustively into the subject, Professor Abrams was able by the aid of slides to present to his auditors a fairly comprehensive idea of some of the important results achieved. Two or three points stood out prominently as the unmistakable results of the series of tests. One is that the engineer who permits aggregates to be flooded makes a grave mistake. Professor Abrams said that excessively wet concrete never gives the strength that drier concrete gives, and it is a mistake to believe that excess water merely runs away, without permanently harming the quality of the concrete.

Professor Abrams said that the use of concrete is very largely a question of correct proportioning. Four or five different theories have been presented, and the ordinary method of proportioning is based mostly on arbitrary selectioning, but the proper method must take into account the properties of the materials themselves. Cement to-day, he said, requires the least attention of all the materials entering into concrete. Only lately has serious attention been paid to water, but the tests at Lewis Institute have proven that water is absolutely the most important element going into concrete—the element that requires the greatest care and knowledge in its use.

The quantity of water necessary to get the best results depends upon the nature of the aggregates used. Some aggregates are of a porous nature, and absorb so much water that it is necessary to use more water than in nonabsorbent aggregates or the mixture will be too dry. It is necessary to use more water in a fine aggregate than in a coarser aggregate. Exhaustive tests showing strength obtained by the use of relative sizes of aggregates, varying materials used as aggregates, and by dry or wet mixes, have been made at Lewis Institute.

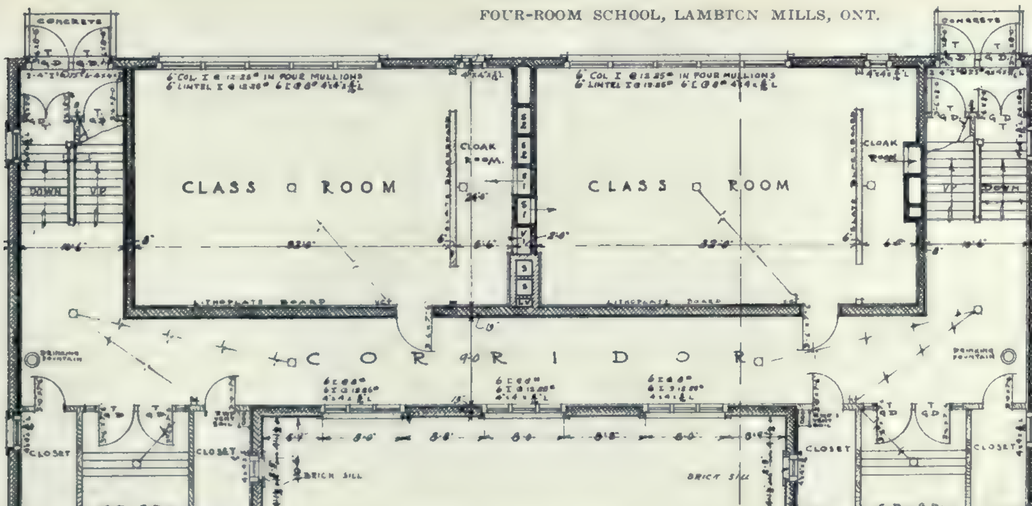


SANTA FE ELEMENTARY SCHOOL, OAKLAND, CALIFORNIA.
JOHN J. DONOVAN, ARCHITECT.
From the "Western Architect."

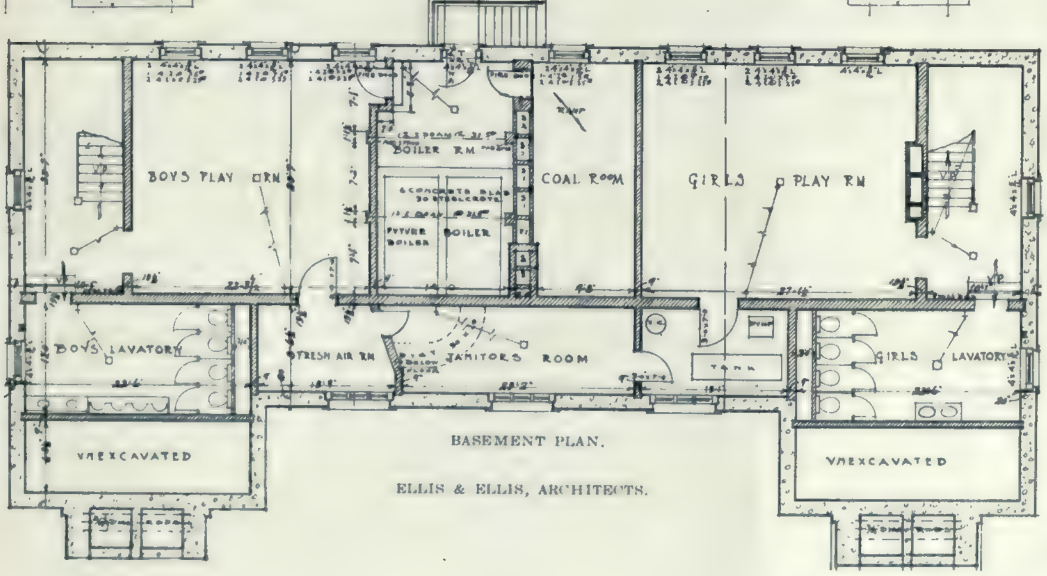


GRAMMAR SCHOOL, HIGHLAND PARK, ILLINOIS.
HOLMES & FLINN, ARCHITECTS.
From the "Western Architect."

FOUR-ROOM SCHOOL, LAMBTON MILLS, ONT.



GROUND FLOOR PLAN.



BASEMENT PLAN.

ELLIS & ELLIS, ARCHITECTS.

A Joint Meeting Held

The local section of the American Society of Mechanical Engineers met jointly with the Toronto branch of the Engineering Institute of Canada on the evening of July 3rd, at the Engineers' Club, 96 King street west. Papers were presented by Mr. Edward Maybee on the subject of "Patents of Invention," and by Mr. Holmes, of the Invalided Soldiers' Commission, who spoke on "The Training of Disabled Soldiers in the Industries." A good attendance was reported.

Mr. A. J. Rowley has opened an office for architectural practice in the Western Trust Building, Regina, Sask.

CORRIDOR, LAMBTON MILLS SCHOOL.

New School, Lambton Mills, Ontario

The new Lambton Mills School is planned on the unit system, which involves the principle of a preconceived scheme providing for future accommodation as part of a general plan. While at present it contains only four classrooms, provision is made for adding to the building up to the size of sixteen classrooms. These extensions will be made so that as each addition is carried out the structure will have a finished and complete appearance. The design, which has a Georgian feeling, is somewhat more meritorious than is usually found in the average school in the smaller communities and country districts. The brick work is exceptionally well done, consisting of a plain, simple effect which derives the suggestion of a pattern from headers placed at every eighth row. Rug brick is the material used, backed by hollow tile, the entrances and trimming being of Indiana limestone.

Quite an interesting feature of the plan are the corridors, which are placed so that direct outside light is obtained along their entire length. The general practice in both this country and the United States is to flank both sides of the corridors with classrooms and to depend on transoms and end windows for light. The later arrangement gives a more economical building, but it is claimed by some that this advantage is gained at the sacrifice of proper light and attractiveness. With the corridors placed as in this building, the lighting makes it possible to adorn the walls with pictures and paintings, thus making the corridors serve effectively as a sort of art gallery in connection with the school.

The basement and ground floor plans only are shown herewith. The upper floor follows the same general arrangement as the floor below, with the exception that immediately over the entrances the space is utilized for the principal's office and a large teachers' rest room, each of which have adjoining lavatories and lockers. The general interior trim is of Southern pine of beautiful grain and transparency, giving a very pleasing effect, the detail being quite simple. Each classroom has a ventilated wardrobe compartment, and is fitted with an inter-communicating phone and electric call and fire alarm bells. The recreation rooms and lavatories for both sexes are located in the basement.

The heating and ventilating is done by a very complete plenum system, each pupil and occupant being supplied with thirty cubic feet of fresh properly tempered air per minute. The district in which the school is located has not as yet any sewerage connection, but in lieu of this for the time being a system of modern chemical closets has been installed.

Colonel Lowe Honored.

A complimentary dinner was recently given by T. S. Rogers, K.C., chairman of the Halifax Relief Commission, in honor of Col. Robert S. Lowe, who since the explosion has been in charge of the reconstruction, and who for his services in those six months has declined to accept any remuneration. Among citizens prominent in public life present were: Premier Murray, Judge Wallace, Mr. Fowke and Hon. A. K. McLean, who paid tribute to the magnificent service rendered by Col. Lowe to the Relief Committee. Following the dinner Col. Lowe left for Ottawa on business connected with contracts in Ontario, but will return to Halifax from time to time to supervise the work which is being carried out by the company of which he is general manager.

A New Use For Luminous Paint

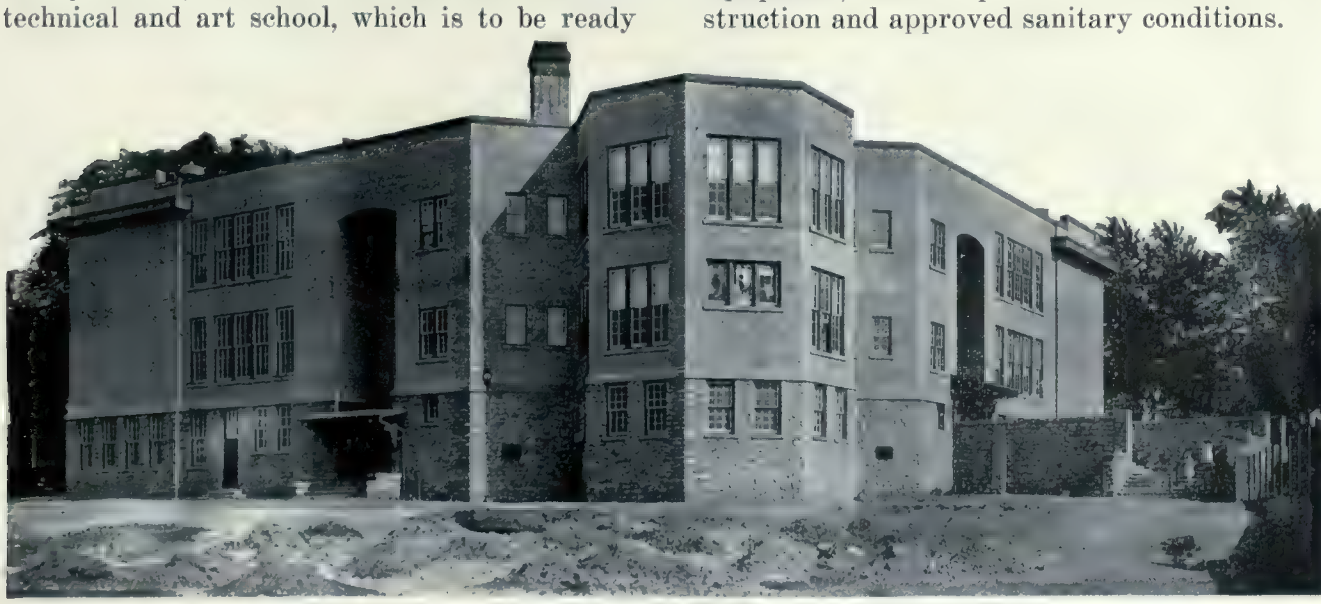
A Boston hotel with a large electrical sign, when compelled to cut off its illumination under the recent U.S. Fuel Administration order prohibiting such uses of current, had the sign painted with luminous paint, which is said to be a fairly satisfactory war-time substitute.

NORTHEAST VIEWPOINT, RIVERVIEW SCHOOL, LONDON, ONT. L. E. CARROTHERS AND J. V. MUNROE, ARCHITECTS.

London (Ontario) Schools

A SURVEY of the school situation in London, Ont., five years back emphasized the fact that the city had outgrown its existing accommodations; that in consequence of this, overcrowding had resulted, and that it was necessary to utilize buildings never intended for school purposes in order to house the children of one or two certain districts. Since then seven new schools have been erected, including five structures of standard type, a modern one-storey school, and the new half-million-dollar technical and art school, which is to be ready this coming September for the opening of the fall term.

The new buildings, which represent the work of local architects, are situated so as to effectually serve both the central and outlying districts, and therefore give accommodations conveniently accessible to the children of all sections. They are surrounded by sufficient grounds for both lawns and recreation purposes, and conform to accepted standards of plan and equipment, based upon safe economical construction and approved sanitary conditions.



SOUTHWEST VIEWPOINT, RIVERVIEW SCHOOL, LONDON, ONT.

Examples of the types of buildings erected are illustrated in the four accompanying subjects, viz., the Riverview School, Lord Roberts' School and the Tecumseh and Aberdeen Schools. The former is an eight-room school, built on the side of a hill, and hence is somewhat unusual in the arrangement of its plan. The building is in the shape of an L, which is well adapted to the corner on which it stands, and gives an excellent view from the rooms to the river in the rear. Features of the plan are the bays, with seats in the corridors, the three exits and the separate kindergarten and teachers' entrance. The exterior design is simple and pleasing in its balance and general proportions. Local white brick, laid in red colored cement mortar, is used for the wall, and Bedford stone for the entrance. The sub-basement is in concrete, and the corridors, boiler room, coal room and staircases are fireproof. Both the corridors and lavatories have terrazzo floors. The heating installation consists of a two-pipe vapor system, said to be very economical and efficient, and the plumbing fixtures are of the latest porcelain type, the lavatories and all parts of the building being ventilated by motor-driven fans. While the slope of the ground necessitated an expensive foundation, the structure was built at a cost of $53,300, or approximately 13½ cents per cubic foot.

Considering the type of construction employed in these various schools, and the fact that their erection was carried out during the period of the war, the matter of expenditure has been well controlled. The cost of the new Lord Roberts' School was $70,000, or approximately 17 cents per cubic foot. This building has thirteen classrooms, a library and an indoor swimming pool. The corridor floors are of concrete, surfaced with terrazzo, which is also used in the domestic science room, the main partitions being of brick throughout. The introduction of the swimming pool in the basement scheme has been successfully done without any encroachment on space required for other purposes. It comprises a most desirable feature, and will undoubtedly be more generally adopted in future schools. The swimming pool room occupies 29 x 33 feet, of which 26 x 13 feet is taken up by the tank itself. Both the tank and the floor are of concrete, finished with a waterproof hardener. The plumbing, heating and ventilating installation of the building are along approved modern lines, all classrooms and corridors receiving a supply at regular intervals of fresh, washed, tempered air. The lavatories are located in the basement, and have metal partitions and porcelain fixtures. The closets are exceptionally well ventilated, the air being drawn through seat vents into ducts and carried to a roof exhaust.

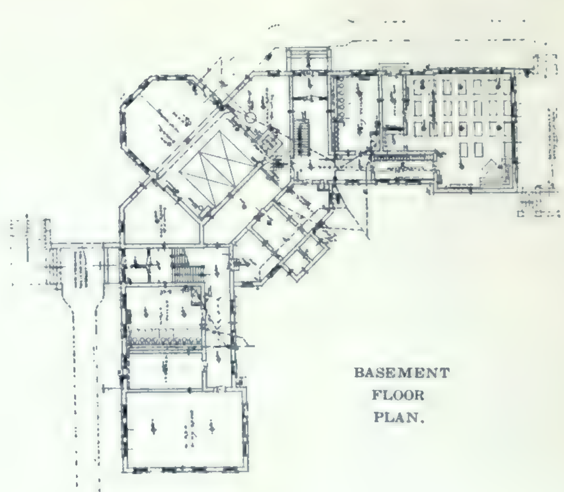
Both the Tecumseh and Aberdeen Schools are built on similar lines to the construction just described. They were erected in 1914-15, and were to a large extent the nucleus of London's present up-to-date school system. The buildings are decidedly modern in every respect, having rug brick exteriors, fireproof corridors and stairs, maple floors in classrooms and Georgia pine trim, stained and varnished. The plumbing is thoroughly up-to-date, as are also the heating and ventilation. Both schools are planned for such future extensions as may be required from time to time.

GROUND FLOOR PLAN.

RIVERVIEW SCHOOL, LONDON, ONT.

L. E. CARROTHERS AND J. V. MUNROE, ARCHITECTS.

UPPER FLOOR PLAN.



BASEMENT FLOOR PLAN.

ABERDEEN SCHOOL, LONDON, ONT. WATT & BLACKWELL, ARCHITECTS.

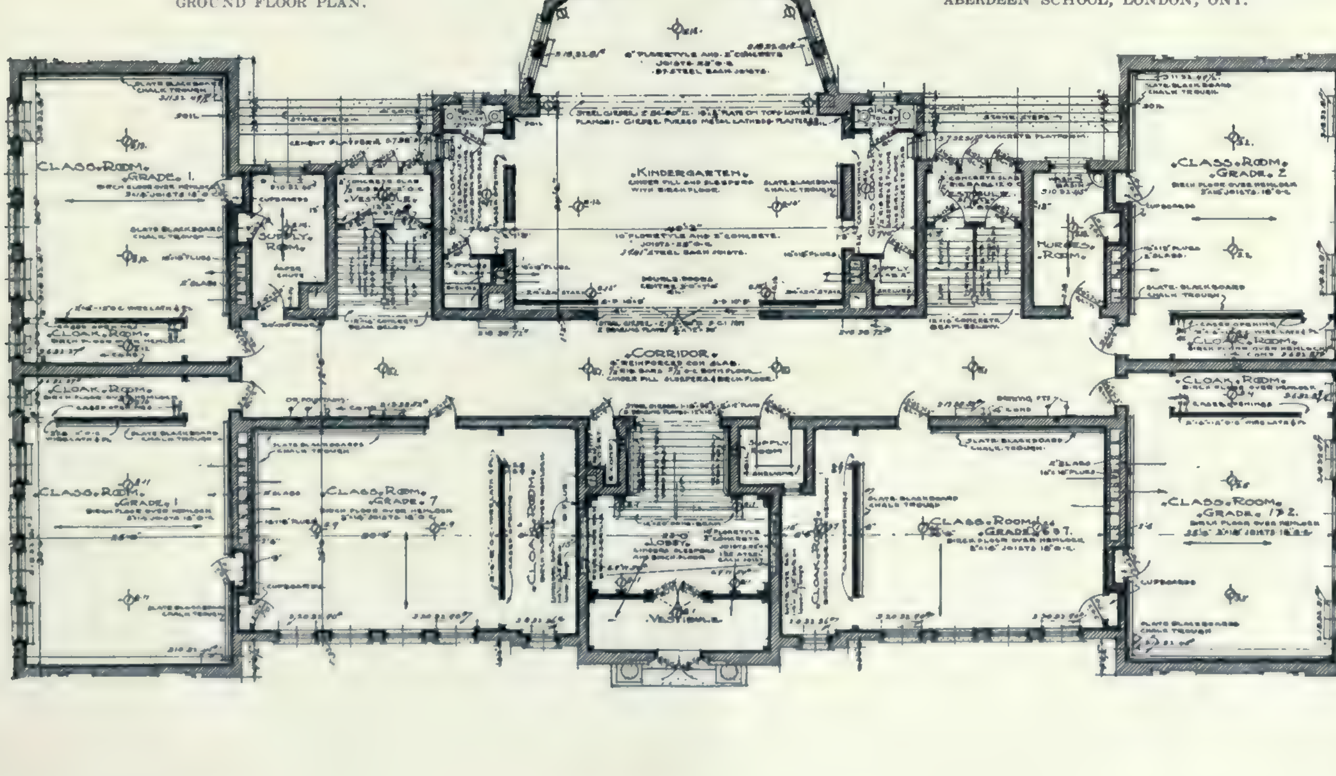
Building Costs Will Not Decrease.

Building material costs are adjusting themselves. People who have an interest in construction generally are beginning to understand that the days of low cost—if they ever come again—are far distant. The war has caused a huge increase in everything that goes into building. The increase thus far has been excessive, it is true, but not so excessive as some may think.

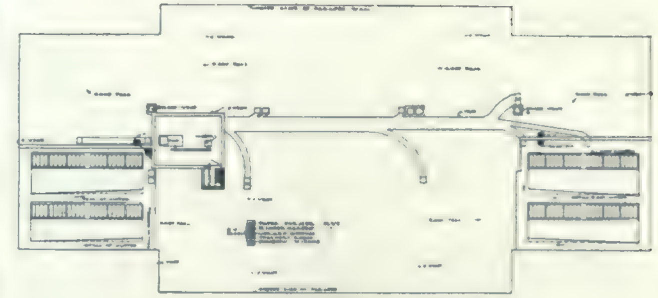
Labor prices will remain high for a long time. The decrease in men through losses in the war, the rebuilding of shattered Europe, even after peace comes, and the consequent demand for labor, means that, under the working of the inexorable law of supply and demand, labor is going to be high for a long time. This applies both to skilled and unskilled labor.

For practically the same reason material costs are going to remain high. It will not only be because of the manufacture of war necessities, but from the demand for peace necessities which will come after the war. Institutions of production have been destroyed and will have to be rebuilt. Demands of an extraordinary

GROUND FLOOR PLAN. ABERDEEN SCHOOL, LONDON, ONT.



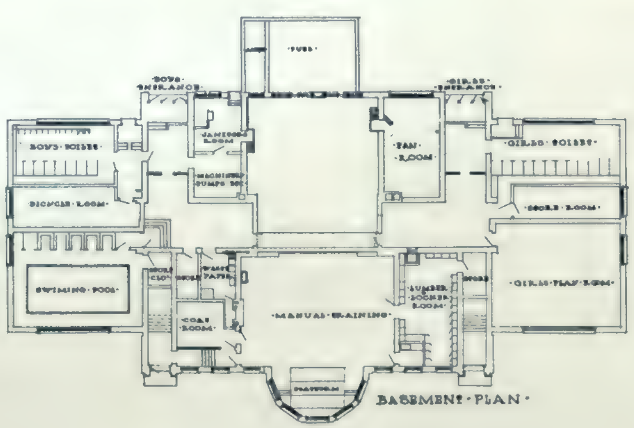
EXTERIOR VIEW, LORD ROBERTS SCHOOL, LONDON, ONT.



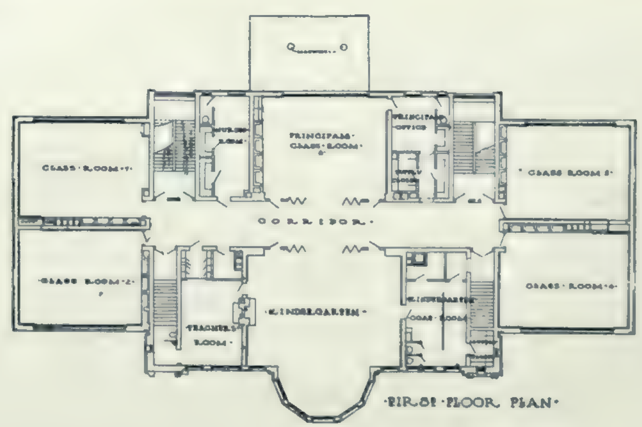
PLAN OF ROOF, EXTRACT DUCTS

LORD ROBERTS SCHOOL,
LONDON, ONT.

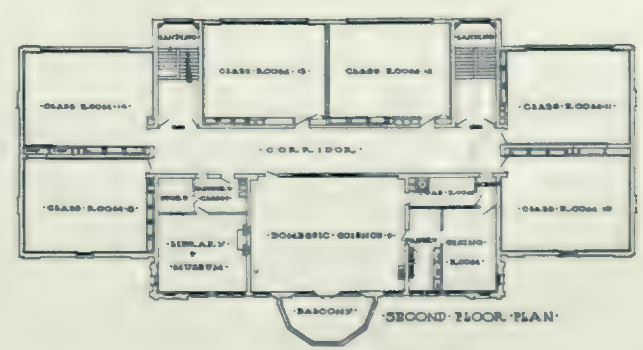
M'BRIDE & GILBERT,
ARCHITECTS,
AND
A. E. NUTTER,
ASSOCIATED ARCHITECT.



BASEMENT PLAN

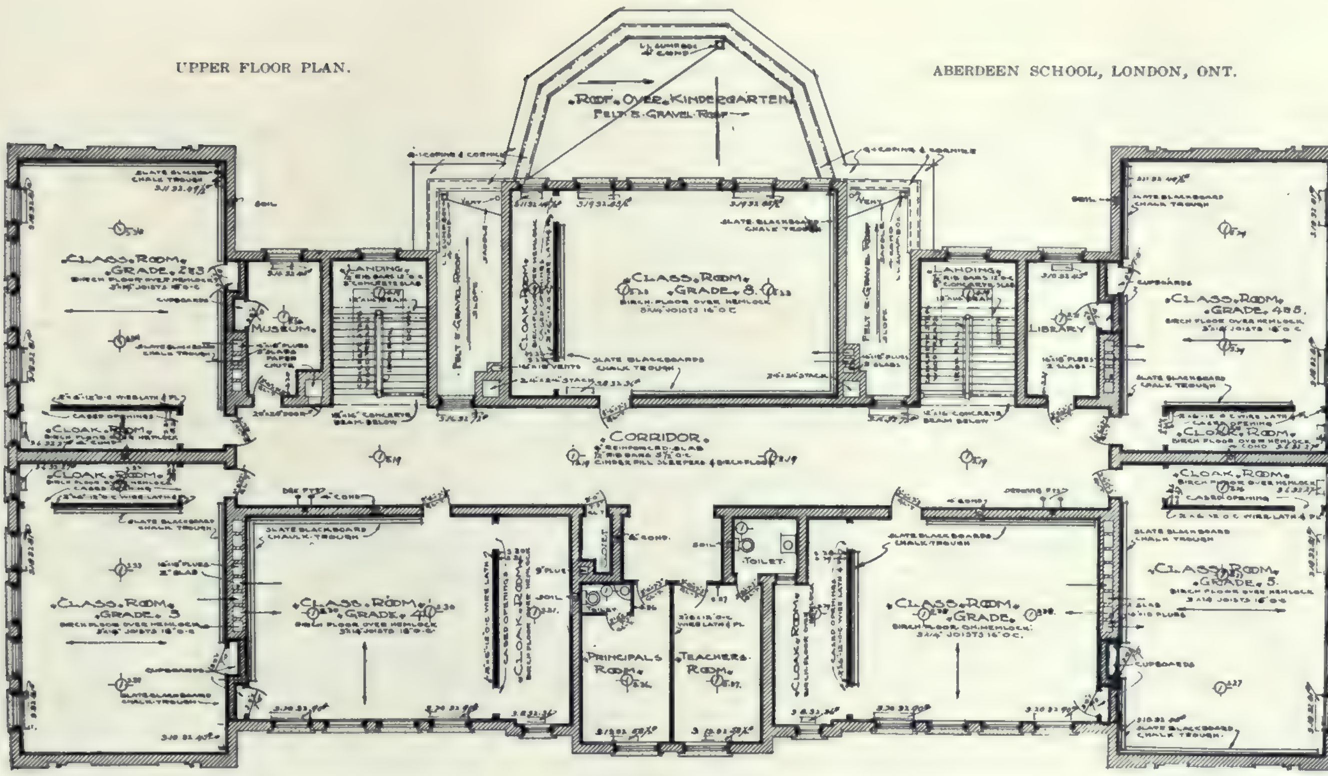


FIRST FLOOR PLAN



SECOND FLOOR PLAN

UPPER FLOOR PLAN. ABERDEEN SCHOOL, LONDON, ONT.

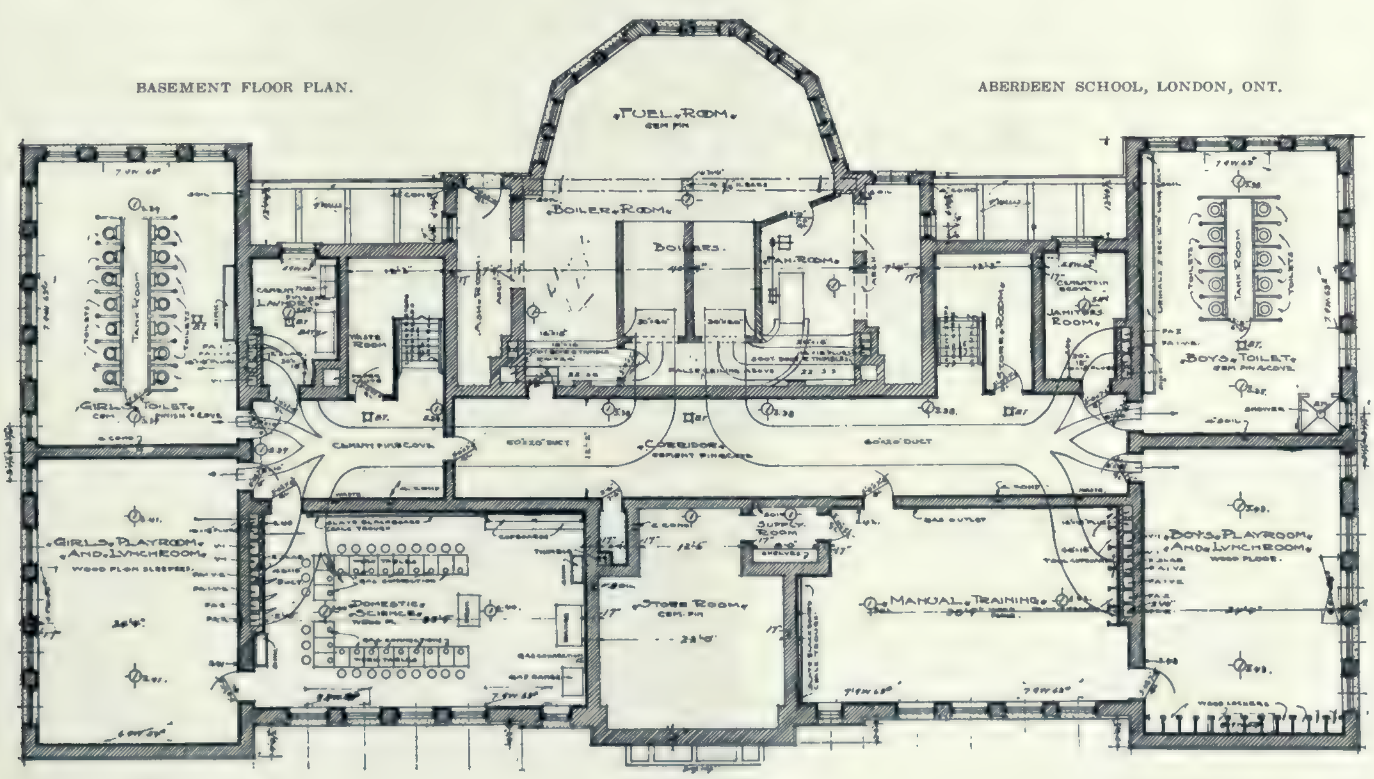


nature have been made upon every branch of industry and production, and factories which have supplied these demands have been demolished in the war zone, while others have been converted to other uses.

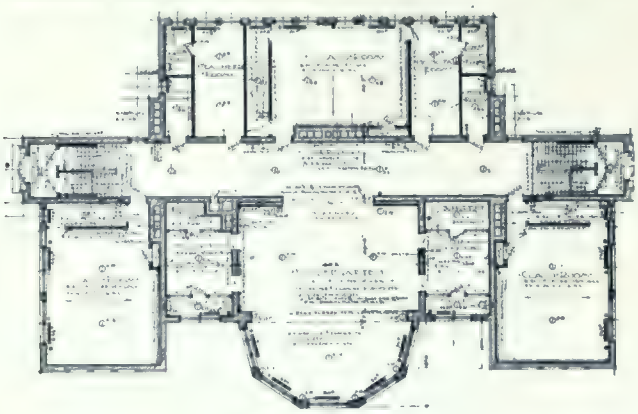
In short, all industry has been metamorphosed, and to get it to a sound basis will mean the consumption of huge quantities of material, aside from that directly required in the process of reconstructing that portion of the world shattered in the war. That means a continuance of high building costs.

Now, what will builders do? Inevitably they must adjust themselves to changed conditions, and they are already beginning to do so. They are realizing that high costs are stable now, and they must predicate future operations upon high costs. That does not mean a restriction of building. It really means an extension, and, once the people interested get the idea out of their heads that by waiting they will save money in material and labor, they will adjust themselves to changed conditions.—"National Real Estate Journal."

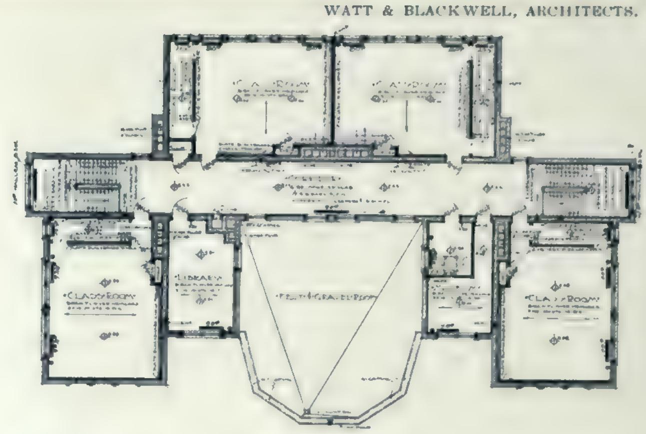
BASEMENT FLOOR PLAN. ABERDEEN SCHOOL, LONDON, ONT.



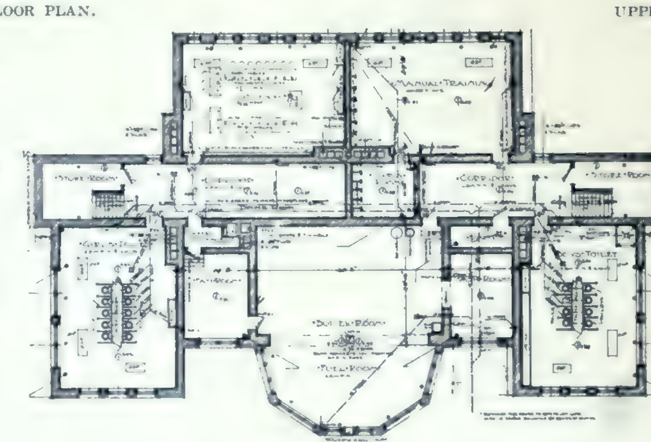
TECUMSEH SCHOOL, LONDON, ONT. WATT & BLACKWELL, ARCHITECTS.



GROUND FLOOR PLAN.



UPPER FLOOR PLAN.



BASEMENT FLOOR PLAN.

A Test of Concrete

We are told by a contemporary of a remarkable test that has just been carried on in Chicago in pursuance of scientists' efforts to ascertain the "point of destruction" in reinforced concrete. A building erected in 1909 for heavy printing work has now to be demolished to make way for Chicago's new Union Station. The sixth floor, chosen for the test, was a four-way flat slab construction, designed for a live load of 250 lbs. per square foot. Into this flat was conveyed a million and a quarter pounds of pig iron, applied in increments of approximately 200 lbs. per square foot, until a weight of 910 lbs. per square foot had been reached. The time between the first and last loads covered a period of twelve days. Professor A. N. Talbot, of the University of Illinois, who conducted the experiment, estimated that a load of 1,500 lbs. per square foot would have been necessary to produce a collapse, and he therefore decided that it would be of far greater value to watch the recovery of the floor after the removal of the load than to cause a complete collapse of the structure which had been made use of for the above test.

Building operations in practically all sections are equally as good, if not ahead, of the summer period last year. From a large number of sections come very good reports, including an improvement in the amount of work undertaken by the Federal Government, and the establishing of new industrials such as the large chemical works to be built at Walkerville, Ont.,

ACADEMIE DU ST. NOM. DE MARIE, MONTREAL. C. A. REEVES, ARCHITECT.

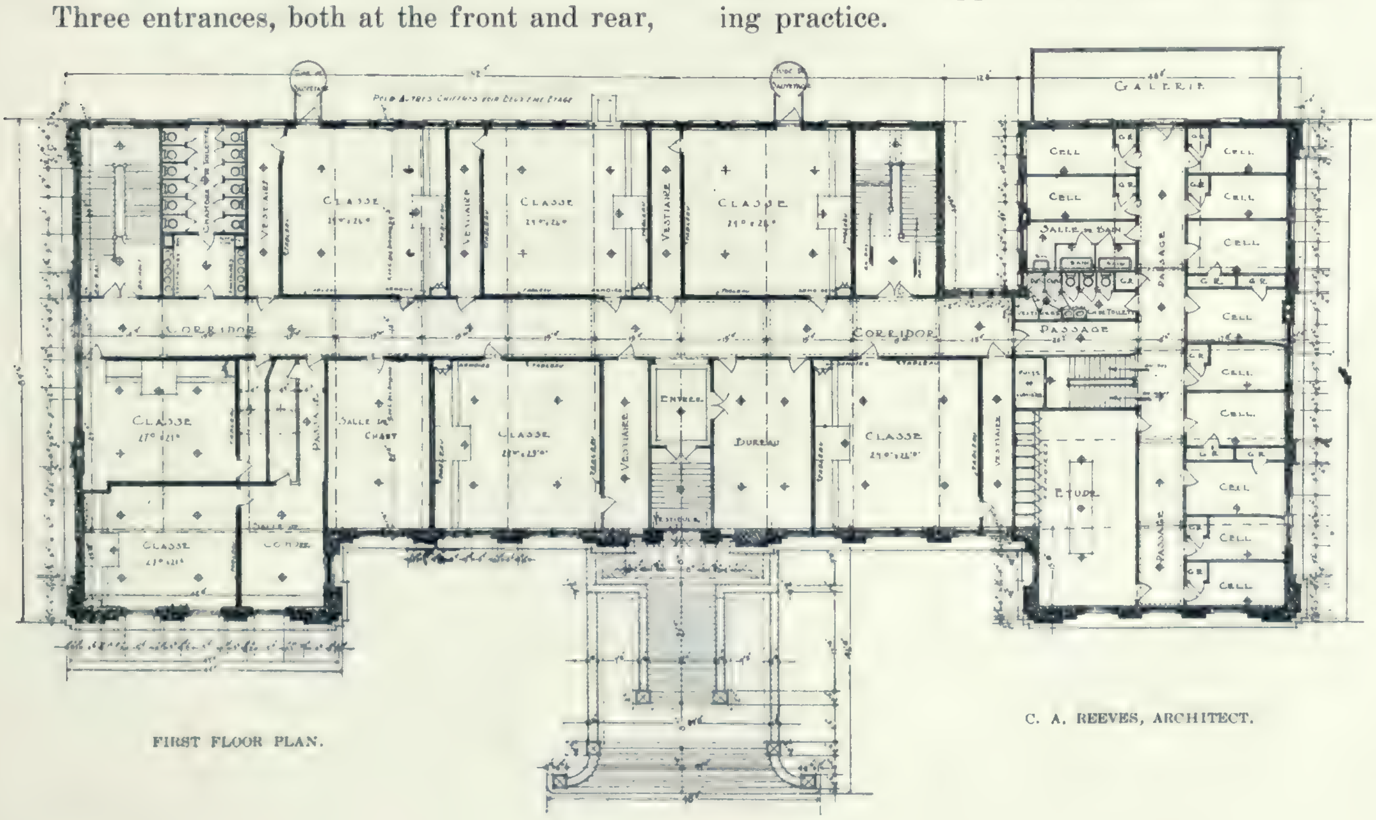
Academie du St. Nom. de Marie, Montreal

THE above building is one of two new schools of similar design recently completed at Maisonneuve for the Catholic School Commissioners of Montreal. It contains in all fifteen class rooms for girl students, a large recreation hall, library, etc., and a residential section for the nuns, who will also have supervision of the boys' school built on a nearby site. The construction is along approved modern lines consisting of steel framework, concrete floors and hollow tile partitions. The exterior is of cut stone with brick work above.

Three entrances, both at the front and rear, give convenient means of ingress and egress on the street and playground sides. The corridor stairs are of iron and marble, the general interior trim of chestnut, and the walls and floors of the lavatories finished in white tile.

In the residential wing, the accommodations provide twenty-two bedrooms, a chapel and sacristy, community hall, refectory, wardrobe, and four separate toilets.

The construction and equipment of the building cost $250,000, including a hot water heating plant and modern ventilating system installed in accordance with approved methods of engineering practice.



FIRST FLOOR PLAN. C. A. REEVES, ARCHITECT.

CONSTRUCTION

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CONTRIBUTIONS.—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and returned.

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Vol. XI Toronto, July, 1918 No. 7

A Point in Controversy

More or less discussion has recently been indulged in by members of the Toronto Board of Education as to the best procedure of obtaining plans for the erection of future schools. Dr. Noble, one of the oldest trustees, emphatically declares himself in favor of inviting architects to submit designs in competition for all work hereafter proposed and recently introduced a motion to this effect. Dr. Noble contends that the erection of buildings under the Board's own architectural department has been both unsatisfactory and too costly, and that competitive methods would give the best and most satisfactory results.

While others also support this proposal, there are some who are opposed to any change. Dr. Hunter, likewise a member of long standing, quite believes that the present system not only fulfills its purpose, but in a recently published article on school architecture, holds that it is probably the best. While admitting that "we owe much of our progress to chivalrous, honest, intelligent competition," which he says cannot be too highly appreciated, he still contends "that with a competent official who has long experience in highly specialized work, the Board should get equally as good if not better service than from any competition of outside firms."

Perhaps Dr. Hunter has some grounds on which to base his statement. We are free to grant that the public schools erected in Toronto during the past ten years are of a more advanced type than their predecessors, being safer and more efficiently planned and more sanitary in every way, and credit is certainly due to those responsible for the work. But in allowing this, we are at the same time prone to the idea that it is not altogether a matter of specialization which counts but rather the faculty to grasp and understand a definite set of principles and to apply them intelligently to the problem involved.

The Toronto Technical School was not the work of specialists in the restricted sense of the term, but was built from plans submitted in competition by a firm of architects who, both previously and since, have done much other important and successful work entirely different in character. The Technical School competition gave the promoters a final choice of at least three designs from any one of which a good building could have been erected, and at the same time resulted in a degree of comparison which enabled them to select the best and most suitable scheme.

Other instances could also be cited including a number of university schools, which were designed by firms whose efforts have not been limited to one class of work. And while it might be argued that these are buildings of a more advanced and costly type, they involved related but more difficult problems requiring a high order of architectural skill for their proper solution.

Specialization is to be commended, but ability is what really counts. Where the two go hand in glove an ideal combination exists. A way out of the controversy would be to put the point in question to a test. This could be done by arranging a competition in which the Board's own architectural department and outside firms could participate. It would be fair to all parties and unquestionably derive the best results.

Plans have just been completed for a new consolidated schoolhouse for East Zorra, by Architect W. W. Lachance, Welland, Ont. The building will contain six regular classrooms, two agricultural classrooms, household science department, assembly room, gymnasium and manual training department. The estimated cost of the building is $65,000. Tenders will be called for immediately. The plans are approved by the Department of Education.

National Housing and National Life*

By Professor S. D. Adshead, M.A.

USED in its modern sense "Housing" does not mean "house building," and although in all probability at least one-half of the time and energy of those of us who are members of the architectural profession is devoted to the building of houses, at the same time it is doubtful if one-hundredth part of our professional energy has been expended on "Housing." The term "Housing," as used to-day, means "the providing of living accommodation for the working classes," and when we have it on reliable authority that over 90 per cent. of the plans for working-class houses submitted to Local Authorities for their approval have not been prepared by architects, I think I am justified in asserting that the interest of our profession in this class of work has been, to say the least, negligible. This is a very serious statement to have to make, and one that is surely deserving of our closest attention.

The subject under discussion, National Housing and National Life, suggests at the outset an entirely new aspect of the position; let us therefore consider it from two points of view: (1) The interest of the general public in housing, and (2) the responsibility of the architect in regard thereto. That there exists at the moment a popular interest in housing amounting almost to an obsession on the part of the nation no one will dispute, and it is an interest which has the support of every phase of social and political opinion; indeed, so important has the question become that it is now recognized that the minimum accommodation and rent of a working man's house are bound to become factors of first importance in national standard values upon which will be built any new system of national finance. . . . .

It is a well-recognized fact in economics that rents are not subject to the same fluctuations as are the prices of consumable articles like tea, sugar and bread. Nor are they subject to the same conditions of supply and demand. A rise in the price of building materials and in the cost of labor does not produce a corresponding rise in rent. It simply discourages building, and people crowd more tightly into houses already built. Crowding at the present moment is abnormal, and the cost of building is extraordinarily high, and yet if 500,000 new houses were built under the present conditions, or anything like that number, and if economic rents were to be fixed accordingly, they would not all be occupied. A big proportion of the working classes would continue to live in crowded houses that were let at a much lower rent than the new houses, and would prefer to spend their increased wages in another way; hence the need for a national housing subsidy.

It may be considered by some that, in order to enable the working man to pay an economic rent for the new houses that it is proposed to erect at exceptional cost, the case would be met more directly by raising wages correspondingly. This may be so ultimately, but at the outset it would mean, as I have endeavored to show that overcrowding would continue, and the extra wage would continue to flow into the pockets of the owner of the older property.

But this question of rent is not a matter of primary importance to us architects, except as indicating that the new houses that are to be built will not entirely depend in the amount of their accommodation upon the ordinary laws of demand and supply. They will be regulated by the accepted national principle that a house with less accommodation than four rooms is not considered satisfactory where there is any likelihood of its being occupied by a family. To-day there is a universally recognized appreciation of the influence of the house and its surroundings and associations on the lives of the people generally. The house must have an interest which the tenant can feel is his own. The standard repeat and the by-law street have been condemned and are for ever doomed. This opens out to us the panorama of an entirely new world and affords opportunities for the architect which his imagination never before conceived.

Housing schemes must be laid out on town-planning lines; they must be placed as far as is possible without the confines of the city. They must be thought of not as spaces covered with packing-cases but as a collection of homes associated with one another in sharing the benefits of public buildings and public amenities. They must have gardens, interesting outlooks both back and front, and all the considered requirements of a complete community. No doubt, some schemes will be urban and built within the city, but they will be laid out on quite new and interesting lines. I think that our slum areas will be gradually cleared and the inmates of the worst of them accommodated in well-controlled flats. We have yet a type of town building to erect which shall consist of a huge quadrangle of flats arranged around a square laid out with cobbles or gravel and decorated with flowers, and where the communal kitchen, the common washhouse, central heating and central lighting, and all the so-much-discussed advantages of communal and common sharing could be tried.

*Excerpt from discussion at the twelfth Informal Conference, held at the Royal Institute of British Architects.

Having now sketched out what is to be, let me now come to my second point—viz., the qualifications of the architect to accept the responsibility of carrying out this comparatively new branch of his work. I mention the word "qualifications" in this connection because I wish to make it particularly clear that if architects are to undertake this kind of work—though they as a profession may not realize it—they have a great deal to learn about town planning, they have a great deal to learn about a modern system of housing, and they have a great deal to learn both of a practical and common sense nature that is at the moment much better understood by the engineer and the surveyor. In my opinion, the surveyor and engineer have, since the passing of the Town Planning Act, studied the subject in all its bearings, both much more seriously and much more generally than have the architects, and this not only in its immediate relation to the width and construction of streets but also with the wider view which we architects associate with architectural effect. I say this because I feel that our profession must bestir itself if it is to qualify itself to undertake the great work that undoubtedly lies ahead.

Let me make myself quite clear, and let me say that the housing scheme of the future will depend for its success upon an entirely different set of interests from those that have obtained in the past. It will not be the interest that we have been wont to associate with the picturesque village of the past, those humble records of a rural history spread over long and restful periods of slow change in architectural style, in the different use of materials and in the weathering of brick and stone. The new schemes cannot depend upon any interests like these. They were built under totally different conditions from those obtaining to-day; their builders were country carpenters and their workmen real craftsmen, or if in Georgian days, when contracting became common, they worked under some inborn architectural influence, were not entirely absorbed in pocketing discounts and juggling with advances, and were quite simple men.

Nor again will the cottage of the future be built by the speculative gentlemen purely as a commercial enterprise, as have practically all the workmen's houses erected since the middle of last century. No, the housing scheme of the future will be laid out on town-planning lines, and the commercial aspect will not loom largest in the field; and whilst nowhere will there be standard streets it goes without saying that the cottages themselves will be built to standardized plans. But both cottage and street will now for the first time be considered conjointly, and in the grouping and composition that will follow will lie the architect's opportunity.

The recent cottage competition has proved a valuable and instructive lesson to the architectural profession. A general inspection of the designs submitted shows very clearly that as a profession we have not yet realized that the cottage of the future cannot be the cottage of the past, the former being necessarily a unit in a composition, the latter having an individual entity.

I sincerely hope that cottage building in the future will come to be the work of the architect. It is his own fault if it doesn't, but he must not think of cottages separately. I think that the profession would do well to have an exhibition of housing schemes. . . . . . . The profession must hold on to this housing while the nation is interested.

Concrete Beautiful

By T. J. Clark, A.I.C., in The "Builder," London.

IT has been stated that any style of architecture may be imitated and reproduced in concrete. True; but this violates one of the essential canons of art, since, as Ruskin says, "Art is Truth"; and to employ one material for the imitation of another is to debase the uses of the material so employed, and stultify that which it imitates. It is not the function of concrete —and this we state with all emphasis—to pretend to be other than it is. Of its strength and durability there is no longer any question; the nature of the material needs but a brief consideration in order to realize its perfect adaptability to any design; and the great variety of effects which may be obtained by legitimate surface treatment in order to produce a pleasing appearance, render unnecessary, as well as illogical, any attempt to make concrete masquerade as brick or stone.

It may be taken as an axiom that every house should be a home, and every home should be as healthful, as comfortable and as beautiful as it can be made. The first two aspects of the question it is outside the scope of this article to consider, but a few suggestions will be offered which may assist in the realization of the third.

The most prominent feature of a building, and that which has the greatest effect upon the eye is its design and style. Reference has already been made to the adaptability, in this connection, of concrete, one of whose chief characteristics is plasticity; and when it is remembered that it may be moulded to any desired shape, it will be seen that the capable designer, possessed of imagination, will find ready to his hand a medium for the expression of artistic feeling, and one which offers unlimited opportunities for originality of conception and for variety and breadth of treatment. Large masses may be so treated that they combine the suggestion of great strength with simplicity, dignity and beauty of form, while smaller masses, as represented by dwelling-houses, can be so designed as to suggest daintiness, comfort and home. But whether for large masses or small, the design should be such that it takes advantage of and emphasizes the characteristics of the material instead of being a mere copy of some existing design or style. By thinking and working on these lines, the architect will realize that science has provided him with a material which, as far as its architectural possibilities are concerned, is in its early infancy, and by means of which he may break away from established tradition, inaugurate a new era in architectural development, and create a new style.

This part of the subject is too wide to be dealt with in detail within the limits of the space at our disposal, but the imaginative mind will perceive in concrete an architectural material full of rich promise, teeming with possibilities, and presenting for consideration and solution problems of absorbing interest.

Next to the general design of a building, its most noticeable features are color and texture. Here, again, concrete presents a wide field for effort in the direction of surface treatment, since it contains within itself the elements for the production of rich and beautiful effects. While the characteristic grey of this material is eminently suitable for large masses, the smaller structure seems to demand more warmth of tone and greater variety of texture—a surface broken by flecks of light and color. These may be secured by various means more or less legitimate, but the method which will appeal most strongly to the advocates of concrete pure and simple, and which alone will be here considered, is that of exposing the aggregate. If this method be adopted it will be seen at once that there is practically no limit to the variety of surface which may be produced with regard to both color and texture. In the ordinary, untreated concrete surface, no matter what aggregate is employed, the particles are so mixed with and coated by the cement as to result in that uniformity of tone to which so many objections have been raised. By a judicious selection of the aggregate, however, and the adoption of means for exposing it to view, a great variety of very charming effects may be obtained. Materials which may be suggested as being suitable for this purpose are marble chippings of various colors and sizes, different colored gravels and sands, red or blue granite, or combinations of these in various proportions which may be determined by a series of experiments.

The aggregate having been selected and the best proportions ascertained, the whole secret of obtaining, on the surface, the full effect of its richness and variety of color and texture lies in removing the film of cement mortar by which the particles of the aggregate next the face are coated. This may be done by one of three methods, viz., scrubbing, tooling, or sand-blasting.

The removal of the mortar film by brushing is best performed while the concrete is green, and to this end the forms must be removed as soon as may be done without injury to the structure. An ordinary scrubbing brush or a wire brush, used with a liberal application of water, will generally serve the purpose if the concrete is not too hard, but if it is found that the color of the aggregate is not fully brought out by this treatment, a solution of hydrochloric acid diluted with three or four parts of water may be employed. Where this is done, care must be taken that every trace of the acid is immediately removed from the surface of the concrete by well washing with pure water, preferably by means of a hose. By this method the aggregate is brought into semi-relief and its color is fully revealed.

It sometimes happens, however, that the shuttering cannot be removed before the concrete is too hard for this treatment; when this is the case, another method is available, viz., that of bush-hammering. The action of the bush-hammer, whose face is cut into broad-based teeth, produces an effect similar to that obtained in the process of brushing, by cutting away the cement mortar and leaving the aggregate exposed. If necessary, the acid solution may be used as a clearing agent to supplement the effect of the tooling.

Sand-blasting is another means by which the same purpose may be effected when the concrete is hard. In this process a fine stream of sand is forced through the nozzle of a compressed air machine, and by impinging sharply upon the concrete surface removes the mortar from the face of the aggregate.

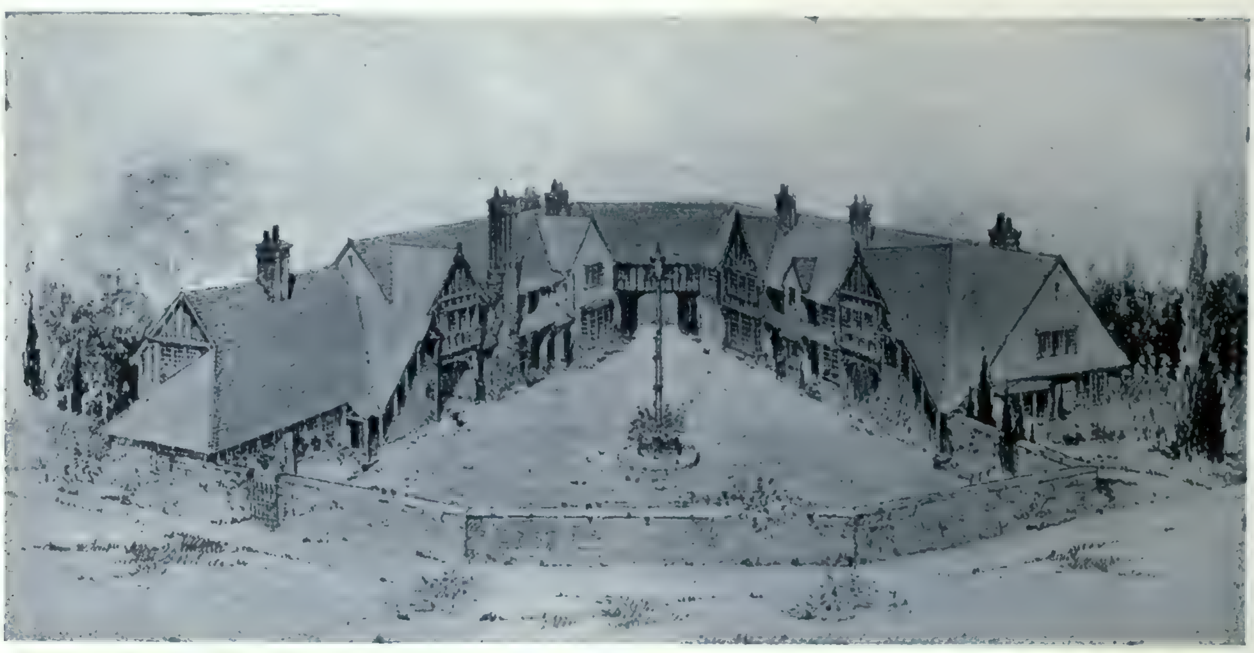
By either of these methods delightful effects may be produced which will amply repay the extra time and labor expended upon them, and many of these can be obtained by the use of quite common and inexpensive aggregates. Where, however, the cost of a specially selected material would prohibit its use for the whole of the concrete work of the walls, another method may be employed, by which the special mixture is applied as a facing material only, backed by the ordinary concrete of the wall. A simple method of doing this is to apply the facing mixture to the surface of the wall-form to the thickness of one or two inches, immediately before the ordinary concrete is placed in position. The tamping should be confined mainly to the backing, which will then be driven into the facing, and the aggregate of the latter forced outwards, so that not only will the two thicknesses be formed into one homogeneous body, but the aggregate which it is desired to expose will be found at or near the surface when the shuttering is removed.

An alternative method of depositing the facing mixture in the required position, and one that is often employed, is by the use of iron sheeting, which is placed inside the wall-form, its distance from the outer shuttering being from one to two inches, according to the thickness decided upon for the facing. The form is thus divided longitudinally into two compartments, which are then filled with concrete, the outer space with the special mixture, and the inner with the ordinary material. The iron sheet is then gradually withdrawn, the backing meanwhile being tamped against the facing. To obviate the difficulty experienced in placing the material within so narrow a space as that containing the facing mixture, the iron sheet is not usually more than one foot high, and to keep it in position it must be clamped to the form, and handles may be riveted to it, in order to facilitate its withdrawal. After the shuttering has been removed the surface may be treated by scrubbing or bush-hammering as before.

By selecting suitable aggregates either for the whole body of the concrete, or for use as a facing, similar effects may be produced by the same methods on the surface of concrete blocks. The operations may be carried out either after the wall has been built, or by treating the blocks before they are used upon the work. The latter will be found to be the more convenient plan, since after the blocks are taken out of the mould they have to be stored for a considerable period before they can be used, and by that time have become thoroughly hard. By scrubbing them, however, shortly after they are cast, and while the concrete is green, the work is rendered easier and much less time is occupied in the process.

The decoration of the interior may be carried out in various ways—indeed, there is no limit to the number and richness of the effects which may be produced. The walls, or portions of them, may be "brushed" or the surface may be left smooth and suitable points of accent selected for enrichment. Mosaic patterns worked out in colored marbles, burnt clays or other material may be laid in precast slabs and either incorporated into the wall by being laid next the form during concreting, or cemented into recesses left in the wall for the purpose. Such recesses are cast by fastening slabs of wood in the desired position on the inner face of the form before the concrete is filled in. Or again, patterns may be designed, and the particles forming them glued on to sheets of stout paper, which are attached to the form in the required position and the concrete filled in behind them.

Much more could be written on this fascinating subject, but enough has been said to show that by following up the line of thought here suggested, and by a combination and extension of the methods above described, the opportunities afforded for the exercise of the imagination and for the expression of artistic feeling, both with regard to design and surface treatment, are unlimited. Much of the work done in the early days was crude and lifeless; in their enthusiasm for concrete the strong, the durable, the hygienic, the workers of that time lost sight of the possibility of concrete the expressive, the satisfying, the beautiful. To-day, science and experience are demonstrating to us the value of concrete as a structural material; to-morrow the architect and the designer will reveal to us its inherent beauty and its varied charm.



AN ATTRACTIVE APARTMENT HOUSE FOR MILL OPERATIVES AT DANIELSON, CONN.

CATALOGUES and BOOKLETS

GRAVITY ROLLER HINGES.

Among the new devices on the market is the Carpenter Gravity Roller-Bearing Hinge for toilet room doors, office railing gates, partition doors, etc. The basic principle of this hinge is the replacement of spring action by gravity action, which the manufacturer axiomatically observes "never wears out." It consists of five parts only and has no pins or superfluous parts to get loose or out of order. The upper hinge is essentially a heavy casting with a pivot carried in a pocket. The lower hinge is of similar design with the weight of the dooor carried on a wheel rolling on a double incline. A more complete description together with practical illustrations is contained in a folder issued by the R. F. Carpenter Company, Cleveland, Ohio, which will be sent upon request.

BLOWERS, FORGES, AIRWASHERS, ETC.

A most comprehensive line of blowers and forges adaptable to every use for which equipment of this kind is required, is illustrated in a 112 page catalogue issued by the Buffalo Forge Company, Buffalo, N.Y. It consists mainly of excellent half-tone cuts with practical information and alphabetic and numerical indexes which will be found to be a very convenient feature. The company manufactures steam engines and turbines, fan system apparatus for heating, ventilating, drying and mechanical draft. Also air-washers, humidifiers and dehumidifiers, combination woodworking machines, etc. The Canadian factory is located at Kitchener, Ont., under the name of the Canadian Blower & Forge Company. This plant together with the company's works at Buffalo is shown in the frontispiece.

"THE INDUSTRIES OF BRITISH COLUMBIA."

One certainly feels better acquanited with the importance of British Columbia after examining the publication under the above title, regarding a copy of which we are indebted to the Progress Publishing Company, Vancouver. It represents a most thorough compilation issued for the Manufacturers Association of British Columbia, which gives a complete summary of the various industrial and natural resources of the Pacific Coast district. In addition to giving statistics on the lumber trade, mining, fisheries, power development and agricultural and manufacturing activities centred in that province, it contains much useful information of a general character. The book incorporates one hundred and thirty-eight pages in all, and is illustrated with interesting views covering a large number of subjects.

FUEL ECONOMY.

Fuel economy at the present time is one of the nation's biggest problems, and anything which will effect a saving of fuel elements is a matter of utmost importance. One way to help out the situation is to increase the boiler efficiency so as to get the most perfect combustion and heat value. The fact that air is allowed to filter into a boiler through a porous brick setting causes an enormous fuel loss, and because the air doesn't hiss and constantly call attention to its escape, the loss goes on unchecked. In order to overcome this a preparation has been put on the market called "Nox-Aer-Leek," which, it is claimed, stops the infiltration of air, thereby raising the percentage of CO_2 gas and effecting a saving in coal bills.

"Nox-Aer-Leek" is a plastic cement composed of elastic bitumen fused with non-drying oils and asbestos fibre. It is trowelled on the exterior walls of the boiler setting and makes the setting air-tight and moisture proof. It adheres firmly to the brick, and will not dry out or become hard and brittle. Instead, it is said to remain permanently elastic, contracting and expanding with the walls. "Nox-Aer-Leek" is one of the products of the Barrett Mfg. Company, who have warehouses in all the principal Canadian cities, and who will gladly supply prices and full information as to its covering capacity and efficiency to any one interested.

CONTRACTORS and SUB-CONTRACTORS

As Supplied by the Architects of Buildings Featured in This Issue

LORD ROBERTS SCHOOL, LONDON, ONT.

Boiler, E. Leonard & Sons.
Brick, Interprovincial Brick Company.
Brick, Milton Pressed Brick Company.
Electric fixtures, Benson & Wilcox.
Electric wiring, Commercial Company.
Fire doors, Dennis Wire & Iron Works Co., Ltd.
General contractor, Samuel Willis.
Heating and plumbing, Noble & Rich.
Heat regulators, Canadian Power Regulator Company.
Iron stair, Dennis Wire & Iron Works Co., Ltd.
Masonry and concrete, John Putherbough.
Plastering, William Scott & Son.
Reinforcing, Trussed Concrete Steel Company.
Roofing, Walter Scott.
Steel partitions, Dennis Wire & Iron Works Co., Ltd.
Terrazzo floors, Italian Mosaic & Marble Company.

ABERDEEN SCHOOL, LONDON, ONT.

Boilers, Pease Foundry Company.
Brick, Milton Pressed Brick Company.
Electric wiring and fixtures, Commercial Electric Company.
General contractor, John Hayman & Sons.
Glass, Hobbs Manufacturing Company.
Hardware, Cowan Hardware Company.
Heat regulation system, Canadian Power Regulator Company.
Plumbing, Eggett & Company.
Plumbing fixtures, Standard Ideal Company.
Plumbing fixtures, Standard Sanitary Company.
Vacuum system, Tuec Vacuum Cleaning System.

TECUMSEH SCHOOL, LONDON, ONT.

Boilers, E. Leonard & Sons.
Brick, Milton Pressed Brick Company.
Electric wiring and fixtures, Commercial Electric Company.
Glass, Hobbs Manufacturing Company.
Hardware, Cowan Hardware Company.
Heat regulating system, Johnston Temperature Regulator Company.
Plumbing fixtures, Standard Ideal Company.
Plumbing fixtures, Standard Sanitary Company.
Plumbing, Noble & Rich.

PARK SCHOOL, TORONTO

Ash hoists, Herbert Morris Crane & Hoist Company.
Boilers, John Inglis Company.
Brick, Bell Brothers.
Concrete, A. C. Richmond.
Electric wiring, A. R. Rice & Company.
Fire alarm system, Wilson & Cousins.
Hardware, Vokes Hardware Company.
Heating contractor, Purdy, Mansell Limited.
Heat regulators, Johnston Temperature Regulator Company.
Hollow tile, Don Valley Brick Works.
Interior woodwork, Wm. Williamson.
Marble, Canada Glass, Mantle & Tile Company.
Mason contractor, Lucas & Son.
Metal lath, Trussed Concrete Steel Company.
Ornamental iron, Canadian Wire & Iron Goods Company.
Painting, J. R. Bell.
Plumbing fixtures, Imperial Products Company.
Plumbing fixtures, Twyford & Company.
Plumbing, Purdy Mansell Limited.
Radiators, Dominion Radiator Company.
Seating, Canadian Office & School Furniture Company.
Seating, Globe Furniture Company.
Sheet metal, W. E. Dillion Company.
Stained glass, Luxfer Prism Company.
Stone, Queenston Quarry Company.
Structural iron, Hepburn & Disher.
Terrazzo, Venetian Marble & Mosaic Company.

LAMBTON MILLS' (ONTARIO) SCHOOL

Boilers, Pease Foundry Company.
Brick, William Pierce.
Carpenters, Hudson & Mosley.
Chemical closets, Kaustine Company, Ltd.
Electric wiring, W. H. Moon & Company.
Hardware, Canada Hardware Company.
Heating, R. Patterson.
Painting, R. G. Johnston.
Paints, International Varnish Company.
Plastering, Taylor & Nesbitt.
Plumbing, R. Patterson.
Roofing, J. H. Kidd.
Stone, John Vokes.
Structural steel, Hepburn & Disher.

COLLEGIATE INSTITUTE, WINDSOR, ONT.

Boilers, Kewaunee.
Brick, Chick Contracting Company.
Cement, Canada Cement Company.
Clocks, International Business Machines.
Cut stone, Ritchie Cut Stone Company.
Electric wiring, McNaughton-McKay.
Fire alarm system, McNaughton-McKay.
Flooring, W. A. Hadley.
General contractors, Well & Gray, Limited.
Hardware, Baxter Hardware Company.
Heat regulators, Canadian Power Regulator Company.
Hollow tile, National Fireproof Company.
Interior woodwork, Windsor Lumber Company.
Lockers, Canada Wire & Iron Goods Company.
Ornamental iron, Page Wire Fence Company.
Paints, C. M. Bennett.
Plumbing fixtures, Windsor Hardware Company.
Radiators, American Radiator Company.
Radiator traps, C. A. Dunham Company.
Reinforcing, Steel Company of Canada.
Roofing, Canadian Roofing Company.
Structural iron, Canadian Bridge Company.
Terrazzo, Bertini Company.
Ventilators, Canadian Sirocco Company.

ACADEMIE DU ST. NOM DE MARIE, MONTREAL

Ash hoist, Gillis & Geohagen.
Blackboards, Lepage Marble Works Company.
Boilers, Spencer Heater Company of Canada.
Brick, Ulric Paris.
Cement, Alex. Bremner.
Flooring, A. Choquette.
General contractor, A. Choquette.
Hardware, Durand Hardware Company.
Interior woodwork, Carriere & Frere.
Hollow tile, Montreal Terra Cotta Lumber Company.
Ornamental iron, Montreal Architectural Iron Works, Limited.
Paints, Colas & Charest.
Plumbing fixtures, Jas. Robertson Company.
Radiators, Warden King Company.
Stone, Victor Quarries.
Tera cotta, Montreal Terra Cotta Lumber Company.
Ventilators, Modern Heating & Engineering Company.

TIME CLOCKS FOR SCHOOLS.

The International Business Machines Company, Limited, installed in the new Windsor Collegiate Institute a Master Clock and 36 Secondary Clocks. The Secondary Clocks are distributed throughout the different parts of the building, and are all controlled electrically by the Master Clock, so that there is uniform time throughout the entire institute. This equipment also embodies the automatic ringing of bells for the dismissal of classes and the recalling of same.

The International Business Machine Company's products are made in Canada and they are building a new factory, at Royce and Campbell Avenues, Toronto, to take care of the increased demands for their different time recording equipments, which are becoming so universally used throughout the Dominion.

They also recently installed one of their splendid equipments in the London Technical School, and have a long list of public buildings and large manufacturing plants among their prominent users.

August, 1918 **Volume XI, No. 8**

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Full Page Illustrations

H. GAGNIER, Limited, Publishers

GRAPHIC ARTS BLDG., TORONTO, CANADA

BRANCH OFFICES

MONTREAL NEW YORK

GENERAL OFFICES, CANADIAN WESTINGHOUSE COMPANY, HAMILTON, ONT.

PRACK & PERRINE, ARCHITECTS.

Canadian Westinghouse Office Building

INDUSTRIAL office buildings are assuming a character of considerable architectural importance. To-day the progressive manufacturer not only recognizes the advantage of a separate building for administrative purposes, but find it a matter of genuine business expediency. This incidentally vastly increases the architect's opportunities by widening the field for specialized work. The Canadian Westinghouse Company has just completed a noteworthy building of this type in connection with its large plant at Hamilton, Ont. It is a five-storey structure, 200 by 50 feet, especially planned to house their executive and office staff and involves a well-arranged system of offices and departments. In addition to the various offices the building also contains a good-sized auditorium, which is intended to be used for salesmen meetings and staff lecture work.

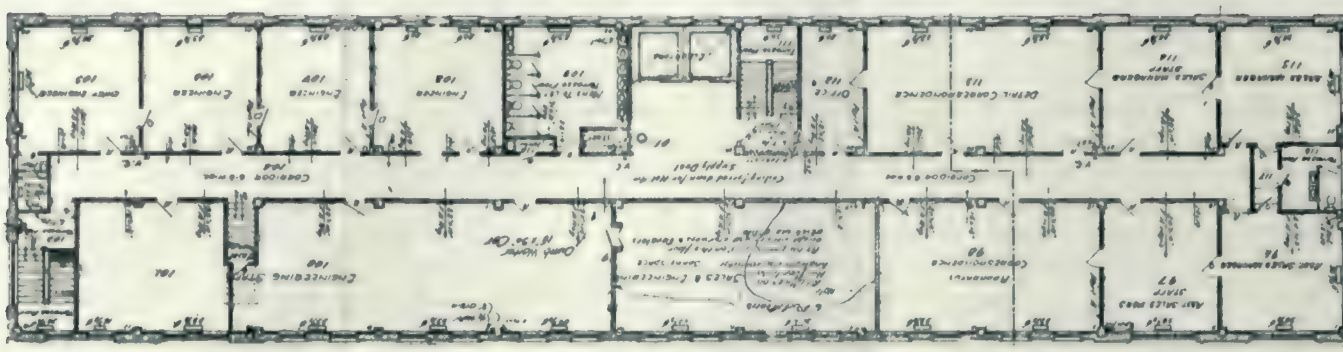
The building itself is constructed of reinforced concrete with hollow tile floors, and has a flat ceiling throughout. The offices are arranged on either side of a central corridor, and have a clear span of approximately 18 feet from the side of the corridor to the outside wall. The corridor itself is approximately 7 ft. 6 in. wide. This leaves the interior entirely without any exposed columns or ceiling obstructions. Besides the building is exposed on all four sides with the result that all offices have outside light.

All the main offices are finished with quarter-inch cork carpet over the concrete floors, including the large draughting room on the fifth floor. The executive offices, reception room and dining room, have mosaic floors with a marble cove. In the reception room, which is of spacious dimensions and has an enquiry desk or counter, the walls have a panelled marble dado, plastered above and finished with an enriched ceiling.

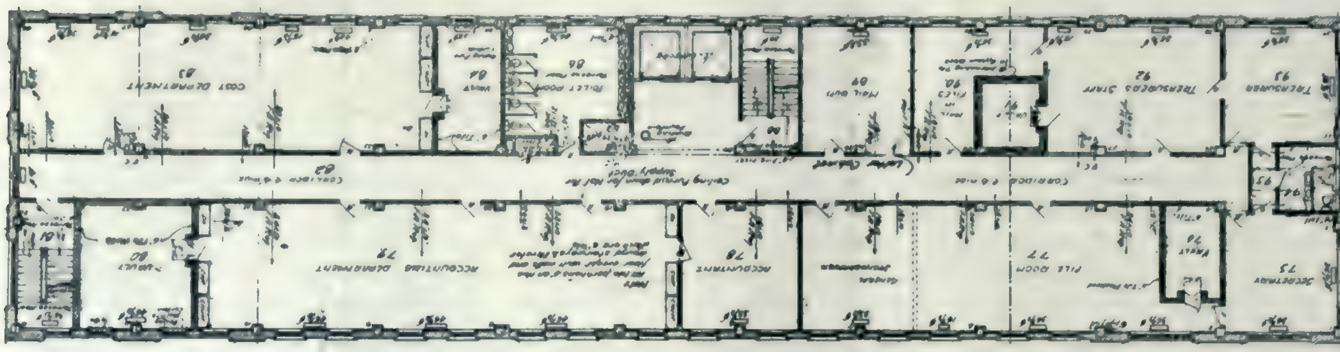
Ornamental plaster work is also used quite extensively in the auditorium, which is quite elaborate in its decorative character. This room, which is situated at the rear of the main floor, can be entered either from within or through a separate outside entrance, and seating accommodation is provided for over three hundred. The auditorium is approximately 50 feet square, the structural trusses spanning the full fifty feet, the second floor columns resting on top of the structural girders, thereby not interfering with the column spacing throughout the rest of the building.

Specially selected quarter-cut oak is used generally for the interior trim of the principle rooms. The President's and Vice-president's rooms have panelled walls and decorative plaster ceilings. In the President's room is a fireplace designed in character with the architectural treatment of the room. The dadoes of all corridors, stair wells and toilet rooms, as well as those of the executive offices and special

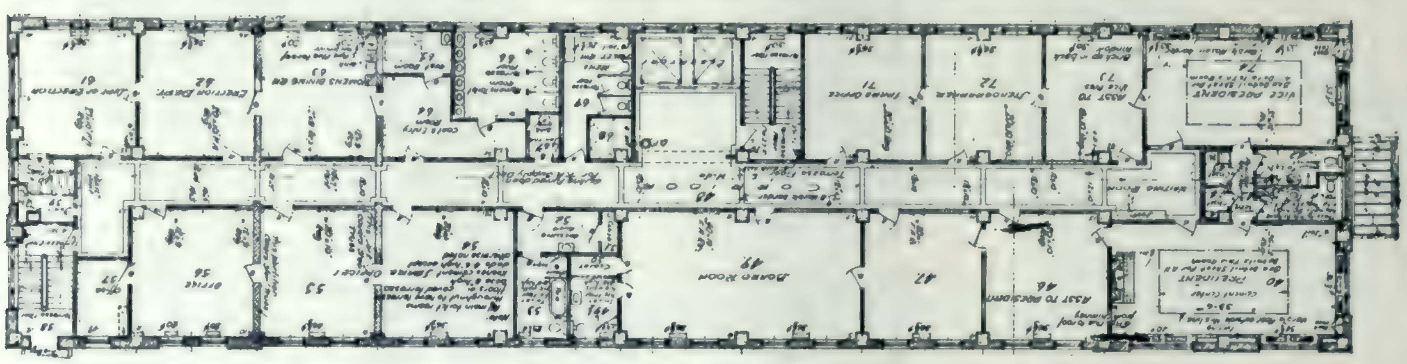
ENTRANCE HALL.



FOURTH FLOOR.



THIRD FLOOR.



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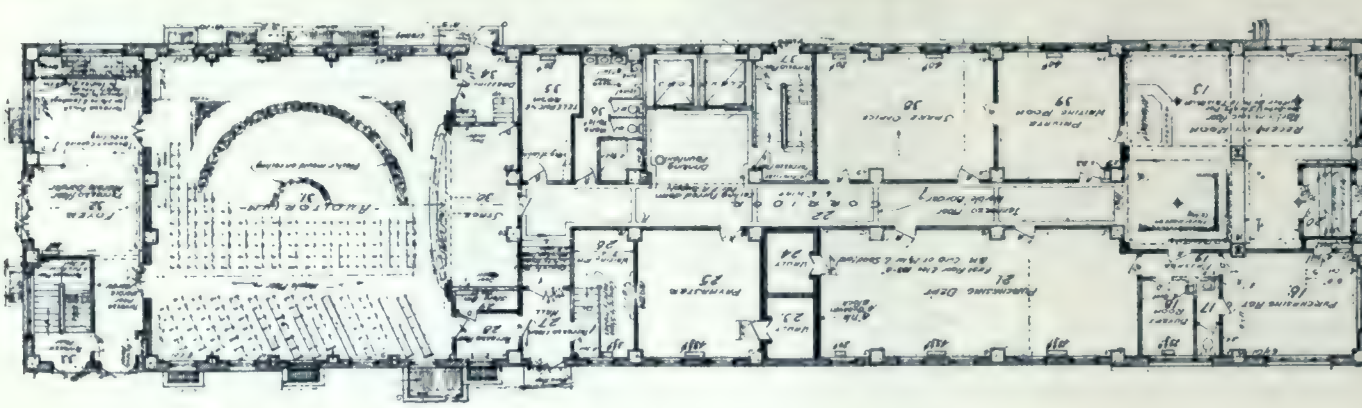
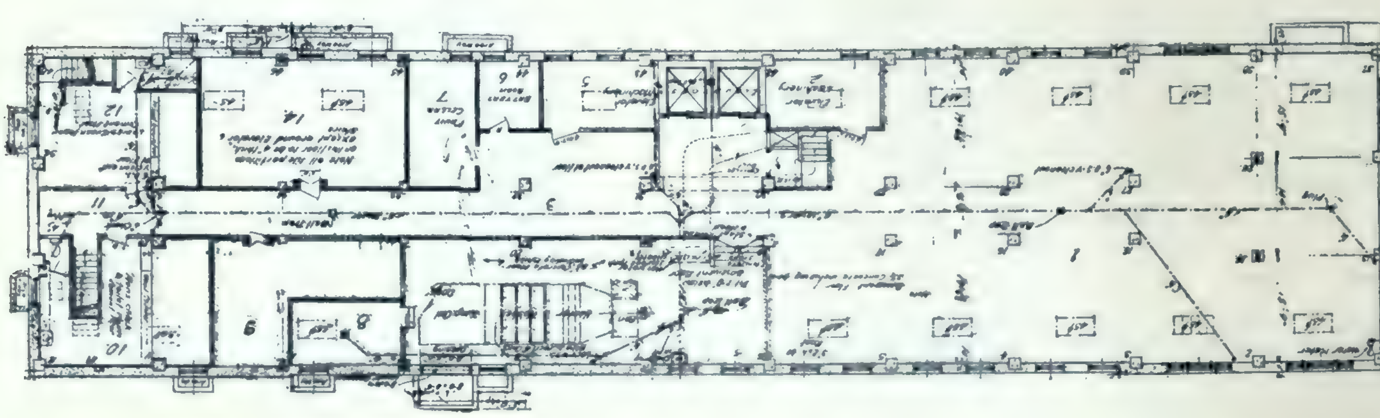


GROUND FLOOR.



BASEMENT.

GENERAL OFFICES, CANADIAN WESTINGHOUSE COMPANY, HAMILTON, ONT.

LOWER FACADE. GENERAL OFFICES, CANADIAN WESTINGHOUSE COMPANY, HAMILTON, ONT.

rooms, are covered with canvas and painted. All executive offices, including the rooms of the heads of the departments, have private toilet facilities.

As manufacturers of general electrical appliances, it is natural to expect that the electrical and service installation would be modern and complete. Semi-direct lighting is employed in most of the general offices, and total indirect in the draughting room. An autophone system connects the President's room with all general and executive offices. This is supplemented by a buzzer installation connecting executive with communicating departments. All inter-works telephones and outside telephones are controlled by the main switchboard on the ground floor. There is also a master clock in the telephone operators' room with a system of auxiliary clocks in all corridors and executive offices. All buzzer system wires are so arranged that they are completely hidden beneath the main chair rail, which is in sections and can easily be removed so that

RECEPTION ROOM.

AUDITORIUM, GENERAL OFFICES, CANADIAN WESTINGHOUSE COMPANY, HAMILTON, ONT.

additional buzzers may be installed or rearranged at any time. All wires for the other systems are arranged in the same way and located in the base, which is also sectional. In addition the kitchen on the fifth floor located between the executive and general dining rooms, is fully equipped with electrical stoves, heaters, cookers, and other modern appliances.

The heating and ventilating of the building also represents an up-to-date installation. Two-thirds of the heating is direct with wall radiators, and one-third direct, coming from heater coils and fans located in the basement. In the summer time this equipment is reversed so that the air is chilled and rendered cool by sprays of water and then pumped through the building, coming in at the ceiling, the exhaust leaving through vents in the bottom of all corridor doors and returning by way of stair wells to ducts in the basement, where the air is re-washed and again used.

How to Become An Architect

By a Man Who Has Been One.

The architect is, unlike the poet, made and not born. He is entirely the creature of circumstances—let him mould them if he can.

When the articles are signed and the premium paid and the youth fairly launched in an architect's office, he will find himself started on a long, long road, as long as that to Tipperary, which he has to traverse before he can claim to have become an architect himself. For his encouragement the following notes are written. And as example is always better than precept, I may have to quote many incidents in my own career, trusting to anonymity to hide my personality, or I may draw upon the published lives of other architects to point the moral and adorn the tale.

A youth of the age for "leaving school" who is not proceeding to one of the Universities should be old enough to select the profession for which circumstances or inclination have best fitted him; or by that age his parents or guardians, or at least his tutors, should know something of the bent of his mind and have some pretty clear idea of the life-work for which he is most suited.

Sometimes a youth has been brought up with artistic surroundings and that atmosphere of refinement in taste which in itself is half an education; or he may have been the son of, say, a butterman, but ambitious and with strong predilections, coming he knows not how, to an architect's profession. His circumstances form no barrier to his success, heavily though he may be handicapped by them; but he should be certain of his taste and know something of the difficulties which must attend his efforts, since it is

PRESIDENT'S ROOM. GENERAL OFFICES, CANADIAN WESTINGHOUSE COMPANY, HAMILTON, ONT.

VICE-PRESIDENT'S ROOM. GENERAL OFFICES, CANADIAN WESTINGHOUSE COMPANY, HAMILTON, ONT.

DRAUGHTING ROOM.

ACCOUNTING DEPARTMENT.

MECHANICAL EQUIPMENT.

better to be, at the end of his career, a successful butterman than a struggling architect.

On two separate occasions I met in Rome a man who showed considerable and informed interest in a certain phase of artistic life and work, although his conversation betrayed but little culture; and I afterwards discovered that he was a successful trader, the owner of many retail shops in London and the Provinces, who devoted every year a considerable sum of money to assisting young art students to study mediæval and renaissance work in Italy. His natural tastes might have led him to become an artist with dubious outlooks; his success as a trader did not kill his regard for art, but enabled him to assist many others to achieve their ambitions.

The fact that a boy was "fond of his pencil" has induced many a parent to place his son in an architect's office only to discover when too late that the taste was ephemeral, to vanish before the tee-square and the set-square. Moreover, the most perfect of artists or even draughtsmen are not necessarily fitted for our business-like profession. The experience of J. B. Waring, than whom there was no better illustrator of architecture and the decorative arts, himself remarkable for his taste in color, as given in his published life, is very much to the point. "After this," he writes, referring to his failure in a competition, "I determined to try no more. I had done my best, had fitted myself by diligent and prolonged study of my profession for producing works of art which might have done credit to myself and my employers. I had always acted upon the maxim of La Bruyere, 'Nous devons travailler a nous rendre tres dignes de quelque emploi; le reste ne nous regarde point; c'est l'affaire des autres.' But it was a mistake; in this age of competition, unless artists are of known and approved merit, they are obliged to seek for business like other people; the public will not apply to anyone unless he has a name; and in architecture, especially where

DINING ROOM, GENERAL OFFICES. CANADIAN WESTINGHOUSE COMPANY, HAMILTON, ONT.

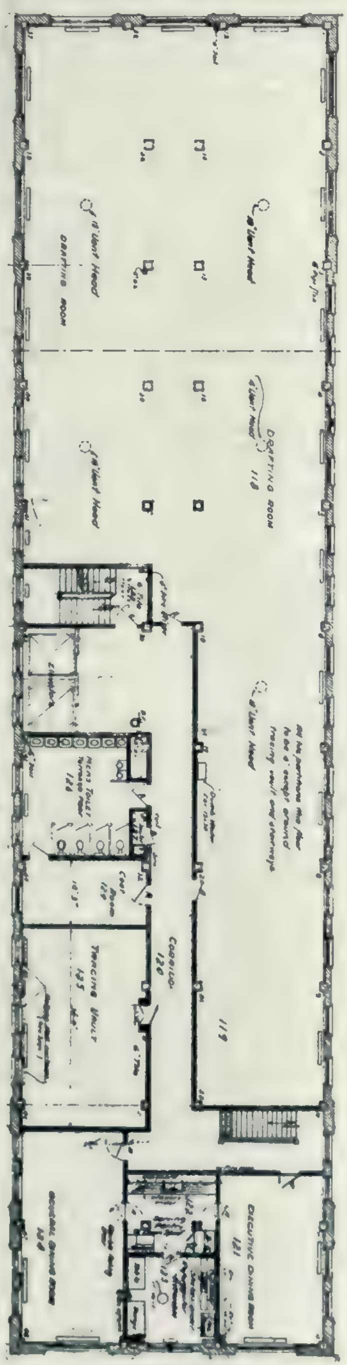
it is impossible for a man to show what he is capable of, not to seek employment is to court neglect."

As with solicitors who have already established a family business, their sons, if of average capacity, may after death "keep on the business still," so with architects, whose connection is even more personal, who have got one together, public or private, their sons and their sons' sons, as we know by many examples during the last century, may carry on the same practice to higher and more successful achievements.

Not infrequently some accidental circumstance may implant the initial desire of a youth to become an architect, and the favorable conditions in which he is placed bring it to fruition. The idea first came to me almost as a vision when, during a school holiday, I saw the chapter-house doorway of Southwell Minister; and the atmosphere was supplied by the tales of a grandfather, who had also been an architect, and who left behind many books, casts, and instruments, some of which I to this day use, but unfortunately no practice to which I could succeed.

The decision having been definitely arrived at that the youth is to be made an architect, the first thing to consider is how he is to achieve his purpose. Once there was only the straight gate of apprenticeship by which to enter the professional path, but now climbing over the wall is not only permitted but encouraged, and official and recognized ladders may now be used to surmount such an old-fashioned difficulty.

The benefits of proper apprenticeship are manifold. With the driving force of a premium paid and the direct control of a legal master come more steadfastness in the pursuit of knowledge; the benefit of another's example and experience in practice and professional duties; assistance and guidance as difficulties of all sorts arise; an outlook gained on general procedure only to be obtained by having the run of a working office; the early association with men who have already gone through the probationary stages and are perhaps in practice, more or less, on their own account; and, beyond all, an early appreciation of that esprit de corps which is essential to all professional success.



FITFH FLOOR.

The disadvantages of "climbing over the wall" as a short cut are as numerous, if much less tangible. Take the case of the pupil educated for the profession in "the schools"; and there are numerous important institutions in London and the Provinces undertaking to teach their students, in a few courses, drawing from the round, geometrical drawing and perspective, and the elements of architectural design and construction sufficiently to pass, at least, the intermediate examination of the Institute and be on the high road for its associateship. But the acquirement of all these things implies close attention to the classes, lectures, etc., a difficult thing to ensure where there is no compelling authority to secure the student's continuous attention. In the schools the pupil has to have his knowledge pumped into him; in the office he inhales it with his breath or absorbs through the pores of his skin. And when all is said and done, I venture to say that an architect's office boy of twelve months' standing and average ability has acquired more practical insight into professional work than many a prize student turned out by the schools.

An office boy is frequently called upon in times of stress to help on the tracings, and by that means learns a great deal about planning, construction, and design, and, above all, to be very exact in his work. Nothing has a greater educational value in the teaching of design and style than carefully tracing published drawings of fine buildings, and nothing makes the eye more sensitive in drawing and perspective or trains it with equal exactitude. . . . . I am perfectly sure that a student who has carefully traced an architectural drawing has a greater and more accurate appreciation of the work it displays than it is possible for anyone to acquire who, with the drawing propped up in front of him or perhaps covered with a sheet of talc, attempts in such a manner to copy it. The eye has to be taught to see the things before the hand can draw them; and tracing leaves nothing to chance.

When I was a pupil my master had occasionally to lecture on architecture and required diagrams for the purpose; and I was told off to make tracings for the purpose from books he had selected at the Institute library, often of a character not ordinarily brought before a student's notice. The amount of knowledge I thus acquired in working for him I quite appreciated, and continued tracing on my own account; I thus worked on Cotman's etchings in Normandy, and while tracing his drawings incidentally learnt something of pen-and-ink work as well.

Any talent that a boy may show in his drawing should be by all means encouraged; but the drawing usually taught at an ordinary school is generally so much time wasted. Drawing is one of those requirements of modern life that seems natural to everybody now, and, though latent in most, will come almost at call in case of necessity. If he has not attempted to draw before, he will soon find that he must when he starts in an architect's office, and his sketches and drawings will be made with decreasing difficulty as his own tastes or requirements suggest. In my own case, except for a few lessons in water-color from John Varley, I had no direct teaching; but my master was a remarkably good sketcher, and he turned me out, almost weekly, to do some sketching—at Westminster Abbey generally—*and criticised the result,* and he always insisted on seeing the work of my annual tour, notes as well as drawings, even when I was "out of my time."—The Architect and Contract Reporter.

Death of Well-known Contractor

The death of Henry George Love, which occurred at his home, 92 Gloucester Street, on August 18th, removes a personality prominent in the building circles of Toronto for many years. Mr. Love came to Canada from England in 1843 at the age of twenty-nine, and organized the firm of Brown & Love, retiring from same only a few years ago. Among a few of the larger business houses built by this firm are the Bank of Commerce, Western Assurance Company's building, the old Dominion Bank, Victoria College, and the Canada Life Building. The deceased was a member of the Queen City Bowling and Curling Club and will be remembered for his generosity in both charitable and patriotic work. His passing away will be the cause of genuine bereavement among many friends and acquaintances.

To Regain Ontario Trade

It is announced that the British Columbia Government will reopen its lumber office in Toronto, which was closed about a year ago owing to conditions brought on by the war. This decision, it is stated, is due to a serious decline in the business connection maintained at that time. Since then Pacific Coast lumber interests have not been properly represented in the Ontario field, with the result, it is claimed, that the American firms have been getting the bulk of the trade. The object is to again regain this market by having the architects and others in the Province of Ontario specify and use British Columbia lumber in preference to Georgia pine and other American woods for building purposes.

Resigns Office of City Architect

Mr. Alcide Chausse has resigned as City Architect and Superintendent of Buildings of the city of Montreal, and has resumed private practice at 367 Beaver Hall Square, that city. Mr. Chausse has for a number of years capably filled the post he has just left in addition to actively looking after the interests of the R.A.I.C., of which he is honorary secretary. He requests building material manufacturers and supply firm to send catalogues and price lists to the above address.

Lieut. George McSweeney Killed

Word has been received of the death of Lieut. George McSweeney, who was recently killed while flying in England, where he was attached to the Royal Air Service. The news comes as a distinct shock to his many friends, and especially to the members of the Toronto Builders' Exchange, of which he held the secretaryship at the time of his enlistment. He was not only regarded as a capable and highly efficient official by his fellow-associates in the Exchange, but enjoyed a wide popularity generally among a host of personal acquaintances. Lieut. McSweeney left for overseas early this year, and was honored with a presentation on the part of the Exchange prior to his departure.

Is Wood Suitable for Mill Buildings?

By W. Kynoch, B.Sc.F., F.E., and R. J. Blair, B.A., Forest Products Laboratories of Canada.

THE Forest Products Laboratories have frequently had occasion to draw attention to the serious financial losses resulting from the ravages of so-called dry rot in mill or factory buildings of wooden construction. Numerous cases in which this trouble has occurred in Canadian buildings have been carefully investigated, and one of these, which has been under observation for upwards of a year, affords a typical example of a deplorable state of affairs which could have been entirely avoided had those concerned in the erection of the building been guided by the necessary knowledge of the technology of timber and the mechanism of the decay of wood.

From the point of view of the owners of the building the facts are as follows: Five years ago a large factory building was constructed with heavy timber columns and beams and laminated floors of 2-inch x 6-inch planks overlaid by ⅞-inch hardwood. The timber was partially seasoned only when installed. The operations carried on in the building are such that the relative humidity in the interior is usually high. Serious decay was first noted about three years after the erection of the factory, and since that time has apparently become steadily worse. The tearing out of practically the whole of the timber construction has now become imperative, and such is the prejudice against wood as a structural material which has been created in the minds of the owners that they have decided to replace entirely with reinforced concrete at an estimated expenditure of $100,000.

From a technical standpoint some additional important facts present themselves. The decay of wood is due to the action upon it of low forms of plants known as wood-destroying fungi and bacteria. For practical purposes the bacteria may be ignored. The germs of decay are no more inherent in timber than tobacco is inherent in a tobacco pipe; infection must come from outside, and sound wood becomes infected in two ways, namely, by contact with either tissue or spores of a wood-destroying fungus under suitable conditions of temperature, moisture and air supply. It should be noted that this is not merely an interesting theory. It is a hard fact, proved beyond dispute by extensive research and thousands of carefully conducted tests, and we can now induce decay in timber at will in the laboratory. A number of kinds of fungi which can be definitely identified are responsible for the destruction of timber in buildings. In the particular case under discussion the range of temperature and relative humidity of the air in the factory were such as to provide exceedingly favorable conditions for the growth of several of the most destructive kinds. In addition the unseasoned state of the timber facilitated decay because it was not even necessary for the wood to absorb water from the humid air before reaching the moisture content permitting the action of the destructive agent—the moisture was there already. Lastly, a large quantity of the timber used was of the character shown in Fig. 1—that is to say, of rapid growth and low density. Different pieces of wood, even of the same species, differ in their ability to resist attack. Fig. 2 shows timber of slower growth and higher density and possessing much greater resistance to wood-destroying fungi. What occurred, therefore, was that timber of low resistance in a condition to invite decay (*i.e.*, unseasoned) was placed in a building in which the operations to be carried on gave rise to very favorable conditions for the growth of several extremely destructive kinds of fungi. It is, therefore, obvious that it could have been predicted that in all human probability decay of the timber would occur.

Such instances, and they are numerous, raise two important points for the consideration of the lumber trade. Firstly, they bring wood into serious disrepute as a structural material and indirectly advertise other materials; the net result being loss of business to the lumber dealer. Secondly, they do not simply happen without warning like an earthquake nor are they due to some mysterious and unknown cause. The cause is known and the trouble can be prevented by proper procedure. Wood initially sound will last for an indefinite period so far as decay is concerned if any one of the factors essential to the growth of fungi is lacking or can be effectively controlled. The moisture factor is especially important. If the required amount of moisture is present in the wood the fungi can grow in it. If it can be kept thoroughly air-dry their growth is absolutely prevented. It is, of course, rarely practicable under ordinary conditions to control the moisture content of the wood, the humidity of the air, temperature or air supply. The food supply of the fungus, however, that is the wood itself, can readily be controlled in that by efficient impregnation with a suitable preservative it can be made chemically impossible for the fungus to act upon it. In the particular mill with which we are now concerned the conditions were so exacting that the timber should without doubt have received efficient preservative treatment.

The selection of the preservative to be used for the treatmentof timber for a mill or factory building should depend on the circumstances of the particular case. A material which has been

Fig. 1.

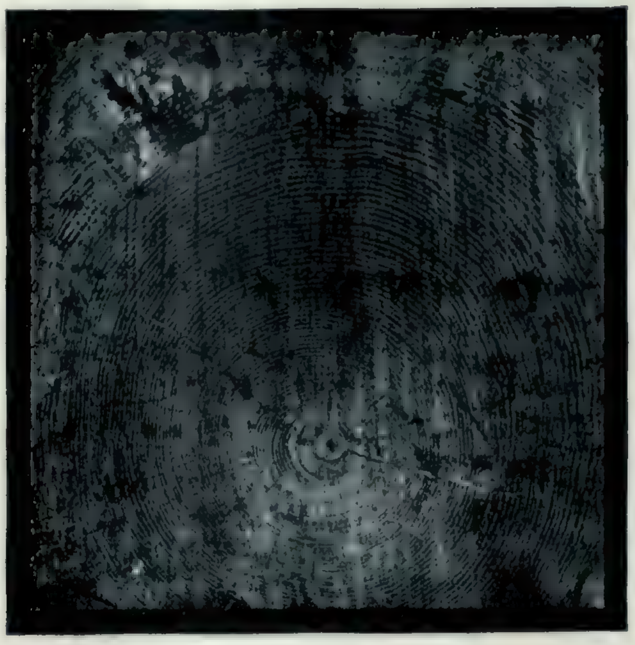


Fig. 2.

employed in several cases in Canada and the United States, known to the Laboratories, is mercuric chloride (corrosive sublimate). This preservative has been in commercial use to a rather limited extent for many years for the treatment of timber for various purposes both in Europe and on this continent and has given excellent results.

Before the war several concerns of which the writers have knowledge treated timber with mercuric chloride for use in their own mill buildings at a cost of about $3.00 per thousand feet B.M. The price of the preservative has since advanced so greatly, however, that it might in some cases prove prohibitive at the present time. Other less costly preservatives which might be used are zinc chloride and sodium fluoride. The Laboratories would be glad to furnish, on request, further particulars regarding the use of these materials for the treatment of timber for mill buildings. Timber to be treated with preservatives should always be thoroughly air-dry. Treating green or very wet wood is time and money wasted, as little or no penetration of the preservative can be secured. In the case of large structural timbers, which frequently take years to become seasoned, the outer inch at least should be reasonably dry before treatment.

In mill or factory buildings or parts of the same, where the operations carried on create very favorable conditions for the growth of fungi, the use of untreated timber, especially timber of low density, or timber containing much sapwood, is inviting disaster. If the timber be efficiently treated, however, there is no objection to the presence of a considerable proportion of sound sapwood or to the use of sound second quality or low density wood, provided that where necessary due allowance be made for the lower strength of the lighter material. The added cost of treatment could, therefore in some cases be partially offset by using less costly timber.

It must not be inferred that treatment of timber for mill construction is always necessary. It is only requisite where the conditions are especially exacting. In other cases the use of timber of the proper quality and the observance of certain precautions will give reasonable assurance of immunity from decay. The following precautions, some of which would require modification in individual cases, have been mentioned by the Laboratories on previous occasions but will bear repetition here.

(1) Only dense material of the more durable species should be used and the proportion of sapwood allowed should be small.

(2) The timber should be carefully inspected as to soundness, density and proportion of heartwood and material not up to specifications should be rejected.

(3) Planking should be thoroughly seasoned in all cases. In large timbers the outer inch at least should be reasonably dry.

(4) Timber delivered on the work should be piled out of contact with the soil and with any unsound wood.

(5) All reasonable and practicable precautions should be taken to keep the wood as dry as possible before and during construction.

(6) Laminated floors should not be built while the wood is wet. If this is unavoidable it is advisable to proceed as follows: As soon as the building is completed and the heating plant installed, close all doors and windows, raise the temperature inside the building to, say, 120 degrees Fahrenheit, or as near this as possible and maintain this condition for several days. If this can be done before building paper, pitch or

hardwood flooring is applied over the laminated flooring so much the better. (In the case of storage or other buildings not provided with heating plants it is suggested that some temporary means of heating might be used. Where this is not feasible it would be safer to build with treated timber.)

(7) Wood should not be covered with plaster or other materials or painted until at least two years after the building has been occupied.

(8) Construction at joints, where beams enter walls, etc., should be such as to permit of ample ventilation.

(9) Special care should be taken in the construction of roofs when untreated timber is used. It is necessary to have the interior roof planking thoroughly insulated, so as to prevent condensation of moisture on it in winter.

(10) An examination of the planking and timbers should be made periodically, say, half yearly, during the first three or four years after the completion of the building.

That timber frequently becomes infected in the lumber yard, and that trouble from decay in mill buildings often arises from the installation of such infected timber is beyond question. Where infection occurs in the lumber yard it is usually due to the existence of conditions which foster the growth of fungi, such as the following:

1. Location of yard in a damp, low-lying situation, or neglecting to provide proper drainage.

2. Allowing decaying waste wood to accumulate in the yard and to form centres for the distribution of infection.

3. Using partially decayed foundation timbers for lumber piles, whereby disease is transmitted to sound lumber piled on same. (Foundation timbers should preferably be thoroughly impregnated with creosote oil.)

4. Piling lumber too near the ground, thus retarding circulation of air where it is most needed, and keeping timber in the lower part of the piles in a favorable condition for infection.

5. Using diseased spacers in lumber piles.

6. Permitting diseased timber to remain as part of permanent structures in the yard.

Timber possesses several important advantages over other materials for interior construction in mill or factory buildings. For example, the initial cost is appreciably lower, alterations and extensions can be more easily and cheaply effected, construction can be completed in a shorter time, and conditions are frequently more conducive to health, and therefore to efficient work on the part of employees. Lower insurance rates can be secured for a sprinklered building of the standard mill construction type than so-called fireproof buildings not protected by sprinklers. The only serious objection to the use of timber for this purpose is its tendency to decay, and as we have endeavored to show, the cause of the disease is known, and preventive measures are neither difficult nor costly.

The Courage of France

When the biggest war in the world's history was launched by the German military machine, to quote the "Improvement Bulletin," France had embarked upon the preliminaries of one of the greatest engineering feats ever attempted.

On the shores of the Mediterranean is the busy city of Marseilles. It lies near the mouth of the Rhone River, a great inland waterway. In order to dock at Marseilles river barges making the Rhone trip were compelled to venture out into the open Mediterranean, always a dangerous feat for river craft of light draft.

The French had, as far back as Napoleon's day, planned to connect, at some period, the outlet of the Rhone with parallel canals, running to Marseilles. The great engineering obstacle to this plan lay in the ring of hills which fringe the city of Marseilles.

Shortly before the war began, French engineers planned to construct not only the canal, including a canal tunnel through the hills, but an elaborate system of breakwaters, and the dredging of a basin for shipping protection at Marseilles.

The city of Marseilles did not permit the stress of war to interfere with this project. Marseilles kept on with the work. The canal tunnel is one of the most remarkable in the world. It is not only seven miles long, but it is the widest tunnel in the world. As the war advanced and the call for man-power increased, Marseilles found it necessary to employ German prisoners upon the work.

It is a startling commentary upon the German viewpoint that the prisoners so employed accepted the situation with equanimity, remarking that it was well to finish the work, because it would be all ready for Germany when she came to seize it and make it efficient.

The tunnel has been driven and is ready. The channel will not be dug until after the war.

The remarkable fact, however, is that a nation, so torn and desolated as France, could, in her hour of supreme effort, find time and enterprise to continue this great engineering work. If France, seeing the necessity of such work, could carry it through, how much more important is it that this country, with its great available resources, should continue necessary public construction during the period of the war?

Reasons for Failures of Heating Systems*

By J. D. Hoffman.

THE time has come for a campaign of education for more satisfactory heating and ventilation in the homes of our country. Buildings of larger proportions have been carefully worked out, because of their importance as public utilities, have been treated with such respect by both architect and engineer as to insure fairly satisfactory service. The home of the private citizen of moderate means, on the contrary, still suffers grievously, and the need for such agitation is apparent. The society should do this and some means should be found through which to educate the public to demand and see that they get more satisfactory heat in their homes.

POOR BUILDING CONSTRUCTION.

The recent coal situation has served the purpose of calling to the attention of heating and ventilating engineers that in the future the economic problems of the home must necessarily become more vital factors. Heretofore they have pacifically endeavored to fit their heating and ventilating systems into ill-conceived and poorly constructed houses, and have trusted to their ability as engineers to overcome the handicap imposed upon the systems by architects or constructors who knew little and cared less about the requirements of home comfort. The heating and ventilating engineers this past winter have shown their willingness to do anything in their power to tide over the acute stages of panic and suffering due to the fuel shortage. They have unceasingly counseled "fewer fires" and "more economic firing," because under the conditions this was all that could be done. Then, nothing counted as much as direct coal saving, but now that the stress of severe winter has passed, we may ask ourselves: What and how may the heating and ventilating engineers do to assist in laying the foundation of a more effective economy in the years just ahead?

I have especially in mind some of those conditions (principally residential) that not only work against economic heating, but absolutely prevent it in a large number of cases. Some of these conditions are due to the mistakes of the architect with knowledge aforethought or otherwise, some of them to those of the heating man (or hardware man) who installs the system, and some to those of the householder who practising false economy is not willing to pay the price of good work.

CAMPAIGN NEEDED FOR BETTER BUILT HOUSES.

We need to urge a campaign for better built houses—houses that are made to *live in*, and not merely to rent or to *sell*. It is a sad commentary on our domiciles, but it is a fact that the average residence is a satisfactory habitation for only nine months in the year. It has been stated that 75 per cent. of the residences built in 1912 cost each $5,000 or less. This ratio, if correct, has probably not changed much in the interim. From what I know of the methods of construction of the average residences of this class, I am safe in venturing that 75 per cent. of this number are not satisfactorily heated. Further, I am willing to venture that 75 per cent. of the number not giving satisfaction are failing, not so much from the lack of gray matter on the part of the heating man, as from unsatisfactory house design and construction.

In most of the ordinary balloon-framed houses the sheathing is very inferior in grade and loosely butted at the edges, when there should be solid boards and lap joints. Some of the houses have no building paper or its equivalent, some have one course of the building paper, and a few have two, but very few courses are laid with care to serve as an insulation. Two courses of paper in face contact are, it should be stated, inferior to one course with the sheathing, and one course woven in and out over the studding; or, to one course with the sheathing and one course on the inside of the studding, with strippings under the laths to bring the plaster free from the paper surface. Again, suppose the wall is well protected against inleakage, but the upper and lower ends of the spaces between the studs are open; in this case there is free connection of air upwards between the inner and outer layers of the wall and the heat that should be kept within the room is dissipated to this air current and lost to the attic, and the conditions are worse than the open wall in that the heat is lost and there is no corresponding physical benefit from inleakage.

TYPICAL CASES OF POOR BUNGALOW CONSTRUCTION.

One of the worst types of construction, and one I have frequently met with, is the bungalow type second floor outer wall, which offsets within the plane of the first floor outer wall. Irrespective of the type and quality of main wall construction (balloon-frame, brick or stone), the second floor wall is studded down from a ceiling level near the roof line, lathed and plastered on the inside of the studs and on the ceiling; and the outside of the studs and joists left open to the cold spaces under the roof. In two, otherwise well-designed and properly-heated stone bungalows called to my attention recently, where the heating systems were pronounced

*Paper recently presented before the American Society of Heating and Ventilating Engineers, at Buffalo, N.Y.

failures, the heat lost through the second floor walls and ceilings to the cold spaces underneath the roof was so great that a cold draft of air down the open stair was sufficient to make the first floor uncomfortably cold. A careful inspection of the heating systems showed them sufficient in capacity to supply similar buildings with ordinarily well constructed walls, and excessive in capacity for the heavy stone outside walls those houses had.

Everything seemed to be satisfactory, but as a last resort I asked to see the attic construction. Here we found that the exterior walls and ceiling of the second floor had only one ordinary lath and plaster thickness separating the rooms from the attic spaces. The outside temperatures at the time were near zero, and the temperature in the attic spaces showed that the heat was going through these plaster partitions like water through a sieve. My advice in each case was to surface the outside of the studs and joists with heavy building paper or tight boards, or better, with both. I have mentioned these two cases because they show how a splendid construction may be set at naught by inexcusable carelessness in some hidden detail of construction. These houses that on the face of things were overheated, were as a matter of fact only partially heated, and through no fault of the heating man excepting that he should have insisted upon knowing what kind of construction would be used in these various walls. Most cases of poor house construction that come to the attention of the heating and ventilating engineer differ, however, from the ones mentioned, in that the failures are due to *general house debility,* and it is more difficult to say which bad feature has the greatest effect to produce failure of the heating system.

POOR PRACTICE TO CARRY PIPES THROUGH ATTIC.

It frequently happens that in order to conceal the piping the heating engineer frequently crosses the wall and carries his pipes through the attic spaces. The practice improves the appearance of the room somewhat (and some householders insist upon it), but it is opposed to economy. In one striking example of how not to do it, a new vapor system was installed in a stone bungalow last summer with all the second floor returns and some of the mains traversing these attic spaces. The result was a freeze-up in every radiator on the windward side, alternating, of course, as the wind shifted so as to give every room some of the same experiences, and during one week of the extreme weather last winter every second floor radiator was out of commission. No insulation was put on the pipes, and I doubt if they could have been successfully insulated against the zero temperatures which were indicated by the thermometer near the pipes. Vapor system returns are especially susceptible to freezing conditions.

OVERHANGING ROOMS SHOULD HAVE WELL-INSULATED FLOORS.

Another feature of house design that is frequently fatal to the plans of the heating engineer is the overhanging room with only one thickness of ⅞-inch flooring on the room and light ceiling over the porch. This always gives a cold floor that is not only uncomfortable to the occupants, but eliminates heating possibilities on cold days. These remarks do not apply, of course, to sleeping porches with no heat. If an overhanging room is desired, be sure to provide for a well-insulated floor.

LOOSE CONSTRUCTION AROUND WINDOWS.

One feature of house construction that reflects against the builder rather than the architect is the loose construction around the windows. The owner wishes free moving sash, and the workmen give him everything he could desire in this regard. But how about the person who is expected to inhabit the room on a zero day when the wind is blowing a twenty-mile velocity? I have caught snow in my hand at a distance of two feet from a tightly-locked window, in a house supposed to have better than ordinary construction. What can the society do to better such conditions? Window strips, metal weather strips, and storm windows may be urged. Storm windows, top hung, give satisfactory insulation during the cold days, and at the same time provide ventilating possibilities on moderate days. An average nine-room house can be supplied with good storm windows, west, north and east, for an expenditure of from $75 to $100, and the coal saving will pay for the first cost in two years' time. Such storm windows are no hindrance to open-window ventilation when desired.

OUTSIDE CHIMNEYS NOT GOOD DRAFT PRODUCERS.

Next, let us look at the chimney. Several points in common practice among architects tend toward inefficiency. The outside chimney, in spite of its possibilities toward exterior ornamentation, is not a good draft producer, because of the chilling effect of the outside air. Where a chimney is required in an outside wall it should be not less than two bricks thick (eight inches) on each side of the flue at the thinnest part, increasing to at least twelve inches on the lowest part. This is improved if the chimney wall is double with an air space between the walls. Such an air space may be closed in with an occasional layer of header bricks from the outside wall nearly touching the thinner wall. These header bricks cut off air circulation, and in addition steady the inner wall. They must not bind the walls together, since the lineal expansion of the two shafts are not equal. The chimney is improved occasionally by an ornamental wall of cobble stones laid up on the outside of the chimney proper. All chimneys should have an inner lining of hard burned tiles, well cemented at the joints and embedded with the inner brick surfaces.

Let me add a word of caution in regard to the inside chimney: *Under no consideration should the house construction be rigidly fixed to the chimney.* This is too frequently done. The expansion and contraction of the chimney causes movement of the floors, thus cracking the walls and ruining the fits of the doors, casings, etc.

SPACE RESTRICTIONS IN WARM-AIR FURNACE HEATING.

So far I have been pleading for better *exterior construction,* since this is the most vital. The points touched upon do not by any manner of means exhaust that part of the subject, but now notice what the heating man encounters in the *interior construction,* with indirect heating, or, say, *furnace heating.* (Steam and hot water direct heating may, of course, be fitted to almost any building, no matter what the interior construction may be. Of the unsatisfactory furnace systems, I wager that seventy-five per cent. fail because the architect and constructor have restricted the heating man to such a degree that the heat lines of his system are too small to carry the heat necessary to supply the loss through the outside walls and windows. If this statement is even only approximately true, then it would seem that our society has neglected the the furnace heating business. Any one of the necessities of the home that is so vital to so many of our people should be more carefully guarded.

To note some of these limitations, taking them in the order of first importance, the *wall stack* is, in my opinion, the chief offender. In houses of this classification ($5,000 or less), the interior walls are built of 4-inch studding, set 16 inches on centres. This gives, allowing for shrinkage of the studs, approximately 3¾ by 14¼ inches maximum cross section of opening through which the vertical air ducts (stacks) are run. Since stacks fit loosely in this space and are supposed to be insulated from the woodwork of the wall by one or two layers of asbestos paper, single walled stacks will be about 3⅝ by 14 inches, and double walled stacks (two stacks fastened symmetrically with each other with a thin air space between), 3¼ by 13⅝ inches. All such stacks are of tin or light galvanized iron, and as such cause very little friction in the movement of air through them, but they fail because they are *too thin* or because they have *too many right-angled turns.* The maximum wall stack has, say, 45 square inches net cross sectional area. This will supply a 10 by 12-foot centrally located room having small exposure, but is not sufficient for large rooms, or for heavily exposed rooms.

Can't we conceive of some new styles of first floor designs that will permit square, or nearly square, air shafts instead of the elongated rectangle whose effective cross area approaches zero?

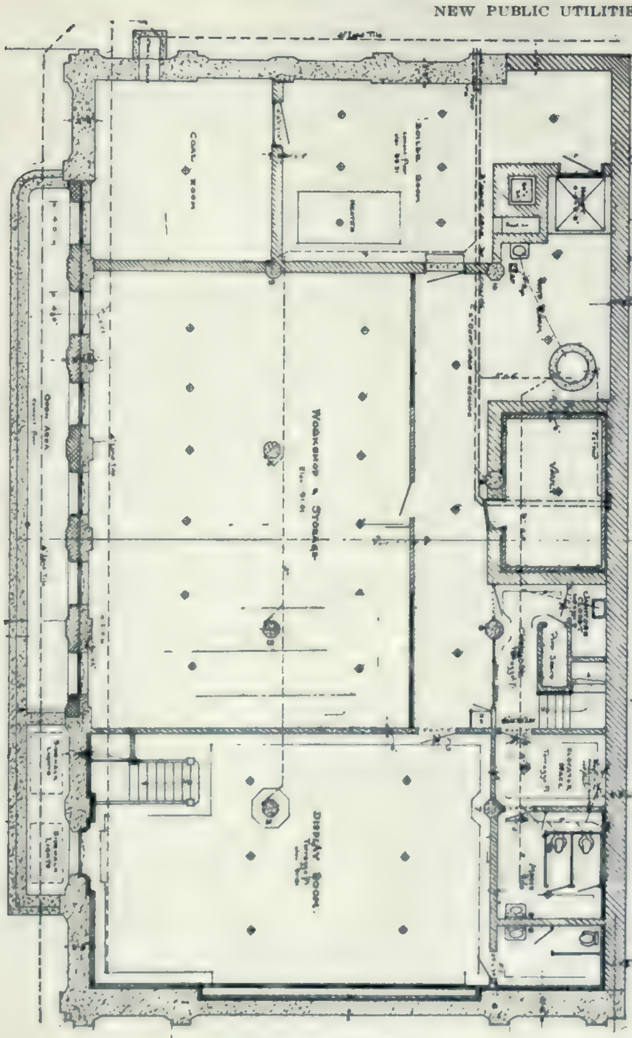
Another point, chargeable principally to the owner, is the low basement ceiling that reduces the pitch of the leaders to a minimum. If the average householder realized the importance of extra pitch to the pipes in the basement he would let loose enough additional capital to guarantee a ceiling height of 8 feet instead of 6 feet, as is so often found.

Another point, tabooed by the average furnace man as unnecessary, is the return metal duct. No furnace plant should be installed that has any part of its air lines formed by merely tinning along the edges of the studs and joists. This is against the laws of the convection of air, and is an offence against the sanitation of the building. The almost universal custom among furnace men is to take air from off the floor of the room, together with dust and all, and carry it back to the basement through a duct that has one side of very rough plaster, two ends of rough studs and one side of tin. In many cases this is continued to the furnace between rough joists on two sides, a fairly loose floor above and tin beneath. After a while the collection of dust and micro-organisms that deposit on these rough surfaces would fill a cemetery if turned loose *en masse* on the neighborhood. Why not add a few dollars to the building and make a smooth duct system with hand holes at intervals to permit cleaning once each year by swabs or fans, as the case may require? Not only will the house be more sanitary, but the heating system will come nearer giving satisfaction, because the laws of friction have been considered intelligently. Teach the householders what to expect and most of them follow your advice.

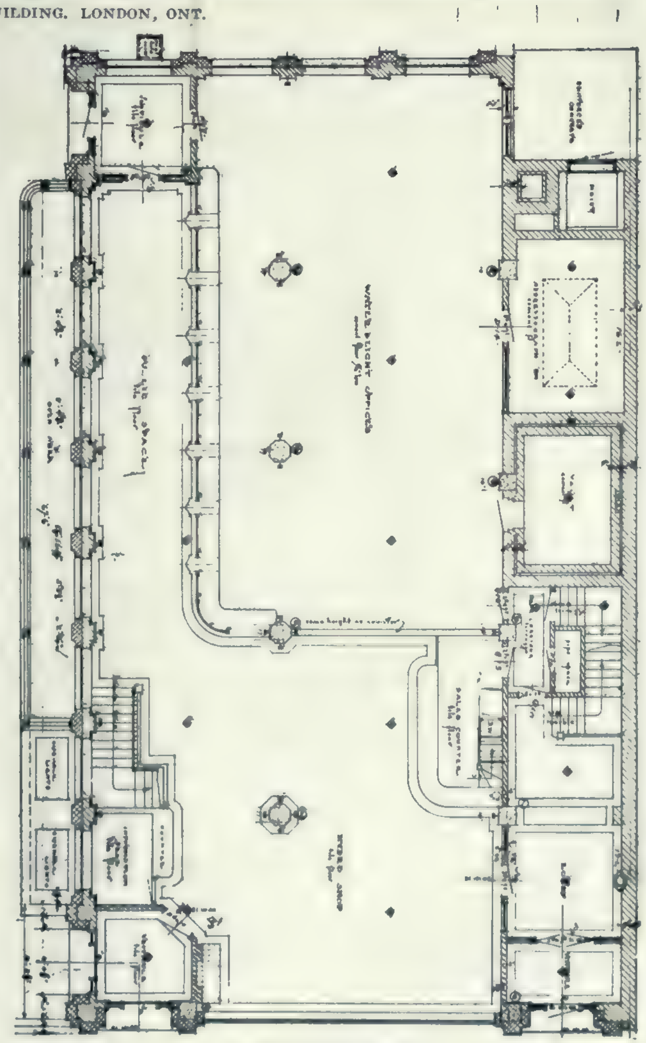
The conditions governing the pitch of the pipes, aggravating as they may be, are to a greater or less degree within the control of the heating man. Friction, on the other hand, is a worse enemy to overcome, because the conditions controlling it are bound up with the house wall construction, and this is usually fixed by the architect before the problem is put up to the heating man. I have no desire to shift the burden of responsibility. The mediocre heating man, especially the furnace man who knows enough to buy a furnace at the cheapest price but does not know enough to install it correctly, is a detriment to the heating profession, but in many cases he is more sinned against than a sinner. He is the victim of a type of construction that even the best at times stumble over.

(*Concluded on page* 260.)

NEW PUBLIC UTILITIES BUILDING, LONDON, ONT.



BASEMENT PLAN.



GROUND FLOOR PLAN.

GENERAL BUSINESS OFFICES AND DISPLAY ROOM. PUBLIC UTILITIES BUILDING, LONDON, ONT.

GENERAL OFFICE AND DISPLAY ROOM. PUBLIC UTILITIES BUILDING, LONDON, ONT., ILLUMINATED AT NIGHT

Public Utilities Building, London, Ont.

THE new Public Utilities Building, which was recently officially opened at London, Ont., by Premier Hearst, is under the direct management of the Public Utilities Commission, which has administration over the civic departments of water, light, fuel and parks. Accommodation is provided for the clerical and working staff of the various departments, in addition to attractive sales and demonstrating rooms for the merchandising of electrical goods and appliances to the consumers direct. The purpose of the structure is rather unique among municipal buildings, in that it seggregates the several utility departments from general civic politics by placing them under well organized and limited control.

With a view to permanency and fire protection the building is built of reinforced concrete flat slab construction, with "T" beams used in conjunction with the floor slabs. The exterior, which is in semi-classic design, is of Indiana limestone, the stone work being backed with common white brick. The interior partitions are of gypsum blocks, and the vault walls throughout are of common brick backed on the inside with hollow tile, to secure an air space. The rough stairs throughout the building are also of reinforced concrete, the finishing treads and risers both terrazzo and marble, being put in place after the erection and securely bonded to them. In designing the structure due provision was made to add another storey should this be required. For this reason the fourth floor slab was laid and the roof built on top of this, so that at any time the commission should decide to build another storey, work can be gone on with without disturbing any of the occupants of the building. The top portion of the coping and cornice is also so arranged to be removable in case a fourth storey is added.

From the street the main office and showroom presents a decidedly attractive appearance. Entrance is through tiled vestibules into a spacious interior, richly finished in marble. The dado is composed of Laurentian base, rail and stile with Italian pavanazzo panels, the apron and cap of the dado being in Vermont marble, Mullen gray. This latter material is also used for the door and sidelight trim, while the counter for the water and light offices carries out the general treatment of the surrounding walls. The top of the counter, however, is partly wood, to enable clerks to use the counter for their ordinary duties. In the public space a mosaic floor is used, while above the dado the walls are stucco with pilaster caps and a simple ceiling enrichment.

Marble is also extensively used in the lobby leading to the upper offices and the basement,

DEMONSTRATION KITCHEN. PUBLIC UTILITIES BUILDING, LONDON, ONT.

which is floored in pink Tennessee. Here the walls to the height of the top of the doors and the stairs leading to the basement display room are finished in Napoleon gray, with Napoleon gray treads and risers and an ornamental iron balustrade. The terrazzo treads and risers were built in forms on the job, and polished before being placed in position, thus securing the best possible result. The basement display room and the second and third floors are floored with terrazzo, with the exception of the dining-room, board room and general manager's office. The dining-room is floored in quarter-cut oak, in keeping with the surrounding trim. In the general manager's office and board room linotile is used over the rough concrete floor. Both of these rooms are richly finished in British Honduras mahogany, which is used for both the wall and ceiling panels. The doors of these rooms, which are of steel, have been grained to resemble the woodwork as closely as possible. The dining-room, which is the only other room in which wood trim is used, is panelled in oak, and has a buffet built in the end wall. Elsewhere in the building the metal trim, consisting of hollow steel doors, base, chair and picture moulding, is finished in Circassian walnut.

The structure is equipped throughout with steel casement windows. These are fitted with bronze hardware, in keeping with the general interior hardware, which is also in bronze. The main showroom on the ground floor, as will be seen from the photograph, on account of its large size, has extremely good advertising value. The transom part of the show window, also the transom heads for the large casements on the ground floor, are glazed in prism glass, the remainder of the exterior glass being plain plate.

MECHANICAL EQUIPMENT.

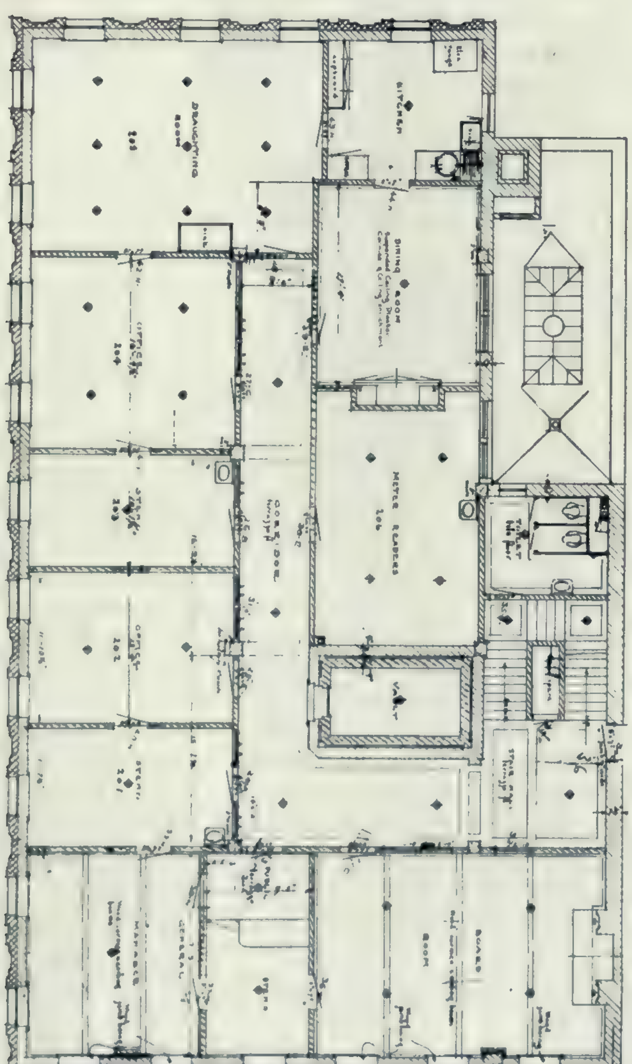
The mechanical equipment of the building represents a very complete installation. The toilet rooms and basement display room have been equipped with a mechanical ventilating system of an exhaust type. The demonstrating kitchen is equipped with a separate ventilating hood, composed of a porthole fan mounted in the exterior wall.

The lighting has been designed to secure the maximum of efficiency. The fixtures, with the exception of the board room, general manager's office and toilet rooms, are finished in bronze. The fixtures in the general manager's office and board room are finished in oxidized silver, and in the toilet rooms nickel-plated finish has been used in keeping with the rest of the equipment. The lighting for the main show window is a decided innovation, lamps being concealed behind prism glass in the soffit of the arch around the window. In order to secure ventilation for the large number of lamps thus enclosed, vent outlets have been provided in the soffit of the ceiling beam immediately above. This type of lighting has proven very satisfactory, and much favor-

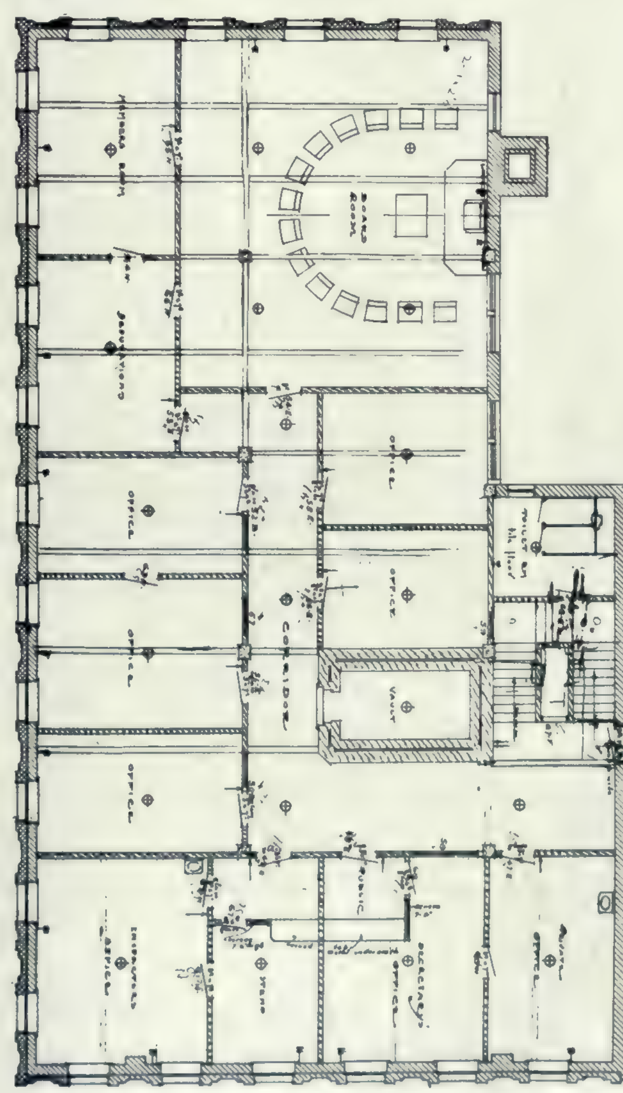
DINING ROOM. PUBLIC UTILITIES BUILDING, LONDON, ONT.

able comment has been made upon its neat appearance and general efficiency. In the basement display room, which, by the way, is entirely artificially lighted, another new system of lighting has been used, in the form of lamps placed behind a false wall directed against a wall painted a sky blue immediately behind the false wall, and are placed so as to reflect the light back through the windows in the false wall, thus making an indirect lighting through ground glass, which, it is claimed, is the nearest approach to daylight possible. By referring to the photos of the basement display room, it will be seen that the distribution of light is perfect, there being practically no shadows. On the ground floor bracket lights have been mounted on the columns and pilasters, adding very much to the artistic beauty of the room.

BASEMENT DISPLAY ROOM. PUBLIC UTILITIES BUILDING, LONDON, ONT.



SECOND FLOOR PLAN.



THIRD FLOOR PLAN.

The heating plant consists of a forced hot water system. Provision, however, has been made to operate the system by gravity in case of a breakdown. The radiators in the public space on the ground floor have been arranged behind the marble dado by the use of bronze grills, the space occupied by the radiators being entirely enclosed from the back, thus forcing the heat out through the grills. A small grill has been used at the bottom to give a forced circulation to the air surrounding the radiator. Provision has also been made in the piping to install electric heating units at some future date, when the supply of Hydro power warrants the change.

The plumbing system throughout the building was designed and installed by the commission's own staff. The very latest type of plumbing fixtures have been used throughout. On the hot water system in connection with the plumbing system an electric heater has been used, thus making the hot water system entirely independent of the heating system. All lavatories have been fitted with the latest type of water closets, flushometer valves being used in place of the storage tanks.

The electric conduit system and the telephone piping were designed and installed by the Commission's own staff of wiremen, the piping being laid in the floors and walls and outlets provided in same during the construction of the building. The piping system is a most complete one, every office room in the building being provided with telephone and base outlets on all four sides. All of the electric wiring was carried out by the Commission's own staff, as well as the placing of the conduit piping. The telephone system was installed, with the exception of the conduit piping heretofore mentioned, by the telephone company's wiremen, each outlet being wired but only one outlet in each office being used, the advantage of having the extra outlets wired being their easy access in the case of rearrangement of the furniture being made. In this connection it might also be mentioned that the electric time system throughout the building was also installed by the Commission's own wiremen. The Commission's wiremen also installed a bell system throughout the general offices. In connection with the telephone system, it might be mentioned that the ground floor is equipped with an information office which also holds the telephone switchboard connected to some fifty telephones throughout the new building, the City Hall and all of the city sub-stations, an operator being placed in charge of the board.

The building was erected by the Commission's own labor. Contracts were let for several of the different staff and all work as far as possible carried out by day works, but were inspected by the Commission's staff from time to time. The estimated cost of the building is $115,000.

Canadian Industrial Reconstruction

It is announced by the press that the Canadian Industrial Reconstruction Association is planning a general Dominion-wide interchange of ideas and conventions next year. The Executive Council, it is said, have tentatively discussed arrangements for delegations to travel throughout Canada as a means of bringing the East and West into closer understanding on questions affecting the general welfare of the Dominion.

According to Sir John Willison, the president, the idea of encouraging the various Canadian interests to understand each other is one of the chief objects of the association. "That is how we can hope to successfully negotiate the trying post-bellum period," said he. The delegations that will visit different parts of the Dominion will consist of farmers, manufacturers, business men, financiers, etc. They will be restricted to no special interest or section of the Canadian business and industrial community.

Sir John Willison states that plans for various university fellowships are going ahead, and that when the coming academic year opens these will take definite shape.

Reasons for Heating Failures

(*Continued from page* 254.)

What we need is a type of building construction that looks toward comfort, utility and permanency.

AVERAGE HOME BUILDER SHOULD BE INFORMED OF STRUCTURAL REQUIREMENTS.

Is it not possible to develop a campaign of education in such a way that the average man who may be contemplating building himself a little home may become more informed on these vital points that are so necessary in co-ordinating the heating and ventilating features with the building construction, and in that way develop an independent thinker who will not be wholly at the mercy of the unscrupulous promoter or the uninformed individual who frequently poses as an architect or engineer? Such a movement to be effective must be supported by some organization of men whose interest in the best things under discussion cannot be questioned. The press of the country is always ready to assist in anything that stands for the public good so long as it is convinced that the movement is *bona fide* and under competent supervision. May the time soon come when we will build our houses to serve as homes, and not as private cantonments.

What Constitutes Unprofessional Practice in Architecture?

In the following article republished from our well known contemporary the "American Architect," the writer has courageously tackled what he evidently regards as certain ethical misconceptions in reference to the practice of architecture. It is to say the least a thorough analysis of an important and time-worn subject, and while many may not be in accord with the writer as to certain phases of his opinion, the general viewpoint is one which even here in Canada will be found of interest and not entirely without concurrence and support in the sentiment expressed.—Editor.

DURING a time of stress two psychological conditions manifest themselves, seemingly very opposite but really almost identical. The one is a loosening of restraint, a throwing off of conventions and an increase in the intensity of competition; the other is an exaltation of ideals, a seeking for new standards and a greater intensity of emotionalism. The architectural profession is just now experiencing both of these moods. We are certainly in times of stress; we certainly are filled with emotions which tend to raise our ideals, and we certainly are throwing over some of the restraints which in the past have made us one of the most straight-laced professions, ranking in that respect only after that of medicine. Now, restraints, ethics, codes of practice are such necessary things and contribute, when properly devised and applied, so much to the enjoyment of the practice of a particular profession that we cannot afford to throw over any code which has a real value. We cannot afford to blunt the keen edge of our ideals; and it is, therefore, fitting that while we are going through the melting pot, while we are trying so many lines and losing so much that we once thought fundamental, we should consider very carefully in what our code of ethics should consist and what is to be the standard of professional conduct in the light of the revolutionary episode of the war.

A code of ethics is simply a statement of the conditions under which a man can follow his calling with fairness to his competitors and with justice to his clients, his employees and his associates. So far the question of ethics seems very simple, and it is really only a constant application of the Golden Rule, but unfortunately the element of business is a very prominent one in architectural practice, and it is right there that the line begins to waver. The American Institute of Architects for the last fifty years has been formulating codes of ethics and trying to define professionalism, but always the point of view has been backward, applying to the future only the tried and proven experiences of the past, and experiences which have been interpreted by the members of the profession who have been successful and have won their full share of opportunity. I often wonder what our code would be like if it had been drawn up in every case by men under twenty-five, if it were based not upon the practice of the past alone, but upon the hopes of the future, as judged with the restraining point of view of the Golden Rule. It has not required the upheaval of the present war to make our past codes of ethics seem strange and illogical to at least some of the young men who are coming out of the architectural schools and are eager to take their place in the profession, but are met right at the very start with restrictions that they do not always understand, and for that matter, which very few of us clearly comprehend.

The fundamental essential of the practice of architecture is to get a job, and to get a job one must have friends or acquaintances, or business connections who are willing to take a chance on an untried quantity, if the architect is just beginning; or at any rate, a certain amount of uncertainty is involved even when the older and more experienced architects get their chance, and right there the difficulties begin. We tell the young man he must not seek out a possible client and offer professional services, and yet in most cases how will an unknown man otherwise get a job? We tell him he must not let his talents be known, and yet if he cannot sound his own praises how can he expect anyone else to? We tell him he must sedulously keep his personality in the background, suppressing his name, suppressing his connection with the work, and yet architecture of all professions is one of personality, and if we tell him to suppress the vital part thereof how is he going to find his chances? We tell the young man that his best programme is to do every piece of work that comes to him just as well as his abilities will allow, to give the most rigid attention to details; in fact, to carry out all of the conditions of most efficient service and that then the rewards will come if he has the ability, and yet on the other hand we all of us know of architects who give their very life blood to the profession, who do creative work of the highest rank without fair reward, and there are scores of young men in all our cities who are able, sufficiently experienced, and certainly honest and well meaning, but whose average income from architecture is a mere pittance.

Again, we tell a young architect he must be a business man, must run his profession as a business, and yet we tell him he must not make good in the very fundamental of all business transactions, namely, responsibility; that since he is only an adviser he must never be responsible for results; that since he is a professional man in a calling which requires a great deal of business management, he must not stand behind any of his statements financially, must not guarantee anything; that his motto to his clients can be only "caveat emptor." Again we impress it upon the young man that his profession is a creative one, that his work over the drawing board is purely objective, that the building is the thing and not the drawing, and yet we absolutely prohibit him from taking any part in the actual building. Architects often refer to the structures they have built. This is an unconscious derogation of a part of the code of ethics. Architects do that really far more than the profession sometimes admits, but theoretically the young man may have no affiliation or connection of any sort with the building, and may take no contracts from anyone to do anything.

Again, and this is a point which is held most tenaciously by most of the older architects who have arrived, the young man starting out must not enter any competition unless it has received an official sanction from a body of men who may have had absolutely no connection with that particular problem. He must make no attempt to show on paper what he is good for unless such an attempt is so surrounded by restrictions that he has slight chance to show his ideas, and he must, perforce, if he is to be professional, stand back and see men of less ability, fewer scruples, but far more freedom of action, sail right by him and take the job out from under his nose.

So, therefore, it is, or has been at least, unprofessional to solicit work, to advertise, to guarantee a contract, to accept a contract for carrying out work or to enter an unauthorized competition, and the last item has been construed to mean that if a certain client wants the combined advice of two or more architects they cannot furnish it to him under any conditions, except it be that of a recognized competition approved by the institute, even though the client is perfectly ready to pay full professional fees for all the advice that is given him. We say our whole trade, our whole occupation is giving advice, and yet we prohibit ourselves from offering that advice freely even when paid for.

Now, these provisos are not the result of an attempt to suppress individuality or to deny access to the field on the part of the younger men, but they are rather the results of the code of ethics being a backward look instead of a forward prospect, and they represent the reactionary element of the profession rather than the alert, striving, active element which looks at results first rather than theories. The American Institute of Architects at its last meeting dodged the matter of advertisement and simply struck out the clause relating to it in the code of ethics. That body did not quite dare to accept the developing facts, and it was quite right in doing so, for we shall always have two codes of ethics, one the written code which will invariably lag behind actual practice, will invariably be archaic and harmful in many cases; and the other will be the unwritten code, the real constitution of the profession and the voicing of custom which has sprung up as result of real, practical experience.

Looked at in the light of what is done, and being really honest with ourselves, we can write a very distinct negative code of ethics.

1. It is not unprofessional to solicit work.

By no possible explanation, except on the ground of pure selfishness, can we deny to another the perfect right to go and ask for a job. It may be inexpedient at times to do so, the method of asking may defeat its own ends, and it may be far wiser to adopt the indirect method and have our friends do the asking for us, but no matter how it is done it is asking just the same, and there is absolutely no wrong to anyone or to the profession in presenting one's case, one's experience and one's ability in the most judicious light so long as the Golden Rule is observed and the presentation is made in absolute fairness and truth.

2. It is not unprofessional to advertise.

This again is a matter of expediency and method. The profession has hid its light under a bushel for so long that it has come to feel a comfortable glow under the suppressed light of the candle and think that means moral victory. It is really nothing of the sort. We are simply sticking our heads in the sand like an ostrich and refusing to let other people even dream we are on earth. With a natural result they take us at our own estimate and pass us by. There is a right and a wrong way to advertise, and no code can say which is which, but that an architect should condemn himself to voluntary oblivion is at least a needless limitation.

3. It is not unprofessional to guarantee results.

If an architect has not the courage of his own convictions and can prove it, he has no place in this busy, practical world. If he is a mere dreamer, changing his mind as easily as he changes his drawings and cannot maintain his promises to his clients, he is a bad and faithless business man, and I would that every architect were held to the same degree of accountability which exists in France, where for ten years after the completion of a building the architect is liable for damages if anything wrong happens, and where not infrequently an architect financially guarantees the results of his work. No individual could possibly be harmed by accepting responsibility and faced the consequences.

4. It is not unprofessional for an architect to assume the capacity of a master builder.

If an architect is not a builder, pray what on earth is he? If he who creates in his mind is to be debarred from creating in fact, we then go back on all the principles of the world previous to the Renaissance. The architect is preeminently the one to carry out his own ideas and give them just the right shape. We admit it in our practice by our close supervision and by our wrestling with contractors who have no interest except a financial one, but just because the profession has tried to put itself apart and assumed a cloistered attitude we try to believe that we are taking high professional ground when we refuse to carry our directing to its logical conclusion, and, by declining to give the final personal touch which will make the building just right, we stamp ourselves as poor business men, as unfaithful servants and as inconsistent artists.

5. It is not unprofessional to compete.

As to the expediency of competitions at all, that is a very different question, but with every young man there comes hundreds of cases where he is eager and anxious to show what he can do, and suppose he does take part in a competition which has not received the sanction of the institute, wherein is he wronging anyone on earth if he is honestly trying to show what he can do? I do not say he might not be very unfair in his methods, but certainly we have had plenty of cases of unfairness and rank injustice perpetrated by competitors in competitions which have been approved by the institute. No code of ethics would of itself change human nature, but we to-day do compete in lines that the institute looks at askance, we do offer our services provided the conditions of employment are satisfactory, and to say that we should not unless we are acting under strict union rules is simply making it easier for the untrained, ignorant practitioner to impose on the public while we stand aside and refuse to give our best to the community.

There is a positive element of professional practice which must not be ignored. It is unprofessional to take a job away from another architect. Everyone agrees to that, always has and always will, but this is simply the Golden Rule put in practice, and needs to be neither defined nor explained. The line between fairness and unfairness in our dealings with our neighbor cannot be laid down by mere words. Sometimes an architect will unconsciously take work away from another man by doing his own work better and thereby unknowingly influencing a client, but that is not his fault. In the great majority of cases we know perfectly well when we are acting fair in the matter of infringing upon someone else's territory, and I believe if rigid distinctions were obliterated from a code and the matter were left to individual honor we would have no more trouble than we have now and might have a great deal less, while each architect would be freer to take what comes to him in a perfectly fair, honourable way and would not be liable to vituperation and charges of unprofessionalism by a disappointed fellow practitioner who did not get the job.

Now why is it not possible to formulate a positive code of ethics something like this?

1. Do unto others as you would have them do unto you.

2. Be a self-respecting gentleman in every act of life.

3. Be a conscientious, faithful business man in all your dealings with clients, builders and associates.

4. Give everybody a square deal.

What more is there to say? The architect who conscientiously carries out the four foregoing can solicit work, advertise, guarantee his contracts, act as a builder, finance an operation if he has the means and ability, roll up his sleeves and go into competition of any sort, sell his services for cash or its equivalent just because he likes the job and yet be self-respecting, professional and square with the world and all about him. Is it not about time that we admitted that is just what we are doing now, that these four comprise the duty of man toward man, and these duties are no more specialized in the case of architecture than they are in any other calling, and that professionalism after all is fundamentally the golden rule and a square deal?

Dissolution of Partnership

After a partnership covering a number of years, Mr. Alfred Chapman and Major R. B. McGiffin, of the well-known architectural firm of Chapman & McGiffin, Toronto, until recently located at 95 King Street East, have mutually decided to segregate their interests. Mr. Chapman will practice hereafter under his own name, and has moved his office and draughting rooms to the new building recently completed for the Harbor Commissioners on the water front between Bay and York Streets. Major McGiffin is at present devoting his time to military work, and will find it necessary in all likelihood to continue in that capacity until sometime after the conclusion of the war.

Economy in the Design of Concrete Buildings

Paper presented by C. W. Mayers, before American Concrete Institute

UPON the designing engineer of concrete buildings rests the big responsibility of conservation of building materials. The mere fact that concrete is composed of cement, sand and stone, of which there seems to be an excellent supply, does not in any way relieve the designer of concrete construction of the obligation of careful study of the work in hand in order that no excess of material be used. Most errors made in concrete design are not easily recognized even by experienced estimators of building construction. For instance, hidden away inside a column there may be reinforcing steel which should be elsewhere doing work at less expense to its owner, as would have been the case had the designing engineer given proper thought to the design of this column. A large percentage of the floor space occupied by columns might be storage space for the same reason. The beams may contain an excess of steel reinforcement simply because it was less trouble to call for straight top rods to take care of negative bending than it was to determine where and how bends could have been made in order to have used the least amount of reinforcements in the design. Flat slabs may have a number of individual rods over the top of each column head, where a few more bottom rods should have been bent up to take care of this negative bending. And yet this entire building may have been designed in accordance with the recognized standards of concrete design. These errors are not errors in computations, but are errors of careless design, and the result is dire waste of material.

ECONOMY IN DESIGN OFTEN OVERLOOKED.

In most cities, building plans are O.K.'d by responsible engineers authorized by the city to pass upon these plans before the work is allowed to proceed. Errors in computation are usually detected in this process, but who ever heard of one of these authorized engineers returning a set of plans with suggestions for a more economical design? The design either "gets by" or comes back for correction on account of errors in computation, etc.

Hence, if the designing engineer does not study economy in the design of his work, he may be reasonably sure it will get very little such study from anyone. Designs prepared without this special study are sure to show a waste of building material, and the building is no better, and serves no better purpose, because of this extra expense.

Recognized standards are observed by most designers of concrete buildings as regards stresses and strains, factors of safety, etc., but unfortunately no rules, tables or data are at hand which will solve the problem of maximum economy in the choice of the various methods of concrete construction which may be used. Each building presents new problems. It is a case of careful study in an intelligent way, and the designer must do this work well if he would "do his bit" and at the same time keep or build up his reputation.

Is there any position more humiliating to the designing engineer of a contemplated structure than to have a bidder who is estimating the cost of this work submit to the prospective owners a more economical design based on the same fibre stresses as were used in the original layout? This is not an uncommon event, and uncomfortable complications always arise.

INSUFFICIENT ATTENTION TO COSTS.

A general survey of conditions and inspection of the possible methods of construction usually constitute the first thought given to a new problem of structural design. By this inspection a process of elimination is set up, and finally the engineer considers only a few schemes which could be well employed to give the owner a structure suitable for his purposes. The next step usually consists of viewing the several schemes from every angle in order to study their individual merits. Each layout possesses different advantages, some of more value than others, but each one would answer the purpose very well. For instance, a beam and girder type of floor construction may offer advantages in the way of hanging shafting if the building is to be used for certain types of manufacturing. Column spacing would perhaps work out to better advantage in one scheme than in another. Thus the discussion continues, with here and there a remark about the probable cost of this and that. A decision is usually made in favor of the scheme offering the most advantages, even though they are trivial. The plans are drawn up on this basis, and the work proceeds. The detailed design is finished with about the same attention to costs as have been given to the selection of the type of construction used. Generally, the owner of the completed building is satisfied, being ignorant of the fact that he could have had just as good a building for less money.

The average concrete designer makes no claim to being an estimator. In fact, he does not think it is necessary to be an estimator even of the materials with which he works. It is a fact that a large majority of men employed in the design of concrete buildings have hardly any idea of the cost of the work they are laying out, and what is more, they do not know how to find this out for themselves. Surely, if an engineer designed a structural steel girder, he could tell with reasonable accuracy what it would cost by computing the weight and getting the market price of the structural steel and the labor cost of erection. Estimating the cost of concrete work is a little more complex, but each step is very similar, and the process is the same.

DESIGNER SHOULD CALCULATE COSTS.

A designer of concrete structures should think continually of costs, but in order to think intelligently of the cost of his work, he must know how to calculate approximately the cost of his design. In no other way is he able to determine which one of his studies will serve his purpose at the least expense.

It should be borne in mind that, in making designs for comparative costs, it is not necessary to work to as great a degree of accuracy as for the finished plans. Rough designs, accompanied by rough sketches, will furnish enough information for his study. In case the comparative costs of two schemes should work out the same, a more careful design might become necessary. A little practice on the part of the designer will soon reveal to him to what degree of accuracy he must work in order to get satisfactory results.

The process of estimating these various designs for comparative cost purposes is not nearly as difficult as may be supposed. Concrete is measured by the cubic foot or cubic yard; forms by the surface measurement in square feet, and reinforcement by the pound or ton. After the quantities have been calculated for the various designs, unit prices are fixed and the total cost of the member estimated. It is usually here that the engineer throws up his hands. In fact, it is very likely that he knows but little about the prices of this class of material and labor, and in his rush of work he has not kept in touch with the fluctuations, and feels he does not have time to inform himself properly on this subject. Again, it should be understood that it is not necessary to fix absolutely accurate unit costs to these quantities in order to obtain reasonably accurate cost comparisons. As long as the same unit costs are used for similar types of work in the various designs, the comparative costs will be surprisingly accurate. In fact, some of the unit costs may be in error 25 per cent. or 30 per cent., and yet the resulting costs will show unquestionably which type of construction should be used. For example, the quantities for two designs, (a) and (b), for an interior column are given here, and these quantities are priced for current normal conditions, under "Estimate A," and another estimate for the same quantities, with the unit prices grossly in error, is shown in "Estimate B."

It will be seen that, although the comparative total costs of the schemes (a) and (b) are entirely different in the two estimates, the resulting comparative costs in both "Estimate A" and "Estimate B" show conclusively the design (b) is the cheaper column to build. It will also be noticed that the percentage of cost saved by using design (b) is about the same in both estimates. However, the alert engineer will soon become as interested in having his unit costs in accordance with current prices of material and labor as he is in having his design correct.

DESIGN CALLING FOR LEAST MATERIAL NOT ALWAYS CHEAPEST.

Contrary to the opinion of most engineers, the concrete building design calling for the least amount of material is not always the cheapest

Estimate A.

(Scheme a.)

Conc. (1 : 1½ : 3), 52 cu. ft. at 36½c.	$18.98
Forms, rd. steel	15.00
Reinfct. (vert.), 514 lb. at 5c.	25.70
Spirals, 264 lb. at 5½c.	14.52
Lost fl. space, 7/10 sq. ft. at $2.75	1.92
Total	$76.12

(Scheme b.)

Conc. (1 : 1 : 2), 52 cu. ft. at 43c.	$22.36
Forms, rd. steel	15.00
Reinfct., 245 lb. at 5c.	12.25
Spirals, 264 lb. at 5½c.	14.52
Lost fl. space, 7/10 sq. ft. at $2.75	1.92
Total	$66.05

Estimate B.

(Scheme a.)

Conc. (1 : 1½ 3), 52 cu. ft. at 27 c.	$14.04
Forms, rd. steel	19.00
Reinfct. 514 lb. at 3¾c.	19.28
Spirals, 264 lb. at 4c.	10.56
Lost fl. space, 7/10 sq. ft. at $3.50	2.45
Total	$65.33

(Scheme b.)

Conc. (1 : 1 : 2), 52 cu. ft. at 32c.	$16.64
Forms, rd. steel	19.00
Reinfct., 245 lb. at 3¾c.	9.19
Spirals, 264 lb. at 4c.	10.56
Lost fl. space, 7/10 sq. ft. at $3.50	2.45
Total	$57.84

building to erect, as such a building may call for much more labor. Form work is a big factor in the cost of concrete buildings, and this phase of the operation must be given careful consideration in order to simplify the construction of the form work as much as possible. Study must be made also to determine whether the complexity of forms in a comparatively light design would not make the final cost of the building in excess of a building designed of simpler yet heavier construction. Concrete floors designed on the flat slab method sometimes have considerably more material in them and yet work out cheaper than a beam and girder type designed for the same conditions. Placing reinforcement costs more per ton and forms more per square foot in a beam and girder construction than the same operations in a flat slab construction. In laying out floors of the beam and girder type, the addition or omission of one beam per bay may influence the cost of the design a great deal. Changes in column spacings will also have the same effect. It is only by making the design of a typical floor bay of the various schemes considered and getting the quantities and costs of these schemes that it will be possible to tell definitely which method should be used. Many times concrete columns should be composed of a richer mix of concrete and have less reinforcement. In a building of several stories it is necessary to devote considerable study to the design of columns in order to locate the point where the mixes should change, where spirally reinforced columns should be introduced, and also to consider carefully the loss or gain of floor space occupied by columns. It will be necessary to make several sketch designs and calculate the cost of each. Thousands of dollars may be wasted by improper column design, and still the error is one which would not readily attract attention. There is a certain type of design for every part of the construction which will show maximum economy, and it is up to the designing engineer to calculate the costs of his various designs and determine for himself which one should be used.

OBTAINING UNIT PRICES.

Up to this point this article has emphasized, principally, the necessity of making several preliminary designs of the various members of a concrete building and calculating the cost of each design before the final layout is begun. Not much light has been shed upon the method of obtaining unit prices to fix to the quantities of material and labor. Unit prices are subject to wide fluctuations. Markets, labor, location of the work in question, speed of the operations, etc., and many other items enter into the making of these costs. However, as stated before, these unit prices need not of necessity be extremely accurate, and the designing engineer need not feel that he cannot price closely enough to obtain fairly accurate results.

A list of approximate unit prices have been tabulated here, which may be used to calculate the comparative costs of the principal members

Concrete	per cu. yd. (1 : 2 : 4 mix),		
	Cement, 1 2/3 bbls. at $2 per bbl. at the job		$3.33
	Sand, ½ cu. yd. at $1.50 per cu. yd. at the job		.75
	Crushed stone, 1 3/10 tons at $2 per ton at the job		2.60
	Plant, cost	per. cu. yd.	
	Freight charges	$0.05	
	Rental of mixer, etc.	.35	
	Purchases	.45	
	Labor	.40	
			1.25
	Labor of mixing and placing		1.25
Total cost per cu. yd.			$9.18
Total cost per cu. ft.			.34

in a concrete building. Judicious use of these unit costs will enable the designer to incorporate in his design the most economical methods and at the same time develop a keener eye for economical construction.

Concrete mixed in the proportion of 1:1½:3 will require about one-third of a barrel more cement per cubic yard. This will add about 67 cents to the cost of one yard of concrete in place, making the unit price about $9.85 per cubic yard, or 36½ cents per cubic foot. If a 1:1:2 mix of concrete is used, the cement will be increased about 1 2/10 bbl. over and above that used in a 1:2:4 mix. At $2 per bbl., this would make the cost of 1:1:2 mix concrete about $11.58 per cu. yd., or 43 cents per cu. ft. In large plain concrete footings it is sometimes advisable to use a concrete mixed in the proportion of 1:2½:5. Concrete mixed in this proportion requires about 3/10 of a barrel less cement than 1:2:4 mix. Figuring cement at $2 per bbl., concrete mixed in the proportion of 1:2½:5 works out at approximately 32 cents per cu. ft. in place.

"PLANT" THE MOST UNCERTAIN ITEM.

In making estimates for the cost of concrete in place, the most uncertain element entering into this cost is the item of "plant." The cost of "plant and tools" varies greatly with different building superintendents, and depends largely upon the foresight of the persons responsible for the layout of the job operations. The number and location of the mixers, towers and runs used on the job, layout and extent of storage space for aggregate, source and expense of power, etc., distance over which concrete machinery has to be transported, good or bad mechanical conditions of rented machinery, rental rates of machinery, replacement of missing shovels and other tools, and many other variable expenses go to make up this cost. The size and shape of the building, as well as the speed of the operations, play an important part in this cost. The "plant" cost for a job containing 6,000 cu. yd. of concrete need not necessarily be one-fifth more than a job containing 5,000 cu. yd. of concrete. The "plant" will, of course, cost more for the job containing 6,000 cu. yd. of concrete, but since the cost of erecting and dismantling the "plant" work for both jobs may be the same, the extra cost of "plant" for the larger job will be principally extra depreciation or rental, fuel, power, wear and tear, and loss of tools. However, "plant" expense enters into all concrete costs, and must be included in the unit price of concrete if we would get a reasonably accurate idea of the ultimate cost of the work. At the present high cost of all building materials and labor, "plant" costs cannot be safely assumed to be less than $1 per cu. yd. and will very seldom run as high as $2 per cu. yd. of concrete. Owing to this wide variation in the cost of "plant," it is necessary in estimating concrete to strike an average cost which, while not accurate, will cover the usual "plant" work, and give a unit cost for concrete in which all items of material and labor have been considered. It is with this in view that a "plant" cost of $1.25 per cu. yd. has been used in making up the unit cost of concrete in place, as given in the above tabulation.

AMOUNT OF AGGREGATE CONSIDERED EQUAL FOR VARIOUS MIXES.

In calculating the amount of materials necessary to make 1 cu. yd. of concrete, it will be noticed that the only change made in the quantities for the various mixes has been in the amount of cement used. It has been assumed that a cubic yard of 1:1:2 concrete will require the same quantity of sand and crushed stone as a cubic yard of 1:2:4 concrete. Theoretically this is not true, but in general practice there is some waste of material, and it has been found that the small differences of aggregate used in the various mixes of concrete in a building are negligible. A very large part of the concrete in a building is a 1:2:4 concrete; therefore, the aggregate quantities of 1:2:4 mix are generally used for all concrete work, and the cement alone is changed for various mixes. It will also be noted that the quantity of cement, sand and stone used here is somewhat in excess of the amount usually given in the tables published in various text-books. It must be borne in mind that the waste of materials on the job must be absorbed, and the quantities in tables compiled by laboratory tests must be somewhat increased. It is actually necessary to estimate on about 1 2/3 bbl. of cement to make 1 cu. yd. of 1:2:4 concrete on a job where the usual construction methods are employed, and in other mixes of concrete the cement should be proportionately increased.

The prices of concrete work as tabulated here are about 30 per cent. in excess of pre-war prices and 50 per cent. more than the prices of 1913. These costs, based on the present high cost of material and labor, should be adjusted from time to time as necessary.

The cost of steel reinforcement is extremely erratic in its fluctuation, but at present it may be assumed at $90 per ton, exclusive of the labor of bending and placing. It will cost from $6 to $15 per ton to cut, bend and place this reinforcement, $100 per ton, or 5 cents per lb., being a unit price which may be used to give reasonably close cost ratios. Reinforcement requiring much bending and made up of small bars should be figured about ½ cent per lb. higher than steel requiring only a small amount of bending. Spiral reinforcement for columns should be figured at an extra cost of about ½ cent per lb. over and above plain bars. In estimating the weight of spiral reinforcement, it should be remembered that about 7 per cent. should be added to the weight of the spirals for welding laps.

FORM COSTS.

Forms for round columns are usually made from sheet metal, and in flat slab construction it usually works out cheaper to use round interior columns formed with this material. However, the cost of forming an interior column 26 in. in diameter for flat slab construction is about the same as forming a column 20 in. in diameter designed for the same purpose. This being the case, it is not necessary to consider the difference in the cost of forms due to different diameters of round interior columns. It may be well remembered that it costs somewhat less to build an interior column having a head by using a steel form than it does to form the column of wood, as the cost of forming the head in wood is no small part of the column cost. The list of unit prices given here covers the cost of labor and material for form work for the principal operations in a concrete building, but are

Type of Construction.	Sq. Ft. Cost. (Surface Measurement.)
Forms for flat slabs, including drop panels	$0.09
Slab, beam and girder construction, slabs to span not less than 9 ft.	.12
Slab, beam and girder construction, slabs to span not less than 7 ft.	.13
Slab, beam and girder construction, slabs to span not less tran 5 ft.	.14
Column forms	.15
Floor beams and girders, not including slabs	.16
Wall beams	.14
Partitions and wall forms	.15
Footing and foundation forms	.15
Round steel column forms, including heads, each	15.00

tabulated for use in making comparative estimates only. It must be borne in mind that these unit prices are for the use of the engineer in weeding out the more expensive designs, and are not to be used for making actual estimates of buildings without regard to conditions and what not. While these costs might be more or less useful in arriving at the total cost of a concrete building, it should be remembered that they are only approximate units to be used for the purpose outlined herein.

Now that the methods of arriving at the comparative costs of the various types of concrete construction have been outlined, it is believed the designer will be able to work more intelligently regarding the cost his work involves. Typical dimensioned sketch cross-sections of the building from the roof slab to the footings, should be made, and the work of estimating done from these sketches. In this way the extra column lengths required to obtain the same clear story heights will enter into the estimate. This is quite a factor in comparing flat slab with beam and girder designs. Estimates made from these cross-sections for a length of building

(*Concluded on page* 272.)

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CONSTRUCTION

A · JOURNAL · FOR · THE ARCHITECTURAL ENGINEERING · AND · CONTRACTING INTERESTS · OF · CANADA

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The Housing Situation

The wide newspaper publicity and sustained interest in the housing situation indicates the importance of the problem with which the Ontario Government and the Toronto authorities are now attempting to deal. The committees appointed both by the government and the City Council are now seeking information with a view to learning more or less accurately the extent of the house shortage which really exists. In the meantime numerous proposals are being brought forth suggesting various possible remedies. These range all the way from the single tax theory down to questions involving the removal of restrictions, cheaper lands, loans and guarantees, transportation, and the utilization of vacant city-owned property.

While all these suggestions will be of value to the authorities in their endeavor to arrive at some satisfactory solution, their chief importance lies in the fact that they show that housing is a many-sided problem which must be worked out on a careful and intelligent plan. In fact, those who have given the subject close attention claim that the only proper solution lies in the adoption of a comprehensive town planning scheme. It is pointed out that this conforms to the more advanced views in England and European countries which have had the benefit of greater experience in undertakings of this kind, and does not imply an immediate programme of general reconstruction, but rather the gradual development of housing according to a definite preconceived general plan.

Just what will be done or the manner in which it will be done, however, still remains to be seen. The committee will undoubtedly base their survey on the data now being gathered before deciding on any course of action. The unfortunate part of the whole thing is the apparent apathy of the architects in the matter. Of the various suggestions which have come forth not one has emanated from the ranks of the architectural profession, and it would seem that a grand opportunity is thus to be let go simmering. Possessed of advantages which their special training gives them, and imbued with the spirit necessary to the success of such an enterprise, the members of the profession could render a most necessary and excellent service, and their co-operation should be of the greatest value in assisting the committees to determine the best course to adopt.

The government fund available for the purpose amounts to the sum of two million dollars. This is to be loaned to municipalities with the proviso that the local authorities provide an additional twenty-five per cent. to the sum borrowed. Allowing for structures which could be built at a minimum of twenty-five hundred dollars each, this will only provide for one thousand houses altogether. In Toronto alone there are at present over two thousand condemned houses, and according to the Medical Health Officer there are at least five thousand additional houses which are tenanted by from two to in some cases five and six families. Considering this, the present proposal will be decidedly limited in scope and will be undertaken with a view to giving immediate relief. However, this is no reason why it should not be considered and carried out in relation to a permanent future scheme. It would certainly be gratifying to see the architects agitate toward this end, and be more satisfying still to know that their services and ability were being recognized and utilized in reference to such an important undertaking.

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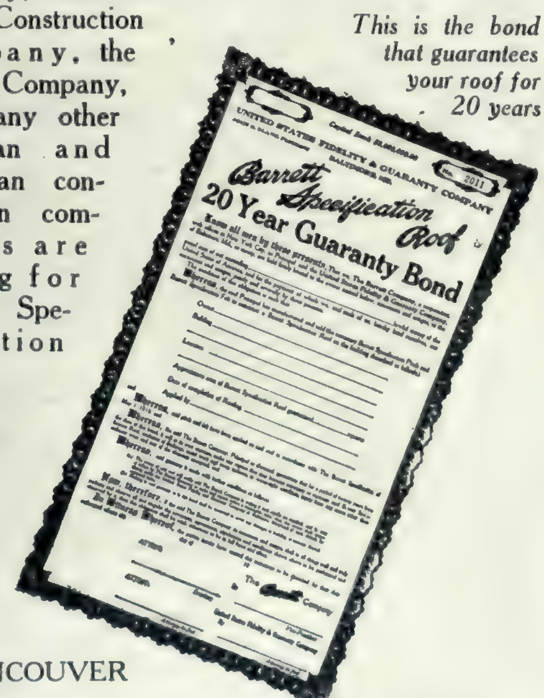

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Economy in Concrete Design

(*Continued from page* 267.)

equal to one bay only, is the usual practice. In this way the cost per lineal foot of building, as well as the cost per square foot of floor space, may be calculated. Comparisons of costs made in this manner are genuine proofs to the designer that he is giving the design proper study for economy, and will result in a conservation of building materials, save good dollars for the owner, and establish for the engineer the reputation of being a designer of economical concrete buildings.

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The Secondary Clocks indicate time in various places throughout the organization and contain no clock mechanism or delicate parts, being electrically operated.

Employees In-and-out Time Recorders furnish an exact, non-tamperable record of time of arrival and departure of each employee. The number of employees these machines care for is limitless.

The equipment also includes a Program Instrument for automatically blowing whistles, ringing bells, etc., at specified periods for work signals. Also an Office Time Stamp, for stamping time and date of receipt of letters, telegrams and documents of all kinds. The use of this machine definitely locates responsibility. The devices are electrically operated. Their motive power comes from electro magnets. There is no wear in an electro magnet. Consequently the apparatus is not subject to any fluctuation. It performs its work day in and day out with as great a degree of accuracy as the day it was first installed.

The various recorders installed throughout the plant are all controlled by the Master Clock, which is placed in one of the executive offices. The time on any instrument cannot vary a fraction of a second. All instruments at all times register exactly the same time as the Master Clock.

Clock mechanism, springs and weights do not enter into the motive power of any Stromberg Device. Electro-magnets furnish the motive power. The system was installed by Signals Systems Ltd., Toronto, who are the representatives for Canada of the Stromberg Electric Co., of Chicago, makers of the equipment.

September, 1918 Volume XI, No. 9

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Full Page Illustrations

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GRAPHIC ARTS BLDG., TORONTO, CANADA

BRANCH OFFICES

MONTREAL NEW YORK

NEW MASONIC TEMPLE.

Yonge Street and Davenport Road, Toronto.

Wm. F. Sparling Company, Architects and Engineers.

New Masonic Temple, Toronto

THE new Masonic Temple is located at the northwest corner of Yonge street and Davenport road. It is a commodious structure, six storeys and basement, occupying a frontage on Davenport road of 135 feet and a frontage of 85 feet on Yonge street. On January 1st, 1819, the construction was so far advanced that the lodge rooms on the first floor level and the main auditorium on the ground floor level could be used, and the building was completed shortly afterwards.

The building is designed in the Italian Renaissance style, the exterior walls being partly of Indiana limestone and partly of selected tapestry brick. Tile back-up was used throughout. A fireproof construction of reinforced concrete was adopted, and steel casements were used to the street elevations, and steel sash and wire glass to the others. All partitions, furring, etc., are built of tile.

The basement contains a large banquet room, with kitchens directly attached, also coat rooms, toilet accommodation, janitor's apartments, boiler and fan rooms, etc. A unique feature of the banquet room is that it is capable of subdivision into two separate banquet rooms by means of two series of folding doors, for the purpose of providing an air space to assist in preventing noise from one room reaching the other.

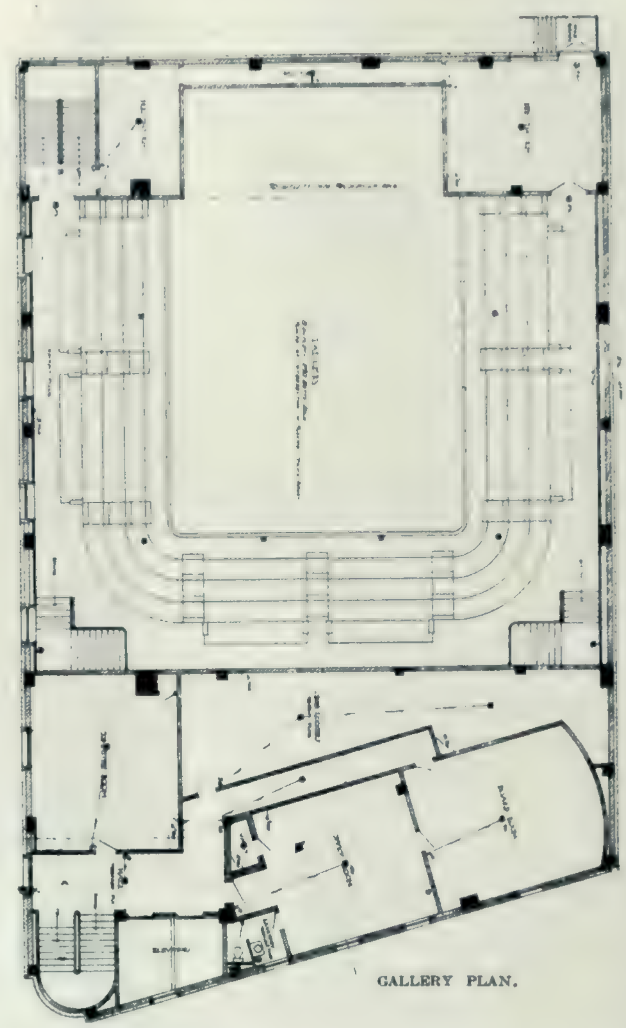
On the ground floor is a large auditorium, which, with the gallery, seats twelve hundred. Fixed seats are used in the gallery, but on the ground floor, which can be used for dance purposes as well as a concert hall, movable seats are provided. A storeroom under the stage is used to store these movable seats when not required. The remainder of the ground floor contains a large foyer, lobby, men's smoking room, check rooms, ticket offices, ladies' parlor, retiring rooms, etc. On the gallery and mezzanine floor are the main gallery to the auditorium and the offices of the Masonic Temple Corporation, comprising general office, board room, committee rooms, etc.

The first floor is devoted to lodge and chapter rooms, and contains one large blue room, 47 feet by 53 feet clear; one smaller blue room, 29 feet by 53 feet, and one chapter room, 33 feet by 53 feet, together with anterooms, reception rooms, etc. The choir galleries and organ lofts to these lodge and chapter rooms are on the first floor mezzanine, on which level is also a general storeroom.

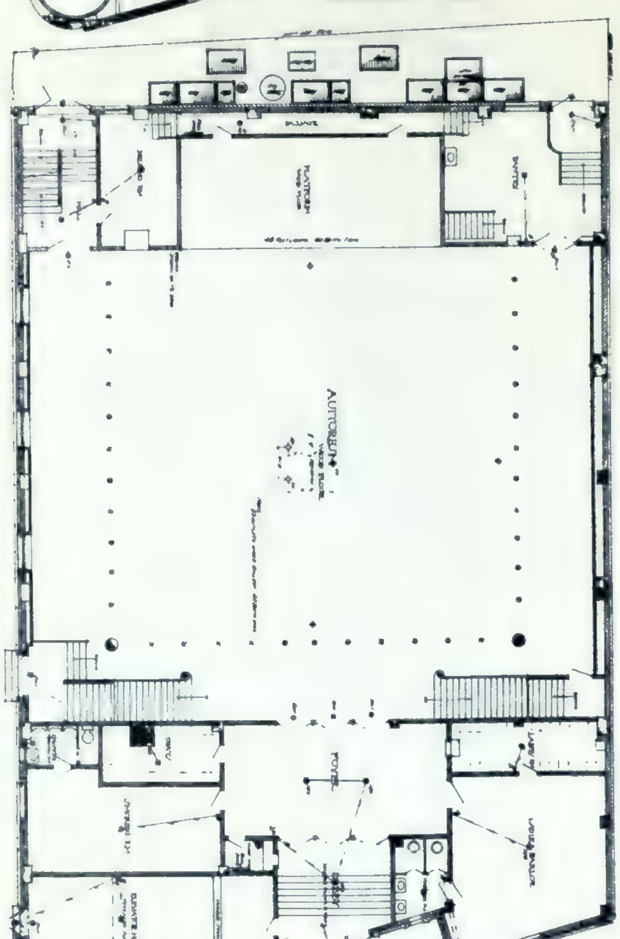
The Scottish Rite and Preceptory rooms,

DETAIL OF ENTRANCE.

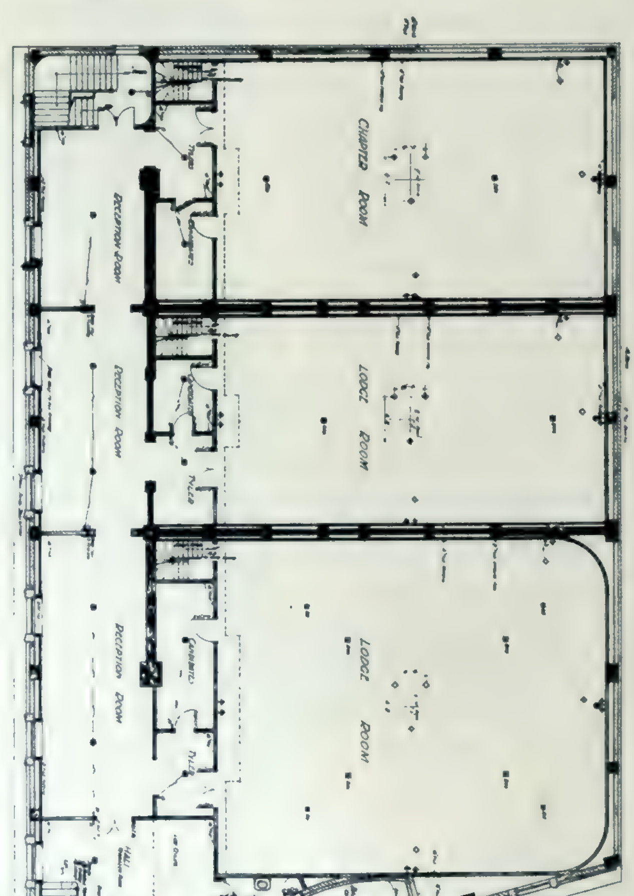
BASEMENT PLAN.



GALLERY PLAN.

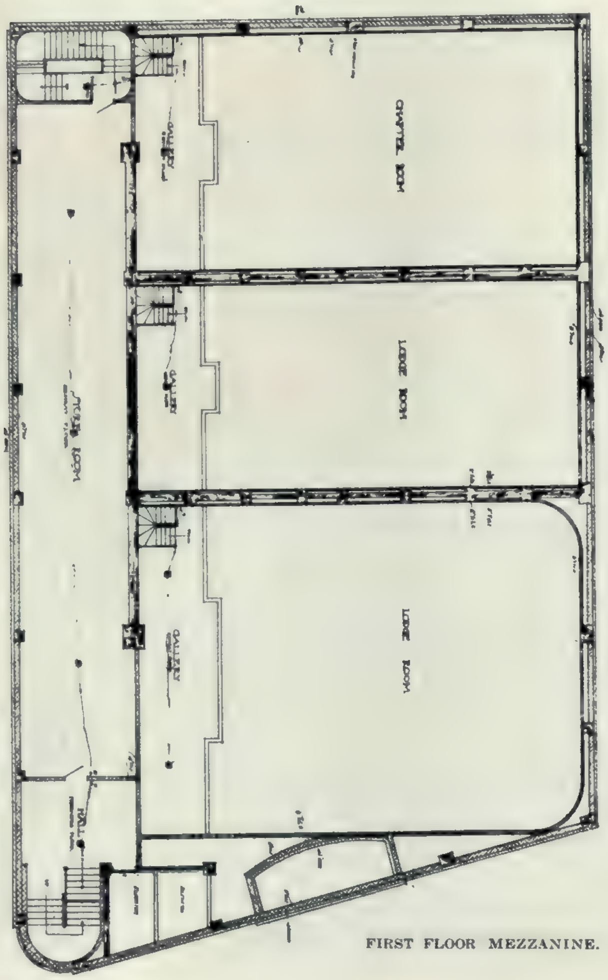


GROUND FLOOR PLAN.

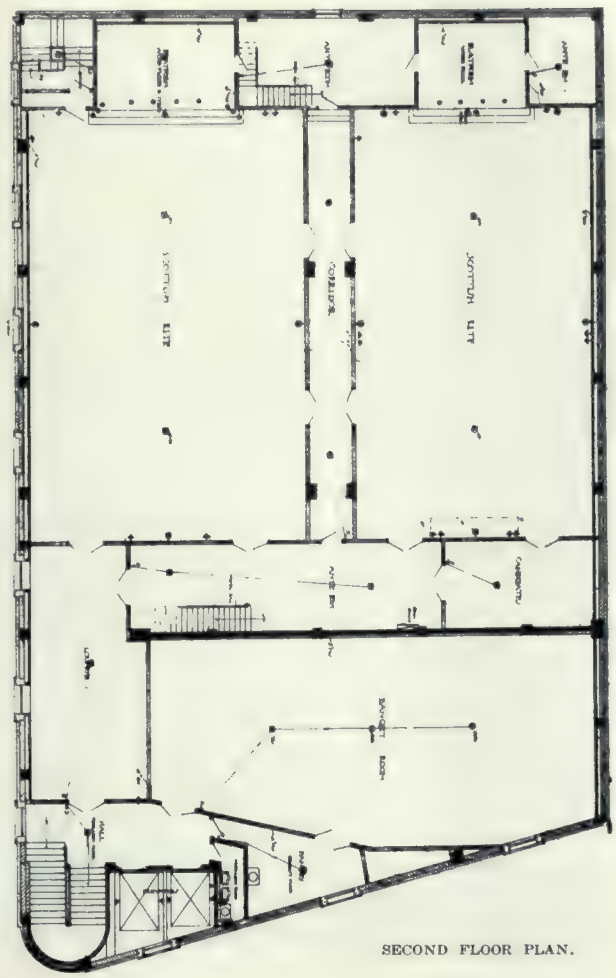


FIRST FLOOR PLAN.

NEW MASONIC TEMPLE, TORONTO, WM. F. SPARLING CO., ARCHITECTS AND ENGINEERS.



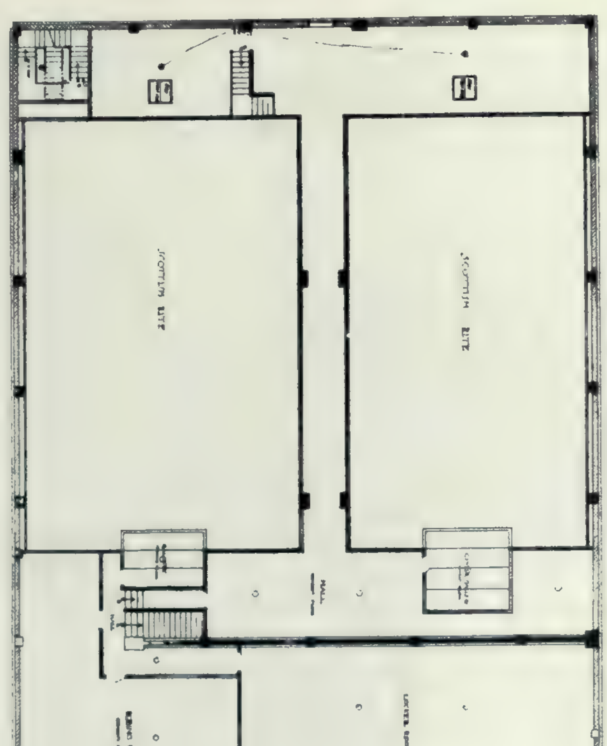
FIRST FLOOR MEZZANINE.



SECOND FLOOR PLAN.

with anterooms, lounge, etc., and a moderate size banquet room, comprise the second floor. On the second floor mezzanine are located the choir galleries to these lodge rooms, together with a general lounge and smoking room. The roof is designed for marching purposes, and is covered with a flat tile laid in asphalt.

An up-to-date system of steam heating was installed, being partly direct and partly indirect. Radiators were located in suitable recesses around the walls, and additional heat is supplied by forcing washed and heated air into the various rooms and exhausting the foul air outside. This ensures in all the lodge rooms, which contain no windows, ample ventilation, together with the fresh warm air supply. For this ventilation and indirect heating the building is divided into two sections. The apparatus supplying the lodge room floor and above is located in the pent-house on the rear of the roof, and that supplying the auditorium and banquet room in the basement, is located in the basement. Suitable controls admit of any one portion being heated independent of the other.

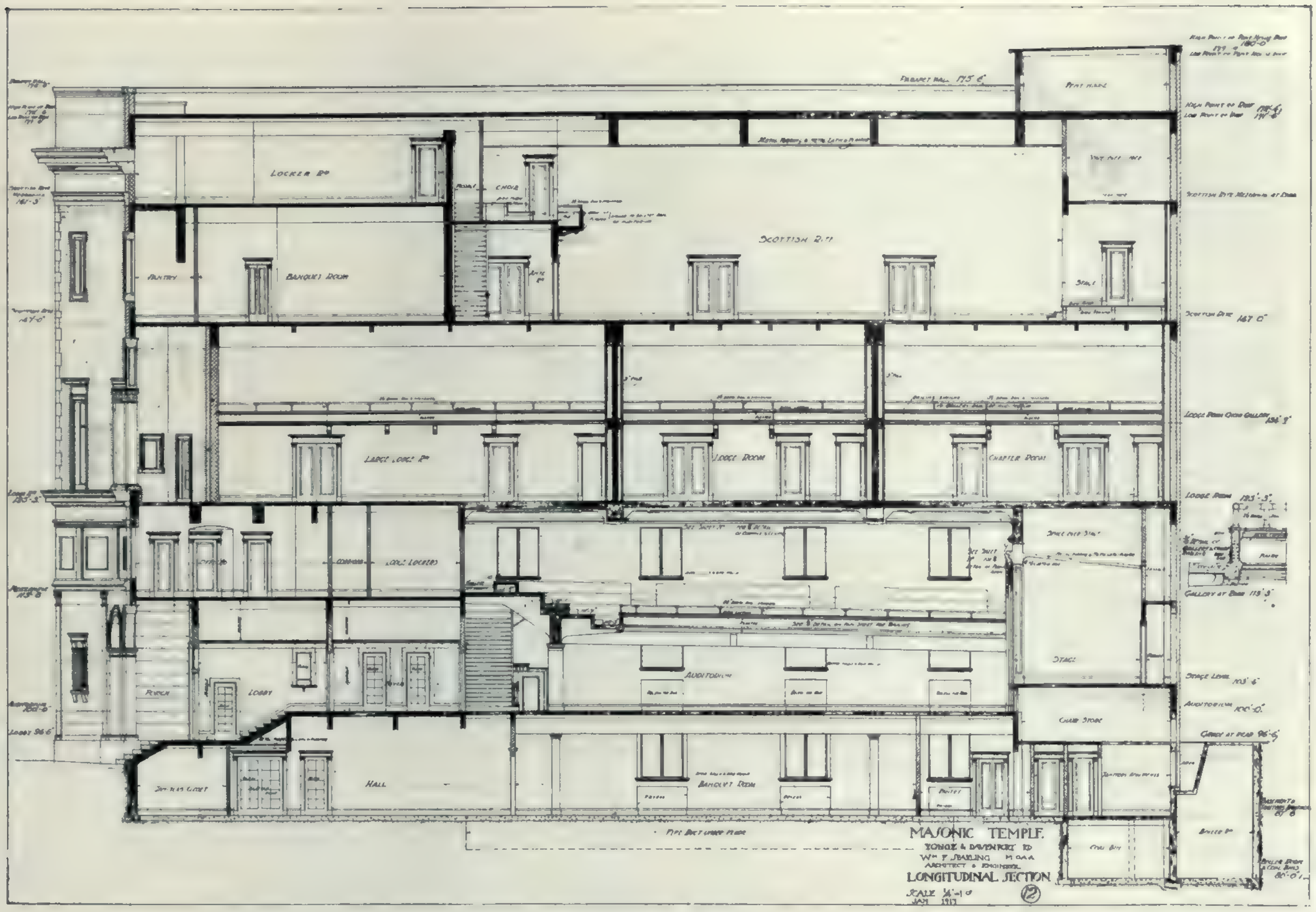


SECOND FLOOR MEZZANINE.

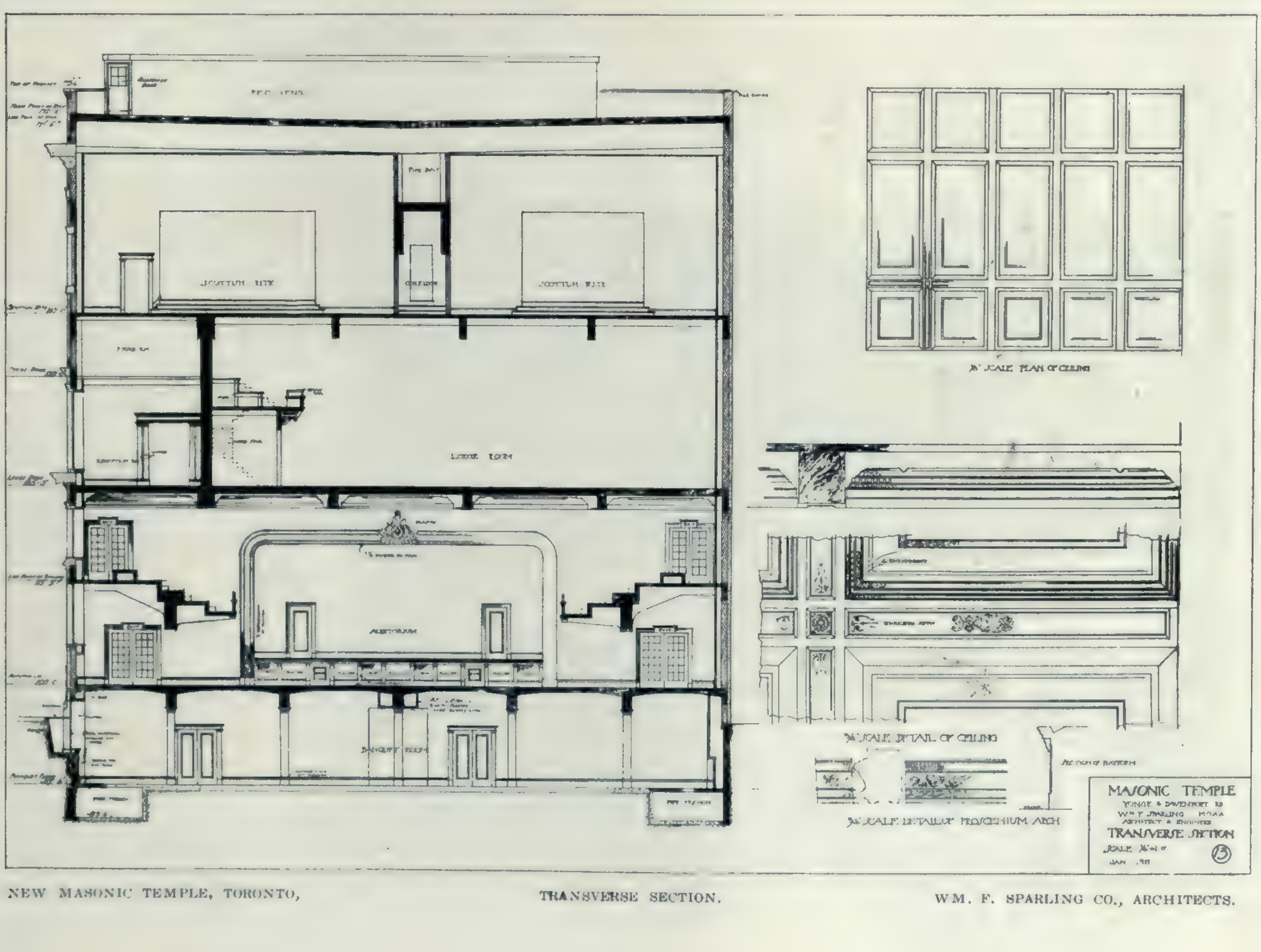
Among the features of interest from an engineering and construction standpoint are the four large reinforced concrete trusses. These are the largest trusses of their kind to be built on this continent, having spans of 66 feet and 68 feet 8 inches, and

SCOTTISH RITE ROOM, NEW MASONIC TEMPLE TORONTO. WM. F. SPARLING CO., ARCHITECTS.

BLUE ROOM, NEW MASONIC TEMPLE TORONTO, WM. F. SPARLING CO., ARCHITECTS.



LONGITUDINAL SECTION.



NEW MASONIC TEMPLE, TORONTO, TRANSVERSE SECTION. WM. F. SPARLING CO., ARCHITECTS.

AUDITORIUM, VIEW TOWARD STAGE, NEW MASONIC TEMPLE, TORONTO.

in the erection of the formwork for these trusses, so that when striking the false work each truss would receive its load in a uniform and symmetrical manner.

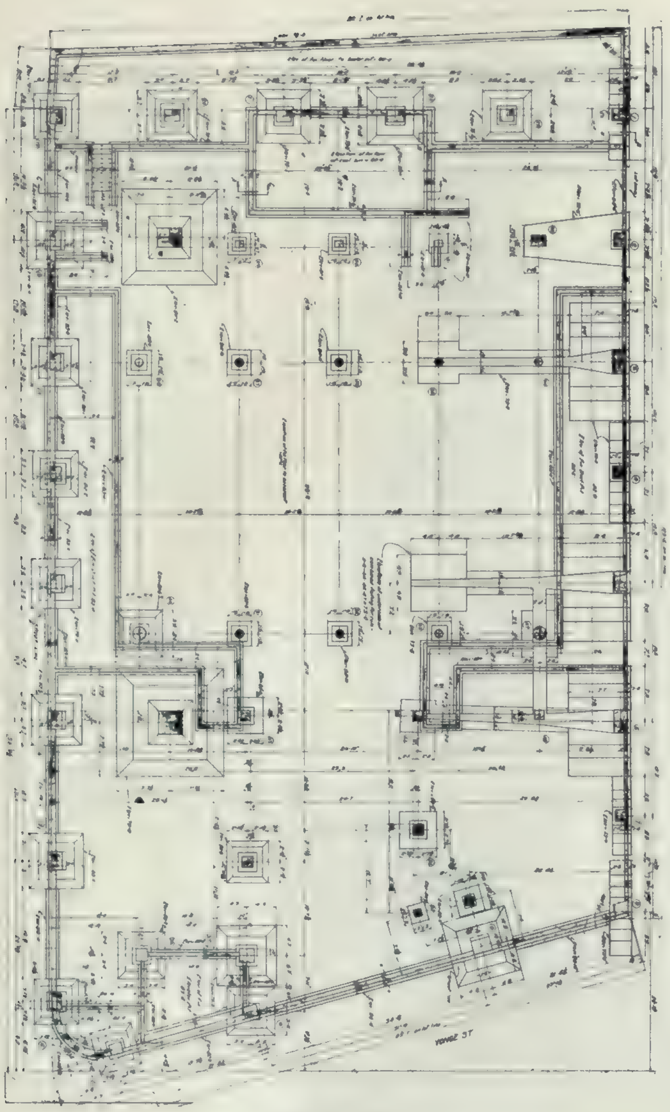
The heaviest truss carries a designed load of one thousand tons, and contains fifty-four main rods in the bottom chord. In rolling the rods for these trusses—some of which rods were 99 feet 6 inches long—an opening was made in the end of the rolling mill so that they could be rolled. In the case of the roof truss supporting the upper floors over the large lodge room, the truss does not show on the ceiling of this room, because this floor above is hung from the bottom chord of this truss. As will be seen from an inspection of the accompanying plans, the mezzanine floors frame into the middle of the webs of some trusses, and an opening for a doorway is provided in the centre of the largest truss.

carrying the upper portion of the building over the auditorium 67 feet by 78 feet clear. Two of the above trusses frame into a third at about its third points, and these three, 24 feet deep, were poured in one continuous operation, necessitating the placing of 240 cubic yards of concrete and the handling of heavy pressures. Heavy timber false work was erected as temporary supports to the trusses, the truss located under the roof requiring false work 60 feet high, and the others 40 feet. Special care was taken

There are numerous large beams in the various floor, but the framing to the gallery of the main auditorium may be mentioned. The gallery is carried on cantilever beams, mainly supported on large through beams spanning 56 feet, with an overall depth of 4 feet 9 inches, and carrying a designed load of 127 tons. As architectural considerations controlled the sizes very closely, these beams contain more than a usual amount of compressive steel.

All the footings excepting the combined and cantilever footings, were designed without the use of shear steel. In the combined footing for columns 5, 6, 44, 45, 47, girders 10 feet deep were used to handle the heavy shears, and owing to the unusual arrangement, this footing is worthy of note.

AUDITORIUM, VIEW TOWARD REAR, NEW MASONIC TEMPLE, TORONTO.



FOOTING PLAN,
NEW MASONIC TEMPLE, TORONTO.

Corrosion of Ironwork

In a paper read before the Iron and Steel Institute, J. N. Friend summarized as follows the results of his researches on the usefulness of paint for protecting ironwork from atmospheric corrosion:

(1) The practical value of acceleration tests is very small in the present state of our knowledge. Reliable results can only be obtained from tests carried out under conditions closely resembling those prevailing in practice.

(2) Addition of pigment paint to oil increases the efficiency of the latter as a protective paint until a maximum is reached. After this, further addition of pigment causes deterioration. The best results are obtainable from paints possessing as high a percentage of good oil as is compatible with good body and any other working property that has to be considered.

(3) Linseed oil on setting expands by some 3.3 per cent. This is the primary cause of crinkling. Further oxidation causes a decrease in volume, which in time leads to cracking.

(4) Linoxyn is permeable to moisture. The permeability is reduced by heating in absence of air, the oil increasing in density, viscosity and molecular weight.

(5) Polymerized linseed oil affords a better protection than raw oil when used as a paint vehicle.

(6) The functions of a pigment are to toughen the film and render it less permeable to water-vapor and oxygen. It also reduces the expansion of the oil on setting, and thus minimizes the tendency to crinkle.

(7) A thick coat of paint protects the underlying metal more efficiently than a thin coat, provided the coat is not so thick that running or crinkling takes place.

(8) The very best results are obtained by multiple coats. Two thin coats are better than one thick one of equal weight.

(9 Thinners enable thin coats of paint to be applied. Turpentine leaves a very slight residue behind upon evaporation, but its effect on the efficiency of the paint is small.

(10) Other things being equal, the most permanent paints are those containing black or red pigments, since these absorb the shorter rays of light, and prevent them from hastening the destructive oxidation of the linoxyn by the air.

(11) Finer pigments afford more efficient protection than coarse pigments, since they are more thoroughly in contact with the oil.

(12) Iron structures should be painted whilst their scale is still on, after loosely adherent flakes and rust have been scraped off. The paint will last rather longer than if applied to the pickled or sand-blasted surface, and the labor of removing the scale is saved.

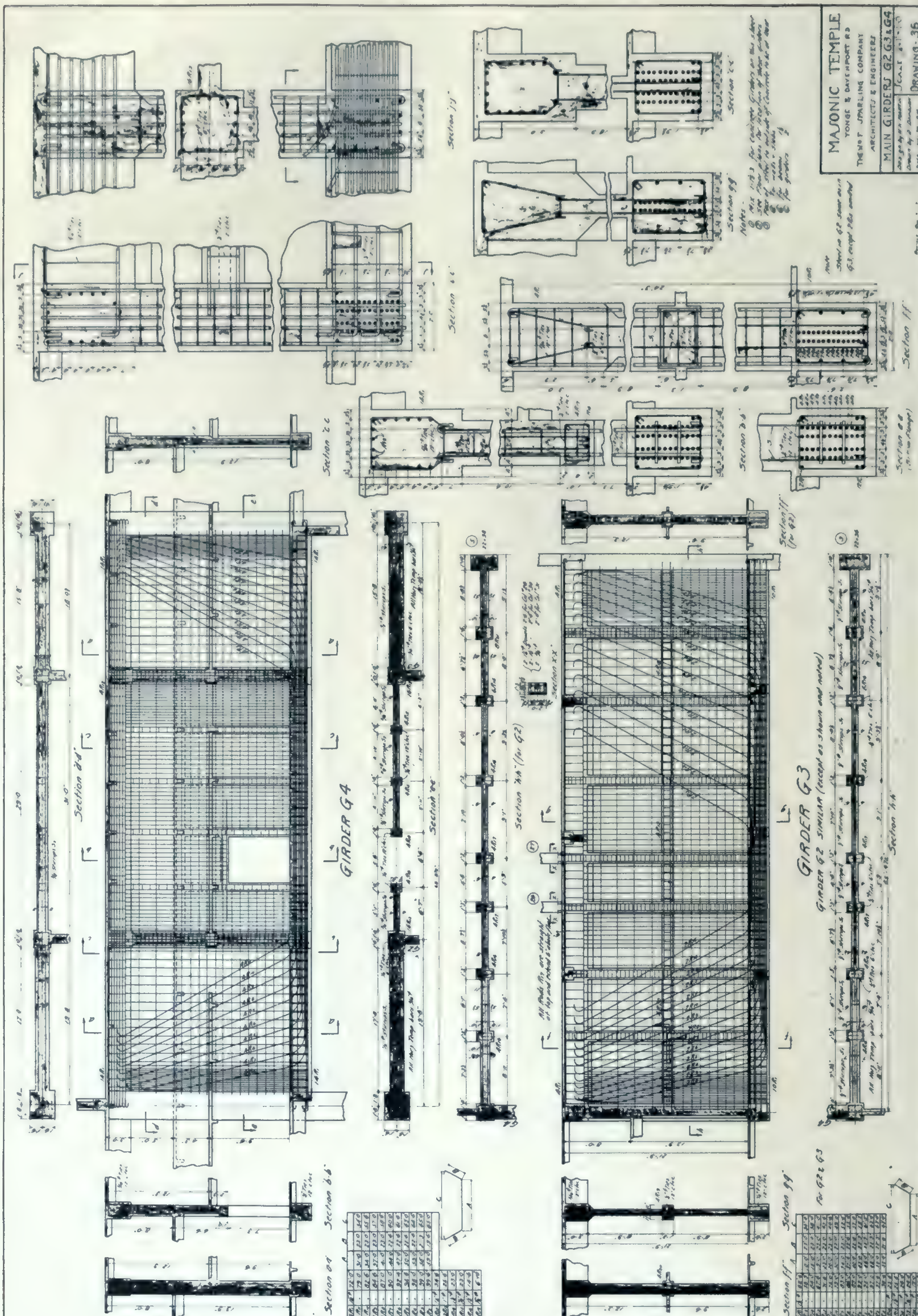
(13) Experiments with rusty plates are not conclusive, but suggest that the rust need not be so carefully removed prior to painting, as is usually thought to be necessary.

Increase in Permits at Galt, Ont.

A substantial improvement is noted in the value of building permits at Galt, Ont. The total up to September 1st amounts to $140,285, which is $60,000 ahead of the corresponding period of last year. During the month of August the aggregate for permits issued reached $30,350, including one item of $17,000 for the erection of a storage warehouse.

Vancouver Shows Big Improvement

Building permits issued at Vancouver, B.C., for the first eight months of this year amount to $1,011,316. This is substantially ahead of the corresponding period of 1917, when the sum of $405,920 was recorded. August operations reached a total of $216,313, as against $54,420 in the same month last year.



New Masonic Temple, Yonge Street and Davenport Road, Toronto.

DETAILS OF MAIN GIRDERS.

WM. F. SPARLING CO., ARCHITECTS AND ENGINEERS.

Underground Concrete Work in Winnipeg*

By Bertram Stuart McKenzie, B.A., B.Sc., Consulting Engineer, Winnipeg, Man.

N presenting this subject for discussion, under the general title given above, it is proposed to eliminate theory as much as possible, and to cite (literally) concrete examples of deterioration under various conditions. Examples which will be given are taken from experience in the Province of Manitoba, and mainly in the city of Winnipeg. These have all come under the observation of the writer, or have been reported to him from reliable sources.

As this subject deals with underground conditions, the examples naturally divide themselves into two main classes:—

(a) Foundations for buildings or bridges.

(b) Pipes for sewers, drains or water supply. These will be discussed in the above order and a few typical examples given.

FOUNDATIONS.

(1) The first case which came under the writer's observation occurred in the footings for the columns of a seven-story building in Winnipeg. The footings consisted of the usual square-stepped design. Owing to proposed increase in the loading, it was considered necessary to put caissons to rock under the existing footings, and in the course of excavation for this work some rather extraordinary conditions were revealed. The first discovery was made by one of the workmen who was engaged in placing a strut between two adjacent footings. To his astonishment, the concrete of one of the footings appeared to be practically a slime. The mass was so soft, indeed, that he could without difficulty plunge his hand into the same and squeeze the material through his fingers. The matter was reported to the writer, who was associated on the work, and an examination of the material was made. The concrete had the appearance of lime mortar, being quite white and of a slimy consistency. There was quite a strong smell of sewage, and the inference, at first, was that there had been a chemical action by sewage from a broken drain in the vicinity, but this was not confirmed by further investigation.

Other examples were soon discovered in other footings as the work proceeded, and conditions were of such a nature that the architect in charge of the work decided to remove the old footings altogether and to build the caissons up to the base plates of the columns. In one extreme case a mass of concrete fell away from the corner of a footing, and was so soft that it was possible to swing the head of a sledge hammer sideways through the mass. The disintegrated concrete, on being allowed to dry, becomes fairly hard, with a white, powdery surface. In the course of removing the old footings it was found that patches of this soft concrete occurred in what appeared to be otherwise quite sound masonry, thus indicating that a gradual rotting process was going on, which now appears to be most probably due to some chemical action by the ground water which had gained access to the footings. Wherever the condition was found it was observed that the concrete was very damp and porous, and the latter condition may explain the action to a certain extent.

IN CLAY FOR FOURTEEN YEARS.

(2) The second example was discovered when exposing the surface of cassions which had been lying in the clay for over 14 years. These were under one of the 10-story office buildings in Winnipeg. It was found necessary, on account of settlement of the building, to excavate under those old cassions and continue same to rock. They were generally lying at a depth of about 35 feet below ground level and in practically every case (21 in number) water in considerable volume was found lying around the cassion and concentrated at the bottom. This water had come from under the basement floor and seeped down along the surface of the cassion. The first cassion exposed had an unusually rough surface, having the appearance of a pile of broken stone. There was a certain bond between the stones but the concrete was full of large voids.

If any martar had ever existed in these spaces, it had entirely disappeared. It was noted that in the spaces mentioned above, a deposit of a brown jelly was often found. It was thought at first that this might be gelatinous silica, left as a residue from some chemical action, but this was not confirmed by analysis. Wherever this rough surface appeared there was discovered a curious sheath of hard clay about 1½ ins. in thickness, which showed quite a marked cleavage from the mass of surrounding clay. When the surface of the cassion was smooth the sheath disappeared. The cassion was dressed up a little to show the condition more clearly. There seemed to be some direct relation between the appearance of this sheath and the condition of the concrete surface. It was thought that there might be some chemical action going on which had caused a combination of certain elements of the cement with the clay, but an analysis of a sample of hard clay did not confirm this. The clay analyzed as follows:—

Loss on ignition	13.33%
Silica	50.94%
Alumina and iron	30 84%
Calcium oxide	3.87%
Magnesium oxide	Trace
Sulphur	Trace

The condition may have been caused by pres-

*Paper read at the Saskatoon meeting of the Engineering Institute of Canada, August 8th to 10th, 1918.

sure due to settlement of the cassion, but so far no satisfactory reason has been assigned. In some cases, at the bottom of the cassion where it had been belled out to get greater bearing surface, the concrete was practically loose stone without any bond whatever. If this condition can be produced by the action of ground water on concrete, then it is indeed full time that the question should be carefully investigated.

HISTORY OF THE CONCRETE NOT OBTAINABLE.

(3) The third case occurred in the foundation of the vault in the same building. This instance consisted of a mattress in which steel I-beams had been placed for reinforcement. In excavating under the mattress, preparatory to the construction of additional cassions, it was found that the concrete resembled close-packed, sandy gravel. It was quite soft, could easily be scraped away, and was water-soaked clear through. When the underlying clay was removed, water dripped from the under surface of the concrete, and white stalactites were formed, sometimes as much as ¼ in. in diameter. The concrete seemed to have lost its character entirely, and a sieve analysis of a dried sample gave some extraordinary results. There was found no product finer than that retained on a 50-mesh sieve, and a microscopic examination of this product showed no trace of cement. It seems incredible that the cement should have disappeared in this way but it has not been established that it did not do so. In this particular case the actual history of the placing of the concrete would be of great interest, but this was found impossible to obtain. (This matter will be referred to in general remarks later on.) The stalactites above referred to were analyzed and found to be calcium sulphate.

(4) The fourth case also in the same building as the third instance, occurred in the concrete beams which had been constructed across the cassions to support the outside walls. These were reinforced with steel I-beams, or as a matter of fact the concrete served as a protective coating for the steel. In the course of an examination of one of these beams the concrete was found to be rather soft, and at one point quite a large hole was discovered. The concrete on the side of the beam was easily laid off with a pick and the steel beam exposed. The beam was found to be very wet, as water had penetrated into the heart of the beam and the resultant corrosion of the steel was quite marked. It was then decided to examine all the beams and as a result of the conditions found they were all stripped and a new concrete covering constructed. Arrangements for under-drainage were also provided so that water could be kept away from the beams as much as posible.

STEEL BEAM WAS CORRODED.

In one of the cases, the concrete covering, if it had ever existed, had completely disappeared from the lower half. The space was spanned by a regular forest of small stalactites which had been formed by water dripping from the upper surfaces of the space. These were brown in color and on analysis were found to be composed of a combination of calcium and iron carbonate, the iron coming from the corrosive action of the water on the steel beam. On the bottom of the beam and lying also on the lower flange of the outside beam a slimy mass, similar in character to boiler sludge was found in considerable quantity. This may have been a by-product from some chemical action by the ground water on the concrete of the beam. The case was somewhat complicated by the presence of manure which had been carelessly left on top of the cassion, where it had been placed as a protection from frost, as the chemicals in the manure might have had something to do with the condition found. The example is given, however, as a matter of interest, and a possible help in the investigation.

PIPES AND SEWERS.

(1) This is a matter which has been under observation for several years, both in Winnipeg and the neighboring city of St. Boniface, and was the reason for the starting of the series of experiments by the city analyst of Winnipeg. It has been the custom in Winnipeg, as in other cities, to construct sewers, either in place of or by the use of pre-molded pipe, and construction conditions are therefore subject to some variety. Conditions have developed which in several cases have resulted in a complete collapse of the pipe and a consequent cave-in of the ground surface. This first indication of disintegration is found in the appearance of soft patches in the interior of the pipe. These gradually extend until a hole develops or the pipe collapses. The appearance of the action on the interior was at first explained by the theory that it was due to the action of certain chemicals in the sewage, but as cases were observed in pipes which did not carry sewage, this explanation did not hold. Experiments to date appear to indicate that a much more probable cause is the action of chemicals carried in ground water on the outside. This seems to be borne out by the fact, in stretches of pipe made of the same materials and at the same time, disintegration will be found only in certain portions, thus pointing to local conditions acting from the outside. In the city of St. Boniface this local deterioration has also been observed. In one case a sewer disintegrated to such an extent that it collapsed and caused a cave-in under a railroad crossing, whereas in other parts of the same job the pipe appeared to be quite sound. Cases have been observed where disintegration occurred within six years from the time of construction, but on

the other hand pipe has been in the ground for over thirty-five years without a sign of decay. Perhaps the most serious case in Winnipeg was the collapse of the sewer on Yale Avenue about a year ago. This was built in place and had been in service about ten years. It collapsed without any warning, and caused a cave-in of the street above.

(2) Deterioration has also been found in manholes. These are usually constructed with premolded rings. They exhibit the same tendency to deteriorate, but as in the case of the pipes above mentioned this deterioration has been local and not general. All this data seems to confirm the conclusion that outside agents are at work in certain localities.

GENERAL CONDITIONS.

The above are given as typical examples of the trouble under discussion. Unfortunately it is practically impossible to get the true history of the concrete which has deteriorated. This is due in many cases to lack of proper records, but more usually to a somewhat unpardonable reticence on the part of those concerned in the original construction of the concrete. It is, therefore, somewhat difficult to draw definite conclusions, and it will be impossible to get at the truth of the matter unless the concrete can be intelligently observed from its construction to its possible decay.

So many elements enter into the construction of concrete, such as material used, the proportioning of same, time of year placed, condition of the ground and amount of ground water present, that only a series of carefully thought-out experiments can give a true line on the situation. If it is a fact that concrete constructed of carefully selected and tested materials, graded and mixed under intelligent and conscientious direction and placed under proper conditions as regards temperature, under drainage, etc., will deteriorate after remaining a few years underground, then it is full time that the Engineering Institute of Canada should take the matter in hand.

INVESTIGATING COMMITTEE SUGGESTED.

It would seem that an effective method of handling the situation would be the appointment of a working committee consisting of a practical engineer, a chemist and a laboratory man, which committee would be so financed by the Dominion Government, or by the Provincial Governments of the three western provinces, that they could devote their entire time to an investigation of the subject. Field work could be carried on during the summer months and data gathered on which to work during the winter. Laboratory work could, of course, be going on all the time. Field experiments could also be carried on, similar to those already in progress in the Western States, but adapted to our local conditions. A certain amount of investigation has already been done in Manitoba, and an attempt made to collect data on the subject, but up to date there has not been sufficient to arrive at any definite conclusions.

CHEMICAL INVESTIGATIONS.

This matter as above mentioned has been carried on under the direction of the city analyst of Winnipeg. Speaking generally, the work has consisted of the analysis of the clays of the Winnipeg District, samples of ground waters, and samples of deteriorated concrete as compared with samples of sound concrete. As a result of these analyses, chemical experiments have been undertaken with the object of determining the action of solutions of the various salts found in the ground waters, on neat cement and on mortar. Solutions have been concentrated and briquettes have been steam-cured in order to arrive at results in the shortest possible time. Under construction conditions the process of deterioration is, of course, a very gradual one, taking several years before conditions become serious. In connection with these experiments some interesting results have been obtained by Mr. Thompson, who has been making experiments on the density of mortars.

Two main theories have been advanced to explain the deterioration of concrete by the action of chemicals in ground waters.

1. The formation of soluble compounds in the concrete which are leached out by the water.

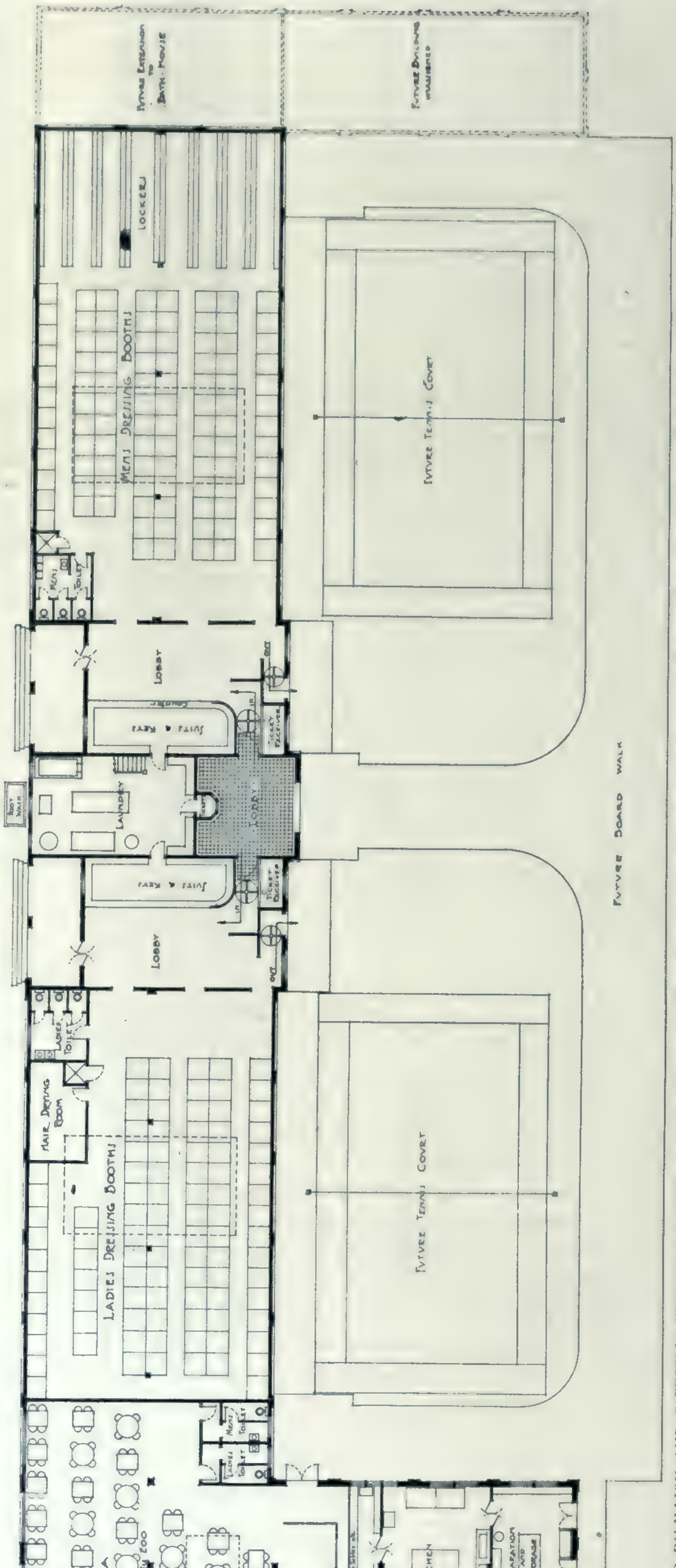
2. The disintegration of the concrete due to expansion in the process of crystallization of the newly formed chemical compounds.

It has not been considered advisable to publish the results so far obtained from experiments until they are more conclusive. It is hoped that some way may be found to make the above record of facts perfectly complete, and that a full and satisfactory explanation may be reached to account for the above-described conditions of some concrete work in Winnipeg

Correction

The new Park School, illustrated in the July issue, was designed by the architectural department of the Toronto Board of Education, under the supervision of Mr. Bishop, the Superintendent of Buildings, and not by J. C. Pennington, as stated under the large frontispiece cut. Mr. Pennington was the architect for the Windsor Collegiate appearing in the same number. This mistake was due to an oversight in making up the pages, and we take this occasion to promptly make correction and to place credit where it is properly due.

GENERAL EXTERIOR VIEW



PLAN AND GROUND SCHEME

BATHING PAVILLION AND CAFETERIA ERECTED AT PORT STANLEY, ONTARIO, FOR THE LONDON AND PORT STANLEY ELECTRIC RAILWAY, WATT & BLACKWELL, ARCHITECTS

INTERIOR OF CAFETERIA, PORT STANLEY BATHING PAVILLION, WATT & BLACKWELL, ARCHITECTS.

Port Stanley Bath House and Cafeteria

The bath house and cafeteria illustrated on the preceding page were erected in the spring of 1917 at Port Stanley, thirty miles south of London, Ont. This is the southerly outlet or terminus of the London & Port Stanley Electric Railway, and is a summer resort serving the cities of London, St. Thomas and district connected with these places, besides having a large number of visitors from Ohio cities coming across the lake by steamer throughout the entire season.

The frame work of both the bath house and cafeteria consists of a steel and frame skeleton supported by a concrete foundation, the skeleton being lathed with hyrib metal lath. The exterior is finished with stucco, and the interior is plastered between the wood studs, forming panels which gives a rather remarkable interior effect. In the cafeteria, the walls are lined with wall-board panelled with lattice work. The bath house has all modern equipment necessary for a building of this kind, including a complete laundry and sterilizing plant, even to electric hair dryers; and has accommodated during the hot weather as many as twenty-four hundred bathers in a single day. The cafeteria is laid out on the improved self-serving plan, and has all the necessary kitchen equipment, steam tables, etc., required to quickly and satisfactorily take care of its capacity of two hundred at one sitting. All cooking in this building is done by electricity.

Education and Training

"It is not easy to lay down the lines on which future generations of architects are to be educated. The advantages of a definite and systematic training in a school are obvious, but I venture to hope that the equally great advantage of being guided and inspired by a great master will be considered in any scheme that will be decided upon. I admit that our system of education so far has been rather haphazard. We must not, however, be content with imparting knowledge, with training the hand, the eye, and the mind only, but must create the desire to exercise the knowledge and skill acquired by school training, and nothing is so certain to do this as close personal contact with a great architect and with his work."

The above is quoted from the address of Mr. Ernest Newton, A.R.A., past president of the Royal Institute of British Architects, and this year's Royal Gold Medalist, in accepting the latter coveted honor. The remarks were made in alluding to his own experience in the office of Norman Shaw, who, according to Mr. Newton, "had an immense influence on all who came in contact with him, and an amazing power to bring out all that was best in those who worked in him." Mr. Newton recalled the time when as a timid schoolboy or seventeen, knowing practically nothing of architecture, he took his appointed seat in the modest room in London, which served as the draughtsmen's office, and started his career by copying to the best of his ability one of the working drawings for which Mr. Shaw was so famous.

Elected Board of Trade President

Mr. W. H. Carter, of the firm of Carter-Halls-Aldinger, prominent Western contractors, has been elected president of the Greater Winnipeg Board of Trade, comprising a membership of over two thousand of the leading business men of that city. Mr. Carter has been identified with some of the largest constructional work west of the Great Lakes, and was formerly president of the Winnipeg Builders' Exchange.

BRIDGE NO. 0.9, ONE OF TWO NEW VIADUCTS BUILT BY THE C.P.R. ON THE NEW SUBDIVISION BETWEEN LEASIDE AND TORONTO.

New C.P.R. Viaducts, Toronto

A RATHER remarkable piece of reinforced concrete work has just been completed in the construction of two new viaducts in connection with the double-tracking of the North Toronto subdivision of the Canadian Pacific Railway, between Leaside and North Toronto. The undertaking involved the replacing of bridges (known as 0.9 and 1.8) which had been trestles constructed of steel, and is regarded as a distinct achievement in railway construction work.

Bridge No. 0.9 is 386 feet long and 90 feet high, carrying two tracks, while No. 1.8 is of similar dimensions, but a three-track structure. The length of the individual spans and the details of their construction are unprecedented in the engineering world. Previous to this no reinforced concrete beam with a length of more than 25 feet has been attempted; the spans of these two C.P.R. structures are each from 35 to 37 feet long. These spans have been made possible by the employment of unit construction, by which each span was designed as two "T" beams, which, after being manufactured near the work, were laid side by side on the previously built reinforced concrete towers. The towers themselves are really reinforced concrete buildings, constructed in the usual manner by means of wooden forms built around a steel reinforcement, which was previously assembled and securely wired together. When all was in readiness the concrete was poured by means of long spouts, which led in several directions from the main mixing tower. The pouring of the concrete was maintained as continuously as possible until a whole tower was completed. This work was done during the winter, at a time when the temperature was below freezing point. It was performed inside of what was virtually a building erected to maintain a suitable temperature around the newly deposited concrete until it was out of danger by being damaged by frost.

These two structures are provided with narrow sidewalks and hand rails, which enable trainmen to move conveniently alongside standing trains. The hand rails add considerably to the appearance of the structures, which are extremely artistic in appearance, and at the same time satisfactory from a general utilitarian point of view, besides being absolutely permanent. Both are designed to carry the heaviest engines in existence with a considerable margin of safety, and are epoch-making in the art of bridge engineering, inasmuch as they involve certain precedents of design as regards the use of reinforced concrete in permanent bridge structures.

These two structures are so solid that when passing over them on a train one gets the impression that he is on a solid fill instead of on a bridge.

The method employed in the erection of the reinforced concrete spans is a specially interesting feature of the structures. Each slab, as a unit, weighed 55 tons, which was the limit load that could be handled by the C.P.R. 100-ton standard wrecking cranes. The crane engaged handled no less than 110 slabs, each 55 tons in weight, or in all, something like 6,000 tons, and all this was done without a single mishap to either men or material. Another remarkable feature is that both structures were built without interruption, from the beginning of June, 1917, to the beginning of July, 1918, which was a shorter period than would have been required to manufacture and erect similar structures in steel. Passenger and freight traffic on the C.P.R. main lines was continued without interruption during the progress of these interesting works.

VIEW ALONG VIADUCT AT ROADBED LEVEL.

CLOSE VIEW OF C.P.R. VIADUCT NO. 0.9, NORTH TORONTO SUBDIVISION.

MOVES TO NEW OFFICES.

Architects Denison & Stephenson, Toronto, who for the past several years have been located at 18-20 King Street West, have moved their offices and draughting rooms to the Confederation Life Building, Queen St. entrance.

Circular Housing Plan

Proposed by

G. J. LAMB, Assistant City Engineer

Port Arthur, Ont.

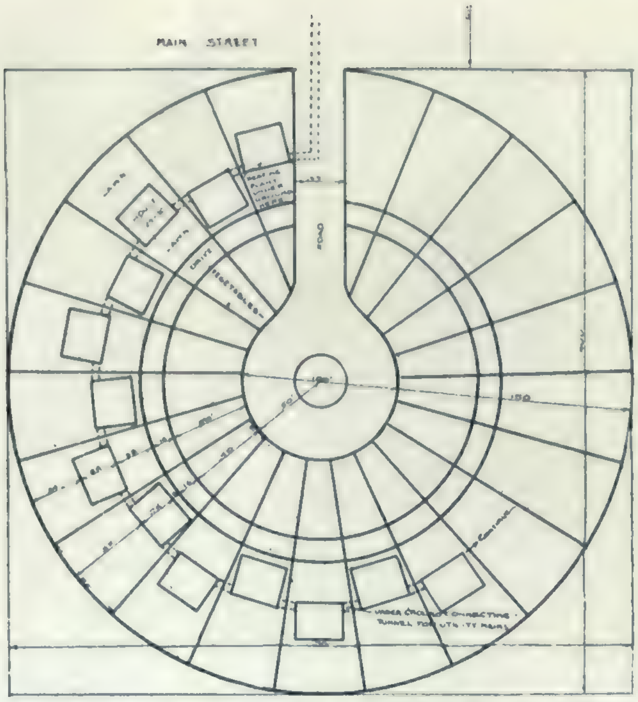


Fig. 2.—Layout of block of twenty-one houses. Note the arrangement of the buildings which admits of direct outside light on all four sides. The lots are approximately 150 feet deep, and vary in width from about 15 feet at the inner circle or drive to 35 feet at line of outside circumference, thus allowing adequate room for lawn space and vegetable gardens. The scheme provides for a service tunnel to be constructed beneath the circular line along which the houses are staggered. This tunnel would carry the sewer, water and gas mains, electric and telephone wires; also the heating pipes which would connect with a central heating plant located near a point where the street and inner road intersect.

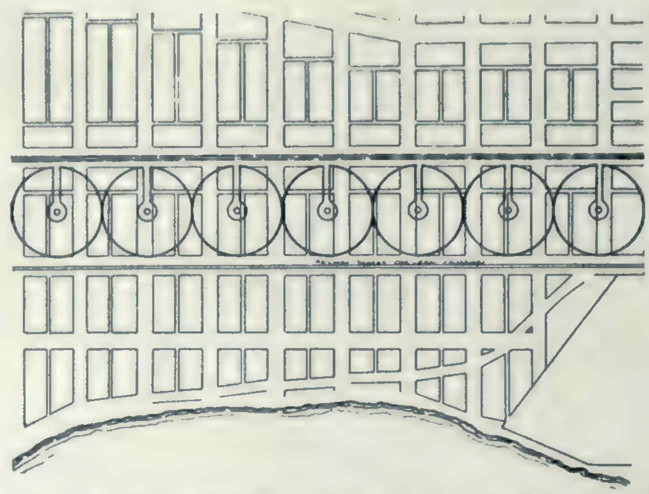
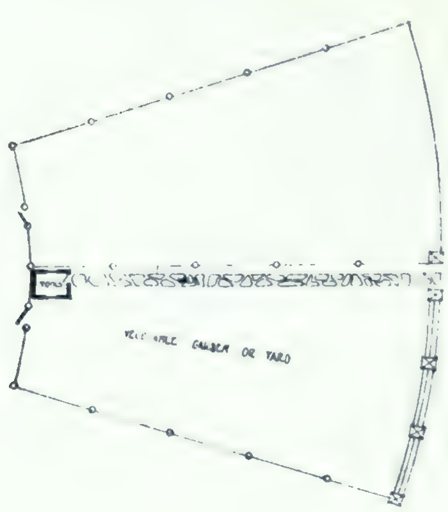
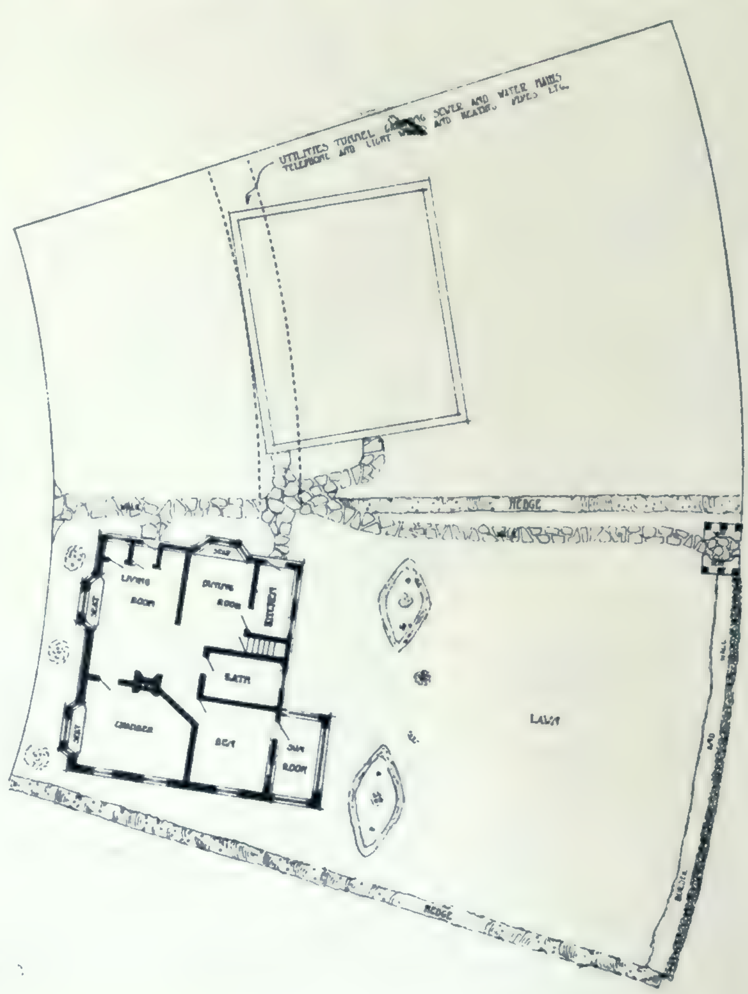


Fig. 1.—Plan showing how the circles in which the houses are grouped can be adapted to rectangular city blocks. This scheme, it is claimed, eliminates a number of common engineering difficulties and offers certain economical advantages as regards up keep and service.

Fig. 3.—Detailed scheme of a pair of individual lots, showing suggested ground treatment, plan of dwelling, utility or service tunnel, flagged walks, hedges, etc.





The plan in the lower half of the drawing is for a detached house. The other structure could be a two-family dwelling, with each tenant having his own lawn space.

Circular Housing Plan

A HOUSING scheme for which many advantages are claimed—economic, engineering and otherwise—has been worked out by G. J. Lamb, assistant city engineer of Port Arthur, Ont. If not altogether new, it is at least interesting in theory, and has the virtue of being considered in relation to various important phases which necessarily enter into the successful solution of such a problem. Mr. Lamb proposes a circular plan, whereby the lots are laid out radially from a common centre, such as is indicated in the accompanying drawings.

Fig. 1 shows how the circular blocks can be fitted into rectangular city blocks. In Fig. 2 the position of the houses in the individual circles are indicated, each circle providing for a group of twenty-one dwellings. Fig. 3 shows a suggested plan for a house occupying one of the lots into which the circle is divided. The direct advantages or benefits which will be derived from the adoption of this scheme are said to be: A direct saving in cost of over thirty per cent., sufficient ground space to allow for adequate lawns and vegetable gardens, an abundance of light on all four sides of each building, increased safety for children as regards neighborhood traffic, the advantages of a central heating plant, and the consequent saving of fuel per tenant, together with economic advantages as regards water mains, sewer and roadway maintenance.

While the drawing in Fig.1 was made in reference to a portion of the city of Port Arthur as at present subdivided, the scheme from all appearances could be successfully carried out in almost any community. The lots, or sectors, into which the circle are divided are approximately 150 feet long. These range in individual width from approximately 13½ feet at the inner circle to about 50 feet at line of outside circumference. It will be observed that the houses are staggered about a circular line. This line is the centre line of a tunnel, which is constructed of connecting links and an additional basement partition in each house. The tunnel carries sewer, water and mains, electric light and telephone wires and heating pipes. It may also be used as a private entrance to the various basements. The various utility mains and wires enter the tunnel from the main street at the point where it intersects the road running to the centre of the block, the heating plant being situated near the same point. The lots may also be intersected by a semi-private drive, as shown, or entered from the common centre or hub. The corners, cut off from the square by the circular layout, are alloted to park purposes. While the design shown is tentative, it is said that the scheme offers itself readily to an endless variety of effects and modifications without giving up any of the general principle. The block as it stands represents a unit of ownership, but by proper legislation individuals might become owners if so desiring. While the plan illustrated in Fig. 3 provides for a detached house, the building on the other lot could be designed as a two-family dwelling, each tenant having his own lawn.

The features of the general plan as explained more in detail by Mr. Lamb himself are as follows, and are, to say the least, quite interesting.

By the adoption of this plan, some common engineering difficulties are at once eliminated. Under the present block system, the engineer is compelled to forecast the probable future traffic of each road and walk. He is compelled to design for traffic much in excess of immediate requirements and the needs of the individual block. This excess must be carried as an added burden to the adjoining property or the city at large till such time as the traffic designed for actually develops. The same thing may be said in a general way about sewer and water mains and other utilities. The proposed plan does away with guess-work. The engineer would know at the outset the exact requirements of the block, and would govern himself accordingly. Definiteness would characterize the whole scheme.

The smallest size commonly used for street water mains is 6-inch. This is much above the requirements for domestic purposes, but fire needs demand it. The large mains extend the whole way around a block served with water. Fig. 2 calls for a 6-inch main from the main road to the utilities tunnel only. A fire hydrant would rise from the tunnel at that point. The domestic supply could be carried by a much smaller pipe, reducing in size as it gets farther from the main. Pressure-reducing valves could be installed if necessary on the domestic supply line, conserving the pressure for fire-fighting purposes, reducing the proportion of leaks and saving much wear and tear on the whole domestic system. As the fire hydrants extend into the tunnel, frost jackets would not be required.

MAINTENANCE.

The greater portion of the cost of maintenance of a waterworks system is caused by excavations for leaks. This work is particularly costly in winter, when the ground is frozen. In cold climates it is also necessary to make a daily personal inspection of fire hydrants, and also to give them special attention after they have been used. This bill of expense would automatically disappear. All pipes would be open for inspection at all times, and trouble would be detected at once.

WATER WASTE.

Where sewer and water mains are laid in the same trench, leaks in water mains are very difficult to detect, because they may never show at the surface. Leakage may amount to from 15 per cent. to 20 per cent., according to condition, age and pressure. Where water is pumped this is, of course, accompanied by a corresponding loss of coal or electrical energy. Detection of waste is a live issue with most municipal engineers. Cutting off waste means deferred extensions to pumping plants and equipment at a time when such are exceedingly costly. This source of expense and trouble would not be possible under the proposed system. Leaks would be detected and repaired at once without excavation.

HOUSE CONNECTIONS.

These connections carry water, sewage, electrical energy, gas and telephone service from the house to the street mains. They represent a big portion of the capital cost of housing and require much attention. They require much energy to operate them. They would be entirely unnecessary with the proposed layout.

CONSTRUCTION.

These houses could be built to a given standard without making them identically alike, and a big saving could be effected in this manner, but it is not legitimate to hold this out as an added attraction of this plan. It may be said, however, that owing to the connection of the buildings, excavation could be done with a steam shovel, effecting a saving of a substantial amount over the hand-shovelling method.

HEATING.

A heating authority has given it as his opinion that, with fuel at present prices, these houses could be heated at a cost of about five dollars per month for fuel. A central heating plant of the general design he proposes, could use soft coal or wood. With individual heating plants it is extremely doubtful if the same result could be obtained for less than twelve dollars per month for the winter months. The price of five dollars per month is estimated for the most severe weather.

The same authority advises the use of high-pressure steam. This is impracticable for ordinary installations, but where it can be used it is economical of fuel, pipes and radiators. The layout lends itself admirably to this method. A saving of one-third could be made on the capital cost of house-heating fixtures alone.

In the ordinary house, the house plumbing is connected to the street plumbing at the line of the front wall. The lines ascend into the house at the rear. This means carrying the sewer and water pipes the full length of the house before they come into service. Under the proposed plan this expense is eliminated.

PUBLIC SAFETY.

It can be seen at once that the houses, lawns and yards are more or less isolated from main arteries of traffic. This would give children freedom to play in private lots and in public parks without undue exposure to danger from passing vehicles.

TRAFFIC REGULATION.

It would be no hardship to restrict traffic within individual blocks to a speed limit of five miles an hour. The relatively short time spent on internal roads and drives would justify this. This restriction would further increase the safety of children at play. It would also make possible a very cheap kind of construction for these internal roads and drives.

As no house would front directly on a main road, they would be at a distinct advantage in the matter of dust and street noises.

ABUNDANCE OF LIGHT.

The plan shows the position of the houses staggered. This means light in abundance on all four sides. By taking the houses one after the other and studying the problem from the viewpoint of hours of actual sunlight, it can be seen what this arrangement means in comparison to the block system. When the radial system was first proposed, this was the greatest advantage claimed for it. Compare one of these houses with its maximum of actual sunlight and daylight on all four sides with the ordinary house in a block, shut off by its neighbors on two sides from daylight and sunlight alike, one of the other sides possibly shut off from the sun the year round and the other taken up by the woodshed. Or compare it with an apartment block, with some of its tenants never getting any sun or partly dependent on a narrow light shaft.

MAIN ROADS.

Main roads in a district built up of such blocks would traverse a series of parks.

Having adopted the idea of an intersecting drive, the vegetable garden, chicken run or more ordinary part of the property would be separated from the houses and lawns by that drive. No window would look out on a neighbor's back yard.

Set apart from main roads, each block would be more or less self-contained and would have an air of privacy quite impossible to realize under any block system surrounded on all sides by the main routes of public travel.

COMMUNITY INTERESTS.

The layout of the block in itself is a direct encouragement to the growth or various community interests. The central space or hub has great possibilities in the way of library, reading room, athletic, social or public welfare interests which people hold in common. With many parks close at hand, they could be laid out with a wide range of purpose and to meet a variety of health-giving and pleasant sporting aims.

An example of the advantage to be gained in actual dollars and cents appears below. It has a purely local coloring. It should be borne in mind that this saving would not be made on a block of shacks. It would at once appear where the ordinary conveniences and improvements were introduced. The actual saving would increase very slowly as the costs of the buildings increase. In other words, the saving would be as much on a house costing two thousand dollars as on one costing ten thousand. Once admit that people must be warm and comfortable and have proper sanitary protection, and that these are required at a minimum of expense, and we are forced to a realization of this plan. The saving accomplished is not on frills and follies which may be avoided, but on the stern necessities. The less elaborate the house, the greater the percentage of gain. It is a saving which strikes directly at the root of the matter of the "high cost of living." That this saving in capital cost and in fuel cost can be affected at a time when money is so much in demand and fuel so scarce, should have a special significance.

REAL ESTATE SPECULATION.

Before this plan can have any widespread application in incorporated towns, the matter of re-subdivision of land will have to be taken up by the various legislative bodies. They can see to it that those for whose benefit the redistribution is to be made, have an honest intention to build and can see to it that they do build. It will have a tendency towards compactness which in itself is a tendency away from wild-cat speculation in outside subdivisions.

COMPARISON OF COST OF TWO SYSTEMS

ITEM	BLOCK SYSTEM		CIRCULAR SYSTEM	
	Quantity	Cost	Quantity	Cost
Lots	333	$ 83,250	333	$ 83,250
Houses	333	566,100	333	466,200
Excavation	60,000	60,000	60,000	15,000
Heating plants	333	66,600	7	28,000
Heating Installations	333	166,500	333	99,900
Plumbing	333	99,900	333	66,600
Other fixtures	333	33,300	333	33,300
Roads	4,620	23,100	1,600	2,400
Lanes	5,280	5,280	0	0
5-ft. walk	8,778	13,778	588	888
Water mains	4,260	27,720	588	3,528
Water mains	0	0	6,244	1,874
Sewer mains	0	0	6,244	1,874
Drives	0	0	4,752	4,752
Concrete walk (priv.)	10,961	8,791	2,664	3,330
Concrete wall	0	0	1,200	3,122
Elec. light mains	4,620	4,620	588	588
Telephone mains	4,620	4,620	588	588
Sewer & water con'ts	333	33,300	0	0
Electric light and tele.	333	3,300	0	0
		$1,200,159		$815,190

Total cost per house	$ 3,604	$ 2,447
Annual charges—		
Capital	$360.00	$240.00
Taxes	25.00	20.00
Fuel	96.00	40.00
*Light and water	24.00	12.00
	$505.00	$312.00
Per month	42.08	26.00

*Operated at a loss.

Halifax Reconstruction Work

Reconstruction work at Halifax is being carried out at a satisfactory rate of progress. Within the past two weeks work has been started on the superstructures of over three hundred houses, mostly four and five-room dwellings, of attractive design, for which the foundations were recently completed. These houses are being built of hydro stone—a concrete block with a stucco facing—which is susceptible to various schemes of coloring. As it is understood other structures will immediately follow, it will not be long before the destroyed portion of the city will take on a much rehabilitated appearance.

Steel Company Changes Name

It is announced that the business operated the past nine years as MacKinnon, Holmes & Company, Sherbrooke, Que., will hereafter be conducted under the name of the MacKinnon Steel Company, Limited. This concern, as is well known, fabricates all classes of steel and steel plate work, and specializes in bridges, tanks, etc. The new name more distinctly identifies the company with the steel industry, and hence makes its purpose more easily recognized by those not already acquainted with its various lines.

Concrete Ships Make Successful Trips

The reinforced concrete cargo steamship "Faith," which left a California port some weeks ago for a west coast South American port was, a few days ago, reported as having arrived safely in first-class condition. The "Faith" is discharging her cargo of lumber and is expected to reload for an American port, which she will reach by the Panama Canal.

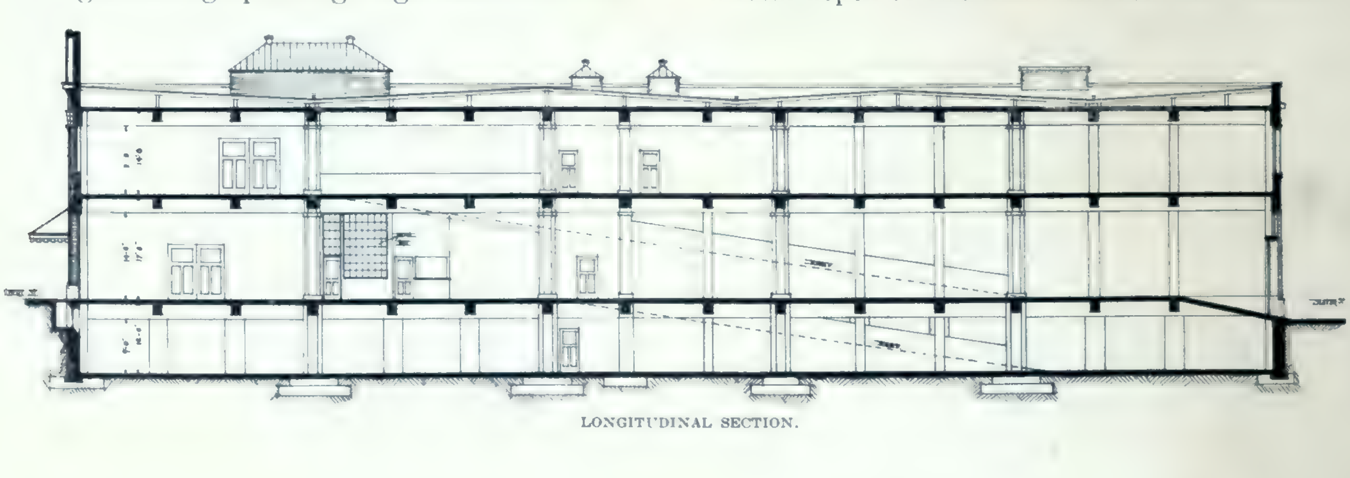
A new five-dollar note of rather unique design has been issued by the Canadian Bank of Commerce to commemorate the jubilee of its president, Sir Edmund Walker. On the face of the note is a central group consisting of Mercury holding the caduceus, supported on the left by a figure representing Architecture, and on the right by another figure symbolizing Invention, and holding in her hand a model of a flying machine. The note is surrounded by a decorative border of immortelles, fruits and vines.

OTTAWA CAR COMPANY'S GARAGE, OTTAWA, ONT. W. E. NOFFKE, ARCHITECT.

Ottawa Car Company's Garage

It requires no special gift of mental perception to visualize the many ways in which the automobile has contributed to the field of architecture. Besides bringing into existence large manufacturing and assembling plants necessary to its production, it is responsible for the erection of countless buildings for the private housing of cars, the development to a large extent of country and suburban estates, and the construction and rehabilitation of many rural hostelries and wayside inns, catering to the motorist's patronage. Moreover, to its credit also belongs the large public garage and service station which is gradually being developed into a distinctive type of structure taking an important place among commercial buildings.

Of the latter class, a recent example is the Ottawa Car Company's garage, which has only lately been completed and open to the public. This building is situated on Albert Street in the City of Ottawa, next to the large plant of the Ottawa Car Manufacturing Company, and is one of the largest and best equipped garages in Canada. It has frontages on Albert and Slater Streets of 136 feet and 68 feet, respectively, and a total depth of two hundred feet from street to



LONGITUDINAL SECTION.

street. The present structure is two stories and basement in height, but the plan provides for two future stories to be built as additional space is required.

Fireproof methods have been followed as far as possible in the construction of the building. The floors and columns are of reinforced concrete, the walls are of brick with Indiana limestone trimmings, and the windows throughout are of metal sash and wired glass, with the exception of the large plate glass show windows which extend down to the level of the ground floor, and practically occupy the entire lower portion of the walls on both fronts. There are two entrances for cars on Albert street and one on Slater Street, the main car entrances being thirteen feet wide.

VIEW OF RAMP, OTTAWA CAR COMPANY'S GARAGE, OTTAWA, ONT.

A feature of the plan is the elimination of elevators. Large ramps, 18 feet wide, being used instead, on which the cars run from floor to floor under their own power, thus doing away with inconvenience and delays in moving cars in and out of the building. This is modelled to a large extent on some of the largest garages in the principal American cities.

The total floor area of the building is about 60,000 square feet. Storage space is provided for about three hundred automobiles, and each patron is provided with a metal locker for spare tires and accessories. Each floor has water and air stations, the gasoline and oil service being situated on the ground floor, where a special system for this purpose is installed, with the necessary tanks placed in the basement.

The building has only six columns on each floor, the spans being 34 feet. The ceiling height clear of beams, are: Basement, 9 feet; ground floor, 14 feet; first floor, 11 feet. The stairs throughout are of reinforced concrete with iron hand rails. Four large vents are provided on each floor and are connected to a fan in the roof, thus providing means for drawing off fumes and assuring continuous changes of air.

OTTAWA CAR COMPANY'S GARAGE, OTTAWA, ONT.

SHOW ROOM, OTTAWA CAR COMPANY'S GARAGE, OTTAWA, ONT.

The show room on the ground floor facing Albert Street, is 66 by 37 feet, the wall and ceiling being plastered and the floor of mosaic tile. At the rear of the show room are the ladies' rest room and toilet, finished in tile, together with an office, 12 by 24 feet, also with plastered walls and ceiling and a tile floor. The ground floor also contains men's lavatory, stock room and a chauffeur's club room.

The first floor contains large paint and repair rooms, and additional storage space. The basement has both storage space and rooms for the washing of cars, the latter being equipped with patented overhead washers. All floors throughout the building are finished with a chemical concrete hardener, and are graded to traps so as to secure perfect drainage. The electrical equipment has been carefully considered to obtain the best possible results, and the woodwork, office partitions, doors and show window frames are all of the metal covered type. The building is heated from the new heating plant installed in connection with the Ottawa Car Company's works, and the plumbing is modern in character, lavatories being provideed on all floors.

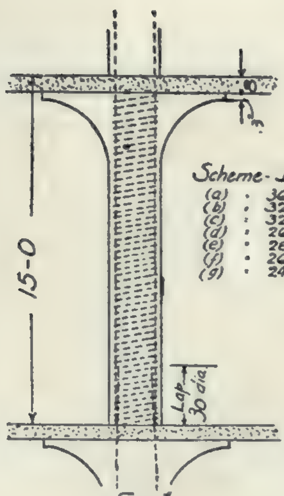
Community Houses Instead of Monuments

The erection of community houses as fitting memorials to the brave men, living and dead, who are saving the world for democracy, is suggested editorially by the "American City," in its September issue. "Liberty Buildings" is the name proposed in the United States for these structures, which, erected immediately after the war, would perpetuate the democracy of the camp and serve as neighborhood gathering places for civic activities and fellowship of all people.

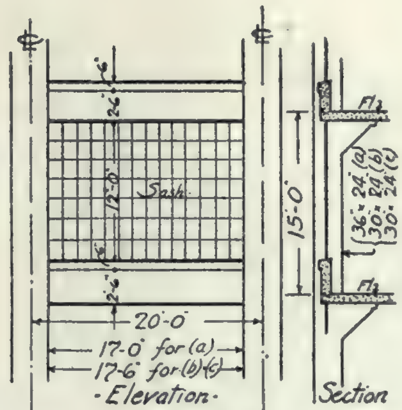
It is pointed out that of the countless numbers now engaged in the war, many will return unscathed, some will come back crippled for life, and some will never see their homes again. To those who shall live, and to those who shall die, the people will owe a debt they can never repay. But as a visible recognition of that debt they will wish to erect in every community some fitting memorial. No mere shaft of marble or granite, our contemporary says, can ever symbolize the democracy for which this world war is being fought.

The war, the editorial adds, has speeded human progress in many ways, and why not let it establish yet another precedent. This could take the form of memorials in the shape of structures which would help the living, while commemorating the dead. It recommends that when the day of peace comes that the people in every municipality be ready with their money pledged—or perhaps the necessary sum already subscribed in war bonds, with building plan completed, with an option on the site—if not already donated by the public-spirited owner, and with an organization already formed to administer the new community home when built.

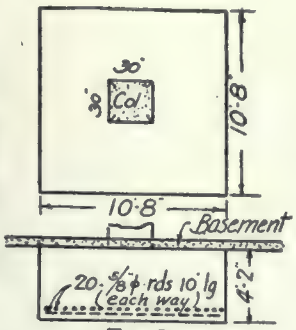
The idea is by no means without merit, and is something which perhaps could be adopted to a certain extent here in Canada. According to our contemporary, the erection of these buildings could be begun at such time as may best help to tide over, in some measure, the period of readjustment, when the returning soldiers and the industrial workers shall be in need of employment. And finally, it points out, in planning, financing and administration, an advantage would accrue by making every possible use of existing commercial and civic bodies, and of the many war service organizations which have been the medium of patriotic effort. Thus in turning to constructive works of peace with a new spirit and energy of public service, liberty and democracy would indeed be achieved.



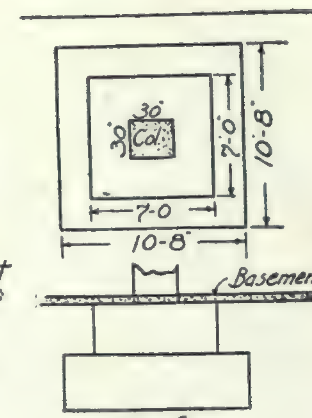
- Fig 1 -



- Fig 2 -



- Fig 3 -
(Scheme - a)



- Fig. 4 -
(Scheme b)

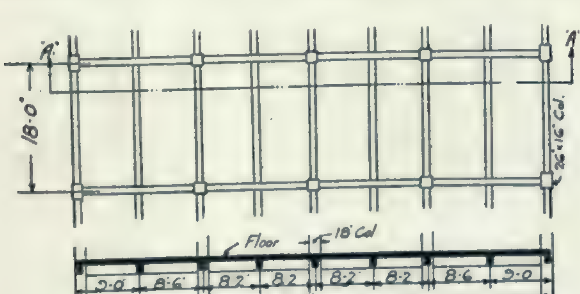
Economy in Concrete Column Design

Paper Presented by C. W. Mayers, before American Concrete Institute.

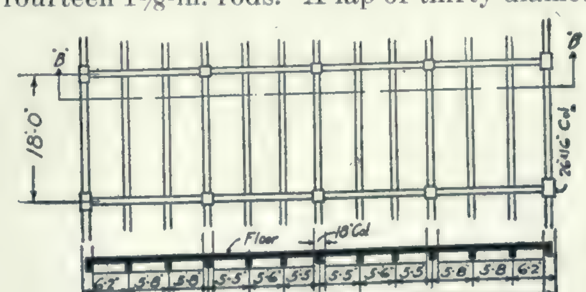
PROBABLY no part of a concrete building is simpler to design than the columns, and because of this simplicity the designer is very likely to give this part of his computations very little special study. It is also true that no part of a concrete building can conceal so effectively the lack of economical design as can the columns.

The economical design of the columns for a concrete building of only one, or even two storeys in height, is not a matter requiring much special study, but in buildings several storeys in height the subject is one of vast importance. It is not possible to design columns showing maximum economy without careful consideration of several important facts. Engineers designing concrete buildings realize that a richer mix of concrete costs more than a leaner mix. They realize that to offset this extra cost of a richer mix of concrete in column design, there is a corresponding decrease in reinforcement which results in a change in the total costs of the concrete columns. The manipulation of these mixes of concrete in order to determine the most economical column construction is a subject for real study, and to accomplish this end the engineer will find it necessary to make several trial designs and calculate the cost of each design. For example, a column 26 in. in diameter, composed of concrete mixed in the proportion of 1 : 1½ : 3, reinforced with eleven 1-in. round rods and 1 per cent. spiral hooping, will carry about the same load as a column of the same diameter composed of 1 : 1 : 2 concrete, reinforced with seven ⅞-in. round rods and 1 per cent. spiral hooping. As both of these are good designs, the question arises as to which one would be the most economical. Assuming the unit price of 1 : 1½ : 3 and 1 : 1 : 2 concrete at 36 cents and 43 cents per cu. ft. respectively, vertical reinforcement at 5 cents per lb., and spiral hooping at 5½ cents per lb. in place, it can be clearly shown that the column composed of 1 : 1 : 2 concrete will prove to be the more economical one to use. The point at which the column mixes change, and where spirally reinforced columns should be used is determined only by making these comparative estimates.

It is not uncommon to see detailed plans calling for a lap in all the rods in a lower storey column without regard to the fact that the column above may call for a lesser number of rods for its reinforcement, and it is only necessary to lap part of them. This is real waste, and shows careless design which will run into money faster than the designer suspects. For illustration, the first storey wall columns of a concrete building are 36 x 34 in., reinforced with twenty 1⅛-in. round rods. The second storey wall columns are 36 x 30 in., reinforced with fourteen 1⅛-in. rods. A lap of thirty diameters



Cross Section A-A
- FIG 5



Cross Section B-B
FIG. 6

is called for in all column rods. If the entire twenty rods in a first storey column are lapped into the second storey column it means that six of these twenty 1⅛-in. rods have been unnecessarily lapped, and consequently this extra reinforcement wasted. Had only fourteen of these first storey column rods been lapped into the second storey column instead of twenty, a saving of about 17 lin. ft. of 1⅛-in. round steel rod would have been made. This reinforcement, figured at 5 cents per lb., would have shown a saving of about $3 at this one point. Multiply this saving by the number of columns in the building where such laps occur and it becomes no small item. The expense of a cost of this kind becomes considerably greater when the column in question is a wall column on which is superimposed a so-called turned up wall beam designed to be poured with the floor slab. In this case the specified lap begins at the top of the wall beam instead of the top of the floor slab and extends upward. For example, suppose a wall beam, extending 14 in. above the second floor, designed to be poured with the slab, had been superimposed on the 36 x 34-in. wall column just discussed. In this case the lap must be measured from the point where pouring is stopped. If the twenty 1⅛-in. round rods are all carried up into the second storey column for a lap of 30 diameters it means that all the rods must extend to a point 4 ft. above the second floor, when in reality it is necessary to carry only fourteen of these rods to this point, starting the fourteen 1⅛-in. round rods in the second storey column at a point 14 in. above the second floor and extending upward. The loss incurred by carrying the entire twenty 1⅛-in. round rods into the second storey column is about 24 ft. of 1⅛-in. round rod, which at 5 cents per lb. is about $4, as against the loss of $3 when no wall beam is designed to be poured with the floor slab. Wastes of this nature at the present high price of reinforcement are serious.

In the design of wall columns it will be necessary, usually, to consider the amount of sash and curtain wall required to fill the space between columns, as the smaller the width of the exterior columns the more sash and curtain wall will be required to fill in the space between these columns. This may seem trivial, but it will oftentimes give false impressions of economy if all these seemingly trivial details are not

TABLE I.

	Design.	Comparative Estimates.		
Scheme (a)	36-in. dia. col. 11 1⅛-in. rd. vert. rods ⅜-in. rd. bands 12 in. o/c Mix 1 : 2 : 4	Conc.	99 cu. ft. at 34c.	$33.66
		Forms	Round steel	15.00
		Reinfct.	716 lbs. at 5c.	35.80
		Lost fl. space	5 sq. ft. at $2.75	13.75
		Total		$98.21
Scheme (b)	32-in. dia. col. 23 1⅛-in. rd. vert. rods ⅜-in. rd. bands 12 in. o/c Mix 1 : 2 : 4	Conc.	79 cu. ft. at 34c.	$26.86
		Forms	Round steel	15.00
		Reinfct.	1,437 lbs. at 5c.	71.83
		Lost fl. space	3 1-10 sq. ft. at $2.75	8.54
		Total		$122.25
Scheme (c)	32-in. dia. col. 12 1⅛-in. rd. vert. rods ⅜-in. rd. bands 12 in. o/c Mix 1 : 1 : 1 2-3	Conc.	79 cu. ft. at 36½c.	$28.84
		Forms	Round steel	15.00
		Reinfct.	770 lbs. at 5c.	38.50
		Lost fl. space	3 1-10 sq. ft. at $2.75	8.53
		Total		$90.87
Scheme (d)	26-in. dia. col. 11 1-in. rd. vert. rods 1 per cent. spirals (18½ lb.) per lin. ft. Mix 1 : 1½ : 3	Conc.	52 cu. ft. at 36½c.	$18.98
		Forms	Round steel	15.00
		Reinfct (vert.)	514 lbs. at 5c.	25.70
		Spirals	264 lbs. at 5½c.	14.52
		Lost fl. space	7-10 sq. ft. at $2.75	1.92
		Total		$76.12
Scheme (e)	28-in. dia. col. 20 1⅛-in. rd. vert. rods ⅜-in. rd. bands 12 in. o/c. Mix 1 : 1 : 2	Conc.	60½ cu. ft. at 43c.	$26.02
		Forms	Round steel	15.00
		Reinfct.	1,255 lbs. at 5c.	62.75
		Lost fl. space	1.45 sq. ft. at $2.75	3.99
		Total		$107.76
Scheme (f)	26-in. dia. col. 7 ⅞-in. rd. vert. rods 1 per cent. spirals (18½ lb.) per lin. ft. Mix 1 : 1 : 2	Conc.	52 cu. ft. at 43c.	$22.36
		Forms	Round steel	15.00
		Reinfct.	245 lbs. at 5c.	12.25
		Spirals	264 lbs. at 5½c.	14.52
		Lost fl. space	7-10 sq. ft. at $2.75	1.92
		Total		$66.05
Scheme (g)	24-in. dia. col. 10 1⅛-in. rd. vert. rods 1 per cent. spirals (16 lb.) per lin. ft. Mix 1 : 1 : 2	Conc.	44½ cu. ft. at 43c.	$19.14
		Forms	Round steel	15.00
		Reinfct (vert.)	306 lbs. at 5c.	30.30
		Spirals	229 lbs. at 5½c.	12.60
		Total		$77.04

given a place in the estimated comparative costs of the various designs.

Illustration of the methods of determining the economical interior column are given below. It may be well to add that no attempt is made to consider any of the various methods of concrete design from an engineering standpoint. This paper is not intended to be a text on design in any form, but rather it is intended to present to the designing engineer a method by which he can solve for himself the question of economy in his work. Hence, the reader should study the examples given here with a view to applying the methods of cost calculation to his work, and not draw engineering conclusions from any of these illustrative costs.

Several comparative designs for any interior column (Fig. 1) are shown here. The comparative costs of the various schemes are worked out in detail, using unit prices principally from tabulations in Part 1 of this paper. (Published in August issue of CONSTRUCTION, page 264).

In the estimated comparative costs (Table I) perhaps the most noticeable fact is that the columns using the 1 : 2 : 4 mix of concrete are among the most expensive. Using this lean mix necessarily produces a column larger in diameter, which means, also, a loss of valuable floor space. It will also be noticed that the smallest column designed is not the most economical. The column which shows the most economy in this case is one having a 1 : 1 : 2 mix and about 1 per cent. of vertical reinforcement, together with 1 per cent. of spiral reinforcement. Hence a rich mix of concrete and comparatively small percentages of steel reinforcement seem to show the most economical results for a column carrying a fairly heavy load.

For comparative purposes, the difference in the amount of concrete in the column heads may be neglected, as the top diameter of the head usually remains the same throughout the building. The cost of forming the column and its head has been estimated here at $15 each. This is done for convenience in arriving at a total cost of the column shaft. Ordinarily this is neglected in making comparative estimates of interior round columns, as it costs about the same to form a round column of small diameter as it does a column of larger diameter. Many other schemes may be designed for this particular column and the comparative costs estimated. However, these several examples, some of which are obviously too expensive to consider, will suffice to give the reader a working knowledge of the methods of calculation employed to determine the costs of the various types of interior columns. It is readily appreciated that even though a larger column were somewhat cheaper to build, the additional floor space occupied by this larger column might be worth more to the owner of the building than he would save in the construction of the column. Hence it becomes necessary to consider the value of this additional floor space as a part of the cost of this larger column. It is difficult to say what this floor space is really worth. However, a satisfactory way to deal with the situation is to consider the smallest column designed as a basis to which the other columns are to be compared. In the illustration this column is 24 in. in diameter. Consider the area of floor space occupied by a column equal to the square of the diameter of the column. The additional area occupied by any one of these larger columns is equal to the difference of the square of the diameter of the column in question and the square of the diameter of the smallest column designed. This additional or lost floor area is priced at a unit cost equal to the approximate unit cost per square foot of floor space of the completed building, including heating, lighting, sprinkles, etc. The unit cost per square foot of building is calculated by dividing the approximate total cost of the building by the number of square feet of floor space in the building, measurements to be taken "out to out" of the floor plan. For example, a building 200 x 60 ft. and five storeys high may cost $165,000 complete. This works out at $2.75 per sq. ft., and for general purposes this will give fairly accurate results for the purpose described above.

In the comparative estimates of the interior column (Fig. 1) given, if we strike out of each estimate the cost of lost floor space, the relative cost of each column will remain unchanged. This is not always the case, and even in our examples it will be noticed that the columns having the leaner mixes show up much more favorably when this item of cost is excluded from the total cost of the column. Frequently, the omission of this item will result in a transposition of the economic order of the various designs. In many buildings the loss of a few feet of floor space is immaterial, but in other cases it is of great importance, as in storehouses or in buildings where the machinery layout would be interfered with by a larger column. Where loft buildings or offices are rented by the square foot of net area the cost of this floor space should be figured at a considerably higher figure than the one given in our tables.

In determining the economical wall column, the method is very similar to that used for interior columns, except that the item of the cost of wood forms enters into the estimate. It will be necessary also in designing exterior columns to consider the width carefully, as every inch added to or deducted from the width of the column will change the corresponding dimension of wall sash a like amount.

Consideration is given in Table 2 to the economical design of a typical wall column (Fig. 2) for a concrete building having these columns spaced 20 ft. on centres. While only three designs are compared here, the principles are clearly illustrated and further designs should be treated in a like manner.

The cost of each wall column design includes the cost of sash and glass, together with the curtain wall necessary to fill in one bay. For convenience in making these estimates, it is assumed the glass is factory ribbed glass costing 20 cents per sq. ft., including glazing. Steel sash is estimated here at 25 cents per sq. ft., erected and pointed, making a total of 45 cents per sq. ft. for the sash and glass in place. The curtain wall below the sash is figured here at 75 cents per sq. ft. In making the sketches of the exterior wall bay for estimate purposes, no care has been exercised to select stock sizes of steel wall sash. In actual practice, however, this is usually of prime importance. The cost of the extra floor space occupied by the larger wall column has not been considered here, as its influence on these particular columns would be negligible.

In the design of concrete footings it often happens that it is difficult to decide off-hand whether a plain or reinforced concrete footing should be used. A design of each type of footing should be made and the comparative costs calculated. The engineer knowing the kind of soil these footings will rest upon should price the excavation required at a proper figure. This is a very important part of the footing cost, in fact, many times the most vital part of the estimate for foundation work. In the absence of any more reliable information the unit costs of excavation per cubic yard (not over 5 ft. deep) may be assumed as follows:

TABLE II.

Scheme (a)	36 x 24 in. 12 ⅛-in. rd. rods 17 ft. 6 in. ⅜-in. rd. bands 12 in. o/c	Conc.	86 cu. ft. at 34c.	$29.24
		Forms	143 sq. ft. at 15c.	21.45
		Reinfct.	777 lbs. at 5c.	38.85
		Curtain wall	31 sq. ft. at 75c.	23.25
		Window sill	17 lin. ft. at 60c.	10.20
		Sash and glass	204 sq. ft. at 45c.	91.80
		Total		$214.79
Scheme (b)	30 x 24 in. 10 1⅛ in. rd. rods 17 ft. 10 in. ⅜-in. rd. bands 12 in. o/c Mix 1 : 1½ : 3	Conc.	71 2-3 cu. ft. at 36½c.	$26.16
		Forms	129 sq. ft. at 15c.	19.35
		Reinfct.	651 lbs. at 5c.	32.55
		Curtain wall	32 sq. ft. at 75c.	24.00
		Window sill	17½ lin. ft. at 60c.	10.50
		Sash and glass	210 sq. ft. at 45c.	94.50
		Total		$207.06
Scheme (c)	30 x 22 in. 12 ⅞-in. rd. rods 17 ft. 2 in. ⅜-in. rd. bands 12 in. o/c Mix 1 : 1 : 2	Conc.	46 cu. ft. at 43c.	$19.78
		Forms	124 sq. ft. at 15c.	18.60
		Reinfct.	460 lbs. at 5c.	23.00
		Curtain wall	32 sq. ft. at 75c.	24.00
		Window sill	17½ lin. ft. at 60c.	10.50
		Sash and glass	210 sq. ft. at 45c.	94.50
		Total		$190.38

Loam or other easy excavation	$0.75 cu. yd.
Gravelly earth containing small stones	$1.00- $1.50 cu. yd.
Frozen earth	2.25- 2.50 cu. ft.
Rock or ledge excavation	3.50- 4.00 cu. yd.
Back fill	.10 sq. ft.

For excavation work over 5 ft. deep and down to 10 ft. deep, the unit cost on the yardage below the 5 ft. depth should be increased approximately 50 per cent. An example is given below with comparative costs for the two types of footings, reinforced and plain, shown in Fig. 3 and Fig. 4, respectively. The excavation is assumed as costing $1 per cu. yd. to remove, and the excavated holes are sheeted close in order to do away with form work around the large footing block.

TABLE III.

Scheme (a) Reinforced type. (Mix 1 : 2 : 4)	Conc.	460 cu. ft. at 34c.	$156.40
	Forms (none)		
	Reinforcement	420 lbs. at 5c.	21.00
	Excavation	19¼ cu. yd. at $1.00	19.25
	Back fill and level	19¼ cu. yd. at 30c.	5.78
	3-in. sheeting (close)	182 sq. ft. at 10c.	18.20
	Total		$220.63
Scheme (b) Plain type	Concrete 1 : 2½ : 5	507 cu. ft. at 32c.	$162.24
	Forms (top block)	84 sq. ft. at 15c.	12.60
	Excavation	24 cu. yd. at $1.00	24.00
	Excavation below 5 ft. mark	5½ cu. yd. at $1.50	8.25
	Back fill and level	29½ cu. yd. at 30c.	8.85
	3-in. sheeting (close)	270 sq. ft. at 10c.	27.00
	Total		$242.94

As shown in Table 3, the reinforced footing is the most economical to use in this case. However, provided stones or "plums" were obtainable at a small expense, the cost of the plain footing could be considerably reduced. It will be noted in the estimates for these two footings that the excavation for the plain footing is the determining factor in its cost. The materials used in the plain footing cost somewhat less than those used in the reinforced type, but the extra depth of the excavation makes the plain type the more expensive one to use. This extra cost becomes still greater when the unit cost of digging increases. In case the reinforced type of footing is built with a sloping top, and a wood form is used for this top, the cost would be about the same as though the concrete were poured up to a level with the top of the footing, and the form work omitted, as above estimated. In some operations the top part of a footing is sloped and the concrete poured "dry." This necessitates a change in the batch, slows up operations and many times does not work out economically. For estimating comparative costs of footings it is not a safe procedure to assume that the top part of the footing will be poured "dry" in order to do away with forms on the slope. Either estimate a form for this sloping surface or figure on the concrete as being poured up to a level with the top of the footing.

It has been previously stated that in the design of the beam and girder type floor, the omission or addition of one intermediate beam per bay may influence the cost materially. Although this problem is usually handled economically by engineers designing concrete buildings which have usual floor loadings and column spacings, it sometimes happens that when unusual floor loadings and column spacings are required, it is necessary for the engineer to determine a layout which will show the most economy. In a proposition of this kind it is first necessary to make the design which looks most likely to be the economical one. Then, two more designs should be made, one having one more intermediate beam and the other having one less intermediate beam. Sometimes the girders should be run in other ways and designs made on layouts entirely dissimilar. Cost comparisons made of these designs will show conclusively which system should be adopted.

For the purpose of illustrating the methods of estimating beam and girder floors with a view to economy, the two schemes shown in Fig. 5 and Fig. 6, designed for the same column spacings and live loads, are estimated here in a comparative way. Only these two layouts are compared here, but other layouts should be estimated in a similar manner, bearing in mind that the more beams and girders in the floor the more expensive the form work becomes.

In scaling the quantities for the comparative estimates of these two designs, it will be necessary to include all the concrete forms and steel reinforcement in one 18-foot bay for the full width of the building, which is about 67 ft. 6 in. In Fig. 5 the quantities will include the slab over one complete bay, seven intermediate beams, two wall beams and four girders. In Fig. 6, the corresponding quantities will include the slab over one complete bay, eleven intermediate beams, two wall beams and four girders. Under the head of "Estimate, Fig. 5" and "Estimate, Fig. 6," will be found these respective quantities to which unit prices have been fixed (a list of which will be found in Part 1), and the total comparative cost of one bay for each scheme estimated.

Estimate, Fig. 5.

Concrete, 825 cu. ft. at 34c.	$280.50
Forms, 1,860 sq. ft. at 13c.	241.80
Reinfct., 7,300 lbs. at 5c.	367.00
Total	$887.30

(Unit cost, 73 cents sq. ft. of floor.)

Estimate, Fig. 6.

Concrete, 700 cu. ft. at 34c.	$238.00
Forms, 2,000 sq. ft. at 14c.	280.00
Reinfct., 6,300 lbs. at 5c.	315.00
Total	$833.00

(Unit cost 68½ cents sq. ft. of floor.)

In "scaling off" the quantities for comparative estimates of beam and girder type floor, care must be taken to carefully consider the laps in the reinforcement. All steel reinforcement actually occurring in the slab and beams should be estimated. In taking off the quantities, also, it will be found most convenient to first get the quantity of concrete, then the square feet of forms, and lastly, the pounds of reinforcement. The order of scaling for the form work and reinforcement should be the same as that followed in getting the quantity of concrete; that is, if beams follow slabs in the concrete scaling, beam steel should follow slab steel in the reinforcement scaling. This method will eliminate to a large extent the liability of error, and also lessen the work of scaling dimensions, since the form areas may be taken directly from the scaled dimensions of the concrete work.

The slight changes in column and footing design which might actually occur in two buildings designed with floors like those above estimated, have not been considered here, as the details of column and footing costs are treated elsewhere. However, in buildings several storeys in height this phase of the design should be carefully considered in conjunction with the cost of floor designs when the cost comparisons are made. Even though the spacing of columns remains the same for all schemes considered, the different dead loads may influence the cost of the columns and footings considerably, and the different girder depths may make it possible to vary the over-all height of the columns in order to get the same clear head room.

MODEL OF THE COMMODORE HOTEL, AT PRESENT IN COURSE OF ERECTION IN NEW YORK CITY.

The World's Largest Hotel

A model of the world's largest hotel, the Commodore, now in course of erection in New York City, proved an interesting feature of attraction at this year's Canadian National Exhibition. This carefully executed miniature reproduction which minutely follows the architect's plan, was exhibited in connection with the Pure Food Exhibit, and gives a clear and definite idea of what this mammoth hostelry will be like in external appearances when it is finally opened to the public. It shows a brick exterior, practically solid in mass and relieved at the lower and upper stories by artistically detailed stone work, the general design being worked out in very excellent proportions. The building will be twenty-eight stories high and contains two thousand rooms, all outside ones, with baths. At night the two thousand windows of the model were lighted by electricity, producing a brilliant and vividly realistic effect. A feature of the design is the roof garden which occupies the space in the recess forming the court above the ninth floor level.

It is perhaps interesting to note that the hotel will be under the direction of Mr. John McE. Bowman, a former resident of Toronto and now president of a syndicate which control a chain of large New York hotels, representing an investment of $200,000,000. Mr. Roy S. Hubbell, assistant manager of the Commodore, and Mr. Robert J. Kennedy, publicity director of the Bowman group, came to Toronto to arrange the exhibit. According to Mr. Kennedy, when the hotel is opened in 1919, a million guests will register the first year, and over five million meals will be prepared by the culinary department. The model is made of wood pulp and cost $3,000. Six months were required to complete it.

Future Housing

In future the cost of factories will not be limited merely to the buildings wherein machines are operated and workers perform their tasks, but must include the buildings wherein the workers meet in social intercourse, and for purposes of recreation, and to some extent the buildings wherein they live. The housing of the human machine can no longer be left to speculation or to chance, and those employers who to-day are providing their work people with welfare amenities, and considering their well-being, are doing wisely, although this may only be a step towards what will be demanded in days to come. Labor has measured its strength in this crisis and will never consent to go back to the conditions which prevailed prior to the war. No man can work properly unless he be adequately housed, and it is therefore only right that employers of labor should be made answerable for the provision of a sufficiency of suitable houses and for the general well-being of those whom they employ. The whole matter is one of great and vital importance, and in a future issue we shall hope to return to the subject more fully.—"Builder," London.

Project for Irish Tunnel

Advices from London state that the scheme for a tunnel between Great Britain and Ireland has been revived, and that Premier Lloyd-George is to consider the project at a time not far distant.

It is thought that the construction of such a tunnel would be a most powerful influence in putting an end to the disputes and misunderstandings between the two countries.

The scheme is not a new one, plans having been in existence and laid before the Government some twenty years ago. Five plans for this tunnel are on paper, and it has even been proposed to build a solid railway across the Irish Channel. A bridge and a tube sunk beneath the surface have also been proposed.

CONSTRUCTION

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Proposed National Builders' Association

Local co-operative effort can always accomplish something, but national organization is what really counts in the attainment of fully effective results. Hence a great deal in the way of influence, general usefulness and accruing benefits can be predicted for the proposed Canadian Association of Building Industries now in process of formation. Permanent organization of this body will be effected at a general conference to be held in Ottawa on October 22, 23 and 24, and which gives promise of being fully attended by representative contractors from all sections of the country. The object will be to unite the various contracting and building interests, including supply and material firms, into a Dominion-wide organization, aiming to bring about a better understanding among those directly concerned, and to solidfy action in all matter relating to their interests and general welfare.

Two circumstances attending the inaugural of this movement at the meeting held at the Toronto Builders' Exchange on September 4, and which included representative contractors and builders from Montreal, Toronto, Ottawa, London, Galt and other cities, seem to indicate the assured success of the association. One is the prominent men behind the project, and the other is the draft programme to be considered at the Ottawa conference, which indicates that the proposed association is to adopt no half measure policy. Besides this personal representation and the enthusiasm displayed at the preliminary meeting, there was also a sufficient assurance by proxy of the endorsation of a large number of firms in the eastern and western sections in support of the movement.

To a certain extent the association will be analogous to the National Federation of Building Industries, recently formed in the United States. It will consider, among other things, various contracting problems, ethical and business questions, the interdependence and relations of its allied branches, business relation with the architect, engineer, owner and public works departments; cost plus percentage basis, labor trade parliaments, the matter of resources, economy, readjustment and standardization of materials, and various other important subjects having a direct or indirect bearing on the building trades.

Not the least of the association's responsible duties will be to take up with the Dominion Government the matter of securing protective legislation in regard to the present unfair condition to which the Canadian contractors are subjected through the competition of alien firms, and which has been the means of taking large sums of money directly out of the country. In fact, in many cases competition is not the proper word, as very often alien firms are awarded contracts without Canadian firms even being given a chance to figure on the work. However, a hopeful sign, and one which indicates the usefulness of the proposed association, is the announcement made at the preliminary meeting by Mr. J. Penrose Anglin, president of the Montreal Builders' Exchange, to the effect that the Minister of Public Works has signified his willingness to meet the contractors, or a delegation of their association, to talk over various matters that relate to Dominion Government work or to Federal legislation.

In view of this and the many other worthy objects it seeks to attain, it is certainly to the interest of all contractors, builders and supply dealers, to rally to the support of the new association, and to make its organization effective and complete. What will benefit the association will likewise help the individuals who comprise it. That it can become a live, active and influential factor cannot be denied. That it has already been too long delayed in coming into existence is likewise apparent. Organized along national lines it will be in a position to correct many of the existing evils which have crept into the contracting business, and with which local exchanges at the best can only feebly cope.

The draft programme to be considered at the Ottawa conference is as follows:

Proposed Ottawa Programme.

1. Provincial Roll Call. (number from each)
2. City Roll Call. (number from each)
3. Section Roll Call.
   I. General.
   II. Sub or Trade.
   III. Supply.
4. Organization for Conference.
   (a) Order of Programme Committee to arrange and post details of programme.
   (b) Builders' Exchange(future usefulness of).
   (c) Publicity Committee (Press, notices, etc.).
   (d) Three Entertainment Committees (one each day).
   (e) TeTndering.
   Quality Surveying.
   Method of calling and opening Bids.
   Contract and Bid Bonds vs. Cheques.
   Contracts—Standard Agreements, unit prices, etc.
   Cost-plus-fixed-Sum Contract.
   (g) Labor
   Labor Trade Parliaments.
   Employers' Apprenticeship and Technical Education.
   (g) Materials Committee.
   Resources, economy, readjustment, standardizatoon.
   (h) Future Business.
   Industrial housing, concrete roads, etc., contract farming.
   (i) Business Relations.
   Public Works, Architects, Engineers and Owners, Sub Contractors and Supply Houses.
   Powers of Superintendent or Inspector and Arbitration.
   Foreign competition anl Plan making.
   (j Building By-laws and Lien Laws Committees.
   (k) Other organizations. Relation to Board of Trade and Manufacturing Association, etc.
   (l) Code of Ethics as Between General Contractor. (1) Receiving bids and Awarding Work. (2) Payments. (3) Bonds (4) Bonus and penalties.
   (m) Zones of operation, plant, yards, etc.
   (n) Trade papers. Building Statictics.

The following constitutes the temporary executive committee appointed at the preliminary meeting, with power to add to its number, especially as regards Western members: J. Penrose Anglin, of Anglins Limited, Montreal, chairman; D. K. Trotter, secretary-treasurer of the Montreal Builders' Exchange, secretary; W. Davidson, member of the Winnipeg Builders' Exchange; W. E. Dillon, of W. E. Dillon Co., Limited, Toronto; Herbert Elgie, Toronto; Harry Hayman, London, Ont.; H. Hazleton, president of the Winnipeg Builders' Exchange; J. D. Johnson, Ontario manager of the Canada Cement Co., Limited; W. A. Mattice, of the Dominion Bridge Co., Limited, Ottawa; W. E. Ramsey, of Pedlar People, Limited, Montreal, and E. A. Sanders, secretary of the Mechanical Trades Association, Halifax.

Among those present at the Toronto meeting in addition to most of the above mentioned, were: John Quinlan, Montreal; C. F. Smallpiece, Eastern manager of the Taylor-Forbes Co.; H. N. Dancy, Toronto; T. Gander, Toronto; R. Jackson, of the Jackson-Lewis Co., Limited, Toronto; Walter Davidson, Toronto; Geo. R. Hyatt, London, Ont.; Edward and George Hayman, of Hayman & Sons, London, Ont.; A. G. Robb, of Galt; T. R. Wright, of London, Ont.; and F. B. McFarren, general manager of the Interprovincial Brick Co.; Geo. E. Stocker, president of Wickett Bros., Toronto.

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Elevators, Otis-Fensom Company.
Electric fixtures, McDonald & Willson.
Fire escapes, Canadian Allis-Chalmers Company.
Grilles, Reid & Brown.
Hardware, Canada Hardware Company.
Heating and ventilating engineers, Benett & Wright.
Marble and terrazzo, J. G. Gibson Marble Company.
Ornamental iron, Canadian Allis-Chalmers Company.
Painting, Hughes & Company.
Plumbing fixtures, Jas. Robertson Company.
Plaster work, Hoidge & Sons.
Reinforcing steel, Trussed Concrete Steel Company.
Radiators, Dominion Radiator Company.
Stone, Scott Bros.
Vault doors, J. & J. Taylor.

OTTAWA CAR COMPANY'S GARAGE, OTTAWA, ONT.

Concrete work, John Sutherland & Son.
Cut stone, Hooper Bros.
Electrical work, Mac Electric Company.
Heating, J. R. McLennan.
Marble work, A. K. Mills & Son.
Metal sash, Trussed Concrete Steel Company.
Painting and glazing, W. J. Carson.
Plumbing, J. R. McLennan.
Roofing, J. D. Sanderson & Company.

October, 1918 Volume XI, No. 10

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Full Page Illustrations

H. GAGNIER, Limited, Publishers

GRAPHIC ARTS BLDG., TORONTO, CANADA

BRANCH OFFICES

MONTREAL NEW YORK

COLLEGE STREET ENTRANCE. ANTIQUE AND ART GALLERIES OF B. M & T. JENKINS, LIMITED. SPROATT & ROLPH, ARCHITECTS.

DETAIL OF WOOD CARVED CORNICE.

Antique and Art Galleries, B. M. & T. Jenkins, Ltd.

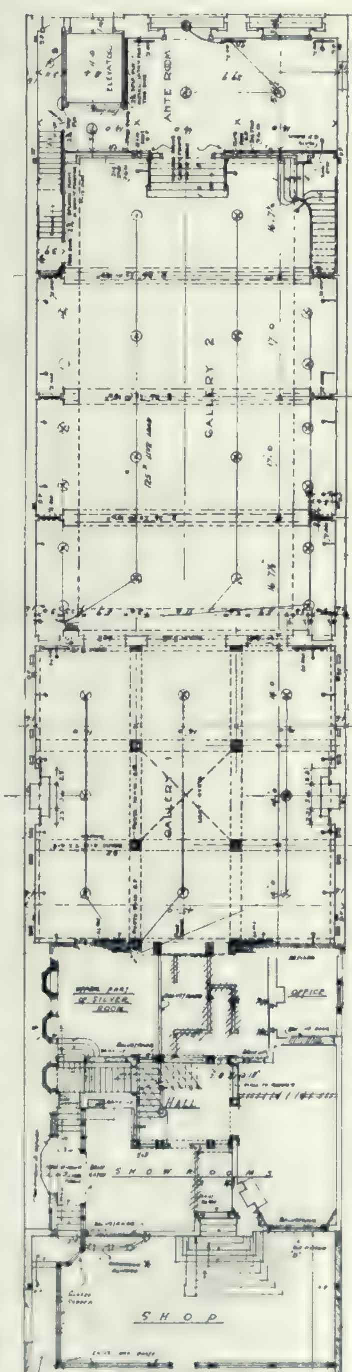
THE galleries of this firm extend from College to Grenville Street, Toronto, having frontages on both streets. An old house on the College Street side of the property, formerly the homestead of L. R. O'Brien, the artist, has been incorporated with the new buildings, but the block to the north on Grenville Street is entirely new.

The College Street front, of solid oak construction, is perhaps a rather startling contrast to the adjoining buildings, recalling as it does, the old world. Standing back from the street, with its paved forecourt of rough flagstone and the single tree, very happily left standing and adding to the picture, it reminds one possibly of some old wayside inn in England, or as a passer-by was heard to remark, "of the half timbered streets and rows of Chester."

Whether such reproductions of old-world methods is desirable in Canada, a country modern and new, is something which the owner must decide, and there are evidences indicating this preference in at least a number of instances. Maybe the experiment should not be tried too often, but to the artist's eye it can hardly fail to be a pleasant surprise, and it certainly seems in this particular case a fitting frame for the business carried on within it.

The carving in the cornice, more especially, is worthy of study as an example of Canadian wood-carving which has most successfully caught the spirit of the architect's sketches for the work.

The same character of design is also maintained within the new gallery, which stands in front of the old house on the street level. It is all of solid oak with a balustraded gallery round three sides and the floor paved with rich, red, quarry tile.



GROUND FLOOR PLAN.

The windows in the front of the old house have been removed and openings formed which afford very effective vistas into show rooms on a higher level, the original first floor of the house. Here there has been very considerable reconstruction. The old staircases have been removed and a central hall formed from which views of all the galleries are obtained. From this hall a stair leads down to a kind of sunken room on the basement level, and visible over a balustrade from the floor above, making an effective place for the display of silver and such like and forming a vestibule to the strong room, or vault, with its massive doors.

Beyond the old house to the north, and on the same level, is a square gallery, top lighted, and then a long gallery reaching to the entrance from Grenville Street. This large gallery has a balcony at the sides and one end, for the display of pictures and smaller articles. Beneath the balcony, between the piers, are alcoves also well adapted for picture hanging and specially lighted for this purpose.

The design of these galleries is intentionally refined and unobtrusive, the intention being to form a setting for the wares displayed and to advantageously show their values. All the woodwork is oak, and it is intended, eventually, to decorate the plaster panel on the face of the piers and the soffits of the molded cast plaster beam casings on the ceilings, and also to fill the south window above the balcony with stained glass.

The large gallery is 100 x 50 feet,

VESTIBULE ENTRANCE FROM COLLEGE STREET.

VIEW THROUGH GALLERIES TOWARD GRENVILLE STREET.

ANTIQUE AND ART GALLERIES OF B. M. & T. JENKINS, TORONTO.—SPROATT & ROLPH, ARCHITECTS.

and its spacious character is, perhaps, better described by stating that it is of a size large enough for assemblies and conventions, and was placed through the courtesy of the owners at the disposal of the Daughters of the Empire during their national gathering, held recently at Toronto. Directly above this large room, on the second floor, is another gallery, or show room, of the same size,and above this again two floors of stock rooms.

The top light over the central gallery previously referred to gives a perfect daylight diffusion, the result being arrived at only after considerable experimenting which finally led to the adoption of a semi-transparent glass having an almost imperceptible amber cast. In consequence of this oil and water color paintings and other articles into which coloring enters, are seen at their true tonal values.

A feature of the mechanical equipment is the concealed sprinkler system installed throughout the building, the sprinkler heads of which being set in plaster ornaments so as to produce a decorative rather than a disfiguring effect.

The building is ventilated by natural means, comprising mainly casement windows in recessed bays along the side of the building, which admits of an inflow of outside air in quantities which can be conveniently controlled and regulated.

On the northwest corner there is a large passenger and freight elevator with doors to Grenville Street. The Grenville Street elevation is entirely different to that on College Street, as modern as the later is old world. It is a brick design carried out with tapestry bricks worked in a color scheme over the whole front. The massing of the colors is quite remarkable, and was suggested by a sunset in oils by the late O. R. Jacobi, P.R.C.A., and produces a strikingly rich and harmonizing effect.

The timbers used in the Col-

GALLERY OVER VESTIBULE.

STAIRS TO VESTIBULE GA'LERY.

ANTIQUE AND ART GALLERIES OF B. M. & T. JENKINS, TORONTO.—SPROATT & ROLPH, ARCHITECTS.

CENTRAL GALLERY.

MAIN GALLERY, GRENVILLE STREET.

ANTIQUE AND ART GALLERIES OF B. M. & T. JENKINS, TORONTO.—SPROATT & ROLPH, ARCHITECTS.

lege Street front were taken from the hulk of an old vessel which laid for years at Toronto Island, and also from the hulk of a war vessel sunk in the St. Clair River at the siege of Detroit; thus giving a quaint and historical value to the construction of the building.

ANTIQUE AND ART GALLERIES OF B. M. & T. JENKINS,— SPROATT & ROLPH, ARCHITECTS.

Grenville Street Entrance.

Skill Recognized in U.S. Housing Schemes

An evidence of the thoroughness with which the United States Government is dealing with industrial housing projects is seen in the appointments announced in the U. S. Official Bulletin, issue of September 3rd. The announcement which is authorized by the Department of Labor relates to appointments made by the Bureau of Industrial Housing and Transportation, in connection with the Bureau of Standards, Washington, D.C., and in reference to work to be carried out in several cities. In each case the Government recognizes the services of the architect, engineer and town planner, and evidently reason that the best results are to be obtained through the intelligent planning and collaboration of men who by training and experience should prove most competent to do the work.

The designated localities and the names of the appointees reads as follows:

Bureau of Standards, Washington, D.C.; Architect, Donn & Deming, 808 Seventeenth Street, N.W., Washington, D.C.

Dayton, Ohio: Architect, Schenck & Williams, 908 Mutual Home Building, Dayton, Ohio; town planner, F. Vitaley, 527 Fifth avenue, New York City.

Eddystone, Pa.; Architects, Rankin, Kellogg & Crane, 1912, Walnut St., Philadelphia, Pa.; town planner, John Nolen, Harvard square, Cambridge, Mass.; engineer, Charles F. Mebus, 907 Land Title Building, Philadelphia, Pa.

Elizabeth, N.J.; Architect, Charles W. Oakley and Hugh Roberts, Associated, 1259 Clinton Place, Elizabeth, N. J., town planner, A. F. Brinkerhoff, 527 Fifth avenue, New York City; engineer, C D. Pollock, Park Row Building, New York City.

Pensacola, Fla.: Architect, Favrot & Livaudais Title Guaranty Building, New Orleans, La.; town planner, Favrot & Livaudais, Title Guaranty Building, New Orleans, La.; engineer, Arthur Pew, Forsyth Building, Atlanta, Ga.

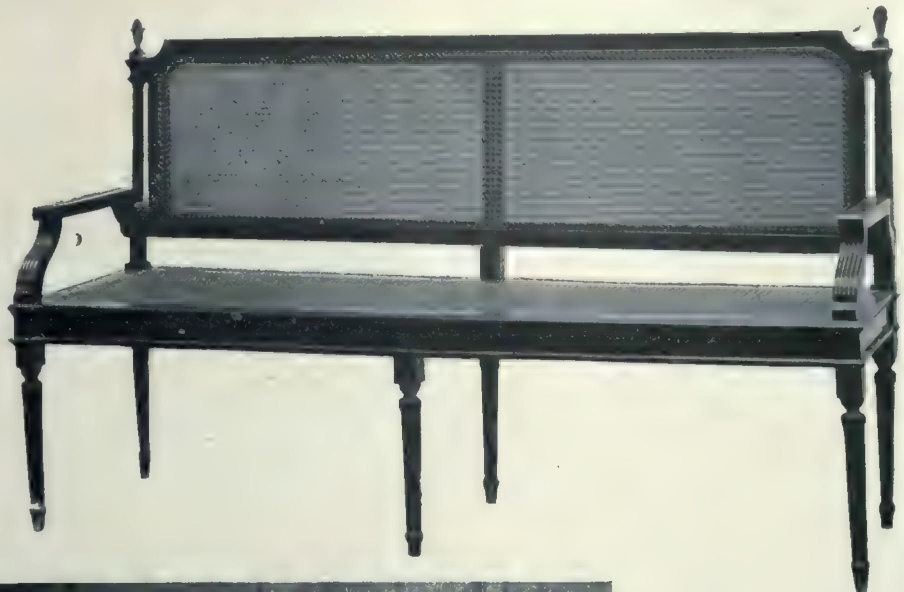
New Orleans, La.: Architect, Favrot & Livaudais, Title Guaranty Building, New Orleans, La.; Town planner, Favrot & Livaudais, Title Guaranty Building, New Orleans, La.; engineer, J. W. Billingsley, Interstate Bank Building, New Orleans, La.

Watervliet (Troy), N.Y.: Architect, Stanton P. Lee, 55 Third street, Troy, N.Y.; engineer, P. E. Green, engineering staff.

The above indicates a wide-awake administrative policy, aiming at successful accomplishment and achievement. It is certainly something which should commend itself to Dominion and provincial authorities, and such municipalities in Canada as are contemplating similar housing developments, just as soon as their present surveys are completed and that point is reached where a definite plan must be considered and the work actually carried out.

Red Oak Office Chair. *Board Room Table.* *Hat Rack and Wardrobe.*

Furniture in Office of Cawthra Mulock, Esq., Toronto. Designed by John M. Lyle, Architect.



Circassian Walnut Settee, Rattan Seat and Back, Fluted Legs and Arms.

Office of Burton's, Limited, Tailors, Toronto.

Red Oak Rolled-Top Desk.

Office of Cawthra Mulock, Esq. Toronto.

Equipped with Specially Designed Bronze Hardware. Note Comfortable Leg Space and Sense of Cantilever Support which Console gives.

Circassian Walnut Table, Rotary Cut Veneer Top in Panels Radiating to centre, Fluted Frieze and Legs.

Circassian Walnut Chair.

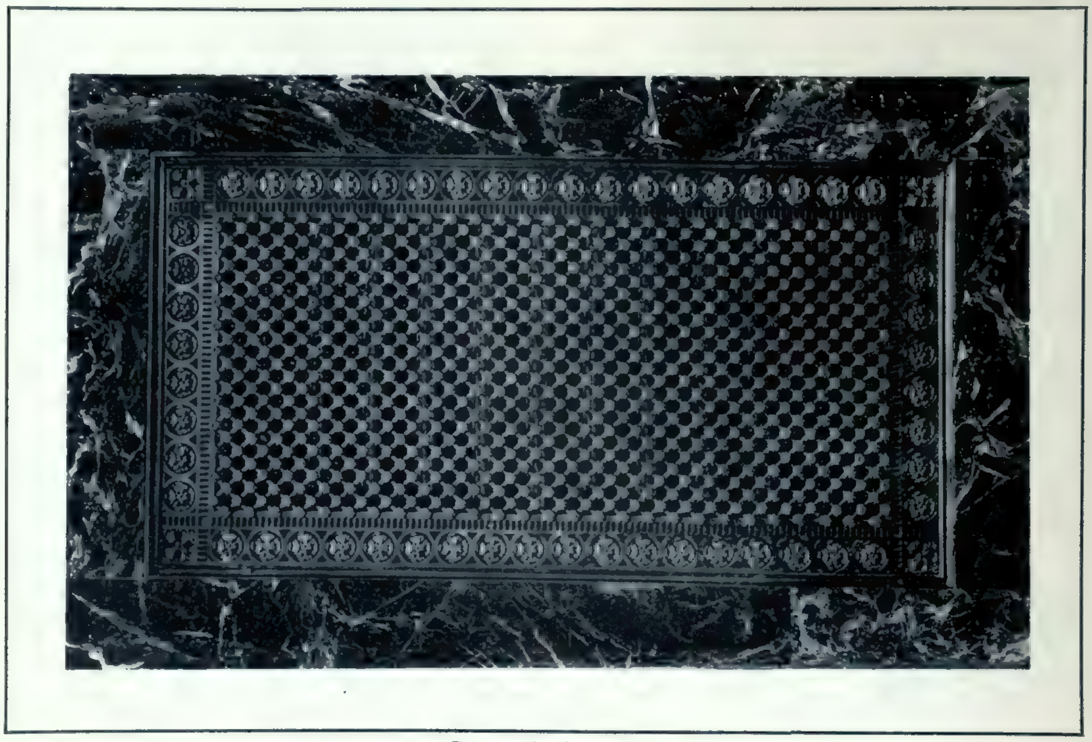
Office of Burton's, Limited, Tailors, Toronto.

Articles of Furniture in Adapted Louis XVI. Style

Designed by John M. Lyle, Architect.

White Oak Piano in Adapted Jacobean Style.

Residence of W. R. Johnston, Esq., Toronto. Designed by John M Lyle, Architect.



Bronze Radiator Grille.

Royal Alexandra Theatre, Toronto. John M. Lyle, Architect.

GATES OF BUCKINGHAM PALACE, AN IMPRESSIVE AND STATELY EXAMPLE OF ENGLISH WROUGHT IRON AND BRONZE WORK.

Ornamental Products of Bronze and Iron

*By Richard V. Clark**

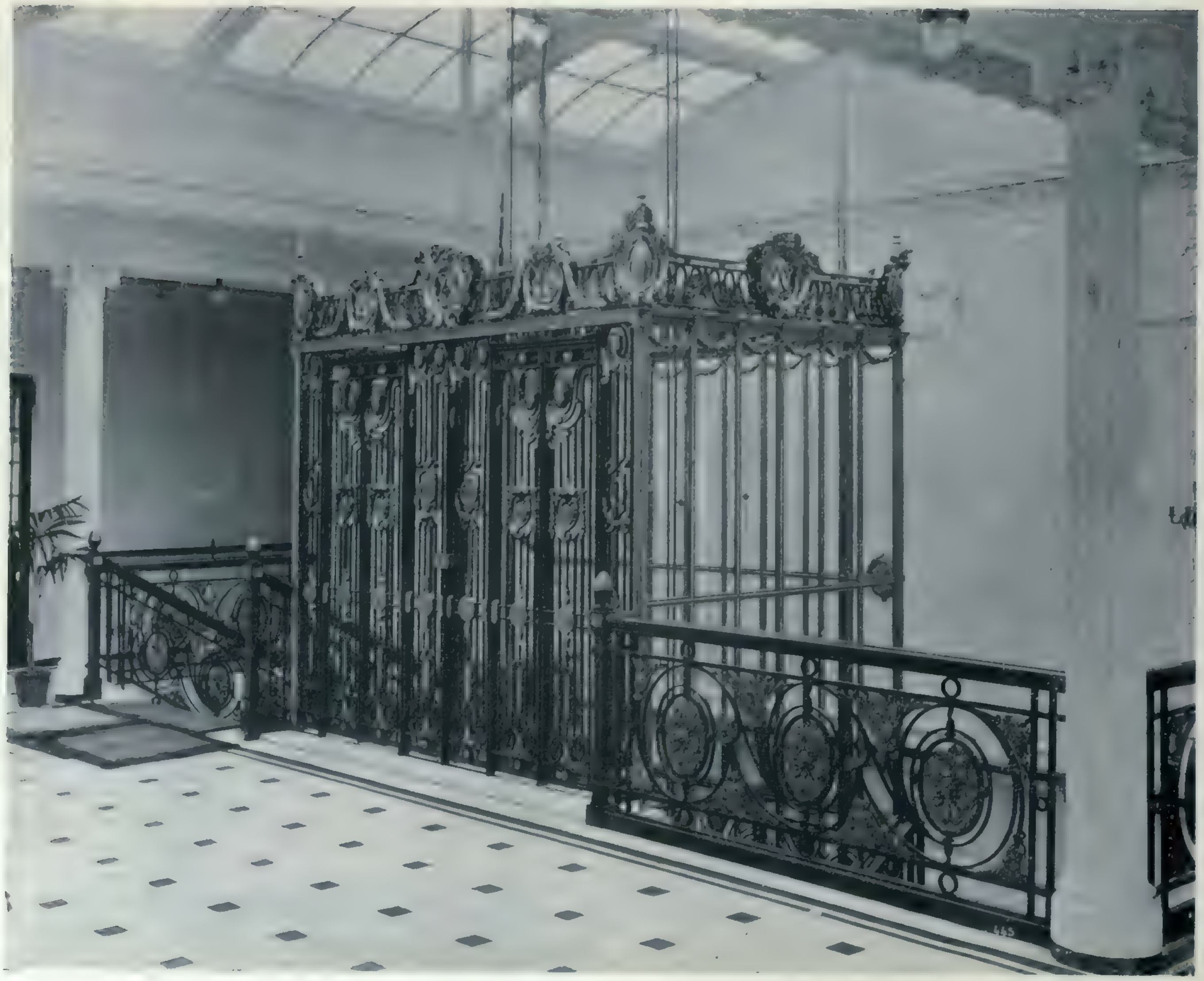
IT is impossible within the confined space of a short article to properly and adequately express the beautiful sentiment and mystic feeling which has been woven into the ornamental products of bronze and iron since the earliest days of history, right along the ages until our present day.

In the age when the Romans made history, and during that period when the Greeks were pre-eminent in power, the most beautiful productions of brass and bronze were made. These beautiful ornaments, with their translucent colors and delicately modelled textures, are still a mystery to us, for such men as Robert Austen, Sterling Lee, Christophe and Duval, themselves masters of the present day arts, have tried every possible means they know to solve the methods by which these beautiful products were made, but without success; the mystery is just as deep —just as profound—just as alluring as ever.

It is not, however, with the past art in bronze and iron that I wish to dwell, but rather with the works of later years. During the present century the Japanese have certainly held sway as the greatest masters in producing beautiful and alluring things in metal. The glorious colorings which they obtain in lasting patina are in their way just as wonderful, though perhaps not so masterful as those of the ancient world. Their own particular way of casting bronzes known as "cera perduta," is perhaps some explanation of the delicacy of texture and beauty of line which they have wrought into those lovely statues and ornaments which resemble to perfection their local beauties of nature. Certain it is that although the foremost artists of Europe have endeavored to copy their Eastern genuis in casting ornaments of bronze, they have yet much to learn before they can think to compare favorably with the works of the Eastern genii.

The process of cera perduta casting as used in England, I will endeavor to explain as briefly as possible. First, an ordinary piece mould or gelatine mould is made from the plaster model.

*Montreal Representative of the Dennis Wire and Iron Works Company, Limited, to whom we are indebted for the photographs illustrating this article.



ELEVATOR ENCLOSURE ON THE ILL-FATED "LUSITANIA"—A RECENT PRODUCTION OF THE METAL WORKERS' ART IN IRON AND BRONZE, ENHANCED IN COLORING BY MERCURIAL GILDING.

Secondly, a wax casting is run from the mould, to which are attached the runners and gates for the flow of the metal, and vents for air or gases. Thirdly, it is cored and an external mould now covers the whole. It is then placed in a muffle or furnace, the wax melted out, and when the mould is dry the metal is poured in that replaced the wax model.

The founder's wax is made of Gambia, Italian, or native beeswax and resin, colored with vegetable matter or vermilion. The foregoing coloring substances volatilize and leave no residue. The Japanese employ a vegetable wax from the fruits of rhus succedanea. The method of obtaining the founder's casting in wax is by pouring the molten wax into a piece mould until such time as the desired thickness is obtained. Sometimes wax wrought by tempering with hot water or in a semi-melted state, is painted or brushed into the mould. Sometimes gelatine moulds are used for, say, two copies, although the shrinkage is a great risk. The coloring of the wax is important, as if some metallic pigment or earth color were employed it would cause a residue in melting out that would destroy the casting. Vegetable color or vermilion is generally employed, as they completely volatilize. Upon the founder's wax model are placed the jets and ingates, or openings, through which the metal is poured into the mould; the necessary outlets for the escape of the air and gases, and for running or melting out the wax, are moulded in pipe fashion, and lantern pins, as they are termed, are inserted to aid in keeping the core in position.

The loam is made of half brickdust and half plaster, but the intonaco is of powdered earthern drain-pipes, obtainable from Doulton, Lambeth. The Japanese employ clays of decomposed granite, obtained from the hills round Kioto or Osaka; they are extremely plastic, but not very refractory, as they contain considerable amounts of the alkalies. Clays are tempered by admixture with old fire bricks of fine and coarse powder. The core, which is one of the most important parts of the mould, may be hollow or solid; for figures it is generally solid. The Japanese core does not differ much from European cores, save in thickness. After the core is made and dried the object is modelled in way upon it. The artist in preparing this model uses all the resources of his skill, and if the casting be successful, all the subtle and delicate touches of his hand will appear in imperishable bronze. Occasionally the Japanese employ paper for making moulds. Compressed, I am informed, it makes fine moulds, and the charcoal gives a good impression—very delicate when burnt—but this process is not general. The ancients employed lava for moulds, jewellery especially, the same as other Oriental nations employ tufa and stone. The founder's wax model is coated with a thin layer of the first intonaco, or fine clay; after drying, other layers are applied, until the crust is thick enough for the stronger loam. The mixture of clays for the first layer of intonaco is very carefully prepared to prevent them from being melted by the molten metal. The formation of a fused crust on the casting, which is always difficult to remove, and destroys its surface, is obviated by this. The core and mould are dried slowly, the wax is melted out by means of a charcoal fire, by which both inside core and outside mould are heated, and the walls baked hard. The core and mould are heated by a charcoal fire generally to a red heat before the metal is poured in.

CAST BRONZE FIGURES MODELLED FOR THE EAST END STAIRS OF THE "LUSITANIA."

The methods generally used in France, England and the other countries of Europe are entirely different, the moulds being worked in sand, and many works of magnificence and splendor have been produced by this method. The modellers of France and Switzerland are wonderful beyond description for their fineness of line, and especially in those fascinating and delicate ornaments of the style which owe their birth to France. This is made manifest to every visitor to France. Study for a moment that glorious metal screen, the "Forecourt at the Palace of Stanislaus, Nancy," or the "Gilded Chandelere of the Petit Trianon in Paris," and you will forget that Paris is gay, or even that you are in France, for the glorious line and delicate detail, together with the soft patina of the finish to this work will enthuse you into believing that you live in an enchanted world, from which you eventually recede with a sigh of regret. It is surprising how the English mind has opened itself to the study and production of works in bronze and iron during the last century.

Those of you who have stood in front of the Buckingham Palace gates in London, an illustration of which appears on page 313, must have been impressed with the stateliness and grandeur of these fine specimens of English work. Here bronze and iron have been combined and wrought to harmonize in an endearing combination. See the beautiful lock surrounded, with its supremely happy little groups of Amorini, whispering, it would seem, to each other stories of the artists who conceived and produced them. It is such works as these that cause a

MODEL FOR CARTOUCHE ON BALCONY RAILING, GENERAL BUILDING, ALDWYCH, ENGLAND.

serious thinker to realize how history is woven into imperishable memoriam by the hands of those wonderful men who write in metal, and whose pens are huge pieces of iron, copper and brass of unwieldly shapes and sizes. The fascination of this wonderful work has also travelled westward. Leaving England before the horrors of this devastating war had laid its destroying hand on those magnificent leviathans of the deep—had you travelled on that wonder boat, the "Lusitania," you would have been able to leave your stateroom and travel upwards in the iron and bronze enclosed elevator illustrated on page 314. Here again the clever combination of two totally different metals, iron and bronze, have proven majestically effective, especially so in that the ornaments have been enhanced in color by mercurial gilding, which gives to them the glowing effect of sunlit gold.

Approaching that great city of the Western world, New York, the traveller sees America's finest memorial of metal. Bartholdi's super effort, the Statue of Liberty, rises to a majestic height, which, though the gift of France, shows that our Western world appreciates in the highest degree the supreme efforts in the modern world of art. England cannot, to my knowledge, boast of such a wonderful statue to the glorification of Britannia, neither France to the memory of her old world glory, and we have to turn again to that little country of the East, Japan, to find its equal in size and weight. There these little men, with great minds and wonderful hands, have erected the statue of a seated figure, with a face 9 feet 4 inches in breadth, and stretching upward to a height of 53 feet. It is estimated that at least 450 tons of metal were used in casting this figure.

Before this present war, when prosperous times gave this Canada of ours many splendid new buildings, our architects did not lose sight of the effective possibilities of these metals, and many a beautiful building gives eloquent testimony to their well-studied thought and taste along the lines of metal ornamentation. When the war is over and peace terms are forgotten in the harmony of peaceful living, once again the mystic appeal of beautiful well wrought metal work will present itself to those lovers of beautiful things, which express in their soft colorings and delicate lines all the sentiment and seductive allurement of old world stories. There will be opportunities of showing those wealthy patrons of art that we too can weave stories and beat them into beautiful shapes; moulding thoughts of mystic loveliness into solid form of a rhythmatic shapeliness, which shall in ages to come, when Father Time has touched them with his magic wand, take their place with those of the great Michael Angelo and others in the worn and beautiful gallery of antiquity.

The Question of Advertising

Now that the American Institute of Architects has agreed to recognize the right of its members to advertise, says "The Building News," of London, it will be interesting to watch the methods adopted to secure publicity. The permission, at any rate, shows a breaking away from the ultra-conservative attitude of conventionalism that has in America and here been detrimental to the progress of architecture in this country. It probably heralds other changes later of a more far-reaching effect, which will bring architects and architecture into prominence quite creditably, but much more effectively than some of the means proposed with that perfectly legitimate end in view. None of us, of course, wish to see the styles and methods of the patent medicine vendor or the big departmental stores followed; but, as a beginning, surely no more objection could be taken—say to the inclusion by the architect of his name and address in our own "Directory" pages than to the posting of his name on a building in course of erection under his superintendence?

Irish Marbles

A large variety of colored marbles exists in Ireland, varying from white to pink and dove and from green to black. The different colors are sometimes found intermingled, especially in Connemara serpentine, and some very striking specimens for decorative purposes have been quarried.

Many Irish marbles have been used in architectural work and have well stood the test of time. The use in exteriors of certain Irish marbles, which did not weather well, led to a general condemnation of all classes of Irish marble that was wholly undeserved. The demand for marbles is not, at this time, very great, but these marbles are again in favor in such cases where the cost of importation does not militate against them.

English Channel Tunnel Project Revived

One of the enterprises which will be taken up and carried to completion after the war will be a tunnel under the English Channel. Sir Arthur Fell, chairman of the House of Commons Channel Tunnel Committee, speaking at a recent meeting in London, explained the importance of such a railway between England and France. He thought it would be practicable for the line to run from London to Constantinople without break or change of cars. Eventually, he said, when normal conditions are restored, the line might be extended from London to Calcutta, to Capetown and Peking.

TERRACE, ALGONQUIN C.P.R., ST. ANDREWS, N.B. BAROTT, BLACKADER & WEBSTER, ARCHITECTS.

Algonquin Hotel, St. Andrews, N.B.

IT stands to the credit of the railway companies of Canada that they have not only provided the country with very excellent transportation facilities, but, that the hotels owned and controlled by them maintain a high standard of service and accommodation. These include in addition to some of the best hotels in various of the principal Canadian cities, a number of well-appointed summer hotels, of which the "Algonquin," at St. Andrews-by-the-Sea, is a noteworthy example. This building replaces the old Algonquin Hotel, a frame structure, which was destroyed by fire in 1914. In rebuilding at the time, the C.P.R., with its characteristic progressive policy, decided to erect a much improved type of structure, and had plans prepared accordingly by Messrs. Barott, Blackader & Webster, architects, Montreal, under the direction of D. H. Mapes, C.P.R. Engineer of Buildings, for the present modern hotel, which was completed in the following spring.

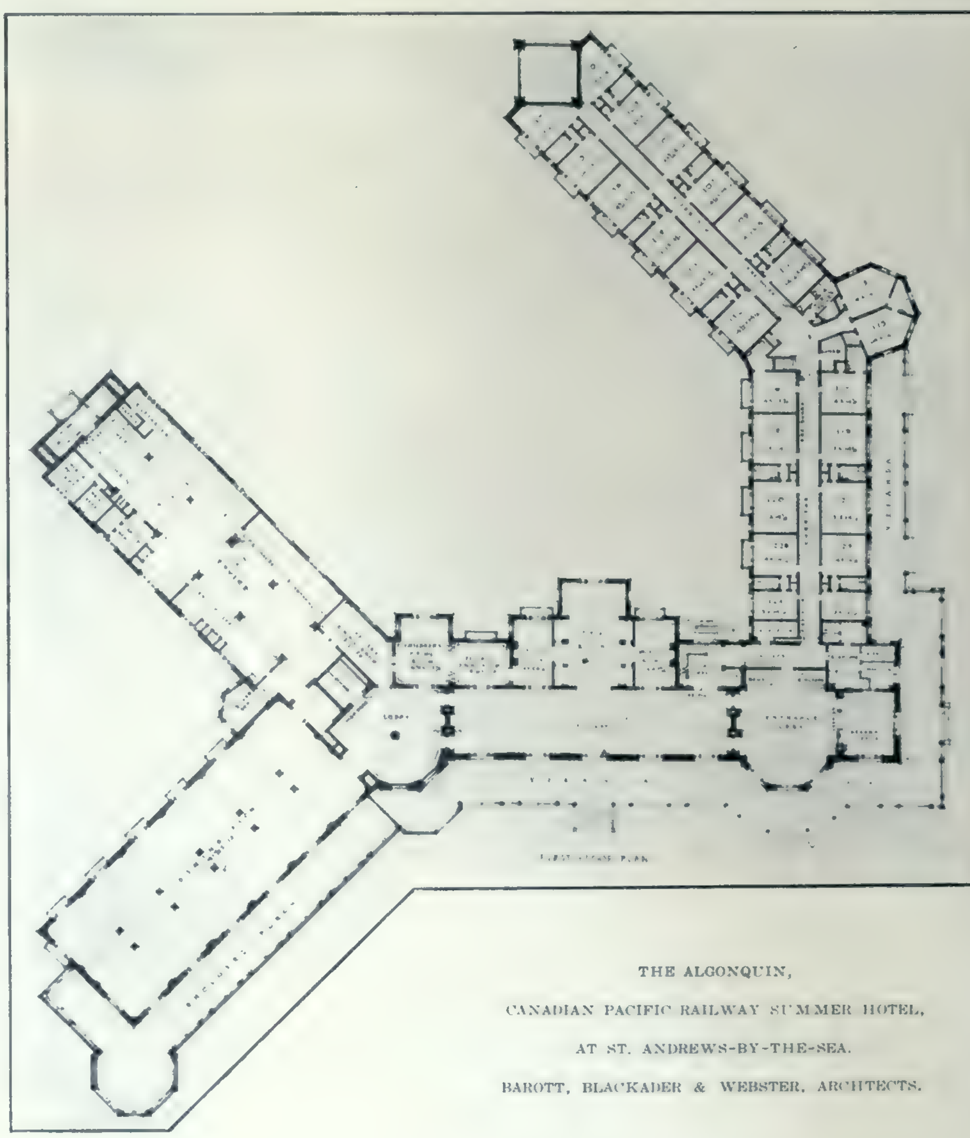
The hotel stands on a site covering 28,000 square feet, and is constructed almost entirely of reinforced concrete, hollow tile being utilized for all interior partitions. The upper part of the exterior introduces a half timber effect, done by embedding the boards directly into the concrete, and is finished above with dormer of alternating sizes set in a red slate roof. The building, consisting of four storeys and two basements, has over two hundred guest rooms, with maximum accommodations for three hundred and fifty persons. The basement contains servants' quarters, officers' quarters, helps' dining-room, bakery, laundry, men's lounge, female helps' common room, servery, etc. An open terrace is built over the front portion of the basement, and as a higher level is reached, a verandah is constructed along the front and one side of the building.

The first floor, entered from the verandah, is arranged so that the lobby is placed between the dining-room (41½ ft. x 112 ft.)—the largest room in the hotel—and the lounge (21½ ft. x 89½ ft.). These can also be entered from the terrace and verandah respectively. The drawing-room (27 ft. x 38½ ft.) leads off the lounge. Behind these rooms and facing the rear portion of the hotel, are children's dining-room, private dining-room, sitting-room, office, news stand, tourist agents' office, telephone booth, telegraph office, manager's office, smoking room, etc. The entire second and third floors, including the wings, are given up to bedrooms; ninety-seven

GENERAL EXTERIOR VIEW, ALGONQUIN HOTEL, ST. ANDREWS, N.B.

of these have private baths and twenty-two have private lavatories. In the attic, bedroom accommodation is also provided, while here is also situated the male helps' quarters, dormitory and common room. A boiler house is constructed about 300 feet from the main building, and is connected therewith by means of a tunnel. This contains three boilers and two generators for the purpose of providing electric light, power, heat and hot water, the refrigerating plant and laundry, as well as quarters for the engineers and laundry help.

The keynote of the furnishing is one of simplicity, as becomes a purely summer hotel. Most of the bedrooms and public rooms have hardwood floors. With the object of miminizing any risk of fire, fire walls and automatic fire doors have been provided, dividing each



THE ALGONQUIN,
CANADIAN PACIFIC RAILWAY SUMMER HOTEL,
AT ST. ANDREWS-BY-THE-SEA.
BAROTT, BLACKADER & WEBSTER, ARCHITECTS.

REAR VIEW, ALGONQUIN HOTEL, ST. ANDREWS, N.B.

floor into five sections. which can be isolated in case of an outbreak. Thus, on the first floor there are seven such doors, besides two rolling fire shutters, which operate automatically in event of fire.

Attached to the hotel is what is claimed to be one of the finest golf links in the world, with delightful natural bunkers. The length of the course is the regulation eighteen holes, most of which are longer than the ordinary run of

VIEW ALONG VERANDAH, ALGONQUIN HOTEL, ST. ANDREWS, N.B.

MUSIC ROOM, ALGONQUIN HOTEL, ST. ANDREWS, N.B.

holes. This gives it additional popularity, as it affords the golfer an opportunity for the frequent use of his brassy in long driving.

These links and the general character of the surrounding grounds form an attractive and picturesque setting, and affords a pleasant outlook from the spacious verandah along the front.

Both the comfortable and inviting character of the place are noticeable to a marked degree. The appointments are simple and in good taste, the general feeling is quiet and restful, and this, together with the natural recreation advantages it enjoys, makes it a much sought out place by an increasing number of better class patrons.

It is altogether carefully planned, built along sound and safe lines, and embodies in its equipment all features of convenience necessary to a thoroughly efficient hotel service, thus complying with that degree of modernity which the public has come to expect in the first-class summer hotel.

DINING ROOM, ALGONQUIN HOTEL, ST. ANDREWS, N.B.

Fire Waste in Canada

CERTAIN well directed efforts are at the present being made to acquaint the public with economic disadvantages which the annual fire waste in this country entails, and to obtain the co-operation and support of every community in reducing future losses of this kind to a minimum. One manifestation of this is "Fire Prevention Day" inaugurated on October 9th by the league recently formed for this purpose under the auspices of the Ontario Government, and which in the course of another year will in all likelihood spread its influence to other provinces. Another evidence is certain recommendations made at the recent Fire Chiefs' Convention, held at Toronto, which are based on observations gained through actual fire fighting experiences. Through means of propaganda it is hoped to curtail this national extravagance, and to obtain by legislative enactment effective remedial measures.

The plain facts are perhaps best stated in the recent summary compiled by J. Grove Smith for the Commission of Conservation, which we publish here in part. This summary, which appears in book form under the title of "Fire Waste in Canada," is by far the most valuable collection of facts on this particular subject yet published. It is not only comprehensive and informative, dealing with a wide array of statistics, but is a lucid and convincing statement of conditions which cannot wisely be ignored. The summary says:

SUMMARY OF CONCLUSIONS.

Fire waste in the Dominion of Canada constitutes a problem of paramount and far-reaching importance. Continuation of the present tremendous loss of property and life by fire cannot but vitally affect the economic future of the country. If, with the cessation of war in Europe, we are to enter successfully upon a period of rapid expansion, it is imperative that rational conservation go hand in hand with development. It is as necessary to conserve created wealth as it is to prevent the waste of natural resources. Nature in time may restore devastated forest areas, but only human toil can raise a new city from the ashes of the old. Re-creation arrests productive effort, and the replacement of values destroyed by fire absorbs energies that would otherwise be devoted to industrial and economic progress.

FIRE WASTE UNNECESSARY.

There is a growing recognition of the fact that fire waste is needless and that definite measures should be taken for its avoidance. Numerous individuals, municipal councils, boards of trade and other organizations throughout the Dominion urged the Commission of Conservation to investigate the problem. Accordingly, an investigation was begun and an attempt was made to gather into a well-rounded whole the experiences and technical knowledge of fire-prevention experts, and to apply it to existing conditions.

To the average citizen fire prevention implies a vaguely outlined means of curtailing fire waste by the simple expedient of preventing fires. How this desirable end is to be accomplished is not made clear. The well-informed go further and analyze the problem into at least five distinct factors, *viz.*, (1) the engineering, (2) the underwriting, (3) the legislative, (4) the commercial, and (5) the individual. Co-ordination of these varied interests in united reformative endeavor is the first step in any programme designed to deal effectively with the question.

The following general conclusions reached by the investigator are the result of a statistical survey covering the entire Dominion and based to a large extent on replies received to a questionnaire sent to general managers of insurance companies, loss adjusters and other persons qualified to give an authoritative opinion.

GENERAL CONCLUSIONS.

The conclusions reached may be briefly summarized as follows:

1. That the annual loss of life and property by fire in Canada—the latter averaging $2.73 per capita annually for the years 1912-1915—is greater per capita than in any other country in the world, and constitutes an enormous and increasing drain upon the resources of the Dominion, besides most seriously affecting the economic prosperity and general well-being of the people.

2. That such losses can be very materially reduced. This is clearly shown by the experience of European countries which have attacked the problem at its source.

3. That the loss by fire is chiefly ascribable to
   (a) Carelessness due largely from a sense of security created by the present system of fire insurance.
   (b) Faulty building construction.
   (c) Arson.
   (d) Lack of adequate fire prevention laws, such laws as exist being poorly enforced.

4. That, for immunity from the danger of fire losses the people of Canada are relying largely upon elaborate and expensive systems of fire-fighting and are giving too little attention to the prevention of fire.

5. That our fire departments, while among the best in the world, in both apparatus and personnel, are not preventing the steady growth of losses.

6. That the momentary indemnity provided by fire insurance does not restore the values destroyed, but merely distributes the loss, through the channels of commerce, over the whole people.

7. That the cost of fire insurance and fire prevention is, in a large measure, determined by the amount of the fire loss and cannot be expected to decrease except as the fire waste declines.

8. That, although the aggregate loss by fire constitutes a national problem, all fires are local in origin and are, therefore, locally preventable and controllable.

9. That property owners generally have not been sufficiently influenced by their own interests or the welfare of the country at large to use effective means to correct fire-waste conditions.

10. That existing legislation respecting the prevention of fire is inadequate and lacking in uniformity.

11. That such legislation is almost entirely confined to cities and more important towns, and that the dangers and hazards of fire in small communities and rural districts are without regulation or control, despite the occurrence of a large proportion of the fire waste in rural districts.

12. That the only possible solution of the national fire-waste problem lies in the adoption of compulsory measures which, by reducing to a minimum the fire hazards in all communities and properties, will prevent the occurrence of fires.

13. That, owing to the failure of local authorities to deal adequately with the situation, the Provincial Governments should undertake the removal of a burden imposed upon the whole people and should safeguard the lives and property which, in the final analysis, constitute the true wealth of the country.

FIRE WASTE IN GENERAL.

The summary goes on to point out that:

"The Dominion of Canada, since Confederation, has suffered direct loss from fire to the extent of over $350,000,000, exclusive of forest losses. To this sum must be added the cost of public and private protection, $150,000,000, and the amount of insurance premiums paid in excess of indemnity returned, $197,000,000. These figures in the aggregate represent the direct fire cost to the Dominion and show that, during the last half century, the ravages of fire have taxed the people of Canada to the extent of nearly $700,000,000. The indirect cost involves interrupted business relationships, loss of earnings by employees, loss to property owners through vacancy of dwellings caused by removal of tenants to seek work elsewhere, loss to municipalities from destruction of taxable values and, most important of all, the loss of human lives. These costs, even regarded solely in their economic effects, are beyond the power of figures adequately to represent.

FIRE WASTE IN FOREIGN COUNTRIES.

Were the enormous fire losses of Canada unavoidable, speculation and attempts at reform would be futile. That the condition is capable of improvement, however, is evidenced by reference to the losses of other countries. Special reports gathered by the National Board of Fire Underwriters of the United States show that the average per capita loss in fourteen European countries during the period of 1912-1915 was $0.71, and in the United States $2.26. For the same years, the average loss in fifty-six Canadian cities amounted to $2.96 per capita. The respective returns for each country are shown in the following table:

FIRE LOSSES PER CAPITA FOR VARIOUS COUNTRIES.

Country	No. of cities reporting 1912	1913	1914	1915	Fire loss per capita 1912	1913	1914	1915	Average
CANADA ...	56	56	56	56	2.74	3.22	3.38	2.49	$2.96
United States	300	298	298	333	2.55	2.25	2.32	1.94	2.26
Philippine Islands	—	1	1	1	—	4.41	1.28	1.00	2.23
Scotland	2	3	1	3	0.49	0.36	5.35	1.62	1.95
Spain	—	1	1	1	—	2.30	0.15	3.13	1.86
South Africa	—	—	1	—	—	—	1.77	—	1.77
Belgium	1	1	—	—	0.69	1.36	—	—	1.02
Russia	2	2	1	1	0.84	0.89	1.19	0.95	0.97
France	6	5	3	3	0.84	0.49	0.63	1.02	0.74
Hawaii	—	1	—	—	—	0.69	—	—	0.69
England	12	14	9	8	0.54	0.33	0.67	1.03	0.64
Norway	1	1	1	1	0.69	0.32	0.48	0.72	0.55
Italy	3	5	5	3	0.90	0.25	0.37	0.62	0.53
Japan	—	3	10	—	—	0.59	0.44	—	0.51
Ireland	2	2	2	2	0.57	0.28	0.39	0.55	0.45
Chile	—	1	—	1	—	0.30	—	0.58	0.44
Sweden	1	1	1	1	0.13	0.74	0.54	0.29	0.42
Austria	4	4	1	—	0.30	0.25	0.42	—	0.32
Germany	9	8	4	2	0.20	0.28	0.17	0.49	0.28
Switzerland .	1	1	1	—	0.04	0.15	0.19	—	0.13
Netherlands	2	1	1	1	0.12	0.11	0.07	0.14	0.11

Average annual loss per capita:
- United States and Canada $2.61
- European countries 0.71
- All other countries 1.13

According to this record the average losses in Canada are approximately four times the losses in Europe. As the comparison is confined to the more important cities, where fire protection is provided, it does not represent general conditions.

Statistics gathered from a number of European and Canadian towns of less than 4,000 population show that the loss for the years 1910 to 1914, inclusive, was sixteen times greater in Canada. This striking difference may be accounted for largely by our excessive exposure losses and the fact that towns in Canada have a much greater property value per capita subject to fire. Many important industries are situated in small places in Canada. These often provide the sole reason for the existence of a town and, in the event of their destruction, the per capita loss of that particular town is increased out of all proportion to the normal average of the country. A somewhat similar qualification should accompany any attempt to compare the loss records of Canadian and foreign cities. The fact that values at risk are approximately four times greater per capita in Canada than in Europe obviously leads to the conclusion that the same fire causes will, in all probability, produce losses four times as great. This provides no excuse for the extent of our fire loss, but it is an essential factor that is apt to be overlooked in making the comparison.

In connection with a table showing the number of fire alarms per thousand population and losses per capita in the largest cities of the world, and which, in the case of the principal Canadian cities, shows a per capita loss ranging from $1.60 to $12.60, the summary says:

In Canada, taken as a whole, the number of fires has increased much more rapidly than the population. For instance, the city of Toronto had 385 alarms in 1890, 746 in 1900, 1,267 alarms in 1910 and 2,080 alarms in 1916, an increase in the twenty-six years of 440 per cent. Toronto, in this respect, is representative of practically every other municipality in the Dominion. Fires have also increased in frequency of recent years in such European cities as London, Berlin and Paris, due, no doubt, to the complexities of modern life, but the number has remained practically stationary in the smaller European towns.

The striking contrasts between the losses, frequency and extent of fires in European countries as compared with Canada are due to differences in the regulation and control of these three prime factors of fire waste. The immediate effects of this control are most clearly shown in

(1) The general character of the buildings.

(2) The laws governing the conduct of the people.

(3) The viewpoint and civic responsibility of the individual.

1. CHARACTER OF BUILDINGS.—The chief structural conditions that operate to effect a small fire loss in Europe are the general use of non-combustible materials, the restricted height and area of buildings in cities, and the stringent requirements of building codes. With the exception of Norway, Sweden and Russia, where wood construction is prevalent, practically all European countries prohibit the erection of frame buildings within municipal areas. Very few wooden buildings exist even in rural districts, and whole communities of inflammable structures, such as are common in Canada, are unknown. This condition is primarily due to the relatively high cost of lumber in Europe and the intangible influence of older civilizations, which make for permanence. The authorities have realized the necessity of good construction, so that, on the average, buildings are much less inflammable than in Canada. Anomalous as it may appear, the more fire resisting all buildings are, the less fire-resisting does any particular building need to be. What is known as modern fire-proof construction is far from common in Europe. Few buildings are comparable with the steel and tile or concrete structures erected in Canada during recent years. They have not been found necessary, because internal fires are few and the external hazard due to exposure is practically negligible. In a city composed of buildings which, although not fire-proof, are comparatively non-combustible, the danger of fire is much less than it is in a city having a large amount of inflammable construction and a few scattered fire-proof buildings.

In Canada, the most costly and extensive fires have invariably been caused by the poor average of building construction in the areas affected. It is estimated that only one in every 1,200 buildings in Canada is in any sense fire-resisting and that 69 per cent. of the total number are of frame construction. Despite advances in the price of lumber in recent years, 47 per cent. of all the buildings erected during 1912-1915 were built of wood. No harsh indictment of the Canadian people is justified by these facts. Timber has always been abundant, more adaptable and less costly than other materials. Pioneer settlements have become villages and villages have become towns in a brief period of time. The demand for new buildings has been urgent and development has taken place with little definite planning or foresight. In all Canadian cities, community problems incidental to industrial growth have, at some time, forced the transition of residential streets into mercantile districts. There has been no guarantee of permanence and no means of anticipating future developments. Consequently, it has been to the economic interest of the individual to build cheaply and temporarily, to burn, if necessary, and build again.

There is no immediately effective remedy applicable to structural conditions in Canada. The worst feature will gradually disappear as lumber becomes relatively more expensive and the existing buildings are destroyed or torn down to be replaced by a better type. Municipal building legislation, such as is in force in most Canadian cities, does not adequately deal with the situation. Frame construction is usually prohibited in small congested business areas, but, in adjacent districts, the poorest type of buildings is permitted. As the cities expand, these districts, in turn, become congested areas and form an insuperable barrier to any real progress. To effect reform and to approach European standards, in even a measurable degree, the only logical plan appears to be the enactment of legislation in each province to regulate and control all building construction in accordance with known standards of structural safety.

While better construction and climatic conditions account largely for the insignificance of the fire losses in Europe as compared with those in Canada, another potent factor is to be found in the laws governing the conduct of the people. European laws punish carelessness, protect the community from its results, rigidly investigate the cause of fires and enforce severe penalties for negligence and criminality. Profit from the burning of property is made practically impossible.

In France, . . . a tenant is held responsible for all loss occurring through a fire breaking out in the premises he occupies, unless he can prove that the fire was not occasioned by his neglect or fault. In the case of a fire due to a defect in the building, the landlord is responsible to the tenants and others suffering loss thereby; the landlord, in turn, can sue the architect, builders or others to whom the fault for the defect is traced. They are also liable to the penalties provided for by the laws and regulations which have been violated.

Space does not permit of anything more than a passing reference to the mass of related evidence and tables. Suffice it to say that a thoroughness is shown which omits no data necessary to the completeness of the volume in laying the facts fully before the reader.

BUILDING CONSTRUCTION AND FIRE PREVENTION.

Efficient building construction constitutes the foundation of successful fire prevention. The extensive and indiscriminate use of wood for structural purposes is regarded by many competent authorities as the largest single factor contributing to the excessive fire waste in Canada. Of approximately 2,000,000 buildings throughout the Dominion, less than one-tenth of one per cent. has been built with proper consideration of fire safety. In the cities and towns from which statistics are available, almost 70 per cent. of the construction is frame, the majority of brick buildings are structurally defective or inadequately protected, and only one in every 1,200 is even nominally fireproof. With such conditions prevailing it must be recognized that the enforcement of measures regulating future construction, cannot immediately effect any substantial reduction in the volume of fire waste. There are sufficient combustible buildings in Canada to maintain the present rate of loss for many years. Upon the average, fire occurs every year in one out of every 80 buildings in cities and towns. Fire prevention is concerned, therefore, not only with the erection of new buildings, but with what is of equal or even greater importance—correction of the worst faults in existing buildings.

BUILDING CONSTRUCTION AS AFFECTING FIRE LOSSES.

Buildings, in relation to fire loss, are contributory rather than causative. Comparatively few fires other than those originating from defective chimneys and shingle roofs, are primarily occasioned by poor structural conditions. The assertion that fires are more numerous in Canada than in Europe because of the greater prevalence of wooden buildings is not strictly in accordance with the facts. Were the frequency of fires thus affected by construction, the numerical ratio to population in Canadian cities should have decreased of recent years. Since 1890, practically all the more important cities have enacted measures prohibiting frame buildings and shingle roofs within at least a portion of their areas. Despite the progressive structural betterment thereby effected, the number of fires in these places has shown no appreciable decline.

While buildings are seldom the original cause of fires, their physical characteristics largely determine the extent and destructiveness of every fire. The value of brick construction in confining fires to the buildings immediately involved is demonstrated by the record of exposure losses in Canada. Of 1,379 fires spreading to two or more buildings, approximately 80 per cent., originated in frame buildings. Analysis shows, further, that losses due to exposure were proportionately least in the places where better construction prevails.

STRUCTURAL CONDITIONS IN FOREIGN COUNTRIES.

Comparison of fire losses and of structural conditions in Canada and Europe leads to the conclusion that a radical change in building methods is fundamental to the curtailment of Canada's fire loss. Serious fires in Europe are exceptional occurrences and conflagrations are almost unknown. The fire departments in the principal European cities are certainly no better than ours and, in the smaller places, comparison would be ludicrous. Their greater immunity from destructive fires is, undoubtedly, due in large measure to superior construction. Frame buildings are practically non-existent in the larger cities.

INEFFICIENT BUILDING METHODS.

A candid inquiry into present-day building methods in Canada leads to the conclusion that we are decidedly lacking in that thoroughness which might properly be expected, especially in buildings involving considerable cost. Our unwarranted haste and consequent carelessness, our neglect of proper supervision and our system of contracting whereby the date of completion of a building is made the factor of greatest importance, all militate against efficient and permanent work. Unquestionably the majority of buildings in cities are constructed with thoroughness as regards structural safety, but there is ample testimony that few are capable of withstanding a sudden attack of fire. The responsibility for these conditions may be equally divided between the owners, architects, contractors, and public authorities. Speculation and the desire for large returns by investors have been the cause of much poor construction in Canada. Efficient building construction requires time. The modern "rush" contract deliberately invites slighted work on the part of the builder, and scant supervision on the part of the architect. Under pressure of time, the architect is sometimes obliged to pass mediocre work rather than delay completion, and this knowledge is too often taken advantage of by the contractor. Following recent fires, buildings, hitherto assumed to be of first-class construction, have been found with hollow masonry walls filled with broken bricks, floor arches chopped away for the purpose of applying ceiling finish, curtain walls laid with insufficient mortar and tile column coverings fractured for the admission of pipes and wires.

Regarding these things the average building owner is not only ignorant but indifferent. Dependence is placed upon insurance to take care of any fire loss that may result, and in this manner the burden is shifted upon the community. Every year Canadians pay millions of dollars for the maintenance of fire departments, and other millions to insurance companies to be used in indemnifying losses which are to a large extent unnecessary. If only one-half of the money so expended during the last quarter of a century had been used in the proper structural development of our cities and towns, the fire loss in Canada would be merely a fraction of what it is to-day.

BUILDINGS AS INVESTMENTS.

One of the most important phases involved in the question of building construction is that of cost. The first consideration should be security, the second, earning capacity, and the third, continuity of earnings. By disregarding these underlying principles, investment in buildings is purely speculative. Before purchasing land upon which a building is to be erected, months are spent in investigating titles and values but double the expenditure is often made upon the structure without enquiry save as to its arrangement, convenience and appearance. Security is entirely ignored in dealing with the one factor subject to possible destruction by fire and to certain deterioration by age.

From the standpoint of the individual owner, there can be little doubt that a first-class structure affords a superior investment. The capital expenditure may be greater but, after a number of years, the building will represent practically as valuable an asset as when it was erected. On the other hand, a smaller initial investment in a poor building demands constant and increasing outlays for repairs that add nothing to the actual value of the property.

INFLUENCE OF ARCHITECTS.

Architects and contractors can exert a tremendous influence towards the elimination of fire waste. In the past, it has sometimes been deplored that the building profession has given little encouragement to fire-prevention movements. "Safety Engineering," June, 1917, points out the responsibility of architects in this respect as follows:

"The architect's duty lies in specifying, advocating and insisting upon fire-resistive construction. The enormous proportions of fire waste in America is a distinct reflection upon American architects. It indicts them as creators of dangerous conditions. Some 9,000 lives are sacrificed each year to fire. What have the architects to say to this? The architect's advice is sought in planning a building. He should under all circumstances, insist upon construction which will not add to the ash heap and appalling loss of life. If the architects would see their duty aright as creators of buildings, it is to them above all that we must look for a reduction of our annual fire waste. The architectural profession, if it will, can render great service to the country and remove from the profession the accusing finger of being a primary cause of the tremendous fire waste."

LICENSING ARCHITECTS.

There is an obvious need for the more general employment of technically competent persons in the planning and erection of buildings in Canada. Pseudo-architects and speculative builders are a menace to life and credit yet flourish without restraint. Very few employers of architects can judge of their technical qualifications by an interview. These can only be revealed empirically and too often the employer pays dearly for the demonstration. In the United States and in Canada, the question of licensing architects has been frequently raised, but with indifferent success both in the

(Concluded on page 336.)

AN EXAMPLE OF JAPANESE ARCHITECTURE ON WILTSHIRE BOULEVARD, LOS ANGELES, PHOTOGRAPHED FROM TWO VIEWPOINTS.

TYPES OF MODERN CALIFORNIA BUNGALOWS BUILT AT LOS ANGELES DURING THE CURRENT YEAR.

DIVERSIFIED DESIGN AS SEEN IN RECENT DOMESTIC WORK AT LOS ANGELES, CALIFORNIA.

The Building Industry and National Progress

Efficiently organized, the National Federation of Building Industries in the United States, already in the short period of its existence, has resolved itself into an energetic and progressive body having the support of a large membership behind its purposes and views. Of a character somewhat similar to the proposed Canadian association, it demonstrates what can possibly be accomplished in this country if the proposed Ottawa conference turns out as successful as anticipated. Having aims which are both patriotic and protective, it offers to place at the disposal of the authorities at Washington the combined experience of its members in all matters which relate to Government war measures, at the same time seeking a fair degree of recognition and consideration from the Government in all matters affecting the building industry.

BUILDING INDUSTRY AN ORGANISM AND NATIONAL FACILITY.

Conditions in both countries being identical to a marked degree as regards the industries involved, the statement recently issued by the executive of the association in the United States, outlining its objects and activities, is not only of interest, but offers certain considerations which apply with relative importance to the building fraternity here. The statement referred to makes out a very excellent case for the interests it represents. Stress is laid on the importance of the industry and the place it occupies in the economic development of the country. It points to the fact that many do not realize that the building industry is an industry, an organism, and a national facility, but look upon its many branches as independent industries in themselves. Pursuing this thought further, it adds that it becomes apparent upon reflection that shingles are of no use without nails, and that bricks are of no use without mortar. It points out that "it is useless to release fuel for the manufacture of one product without releasing fuel for the manufacture of other products in proper proportion. Every structure requires for its completion many component parts, for the want of the least conspicuous of which the completion of the work is delayed and made impossible. A structure is, in fact, an assembly of materials and products produced chiefly in large quantities mainly by highly capitalized and highly specialized manufacturing concerns."

Briefly enumerating the number whose work relates to building development, including the many architects and engineers engaged in designing and superintendence, the number of organized builders' exchanges composed of contractors and material dealers, the various associations of manufacturers of lumber, cement, clay products, heating apparatus, paint and the like, it urges that all must work together for speedy and economical construction, bringing their efforts into unison in the accomplishment of any object in view.

ADVANTAGES OF A MUTUAL CHARACTER.

In reference to the present and prospective national conditions, the attitude of the Federation is indicated in suggestions made by its executive to the War Industries Board to the effect that "the Federation of Building Industries, as a single great national unit, might serve a most valuable and important purpose to the national administration, as a self-governing instrumentality, possessing understanding of the country's requirements, and having efficiency for their execution, if a definite point of contact between the necessary governmental agencies and the building industry can be established.

"Information as to the needs and purposes of the government could be thus most readily transferred to the industry, and information as to facilities and needs of the industry could with equal facility be placed at the disposal of the government and practical and efficient working conditions thus assured."

In this connection it is pointed out that the Federation, through its executive and War Service Committee, is both willing and prepared to act, if desirable, as advisers or specialists to the government, from the point of view of the industries involved, as well as a clearing house for the accumulating of information and of the problems of the industry itself. Through the many organizations federated into this national association and through the large number of experienced, responsible and dependable men connected with it, it is felt that actual facts and information essential to the government could be gathered more promptly, completely and reliably than in any other way.

UNINTERRUPTED BUILDING ESSENTIAL TO NATIONAL DEVELOPMENT.

The importance which is attached to the building industry in relation to national development is stated as follows:

"During the time when the production of the nation is being burned up, thrown into scrap heaps, or consumed as food, it may not be amiss to make provision for the morrow by the speeding up of production of materials whenever this can be done without interference with the war programme.

"Building does not lock up funds, but transfers them from one hand to another. Material from the raw is raised in the form of structure which can be taxed and on which money can be borrowed. It earns its own upkeep and replacement beside the return which the capital would be earning if it were being 'saved.' Rent is the first cost of all necessities and civil construction must continue if we would mitigate the increased cost of living.

"Few who are not close to the industry realize how large a proportion of their neighbors are wholly or partly engaged in building. The number is so great that to hold any considerable number of them marking time would strain the resources of tradesmen, landlords and many others in every community of the country—weakening the people as taxpayers, bond buyers and as contributors to Red Cross and other relief funds.

"Labor must be permitted to exchange sufficient of its wage for what it requires to keep it in contentment, and it may be well for the nation's immediate and ultimate welfare that this wage should be exchanged for homes and permanent buildings, rather than for the glass beads of petty luxury which involve importations and a corresponding depletion of our gold reserve.

"In the final analysis the nation must embark, consciously or unconsciously, on a policy of integration or disintegration; its action must be either constructive or non-constructive. We must create new wealth and maintain a broad basis of taxation, or allow our wealth to be consumed, living on our principal rather than on our income. . . .

"When building stops in any community, that community begins to run down at the heel in its housing for residents and business. In war as in peace, depreciation is constant—there is the real estate scrap heap and there is the fire loss. Even stationary population must have new dwellings and other common types of structures or the community will suffer in health and morals from overcrowding, defective sanitation and a general delapidation at home and at work. It is already apparent that the need, especially for dwellings, has in many parts of the country seriously overrun the supply.

"Not the least important reason for sanctioning civil construction, when, where and as war needs permit, is that national interest requires the preservation of the industry as a national facility. The merchant marine was allowed to disintegrate, and we encountered the necessity of creating and manning a fleet under pressure and at the highest cost, and taxing the money out of the income of the people. The efficiency of the railroads likewise declined with a somewhat similar result. The people paid. War needs come first, but we should do what we can to prevent the breaking down of an entire industry, and the disintegration of its now efficient plants and of its forces of skilled artisans which must be constantly available, not only to give our people necessary living facilities, but to be always in readiness for war work and for the reconstruction period to follow the war.

"The policy we suggest would tend to keep in being and in progress the arts and occupations related to the provision of shelter and to rear in normal course of events a generation of personnel trained to those callings, interested in particular enterprises through which the industry works, and devoted, by ambition and sentiment to the pursuit of building construction. Otherwise the reconstruction of the industry will be slow after its products have been increasing in demand for years and there will result a serious increase in rental charges, which have already been materially increased through shortage of supply."

Sacred Road Memorial in France

Already the French Government has decided on a memorial that will worthily represent to the ages to come the grandeur and the horror of the present world war. It is to take the form, says the "American Architect," of a "sacred road" stretching 400 miles, from the coast of Flanders to far Alsace, along the line on which for four years and more the contending hosts have faced each other in grim battle.

Planted on each side with forest trees, the memorial road is to grow year by year, century by century, into an undying and perpetual monument which nature herself shall raise in everylasting commemoration of the war.

In the woods at either side the men who have given up their lives for humanity will be buried. Within this long and narrow woodland belt will be preserved a memorial and a lesson to the generations to come.

Already active preparations are being made for the commencement of the scheme. By direction of the French Government, aided by the co-operation of patriotic societies and individuals, a million young trees have been collected, and when peace at last comes to the world this "sacred road" will spring quickly into being.

Half-a-Million for New Schools

The Toronto Board of Education proposes an expenditure of $500,000 in connection with new schools. It has been decided that more accommodation must be provided, and next year's council will be asked to authorize the sum necessary for the contemplated improvements.

Five Decades of Heating and Ventilation

IN a review of the advances made in the art of heating and ventilation, contributed by Werner Nygren, C.E., to "Record and Guide," Mr. Nygren says, among other things:

Air is the oldest of the three mediums used as heat carriers. Before water and steam were even thought of for this purpose, hot air or furnace heat was introduced and distributed in about the same manner as is done with the furnace-heating systems of the present time.

In the natural order of things, the first steam and water heating systems were of a home-made order. At the outset or pioneer period of the modern heating, there was not only the lack of the present-day knowledge gained by experience, but also the uncertainty of what material was best suited for pipes, heaters and boilers. The piping used was mostly made up of a bulb-jointed cast-iron pipe, with caulked joints, assembled in about the same manner as our present cast-iron drain piping. Radiating surface was also made up in this manner, and the boilers were either made specially for each installation according to the designer's own notion, or else such available types of boilers as were then in use for operating steam engines were selected for this duty.

One of the earliest improvements was the introduction of the wrought-iron pipe assembled by screw joints and flanger and the use of wrought-iron pipe coils. A further step towards refinement was made by the invention of the radiator, which first made its appearance in the early fifties. Quite unlike most other innovations, the radiator in its earlier form was so efficient that but a very slight increase has been possible in all these years.

Indirect heating, like the direct method, was first accomplished with pipe coils. Indirect radiators made of cast-iron came into use about 1860. The original pattern, known as the "pin" pattern indirect radiator, is still being manufactured and used in competition with numerous other types of more recent design.

SECTIONAL CAST-IRON BOILERS FIRST MADE ABOUT 1850.

The first sectional cast-iron boiler of the type at present used for steam and hot water heating was made about 1850, but did not come into general use until in the early sixties. This has no reference to the power boilers of the sectional water-tube type which were conceived prior to the year 1800, but were not widely used until some time later, and were of but little merit until in the sixties, when they began to develop along the lines of their present-day form.

LITTLE CHANGE BETWEEN 1860 AND 1888.

During the time that elapsed between the introduction of radiators, sectional boilers and other specialties which gave the steam heat its present character and until about 1888, the demand for this form of heat was greatly increased without any noteworthy changes in its application, except that exhaust steam more and more came into use. At the end of this period, however, something happened which gave steam heating new impetus and added prestige, viz., the invention of automatic heat control and the introduction of specialties for vacuum heating a few years later.

THE ADVANCE OF VACUUM HEATING.

Vacuum heating, which first appeared in the early nineties, came very rapidly into use in steam-heated buildings, equipped with power plants, because it provided an effective method for distributing the exhaust setam for heating without undue back pressure on engines, pumps, etc.

While the basic patents of the system remained in force, the appliances used in connection therewith were sold to the trade, together with licenses for operation of the systems in the buildings for which they were bought. Lately, and since these patents have expired, the appliances are sold without any operating rights, and incidentally with greater competition and much less claim for economy in operation than formerly was the case. This is not intended to imply that the use of vacuum as an agency for induced steam circulation that reduces back pressure is not fraught with a certain economy, or that this economy has been reduced by the influence of competition. On the contrary, the latest appliances of the older systems now in existence are more efficient than ever.

RETURN LINE AND AIR LINE SYSTEMS.

From the very beginning there have been two types of vacuum systems in use. One of these systems, known as the return-line system, is used very extensively at the present time. The function of this system is to expel both air and water of condensation through an automatic return valve attached to the outlet of each radiator and heat source of the heating apparatus. This valve discriminates between the steam which is to be retained and the water and air which are to be expelled. In this system the entire return piping is under suction from a pump which maintains a vacuum as needed and pumps the condensation water and air to a separating tank, whence the water is then returned for boiler feed. A modification of the vacuum return-line system is what is commonly known as the open return-line system, which differs principally in that the water of condensation and the air with it are discharged by gravity directly to the separating tank, the vacuum pump being omitted.

The other vacuum system, which also is in use at present, is known as the air-line vacuum system. The function of this system is to expel air from each radiator and heat source served by the heating system through an automatic air valve which discriminates between steam and air. The vacuum, which in this system is confined only to the air lines, was first produced by a steam ejector discharging the air to the atmosphere. Laterly, however, this system is as frequently operated by vacuum pump as ejector. The air-line vacuum system is best suited for one-pipe heating systems, although it is occasionally used also in connection with two-pipe systems. The vacuum return-line system, however, is only applied in connection with two-pipe systems.

MECHANICAL VENTILATION OF BUILDINGS.

Little was done towards the application of mechanical ventilating until recent years, although it appears from old records that ventilating fans of crude form were in use more than 250 years ago for ventilating mines. Up to about 1870 fans were used mainly for special industrial processes, and, with few exceptions, the ventilating of buildings as we know it today was either ignored or made to depend upon natural air movement secured by physical properties of the atmosphere.

When consideration was first directed to the application of mechanical means of ventilation, the largest and most prominent places of assembly naturally received the first attention. To begin with, however, the use of mechanical devices was usually an afterthought and resorted to after the buildings were completed and when it had been found by bitter experience that the more primitive methods of ventilating by heated shafts and chimneys could not produce satisfactory atmospheric conditions.

The House of Commons in England affords one of the earliest European examples of this kind. After many attempted improvements of the ventilation of this building the idea of moving the air by mechanical means was finally conceived in 1736 and a centrifugal fan was installed, which remained in service until 1820.

Another and more recent case was the U.S. Custom House in Boston. Bids for mechanical ventilating apparatus for this building were advertised for in 1846 after the building had been erected. The apparatus then installed incorporated a steam-driven fan, which was, perhaps, the first of its kind in this country.

The next fan installation appears to have been that in the Utica, N.Y., Insane Asylum. After this mechanical ventilating apparatus came into use more rapidly, until the present stage of development has been reached.

Fans of the present type did not come into general use until in the seventies when the self-contained steel-encased fan was put on the market for ventilating purposes. The introduction of this type fan, together with the development of the steam-tempering coil and the improved method of operating ventilating fans with steam engines driving directly on the fan shafts, gave the fan practice a new character. In later years electric motors have gradually taken the lead over steam engines for the operation of ventilating fans, on account of their greater convenience in operation and attendance, and because motors lend themselves more readily for installations in out-of-way places than steam engines, besides which they can be made to operate practically without any noise or vibration, which is usually essential in ventilating work.

In our modern buildings space conditions must be carefully considered and conserved in order to find room for all the appliances and machinery that goes to make up the mechanical equipment. This situation has crowded out the cone fan as a supply blower in favor of its own offspring, the steel-encased centrifugal fan. For the same reason it has also been superseded as an exhause fan by fans of more suitable types.

For exhausting air, both the so-called disc (or propeller) fan and the centrifugal fan are used. The former has gradually gained in favor on account of the comparatively little power this fan uses when handling air at low velocities, as is the case with most of the present-day exhaust systems. It also offers less hindrance to the escape of the air by natural draft when not operated; a valuable feature in exhaust systems terminating at the roof, which is the case in most installations.

The origin of the principle on which the disc fan is founded dates back to the time of the ancient Archimedes screw. At the present time there are several forms of disc fans which are variously used for exhausting air, for producing air currents, for fanning effect and as local ventilators set in the wall openings. The disc type fan is, however, but very seldom used as a blower fan, inasmuch as it is incapable of creating the higher pressures usually encountered in air-supply systems.

DEVELOPMENT OF MULTIBLADE FANS.

The blast wheel of the original steel-encased centrifugal fan was of the paddle-wheel type, The more compact "multi-blade" type of fan wheel which came into use in 1908, made the fan housing less bulky, an advantage that was quickly appreciated and soon made this newer type fan very popular.

Apart from the various other improvements that have been made from time to time, the following new features might be mentioned: The cooling of indoor atmosphere by refrigeration, well water and water spray; the introduction of the air washer for cleansing the air and the invention of the steam humidifier and the automatic control of both temperature and humidity.

CHEESE CLOTH SCREENS AND AIR WASHERS.

The old method of filtering air through cheese cloth is still in use for screening out dust and other mechanical impurities. The common practice about thirty years ago was to make up this filtering medium in form of bags, but the more modern method is to stretch the cheese cloth on vertical frames set in V-shaped holders, thus securing the requisite filter area in a more compact form.

The air washer as applied to ventilation work came into use about 1900. The steam humidifier, together with the automatic humidity control by the humidostat, appeared two or three years before. The steam humidifiers now in use are of two types, one causing the evaporation of water from a pan placed in the air passage by means of a steam coil in the water, and the other releasing low-pressure steam directly to the air through perforated nozzles covered with lamp wick material.

MASONRY AIR DUCTS.

The old method of conducting air for ventilation through masonry ducts and flues formed in the building construction is but seldom resorted to at present. Ducts and flues made of galvanized iron are instead used for this purpose, because of their greater efficiency, due to decreased friction, decreased air leakage and increased cleanliness.

PIPE COVERINGS.

The precautions which had to be taken against undue heat losses and disagreeable effects from the hot pipes, flues, etc., have brought into use various forms of non-conducting covering. Among the first materials used for this purpose was hair felt, a covering material which consisted of cow's hair, and which, when carefully applied, provided a very efficient non-conductor. It was found, however, to have one very serious defect,—*i.e.*, under the action of heat vermin bred rapidly in this material. Its use as an insulating material for hot surfaces is therefore now limited mostly to temporary covering of pipes during building construction operations. The modern covering, both for pipes and other hot surfaces, is mostly made of mineral substances, such as asbestos, magnesia, diatomaceous earth, etc. Covering for pipes and fittings is made up in sectional form and canvas jacketed, whereas covering for other purposes is usually made in blocks or sheets for convenient application, and either finished off with plastic cement or encased in canvas, glued or sewed on.

The matter of non-conducting covering is given very careful consideration in present-day practice, as it is realized that proper protection in this respect has an important bearing, not only on the economy of operation of heating and ventilating apparatus, but also on the results to be accomplished.

SLOW DEVELOPMENT OF SCIENCE OF HEATING.

From the scientific aspect a great deal of valuable information has been gathered during the evolution of the heating and ventilating practice. The science on this subject did not develop very rapidly, however. Its path was beset with conflicting theories and whims which had to be eliminated before data of scientific and practical character would be accepted. Some very simple facts and theories were literally dragged forth from obscurity by repeated failures in obtaining uniform results, because of the fact that physical laws had been overlooked.

A striking example of this is the old method of sizing radiators on the cubic foot basis. For a very long time the simple and obvious theory that the heat requirements of a room are in direct proportion to the room exposure was lost sight of, and until this theory was applied it was customary to allot heat in direct proportion to the cubic contents with an arbitrary allowance for extra severe conditions. This method occasionally and repeatedly resulted in huge failures, but is still used to some extent.

A Greek Natural Cement

Greece and the neighboring territories use only a limited amount of manufactured cement, all of which is imported, but obtains their chief supply from the volcanic island of Santorini, in the Aegean Sea, which produces a natural cement called "Portselena." Mixed in certain proportion with sand and lime, this natural product is an excellent substitute for the manufactured article. Portselena has been used for many centuries and is still being used throughout the Near East for bridges, harbor works, breakwaters, forts, lighthouses, etc., in the Mediterranean, the Black Sea, and the Adriatic. With it the Venetians constructed the great fort of Monemvasia and Nauplia, the then Gibraltar of the eastern Mediterranean, the foundations of which are in the sea, intact and immovable up to now after many centuries. The forts of Crete and those of the Dardanelles are also built with Portselana.

Government Office Building, Ottawa

The new Government Office Building now being erected at Ottawa, is intended to house under one roof the various departmental staffs at present scattered throughout the city, and thus ensure the more speedy and convenient transaction of Government business. It has been designed and planned along the commercial lines of a modern office building, and will embody a most economical type of construction throughout. The framework will be of skeleton steel construction encased in concrete and carried on steel columns from the foundation rock. The floors will be of reinforced concrete with mastic finish, and the partitions will be of gypsum blocks. Granite will be used to approximately the ground floor level, with two storys of limestone above, the remaining stories being a light tapestry brick with stone trimmings and backed with twelve-inch hollow tile.

Entrance to the building will be obtained from O'Connor, Queen and Albert streets, through vestibules to the elevator halls, from which corridors on the several floors give access to the various offices. The main entrance halls on the ground floor will have marble dadoes and marble mosaic floors, all other halls and corridors having terrazzo floors with a seven-foot cement dado finished with white vitrolite enamel.

There will be three batteries of elevators of two cars each, providing one battery at each of the three entrances, which will ensure speedy distribution to all offices throughout. Ample provision has also been made for fire escape stairs inside the building, running from the basement to the roof; also for two stand pipes with hose attachment on each floor. The general equipment, including the various staff lavatories, will be modern and sanitary in character, and a vacuum cleaning system will be installed for cleaning the offices, corridors and halls. Steam will be employed to heat the structure, a vacuum steam-heating plant being utilized for this purpose. The ventilation will be accomplished by two large plenum fans, air washers, etc., placed in the basement with a system of fresh air ducts giving fresh air to the corridors throughout.

DOMINION GOVERNMENT OFFICE BUILDING, OTTAWA, FOR WHICH THE CONTRACT WAS RECENTLY LET.

The building was designed by the Chief Architect's staff of the Department of Public Works, Ottawa. It will be nine stories above the sidewalk level, and will cost, according to the contract price, slightly over a million dollars.

Loosening Rusty Wood Screws

Wood screws that have become so badly rusted that they cannot be moved by ordinary means may be loosened by applying a hot soldering iron or poker to the heads. The expansion and contraction caused by the application of the hot iron and its subsequent withdrawal will usually loosen them enough so they may be removed with a screwdriver.

The Architect As a Man

(Reprinted from the "Architect and Contract Reporter," London.)

We are passing through a great crisis in the history of the human race, but whatever the duration of the war may be, we know that an era of peace will follow in which the activities of mankind will resume their customary channels or seek new ones. No class in the whole of the community has suffered so much during the war as the architectural profession, and, as all but a small fraction of their work has been stopped, most architects have had to seek means for bridging over a long period of forced inactivity. We are told that good often arises out of that which is evil, and the temporary stoppage of their work has made many architects wonder whether there is not a means of establishing their future position on surer foundations than those on which it has rested in the past, and if this can be done the war may very well have been, from a local and specialized standpoint, a blessing in disguise.

We have heard much discussion as to the means to be adopted for educating the public in the value of architecture, but as charity is said to begin at home, it is clear that the architect to lead and guide the public must possess the quality which we usually describe as "personality," and, moreover, must be quick to see and recognize what it is the public is likely to place value upon.

The invention of paper created a fundamental change in the architect's position, and, while it supplied him with a ready means of conveying his ideas, it also divorced him from much personal connection with building and with the men who carried it out. Instead of the architect or master-builder directing everything on the spot, it became possible for him to work in one place while the building he designed was erected in another. It thus tended to make him a solitary being, living apart from his fellows, and concentrating his attention on the products of his imagination and their presentation on paper. And in proportion as fresh energy, thought and skill have been directed to the acquisition of greater facility of delineation, there has been a tendency to eliminate close intercourse with clients and employers. Yet when all is said and done, the finest architectural drawing often fails to have the same meaning or charm for the public as a slight water-color sketch. The architectural drawing was practically non-existent in the Middle Ages, and few examples, and those crude parodies of what would be now called architectural drawings, have come down to us from that time, while in the later era of Wren the architectural draughts made as compared with those of to-day are little more than explanatory diagrams, and only in the eighteenth century did the architect begin to express himself fully on paper. The master-builder of the past may be depicted as directing workmen, the architect of to-day—like the poet—often sits in solitude, burning the midnight oil and communing with his own thoughts. There is thus a tendency to live out of the world to which we all belong, and to lose touch and sympathy with our fellows. The danger of doing so is apparent, for the architect, though his work may be the noblest of all arts, is at every step bound up with most practical considerations and limitations, and of all men can least afford to ignore practical issues and the financial aspects of life.

The scriptural injunction that we should be all things to all men applies to him, and the ignorance or disregard of the broad interests which sway mankind is, we are convinced, at the root of many architects' failure. It is necessary first of all to be a good citizen, understanding and mixing with one's fellows, and then on this basis building up the technical knowledge and skill which must be mastered and possessed if we want to serve the public and in serving them benefit ourselves. We must know our work thoroughly, but this does not imply that we must ourselves be able to do every part of it; but we must be capable of taking a fair and thorough survey of the whole and see that everything is efficiently carried out by ourselves or by others. The personal pride and delight which many men feel in doing everything "with their own hands" sometimes blinds them to the fact that they are neglecting other and more essential work which might bring them into touch with the public. More than this, the man who learns to work with others helps to build up a school inspired with similar ideas, and more nearly approximates to the old conditions under which some of the greatest work has been done, though we know the names of few individual designers of 300 years ago.

The broader knowledge which we have alluded to and which many architects are deficient in is the understanding of such questions as the finance of building, the commercial and legal aspects which touch it at every side, and the crucial knowledge which would enable them to make the best use of a given site. But even such special knowledge, though a qualification for the architect who serves the public, will not necessarily bring clients to his door unless it is combined with the wider general knowledge and sympathy which make a man popular and interesting to his fellows. We must sadly admit that it is not the great gifts and qualities of men which make them general favorites so much as the possession of that tact which prevents them from boring others, and the sympathy and quickness of mind which is necessary if they wish to follow the thoughts of others and to meet them on their own mental ground. The architect who attends a building committee meeting resolved to put his own special views before his clients may frequently meet with defeat, while another who is quick at understanding and gaging the personal equation of his fellow-men will obtain the result he wishes for with little effort. To be a good listener is good, but to be a good listener because one has nothing to say is not enough, and the architect who would be successful should be able to hold his own in any society and to take part in a discussion at the fitting time. It should be borne in mind that the world being what it is, most of us are made happier by being with those who appreciate and like us, rather than those who try to impress us with their ability, and many men have made great positions for themselves mainly because they possess a spirit of camaraderie, tact and good nature. Mankind is, in fact, not strenuously on the lookout for merit, but chiefly asks that a man should in the first place be a good companion, and in the second competent and discreet. And the essence of discretion is to be able to avoid the corners of others.

We believe the architects of the new area, if they are to succeed and to effect the "education of the public," should resemble the "surveyors" of the seventeenth and eighteenth centuries, men of the world and masters of affairs, able to understand the standpoint of the society in which they live, and will not be pale and anaemic enthusiasts living in a self-contained temple of art and somewhat despising the average run of their fellows. For do what we may, and think what we will, we are part and parcel of the sum of humanity on whose support we are dependent, and whose wants and tendencies we should study and associate ourselves with. All the work of all the schools and all systems of tuition will be valueless for the architect who has neglected the broader foundations which he, in common with men of other callings, should build upon. Not only is the proper study of mankind man, but it is the essential groundwork for everything else.

No single problem in our life stands by itself; thus housing and economics are interlocked and relative, while question of finance will determine and limit almost every building scheme. Our commercial future, bringing with it building or stagnation, is dependent on the relations of capital and labor, on tariffs and other political issues.

This being so it is necessary for the architect to study and understand more than his own work in order that he may have his proper weight as a citizen and fit himself to play the part of a man of the world.

The man who overestimates the value of what he does is living in a fool's paradise, often with dangerous results to himself, and close and exclusive absorption in one field of study tends to render us oblivious of broad and important issues which may be paramount in the estimation of clients.

Professional Ferment

The following is taken from an article by Wm. Phillip Comstock, which was published a short time back in the "Architect and Builder" (U.S.A.). It has since appeared in several other architectural contemporaries, and deals pertinently with a condition which is not wholly without evidence here in Canada:

There are, even in this day and hour, architects who have business of considerable volume on their boards, and many of our contractors can hardly be said to be starving for lack of work. Yet the architects as a body, and with them many in the construction industries, view the present situation with concern, and well they may.

Building construction methods are in a period of mutation; new species bid fair to be created, and the old order is on the wane. Not that this condition is a sudden development—as some may think—for the odor of it has been in the air for many moons. Building conditions, like a huge structure founded in a quagmire, have courted disaster until with a precipitation of an earthquake, they are now suddenly engulfed, and the architectural profession, with many of its satelites, finds itself floundering—and wondering why.

The world war is the immediate cause of this cataclysm, and, as usual, the immediate cause receives the blame, though the structure has long been showing dangerous settlement cracks caused by the improper foundations laid down in the past. Good foundations are a necessity in all good building, and the architect knows this better than anyone else, yet in his very life-work has he neglected the preachments he has made to others.

With lofty thoughts and stilted ethics he has strode along without an appreciation of the progress about him, ever changing, searching, specializing. Business—life—is a continuous revolution. New precepts rule, to be superceded by even other newer precepts. The professional practice of architecture has not kept pace, and is therefore doomed. It must be reborn from the ashes of the past, even as the legendary phœnix.

Art—architecture is the culmination of all arts—is undying. Architecture is inherent in the human race; the desire for it cannot be destroyed, and it will rise with a spirit of victory above all sordidness. This idealism is immortal. It is the soul of the phœnix, which shall inspire the new body of a rejuvenated professional practice.

All have not been blind. Some—many even—have seen the light and remodelled their course to meet the modern trend. These are the successful architects and busy builders of to-day who have met the demands of current development, and from them won a deserved return. Chance or accident has not been an element in their progress, which has been based on the sound business principle of true service for value received.

The famed architects of antiquity were master-builders. They designed freely and wrought wonderfully with the clay in their hands. They lived in the heyday of the artisan and craftsman; they were the leaders who rose above their fellows by the sheer might of their gifted prowess. Times have changed.

This is the age of standardization, machine-made quantity production, rule by the multitude, not by the few, and yet our art lives on and reaches ever higher levels of attainment. Let our architects read the signs of the times and rise to new pinnacles based on our modern productiveness.

When our country went to war there was a sudden and enormous demand for construction on a vast scale; the Quartermaster's Corps of the army had to provide housing for the new armies; extensive additions were necessary to existing manufacturing plants, and even greater new factories were built over night, as it were; office and executive buildings of great extent were demanded to house the ever-extending executive departments of the Government; housing for operatives became a crying need in our great industrial centres; construction on a vast scale was necessary to meet the needs of our colossal new war machine, to build our ships, and supply the materials of war.

To make possible this accomplishment, in all its ramifications, vast to the extent of being almost incomprehensible, the organization of our Government departments was extended manyfold; the personnel increased with a rapidity which was marvellous, and an organization of professional talent created which to-day, after a year of war, is perfected and efficient in a remarkable degree. What is the status of this organization? How is it made up? And how was it possible for the Government in its hour of need to immediately get assistance?

It was the trained engineers of the country who became the technical advisers of the Government on planning, design and construction, utilization of existing facilities to the utmost, exxpansion of them and creation of new utilities. It was our trained engineers, already well organized in our great building construction firms into harmonious working units, companies, even regiments, who were ready in the hour of need to do the deed.

Professionally, as such, our architects have not been a factor in the greatest building emergency the country ever saw. Individually, to many the greatest praise is due. They have donned the uniform, striven at home and fought abroad, and given of their best in ability, effort, and resourcefulness. But as a profession, in the oft-vaunted position of autocrats of the building industry, they have been wanting. And the reason is not beyond discernment; it is an inheritance from the past; architectural practice has not kept pace with the times. . . .

The need of federation in the building industry as a war-time need has been met. Why not face the truth squarely and hold a conference to reorganize the outworn system of professional practice?

The after-war period in the building industry will be a time of great enterprise and expansion. In this the architect should play a prominent part, but his days of autocracy are over, and his success will depend on his ability to cooperate, not to dictate. Now, when the architect secures a job, he calls on the foundation builder to figure his footings, he depends on the steel contractor to design the structural members, he depends on the plumbing contractor to draw up his plumbing lay-out, he expects the electrical contractor—but why go on?—and when the building is finished he zealously, often belligerently, demands exclusive credit for its entire design and construction.

The day for this is past—and why? The architect has been losing business. Others who build better, more efficiently, and more economically under the name of architectural or engineering contracting firms have taken the work from him, and they work on the principle of cooperation, not autocracy.

Roman Ruins in Southern France

Wilfred P. Mustard, Professor of Latin in Johns Hopkins University, delivered an address recently at Toronto under the auspices of the Women's Association of the Bloor Street Presbyterian Church. His subject was Roman Ruins in Southern France, of which he made an intimate study during several years' residence there. The address, which was illustrated by slides, dealt chiefly with the ruins in the historic cities. Professor Mustard referred to the palace of the Popes at Avignon, and mentioned the fact that it is now fitted up as a hospital for the Allied soldiers.

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The Present Power of Industry

Canada has just had the most successful industrial and commercial year in her history. There has been a greater expenditure in keeping the wheels of industry going than ever before, and according to bank statements, more money saved by the working class, due to high wages, than at any previous time. The very satisfactory condition of affairs which have existed during the past twelve months is altogether attributable to the successful Victory Loan raised a year ago, which has not only enabled Canada to finance her own needs as well as the credits in this country of Great Britain, but which also supplied a surplus sufficient to provide needed funds for provincial government, municipalities and corporation requirements.

A continuance of this prosperity which has grown out of the war, as well as the necessity of meeting our own direct responsibilities in connection with same, makes it imperative that the forthcoming Victory Loan must not only be fully taken up, but should be, as on the previous occasion, well over-subscribed.

Just what the last bond issue meant to the country during the past year has been very ably set forth by Mr. E. R. Wood, the well-known financier. The statement which he has given out shows the extent of the huge benefits derived. For the farmer, the loan was able to finance the only purchaser who could buy his excess products, namely, Great Britain. In the fiscal year of 1915 the farmers of the Dominion exported animal produce and agricultural products valued at $209,000,000. For the fiscal year ended March 31st, 1918, they exported no less than $740,000,000 worth of their output, the largest agricultural export from this country on record.

For the manufacturer the Victory Loan continued to give the best export market he had ever possessed. Canada's manufacturers during the fiscal year ended March 31st, 1915, exported $85,000,000 worth of merchandising. That period included eight months of the war. For the twelve months ended March, 1918, they have exported $636,000,000 worth of merchandising, an increase in three years of $551,000,000, 648 per cent. It is interesting to note in connection with these exports, Mr. Wood points out, that since the loan was raised, approximately $20,000,000 per month has been advanced to the Imperial Munitions Board at Ottawa for the purchases of Great Britain in this country. There have also been expended approximately $20,000,000 a month for other war purposes in Canada, including large purchases of farm products. This is a monthly total of $40,000,000, or during the seven months from December, 1917, to June, 1918, a sum of $280,000,000.

Further facts introduced in this connection are as follows: War contracts have been given to 950 manufacturers, and in July of this year 400 manufacturers were in actual contract relations with the Imperial Munitions Board at Ottawa.

Up to June, 1918, Canadian manufacturers have produced over 60,000,000 shells, 20,000,000 fuses, 74,000,000 pounds of powder and 50,000,000 pounds of high explosives.

Of the 1,654,000 tons of steel used, 1,400,000 tons were produced in Canada.

Contracts have been let in Canada for 90 steamships with an aggregate dead weight tonnage of 375,000 tons. These orders have a value of $71,000,000.

National war plants have been established at a cost of $15,000,000, for the manufacture of powder, high explosives, forgings and aeroplanes; while large quantities of fir and spruce are being purchased by the Imperial Munitions Board, which now has 67 logging camps in operation.

In addition to this, the United States Government has placed large orders for various products with the manufacturers in this country, including a contract for 75 millimeter shells, which are now being delivered at the rate of 225,000 per week, with the number steadily increasing.

The above is very convincing as to Canada's unprecedented industrial growth. While the building industry has not fully shared in this great prosperity, it has participated to a degree, and will eventually benefit to a far greater extent as a direct result. A large portion of the Victory Bonds held by individuals will, as the material market normally rights itself, be the negotiable means whereby much building will be done, both in the interim period and when the time of maturity for these bonds arrives.

Consequently the necessity of taking as many of new Victory Bonds as possible cannot be urged too strongly on the part of every citizen of the Dominion. To do so is to help stabilize the industries of the country and to make a thoroughly sound investment on a patriotic basis. Canada rose magnificently to the task on the previous occasion. That she will fail in the present necessity is anything but a likelihood. Let every person do his duty and the loan will be over-subscribed. The slogan, "Buy Bonds to Your Utmost" is a good one, and is something which imperatively should not go unheeded.

Fire Waste in Canada

(Continued from page 323.)

United States and Canada. In some States, Illinois for instance, registration and licensing by the legislature, after an examination by a technical board, is compulsory.

Regarding the standardization and testing of structural materials and devices, the summary devotes a chapter of twenty pages to this subject, and states that no material in present commercial use is "fireproof," and that in view of the popular misconception attached thereto, the term "fire-resisting" is the better word to employ. This chapter collects a large amount of generally useful information in reference to the production and importance of various material and equipment as based on laboratory tests and practical structural applications.

Other chapters are devoted to private fire protection, municipal fire protection, fire insurance as affecting fire waste, and appendices on notable conflagrations in Canada, the need of provincial legislation governing building construction, fire prevention in Germany, and much other valuable data.

Dates for Builders' Conference Changed

The conference to be held at Ottawa for the organization of the proposed Canadian Building Industries has been postponed until November 26, 27, 28. The intention was to hold this meeting at an earlier date, but the gathering has been deferred to the time mentioned in order to more fully complete the preliminary arrangements and to insure the meeting being a success in every way. Present indications are that the conference will be largely attended, and that representative contractors, builders and supply men from all parts of the Dominion will be present.

BIG INTERESTS UNITE.

The W. J. Crouch Company, Incorporated, and Rownson, Drew & Clydesdale, Inc., two prominent United States firms, announce the amalgamation of their respective organizations. All trading and manufacturing operations will hereafter be conducted under the name of Rownson, Drew & Clydesdale, Inc., with general offices at 68 William street, New York. In the future the name of "Couch Steel" will be linked with the well known products of the concern under whose name the joint interests of the two companies will be perpetuated.

Mr. P. G. Donald, President of Rownson, Drew & Clydesdale, Inc., will continue in this office, while Mr. I. Smullyan, President of the W. J. Crouch Company, Incorporated, will act as managing director of the new firm.

Elaborate plans have been made for the further development and expansion of the company's engineering division in order to cope with the wholly unprecedented demand for their gravity runways, portable elevator conveyors and other labor saving devices. These plans will be carried out under the personal direction of Mr. John J. Smart, Secretary and Assistant General Manager of the W. J. Crouch Company, Incorporated.

CONTRACTORS and SUB-CONTRACTORS

As Supplied by the Architects of Buildings Featured in This Issue.

ALGONQUIN HOTEL, ST. ANDREWS, N.B.

Cement, Canada Cement Company.
Electric Fixtures, Robert Mitchell Company.
Elevators, Otis Fensom Company.
Hollow Tile, National Fireproofing Company.
Kitchen Equipment, Gurney-Massey.
General Contractor, P. Lyall & Son Construction Co.
Plumbing Fixtures, Jas. Robertson Company.
Plumbing Fixtures, T. Robertson.
Plumbing Fixtures, Cluff Brothers.
Paints, Sherwin-Williams.
Refrigerator System, Linde Canadian & Jewett Refrigerator Co.
Roofing, McFarlane-Douglas Company.

ANTIQUE AND ART GALLERIES OF B. M. & T. JENKINS, LIMITED.

Brick, Sun Brick Company.
Carpentry, A. Weller & Company.
Decorating, Murray-Kay, Limited.
Electrical Work, Hudson Electrical Company.
Elevators, Otis Fensom Company.
Heating, W. J. McGuire, Limited.
Masonry, W. Hughes.
Plumbing, W. J. McGuire, Limited.
Roofing, H. Williams & Company.
Plastering, Hoidge & Company.
Painting and Glazing, A. E. Phillips.
Sprinklers, General Fire Extinguisher Company.
Steel Doors, A. B. Ormsby, Limited.
Steel Work, McGregor and McIntyre.
Terra Cotta, Atlanta Terra Cotta Company.
Steel Frames, Trussed Concrete Steel Company.
Wood Carving, McCormick & Carroll.

November, 1918 Volume XI, No. 11

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Full Page Illustrations

H. GAGNIER, Limited, Publishers

GRAPHIC ARTS BLDG., TORONTO, CANADA

BRANCH OFFICES

MONTREAL NEW YORK

ENTRANCE TO NEW TECHNICAL AND ART SCHOOL, LONDON, ONT.

FRONT VIEW OF NEW TECHNICAL AND ART SCHOOL, LONDON, ONT.

New Technical and Art School, London, Ont.

By Victor J. Blackwell, Watt & Blackwell, Architects.

THE Technical and Art School recently erected by the Industrial Advisory Committee of the London Board of Education at London is of the solid block type; a large auditorium being planned in the centre of the building with spacious corridors at the sides; the classrooms and work shops being arranged along the outside walls, which allows for most excellent non-obstructed lighting.

The building throughout is absolutely fireproof being built of reinforced concrete, with the front and two side elevations faced with tapestry brick and white stone trimmings, steel sash being used in the larger portion of the openings.

The corridors throughout have red quarry tile floors and a brown glazed brick dado.

The lighting of class rooms and work shops is by a large group of windows on one side only to the left of pupils in accordance with established practice in school building.

The ground floor with public entrances on each side of the building, contains machine shops, building construction, printing classrooms, etc., and although gymnasium and swimming pool were omitted owing to conditions of the war-time economy and were deemed a non-essential for the time being, provision is left for the future carrying out of the scheme. Lavatory accomodation is amply provided for by two units on each floor, well lighted and with the most up-to-date fittings; special lavatories being provided for teaching staff at other points in the building in connection with teachers' coat rooms, etc.

The first floor which is reached by the main entrance stair hall, enters direct to auditorium, and at the right is the general business offices, board room, etc., the board room being trimmed in walnut panelling and massive tapestry brick fireplace of approved design. On this floor are the wood working department, millinery, embroidery, dressmaking, classrooms, teachers' preparation rooms, etc.

The second floor contains the draughting rooms for mechanical, architectural and free hand drawing, wood-carving, and allied arts, also the physics and chemistry classrooms. A feature of this floor is a complete model apartment in connection with the domestic science department.

The corridors also contain spaces in walls for metal lockers, one for each pupil in the school, thus doing away with the necessity of cloakrooms in the different departments. Each locker is ventilated by a special arrangement, there being an air space in the opening in the wall behind the rows of lockers.

MAIN CORRIDOR, TECHNICAL SCHOOL, LONDON.

The basement contains the boiler room and accomodation for the heating and ventilating apparatus.

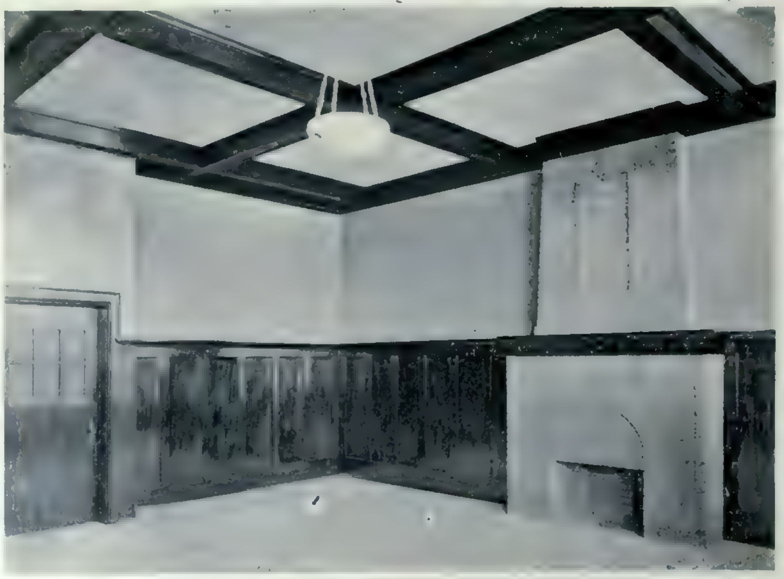
The equipment, though not complete as yet, is ample for the time being and includes special desks, cupboards, filing cabinets, etc., along with the varied pieces of machinery used for teaching the different trades, for which the school was erected; the purpose being to give a general course in all the different departments shown on the plan, thus equipping a pupil to carry on his work to better advantage after securing employment in his chosen vocation.

The lighting, heating and ventilating are of the most modern design.

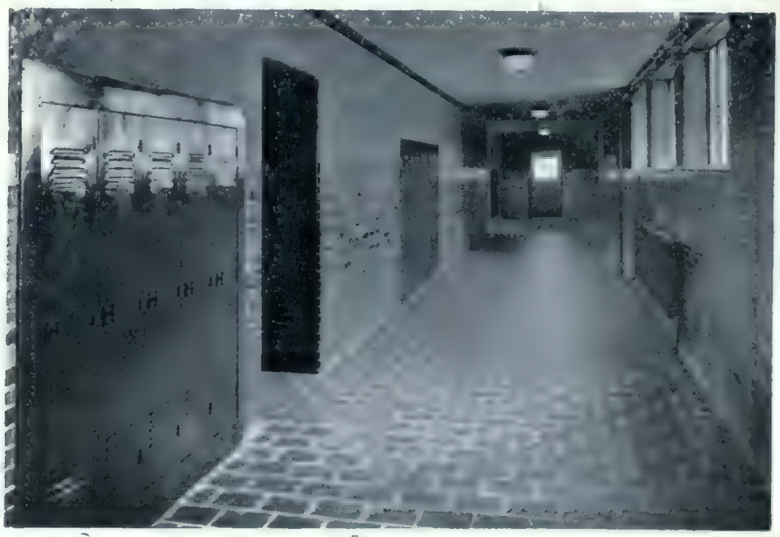
High School Science Department

Walter H. Kilham, in the Brickbuilder.

THE problems presented to the architect in the designing of a modern high school, while identical in matters of general detail with those of an elementary school, are much more complicated and varied on account of the many different courses of study, the elaborate apparatus which is installed, and the "collegiate" feature connected with the social life and physical welfare of the pupils. A commercial or vocational high school of the present period combines most of the features which until recently were found only in the larger universities, together with many others which are purely a development of high school education. A high school of a thousand or twelve hundred pupils may require in addition to the regular standard class rooms, 24 by 30 feet, accomodating say thirty-five pupils, a certain number of recitation rooms seating about twenty pupils each; probably one or two study halls; large rooms with single desks and chairs accomodating from seventy-five to one hundred and fifty or more pupils; a library; a science department with laboratories and lecture rooms euipped for instruction in chemistry, physics, and possibly biology and botany; a commercial department for instruction in bookkeeping, stenography, typewriting, and banking; rooms for freehand and mechanical drawing; a music room; a department for domestic science, i.e., cooking, housekeeping and sewing; and a manual training department for wood and iron working. In addition to these usual pedagogical requirements some cities introduce facilities for the study of print-



BOARD ROOM, TECHNICAL SCHOOL, LONDON.



CORRIDOR, SHOWING LOCKERS IN WALL, TECHNICAL SCHOOL, LONDON.

ing, bookbinding, natural history (with menageries of animals and birds), and various other topics.

The social and physical culture side of the school's work requires an assembly hall, gymnasium, and locker accommodations, perhaps a swimming pool, a lunch room, rooms for the school paper and athletic society, and in large cities sometimes an arrangement on the roof for outdoor dancing.

The administrative department requires accomodations for the principal and his assistants, clerks, retiring rooms for men and women teachers, a teachers' lunch room, and rooms for the physical directors for boys and girls.

Provision also has to be made for the pupils' clothing storage of books, and apparatus, unpacking of cases, toilets, bicycles, heating and ventilating apparatus, vacuum cleaner, and various other things which may vary in different places, not forgetting permanent provision for the inevitable wireless outfit which will surely encumber the roof with unsightly aerials made by a local carpenter unless a neat construction is provided in the contract.

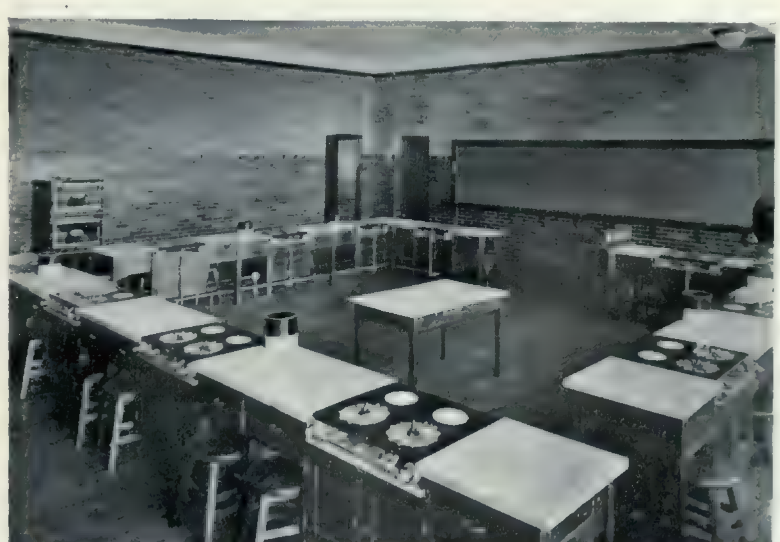
TYPICAL CLASS ROOM, TECHNICAL SCHOOL, LONDON.

CHEMISTRY CLASS ROOM, TECHNICAL SCHOOL, LONDON.

High schools are generally equipped for instruction in chemistry and physics, and sometimes for biology, physiography, and various other sciences. The most elaborate equipment is that required for chemistry and physics, and a separate laboratory is generally provided for each of these two studies, ordinarily fitted up for sections of twenty-four students at a time to practice experiments. As the lectures on these subjects require the setting up of special apparatus which requires a good deal of time, it is convenient to assemble several sections at one time in a lecture room which seats multiples of sections, as forty-eight, seventy-two, ninety-six, or one hundred and twenty. This lecture room is most conveniently placed between the chemistry and physics laboratories, with storerooms adjoining on either hand for chemical and physical apparatus. When the school is a small one and one teacher handles the entire science department, one storeroom may be enough; but it is always better to provide separate rooms to avoid possible damage to delicate physical apparatus by fumes from chemicals. Windows may be arranged in these storerooms for passing out materials, but doors will usually suffice.

LOCATION OF SCIENCE DEPARTMENT

On account of the desirability of quickly getting rid of the fumes from chemical experiments the science department is generally located on the top



DOMESTIC SCIENCE ROOM, TECHNICAL SCHOOL, LONDON.

WOODWORKING SHOP, TECHNICAL SCHOOL, LONDON.

floor. If placed on the first floor or basement, the plumbing would be greatly simplified and the wastes from the chemistry sinks which have a tendency to corrode iron pipes could be carried away in tile. Some educators also prefer to keep the older classes on the ground floor, where they may receive more personal attention from the principal, and as science is an upper class study this at once locates the laboratories on the ground floor. But the most general practice by far is to keep the younger children near the ground and the laboratories at the top, where they can be easily ventilated and well lighted by skylights, if necessary. Another advantage is the additional ceiling height which may be obtained for the science lecture room. On account of the amphitheatrical arrangement of seats a high ceiling is often required which is difficult to provide on the ground story, but can be easily managed at the top of the building. This arrangement also involves placing most of the class and recitation rooms downstairs and hence precludes a great amount of stair climbing by pupils who do not need to use the laboratories. Two stories ought to be the limit of height for surburban high schools, and the realization of such a practice seems to be in sight. At all events, the place for the laboratories is generally conceded to be the top story.

MACHINE SHOP, TECHNICAL SCHOOL, LONDON.

THE CHEMISTRY LABORATORY

The walls of the chemistry laboratory may preferably be of brick covered with a paint containing no lead, as lead will soon become discolored by the chemical action of the gases. Plastered walls are often used to give a more finished aspect to the room, or on account of constructional difficulties in making all the walls of brick.

The ventilation of the rooms is arranged as in other rooms, except that special ventilation for noxious gases is provided in hoods which

FORGE SECTION OF MACHINE SHOP, TECHNICAL SCHOOL, LONDON.

will be later described. In some cities provision is made for removal of gases from all experiments "at the source" over the working desks, by funnel-like pipes of copper leading down to a underneath, but this is not usually thought to be necessary.

Various opinions exist as to the floor of the chemistry laboratory. A cement floor is hard, cold, liable to "dust," and subject to injury from acids. Floors perhaps not so cold and are in some ways superior. Terazzo is subject to the same objections as cement. Asphalt is suitable in many ways, and is waterproof, but is unpleasant in appearance and somewhat soft and liable to injury by chairs and tables sinking into it. Tile, set in cement, is expensive, but in many ways makes an ideal floor for a laboratory. Wood is very commonly used for cheapness, and narrow strips filled in by asphalt make a very satisfactory compromise. It is rarely necessary to drain the floor. Some carefully kept schools have immaculate doors of waxed maple in their laboratories.

EQUIPMENT

The working desks are generally made 4 feet wide, with spaces 4 feet wide between, to allow students to work facing each other. This causes half of the students to have their backs toward the instructor at all times, resulting, as some claim, in a loss of the teacher's efficiency of at least 50 per cent. Some laboratories have been fitted up with one-way desks at which all the pupils face toward the front of the room. These may be 28 inches wide, with aisles 3 feet wide and some educators make the claim that one instructor can handle twice as many students when the desks are so arranged. When the double-front system is used the desks

DRAUGHTING ROOM, TECHNICAL SCHOOL, LONDON.

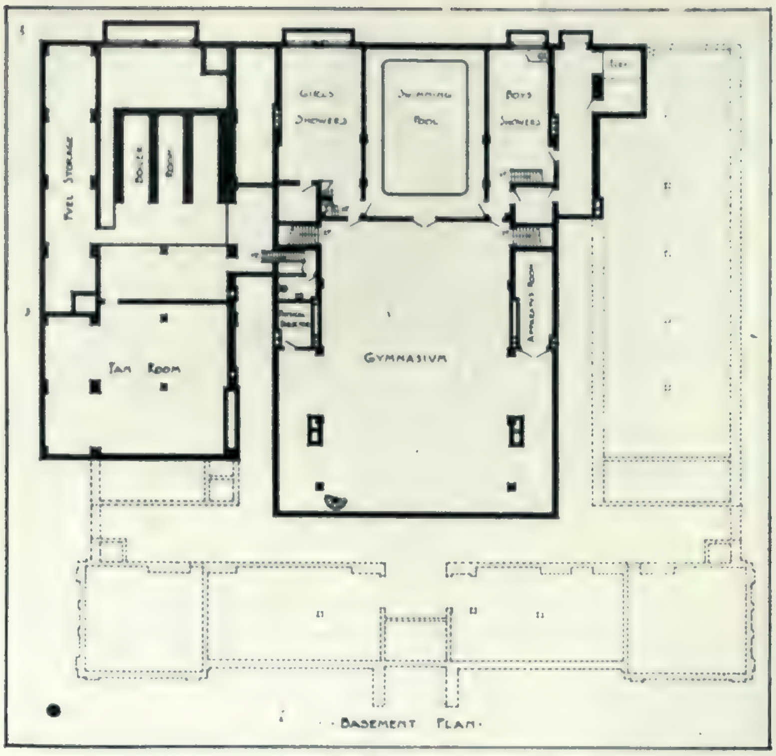
MOTOR MECHANICS DEPARTMENT, TECHNICAL SCHOOL, LONDON.

are made in sections which are placed back to back and are movable when the top is removed. This enables the room to be thoroughly cleaned during the summer vacation without dis- the plumbing pipes. The desks contain drawers and lockers arranged for 4 times as many pupils at one time, i.e., a laboratory which accomodates twenty-four students at one time would have drawer and locker accomodations for ninety-six, or four sections during the day. In large high schools, or schools operating also in the evening with a night master, a still further development of this space is necessary, which may be accomplished as in the Boston High School of Commerce by alternating with the working benches "blanks" or tables 3 feet wide, containing drawers and lockers, but no plumbing. These tables are very useful in providing additional apparatus space for the pupils while working. The working tables are 36 or 38 inches in width and a linear working space of 4 feet is allowed per pupil. Under each pupil's position an open space is arranged, both to give toe room and to provide a place for a stone receptacle for waste. The table is generally built of oak with a top of splined white pine 2 inches thick, treated with and acid-proof finish made as follows:

First Coat. 125 grains copper sulphate, powder, 125 grains potassium chlorate, 1 liter of water. Heat in steam bath or double kettle in glass or porcelain vessel till dissolved. Apply one coat hot with clean brush.

Second Coat. 150 grains of analine hydrochlorate, 1 liter of water. Dissolve same as above. Apply three coats with a clean brush, each coat to become thoroughly dry before applying next. Color will become green when first applied, but in several days will turn a dead black. Allow material to thoroughly dry and wipe bench tops with

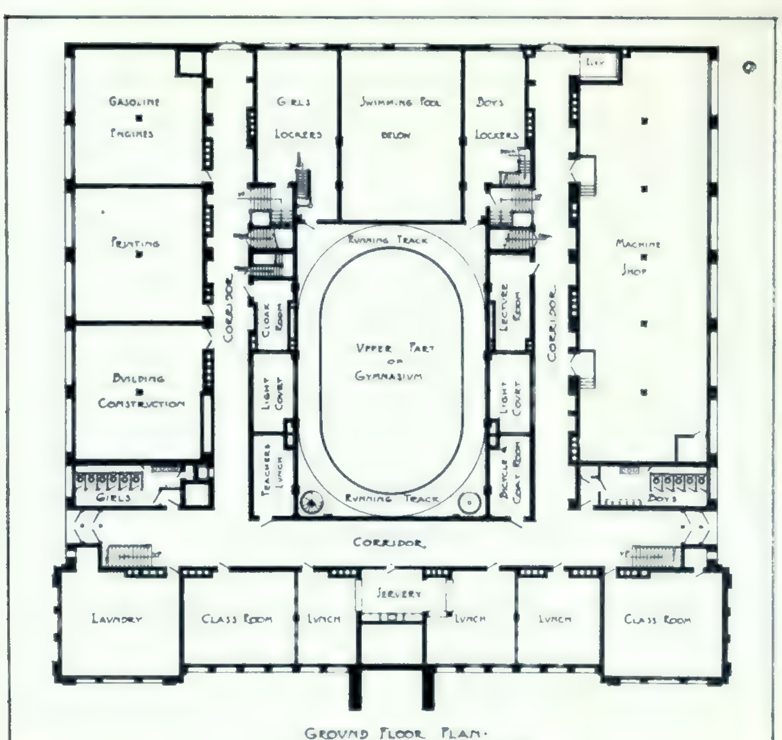
ONE SECTION OF ART DEPARTMENT, TECHNICAL SCHOOL, LONDON.



TECHNICAL AND ART SCHOOL, LONDON, ONT.

linseed oil. The above quantities will cover about 5 square yards.

Slate or soapstone tops are occasionally provided and have the advantage of presenting a neater appearance, but the bill for the breakage of glass apparatus is higher and they are less easily removed. The appearance of a laboratory rests mainly with the instructor. In some laboratories the woodwork is stained and corroded by acids after a year's wear, while others retain their first freshness through a considerable period of time. Soapstone sinks are arranged in the form of a continuous



TECHNICAL AND ART SCHOOL, LONDON, ONT.

trough or individual sinks. The long trough is adequate for teaching elementary chemistry and is less expensive than the separate sinks. It should be at least 8 inches wide, 6 inches deep at the upper end and 8 inches deep at the lower.

Reagen shelves are generally provided, running longitudinally in the center, 10 or 12 inches above the desk, supported standards. This shelf should have an acid-proof surface, which is sometimes accomplished by giving it a surface of plate glass, clamped firmly to the wood, which may be painted white under the glass. Others prefer to keep the reagents in cases at the ends of the working desks; but the general tendency is to eliminate all unnecessary complication of the laboratory equipment and in many modern schools the shelves are being omitted entirely.

In addition to the plumbing the desks are equipped with gas, alternating and direct electric current, steam and com-compressed air, located as shown in the accompanying drawing.

Some teachers like to have a space in the laboratory equipped with a demonstration desk and about twenty-four tablet chairs where the section can assemble for instruction before going to the tables to perform the experiments. A "battery" of triple blackboards may be located behind the demonstration desk.

For use in experimenting with substances which produce noxious gases, a half dozen or more hoods are provided at the side of the room. These are best lined with white tile, with slate or red tile floors and sliding glass fronts. The space above the opening may be utilized for a blackboard. Electric light and gas outlets are provided in each hood, or if desired, the electric light may be hung outside each window. "Down draft" ventilating outlets are sometimes built in the pupils' tables with movable hoods to fit into them, but their use is scarcely necessary and tends to complicate the equipment.

Wall benches are often provided for special or additional students, provided like the other tables, with gas, electricity, etc., and copper sinks, which are made removable so as to gain additional working space.

A good sized soapstone sink is also desirable with draining pegs above for drying beakers and test tubes.

The teacher should be provided with a private office fitted up with a laboratory, table, space for a desk, etc., where he can prepare his lecture apparatus and work on experiments without danger of disturbance. The motor generator set is sometimes located here.

THE SCIENCE LECTURE ROOM.

Adjoining the chemistry laboratory, and separating it from the physics laboratory, is located the lecture room, which should accommodate from forty-eight to one hundred and twenty pupils in seats raised in an amphitheatre in such a way as to give them the best possible view of the lecturer and the demonstration desk. Behind the desk one or two hoods should be located and a battery blackboard, and, if the room is located in the upper storey, a skylight may profitably be placed directly above the lecturer. In fact, outside window light is not necessary for this room. The best arrangement is undoubtedly to have the room lighted from one side, so that the pupils face parallel with the light; but if the rise of the bank of seats is high enough to prevent the light from shining directly into the teacher's eyes, the windows may be located behind the pupils.

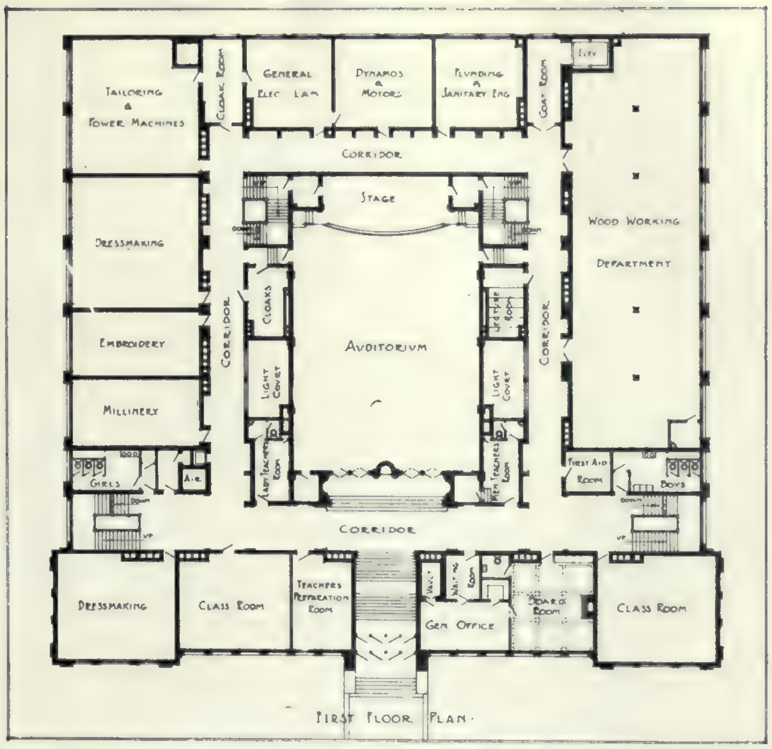
As a stereopticon will often be used in connection with science lectures, a space should be arranged for one at the rear of the room with receptacle for plugging in for electric current and a concealed signal system operated from the demonstration desk. To ensure absolute darkness for the steropticon, the windows, skylights, and glass panes in the doors, if there be any, should be equipped with light-proof black shades, running in grooves, which prevent the entrance of any light. Some time is lost and confusion caused by sending pupils to draw these shades, which may be prevented by operating the cords by a small electric motor controlled from the demonstration desk.

This desk is about 15 feet long, 3 feet wide, and 2 feet 8 inches high, with splined pine top and a sink of two depths, placed at the right hand end facing the pupils. A dished soapstone slab covers about 5 feet of this end of the desk. Electric receptacles and gas cocks are provided, together with steam, compressed air, a down shaft outlet with cover, a pair of brass standards 4 feet high with adjustable clamps for a horizontal bar, and switches for controlling the lights in the room, the stereopticon, and the curtain motor. Cupboards and drawers and the switchboard cabinet are arranged underneath. All connections of any sort for apparatus used in experiments should be placed in the demonstration desk to avoid the necessity of stretching wires, etc., across the space between it and the wall. On account of the large number of pupils to be accomodated, this room should have two doors to the coridor.

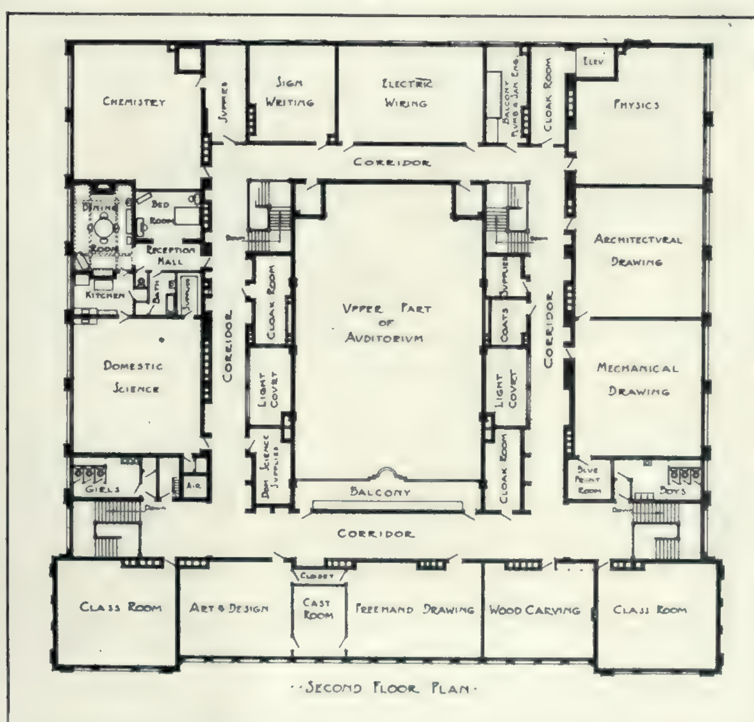
A dark room, with sink for use in photography, should be provided, and a photometry room, with a table allowing a free length of at least 14 feet.

Ample storage space with shelving and glass

(*Concluded on page* 361.)



TECHNICAL AND ART SCHOOL, LONDON, ONT.



TECHNICAL AND ART SCHOOL, LONDON, ONT.

Royal Architectural Institute of Canada

A meeting of the Council of the Royal Architectural Institute of Canada was held on October 5, 1918, in the rooms of the Ontario Association of Architects, No. 96 King street west, Toronto, Ont.

Those present were: Messrs. J. P. Ouellet, A. Frank Wickson, C. H. Acton Bond, A. E. Nicholson, David R. Brown, Alcide Chausse and J. P. Hynes. Mr. J. P. Ouellet, president, in the chair.

The minutes of the meeting of the council held at Ottawa on October 1 and 2, 1917, were read, and were approved as corrected. The minutes of the matters decided upon by correspondence were taken as read, as all the members of the council had received copies of same.

The hon. secretary reported that the Architectural Institute of British Columbia had conformed to the wish of the council as expressed in a resolution adopted in October, 1917, sending satisfactory evidence that the Society of Architects of British Columbia had been disbanded, by sending $34, being the amount of their contribution for seventeen members composing this association; and by sending the list of their members, the names of their officers and of their delegates to the council of the R.A.I.C.

It was proposed by J. P. Hynes, seconded by Alcide Chausse, that the application of the Architectural Institute of British Columbia be accepted, and that federation with this body be effected. This motion was adopted unanimously.

The hon. secretary reported that the Ontario Association of Architects had appointed A. E. Nicholson as their delegate to this council, to fill the vacancy caused by the death of the late J. W. H. Watts; that the delegates to this council appointed by the Architectural Institute of British Columbia are Messrs. S. M. Eveleigh and Kennerly Bryan, both of Vancouver, B.C.

It was proposed by J. P. Hynes, seconded by Alcide Chausse, that Messrs. A. E. Nicholson, S. M. Eveleigh and Kennerly Bryan be elected as members of the council of the Royal Architectural Institute of Canada. This motion was adopted unanimously.

It was proposed by J. P. Hynes, and seconded by C. H. Acton Bond, that John I. Sutcliffe, of Toronto, be appointed as auditor for the current year. This resolution was adopted unanimously.

It was proposed by A. Frank Wickson, seconded by David R. Brown, and adopted unanimously, that the hon. treasurer be authorized to make the necessary arrangements to bond the hon. treasurer for $2,000, by the Employers' Liability Co., of London, England, and to pay the required premium.

It was proposed by C. H. Acton Bond, seconded by J. P. Hynes, and adopted unanimously, that the actual travelling expenses of the members of the council attending a meeting of the council, other than the officers, up to and not exceeding $25, be paid by the hon. treasurer upon presentation of a detailed statement of such travelling expenses. This resolution applies to the present meeting of the council.

The hon. secretary reported that through the joint effort of the Architectural Institute of British Columbia, the Royal Architectural Institute of Canada, and the Canadian Society of Civil Engineers, the proposed bill to incorporate the Engineering and Technical Institute of British Columbia, by the Legislature of the Province of British Columbia, was not adopted.

The matter of the extension of the R.A.I.C. in the Maritime Provinces came up for discussion, and was left pending until the coming annual assembly.

A letter received from Charles Harris Whitaker, editor of the "Journal of the American Institute of Architects," was read. It is in connection with the competition for a solution of the housing problem, and also suggesting the possibilities of a closer affiliation between the Royal Architectural Institute of Canada and the American Institute of Architects.

It was proposed by A. Frank Wickson, seconded by David R. Brown, and resolved: that the $200 received from Lord Strathcona in 1913 be deposited in a "scholarship fund," and that said amount be used to purchase Victory Bonds.

It was proposed by Alcide Chausse, seconded by A. E. Nicholson, and resolved: That Messrs. J. P. Ouellet, A. Frank Wickson, J. P. Hynes and David R. Brown be appointed a committee to report on the matter of the conservation of technical education.

It was proposed by David R. Brown, seconded by A. Frank Wickson, and resolved: That the council of the Royal Architectural Institute of Canada learn with regret the Government's action in having started the erection of a government office building on O'Connor street, in the city of Ottawa, in direct opposition to the advice given them by the Federal Plan Commission. In the opinion of the council this is a serious mistake, and though now too late to be remedied, they wish to enter a protest against it having been started, and they also wish earnestly to protest against the erection of any future buildings that may violate the advice given by the commission. The hon. secretary was requested to forward a copy of this resolution to the Prime Minister.

It was suggested by the hon. secretary that the coming General Annual Assembly of the R.A.I.C. be held at the same place and time as the annual convention of the Province of Quebec Association of Architects, which will be held in Montreal in January, 1919, and that in future years the annual assembly of the institute be held in connection with the annual convention of one of the provincial associations.

It was resolved that Messrs. J. P. Ouellet, David R. Brown and Alcide Chausse be appointed a special committee to meet the council of the P.Q.A.A. and organize such joint convention. It was suggested that an exhibition on architectural subjects, and discussions on matters relating to the profession be arranged. The names of Messrs. A. B. Pond, of Chicago; C. Harris Whitaker, of Washington; Claude P. Braydon, of Rochester; Ackerman, Adams, were mentioned among others who might be invited to be present at a special meeting and speak on prearranged questions.

It was suggested that in the future all meetings of the council be held in Ottawa, which, according to clause 2 of the charter of the institute, is its head office.

There being no other matters before the chair the meeting was adjourned.

R.A.I.C. TO HOLD JOINT MEETING WITH P.Q.A.A.

It is now definitely announced that the General Assembly of the Royal Architectural Institute of Canada will be held at Montreal, on Friday and Saturday, the 17th and 18th January 1919, at the same time as the Annual Convention of the Province of Quebec Association of Architects. The program of the Assembly will be sent to all members of the Institute in the month of December.

Big Gathering of Builders Anticipated

The Ottawa conference of the proposed Canadian Building Industries, to be held November 26, 27 and 28, gives every promise of arriving successfully at the object in view, namely, a much-needed and efficiently organized national association, comprising builders, contractors and supply and material dealers.

This is indicated by the active manner in which the movement since its inception has been taken up, and by the encouraging reports received by the temporary executive from eastern, central and a large number of western sections, giving assurance of support and co-operation to bring the organization to a full state of realization.

The Montreal Builders' Exchange, which originally fostered the idea of this organization, and has labored diligently to make it effective, will send a large size delegation to the conference.

Toronto will likewise be well represented. At a meeting held at the Builders' Exchange in the latter city on November 6th, representatives of some thirty firms gathered for the purpose of making final arrangements to attend. This meeting was presided over by Mr. Maxwell, of the sanitary and heating engineers' section. Mr. A. H. Dancy, of H. N. Dancy & Son, explained what had been accomplished at a previous preliminary meeting at Ottawa, and Mr. W. E. Dillion and Mr. H. Elgie both spoke of the purpose of the conference, and urged as many as possible to attend. Mr. McIntyre, of the firm of McGregor & McIntyre, also strongly endorsed the object of the association, and drew a comparison between the building trades and other industries to show what could be accomplished where full effort and support were given to get the desired results.

Altogether it is expected that the conference will find delegates from all the principal cities, cluding extreme eastern and western points, participating in its sessions. It will be in every sense a strictly business gathering, subordinating entirely any social features to the important transactions to come before the meetings.

It is certain with the advent of the armistice and the period of reconstruction immediately ahead, the conference comes at a particularly opportune time. War time curtailments and inactivities will now merge into a period of peaceful pursuit and development which eventually promises much and in which the building interests will naturally largely figure. Consequently other phases than those perhaps originally considered will be dealt with at the conference.

By getting together in a thoroughly national organization a much better understanding is bound to exist. It is only by this means that the many evils which at present beset the contracting business can be effectively overcome, and with a representative membership and a capable executive directing its affairs, the association will not only be to present a solid front in all matters which might be necessary to establish the legitimate rights of those whom it represents, but in various other respects will be an agency of mutual service and benefit to the contracting and building fraternity in general.

It is therefore of utmost importance that all branches of the contracting and building trades should be strongly in evidence at the approaching meeting and that the association should be made thoroughly representative and effective from the very start.

Canadian Northern's Tunnel, Montreal

By Henry K. Wicksteed, Chief Locating Engineer for the Canadian Northern Railway.

THE recent opening for traffic of the Montreal tunnel of the Canadian Northern Railway, marks an era in the history of the road itself, and in the history of transportation in Canada.

It was accomplished without fuss or ceremonial on October 21st last, and on account of the stupendous happenings in Europe, very little notice has been taken of it in the newspapers or periodicals. Yet, it is the greatest work but one of its kind in Canada, and one of the great tunnels of the world, dwarfed only by the three great Alpine tunnels, the Mount Cenis, the St. Gothard, and the Simplon. The greater one in Canada is that of the C. P. R. through the Selkirks, but this tunnel is a detail only in the general improvement scheme of the Canadian Pacific, while the Montreal tunnel was an essential feature of the Canadian Northern, the missing link in its transcontinental line.

ENTRANCE TO C.N.R. STATION, MONTREAL.

VIEW OF TERMINAL FROM REAR ALONG TRACKS.

The Canadian Northern System extends east of Montreal to Quebec and Chicoutimi, but the extensions are more in the nature of feeders and branches than main line, and their traffic is towards Montreal rather than away from it.

Montreal, for much the same reasons as Duluth, is a long, narrow city. It is wedged between the St. Lawrence and the great mass of volcanic rock known as Mount Royal, from which it takes its name. It answers to the description of the Eastern man who characterized Duluth as being twenty-five miles long, one mile wide, and nearly a mile high, even more completely than Duluth itself. One offshoot of the city has climbed over the northern slope and reached nearly to the Back River, but this is a comparatively modern growth, and in no way stopped or hindered the extension along the water front, which is now practically continuous from Lachine to near Bout de L'Ile. These are the "Dan and Beersheba," the "John O' Groats and Land's End" of Montreal. The original Montreal which is still, and is likely to remain, the busiest part of it, and of its port, is directly opposite the highest point of this mountain mass, which rises some 700 or 800 feet above the river.

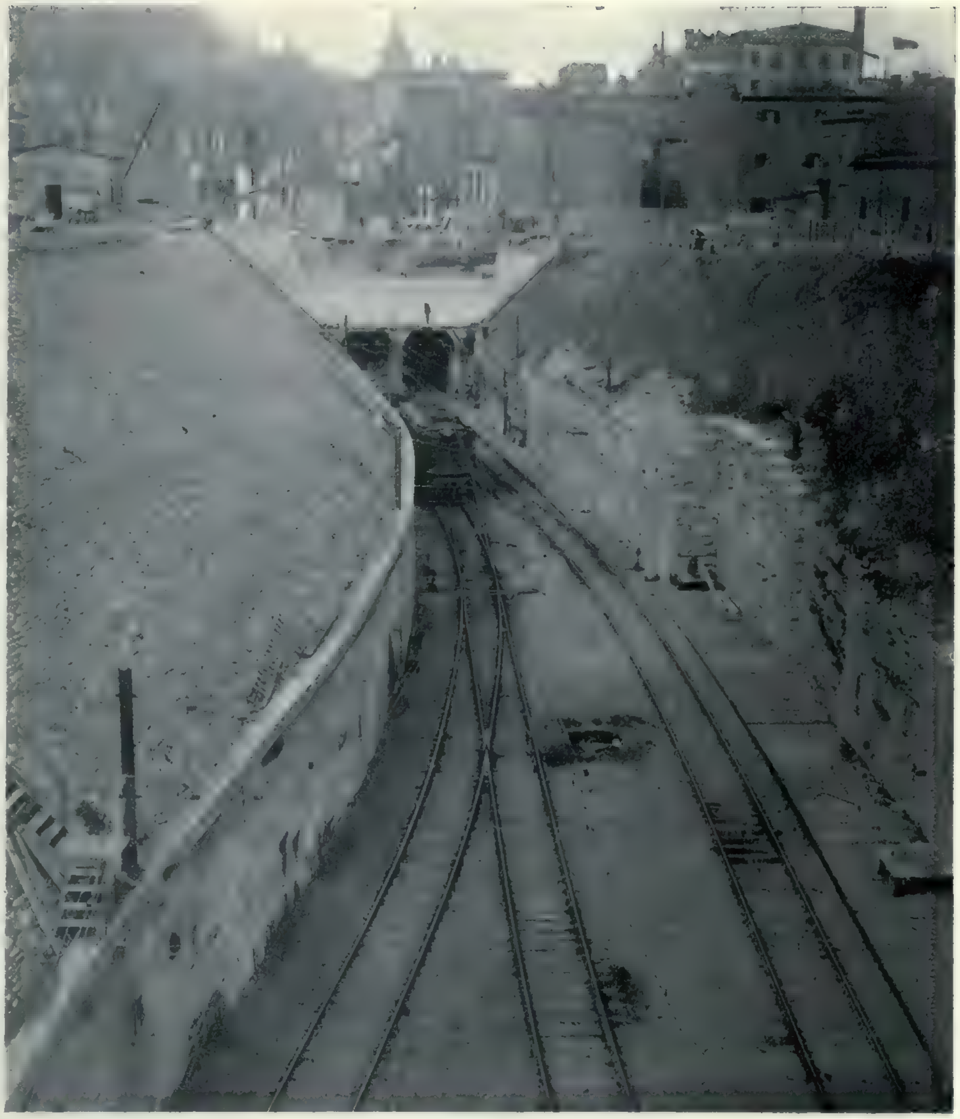
To reach the city's heart from the west it was necessary either to go round it, or to bore a hole through it. The Grand Trunk, built in earlier days, and heading southwest rather than west, got in and out again with tolerable facility, although only at the expense of a two-mile branch for its passenger and local freight service; and the C.P.R., also senior to the Canadian Northern by twenty-five years, came round both ends and established one terminal near the south, and the other near the *then* north end of the city.

To duplicate either of these entries was almost out of the question. Twenty-five years makes a big difference in the growth of a large city, and in the land values. Also, it had made a difference in the attitude of the public and its demands. It had been found that the level crossings of the streets interfered with internal traffic and threatened life and limb; and even where level crossings were avoided, there still remained a growing objection on the ground of noise and trails of filthy black smoke for which railway trains are responsible.

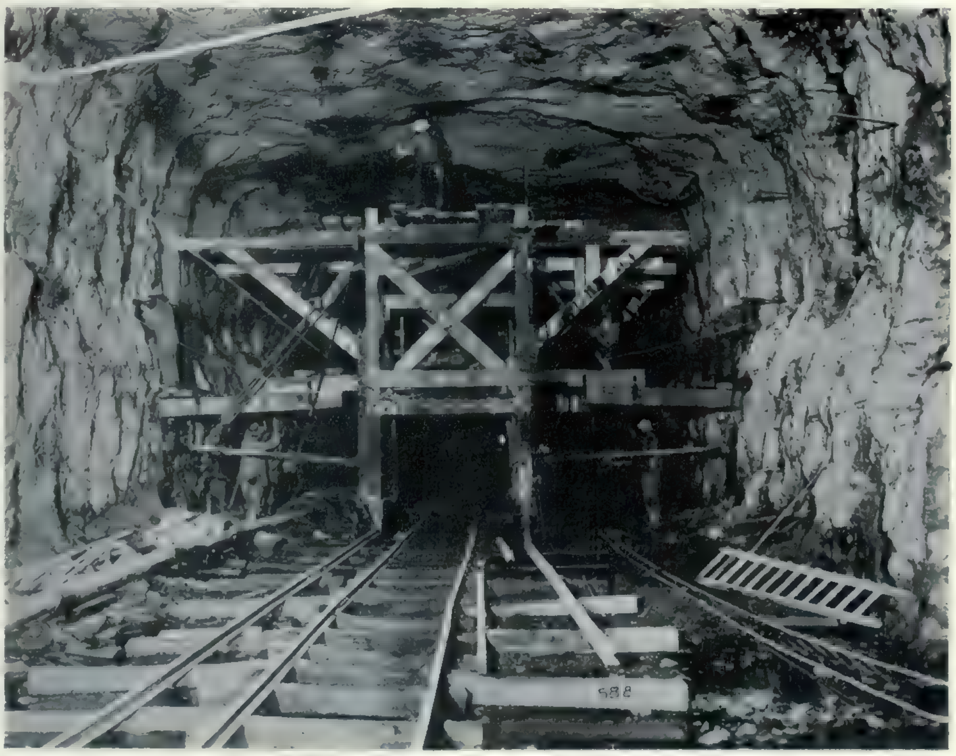
In consequence of these conditions it was decided to enter the city by an under-the-mountain route. This led to the construction of the present tunnel, which gives passage through from the unoccupied slope of the mountain, merging into the plain, or flat country known as Back River.

The station building or terminal itself within the city of Montreal, is located in the two blocks between Cathcart, St. Montique, Lagauchetiere, and Mansfield streets, and is but a few blocks' distance from both the C.P.R. and Grand Trunk stations. There are five tracks devoted entirely to passenger, mail and express service. These branch from the two tracks leading from the tunnel, and terminate with stub ends at the station building.

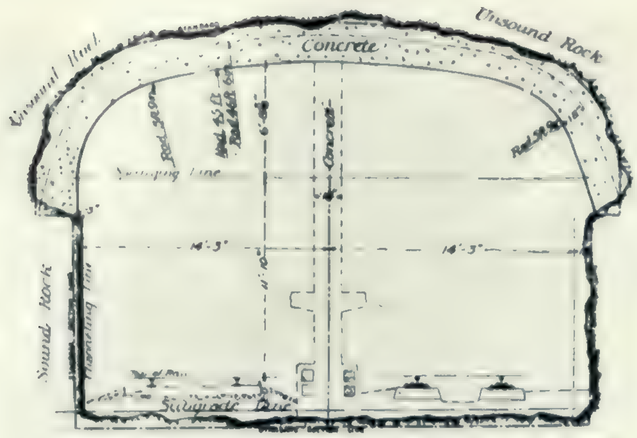
The tunnel itself is double-tracked throughout, and is 3.25 miles long. The western portal is its highest point, and is roughly 150 feet above the harbor. It then descends



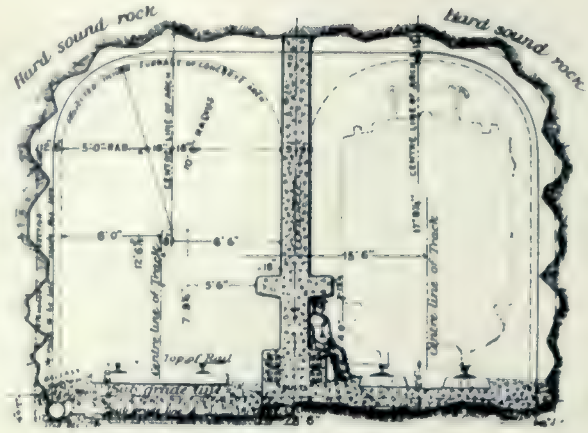
ENTRANCE TO C.N.R. TUNNEL, MONTREAL, AS SEEN FROM DORCHESTER STREET BRIDGE.



PROGRESS VIEW, SHOWING TUNNEL DURING PERIOD OF CONSTRUCTION.



SINGLE ARCH TUNNEL SECTION.—UNSOUND ROCK IN ROOF.



TYPICAL TUNNEL SECTION IN HARD ROCK.

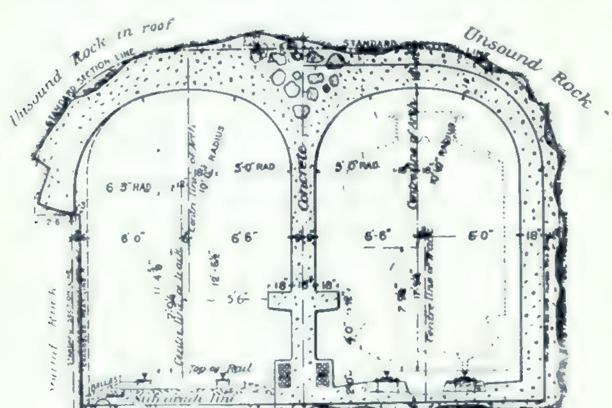
CANADIAN NORTHERN RAILWAY TUNNEL, MONTREAL.

on a grade of 30 feet to the mile, just sufficient to provide good drainage, to the portal at Cathcart street. From the portal the grade is practically level through the terminal to the water front. At Cathcart and Dorchester the grade is some 45 feet below the street level. These streets are on the upper, or terrace, level. Below Dorchester the ground drops rapidly. Lagauchetiere can just be carried comfortably overhead. St. Antoine, St. James, Notre Dame and a number of minor streets are on the lower level, and all carried easily and with ample clearance underneath. An absolute avoidance of grade crossings is thus secured, with only one very slight change in the grade of an unimportant street.

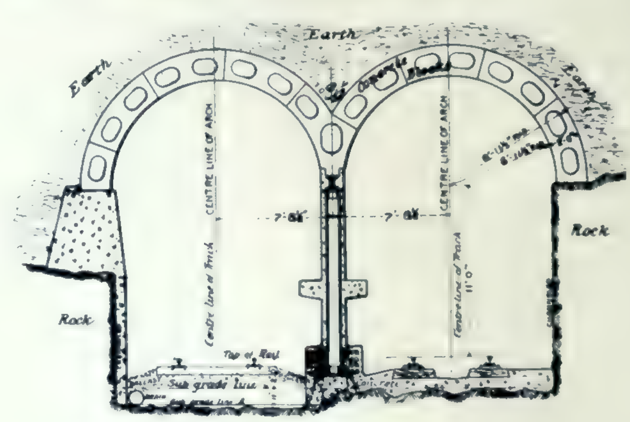
The alignment is a straight line to within a half mile of the east portal, where, in order to avoid property damages, a two-degree curve was inserted to bring it immediately under the centre of McGill College avenue, and at right angles to the arterial north and south thoroughfares.

For a few hundred feet from the west portal, the excavation is in earth as to the roof, although the grade strikes rock almost immediately. This was excavated and arched in and then refilled. For another half mile or more the material is limestone, resting undisturbed on the older strata. Then comes a short length of crystalline rocks, and finally the solid core of volcanic rock, generally referred to by geologists as Essexite. At the east end the transition is reversed and similar, except that it is direct from the Essexite to the limestone.

The most difficult portion was from Sherbrooke street to the portal, about 2,000 feet, where the roof ran out of the limestone into a superincumbent surface deposit known as the "Leda" clay. This clay is a marine deposit and extremely impalpable and plastic, and carried much moisture. A shield was used throughout on this section, and a double arch built of concrete blocks cast in Voussoir form, and resting on either side on the limestone walls and in the centre on a partition wall of reinforced concrete between the double tracks. In spite of great precautions to prevent leakage there was a settlement of the street overhead to the extent sometimes of three or four inches. This was manifestly due to the abstraction of the moisture, although even this did not appear inside. Many of the adjacent houses had been built on this semi-fluid material, and had shown more or less settlement and distortion in advance, so that further subsidence did not cause much further damage. Some old brick sewers had to be rebuilt. They needed rebuilding anyway. But on the whole, the amount of damage done or claimed was very moderate.



TYPICAL TUNNEL SECTION.—BAD ROCK IN ROOF.



SECTION OF TUNNEL BENEATH EARTH ROOF.

CANADIAN NORTHERN RAILWAY TUNNEL, MONTREAL.

A very satisfactory feature on the work generally was the almost absolute absence of water. A spring of moderate flow was struck where it was most likely to be met, at the contact between the limestone and the crystalline rocks. This is carried through the entire length of the tunnel. This dryness was a very fortunate feature, because the heading was driven very largely from the west end, and consequently down grade. Any considerable influx of water would therefore have been a great drawback and hindrance.

The heading (a bottom one) was driven from both ends, and from a 250-foot shaft one mile from the west end. The easterly driving was also pushed harder than that in the opposite direction, because the disposal of material was easier at the west than at the city end. Some ingenious machinery was devised by the managing engineer, with the result that the world's record for speed in hard rock tunnelling was for a time broken with a record of an average of 26 feet per day for a whole month of thirty-one days. Unfortunately, before the succeeding operations were completed, financial troubles supervened, and the benefit of the high speed was not realized.

The drills, generally three in number, were mounted on a horizontal shaft wedged into place with jackscrews, and were driven by compressed air, the volume of which was so large that but little inconvenience was suffered from the fouling of the air by explosives. The removal of this bar with its drills every time a blast was fired, and its readjustment in a very confined space for the next drilling operation, was a work of time and difficulty. A machine electrically driven was devised with a long projecting arm in front, which lifted the bar with its attached drills, and ran it back out of the way of the blast. This being fired, it returned to the front and held it in the new position while being wedged, and at the same time an endless belt on the same machine and carriage carried the "muck," or broken rock, to the rear, where it was loaded on to the ordinary contractors' dump cars and taken out of the west portal.

The drills, as already stated, were run by compressed air, the mucking trains by electricity. Some storage battery traction engines were tried, but were not very satisfactory, and soon superseded by a regular trolley system. In the space of an 8 ft. by 12 ft. heading, this would seem to entail considerable risk, but as a matter of fact, few accidents occurred, and no fatal ones. Such pumps as were necessary were also operated electrically.

It may be imagined that all this power entailed a considerable power plant, which was supplied electrically by the Montreal Light, Heat and Power Company, even the air compressors being operated by dynamos.

The permanent operation of the tunnel will also be carried on by electricity, and three large locomotives are already on the ground and ready for work. A departure from ordinary standards was made by the installation of a 2,400-volt system, which is four times as heavy as the ordinary street railway standard. This, of course, is to save wire and transmission losses.

So much of the tunnel being bored through solid rock, and most of this through a very hard volcanic material, it was thought that very little lining would have to be done. As a matter of fact, had it been an ordinary tunnel on the open road operated through by steam locomotives, very little would have been done, but the rock, after the tunnel was drilled out and the round of the roof finished, proved to be somewhat seamy and friable, and some small falls took place. Inasmuch as the trolley wire had to be suspended from the rock roof, and any interruption of traffic was inadmissable, it was thought better to put in a thin lining of concrete. This extends almost throughout its length. This is about the only contingency in connection with the work which was not foreseen and anticipated, and it delayed the completion somewhat, although it was in itself very rapidly done over a moveable mould run on the construction tracks. The clearance and thickness of the arch ring being small, a great deal of the necessary concrete was blown in by compressed air.

The Montreal tunnel, therefore, while remarkable on account of its magnitude and speed of initial construction, shows no special difficulties which had to be overcome, and the novelties were all of the nature of higher development of working methods on the same general lines as had been already initiated.

The chief locating engineer was H. K. Wicksteed. The managing engineer was Mr. S. P. Brown, who had been engaged on similar work for the Pennsylvania and Brooklyn Rapid Transit tunnels. Mr. W. A. Lancaster designed and supervised the electrical plant, and Mr. Fisher attended to the alignment and levels.

The alignment had to be carried some two miles from the west end, and something over one mile with a curve from the east. The final closure was "out" less than one inch, and the levels only one-quarter of that amount.

Practising at Halifax, N. S.

Wm. Fraser and Harold S. Kaplan, recently of Toronto, Ont., have opened an office in the St. Paul Building, Halifax, N.S., for practice as associate architects. They are at present preparing plans for two schools for the Halifax School Commissioners. The buildings will be brick, reinforced concrete and hollow tile construction.

Developments in the Theory of Ventilation

By Charles L. Hubbard.

THE term recent, as used above, has a somewhat broader meaning than is usually given to it, as the developments referred to had their beginning some ten or twelve years ago. However, it is only within the past three years or so that a general discussion of the matter has appeared to any extent in the technical journals, and at the present time investigations are still being carried on to reduce these theories to a practical working basis. While considerable matter along this line has been published, it has not appeared to any extent in the various heating, medical and school journals, and has usually taken the form of a radical presentation by the adherents of either the *natural* or *artificial* system according to their personal belief.

It is proposed in the present article to review the matter in a simple manner, giving what seems to be the general opinion of a majority of those who have made a special study of the subject, and who should be able to give reliable information to those interested. As these new developments, when finally worked out, are likely to call for more or less change in building construction, as regards the ventilating arrangements, it would seem that the matter should have an especial interest for the architect.

Air has two principal functions: a chemical and a physical; it aerates the blood and absorbs the body heat. In order to perform the first of these it must contain a sufficient amount of oxygen and a minimum of harmful gases. Absorption of bodily heat depends upon the temperature, humidity and motion of the air. If the air of a room is not renewed its oxygen is gradually consumed and it becomes laden with heat and moisture from the bodies of the occupants.

Until within a comparatively short time all efforts toward better ventilation have been directed to chemical improvement instead of physical.

The theory upon which all systems of ventilation were formerly designed was that the percentage of oxygen must be maintained as nearly as possible to correspond with that of outside country air and that the proportion of carbon dioxide, or carbon acid gas, must be kept below a certain maximum. The method employed for obtaining this condition was that of dilution or the supplying of large volumes of fresh air at the room temperature or higher, depending upon the system of heating employed. Normal outside air contains approximately 21 per cent. of oxygen and from 3 to 5 parts of carbon dioxide in 10,000 parts of air. It has been assumed, arbitrarily, that the carbon dioxide should not be allowed to rise above 10 parts in 10,000, and for the best results 6 to 7 parts have been considered the limit.

The harmful results of an insufficient air supply were supposed to come principally from the poisonous effects of the carbon dioxide coupled with the corresponding diminution of oxygen. Later it was thought the effect of poor ventilation was due, not only to the presence of carbon dioxide, but to certain harmful gases and organisms which were given off in the process of respiration. As these substances were supposed to exist in a fixed proportion to the carbon dioxide, the latter was still considered to indicate the quality of the air, although in itself it was thought to be less harmful, especially in small quantities.

The common allowance of 30 cubic feet of air per occupant per hour is based on an increase of carbon dioxide from 4 parts in 10,000 of air to slightly less than 7 parts. A maximum of 6 parts in 10,000 calls for a supply of 50 cubic feet per minute under the same conditions. As already stated, the sole object of ventilation was one of dilution, so as to keep the carbon dioxide content and its accompanying products of respiration below a certain percentage. While this has been the accepted theory of the heating engineer and the general public until a comparatively recent date, there has been some doubt among those engaged in laboratory research as to the importance of the chemical purity of the air to the exclusion of its physical characteristics, and it was only with the advent of the air washer that we began to learn of the advantages of air "conditioning."

The perfection of the air washer was the outgrowth of the demand for a filter which would be more effective and more nearly automatic in its action than the older form of dry filter, which were extremely bulky when made of the proper proportions and required frequent removal for cleaning in order to limit the resistance to air flow. While the primary use of the air washer was for the removal of dust and soot from city air, its field was soon extended to air moistening, cooling, and the removal of some of the products of respiration.

Although most of the ventilating systems at the present time are designed along the same general lines as in the past (with the exception of air washing in large city buildings), the *theory* of ventilation, as accepted by many of the leading authorities at home and abroad, has radically changed, the idea being that the physical characteristics of the air we breathe are of much greater importance than chemical purity.

While there are still some who give considerable importance to the chemical theory, a majority of those who have made an exhaustive study of the matter seem to have discarded the older theory and recommend that future development in the design of ventilating equipment be along the line of improvement in temperature and humidity control and in air movement.

Briefly stated, the chemical composition of the air, as regards contamination through respiration under ordinary conditions, is negligible, as compared with the removal of bodily heat and moisture. It will be interesting at this point, before considering the physical effects of air, to examine briefly into the reasons for this change in theory in regard to the chemical characteristics, as related to bodily health and comfort.

In order to show the relative importance of changes in the percentage of oxygen and carbon dioxide in the air for breathing, it is necessary to have a clear understanding of the process of respiration and the changes which take place in the air within the passages of the respiratory tract. At the beginning, it should be clearly understood that the lungs are never filled with *pure* air, even under the most favorable conditions, because breathing is only a frequently repeated slight dilution of the air remaining in the throat and larger bronchial tubes after expiration.

So far as its chemical composition is concerned, this is air which has passed out of the lungs, and after being mixed with a certain proportion of outside air, during the next breath, is again drawn into the lungs as a mixture which does not even remotely approach chemically pure air. This results in making respiration a continuous instead of an intermittent process, and so provides for a constant supply of oxygen which is necessary to the life of the tissues.

Thus we see that any changes in the proportion of oxygen and carbon dioxide, which are likely to occur in the air of a poorly ventilated room, will have no appreciable effect upon the air within the lungs.

As previously stated, pure outside air contains about 21 per cent. of oxygen, and this hardly ever falls below 20 per cent. in the poorest ventilated room. As the air in the lungs contains but 16 per cent. under normal conditions, it is evident that any changes which may take place in the oxygen content of the surrounding air will have but slight effect internally. Furthermore, the supply of oxygen in the lungs is not dependent upon the outside conditions, but is regulated by the amount of carbon dioxide dissolved in the blood, and this, in turn, acts upon certain nerve centres which control the depth and rate of breathing. If the carbon dioxide falls too low, stimulation of the nerve centres ceases, and the process of respiration does not take place until the proper proportion has again been accumulated. The normal proportion of carbon dioxide in the air of the lungs is about 5 per cent., and is kept at this point automatically by the action of respiration. Under these conditions the only effect of breathing in an excess of this gas with the surrounding air is an unnoticeable increase in the action of the lungs through faster and deeper breathing.

Thus we see that the amount of carbon dioxide remaining in the blood depends entirely upon internal conditions rather than external, and is entirely automatic in its action—the rate of ventilation of the lungs being the means by which a proper balance is maintained between the oxygen and carbon dioxide.

It is also evident that our chief safeguard against a want of oxygen by the body tissues is a definite accumulation of carbon dioxide, and this is maintained by rebreathing the "dead-space" air, so called, contained in the throat and larger bronchial tubes.

Besides the necessary reinspiration of the dead-space air, it is also known that one usually takes in again a part of the breath entirely expelled from the body during the preceding expiration. When standing alone in a room a person will rebreathe from 1 to 2 per cent. of the air he has just exhaled. When lying in bed he will rebreathe from 2 to 6 per cent. or more, depending upon his position, and even in the open, if there is a shield to break the wind, a small proportion is taken back with nearly every breath.

While the above seems to prove the fallacy of the older method of reasoning, it is interesting to note the results of certain experiments which have been carried out from time to time. Although a large amount of investigation has been done in this direction, space allows the mention of only a few results.

As far back as 1842 Leblanc found that an animal could survive exposure to atmosphere containing 30 per cent. of carbon dioxide, provided the proportion of oxygen was 70 per cent., and recover quickly from the depression produced by this mixture.

Pettenkofer, in 1849, demonstrated that the symptoms produced in crowded places were due neither to an excess of carbon dioxide nor a deficiency of oxygen. He also found that air containing 1 per cent. (100 parts in 10,000) of carbon dioxide could be breathed for hours without discomfort, and laid down the doctrine, accepted by sanitarians, that the percentage of carbon dioxide was only a guide to the other harmful properties contained in the atmosphere.

Later tests in an English brewery, where carbonic acid gas was compressed and bottled, showed the air of the workroom to contain from 0.14 to 0.93 per cent. of this gas (14 to 93 parts in 10,000). Work was carried on continuously in 12-hour shifts, the men having their meals in the room. Some, it is stated, had followed this employment for eighteen years without detriment to health.

Other experiments have shown that the air may contain from 3 to 4 per cent. (300 to 400 parts in 10,000) of carbon dioxide before increased respiration will be noticed by an individual at rest, but percentages over 1 per cent. (100 parts in 10,000) diminish the power to do muscular work.

The widespread belief in the presence of organic poisons in the expired air is mainly based on the statements of Brown-Sequard and D'Arsonval, and it has been assumed by sanitarians that the carbon dioxide must be kept below 10 parts in 10,000 of air to prevent harmful results from this condition, the percentage of carbon dioxide being taken as an index of their amount.

The evil smell of crowded rooms has long been accepted as proof of the existence of such poisons. As a matter of fact, such odors come from secretions of the skin; from food eaten, such as onions and garlic; decayed teeth; the bad breath of dyspepsia; soiled clothes, etc., etc. While such a mixture of odors is offensive and disgusting, it has been proved to be harmless, so far as its direct effect upon health is concerned.

The theory of Brown-Sequard and D'Arsonval was based on three series of tests, as follows: In the first case, water with which they had repeatedly washed out the air tubes of a dog, was injected into the blood-vessels of a rabbit. In the second, they injected the water condensed from the exhaled breath of a man; and in the third, the water condensed from the breath of a dog. The principal symptoms recorded were dilation of the pupil, acceleration of the heart, and paralysis of the lower limbs. The larger doses caused, as a rule, labored breathing, retching and contracted pupils.

Extensive investigations carried out along this same line more recently have proved this theory at fault and seem to show that the results were due to the injection of comparatively large quantities of water, or to its containing infectious bacteria, rather than to any harmful organic matter.

For example, an experiment was arranged where the breath of one dog was exhaled directly into the lungs of another continuously for nearly seven hours without harmful results.

In other cases the exhaled breath of human beings was condensed, then dried, sterilized, mixed with distilled water, and injected beneath the skin of rabbits and mice. Here, as before, no sign of disturbance was shown. In comparison with this, both rabbits and a puppy were killed by injecting sufficient quantities of pure distilled water.

A considerable portion of the above data has been obtained from the Smithsonian Miscellaneous Collections, Volume 60, No. 23, which gives a large number of other tests along similar lines.

Having shown, in a general way, the course of reasoning followed in discrediting the older theory of ventilation, let us now see what has been advanced to take its place.

More than thirty years ago Hermans suggested that the results of poor ventilation might be due, in some way, to heat rather than the chemical condition of the air, and recent investigations have been carried out along this line.

Experiments show that an ordinary adult will produce, and must be relieved of, sufficient heat in the course of an hour to raise the temperature of 1,000 cubic feet of air 15 or 20 degrees. In addition to this, a considerable amount of moisture is given off, partly by perspiration and partly as vapor in the air exhaled from the lungs.

Unless this heat and moisture are promptly removed the body becomes surrounded by an envelope of stagnant air, having the same effect as an oppressive day in the summer, with a high temperature and excessive humidity.

The remedy for this condition is evidently suitable temperature and humidity regulation and air movement, which combination forms the basis of design for the latest systems of ventilation.

The physiological effect upon the human body of overheating is a derangement of the vaso motor system, that is, the nerves which regulate the circulation through the blood-vessels, other than the action of the heart. For example, a cool wind striking the skin, stimulates, through the sensory nerves, the vaso motor constrictors, which causes the small vessels near the surface to contract and drives the blood deeper in the tissues and so preserves the bodily heat. A warm wind, or other source of external heat, causes the superficial vessels to dilate and draws the blood to the surface, thus cooling it more rapidly and maintaining the normal bodily temperature. Health, and life itself, depend upon a uniform temperature of the blood, the usual sunstroke or heat prostration being the result of a very slight rise in temperature. When the heat regulating functions of the body are interfered with by an envelope of still air, at a high degree of temperature and humidity, the usual discomforts of a sultry day or a badly ventilated room are experienced.

Briefly stated, living beings constantly produce and give off to their surroundings an excess of bodily heat. This heat must be disposed of, and is constantly carried away from the body, partly in the air exhaled from the lungs, but chiefly through the skin by radiation and conduction assisted by the evaporation of perspiration. It is evident that the prompt removal of this heat will depend upon a surrounding atmosphere neither too hot nor too moist, and furthermore, that the process will be hastened if the air is in motion.

Either too high a temperature or too much moisture in the air will retard the cooling of the body, and when these two conditions occur at the same time, as is usually the case in a poorly ventilated room, the result is doubly harmful.

According to this conception, the problem of ventilation is one of physics, and not of chemistry. It seems strange that although more than thirty years have elapsed since this doctrine was first advanced, so little has been known of it outside of laboratories, and that the theory of an excess of carbon dioxide and a mysterious organic poison has prevailed so persistently until the present time.

An interesting coincidence which may be mentioned at this point is, that the usual allowance of 30 cubic feet of air per occupant per minute, based on the amount of dilution to maintain a certain standard of chemical purity, is also the amount of air which is required to remove the heat and moisture given off by one person when introducing it into the room at a temperature 10 degrees less than the room temperature, which is about as low as is possible without causing drafts or chilling the occupants.

This fact is not only of general interest, but serves to show that our modern ventilating systems, while designed upon a wrong assumption, may be made to fulfill the requirements of our later ideas, pending future developments in the way of greater efficiency and effectiveness.

Thus far the new theory of ventilation has been stated as a fact without giving any of the reasons leading up to its adoption.

Investigations in this direction have been under way for a number of years and are quite fully reported in the publication of the Smithsonian Institution previously referred to. Only a few of the simpler experiments will be mentioned in the present article.

In a series of tests at the Institute of Hygiene in Breslau, and reported in 1905, normal individuals were placed in a cabinet of about 80 cubic feet capacity and confined for periods up to five hours until the carbon dioxide rose to 100 to 150 parts in 10,000. No symptoms of illness or discomfort were felt, and the chemical impurity of the air had no effect upon the mental activity of the occupant so long as the temperature and humidity of the air were kept moderately low. Raising the temperature to 75 degrees and the humidity to 89 per cent., with the carbon dioxide at 120 parts in 10,000, caused much discomfort. Breathing outside air through a tube gave no relief under these conditions, while breathing air from the cabinet by those outside caused no discomfort.

Circulating the air within the cabinet, by means of a fan, without changes in temperature, humidity, or chemical composition, removed the disagreeable symptoms experienced by the occupants. When the chamber was cooled to 62 degrees there were no feelings of discomfort, although the carbon dioxide rose to 160 parts in 10,000.

Experiments reported in Bulletin 175, U.S. Department of Agriculture, page 235, show that a man can live many days in a closed calorimeter chamber in comfort, without damage to his health, and having not the slightest knowledge of any defect in ventilation when the carbon dioxide rises to 100 to 200 parts in 10,000, so long as the air in the chamber is kept cool and dry.

Recent investigations have also been carried out along a similar line in the Physiological Laboratory of the London Hospital Medical College with practically the same results.

In this case the chamber was of wood, made airtight with suitable insulation, and equipped with an electric heater, a coil through which cold water could be circulated, humidifying apparatus, and two electric fans for circulating the air within the chamber. Without going into details, the results showed that decreased oxygen and an increase in carbon dioxide up to 200 to 500 parts in 10,000 had little effect upon the pulse, while the temperature and humidity had a profound effect. The feelings of discomfort which were produced depended upon the excessive heat and humidity, and were relieved by cooling and stirring the air by means of the water coil and fans. The carbon dioxide could be suddenly raised to 200 parts in 10,000 without the occupants becoming aware of it. Those outside the chamber could breathe air from within, through a tube, without experiencing any of the discomfort felt by those inside when the temperature and humidity were high, while the breathing of outside air by those within the chamber brought no relief.

A series of tests carried out some time ago by the Chicago Commission of Ventilation seemed to show that there was a temperature and humidity range within which the occupants of a room were comfortable, and this range has given rise to what is called the "comfort zone." This means that there is a maximum temperature with a minimum relative humidity, and a minimum temperature with a corresponding maximum relative humidity, between the limits of which the occupants of a room are comfortable. In other words, there seems to be no *best* temperature or *best* relative humidity; but the maximum temperature at which one is comfortable will be associated with a minimum relative humidity and the minimum temperature for comfort will have associated with it a maximum relative humidity.

Under the conditions of the tests made it was found that a temperature of 64 to 70 degrees with a corresponding relative humidity of 55 to 30 per cent., seemed to be the limit; that is, the comfort zone was between 64 degrees with 55 per cent. humidity, and 70 degrees with 30 per cent. humidity.

We have heard much recently of the necessity of more humidity in the air we breathe, the atmosphere of our dwelling and public buildings being likened to that of an arid desert.

While a certain amount of moisture adds to our comfort, too much is injurious to health, as shown by the experiments just described. Taken alone, a certain degree of humidity does not signify very much, within certain limits, but must be considered in connection with the existing temperature; the combination being what produces comfort or discomfort. It is probably safe to say, where no special provision is made for humidity control, that during the winter our dwellings are too dry and our audience halls and theatres too moist. This is due to the proportion of cubic space per occupant, being large in the former and small in the latter case.

While much has been said of the harmfulness of too dry an atmosphere and its effect upon the mucous membrane of the respiratory passages, there seems to be some reason to doubt that lack of moisture, within practical limits, has any particular effect in this direction.

The membranes of the throat and nose are kept moist by the secretions from certain glands provided for this purpose, and not by the moisture in the air which we inhale. Of course, the drier the air the greater will be the tax upon these glands, but the surfaces themselves will remain moist so long as the function of the glands is not overtaxed. It seems more likely that the sensation of smarting in the throat and nose, which is often experienced in a dry atmosphere, is due to dust rather than a low degree of humidity.

While dry air does not necessarily contain more dust than moist air, a low humidity tends to extract moisture from the floors, furniture, and other objects and thus liberates a certain amount of dust which is readily picked up by the moving air. It is probable that one of the most important beneficial effects of outdoor sleeping is breathing a comparatively dust free air. The relative humidity is higher at night and the amount of dust in the air consequently low.

The most extensive investigations in both theoretical and practical ventilation are being carried out in this country by the Chicago Commission on Ventilation and the New York State Commission on Ventilation.

The former was organized in February, 1910, and has done a large amount of practical work along the line of ventilation as related to schools, churches, theatres, industrial buildings of various kinds, and street cars. The work is carried on partly in laboratories, especially equipped for this purpose, and partly in buildings in actual operation, where tests are conducted under practical working conditions.

The New York Commission was organized in June, 1913, and began its actual work in December of the same year.

The phases of the problem which have been given special study may be classified as follows:

Chemistry of the Air—Oxygen, carbon dioxide, organic matter, odors, ozone.

Air Conditioning—Temperature, humidity, dust.

Mechanics of Ventilation—Air volume, air movement, heating of air, cooling, recirculation, natural and artificial ventilation.

Efficiency of installation and operation. Ventilating apparatus.

The laboratory is equipped with a ventilation chamber having a capacity of 1,150 cubic feet, which is provided with apparatus by which the air of the chamber may be confined and rebreathed, or renewed at any desired rate, may be maintained at any desired temperature and humidity, may be kept quiet or in motion, may be removed, washed and recirculated, and may be given any desired chemical composition.

In this chamber from one to six persons may be confined for any length of time. On certain days they may engage in definite mental tasks, while on other days they perform a definite amount of physical work under a given combination of air conditions. By the quantitative study of a considerable number of bodily functions, such as temperature, sensitiveness of the skin, blood-pressure and pulse rate, respiratory exchange, the production of heat, duration of digestion, various changes in the urine, etc., an endeavor is being made to learn in what respects, if any, the physical and mental efficiency are altered by changes in air conditions.

In addition to laboratory investigations, outside work is being carried on under the direction of members of the laboratory staff.

Addition to Lake Louise C. P. R. Hotel

By William Wren Hay (Jr. Eng. Soc. of Canada).

THE Canadian Pacific Railway Co. has completed extensive additions to their hotels at Banff and at Lake Louise, in the Rocky Mountains, one of the structures at Lake Louise involving unusual features of design. The group at Lake Louise provides accommodations for upwards of 400 guests, and by reason of its isolation, has an electric light plant, water supply system, power laundry, central heating plant and septic tanks. It is connected to the main line of the railroad by about 4½ miles of narrow-gauge track, on which are operated gasoline motor cars.

The first Chalet was erected in the early nineties, and was a simple log cabin, used only for private parties, guests of the railway. From time to time additional facilities have been provided, but it was not until 1910 that a definite group was planned, and in the summer of 1911 construction was commenced on the new buildings, and additions and alterations to existing buildings, to provide ultimate accommodations for 500 guests, so that, together with the servants and other employees, the entire plant must take care of at least 750 persons. As the hotel is some distance from any other community, it was necessary to provide for water supply, lighting and other necessities of modern life.

The present group of buildings consists of the original Chalet, which is built of timber, with rooms for 250 persons, and includes the hotel office and lobby, to which is attached the kitchen store room and servants' quarters; a large reinforced concrete wing, on the ground floor of which is a large ballroom, billiard room, ladies' parlor, and public rest rooms, contains 122 bedrooms; three frame annexes, with bedrooms, unit heating plant, septic tank, diningroom and kitchen, with servants' quarters; a laundry and boiler house, with additional servants' quarters in the second storey, and connected with the main groups by a concrete subway; and a group of buildings in the rear housing the livery teams and the ponies.

Each of the three units are the same in plan, having a length of 160 feet, main width of 40 feet, with service wing in the rear, 28 feet by 44 feet. They are all three storeys high, containing 31 bedrooms, and 19 private baths, all rooms along the corridors being intercommunicating through the bathrooms. The exteriors follow certain of the Swiss Chalets, two being alike, with rough cast ground floor and clapboards on the upper storeys; wide, overhanging eaves, and low, shingled roofs; the third has boarded ground floor and rough cast plaster above, with steeper roof slopes, and small turrets at intersections. The interiors are finished much alike, using British Columbia fir panelling and wainscotting, with rough plastered walls and ceilings. In the big lounging room, the trim is all "carded," and the unusual grains to be had in British Columbia fir have been worked into con-

LAKE LOUISE, HOTEL, SHOWING NEW AND OLD WINGS, LAKE LOUISE, ALBERTA.

MAIN DINING ROOM IN LAKE LOUISE HOTEL.

ventional patterns for frieze and coffered ceilings. The framing is of ordinary construction, except in the lounging room, where there is a clear span of 24 feet, bridged by two trussed timber beams on four timber columns, and carrying the floor joists and framing for the storeys above. A single corridor runs the length of the building, with a main staircase in the middle, separating the dining-room and lounging-room; and other stairs at either end for use in case of fire.

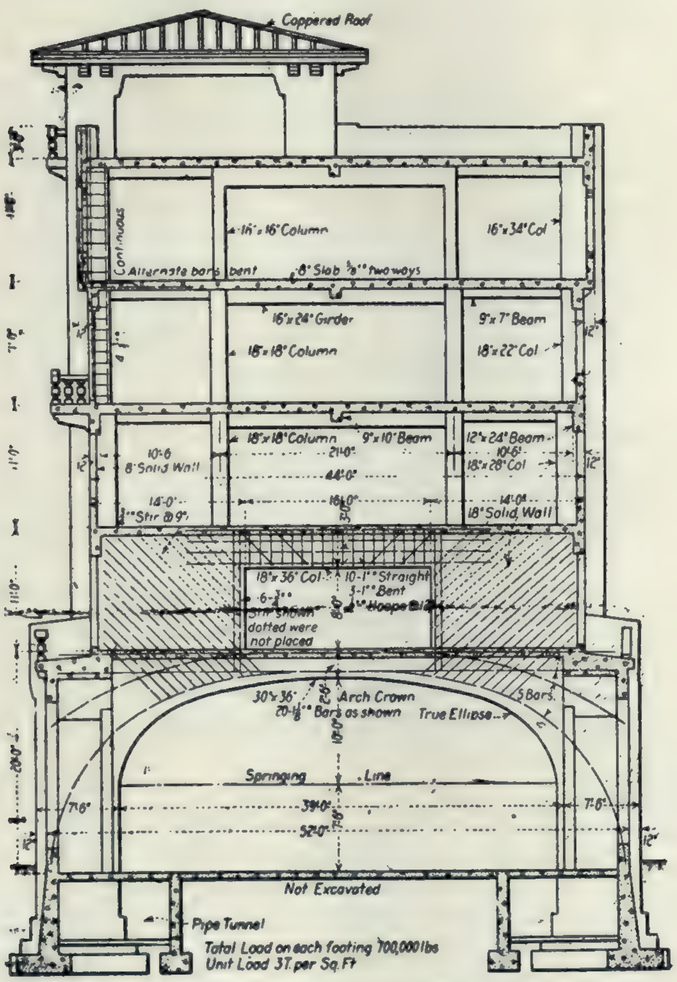
These units cost about $65,000 apiece, with steam and hot water heating systems, electric lighting, and finish. They have about 230,000 cubic feet of contents, and the cost of 28 cents per cubic foot is about equally divided between labor and materials. The design of these units is such that they can be operated as one, two, or three units at one time, either in connection with the main Chalet, or independently, as for large parties.

ARCHITECTURAL FEATURES.

The fireproof wing has been erected in accordance with the policy of the hotel management of replacing and adding buildings of fireproof construction throughout. The structure is of reinforced concrete construction, with solid 8-inch exterior walls and terra cotta block partitions. It is approximately 265 feet long on its longitudinal axis, 44 feet wide in the upper storeys, and six storeys high, with an eight-storey tower on the front. The ground floor is devoted entirely to the public. The feature of the building is the ball room, which is about 120 feet long, 43 feet wide, and 20 feet high, occupying the full width of the building without any columns, thus introducing quite a problem in the structural design of the building. The architectural design called for the use of arches across the room, supporting the four bedroom floors above, but the nature of the foundations, part fill and part cut, precluded any such thrust; therefore, a solid 8-inch wall was carried up one storey above the barrel arches across the room, and was designed as a girder having a span of 42 feet, the distance centre to centre of the columns. It was necessary to cut through the wall for the corridor, and in order to have the opening symmetrical, it was made 16 feet wide and 8 feet high. The crown of the architectural arch below was then designed in full tension, the reinforcing bars being carried back into the haunches as for an arch design; while the floor beam over the opening was designed in combined bending and compression. The spacing of beams and arches throughout is 21 feet, dividing the floor areas into square panels, reinforced in two directions. Under ordinary

INTERESTING VIEW OF OPEN VERANDAH.

conditions, there would have been a single row of interior columns down the centre of the building, which would have given beams of the same dimensions throughout, but in order to take the concentrated load off the centre of the top chord of the girder, there are two rows of columns in the centre of the building, spaced 10 feet 6 inches from the centre line. This arrangement required a girder across the corridor to carry the longitudinal beams, and gave very small beams running from the columns to the wall. This idea slightly increased the cost of the concrete formwork. The introduction of the hexagonal tower in the recess formed by the angle in the front wall also complicated the arrange-



CROSS SECTION OF REINFORCED C.P.R. HOTEL AT LAKE LOUISE. SECTION TAKEN CENTRE OF BALL ROOM.

ment of the beams. This tower had an inside diameter of 42 feet, and is eight storeys high, with a single column in the centre, floor beams radiating to the six columns of the hexagon. The smoking room occupied the ground floor of this tower, and the floor slab over it is flat; all the other slabs in the tower are triangular in shape, with steel placed in three directions. The tower is 115 feet above the footings, terminating in a peaked roof covered with copper. Beneath the roof there is a water tank of 5,000 gallons capacity, hexagonal in shape and supported upon skeleton beams over the top floor. There are four rooms and two baths on each floor of the tower. There is a total of 122 bedrooms, with 102 private baths and eight public toilets.

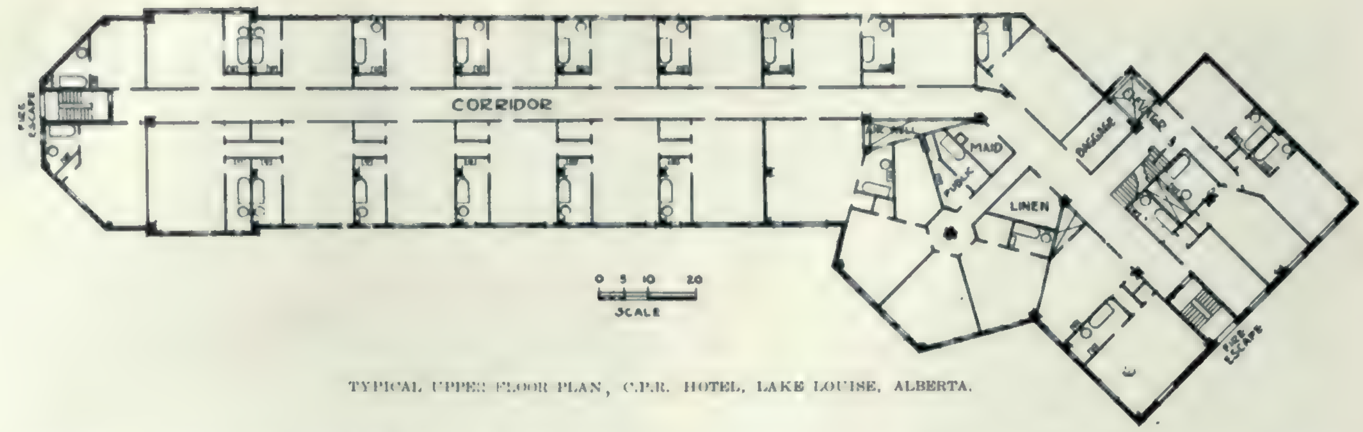
The roof of the main portions of the structure is flat, with a parapet 3 feet high, and the slabs supporting it were designed for a live load of 125 pounds per square foot, or the equivalent of two feet of melted snow and ice. The outside walls of this building are of concrete, 8 inches thick, poured monolithic with the structural concrete, and reinforced inside and out against temperature stresses. They were bush-hammered by hand, to remove projections, and were then painted with a special cement paint, giving a uniform color. The interior partitions are plastered on terra cotta blocks, using a carpet float, and finished with tinted colors. The interior trim is entirely of British Columbia fir. The treatment of the ground floor took full advantage of the concrete construction, all the floors except the dancing floor being of red Welsh quarry tiles, with cement borders. A feature of the large rooms on this floor are the huge fireplaces, built of a true rose quartz quarried at the head of the lake. The cost of the building was $400,000, or about 28 cents per cubic foot.

GENERAL DESIGN FEATURES.

The original buildings had been allowed to encroach upon practically all of the available ground at the outlet of the lake, so that the new wing had to be built into the side of rising ground in order to communicate with the main Chalet, and at the same time face upon the lake. The principal axis of the main group was prolonged for a distance of about 75 feet, where the nature of the ground caused a change of 45 degrees to parallel the hill. The slope of the ground was so steep that to excavate a bench for the foundations, and at the same time cut back to provide light for the rear windows, would have been extravagant. The building was therefore built upon a cut-and-fill bench.

The requirement for a large unobstructed ground floor, without excessive head room, could be met only by the use of an arched ceiling, and the imposed weights of the four floors above rendered the design a difficult problem. It would not have been safe to have designed these arches as such, for the nature of the foundations and the absence of abutments to transfer the horizontal thrust would have invited trouble; nor was it possible to use a deep girder across the building, at least as is ordinarily done, as the headroom was limited by the architectural design and by the rqquirements of the hotel management.

In the design adopted 18-in. walls, pierced to provide the corridor, were built over each arch for the full depth of the bedroom story,

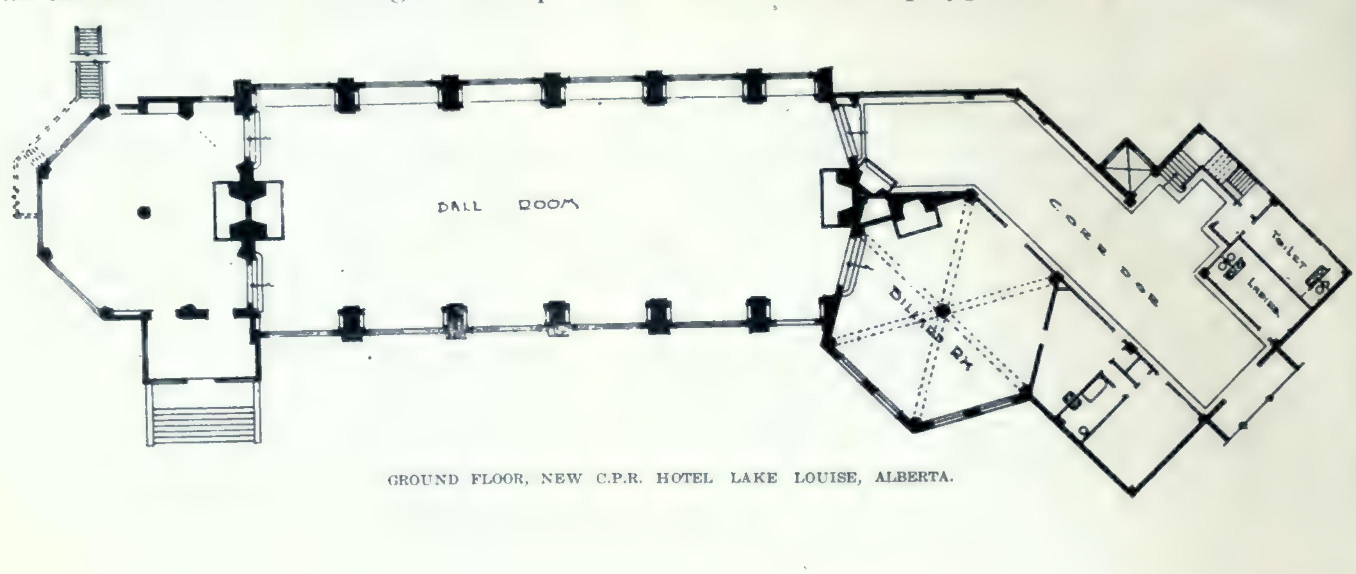


TYPICAL UPPER FLOOR PLAN, C.P.R. HOTEL, LAKE LOUISE, ALBERTA.

and the crown of the arch was designed in tension, while the beam over the corridor was designed in compression, the wall answering for the web of the girder. Except where complicated by the framing of the angles (introduced by a hexagonal tower and by the octagonal terminal at one end), and by a bend in the main axis, the beams and girders were spaced 21 ft. on centers throughout the building with steel in two directions. Over the arches the columns were spaced 10 ft. 6 in. from the main axis, and 21 ft. along the length of the building, bringing the loads from the upper stories onto the wall girder below at such a distance from the center of the span as cleared the opening through the web of the girder and simplified the design of the compression member. Generally, the beams were run around the building, and a single beam was run down the center of the three top slabs, but this center beam was omitted where the load would have come upon the center of the span, and the slab was carried from girder to girder, making the load uniform, rather than concentrated.

When all the loads from the floor above had been determined, together with those from the two floors carried directly across the girder, the girder was designed for bending, as a simple beam of depth equal to the distance from floor to floor plus half the thickness of the arch crown, or 147 in. The crown, which is 36 in. wide and 30 in. thick, was then designed to carry all the tension due to bending moment plus the bending due to the uniform floor load, the reinforcing bars being so placed as to resist any such action that might be developed in the ring. The remainder of the steel was run horizontally to the outside of the building to provide for bond and to assist in taking shear. The upper chord, which is 36 in. deep and 18 in. wide, was designed as a horizontal column subject to direct compression, and also for bending due to the floor loads. Steel was placed as for a hooped column, and additional steel was added for the bending stress, the bars being bent up into the slab to take care of diagonal shear. The diagonal shear in the entire girder was estimated, taking into account the direct loads of the columns and the weight of the girder; and sufficient steel was ordered to take care of the total theoretical shear across a plane at an angle of 45° downward and to the outside from the opening through the web. As actually constructed, none of this steel was placed beyond the bottom of the opening, largely for reasons of a practical nature. The arches were poured some time before the wall was poured, and only such diagonal steel as actually entered the arch ring was placed.

As mentioned before, there is an eight-story tower on the front of the structure, placed in the re-entrant angle formed by the bend in the axis. The tower is hexagonal in shape, with a circumscribed diameter of 56 feet., center to center of columns, and a single column in the center of the polygon. On the ground floor



GROUND FLOOR, NEW C.P.R. HOTEL LAKE LOUISE, ALBERTA.

there is a single room, 11 ft. high, with a flat-slab ceiling, while on the bedroom floors the tower is cut up into small rooms, and beams radiate from the center, forming, with the perimeter beams, triangular slabs which were reinforced in three directions. The roof of this tower has a rise of 14 ft., the beams radiating from the central column to form the hips. In the peak, formed under this roof, is a concrete regulating tank, carried on similar beams placed in a horizontal plane, with a false ceiling. It is interesting to note that the rise of this roof was determined by the architectural requirement that the slope of the roof must be visible from the edge of the lake, 200 ft. lower and less than 500 ft. away. The building terminates in an octagonal tower, 43 ft. in diameter, forming a single room on the ground floor 18 ft. high, with a single column in the center.

Except for the use of the solid exterior walls, the only other unusual feature was an overhang of 12 in. in the top floor—purely an architectural feature. The extremes of temperature are very high in the Rocky Mountains, and the use of the thin walls of solid concrete might be questioned. However, ample protection against temperature stresses has been secured by reinforcing all exposed surfaces with ½ in. square twisted bars, spaced 2 ft. apart horizontally and vertically, and staggered inside and outside the walls. No difficulty has been experienced with cracking, although the total range in temperature has been known to reach 140 F.

LOADS, ALLOWABLE STRESSES AND ASSUMPTIONS

In designing the structure the following values were used: Ratio of moduli, 15; concrete in bending, extreme fiber stress, 700 lb. per square inch; concrete in compression, 500 lb. per sq. inch.

The five loads assumed were 60 lb. per square foot for the bedroom floors and 125 lb. per square foot for the roof. There is a 3-ft. parapet surrounding the roof, and the assumption was made that there might be as much as 2 ft. of water behind this parapet, as the snowfall in this region is normally 10 to 14 ft. per year; the equivalent of 24 feet of snow therefore does not seem excessive.

In general, the columns are of the hooped type, with 1½ to 2 per cent, of longitudinal steel; those in the ground floor have spiral reinforcement in addition. All beams were figured for diagonal shear, and vertical stirrups were added to the bent bars, as the design and other conditions warranted. The transverse beams across the middle of the building were considered as partially continuous, and the longitudinal beams down the center of the structure, with the exception of the end spans, were figured as continuous.

The progress of the work was rendered extremely difficult by the isolation of the structure, and by the condition that the heaviest work had to be carried on during winter weather. The hotel was in use from the commencement of mild weather in the spring until the late fall, and construction was not allowed to proceed during this time. In addition, materials had to be freighted up from the railroad by teams, as the connecting narrow-gauge railway was not in operation at the time. It was particularly difficult to secure a sufficient supply of gravel to enable continuous progress, as the only available deposits were subject to freezing during the winter.

High School Science Department

(*Continued from page* 345.)

cases is needed for valuable chemistry and physics apparatus, and this should be located adjacent to the lecture room and laboratories. A few schools go so far as to provide a straight railway track the entire length of the science department, so that a table may be arranged for a lecture and then wheeled directly in; but this requirement is one which but seldom confronts the architect.

THE PHYSICS LABORATORY.

The physics laboratory requires room for six strong tables, each 4 by 6 feet, giving space at each for four pupils to work, and fitted with gas, electric current, compressed air, etc., as in the chemistry laboratory. Wall tables are located around the room on sides where there are windows. They are equipped with gas, electric current, and cold water supplies and drains. In order to save space movable copper sinks are made and arranged to fit into the holes leading to the drains. When not required they may be removed, allowing use of the bench for other purposes. Instead of double tables the "one-way" system is sometimes installed also in physics laboratories, allowing all pupils to face the front of the room, with corresponding gain in efficiency.

Another system sometimes adopted is to equip the physics laboratory with tables of ordinary height (30 inches), arranged in U-shape, at which pupils may sit in common chairs. These tables have gas and electric outlets, but no high cross bars. Rooms so arranged have a very attractive appearance.

The biological laboratory is often equipped with low, glass topped tables seating two pupils each, some built-in glass cases and drawers, an aquarium, and a large marble sink in two depths. The room may well have a southern aspect, and be equipped with a small conservatory for the observation of growing plants. A demonstration desk fitted up similarly to one for chemistry is sometimes, but not often, provided.

May Eliminate Mechanical Ventilation In New York Schools

AT periodic intervals the exponents of open-window ventilation obtain the front of the stage to proclaim that the present-day method of ventilating buildings by mechanical means is not sufficiently superior to the open-window method to warrant the outlay for the elaborate systems usually installed.

The latest "bombshell" of this sort has been thrown by the New York City Department of Health. In a letter addressed to the New York City Department of Education attention is called to some recent tests of school buildings, some of which were mechanically ventilated and some ventilated only by opening the windows, which apparently show that the prevalence of respiratory diseases is lower when the open-window method is used. The letter concludes with the statement that these tests indicate that it is not necessary for the Department of Education to plan for mechanical ventilating systems in its proposed new school buildings.

While no school construction is contemplated for the present in New York City, plans have been, or are being drawn for a number of schools, so that the matter is one that requires an early decision.

In view of the possible consequences of such a step, which would involve the flashing of the word throughout the country and abroad that New York City had abandoned mechanical ventilation for its schools, the action of the New York Health Board is recognized as sufficiently serious to engage the attention of the Heating Engineers' Society, acting, for the time being, through the New York Chapter of the society.

On the call of President P. H. Seward, of the New York Chapter, a meeting of the chapter's officers and others was held September 13 at the society's headquarters, which resulted in the appointment of a committee "to investigate and report upon proper methods of ventilation of classrooms of schools."

THE TESTS IN QUESTION.

Due to the importance which has been assigned by the Department of Health to the tests referred to, it will be interesting to recall their principal features. They were made in 1916 by the Bureau of Child Hygiene, Department of Health of New York, in co-operation with the New York State Commission on Ventilation. The commission had full control of the selection of classrooms with reference to the type of ventilation to be included, the preparation of forms for recording observations relating to ventilation, the supervision of methods used in obtaining all data concerning ventilation and the final checking up and analysis of the data on ventilation. The Bureau of Child Hygiene had supervision of all other details of the plan.

The inquiry consisted of two complete studies. The first period lasted from February 19, 1916, to April 8, 1916. The second study began November 4, 1916, and extended to January 27, 1917. In 1916 eight schools were studied, and in 1916-1917 twelve schools were selected. For the study of 1916, 2,541 children were under observation, and for the 1916-1917 study 2,992 children were observed. Eighty-six per cent. were from eight to eleven years old. The children were grouped in 58 classrooms in 1916 and in 76 classrooms in the study of 1916-1917. They were of the same age in both studies, from the same localities and of the same nationalities, but an entirely different group were studied each time.

THREE TYPES OF VENTILATION USED.

It was decided that three types of ventilation should form the basis of the study:

1. Type A. These were the so-called cold, open-window classrooms, ventilated by natural means. It was the desire to have the temperature kept at 50 degrees F. This, however, was found to be impossible, owing to variations in the weather, and it therefore ranged from 50 to 60 degrees, and occasionally higher.

2. Type B. These were moderate-temperature classrooms, kept between 60 and 70 degrees F., averaging about 68 degrees F. Ventilation was wholly by open windows. Some rooms had gravity exhaust ducts, while others did not. Window deflectors were used in only one room in the 1916 study, while in the 1916-1917 study window deflectors were installed and used in all rooms.

3. Type C. These rooms were of the same moderate temperature as in Type B, that is, averaging 68 degrees F. Ventilation of the classrooms was by the plenum fan system installed in the buildings, the windows in these classrooms being kept closed.

Records were made by a corps of nurses at each school session of absences from all causes, absences from sickness other than respiratory, absences due to respiratory sickness, respiratory sickness occurring among pupils in attendance at school, temperature of classrooms at each school session, humidity of classrooms at each school session, and sensations of observers at each school session as to temperature, moisture, odor and air motion in the classroom. The record of air conditions was made at eleven o'clock each morning and each afternoon at the end of the period of study immediately before aerating the room for the recreation period. All data were recorded under the items of odor, temperature, moisture, air motion, and air vents. The temperature was taken with the dry and wet bulb, with the sling psychrometer in the centre of the room, about 3 to 4 feet from the floor, and the humidity was computed therefrom by standard methods.

There were 197,977 pupil session units in the 1916 study, and 317,881 pupil session units in the study of 1916-1917. The data obtained showed that there were 506 more pupil session absences due to respiratory sickness in Type C (the mechanically-ventilated classrooms at 68 degrees) than in Type B (the open-window classrooms at 68 degrees), and 983 more pupil session absences due to respiratory sickness in Type C than in Type A (the open-window classrooms at 50 degrees). Also, there were 7,257 more pupil sessions of respiratory illness occurring in pupils in attendance at school in Type C (the mechanically-ventilated classrooms at 68 degrees) than in Type A (the open-window classrooms at 50 degrees) and 9,170 more in Type C than in Type B (the open-window classrooms at 68 degrees).

It was also shown by the data that in absences from school of children who are ill with respiratory diseases, Type C (the mechanically-ventilated classrooms at 68 degrees) has the highest percentage in both studies. Types A and B (the open-window classrooms show variation, but in both instances are distinctly lower than in Type C.

The respiratory illness among pupils in attendance at school was found to be higher among the children of the Type A (open-window classrooms at 50 degrees) than in Type B (open-window classrooms at 68 degrees), while both remain lower than in Type C (mechanically-ventilated classrooms at 68 degrees). As an explanation of the excess of respiratory sickness in Type A over Type B, attention is called to the factor of temperature of 50 degrees in Type A and 68 degrees in Type B. In this study the children under observation wore only their ordinary clothing, no extra wraps being provided. Both of these types were open-window classrooms, the essential difference being in the temperature.

Based on these and other data obtained in the investigation the Bureau of Child Hygiene reached the following conclusions:

1. In the closed-window, mechanically-ventilated type of classroom kept at a temperature of about 68 degrees F. the rate of absences from respiratory diseases were 32 per cent. higher than in the open-window, naturally-ventilated type of classroom kept at the same temperature (about 68 degrees F., and about 40 per cent. higher than in the open-window, naturally-ventilated type of classroom kept at a temperature of about 50 degrees F.

2. In the closed-window, mechanically-ventilated type of classroom kept at a temperature of about 68 degrees F. the rate of respiratory diseases occurring among pupils in attendance was 98 per cent. higher than in the open-window naturally-ventilated type of classroom kept at the same temperature (about 68 degrees F.) and about 70 per cent. higher than in the open-window naturally-ventilated type of classroom, kept at a temperature of about 50 degrees.

3. It was found in this investigation that the relative humidity of classrooms, whether ventilated by natural or mechanical means, was not a causative factor in the occurrence of respiratory illness among school children.

4. It was found in this investigation that the occurrence of respiratory diseases among school children was not influenced by sex.

The tests here described were made the subject of a paper by S. Josephine Baker, M.D., director of the Bureau of Child Hygiene, and presented before the Sociological Section of the American Public Health Association at Washington, in October, 1917. The paper has now been reprinted by the New York City Department of Health as No. 68 of its "reprint series."

COMMENTS ON TESTS.

In discussing some of the features of these tests, Perry West calls attention to the fact that classrooms with mechanical ventilation and consequently more or less air motion are compared with those of the same temperature having open-window ventilation, and presumably less air motion. "We would naturally expect," he states, "poorer results from the mechanically-ventilated rooms under these circumstances, even with the same percentage of relative humidity. It is not stated, however, whether or not the same amount of relative humidity was carried, and if no moisture was added in either case, the mechanically-ventilated room would naturally be much drier, due to the more rapid air change and less opportunity to absorb moisture from the pupils.

"In the second place, open windows at 50 degrees F. are compared with a mechanically-ventilated room at 68 degrees, which is, without question, a futile comparison, as either type of room would naturally be more healthful at 50 degrees than at 68 degrees. In neither case is the temperature of the incoming air taken into consideration. This initial temperature has a marked influence on the relative humidity of the air in certain parts of the room, compared with the average humidity of the entire room.

Dominion Astrophysical Observatory at Victoria, B. C.

By J. S. Plaskett, Director, Victoria, B.C.

THE cause of astronomy in Canada has been markedly advanced by the completion of the 72-inch reflecting telescope at the Dominion Astrophysical Observatory at Victoria, B.C. By the construction of this splendid instrument, the second largest in the world, the Government has shown great progressiveness and enterprise in advancing science. This institution, with the well-known work of the Dominion Astronomical Observatory at Ottawa, will place Canada in the forefront among the nations in astronomical research, as no other national observatory has a telescope of half the aperture of the mammoth instrument at Victoria.

The project was first brought to the attention of the Government in 1911, and then again in 1912 by memorials from scientific societies, but it was not until the spring of 1913 that the Hon. Dr. W. J. Roche, Minister of the Interior, who has sympathetically supported the enterprise from the first, authorized enquiries and the calling for tenders for 60-inch and 72-inch reflecting telescopes. Contracts for the construction of a 72-inch reflecting telescope were let to the John A. Brashear Co. for the optical parts, and to the Warner & Swasey Co. for the mechanical parts, in the fall of 1913. These firms are probably the most favorably known in the world in their particular lines, and have produced a superb instrument, which is now engaged in regular astronomical work, and fully meeting all expectations.

This great telescope differs entirely from the layman's idea of such an instrument, which he conceives as a nicely mounted brass telescoping tube, with a lens at the outer end and an eyepiece at the inner. Such telescopes and the larger ones of the same type mounted at most observatories are refracting telescopes, in which the light coming from the star or other object at the outer end forms an image of the object at the inner end, a real image similar to that formed on the ground glass of a camera, and this image is magnified by the eyepiece, or ocular, as it is technically called. In the reflecting telescope the outer or upper end of the tube is open, and a concave mirror is placed at the lower end, which reflects the light back to the upper end, forming an image of the star there, where it can be magnified by the eyepiece as in the reflector.

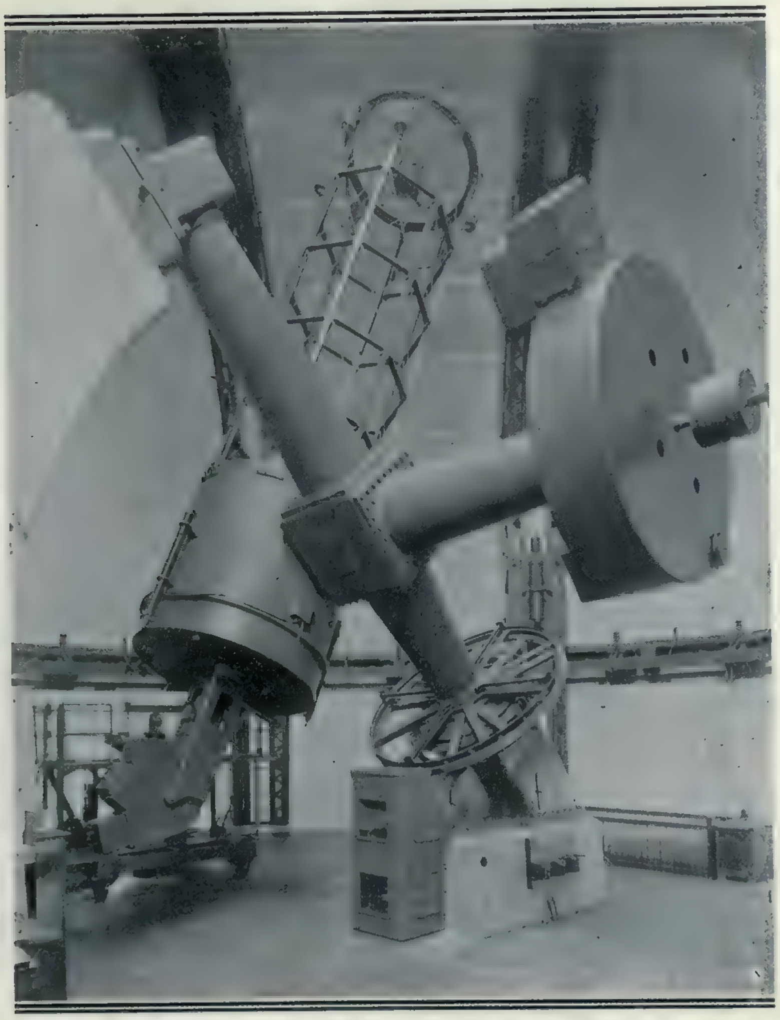
For many years most observatories were supplied with refracting telescopes, which are slightly more convenient to operate, and are more suitable for the visual observations, which in the nineteenth century formed the major part of astronomical work.

THE BRITISH COLUMBIA OBSERVATORY IS CIRCULAR, 66 FEET IN DIAMETER AND SURMOUNTED BY A REVOLVING DOME. IT IS ENTIRELY OF STEEL CONSTRUCTION.

The application of photography to astronomy, for which visual telescopes are not suited, and in which the reflector offers marked advantages, led to the greater use of reflectors, and this change was hastened by the practical impossibility of obtaining the large pieces of glass required for large lenses. The 40-inch Yerkes refractor, completed about 1895, the largest refractor in the world, was the last very large refracting telescope to be built. The change to the reflecting type was accelerated by the fact that a reflector with its dome can be built for about a quarter the cost of a refractor of the same aperture.

Hence, when the Dominion Government decided to obtain a large telescope, only the reflecting type was considered, and the aperture of 72 inches was considered about the useful practical limit. There were reflectors of 36 inches at several observatories, and a very successful one of 60 inches at Mt. Wilson, California. There was also at the latter place a reflector of 100 inches aperture under construction, but the material of the mirror was defective, and no better could be obtained. This instrument has since been completed, but the Dominion telescope was regularly employed in actual observing before the 100-inch.

In the 72-inch reflector, the principal optical part is the large mirror, which is 73 inches in



THE 72-INCH REFLECTING TELESCOPE, THE TUBE OF WHICH WEIGHS 15 TONS, WHILE THE SKELETON UPPER SECTION IS 23 FEET LONG AND WEIGHS 2 TONS.

diameter, 12 inches thick at the edge, 11-1/10 at the centre, with a central hole 10 inches in diameter. It is constructed of a kind of plate glass, and, as the upper surface only is finished accurately and has a bright coat of silver deposited chemically on it, so that the light does not enter or go through the glass, as in a refractor, it is evident, so long as this surface is perfect, that a few bubbles or other defects in the interior, which would be fatal in a lens, do not matter. This particular mirror, however, has very few such defects, and is a beautiful example of the glass makers' art. It was cast at Charleroi, in Belgium, in the spring of 1914, and shipped from Antwerp only three or four days before war was declared. It was ground and polished by the John A. Brashear Co., the most noted opticians in America, if not in the world. The extreme accuracy required in the reflecting surface can be realized when it is said that it must nowhere deviate over the whole 72-inch concave surface more than one two-hundred-thousandth of an inch from the true theoretical form. It is this accuracy, which is twenty times beyond mechanical methods of measurement, and is tested by an optical method, which explains the high cost and the long time required to obtain high grade lenses and mirrors.

This mirror, which weighs 4,340 pounds, is mounted in the lower section of the tube of the telescope, seen to the left of the photograph. This section, which is a steel casting 7 ft. 6 in. in diameter and 1 ft. 6 in. deep, is arranged to support the mirror flexibly without strain, and yet invariably in position, and weighs nearly four tons, so that mirror and cell weigh six tons. The flange of this cell is bolted to a corresponding flange on the central section of the tube, also a steel casting of the same diameter and 6-ft. high, weighing seven tons. The upper section of the tube of skeleton form is built up of structural steel, is of exceedingly rigid and light construction, is 23 ft. long, and weighs two tons.

The light from the star or other object at which the telescope is pointed enters the tube and falls on the silvered concave surface of the big mirror. It is reflected upwards in a converging beam and forms an image of the object at the centre of the circular member, held centrally at the upper end of the tube by thin perforated webs, which being placed edgewise obstruct very little light. This image can be observed here by an auxiliary telescope reflecting it to the side of the tube, or, as is its chief purpose, can be photographed on a plate placed in a suitable holder at this point. Such observations are made at what is called the principal focus.

AN ALTERNATIVE METHOD.

An alternative method of using the telescope is to attach to the circular member a flat mirror about 20 inches in diameter, mounted diagonally about 4 feet down the tube. This reflects the beam to the side of the tube, where it can be conveniently observed with an eyepiece and directly photographed as before. The instrument arranged thus is called a Newtonian telescope.

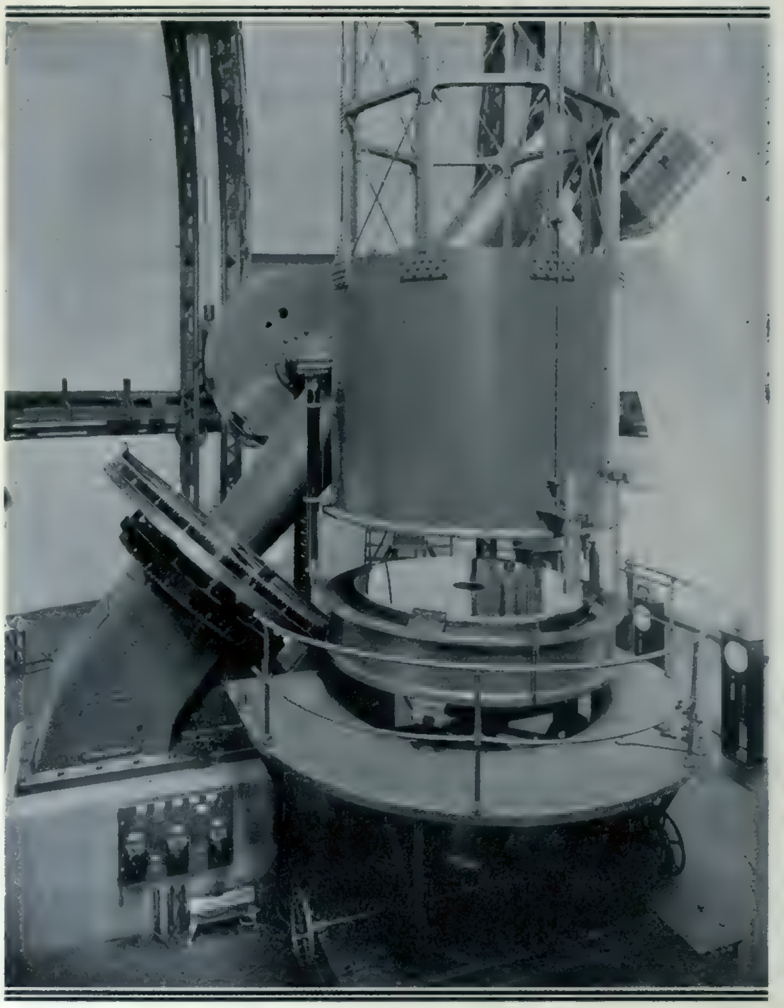
A third method, and the form in which the telescope will mostly be used, is the Cassegrain, in which a convex mirror, 20 inches in diameter, attached to the same circular member, and held about 7 feet down in the tube, reflects the light from the main mirror back again through its central hole and forms the image of the object pointed at about a foot below the mirror cell. Here it can be viewed by an eyepiece or photographed, but will in general be analyzed by the spectroscope, which is seen attached below the mirror cell at the bottom of the tube. The spectrum of the star is formed and photographed by the spectroscope, and from this spectrum can be determined, not only the elements present in the atmosphere of the star and its temperature and pressure, but also the velocity with which it is moving towards or from us, and, as a development of the last year or so, its distance. The spectroscope is probably the most wonderful instrument of research ever devised, as, by the character of the light from any body, no matter how distant, such marvellous knowledge can be obtained, and the telescope will mostly be used with this attachment.

The tube of the telescope weighs 15 tons, and this great weight is necessary in order that it may be sufficiently rigid to maintain the optical parts in their correct relative positions. At the same time, they, and the tube in which they are held, must be so mounted as to enable them to be readily pointed to any desired object in the sky and then to accurately follow its motion across the sky.

This is effected by attaching the tube to a cross shaft, passing horizontally to the right in the photograph, called the declination axis, which is 14 feet long, 16 inches in diameter and weighs over five tons. This axis ends in the weights shown, which balance the telescope on the polar axis, the large, inclined built-up shaft, running diagonally across the photograph and resting in bearings on the two piers. Motors and gearing for moving the declination axis and tube are contained in the large circular housing to the right.

The polar axis, so called because it is adjusted parallel to the earth's axis, is built up of three steel castings bolted together, and is 23 feet long, weighing nearly 10 tons. It carries tube, declination axis, housings and mechanism in ball-bearings on the north and south piers, the total weight of the moving parts being 45 tons, and is also moved by motors for setting the telescope to any desired object. In addition to such comparatively rapid movement, it is driven by a very accurate governor mechanism, called the driving clock, at the rate of one revolution every twenty-four hours on the polar axis. This revolution at the same rate and in an opposite direction and on a parallel axis to the earth, counteracts the effects of the earth's revolution, and enables the telescope to accurately follow the apparent motion of the stars across the sky.

All this mechanism has to move the enormous mass of the telescope with the greatest smoothness and accuracy, and requires the greatest perfection of workmanship. It is a masterpiece of the mechanician's art, and forms a marked



THIS MIRROR WEIGHS 4,340 POUNDS. ITS DIAMETER IS 73 INCHES AND IT IS 12 INCHES THICK AT THE EDGE. THE HOLE NOTICED IN THE CENTRE IS 10 INCHES IN DIAMETER.

advance, not only in size, but in design, quality of workmanship, accuracy and convenience of operation, with, at the same time, relative simplicity of construction, over any previously built. The builders of the mechanical parts of the telescope and of the dome were the Warner & Swasey Co., who have made the mountings for the Yerkes 40-inch, the Lick 36-inch, and

(*Concluded on page* 368.)

CONSTRUCTION

A · JOURNAL · FOR · THE ARCHITECTURAL ENGINEERING · AND · CONTRACTING INTERESTS · OF · CANADA

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FRED. T. HOLLIDAY, Advertising Representative

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Better Prospects for Building

War-time restrictions will now release materials to their former uses. Consequently steel and other products required for building will become more available with the result that a resumption of work on a large number of suspended projects can be looked for, in addition to the erection of an increasing amount of newly planned work.

The feeling of optimism based on the recent turn of affairs not only warrant this assumption, but there are certain definite signs which point to an early return to former conditions. A hurried survey of the field already reveals a state of preliminary activity in many of the architectural offices. In a number of cases there is a demand for the services of competent draughtsmen, which indicates that the planning of new structures has arrived at a stage which practically assures early developments.

Among deferred projects in Toronto alone are a modern departmental store and large mail order house, each running into the millions, which will now undoubtedly go ahead. In fact almost every city or town of prominence in the Dominion has its quota of postponed and after-the-war work which under the influence of peace will materialize to a very large extent. Hardly a community exists but what has outgrown its school accommodations and will require new buildings. The housing problem will also likely be given more direct consideration. Moderate price dwellings are badly needed, while owners contemplating better residential work which has been deferred out of deference to the war sentimnt, will now proceed to build. There are also a large number of churches for which funds are available and which in a number of cases have their basements completed, to be started and brought to completion.

Labor will also be easier to obtain, as a percentage of men released from munition work and returning from overseas will again take up the building trades and help the situation along. Prices, however, will probably remain as they are for some time, probably permanently, but this will not be such a deterring factor as heretofore. It is now more or less generally accepted that wages will stay pretty close to where they are, in which event the manufacturer and supply dealer will have to hold to present prices. The dollar has apparently taken on a new standard of value, and reconciled to this new condition owners who are going to build will no longer hold back proposed work.

At the very least there is much to look forward to. Of course getting back to a pre-wartime basis is going to be a gradual process, but the prospects are such as to justify the prediction that building work at any rate will increase steadily in volume, and that with the opening of the Spring season a vastly improved condition will exist.

U.S. Building Restriction Removed

All restrictions on non-war construction throughout the United States have now been officially removed. According to the U.S. Official Bulletin, formal notice to this effect has been telegraphed to the chairmen of all the State Councils of Defence by D. R. McLennan, chief of the non-war construction section of the War Industries Board.

The action taken permits all building operations of whatever character, held up in the interest of the war programme, to proceed. No further permits will be required from the War Industries Board or the State Councils, through whom control over the situation in each State was maintained.

Dominion Astrophysical Observatory

(*Continued from page 366.*)

many other of the largest telescopes of the United States.

The building in which the telescope is housed is circular, sixty-six feet in diameter, surmounted by a revolving dome. It is built entirely of steel, and has a double steel covering, with provision for circulation of air between the walls from the ground up to louvres at the top of the dome. This is to prevent the building from getting overheated during the day and to enable it to quickly take the temperature of the air, both essential conditions for the satisfactory working of such a large instrument. The dome, as well as the telescope, though not the largest, is the most complete in all mechanical details of any before built. It is of hemispherical shape, provided with a double shutter to be opened during observing, sixteen feet wide and extending beyond the top. A movable platform raised and lowered by an electric motor, across the shutter opening enables the observer to conveniently reach the top of the tube when the principal focus or Newtonian focus methods are being used. Movable canvas curtains electrically operated move up from the bottom and down from the top so as to limit the length of the opening to prevent the wind shaking the telescope tube. The whole dome is revolved by a motor operated by a switch on the same boards from which the telescope is set. Indeed everything that could be thought of to facilitate the work of the telescope has been placed in dome and mounting, and use has demonstrated the completeness and perfection of the whole equipment.

The equipping of this observatory in such a splendid manner places Canada in the forefront among the nations in astronomical research, as no other country has in its national observatory a telescope of half the size of this splendid instrument. The work accomplished with this installation in its splendid location will undoubtedly materially help towards the solution of the problems of the constitution of the universe, and will make Canada and Victoria well known in the scientific world.

LONDON TECHNICAL SCHOOL CLOCK SYSTEM.

The clock system installed in the new Technical School, at London, Ont., is the most modern installation of electric clocks and automatic bell ringing systems in Canada. The

Type of Master Clock used in connection with Time Regulating System in London (Ont.) Technical and Art School.

entire system is a Canadian product, manufactured by the International Business Machines Co. of Toronto.

It consists of a self-winding master clock, forty secondary clocks, bell ringing programme, switch-board and distribution panel, storage battery, etc. The system is entirely operated by the master clock automatically; it winds itself every minute, which gives a uniform power all the time, every minute it transmits a weak impulse to the switch-board which in turn distributes a stronger electrical impulse to the secondary clocks located in the different class rooms. The master clock is of the dead beat Graham escapement type, with a compensation pendulum composed of a nickeled steel pendulum rod and two cut glass jars full of mercury, which will keep time within two seconds per month irrespective of a sudden change of temperature. This degree of precision transmits a degree of accuracy to all the units connected to the system.

CIRCULAR HOUSING PLAN

"Construction" desires to give credit to the "Canadian Engineer" for the main features of the text appearing in Mr. G. J. Lamb's article published in the September issue under the above title. The subject, which is a most interesting one, and has caused considerable discussion, deals with a housing scheme claiming special economic and engineering advantages, whereby a number of houses are grouped in a circular plan which can be adapted to rectangular city blocks.

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If you convince him of value—there's no question of price

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New Sun Life Building, Montreal, showing Copper Roofing, Cornices and Windows.

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(Bronze Covered)

"Crown" All-Steel Doors and Trim

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Fireproof Doors

The FACILE DOUBLE-HUNG WINDOWS, bronze covered as shown above, were installed in the New Sun Life Building, and are doing excellent service. The FACILE WINDOW is absoutely tight, and for ventilation and cleaning they're a marvel in simplicity.

"CROWN" ALL-STEEL DOORS and TRIM as above were used throughout in the New Sun Life Building, finished in mahogany.

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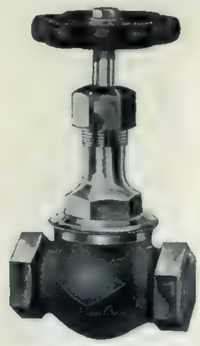

Fig. 106

Fig. 108

is the result of our continual endeavour to produce valves of unquestionable quality.

They have set the Standard for Quality and Service since we first commenced their manufacture—

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Fig. 117

TRADE JENKINS MARK
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December, 1918 Volume XI, No. 12

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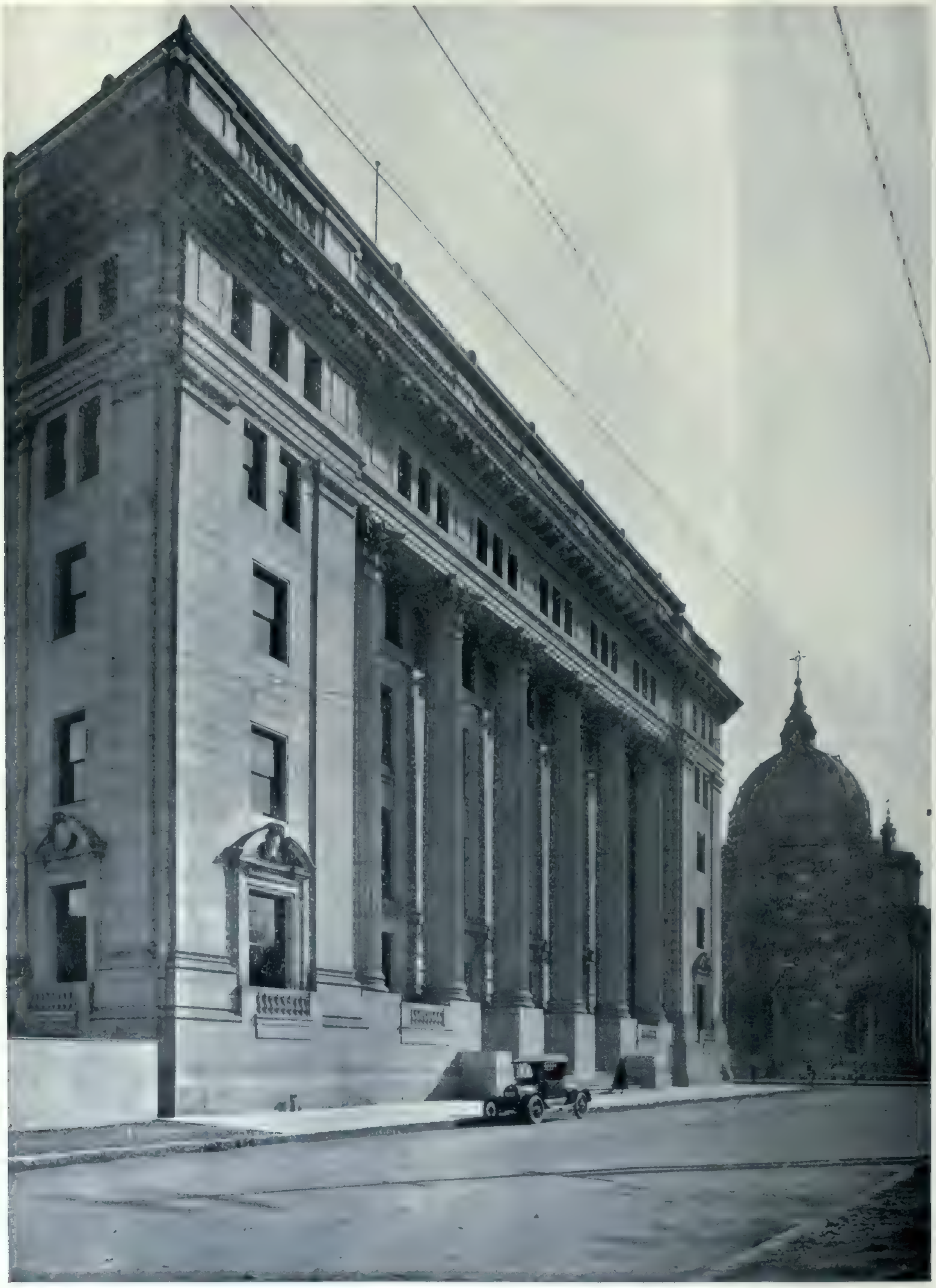


THE NEW SUN LIFE BUILDING, MONTREAL, QUE.

DARLING & PEARSON, ARCHITECTS.

The New Sun Life Building, Montreal, Que.

DARLING & PEARSON, Architects

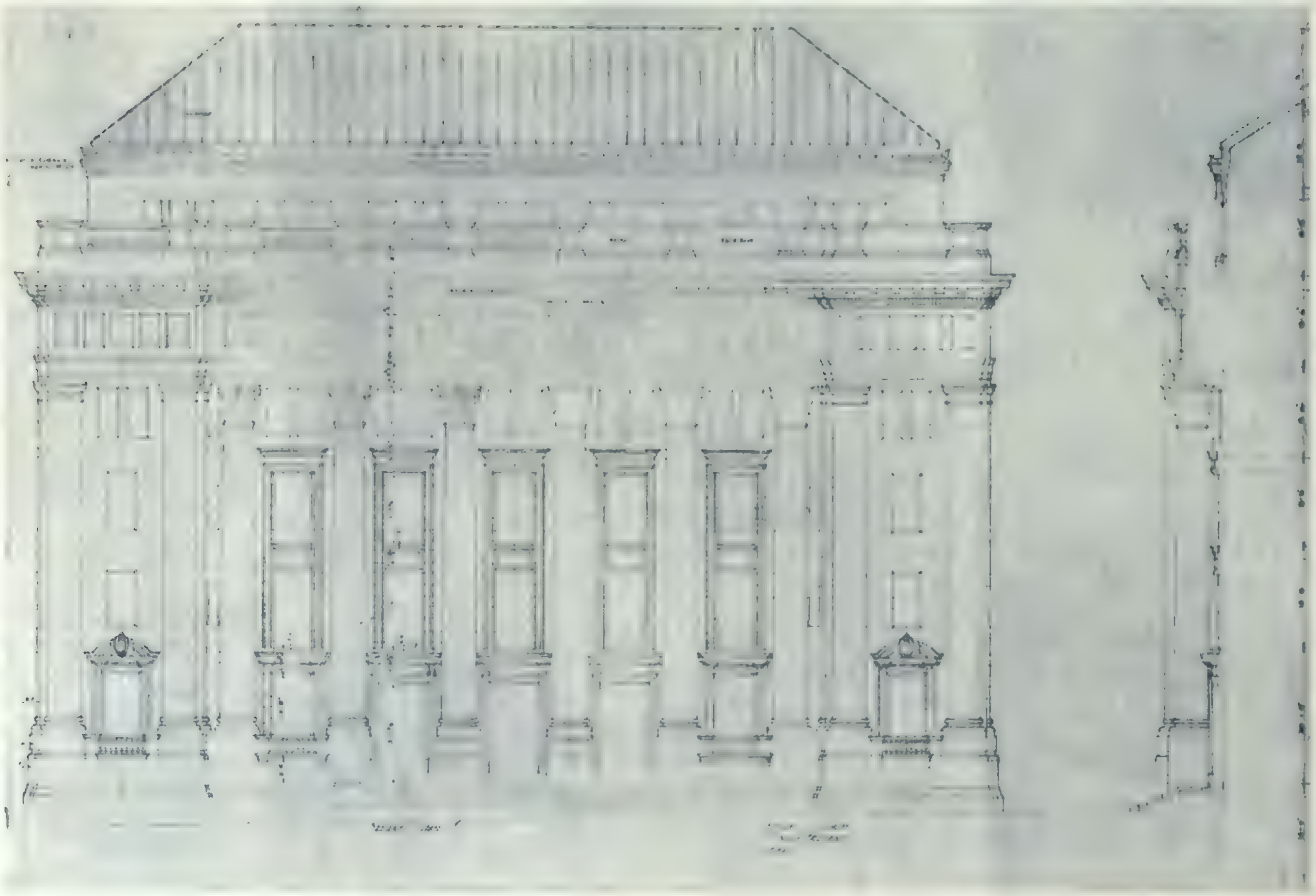
In the new Sun Life Building, the city of Montreal has once more demonstrated to our readers her progressiveness. It has always been her ambition to be the leading city in Canada for structure which impress the student as well as the laymen of their artistic merit and their commercialistic value. How well she has succeeded is revealed in the large number of her up-to-date banking institutions, schools, churches, theatres, hotels, manufacturing plants and public buildings. If she does not stand supreme in this respect, she is going ahead so rapidly that it behooves other cities to have a care, else she will gradually outdistance them.

This new home of the Sun Life Assurance Company of Canada is a monument of dignity and restraint; in perfect harmony with the institution itself. What better accommodation, more tasty design or commanding site could have been selected by the architects? The Company itself is of Canadian birth and has grown into the largest and best equipped corporate body of its kind in the British Empire. Organized in 1865 it has been guided since infancy by the same Scottish thrift which brought it into existence. And what better appreciation of its worth than to know that during the present year over $60,000,000 of new business will have been transacted on account of the studied plans of the heads being executed with enthusiastic confidence by a corps of men well equipped to carry on this great work. The wonderful spirit of Robertson Macauley, who was President of the company from its birth until three years ago seems to have permeated the whole organization. Guided by the motto "Follow the Flag" The Sun Life Assurance Company of Canada is found in all British colonies, and is also fast gaining a commanding position in other countries.

EXTERIOR DETAIL.

It would have been a difficult task to have selected a more commanding site than the Dominion Square. Representing the westward growth and life of Montreal, this small park is situated in the best neighborhood of the city. As one leave the entrance to that well-known hostelry—the Hotel Windsor—he sees facing him on the opposite side of the square an imposing edifice which happens to be the subject of our article. Originally this location was occupied by a seven story grey cut stone building in Queen Anne style. It was the oldest Y.M.C.A. building in Canada. As traditions and landmarks mean nothing to us it naturally fell a prey to the ravages of modern progressiveness. Just to its right on the other side of Dorchester street is the St. James' Cathedral designed by Victor Bourgeau after the style of St. Peter's of Rome, Among other buildings on the square might be mentioned a number of interesting churches as well as the C.P.R. station.

In the square are several monuments, one of which is closely connected with the Sun Life Company. It was a fitting tribute to Her Majesty, Queen Victoria, on the date of her jubilee 1897.



FRONT ELEVATION.

and was at that time presented to the city of Montreal. Executed in rough stone and surmounted by a lion it acts as a natural link between our Empire and one of her leading institutions.

This, then, was the problem presented—to plan for an active modern business a structure which would express the full meaning of the business within and at the same time have it enhance rather than detract from the dignified character of it environments.

That the architects fully appreciated the task in its entirely is quite evident, not only from the appearance of the building itself, but also when taken in conjunction with its general surroundings. Standing some hundred feet above the ground; clothed throughout with a gray granite which invites as well as demands respect; designed with classic feelings of severity and refinement; it tends to raise our own standards of art and as a consequence lift a little higher our immediate thoughts. It is one more argument in favor of adhering to precedent and still allowing of a liberal and free adaptation to fit our present needs.

The central portion of the main facade consists of six massive fluted columns, five feet in diameter, fifty one and a half feet high, which form the decorative feature. These in connection with moulded treatment of the windows between, furnish a striking contrast to the plain subdued treatment at each corner. The columns are recessed so that all the mouldings are back of the face of the main wall, a feature permitting of a richness without the feeling of obtrusion. In order not to break the stability and severity of the corners. The openings are plain with the exception of those at the ground floor. The vertical tendency of the central portion is enhanced by allowing

GENERAL EXTERIOR VIEW.

VIEW TOWARDS MAIN HALL.

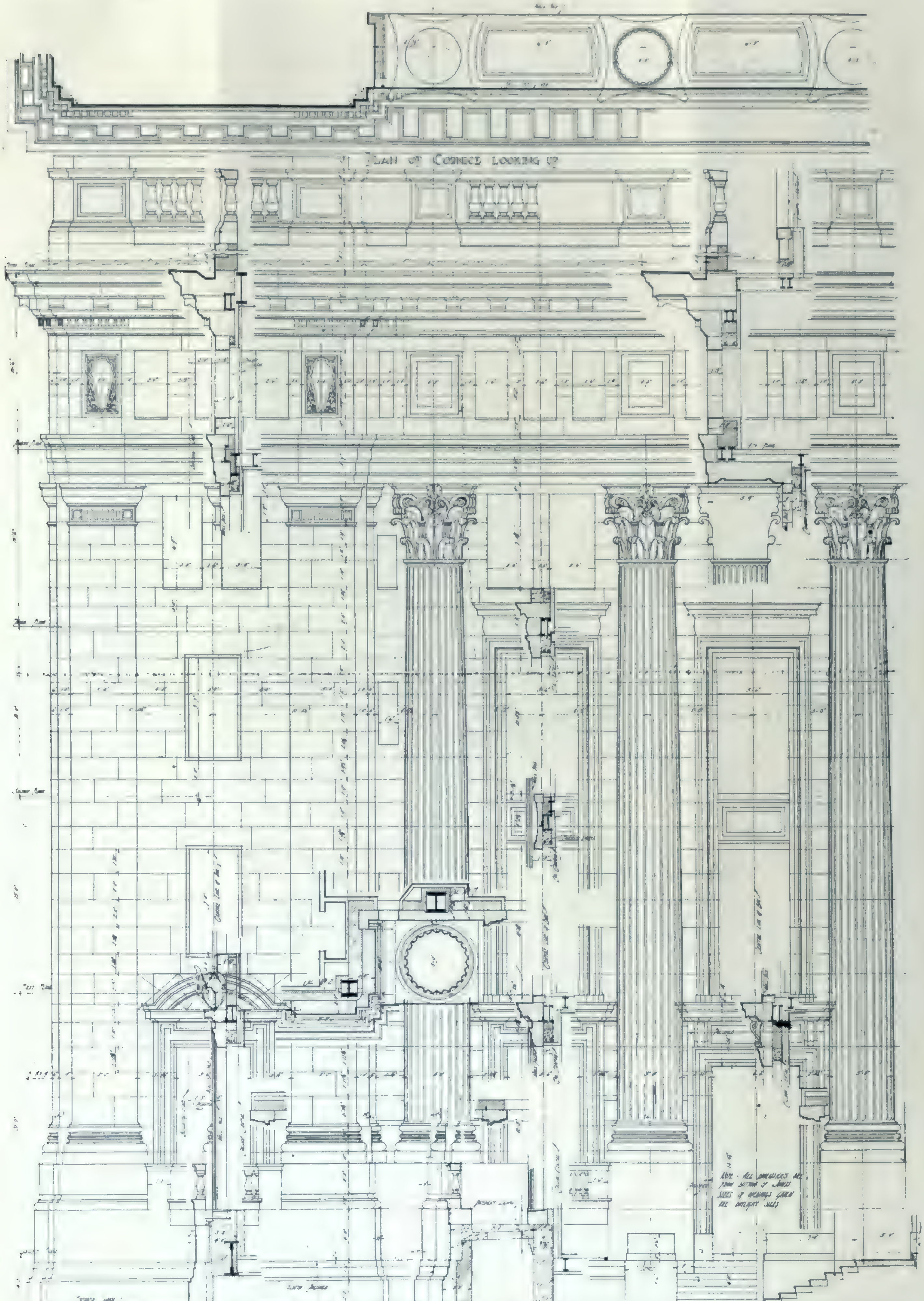
the window trim to continue unbroken from the first to the third floor.

The writer had the pleasure of studying this structure by moonlight when the silhouettes of the main divisions stood out, submerging to a large extent the small openings and details. At this time the real strength of the design became more apparent. The one thought which seemed to prevail was the unfortunate demand of our modern ideas for so many window openings. Our mind wandered back to the Spanish architects who seemed to possess to a marked degree the value of contrasts. They always selected the vital spots for ornamented richness with the surrounding portions treated in a simple unbroken surfaces so as to enhance, if possible, the value of the parts they wished to emphasize. Naturally their business methods were not ours of to-day. We need the light and ventilation in each small interior division. In the Sun Life building this need is met in as wholesome a manner as possible in the use of classic design. Each and every room, no matter how small, is well provided with window space, so that the artificial methods have been reduced to a minimum.

The sides of the building vary slightly from the main facade. A series of seven full pilasters enclose the window treatment. Here the openings for the various floors form a unit in themselves; that of the ground floor consisting of a single window possessing a circular pediment; the three floors above having a double opening, while those in the frieze are grouped in threes. Running around the building at the fifth floor is a pierced balustrade effect. No attempt has been made to show a completed design toward the rear as it is the intention of the company to lengthen the building at such time as conditions warrant.

The entrance to the main hall is through any one of three doorways. These consist of revolving doors housed in solid marble walls circular in plan, the sturdy character of which provides a fitting debut to the interior. The central opening is on the direct axis passing between stairways, elevators into the main hall while the other two are placed directly opposite the two main stairways. Once within we are struck with the severity of the design which grows more impressive as we appreciate the airiness and warmth imparted by the pinkish Tennessee marble which springs from its base of polished Belgian black and continues uninterrupted around the walls to the ceiling, up the stairways, by the elevator enclosures and on throughout the large main hall. The marble being slightly tooled so as to impart an atmosphere of solidity as well as delicate ornateness, the eye is naturally carried to the coppered ceiling, which corresponds in tone value to that of the walls. The monotony which might otherwise arise in prevented by the ornamented courses in gold. This entrance hall is exceptionally pleasing to the eye in its design of chasteness and restraint as well as the mellow effect given to the color scheme throughout.

Leading to the executive offices on the first floor are two monumental stairways. The treads consist of two inch marble slabs, while the balustrade is patterned after a plain Grecian idea having the perforated design cut from a solid five and one half inch thickness of marble. At



THE NEW SUN LIFE BUILDING, MONTREAL.

DARLING & PEARSON, ARCHITECTS.

DETAIL OF CORINTHIAN CAPITAL.

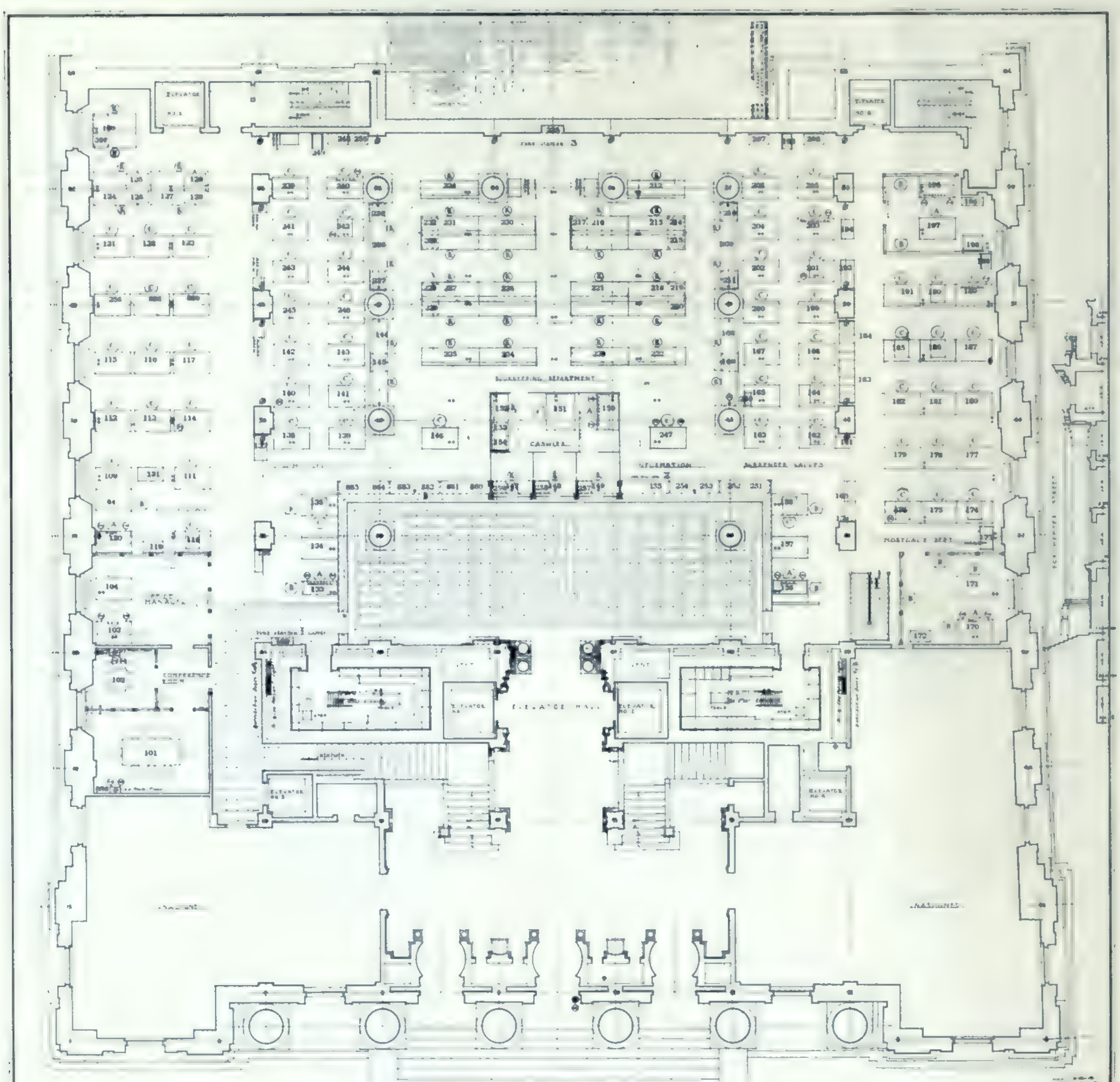
THE NEW SUN LIFE BUILDING, MONTREAL, QUE.

DARLING & PEARSON, ARCHITECTS.

ENTRANCE HALL.

each side of the stairways facing the elevators are placed two carved marble benches which fit into a recess especially made for this purpose. Directly back of the stairways and in front of main hall entrance are placed the two elevators furnishing access to all floors. The bronze grill work is designed to conform to the classic treatment around the door, which is in itself somewhat refined by the long slender brackets; thereby maintaining a harmonious scale between the bronzework and stone.

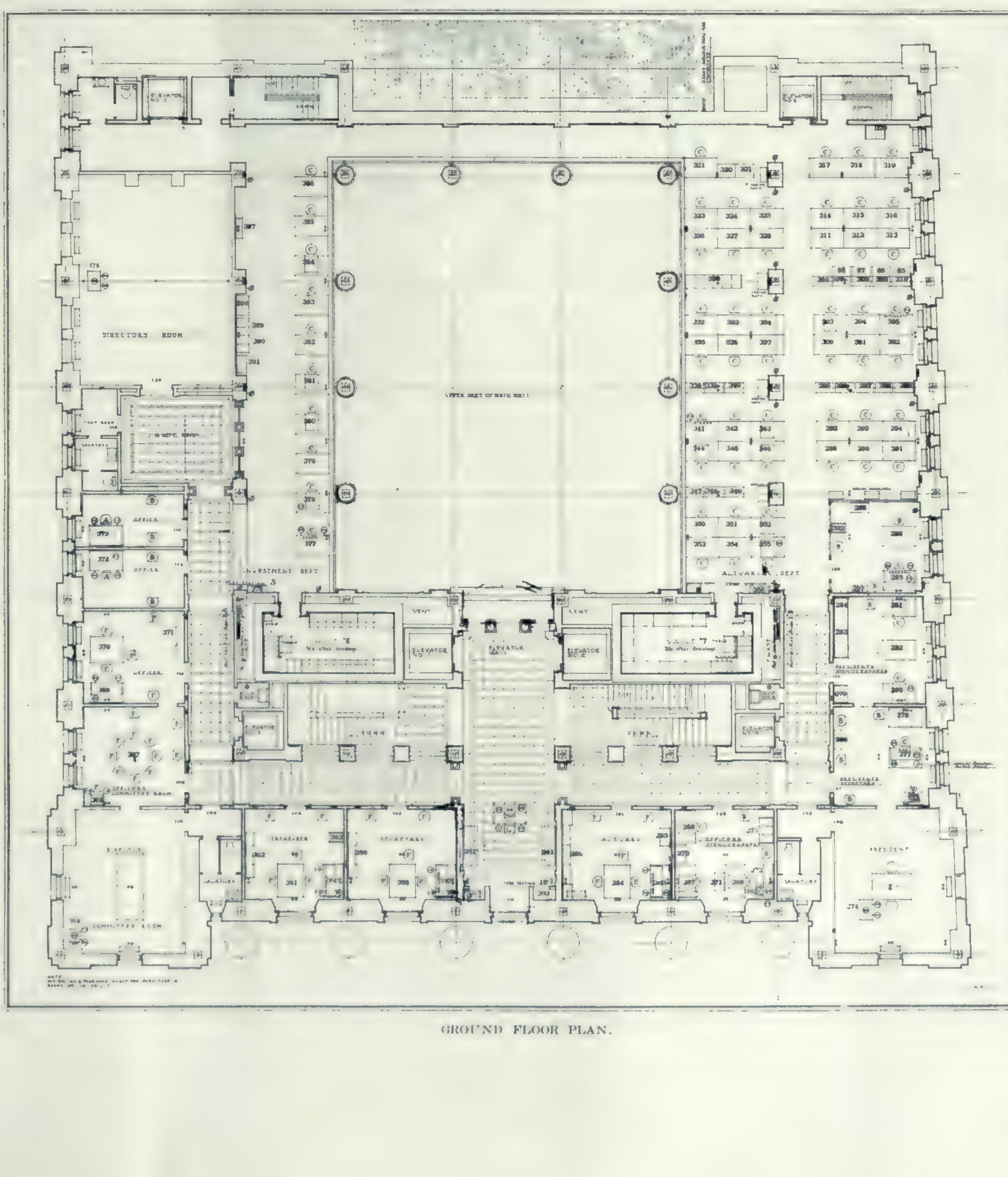
The main hall is entered through a double colonnade of highly polished syenite marble, the gener-



FIRST FLOOR PLAN.

al effect being of a darkish green with a underlying golden tone. It is interesting to note how the two main divisions on the ground floor are linked together in color. In the first place the dark green Sevanto marble which forms the floor border around the entrance hall continues by the elevators and culminates in a rather large square at the opening to the main hall; from which it branches off and encircles the large public area composed of marble slabs two feet square with a deeper shade of pink than the walls. The same rich depth of green is preserved in the counter as well as the columns. Else-

FIRST FLOOR CORRIDOR.



GROUND FLOOR PLAN.

ENTRANCE HALL.

where the restful and delicate shades of pink decorate all surfaces below the ceilings. The universal golden hue is enhanced by the gilded ornament in the panelling of the mezzanine ceilings and also those directly over this section; as well as in the gilded capitals of the large columns and the bronze railing encircling the central portion of the room.

The one outstanding feature of this main office chamber aside from its general effect of grandeur and loftiness is the square consisting of the ten large columns in deep olive green syenite marble. To say it was a daring stunt is expressing it mildly. Picture to yourself each one of these columns rising to a height of thirty-two feet, measuring three feet two inches in diameter and consisting of five drums. Then, remembering that each column is fluted throughout, try to imagine the skill necessary to make each line of the twenty four nosings between the curved spaces hit exactly the corresponding one on the drum above and below; at the same time keeping in mind that there is a slight convex curve to be considered in each vertical line. It seems unreasonable and beyond the skill of man to accomplish this successfully, especially with a material so hard to cut and finished with a polished surface. Still the work has been done and so carefully executed that not one observer in a thousand will ever give it a second thought or appreciate the delicate and expensive undertaking so minutely and properly handled.

At the top of each column is a gilded Corinthian cap supporting an ornamental entablature which builds up into the mouldings of the ceiling that go to provide the proper setting for the large skylight. Here the subdued yellows, greens, blues, unite to give a mellow amber effect.

The large clerical space behind the counter contains massive piers, walls, floors, etc., of the same pinkish marble, while the counter itself is designed in panels of Sevanto deep green and red marble with pilaster divisions and base of the Belgian black. A cashier's bronze cage, tastily designed and presenting an appearance of stability extends along the central portion of the counter. This room is well screened from the outside by the exterior balustrade, the top of which is approximately six feet from the floor.

ENTRANCE TO EXECUTIVE OFFICES ON FIRST FLOOR.

The effect of this main hall at dusk when the lights are on is as near to the soft mellow glow from the setting sun of early Fall, as is possible to be obtained by the handiwork of man. The extensive stretches of the pinkish marble, the ornate capitals and gilded panels, the stained glass and warm shades in the ceiling, all melt into a rich golden hue under the influence of the many indirect hanging lights.

One of the few large vaults in Canada is located in the basement of the Sun Life Building. It measures upon the inside thirty-eight feet by thirteen and one half and has eight feet clear from floor to ceiling. This chamber is finished with steel grey with white ceiling. On all sides are steel compartments protected by grill work. The entrance to the vault is a circular door seven feet in diameter, two and one half inch lining of steel armour plate. The outer half of the door is formed of steel casting containing reinforced concrete and metal section; while the inner part is constructed of alternating two inch, five ply, tool-proof chrome-steel sections, low steel sections, and steel bolt frame cast solid with the door. The walls have a total thickness of twenty-six inches consisting of shock and drill-proof chrome and low steel interlocking sections, reinforced with monolithic rock concrete twenty-two inches thick strengthened with double rows of 100 pound steel railroad rails. On the inside is a two and are half inch lining of steel armour plate. The vault is equipped with electrical protection systems which control gongs outside and inside the building as well as patrol and police service. Well lighted patrol passages surround the vault with mirror devices to permit of observations on all sides, back and top.

The first floor is given up to the executive offices including the President's suite, committee and board rooms. The prevailing treatment is light fumed oak panelling with bronze indirect lighting fixtures. Windows have polished marble sills and facing with marble grills beneath where are concealed the radiators. The furniture is mahogany tables and sea green leather chairs.

The corridors above the first floor has a light mahogany dado with greenish tinge and rough plaster effect above finished in a green-cream tone. The only exception to the four foot marble dado is on the sixth floor where the fac-

DOORWAY BETWEEN ENTRANCE AND MAIN HALL.

ing is seven feet high. All doors and windows off the corridors are of hollow steel cleverly executed to imitate mahogany woodwork. The second, third, fourth and fifth floors are planned to accommodate the general offices.

On the sixth floor is located the main and private dining rooms, library, smoking quarters for the men and rest room for the women. The corridor leading from the elevator lobby is finished in oak with light green burlap forming the dado panels and rough plaster above. In the main dining-room the slope of the roof furnished a difficult problem, but was well thought out in its treatment as shown by the illustration. The general design for the corridor prevails in the main dining room except the floor consists of nine inch square tiles.

STRUCTURAL FEATURES

In excavating for the building, the first ten feet below the surface was sandy soil, after which was found a very compact gravel and boulder deposit averaging 28 feet deep. Concrete caissons 6 ft. 6 in., in diameter were sunk to rock through this deposit, 26 feet below the basement level, and 38 feet below grade.

The exterior retaining walls below grade were built of concrete, reinforced against earth and water pressure and waterproof by the addition of a paste to the mixture.

The building is supported upon a steel frame, designed for a possible extension and an addition of eight stories to the existing eight. The floors are constructed of terra cotta floor arching supported on steel beams, and all steel is fireproofed either with terra cotta or concrete. The sloping and deck roofs are constructed with the metropolitan fireproof slab system, thus ensuring lightness of material in construction.

Stanstead granite is used for the exterior wall on the north, west and south elevations, the granite being backed up with brick in cement mortar and furred with terra cotta. The east or rear elevation, which will be removed when the building is extended, is faced with a light cream colored brick.

All sloping roofs are covered with sheet copper weighing 24 ounces to the square foot; and all deck roofs are waterproofed with 7 ply roofing felt and compound, protected by 6″ x 9″ x 1″ hard burnt roofing tile.

The windows throughout are of the double-hung type having bronze covered frames and sashes. A special feature is the hanging of the sashes up ratcheted bars, and the hinging of the inside stops to allow each sash to be lowered into the building out of the frame in a horizontal position for cleaning purposes. Interlocking weatherstrips out of rolled bronze sections also form part of the window equipment. All glass is polished plate of British manufacture, with the exception of the court elevations where wired glass is used.

MECHANICAL EQUIPMENT.

Three watertube boilers of 225 horsepower each, occupy the greater part of the boiler room space which extends from the sub-basement to the ground floor through a height of 28 feet. The boilers are of ample capacity for the proposed extension, and for an electrical power generating plant if desired. The boilers are equipped with stokers which consume bituminous coal with little or no smoke. The stokers feed the furnaces automatically, the control being operated by a horizontal bar running the full length of the front face of the stokers, to which each stokers is attached at will by movable links. The bar is operated by a small steam engine at one end, with an electric motor standby service at the other. The boilers and stokers are set in fire brick encased in a 3/16 sheet steel covering. The chimney is of sheet steel lined with fire brick, running up through the building, and is 140 feet high.

A coal storage room of 350 tons capacity is provided in the sub-basement. The room is filled from dump hoppers in the driveway to the north of the building by means of an electrically operated coal conveyor, which when reversed reclaims the coal through ports in a tunnel below the floor of the room, and transfers it to a steel bin running above and along the full length of the stokers. From the bin the coal flows by gravity to a weighing hopper from which it is transferred to the stokers.

An electric chain hoist and trolley line transfers ash cans when filled to an hydraulic elevator operating in a shaft outside the building from the sub-basement to the delivery driveway.

Direct radiators throughout are heated by hot water. Two hot water heaters supplied by a low pressure steam main, reduced direct from the high pressure steam lines, are connected to the heating mains through the two steam turbine driven circulation pumps. There is also a high pressure water heater with a circulation pump, motor driven, for emergency service; and also for use when there is a sudden drop in temperature on the outside.

A complete fresh air supply and foul air exhaust ventilation system is provided throughout the building. Fresh air through an inlet on the north side passes through a pre-heating steam radiator stack to an air washer in the sub-basement, which removes all impurities and provides adequate moisture to maintain the proper percentage of relative humidity through the building. From this point the air passes through a re-heating steam radiator stack, thermostatically controlled, is heated to the required temperature and is circulated by the main supply fan through ducts to the various departments and rooms.

A separate fan supplies the boiler room, and auxilliary fresh air supply system is situated on the seventh floor, supply the upper floors. The main exhaust fan for the lower floors is situated in the sub-basement, those for the upper floors being on the seventh floor. Separate fans exhaust from the dining room and kitchen, and from the lavatories.

A compressed air system consisting of three

ELEVATOR DOOR.

compressor units and three storage tanks maintaining different pressures, but connected together through pressure reducing valves, supply air for the pneumatic tube carrier system, for the elevator door operating devices, and for sewerage ejectors. Automatic controllers start and stop the motors of the compressor units so that each tank maintains a constant range of pressure.

A vacuum cleaning system with a capacity of four sweepers at a time is installed in the sub-

UPPER CORRIDOR.

basement, with mains and risers throughout to inlet valves conveniently situated in all corridors.

REFRIGERATING AND WATER COOLING PLANT

An ammonia compressor refrigerating machine with a brine cooling tank is also part of the sub-basement equipment; a brine circulation pump and riser conveying the cooled brine to a refrigerator room, counter refrigerators and an ice making tank in the kitchen on the sixth floor, and to a refrigerator in the janitor's dwelling on the seventh floor.

There is also a drinking water cooler installed in the refrigerator plant room in the sub-basement, with a circulation pump, which ensures a constant supply of chilled water at the drinking fountains that are located in all corridors on every floor.

All cold water supplies and all fire mains and risers are of extra heavy galvanized pipe and fittings. The drainage vent and rain water piping throughout, is standard weight, galvanized, with galvanized recessed drainage fittings, in the case of drainage and rain water piping, the hot water piping and fitting throughout being of copper.

MISCELLANEOUS FEATURES.

There are twenty-four toilet rooms and lavatories throughout the building, all equipped with the highest grade British manufactured vitreous china and porcelain fixtures with nickel plated fittings. All drainage above the basement floor flows direct into the sewers; the drainage from the basement lavatories being collected into two 100 gallon pneumatic ejectors situated in the sub-basement, which operates automatically and ejects direct into the sewer lines.

Hot water for domestic use is supplied from a sub-basement storage tank containing a steam coil. A direct flow riser to distributing mains on the seventh floor, supplies all lavatories. Return circulation pipes from lavatories unit together and are returned to tank in sub-basement.

All water used in the building passes through a mechanical sand filter and is stored in two tanks of a combined capacity of 9,000 gallons on the seventh floor. Distributing mains on this floor supply water to all risers throughout the building, a city pressure of 140 lbs. at the basement level ensuring a constant supply throughout the system.

In the sub-basement is also a seepage pit equipped with two 150 gallons centrifugal pumps, automatically controlled, which takes care of the sub-soil drainings and waste water.

Snow melting pipes with steam connections are installed in all areas, roof gutters and balconies to prevent the collection of snow and ice,

A combined fire alarm and night watchman's system is installed with stations on all floors and an alarm gong and enunciator in the basement, as well as direct connection to the offices of a local accident and guarantee company giving protective service. This means of protection is further supplemented by stand pipes and hose valves in the corridors on all floors.

ELEVATORS.

The elevator equipment consists of two passenger cars, speed 300 feet per minute, capacity 2500 lbs; one small hand operated car, speed

150 feet per minute, capacity 1500 lbs.; two automatic push button cars, capacity 1500 lbs. each; and one combined freight and passenger car of a capacity of 5000 lbs. The hand operated elevator and automatic push button cars, are used entirely for inter-department work by the staff. All cars are provided with approved safety devices and are protected against excessive speed and any danger of over running the travel limits.

The enclosures on the hatchways of cars 1, 2, and 3 are operated by pneumatic door control devices with a hand lever and foot button placed alongside the car controller. Interlocking switches makes it impossible to start the car when any enclosure door is open. These cars have illuminated thresholds which facilitate the locating of the car platform in relation to the floor landing. Flashlight signals indicates the direction in which the cars are travelling and notify the operators where to stop. Mechanical dials indicating the location of cars in hatchways are also provided on each floor.

Kitchen Equipment.

The kitchen on the sixth floor is provided with gas ranges, toasters, broilers and friers; steam tables, vegetable boilers and warming closets; steam heated coffee and water urns and with refrigerator and ice making rooms and counter refrigerators. The staff is supplied with lunch on the self service system, the kitchen equipment being specially adapted for this purpose. A steam service is provided for the kitchen in the summer time, and also for the hot water tank, from a 7½ H.P. boiler in the sub-basement. The firebox of the boiler is equipped as an incinerator.

Electrical service for lighting is provided by two separate services of 2200 volts a.c. direct to the primary switch board in the transformer room in the sub-basement. From the transformer room the two services are run to the main switch board where they are connected to the distributing panels in such a way that should one service fail, the other can be brought into immediate use throughout the building. Normally the load is distributed between the two services.

A direct current service of 250 volts is provided for all motors throughout the building. Two motor generator sets in the switch board room, together with a storage battery on the seventh floor, supply low tension current for the signal systems.

For wiring purposes each floor is divided into two sections, north and south. A panel board in each section controls all wiring in that section. It contains a lighting panel box, a low tension box, a telephone box and miscellaneous section. Each section in the panel box is connected with the corresponding sections in the floors above and below and cross tied with the opposite side of the building, Floor and base outlets both for lighting and low tension work, are conveniently located in every room in such a manner that exposed wiring around mouldings is obviated.

UPPER CORRIDOR.

Description of Security Vault.

The exterior dimensions of the vault are 42 ft. 5 inches deep by 17 ft. 11 inches wide, by 12 ft. 11½ inches high. The interior dimensions are 38 in. deep, 13 ft. 6 in. wide by 8 ft. 4 in. high in the clear.

It is located in the basement of the building, upon a heavy concrete foundation slab, the full size of the vault, and is independent at all points of any of the building construction. It is open to patrol service at front, rear and both sides, and the entire top, which is a considerable distance below the basement ceiling, is brilliantly illuminated and can be readily observed in its entirety by means of inclined mirrors set

DETAIL OF CEILING TREATMENT, MAIN HALL.

THE NEW SUN LIFE BUILDING, MONTREAL, QUE.

DARLING & PEARSON, ARCHITECTS.

against the basement ceiling above the main door.

The room in which the vault is located is composed of heavy masonry walls and its single entrance is guarded by a mob-resisting door and exceptionally heavy steel grilles.

CONSTRUCTION.

The vault walls are 26½ inches in thickness, built up of 2½ inches of shock and drill proof steel lining, arranged in large, over-lapping sections with widely broken joints, and secured with 1-¼ inch diameter, twisted chrome steel bolts; the construction approximating as nearly as practicable a solid box to afford a maximum resistance to all known methods of attack, and it includes the element of slight resilience as one of the shock resisting factors.

The exterior surfaces of this lining are heavily waterproofed and surrounded with concrete walls approximately two feet in thickness of a 1:2:4 mixture, placed directly against the steel lining and door frames, embedding a re-enforcing steel grillage of one hundred pound railroad rails, set in double sections throughout the entire concrete work, spaced approximately on 9 inch centres; the sections being off-set and the corners inter-locked and secured with double and triple rows of heavy angles in addition to double rows of 1 inch tie-rods running continuously around the vault on approximately 2 ft. centers. The top re-enforcement, in addition to the rails, contains 20 inch one hundred pound "I" beams upon approximately 2 ft. centers. These beams not only re-enforce and help to carry the top concrete, but by means of embedded bridge work suspend and re-enforce the steel ceiling and further provide additional resistance to shock of falling walls or other heavy bodies, in the event of fire or accident to the building.

There are two openings to the vault, a main entrance at the front and an emergency entrance at the rear. The doors to each of these entrances are among the heaviest that have ever been built; they are 2½ ft. in thickness, the main door weighing upwards of thirty tons.

MAIN HALL.

The doors are both circular in shape, of composite construction, the outer halves being formed of steel castings containing concrete composed of hydrolithic cement, and a non-hygroscopic aggregate, embedding inter-laced refactory steel members and oxy-acetylene cutter-burner-proof metallic sections. The inner halves are constructed of 2 inch five ply chrome steel plates, low steel sections of similar thickness and solid cast steel bolt frames. The time required to penetrate these doors in burglarious or mob operations is so great as to be an absolutely unknown factor. The entire absence of the usual rebates or stepping at the door joints has permitted of the grinding of the doors into the frames, as glass stoppers are ground into bottles, and results in absolute protection against the use of nitro-glycerine or other liquid explosives which, even if they could be introduced into the joints, would find no seats upon which the force of an explosion could act.

Another feature of interest is the locating of the combination locks and bolt throwing mechanism upon the door jambs and the time locks upon the doors proper, and any attack upon this mechanism would require the penetration of both the door and jamb in order to reach all of the dogging devices. This arrangement doubles the usual amount of time required for such purposes, and further provides solid doors without spindle holes.

All time-locks, combination-locks and bolt-throwing and dogging mechanism upon the doors and jambs, are housed in with heavy steel plates to obviate the almost universal weak condition in so called standard work, where the putting of a small hole through the vault wall would provide direct access to the locking connections.

A substitution for the usual combination dials, consists of a steel cylinder, super-imposed anglewise upon the front jamb pressure housing; the forward end of which is provided with an oval glass window located at the normal line of vision and behind which, at a distance of some eight or nine inches, appears an electrically illuminated dial, provided with two revolving pointers which are operated by knobs located on the side of the pressure housing, and synchronized with the driving mechanism of the combination locks, to which they are connected through steel spindles. This device is not only one of convenience, but prevents any un-authorized observation of the setting up of the combination numbers. The locking devices on the main door check the operation of twenty locking bolts, 4½ inches in diameter, which are set radially and operated simultaneously.

PRESIDENT'S ROOM.

These devices upon the emergency entrances, checks an action of so-called gun-breech inter-locking steel rings.

Each door is swung upon massive polished steel crane hinges provided with ball and roller bearings; rolls upon the main door hinge ware in double cages around both upper and lower hinge pins, the rolls being ¾ inch diameter, and each cage approximately 6 inches long. The hinge pins, which are 9½ inches in diameter, and the bore of the housings, are provided with hardened, ground and lapped sleeves and bushings to take the thrust of the rolls which are also hardened, ground and lapped.

The vertical moment of the weight of the door is taken between the hardened, ground and lapped flat surfaces of two discs, upon approximately fifty hardened steel balls 1¼ inches di- [illegible], the under face of the lower disc is slightly crowned to allow for automatic compensation of possible errors in alignment. The element of friction has been so nearly eliminated that the main door can be easily swung with one finger.

The doors are provided with a pressure mechanism operated by hand-wheels through a series of worm and bevel gearing to force the doors tightly into their seats and against a gasket of Usudurian packing which, with the otherwise tight door joints, doubly insures entrances which are water and steam tight.

The floor line of the vault is set level with the floor line of the vault room and the door-pit is bridged with counter-balanced foot plates and lowering platform sections to provide a clear, level walkway into the vault. The lowering floor sections are operated by hand, and brought back to the floor level when the vault door is open or closed, and furnish a complete floor surface.

The exterior of the vault is provided with a panelled steel cladding of ½ inch bars and ¼ inch panel plates with base and cornice and is finished in gun-metal color.

This panelling provides a physical protection for the delicate electrical alarm covering and furnishes an architectural treatment in keeping with the strength of the vault construction.

VENTILATION.

The section of the patrol passage at the rear of the vault is enclosed with glass panelled doors, which form, with the surrounding walls, a plenum chamber into which air is forced from the ventilating system of the building. From here it finds its way, when the vault is open, through the emergency and ventilating entrance into the vault, where its current is expanded and accelerated by open fans, the exhaust taking place through the main vault door; the arrangement being such that all portions of the vault interior are constantly swept with fresh air.

ELECTRICAL PROTECTION AND EQUIPMENT.

Notwithstanding the intrinsic strength of the vault, its physical resistance elements have been reenforced with two separate systems of electric protection, an isolated or individual alarm system, which in case of an attack would sound upon 12 inch gongs in the building and 24 inch gongs located high upon the Dominion Square facade of the building, and a central office connection with the local electric protection company. These systems are both independent and inter-related so that under normal conditions both would respond immediately to any attack, or if one system were to accidentally go out of commission, the other would give notice.

These systems independent or together, give alarm not only in event of attack by burglars or mob, but effectually prevent employees of the company from entering the vault out of office hours without giving alarm.

The interior of the vault is electrically lighted through individual wiring circuits built through the vault construction in a complicated course at the bottom of the work; the lights being operated with standard push button

BOARD ROOM.

The Sun Life Building Montreal

DARLING & PEARSON, ARCHITECTS.

GIRLS' REST ROOM.

CHIEF CLERK'S DINING HALL.

VIEW LOOKING INTO LIBRARY.

MAIN DINING HALL.

switches, checked by pilot lights near the front entrance.

The interior ventilating fans are operated from the lighting circuits and in additions, messenger calls have been installed, also trouble alarm buttons to bring watchmen throughout the building to the vault if necessary.

A telephone has also been installed within the vault for use during the day and also as a means of outside communication for any person who may become accidentally locked within the vault at night; and in this connection, because such accidents have occurred in the past, a warning alarm bell rings during the operation of closing the doors. Notwithstanding this precaution and the routine patrol of the vault at closing time, in case a person should be locked in, he would find a pair of lights burning all night, and would receive telephone instructions which would permit of his being liberated in a very short time, as he would be able to unlock the time lock dogging devices from the inside, and the officers would operate the combination locks and affect his release, after which the time-lock would automatically re-set and the combination would be locked.

All interior surfaces of the vault are painted upon rubbed filler, the ceiling being finished in stippled zinc white and the walls, including the exposed surfaces of the interior safes, are painted in pearl grey with rubbed varnished surfaces, and the floor is finished with cork tile and cove base, medium shade.

Interior Equipment.

Both main and emergency entrances are guarded with heavy polished steel grill gates and the forward quarter of the vault is divided from the rear three-quarters by a steel grill and gate of similar design. The present equipment consists of a series of full height safes, containing security files, shelving, etc., arranged to store the company's securities in the most convenient manner. These safes are locked with heavy bolt work, and double custody combination locks, and includes all of the up-to-date principles and devices known to the safe making art.

Equipment Features.

In the evolution of the floor plans and arrangements of the departments, of course consideration was given to the relation of one department to another and convenience of the public.

The basement contains supply and receiving departments, security vault and examination rooms, vault for old records, locker rooms and toilets. The ground floor contains the departments to which the public have constant access.

The first floor includes the executive officers rooms, board room and actuarial departments; on the next floor are the policy and premium departments together with smaller associated divisions; the third and fourth floors house nonforfeiture, legal, library, mailing, agency, etc.; on the sixth floor are the kitchens and dining rooms for officers and employees and welfare and rest rooms for both sexes.

From the basement to fifth floors inclusive in each wing have been built continuous fire-proof vaults, which gives each floor two vaults, approximately 19 ft. by 8 ft., some of them two floors high (where height of ceilings permit) in which are stored important documental records. The record vault in the basement is 43 ft. x 11 ft. and is three tiers in height. In this vault are housed the older records of the company to which inspection is not frequent but security and accessibility are necessary.

In front of the vault space running through the floors, are located the central pipe chases

COUNTER IN MAIN HALL.

TYPICAL UPPER CORRIDOR.

fireproof safes underneath to carry the current records; this is advantageous in several ways; no time is lost in the transportation of books to and from the vaults each day; if a clerk is obliged to stay late to complete a record, he is not keeping the main vaults open and he has no access except his own books.

All locks on groups of furniture to which an officer or employee have access are controlled by the same key, so that he has but one key to carry, a feature that required very careful study and attention in planning and manufacture.

Where occasion required it, specially designed unit cases were installed to file records and blanks in quantities, in order that all possible floor space might be conserved.

from which practically all miscellaneous services radiate

The furniture has been manufactured from the latest and most-up-to-date designs. All desks are constructed on the sanitary principle with working surfaces of cork which make the most durable and satisfactory top. The filing cases, bookcases, etc , are built in units in order to lend themselves to future expansion and readjustments which are constant factors to be considered.

Examination of the exterior of the building will indicate the intention of a future addition to complete the edifice covering the entire block. The ultimate scheme has been kept constantly in mind in the planning of the present building mechanically, as well as architecturally, and provision has been made in the present structure with this end in view.

Very careful thought has been given to the convenience of the public and the company staff. Bookkeepers' desks are provided with

DETAIL OF BRONZE RAILING.

The natural light of the building is exceptional, there being practically no dark spaces, the building plan and location producing this ideal condition.

The low tension equipment consisting of telephones, push buttons and annunciators, is the latest model and the best of all previous installations together with additional improvements.

The telephone service is interior communicating or exterior, and a possible combination of both over the one instrument. This is accomplished by means of push buttons located in the desk tops. Every telephone instrument may be connected to every other instrument or any instrument installed in future without any change in the present wiring.

The push button and annunciator system is capable of any expansion in the future or any changes in the present equipment at a minimum of expense. A desk may be disconnected electrically at one location in one minute and relocated in any other department in the building and given immediate service in the new location, the mechanic making the electrical change doing his work outside of the offices.

The power is supplied by duplicate sets of storage batteries alternated every six hours, the testing and recharging of low voltage cells being accomplished through an automatic switchboard.

The plan of the building is also ideal in that it made possible an installation of electrical subjunction and distribution boxes on each floor and furniture outlets so located that they will accomodate any reasonable relocation of furniture in the near future. A study of accompanying portions of electrical plans illustrate the various possible locations of furniture to secure service from the existing outlets.


HEATING APPARATUS AND CIRCULATING PUMPS.

The offices equipment and facilities for the accurate housing of policy and other records formed a very important consideration in the planning of the Sun Life Building. In order that no detail would be overlooked, experts were engaged by the architects to cooperate in determining the requirements of each officer and clerk. As the result of this the necessary equipment in the case of each department and individual has been worked out and standardized according to a carefully prepared schedule, producing in its final effect a uniform, symmetrical and businesslike arrangement.

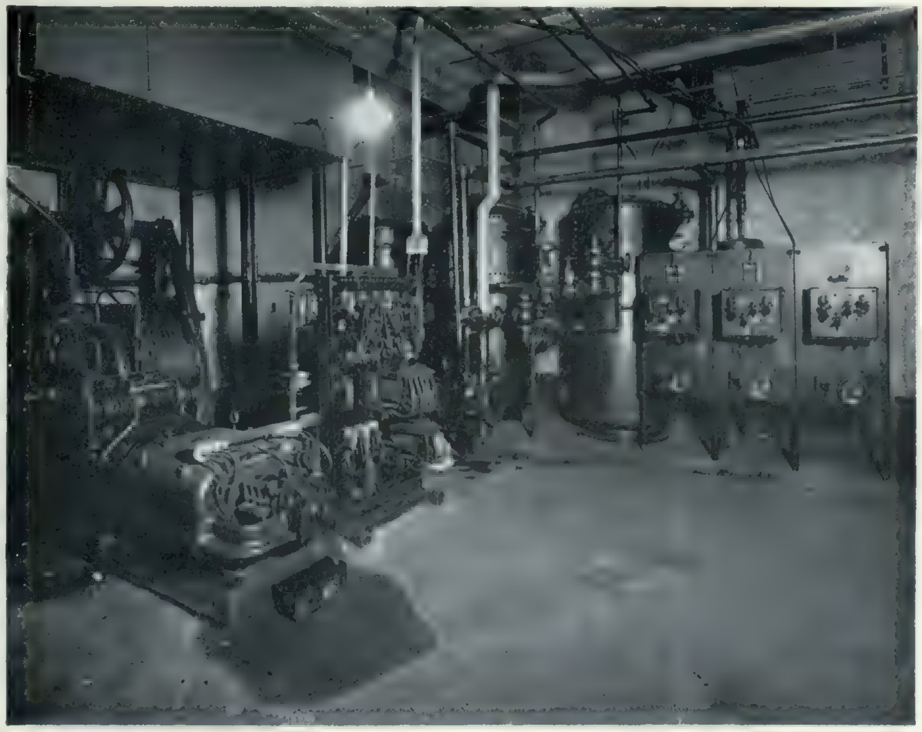
Steel equipment and furniture is used throughout the scheme, even to the desks and minor accessories. The essential governing conditions made it necessary in working out the arrangement to consider not only the number of square feet to be occupied by each clerk and the position of the various desks, chairs and filing cabinets, but also the elevations and construction details of each article so as to obtain a general harmonious result.

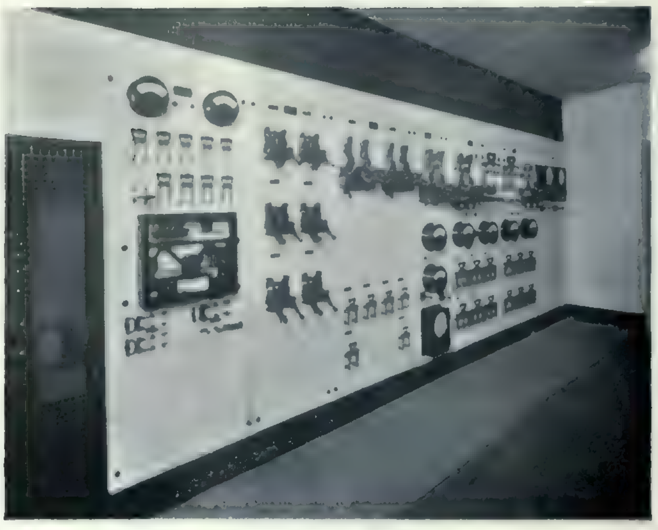
Besides the adaptability of steel for the protecting of valuable books and documents, the improved method of giving it the character of a wood finish enhances its use for this purpose. An evidence of this is seen in the pedestal of the desks, which perfectly match the solid mahogany tops. In these desks the pedestal contains a number of drawers, or in the case of the book-keepers. is locked by heavy doors forming a safe and convenient place for their records and making it unnecessary for them to cart heavy books back and forth from the vaults.

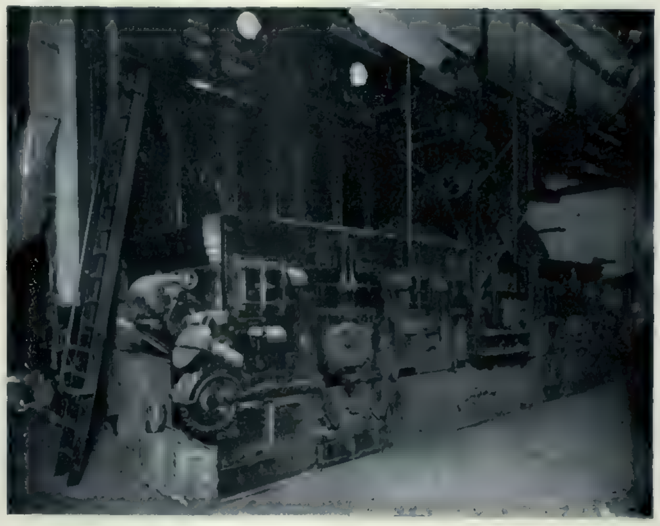
The idea of steel is also carried out in reference to the twenty-one vaults, the largest one of which, in the basement, being used for the storage of old records. The shelving and filing cases here are all accessibly arranged for speedy reference to records which have ceased to be active. These vaults are continued on each floor of the building.

All the shelving is adjustable on inch centers, and the filing cabinets, some of which are arranged in the vaults, are built on the unit principle, so that at any time the rearrangement of the vaults become necessary, the entire equipment is flexible and permits of such adjustments as changing conditions may require.

Over four hundred clerks altogether are em-


ELEVATOR AND COMPRESSED AIR EQUIPMENT.


MAIN SWITCHBOARD.


BOILER ROOM.

ployed in this institution, and each one has his own individual steel locker arranged in the centre of the washrooms. Besides, each clerk has his own individual umbrella rack, which is made of steel and equipped with an ingenious device whereby the umbrella is securely locked and a metal check automatically released which is kept by the clerk until such time as his umbrella is required.

Other features of the equipment consists of steel trucks for the moving of heavy records from one department to another, and such minor accessories as the waste paper baskets, which are also made of this material.

The entire installation represented in all twenty-five carloads of furniture and equipment, all of which was made in Canada and represents a very high standard of workmanship.

Plastering on Concrete

Plastering on concrete is materially different from plastering on other surfaces, as the expulsion of the surplus water during crystallisation and drying out, together with insufficient adhesiveness, serves to break the bond set up under the trowel. Good bond plasters are specially compounded so that the usual expulsion of surplus water during crystallisation is controlled and the bond with concrete is not materially injured. Although no plaster can successfully withstand the expulsion of the moisture during the drying out of concrete which occasionally brings with it an efflorescence which is deposited on the surface of the concrete, yet special bond plasters are fairly reliable in this regard.

A well-known construction company recommends the following method of attaching plaster to concrete:—

Make the concrete as porous as possible by omitting sand from the mix and by not spading the concrete to the forms. Where plaster is required underneath a floor or roof, if the forms are sprinkled with ½ inch stone before the concrete is placed, a rough surface will be obtained to which plaster will key nicely.

To attach Portland cement plaster to smooth concrete, hack the surface with a point, brush the surface thoroughly to get the dust out, wash it, and in every case make sure that the under concrete is thoroughly wet before the plaster is


STEEL SHELVING AND VAULT EQUIPMENT.


SECURITY VAULT.

applied, otherwise the water will be soaked out of the plaster and the plaster will not adhere. Wash the surface with grout just ahead of the plaster and make sure that the plaster is applied before the grout has time to set.

Victory Loan Arch, Montreal

The arch shown in the accompanying view was built in Montreal as a part of the decorations during the recent Victory Loan Campaign in Canada. It was dedicated by the Bishop of Montreal on November 11th, and by a fortunate coincident word was received on the morning of the dedication that the Armistice was signed.

It was erected in lath and plaster and the total height from the base to the top of the flag staff was 70 feet. There is a proposal before the city to re-erect it in marble in which case the design will be considerably modified and given more thought.

The design was given to the Victory Loan Committee by the architect and the work and modelling were carried out at cost by well known local contractors. The arch stood facing St. Catherine street from Phillips Square, and on the four sides of its post were inscribed the names of the many important and historic engagements in which the Canadians fought.

VICTORY LOAN ARCH, MONTREAL, DESIGNED BY SEPTIMUS WARWICK, F.R.I.B.A.

Ontario Housing Essays

Mr. Albert H. Leake and Mrs. James Elgin Wetherell have been named as first and second prize winners, respectively, in connection with the essays submitted on the best solution of the housing problem in Ontario. The competition which showed wide interest and considerable study of the subject, was judged by Mr. C. H. Acton Bond, President of the Ontario Association of Architects, Rev. Peter Bryce and Dr. Horace L. Brittain of the Bureau of Municipal Research.

Registration List—Ottawa Conference

Association of Canadian Building and Construction Industries

GENERAL CONTRACTORS.

Representatives.	Firm.	Address.
J. S. Adamson	W. G. Adamson	Ottawa.
J. P. Anglin	Anglin's, Limited	Montreal.
James Bogue	James Bogue	Peterboro.
G. A. Crain	G. A. Crain	Ottawa.
W. S. Bellows	Fegles Bellows Engineering Co.	Fort Wm.
C. W. Cadwell	Cadwell Sand & Gravel Co.	Windsor.
E. Cass	The McDiarmid Co.	Winnipeg.
W. A. Chestnut	Dickie Construction Co.	Toronto.
Thos. Chick	Chick Contracting Co.	Windsor.
Senator Curry	Rhodes Curry Co., Ltd.	Amherst, N.S.
A. H. Dancy	H. N. Dancy & Sons, Ltd.	Toronto.
Walter Davidson	Walter Davidson & Co.	Toronto.
Hugh Doran	Doran & Devlin	Ottawa.
W. Doran	Doran & Devlin	Ottawa.
Arthur Dinnis	Richard Dinnis & Son, Ltd.	Toronto.
H. Elgie	H. Elgie	Toronto.
John Foley	Ottawa Construction Co.	Ottawa.
E. R. French	E. R. French	Toronto.
H. Fussing	Fussing & Jongenson	Montreal.
A. I. Garvock	A. I. Garvock	Ottawa.
Geo. W. Garnett	Thos. Garnett & Sons	Port Hope.
Jos. Gosselin, Jr.	Jos. Gosselin	Levis, Que.
Col. F. Gourdeau	Concrete Construction, Ltd.	Ottawa.
W. J. Green	A. E. Ponsford, Ltd.	St. Thomas.
John V. Gray	John V. Gray Constn. Co., Ltd.	Toronto.
J. A. Ewart	Grant & Horne	St. John, N.B.
H. Hayman	H. Hayman	London.
C. Hilbert	C. Hilbert	Toronto.
John C. Holtby	Holtby Bros.	Toronto.
A. R. Holmes	Archibald & Holmes	Toronto.
W. H. Hutchinson	Baldry, Yerburgh & Hutchinson, Ltd.	St. Catharines.
James A. Hughes	James A. Hughes	Welland.
W. M. Irving	W. M. Irving	Montreal.
J. A. Little	Thunder Bay Harbor Improvement Co.	Port Arthur.
Arthur J. Jarvis	Atlas Construction Co.	Montreal.
Chas. Holbrook	Chas. Holbrook & Son	Ottawa.
John W. Litton	John W. Litton	Kingston.
R. N. Jones	R. N. Jones	Ottawa.
Col. Robert S. Law	Bate, McMahon & Co.	Ottawa.
J. Arthur Marier	Marier & Tremblay, Ltd.	Quebec City.
Walter Page	Page & Co.	Toronto.
Thos. Painter	Thos. Painter & Sons	Toronto.
F. N. Paulin	Canadian Engineering and Contracting Co.	Hamilton.
G. M. Pitts	Pitts Construction Co.	Ottawa.
E. E. Poole	Poole Construction Co., Ltd.	Regina.
A. A. Proulx	A. A. Proulx	Ottawa.
W. A. Quinlan	Quinlin & Robertson, Ltd.	Montreal.
E. R. Reid	Engineers & Contractors, Ltd.	St. John
E. A. Saunders	E. A. Saunders	Halifax.
J. F. Schultz	Schultz Bros. Co.	Brantford.
Claude F. Secord	P. H. Secord & Sons, Ltd.	Brantford.
John W. Seens	Canadian Bridge Co., Ltd.	Walkerville.
James G. Shearer	James Shearer Co., Ltd.	Montreal.
Wm. F. Sparling	Wm. F. Sparling Co., Ltd.	Toronto.
Alex. Stuart	Stuart Bros.	Hamilton.
Geo. E. Stocker	James A. Wickett, Ltd.	Toronto.
D. K. Trotter	David K. Trotter	Montreal.
Wm. Weller	A. Weller & Co., Ltd.	Toronto.
J. L. Weller	J. L. Weller	St. Catharines.
W. A. Wilson	Wilson & Wilson, Ltd.	Regina.
F. C. Woodroffe	Henry Morgan & Co., Ltd.	Montreal.

SUB-CONTRACTORS.

Representatives.	Firm.	Address.
F. Armstrong	F. Armstrong Co.	Toronto.
J. T. Blyth	J. T. Blyth	Ottawa.
W. B. Champ	Hamilton Bridge Works Co.	Hamilton.
E. R. Dennis	Dennis Wire & Iron Works Co.	London.
W. E. Dillon	W. E. Dillon Co., Limited	Toronto.
J. R. Douglas	McFarlane-Douglas, Limited	Ottawa.
J. B. Duford	Duford ,Limited	Ottawa.
W. G. Edge	W. G. Edge, Limited	Ottawa.
G. F. Frankland	The Toronto Society of Domestic, Sanitary & Heating Engineers	Toronto.
G. A. Gardner	G. A. Gardner & Co.	Toronto.
N. F. Gibson	National Fireproofing Co.	Toronto.
Wm. Hiller	Canadian Johns-Manville Co., Ltd.	Toronto.
R. Hooper	Hooper Bros.	Ottawa.
Wm. J. Hynes	W. J. Hynes, Limited	Toronto.
Stewart N. Hughes	Hughes & Co.	Toronto.
P. H. Jamieson	Canadian Asbestos Co.	Montreal.
J. P. Mantle	Hamilton Bridge Works Co.	Hamilton.
Fred B. Locker	J. R. Locker & Co	Montreal.
A. Matthews	A. Matthews, Limited	Toronto.
W. A. Mattice	Dominion Bridge Co., Ltd.	Ottawa.
F. H. McCausland	Jos. McCausland & Sons, Ltd.	Toronto.
John McKinley	McKinley & Northwood	Ottawa.
A. C. Nobbs	A. & E. Nobbs	London.
Geo. Oakley, Jr.	Geo. Oakley & Sons, Ltd.	Toronto.
Chas. D. Oakley	Geo. Oakley & Sons, Ltd.	Toronto.
W. H. Palmer	W. H. Palmer	Chatham.
Geo. A. Perrier	Geo. A. Perrier	Halifax.
Chas. T. Pearce	Pease Foundry Co.	Toronto & Winnipeg.
Jas. Phinnemore	Jas. Phinnemore	Toronto.
N. K. Reid	Reid & Brown	Toronto.
J. Ritchie	Jas. Ritchie	Ottawa.
D. M. Rowe	D. M. Rowe & Co.	Toronto.
A. Tomlinson	Albert Tomlinson	Chatham.

SUPPLY DEALERS.

Representatives.	Firm.	Address.
A. Walter Allen	Dominion Radiator Co., Ltd.	Toronto.
Fred Armstrong	Port Hope Sanitary Mfg. Co.	Port Hope.
S. R. Armstrong	Municipality of Peterboro	Peterboro.
R. A. Baines	Baines & Peckover	Toronto.
Geo. M. Bailey	W. J. Hynes, Ltd.	Toronto.
W. P. Baxter	James Robertson & Co., Ltd.	Montreal.
F. E. Belfry	Asst. Architect, Military Hosps.	Ottawa.
W. D. Bliss	The Barrett Co., Ltd.	Montreal.
E. M. Barrett	Barrett Bros.	Ottawa.
Alex. W. Bremner	Alex. Bremner, Limited	Montreal.
A. J. J. Brennan	Municipality of Welland	Welland.
Chas. Bulley	Standard Brick Co.	Toronto.
James A. Burnard	Seaman Kent Co.	Meaford.
A. K. Cameron	Metal Shingle & Siding Co.	Montreal.
Thos. M. Burkett	Thos. M. Burkett	Ottawa.
C. A. Chilver	Merle, Merle & Ray	Walkerville.
C. A. Chilver	C. A. Chilver Co., Ltd.	Walkerville.
Arthur Cope	A. Cope & Son	Hamilton.
Chas. V. Clark	Darling Bros., Ltd.	Montreal.
David J. Davidge	Toronto Builders' Exchange	Toronto.
A. M. Davis	McAuliffe, Davis Lumber Co.	Ottawa.
J. P. Dupuis	J. P. Dupuis, Ltd.	Verdun.
Robt. F. Dykes	T. A. Morrison & Co.	Montreal.
John Eadie	Dingwall, Cotts & Co.	Vancouver.
E. R. Eaton	J. R. Eaton & Sons, Ltd.	Orillia.
Gordon C. Edwards	W. C. Edwards & Co.	Ottawa.
F. W. E. Smonder	Gurney, Massey Co., Ltd.	Montreal.
W. F. Evans	Baines & Peckover	Toronto.
K. H. Falkiner	Allith Manufacturing Co., Ltd.	Hamilton.
O. Forest	Ottawa Fireproof Supply Co.	Ottawa.
P. A. Galarneau	Citadel Brick Co., Ltd.	Quebec.
F. A. Gillis	F. A. Gillis Co., Ltd.	Halifax.
G. B. Greene	General Supply Co. of Canada	Ottawa.
J. Fraser Gregory	Murray & Gregory, Ltd.	St. John.
R. A. Hanraker	Can. Johns-Manville Co., Ltd.	Montreal.
D. P. Hatch	The Barrett Company, Ltd.	Montreal.
Sackville Hill	Sackville Hill	Hamilton.
J. D. Johnson	Canada Cement Co.	Montreal.
John S. Hooper	Winnipeg Builders' Exchange.	Winnipeg.
Mayor J. M. Hughes	Municipality of Kingston	Kingston.
Geo. C. Keithering	Industrial Board	St. Thomas.
T. Sidney Kirby	T. Sidney Kirby Co.	Ottawa.
John F. Lawson	Pedlar People, Ltd.	Oshawa.
Geo. J. Lippert	Municipality of Kitchener.	Kitchener.
J. M. C. Lockerby	Alex. McArthur Co., Ltd.	Montreal.
J. A. Lafres	Canada Cement Co.	Montreal.
Chas. Lowrey	Queenston Quarry Co.	St Davids.
Thos. McCord	S. McCord	Toronto.
D. B. McCoy	Steel Company of Canada, Ltd	Hamilton.
F. B. McFarren	Interprovincial Brick Co.	Toronto.
E. F. McGovern	Northern Electric Co., Ltd.	Ottawa.
D. J. MacKenzie	D. J. McKenzie & Co	Ottawa
D. J. MacKenzie	National Brick Co. of Laprairie	Montreal.
Norman McLean	Contractors Master Builders Assn	Vancouver.
H. P. McMahon	Municipality of St Thomas	St. Thomas.
J. Arthur Marrier	Marier & Tremblay, Ltd.	Quebec City.
Geo. M. Mason	Geo. M. Mason, Ltd.	Ottawa.
W. G. Massiah	Sherwin-Williams	Ottawa.
Capt. F. G. Moseley	Canadian Fairbanks-Morse Co.	Montreal.
W. H. Murphy	Pease Foundry Company	Ottawa.
John Newstead	Municipality of Guelph	Guelph.
G. Barclay Nicol	General Supply Co. of Railway Contractors & Mill Supplies	Ottawa
J. P. O'Shea	J. P. O'Shea & Co.	Montreal.
O. N. Parent	Canadian Yale & Towne, Ltd.	St. Catharines.
Hugh Peel	Pedlar People, Ltd.	Ottawa.
Chas. T. Penn	Indiana Quarries Co.—Cleveland Stone Co.	Toronto.
W. E. Ramsey	Pedlar People, Ltd	Montreal.
E. Ramus	Builders' Sales, Ltd.	Ottawa.
Wm. Rutherford	Wm. Rutherford & Sons Co.	Montreal.
R. G. Saville	Port Hope Sanitary Mfg. Co.	Montreal.
A. G. Rose	Jas. Davidson & Sons	Ottawa.
J. H. Shaver	C. A. Dunham Co., Ltd.	Toronto.
Jas. G. Shearer	Jas. G. Shearer Co. Ltd.	
C. F. Smallpiece	Taylor Forbes Co., Ltd.	Montreal.
	Sumner & Co.	Moncton.
G. J. Steele	Standard Brick Co.	Toronto.
J. F. Tilton	W. H. Thorne & Co. Ltd.	St. John.
Gerald H. Watkinson	Taylor Forbes Co., Ltd.	Guelph.
A. H. Webster	Webster & Sons, Ltd.	Montreal.
F. W. White	McDougall Limited	Ottawa.
Geo. H. Whitlock	Whitlock-Marriet, Ltd.	Moose Jaw.
Geo. H. Whitlock	Moose Jaw Bd. of Trade	Moose Jaw.
Walter H. Wickware	Walter H. Wickware	Ottawa.
R. Wright	Wright & Co.	Ottawa.

DELEGATES AT THE OTTAWA BUILDING CONFERENCE AT WHICH THE ASSOCIATION OF CANADIAN BUILDING AND CONSTRUCTION INDUSTRIES WAS ORGANIZED.

The Ottawa Conference

The large number of delegates registering together with the prominence and standing of the firms represented, not only made the Ottawa conference a notable event, but placed the newly formed association of builders and supply dealers on a thoroughly national basis right at the very start.

In fact the conference resolved itself into a very busy three days period, which crowded into the several sessions a thorough discussion of all matters up for consideration. Enthusiasm characterized the proceedings throughout, reflecting great credit on those in charge of the preliminary arrangements as well as denoting a spirit of unity and co-operation which speaks assuringly of the association's success as a useful and influential body. Beside the business transacted during the sessions, addresses were delivered by a number of Cabinet Ministers who by virtue of their high official position gave evidence of a cordial attitude on the part of the government in reference to the purpose and objects of the meeting.

The conference opened with a short morning sessions in November 26th, following the late arrival of the train carrying the Toronto delegation. This meeting was devoted entirely to the selection of temporary officers and the appointment of the various necessary committees. The work of organization was expeditiously carried out, due to a programme worked out at a meeting held on the previous day by the committee in charge of preliminary arrangements.

A resolution was adopted that the conference be called the "Conference of Canadian Building Industries," and divided into three sections, viz., general contractors' section, sub-contractors' section and building supply section.

Mr. Anglin, Montreal, was elected chairman of the conference; Mr. F. Armstrong, Toronto, Vice-Chairman; Mr. A. H. Dancy, Toronto, Hon. Secretary; and G. A. Crain, Ottawa, Hon. Treasurer.

It was also decided to include in the executive the following as ex-offico members: Mr. W. A. McLean, Vancouver, temporary chairman of the general contractors' section; W. A. Mattice, Ottawa, temporary chairman of the sub-comtractors' section; and W. E. Ramsey, Montreal, temporary chairman of the supply dealers' section.

Hon. A. K. McLean, chairman of the Reconstruction Committee of the Privy Council addressed the delegates at the first day's luncheon, following a brief speech by Mayor Fisher welcoming the delegates to Ottawa which as the capital of Canada, he said, belonged to all sections of the country. In the course of his remarks the Mayor facetiously referred to the condition whereby the Government was placed under the necessity of renting buildings to house various of its department, stating that he hoped that the day was not very far distant when suitable structures would be erected, in keeping with the dignity and purpose for which they were to serve. The question of housing was

Conference Committees

Building Situation.

M. P. Davis, Ottawa (chairman); W. A. Mattice, Ottawa; James G. Shearer, Montreal; F. A. Gillis, Halifax; H. H. Vaughan, Montreal; H. Hayman, London; Ed. Cass, Winnipeg; J. D. Johnston, Toronto; Norman McLean, Vancouver; John Foley, Ottawa; W. A. Wilson, Regina; Col. J. A. Little, Port Arthur; A. Dinnis, Toronto; Claude F. Secord, Brantford; F. W. Paulin, Hamilton; J. Mantel, Hamilton; F. McCausland, Toronto; M. Gibson, Toronto; W. Palmer, Chatham; J. Douglas, Ottawa; F. Armstrong, Toronto; F. B. McFarren, Toronto; C. T. Pearce, Hamilton; W. F. Evans, Toronto; Robt. F. Dykes, Montreal.

Business Relations.

Gordon C. Edwards, Ottawa (chairman); E. E. Poole, Regina; Jos. Gosselin, Jr., Quebec; J. W. Litton, Kingston; H. Elgie, Toronto; W. A. Chestnut, Toronto; J. F. Gregory, St. John, N.B.; Stewart Hughes, Toronto; G. A. Perrier, Halifax; H. Dancy, Toronto; J. A. Grant, St. John; W. M. Irving, Montreal; W. Doran, Ottawa; Ed. Cass, Winnipeg; W. S. Bellows, Fort William; A. Matthews, Toronto; J. Ritchie, Ottawa; W. A. Mattice, Ottawa; G. Oakley, Jr., Toronto; A. Nobbs, London; C. T. Pearce, Hamilton; Capt. F. Moseley, Montreal; A. Cameron, Montreal; M. Gibson, Toronto; E. C. McGovern, Ottawa; W. Dillon, Toronto.

Points of Order.

E. R. Dennis, London (chairman); R. F. Dykes, Montreal; Walter Davidson, Toronto.

Finance.

G. A. Crain, Ottawa (chairman); Alex. Bremner, Montreal; W. A. Mattice, Ottawa; Geo. E. Stocker, Toronto.

Publicity.

E. A. Saunders, Halifax (chairman); G. B. Greene, Ottawa; J. S. Hooper, Winnipeg; Norman McLean, Vancouver; E. R. Dennis, London; H. P. MacMahon, St. Thomas; Weston Wrigley, Toronto; Major L. C. Reynolds, Toronto; A. E. Jennings, Toronto; R. H. Parson (official stenographer), Montreal.

Permanent Organization.

Geo. Oakley, Jr., Toronto (chairman); W. E. Ramsay, Montreal; C. Smallpiece, Montreal; E. R. Reid, St. John; E. A. Saunders, Halifax; W. A. Wilson, Regina; Geo. Hayman, London; Thomas Chick, Windsor; John Eadie, Vancouver; A. Matthews, Toronto; G. H. Whitlock, Moose Jaw.

Resolutions and Order of Business.

C. T. Pearce, Hamilton (chairman); Col. J. A. Little, Port Arthur; E. E. Poole, Regina; Albert Tomlinson, Chatham; P. A. Galarneau, Quebec.

Attendance, Membership and Welfare.

Martin Lindsay, Toronto (chairman); J. S. Hooper, Winnipeg; F. B. Locker, Montreal; E. R. Reid, St. John; N. K. Reid, Toronto; C. T. Penn, Toronto.

Conference Arrangements.

W. A. Mattice, Ottawa (chairman); J. R. Douglas, Ottawa; G. A. Crain, Ottawa; Hugh Peel, Ottawa; G. H. Watkinson, Ottawa.

Legal Affairs.

J. A. Grant, St. John, N.B. (chairman); Ed. Cass, Winnipeg; Jno. V. Gray, Toronto; E. E. Poole, Regina; W. Dillon, Toronto; James Phinnemore, Toronto; Geo. Oakley, Jr., Toronto; Daniel P. Hatch, Montreal; W. P. Baxter, Montreal; W. F. Evans, Toronto.

Labor Conditions.

G. A. Crain, Ottawa (chairman); D. K. Trotter, Montreal; W. A. Quinlan, Montreal; J. R. Douglas, Ottawa; J. F. Schultz, Brantford; W. J. Green, St. Thomas; Alex. I. Garvock, Ottawa; Wm. Weller, Toronto; Jno. W. Litton, Kingston; F. C. Woodroffe, Montreal; Thos. Painter, Toronto; W. S. Bellows, Fort William; Jos. Gosselin, Jr., Quebec; W. A. Wilson, Regina; J. Phinnemore, Toronto; H. Palmer, Chatham; A. Tomlinson, Chatham; N. K. Reid, Toronto; J. T. Blyth, Ottawa; G. F. Frankland, Toronto; E. R. Dennis, London; J. Mantel, Hamilton; G. Perrier, Halifax; A. Matthews, Toronto.

Code of Ethics.

A. K. Cameron, Montreal (chairman); G. H. Watkinson, Ottawa; J. H. Shaver, Toronto; Geo. E. Stocker, Toronto; C. A. Chilver, Walkerville; W. Doran, Ottawa; J. W. Seeus, Montreal; E. Geery, London; J. A. Hughes, Toronto; N. K. Reid, Toronto; C. A. Gardner, Toronto; Geo. A. Perrier, Halifax.

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also a difficult problem, but with the present high cost of materials and low interest on investment, he could hardly see how conditions would be immediately improved without government assistance.

Other guests present at the luncheon were Architect John A. Pearson, Toronto, at present in charge of the reconstruction of the Parliament buildings, and Mr. Richard Wright, Chief Architect of the Department of Public Works.

In introducing Hon. A. K. McLean, Mr. Anglin stated that as a result of the conference the interests which it represented would be in a position to co-operate fully with any department of the government in reference to all questions affecting the building industry. Moreover, this willingness to help would apply to any policy which the government might initiate whether it referred to the housing problem, a general survey of the building situation in Canada, or whether it related to any demand for the supplying of building materials to the devastated areas abroad.

Hon. A. K. McLean's Address.

In addressing the delegates, Hon. A. K. McLean laid emphasis on the importance of the conference by stating that next to agriculture the building trades employed more men than any other industry. Canada has just passed through a trying period, but her resources in financing both war requirements and trade were equal to the emergency. The transitions from war to work would not likely be as difficult as the transition from work to war had proved. One of our attributes was a capacity to develope and with vast resources at our command, we should face the future with courage and confidence. Undoubtedly immigration would flow in shortly, in vast numbers. The debt of Canada was exceedingly large for a small country, but with the incoming of new settlers that would become less per capita as the population increased, and when we came to have a population of twelve million, the national debt would be reduced to one half.

The paramount issue at the present was the problem of reconstruction. Huge quantities of materials would be required in restoring the destroyed portions of Belgium and France. It was estimated that ten billion dollars will be needed to re-establish France alone. Neither of these countries were in a position to finance the cost, so the matter had resolved itself into

J. P. ANGLIN, PRESIDENT FRED ARMSTRONG, VICE-CHAIRMAN. A. H. DANCY, HON. SECRETARY.
OFFICERS ELECTED BY THE NEWLY FORMED ASSOCIATION OF THE CANADIAN BUILDING AND CONSTRUCTION INDUSTRIES.

an inter-allied problem. Canada as a participant in the war, also had a right to share in the business resulting from that source. Already the government has made representations to the various powers who will assist the devastated countries, of our ability and capacity to supply some of the materials which will be needed, as well as our ability and willingness to finance these people at least to the extent of what we may supply them in materials. One assurance was that large quantities of lumber would be purchased by these countries for building purposes. While the arrangements being made could not at present be disclosed, as far as firms dealing in this class of materials were concerned, they were sure to find a big market.

In England they proposed to deal with the housing situation by the erection of between 300,000 and 400,000 buildings, not all in one or two years, but that was the program laid out. The manufacturers of building products in Canada could look to participate in the demand for materials necessary to this great development. In fact, as regards the field outside of Canada we can count on a large share of business that will contribute to our prosperity and help solve any problem arising from the demobilization of our soldiers and war workers.

Referring to the effects of the war on construction, the Minister said that these could be summarized as follows: First, an increased demand for houses; second, cessation in the repair of buildings and structures of all kinds; third, an increase in the cost of building and interest rates; and fourth, a lessened supply of building materials with a consequent increase in prices. Available statistics showed that in 1912 thirty-five cities in Canada spent $185,000,000 on building construction, quite apart from undertakings in the nature of railway work, dock and wharf improvements or similar public projects. For the year 1913, the same cities spent $165,000,000; while the expenditure for the last three or four years has not exceeded $40,000,000 annually. Taking these figures into consideration, the deferred building projects during the period mentioned, amounted to at least $100,000,000 per annum, or speaking more generally, including Canada at large, of postponed work representing approximately one billion dollars. Much of this work would presumably be gone ahead with and would result in an activity which promised more prosperous times for the building trades.

Referring to Mayor Fisher's suggestion that as an immediate remedy the government should go on building and should lend money for this purpose to others, he did not totally commit himself to this, but believed that it should be considered and even favored within certain restrictions. It would prove an easy solution, if practicable. Material and labor were both available and that fact that we have the capital necessary for any problem of construction was shown by our last Victory Loan. He believed that capital should be available for any investment of a safe character. Unfortunately as regards the building industry there was one deterring factor, and that was the probable loss for three, five or seven years, covering the depreciation from the present abnormal building costs. Building, however, should not cease on that account. There could not be any rapid decline in prices in this country or in the world. The prices of food would remain where they were for sometime. Never has such a shortage of food existed as at present, and this would play an important part in the prices of building materials and other commodities.

While the increased cost of construction was undoubtedly a serious disadvantage, he was not prepared to offer a solution of the problem, if indeed it should ultimately prove a problem. He understood that certain committees were to be formed to discuss these problems, and he hoped arrangements would be made for the various members of the government to meet the committees and receive any viewpoints of the conference as to how these problems might be solved. Every one should assist in so important a matter.

In the building programme, the governments, provincial and local, which have deferred construction programmes, should resume them at once. There was no restrictions to-day as regards the issuing of securities, so that these bodies were at liberty to procure the money for any work they were contemplating. Moreover it was the duty of all representative bodies to lead the people of Canada in the present unsettled state of affairs.

In conclusion, Mr. McLean declared that the war had taught us the value of standardization, economy, up-to-date machinery, co-operation and organization. Our industries were perhaps not subject to criticism for the lack of these qualities before, for we could not look for these factors to be very prominent in so young a country. But by applying these factors which had contributed so much to our recent success, to the industries of peace we cannot help but benefit, even to a degree which might absorb in efficiency and improved methods much of the enhanced cost of today. Canada had learned to run the war while waging it, and we would learn to meet and solve our problems as the days go by, particularly if we make up our minds to meet them successfully.

AFTERNOON SESSION, NOV. 26th.

Business of the conference was resumed at three o'clock. A number of communications were read by Mr. Anglin, congratulating the conference and heartily approving its objects. These included a letter and telegram from President Garber of the Associated General Contractor of America, recently formed at Chicago, expressing a desire for affiliation between the two bodies. Also a telegram from President Ouelette of the Royal Architectural Institute of Canada assuring the support of the Institute as regards the protest it understood the conference was going to make to the Government against the employment of alien architects and contractors on Canadian work.

At this meeting, Mr. Fred Armstrong, Vice-Chairman, was requested to preside. This session resolved itself into a short period consisting mainly of the business of appointing three committees coming under the respective headings of Legal Affairs, Code of Ethics, and Labor Conditions.

Mr. Ramsey of Montreal, proposed that the conference adopt the slogan of "Build, Boost, or Bust," which he said had been suggested to him by Hon. A. K. MacLean. It certainly typified the spirit of the meeting and was unanimously approved.

The general meeting was then adjourned to to permit the committee members of the three sections to meet separately to prepare their reports and recommendations. The temporary officers chosen in relation to the various sections were as follows:

General contractors: Chairman, Mr. Norman McLean, Vancouver; Vice-Chairman, W. S. Bellows, Fort William; Secretary, E. R. Reid, St. John.

Trade Section: Chairman, W. A. Mattice, Ottawa; Vice-Chairman, W. E. Dillon, Toronto; Secretary, E. R. Dinnis, London.

Supply Section: Chairman, W. E. Ramsey, Montreal; Vice-Chairman, M. F. Gibson, Toronto; Secretary, W. P. Evans, Toronto.

MORNING SESSION, NOV. 27TH.

In calling the conference again to order in general session, the Chairman, Mr. Armstrong, urged upon the meeting the necessity of having all delegates present owing to importance of the various sub-committee reports to be considered.

A preliminary report was presented by Mr. Grant, Chairman of Committee of business relations, recommending that a committee be appointed by the conference to draft a suitable cost plus form of contract. This was adopted and Messrs. Grant, Elgie, McGovern and Poole were appointed for this purpose. It was also recommended that the conference as a whole should consider the question of foreign competition, as well as a memorial which the Ontario Builders' Supply Association had prepared on this subject.

The report of the committee on Permanent Organization embodied the four following resolutions:

REPORT ON PERMANENT ORGANIZATION.

Resolution 1.

Whereas there is at the present time no central organization in Canada having the interests of the building and construction business under its hand and

Whereas we believe that for this reason no stable conditions exist in this business, such a situation resulting in the failure to build up a reliable and virile profession,

Then be it resolved that for the betterment of these industries such a national organization shall be formed, whose duty shall be to establish and promote a new standard in the various phases of construction enterprise and,

That it is desirable that the headquarters of the proposed organization shall be the city of Ottawa,

That the name of the proposed organization shall be the Association of Canadian Building Industries,

That all individuals, firms or corporations, engaged in any branch of building industry, having their permanent offices in the Dominion of Canada shall be eligible for membership,

That the compiling of the by-laws and constitution of the association be left in the hands of the National Council.

Resolution 2.

Whereas we assembled here for the purpose of forming a national organization of Canadian building industries, fully recognize the existence of many Builders' Exchanges and kindred organizations throughout Canada, which are doing excellent work of local interest in the various cities and towns in which they are active, and;

Whereas the desire of this national organization is to assist and encourage their work for the betterment of interests involved;

Therefore be it resolved that all existing Builders' Exchanges, associations and bodies composed of similar interests, and in the absence of such, that the Board of Trade of any locality be invited to affiliate and co-operate with this national body;

That the assessment of annual fees relating to existing co-operative organizations, as well as individual firms and corporations be determined by the National Council.

Resolution 3.

That the executive of this national association be composed of a minimum of twenty-five members, selected by geographical location and embracing every section of the Dominion, including in its body a president, first vice-president, second vice-president, honorary secretary, honorary treasurer; with power to add to its membership as necessity demands.

That the proposed by-laws provide that the office of president shall be filled by a general contractor, first vice-president, a sub or trade contractor, and second vice-president, a supply dealer or manufacturer.

Considerable discussion followed in reference to the above resolutions. Some of the delegates were of the opinion that the name of the organization should be more comprehensive so as to cover the entire construction field. Mr. Sparling, Toronto, made a motion to this effect, seconded by Mr. Painter, Toronto, and an amendment was accordingly made inserting the words "and Construction" after the word "Building" in the name of the association.

Another point raised was the exact meaning of "permanent offices" in clause 4 of Resolution 1. It was felt that this term should be clearly defined. Mr. Oakley explained that the intention was not to keep firms of other countries from coming into Canada, but to see that when they did come, they would become permanently established here.

Clause 2 of Resolution 1, was also made more specific on motion of Mr. Baxter by substituting the words "the section of the Board of Trade relating to building and construction industries" instead of "Board of Trade."

Mr. Dillon, Toronto, strenuously objected to the clause in Resolutions 4, restricting the office of presidency to a general contractor, and this was amended on his motion so that all members of the association would be eligible to any office.

The above resolutions were adopted in their amended form.

Additional discussion ensued in reference to the preamble of resolution 1. Mr. Norman McLean, Vancouver, urged that the wording of the preamble be enlarged to include the words "and for the purpose of aiding the government in all matters relating or pertaining thereto." This the chair held was already implied as the duty of every citizen, and was ruled against as unnecessary.

Supported, however, by Mr. G. B. Greene and a number of others who felt that no doubt should exist implying selfish motives, a motion, duly seconded, was put to the conference, providing that the preamble of Resolution 1 be referred back to the committee for further consideration, and was lost by a very close vote.

The report of the Building Situation Committee was presented by Mr. Arthur Dinnis, Toronto and included the following recommendations;

REPORT OF BUILDINGS SITUATION COMMITTEE.

1. That a committee wait on the Minister of Public Works and advocate the use of Canadian materials in the erection of all public buildings.
2. That the Department of Public Works be asked to commence operations on all delayed public works as soon as possible.
3. That the Government call for tenders in the usual way on stated plans and specifications for all works let under the Dry Dock Subsidy Act.
4. That the Government grant substantial federal aid for the purpose of constructing permanent national roads and that such work be let by tender.
5. That any work for the Federal or Provincial Governments, municipalities, railways, corporations, etc., be let and executed under statutory form of contract.
6. That where commissions are appointed to undertake housing operations the Association of Canadian Building and Construction Industries shall have representation on the commission.
7. That the sub-committee be instructed to discuss with the Minister of Public Works the advisability of proceeding at once with the housing propositions now before the Government, with a view of providing proper accommodation for industrial workers, and eliminating slum districts in large centers.
8. That the development of the natural resources of Canada be subsidized wherever necessary to compete with foreign materials.
9. That this conference pledge itself never again to use German or Austrian made goods.

This report was received and adopted after a few minor changes in reference to certain clauses.

Mr. Oakley enquired whether the recommendation advocating the use of Canadian in the erection of public buildings, referred to raw or finished products. Mr. Dinnis explained that it covered both, as it was felt by the committee that the fullest encouragement should be given to the development of Canadian resources. As regards the cut stone industry in which he was interested, Mr. Oakley said that he believed that nine-tenths of the firms engaged in this line would be forced out of business if restricted to the use of Canadian stone, which he held was less adaptable as a material than the stone imported from Ohio and Indiana. Steel was also cited as a material to which such a restriction would apply.

Mr. Charles Lowery on the other hand claimed that Canadian quarries are lying idle while great quantities of stone are being imported, and he advocated the development of domestic resources.

Mr. Rutherford of Montreal, offered a possible solution to the difficulty by suggesting that the words "wherever possible" be inserted, and a motion to this effect was carried.

In reference to the clause relating to the calling of tenders under the Dry Dock Subsidy Act, Mr. McLean, Vancouver, explained the practice of the Government had been to call for plans and specifications along with the tenders. This involved considerable expense and represented a direct loss to any firm who failed to get the contract. The fair way was for the Government to furnish the plans and specifications and to invite tenders in the usual way.

The sentiment of the conference fully supported the recommendation in regards to pledging the members never again to use German or Austrian goods. It was deemed advisable, however, that any action taken should be governed by the attitude of Great Britain at the coming peace conference, and the proposal was therefore declared by the chair to be of a political character, and was ruled out of order.

Address of Minister of Public Works.

Following the Wednesday morning session, a luncheon was held at which Hon. Frank Carvell, Minister of Public Works, was the guest of honor. Hon. C. C. Ballantyne was also to have been present to address the delegates, but was called away from Ottawa owing to the illness of his brother, a well-known contractor of Montreal.

The Minister of Public Works, in his address, dwelt mainly on the period of reconstruction now at hand, stating that at no previous time had the country faced such great problems. The meeting of these problems, he said, involved a responsibility which should be shared jointly by the Government and the people. While the national debt had doubled and it still remained necessary to raise large revenues, he felt the great resources of the country would enable us to pull through all right and that in a year or two we would witness a greater expansion than ever before.

In reference to housing, which he understood the conference was discussing, this was something with which the Government proposed to deal, although it still remained to be determined as to what policy it would adopt. It was frequently asked as to what the Government proposed to do to tide the country over this trying period. As far as his department was concerned ,they had, up to the present, been putting on the brakes hard, but now, with the war over, it was possible to look at the question of public expenditure from an entirely different standpoint.

Personally, he believed that the Government would be justified in undertaking any work of economic advantage, even if it entailed increased costs. The amount that the Government was at present paying for rented buildings throughout the Dominion totalled up to a staggering sum. In fact, in nearly every case they were paying in rentals more than the interest and depreciation would amount to on buildings of their own. His own convictions were that even before the country got back to normal, it would be an economic expedient to provide government owned buildings for this purpose. This would, of course, represent a big building programme, and it would be given serious consideration, but he was not prepared to make a statement as to just what would be done.

Regarding the question of letting public work done by tender, he was a firm believer in the principle that this should be the basis in awarding all government undertakings. During the tenure of his office, only two exceptions have been made to this rule. The great difficulty in giving out work on force accounts was that the workmen got that easy, comfortable government feeling, and he would be glad if any one could tell him how to correct that feeling so as to produce greater energy in those thus employed.

Mı. Carvell did not feel that he could discuss the Government policies further than this, other than to say that it was a duty to provide as much employment as possible. Moreover, he urged it as the duty of every manufacturer and employer of labor to see that men are employed, even if it is necessary to take contracts at less profits than in ordinary times.

There would be certain difficulties in the way of construction work during the next year or two. To begin with, there would be the cost of labor, but this would be based on the cost of living, which was abnormally high. The cost of labor would not go down until the cost of living decreased, and the cost of materials and building would be governed accordingly. Living expenses would probably go down by next spring, but the decline would be very gradual. In view of present conditions it was imperative to give work to as many as could be employed and at as good a wage as possible. This was a national duty and one which, if properly recognized, would be the means of successfully tiding us over our present difficulties.

AFTERNOON SESSION, NOV. 27TH.

At the afternoon session, November 27th, permanent organization of the general contractors, trade and supply sections was effected, the following being elected officers for the ensuing year:

General Contractors Section—Chairman, A. I. Garvock, Ottawa; Secretary, G. A. Crain, Ottawa.

Trade Contractors Section—Chairman, W. A. Mattice, Ottawa; Secretary, E. R. Dennis, London.

Supply Section—Chairman, W. A. Ramsey, Montreal; Secretary, W. Frank Evans, Toronto.

Several of the western representatives

placed certain views before the conference at the opening of the meeting. Mr. Norman McLean, of Vancouver, complained that in calling for tenders the Government did not give the western contractors sufficient time to submit their bids. He also felt that the Federal authorities could do a great deal more to benefit the lumber interests of British Columbia by further development of the export trade.

These views were supplemented by the remarks of Mr. John Eadie, also of Vancouver, who spoke in regard to the need of greater port development on the Coast, stating that it was a matter of national rather than local importance, and urging the delegates to lend their support in the efforts of Vancouver to have its harbor facilities extended.

Mr. Poole, Regina, also spoke suggesting that the question of a uniform contract, together with the matter of securing uniformity of lien laws and workmen's compensation acts in the various provinces, was something which should be taken up by the conference.

The conference decided to make Ottawa the permanent meeting place of the National Council to be formed, stating that it should meet as the occasion required and assist, whenever possible, the Government, Boards of Trade, and related organizations in all matters pertaining to the building industries.

An early adjournment was taken in order to permit the three sections to meet separately for the purpose of discussing their own individual problems.

EVENING SESSION, NOV. 27TH.

At this meeting, which was largely attended, the delegates had the opportunity of listening to a very interesting address by Mr. Francis Hankin, of Montreal, general secretary of the Canadian National Reconstruction Groups, in which he referred to the duty of the individual in the problems of re-establishment now confronting the country. There was great need, the speaker said, for thorough co-operation of everyone, as well as the necessity of considering industry as a unit rather than as two opposing sections consisting of employers and employed. In England, which has given more thought to after the war problems than any other country, a very progressive policy was now taking shape. Recommendations have been made by the sub-committee appointed by the Minister of Reconstruction, providing for the establishing of trade parliaments having equal representation of employers and labor. Moreover, in the matter of technical education legislation has been passed making it compulsory in Great Britain for all between the ages of sixteen and eighteen to attend trade schools during working hours, it being obligatory on the part of employers to allow the necessary time for this purpose.

As far as Canada was concerned, Mr. Hankin outlined what was being accomplished, stating that National Reconstruction Groups were being formed in all sections of the country. These groups consisted of from ten to fifteen members, including a representative of returned soldiers and labor. It was the aim to bring about a better understanding whereby employers and employees would unite in greater co-operative effort, and this would best be realized through a sense of personal responsibility on the part of everyone in helping to solve the problem with which we are now called to deal.

Another speaker was Mr. J. Grove Smith, who presented some very alarming figures as to the enormity of the annual loss in this country from fires. Mr. Smith's talk represented a very able address in every way, which drew from a fund of first hand information gathered in the preparation of a book on this subject for the Commission of Conservation, and which is one of the most complete and authoritative works of its kind published. The reason why fire prevention measures had not been more successful, he said, was due to the shifting of responsibility on the part of federal, provincial, and municipal governments. As regards fire prevention associations, such bodies served a very important purpose, but lacked co-ordination and plan of attack. Legislation more than education is what was really needed to overcome the heavy losses now sustained. In conclusion, he urged that building codes should be standardized, and dwelt on the necessity of town planning and of the regulation of the development of our towns and cities with a view to reducing fire risks.

Letter from Town Planning Adviser

A letter from Mr. Thomas Adams, town planning adviser, addressed to Mr. Anglin, was then read by the Chairman, and was substantially as follows:

Mr. Adams expressed pleassure that the conference was to discuss industrial houses, building by-laws and kindred subjects, and regretted that appointments away from Ottawa prevented him from being present to emphasize the need of something being done to promote co-operation and to provide leadership from some central authority in regard to the housing problems in the Dominion.

Without entering into the question of the relative degree of responsibility that may attach to the federal or provincial governments, he felt that he would be echoing the unanimous views of those who have considered the housing problem in stating that some form of centralized machinery was needed to stimulate and direct building construction, particularly in connection with the building of small houses for working men. There was need of a greater degree of research into the numerous technical problems in connection with building, many of which have been the subject of little scientic study in the past, as well as a need for some method to so marshal and disseminate the knowledge accumulated that it will be accessible to all who could make practical use of it.

Mr. Adams expressed approval of the scheme to create a bureau to carry out this work. Such a bureau should also give expert advice on questions of planning the land, streets and houses, and of administration of public and private schemes. At a time when we were passing through a transition in our industrial life, such expert advice would be most valuable.

It also appeared likely that for a time, at least, some form of public contribution would have to be made, either as grants or loans, to assist municipalities, and the different forms of private enterprise through the municipalities, to carry on building until capital becomes more plentiful and private investment in building becomes more secure.

The housing question was considered one of national importance in Great Britain and the United States, and its solution in this country seemed to necessitate action on the part of all three governments—federal, provincial, or municipal—the action being primarily advisory on the part of the federal government and executive on the part of the municipalities, although to make it efficient certain functions would have to interweave the whole machinery from top to bottom.

The conference was undoubtedly aware of the important connection between the method of developing the land—including the metho dof planning and the constructing of streets—and the building operations which were carried on. The long experience of England in this matter, Mr. Adams said, has produced the general conviction that the solution of the housing problem requires that it be dealt with simultaneously with the control of the land and the provision, wherever necessary, of the means of transportation. If the best results were to be obtained from the efforts of the builders to provide houses at an economical price or rent, there must be more economical methods of planning the land and less waste of our substance on land speculation.

Following the reading of Mr. Adams' letter, the business of the conference was resumed by the presentation of the report of the Committee of Business Relations, which consisted of the three following resolutions:

BUSINESS RELATIONS COMMITTEE REPORT.

Resolution No. 1.

This committee, after carefully considering (a) Percentage, (b) Cost plus fixed sum, (c) Lump sum methods of payments, recommend that a standard form of contract be framed by a suitable committee appointed by the permanent executive.

Resolution No. 2.

Whereas it is vital to the interest of contractors that their business should be stablished, and whereas the competition of incompetents is not only disastrous to the legitimate contractor, but is also detrimental to the public interest;

And whereas the present system of awarding contracts does not encourage the best work;

It is therefore resolved that advertisements for tenders for public works should state the time and place for a public opening of said tenders and before any tender be accepted that qualifications of the tenderer from the standpoint of experience, ability and equipment, be ascertained, and that a copy of this resolution be forwarded to all Departments of Public Works, Federal and Provincial, and to leading Municipal and Industrial Corporations.

Resolution No. 3.

That the Conference be asked to consider the question of foreign competition, and also the Memorial prepared by the Provincial Association of Contractors of Ontario.

While the first two resolutions were unanimously adopted, the third one relating to foreig competition failed to meet with the endorsement of the conference. The memorial was read by Mr. Elgie, Toronto, and as originally drafted was as follows:

MEMORIAL TO THE GOVERNMENT.

Memorial—to the Rt. Hon. Sir Robert L. Borden, P.C., G.C.M.G., K.C., LL.D. And to the Hon. the Members of the Government of the Dominion of Canada:

This Memorial Humbly Sheweth: Upon behalf of the contractors of the Dominion of Canada, we, the undersigned, respectfully request no public works of any nature should be undertaken in the Dominion of Canada except by Canadian contractors, and, that this also apply to all concerns acting for the Government or operating under Dominion incorporation. In support of that request, we beg to set before you the following consideration:

(1) The Canadian contractors have demonstrated over and over again their ability to erect structures of any kind whatsoever required for the purpose of their own country.

(2) Canadian contractors are interested in the welfare of Canada, and contribute to its taxes and to its growth, whilst contractors of other countries merely make money in Canada for the purpose of spending it in the country to which they may happen to belong. They also have a tendency to recommend and use foreign materials which is an injury to Canadian industries.

(3) Canada has made such generous contributions towards the successful prosecution of the war that the Government of the country should see to it that every line of activity is safeguarded, because it is becoming more and more evident that one industry of our country cannot suffer without every other industry suffering with it.

(4) Patriotic contractors, as well as architects and engineers of military age have volunteered to fight at the front and for other duties in the war, and thereby have established a claim for consideration towards their fellow contractors.

(5) The business of contractors has been greatly interfered with by the patriotic necessities occasioned by the war, so that the work to be done, even if executed by Canadian contractors alone, is not more than sufficient for their needs.

Respectfully it is submitted that if due weight is given to the above considerations, one course only will commend itself to you and to other members of your Government, namely, to take every pains to see that the construction of public buildings is entrusted to Canadian contractors and to them only.

Mr. J. Fraser Gregory, St. John, stated that the supply section had carefully considered the memorial, and that in view of the remarks of the Minister of Public Works, at their luncheon, and the thorough, sympathetic and Canadian attitude which he displayed, it was ill-timed, uncalled for, and beyond the scope and desires of the conference. Canada could not expect to build up a big foreign trade and at the same time deny other countries the privilege to sell in our market. To adopt this policy would be to keep others out, and hem ourselves in. He felt assured that preference would be given by the Government to Canadian and Canadian materials whenever possible, without any question, and that in view of this he believed that it should not be considered by the conference.

This pretty much represented the sentiment of the meeting. Mr. Norman McLean, Vancouver, said that the fault in the past was due, in most cases, to the employment of foreign architects, who, knowing nothing of our resources and materials, naturally specified the materials with which they were most familiar. Canada, as a whole, he declared, was bigger than any provincial matter. Instead of passing the memorial, he felt that it would be possible to get the same results in a better way by protesting against the employment of foreign architects. The Canadian architects could be entrusted to give the work to Canadian contractors, and thus the object in view could be secured more harmoniously.

Subsequently, the memorial was taken up clause by clause, each being carried with the exception of the second one, which the conference decided to eliminate. It was then resolved that the memorial, as amended, be adopted and presented to the Premier.

MORNING SESSION, NOV. 28TH.

Thursday morning, November 28th, was devoted to a consideration of reports submitted by the committees on Labor Conditions, Legal Affairs, and Code of Ethics.

The report of the committee on Labor Conditions stated that the avenues which presented themselves as to how labor could be improved was based on the following considerations:

The following is the text of resolution which your committee has to submit for the consideration of the conference.

Be it resolved that the executive of this association do appoint a permanent committee to be called a committee on labor, which shall have the following duties assigned to it.

(1) To consider all legislative matters in the Dominion Parliament and the provincial Legislatures affecting labor in the building and construction industries.

(2) To foster and aid all the movements and activities which will directly or indirectly increase the efficiency of labor, physically and mentally, and improve its quality, particular attention being given to the following:

(a) The housing of the worker.

(b) The development of the apprenticeship system.

(c) The immediate establishment and furtherance of technical education throughout Canada.

REPORT OF SUB-COMMITTEE.

To the Chairman, Committee No. 14:

We beg to submit the following memorandum re position of Dominion Government towards technical education, as containing data for the preparation of a memorial by Committee of the Association of Canadian Building and Construction Industries to be presented to the Dominion Government.

(a) Up to the present time the Dominion Government has not given any financial assistance to the promotion of technical education.

(b) The activities of the Dominion Government in this matter have consisted in the appointing of a Commission, under Dr. J. W. Robertson to make a thorough investigation of technical education. In 1913 this Commission submitted a report. This report was published and has had wide distribution.

(c) Financial aid or assistance has been granted by the Dominion Government, firstly, one million dollars ($1,000,000) per annum,for the furtherance of agricultural education; secondly, a substantial amount yearly for the furtherance of education in the Fisheries Branch; and, thirdly the sum of ninety thousand dollars ($90,000.00) annually for the promotion of industrial research.

(d) The recommendation for financial assistance by the Dominion Government for technical education made in Dr. Robertson's report, consisted of the following, the sum of three million dollars per annum for a period of ten years, and the sum of three hundred and fifty thousand dollars per annum for pre-vocational work in the schools.

(e) It is to be noted that this recommendation was made prior to the war, and it is the opinion of this committee that, provided the amounts asked for in Dr. Robertson's report will take care of the requirements of Canada in technical education in co-operation with the provincial and municipal governments, conditions in Canada to-day warrant and imperatively called for the making available immediately of a vastly greater initial sum of money so that an immediate stimulus may be given to this vital matter and the young soldiers returning to civil life, can be benefited thereby.

(f) It is a matter for the expresion of great pleasure that in the late conference between the Dominion Cabinet and the premiers of the various provinces this question of technical education was fully discussed and that warm interest was shown by the members of the Dominion Cabinet.

(g) It should be emphasized in this memorial that for the upbuilding of Canada, it is just as vitally necessary that the Dominion Government provide money for technical education of the workers of Canada as they should provide for the upbuilding of the ship-building industry or provide credits for the sale and export of agricultural or live stock products.

(Signed) J. T. Blyth
G. F. Strickland
Sub-Committee.

COMMITTEE ON LEGAL AFFAIRS REPORT.

The committee on Legal Affairs submitted the following resolutions, which were referred to the executive:

(1) That the executive appoint a standing committee to investigate the feasibility of standard building by-laws throughout Canada and to consider ways and means to carry same into effect.

(2) In view of the difficulty in connection with the variation of the lien laws to the different provinces at the present time and the serious difficulty caused by unfamiliarity with existing laws, that the executive have a pamphlet prepared for distribution to members of this association describing the various lien laws in the different provinces.

CODE OF ETHICS.

Recommendation made by the committee on the Code of Ethics were as follows:

1. When general contractors submit their tenders to the architect or owner, the general contractor should list the names of the sub-contractors whose tenders he used and advise the sub-contractor. In the event of his tender being accepted, the general contractor should notify his sub-contractor immediately. The same conditions should obtain with respect to sub-contractors and their respective supply men.

2. It is recommended that the sub-contractors shall receive payment in the same proportion and substantially at the same time as payments are received by the general contractor.

3. That the matter of bonds, bonus and penalties, as between general and sub-contractors be left to their own individual arrangements to suit specific conditions, but when requested, shall be on a proportionate basis.

4. Zones of operation.—In view of the fact that in several districts of the Dominion there are at present no branches of this association or duly representative bodies,

we recommend that the appointment and location of zones of operation be deferred until representative sections have decided to co-operate.

Nominations were then made with the result of the following being elected to office for the ensuing year.

EXECUTIVE.

Association of Canadian Building and Construction Industries.

J. P. Anglin, President, Montreal.
Fred Armstrong, Vice-Chairman, Ontario.
J. C. Harvey, Vice-President, Nova Scotia.
To be appointed, Vice-President, Prince Edward Island.
J. A. Grant, Vice-President, Quebec.
P. A. Galarneau, Vice-President, Quebec.
E. Cass, Vice-President, Winnipeg, Manitoba.
W. A. Wilson, Vice-President, Regina, Saskatchewan.
J. E. McKenzie, Vice-President, Calgary, Albert.
Norman McLean, Vice-President, Vancouver, British Columbia.
G. A. Crain, Hon. Treasurer, Ottawa.
A. H. Dancy, Hon. Secretary, Toronto.

A. D. Smith, Amherst, N.S.; E. R. Reid, St. John, N.B.; J. F. Tilton, St. John, N. B.; Jos. Gosselin, Levis, Que.; W. H. Ford, Montreal, Que.; Wm. Irving, Montreal, Que.; James Ballantyne, Montreal, Que.; Wm. Rutherford, Monreal, Que.; Geo. A. Perrier, Halifax, N.S.; W. E. Dillon, Toronto, Ont.; Walter Davidson, Toronto, Ont.; James Phinnemore, Toronto, Ont.; George Oakley, Jr., Toronto, Ont.; Stewart Hughes, Toronto, Ont.; J. F. Schultz, Brantford, Ont.; A. T. Enlow, Hamilton, Ont.; H. Hayman London, Ont.; K. R. Geikie, Oshawa, Ont.; A. C. Nobbs, London, Ont.; Thos. Chick, Windsor, Ont.; Col. J. A. Little, Port Arthur, Ont.; H. T. Hazelton, Winnipeg, Man.; T. R. Deacon, Winnipeg, Man.; W. P. Alsip, Winnipeg, Man.; one to be appointed by the Builders' Exchange, Winnipeg, Man.; Duncan Smith, Saskatoon, Sask.; E. E. Poole, Regina, Sask.; W. R. MacKenzie, Regina, Sask.; G. H. Whitlock, Moose Jaw, Sask.; Chas. Forbes, Moose Jaw, Sask.; four to be nominated later for Province of Alberta; four names from British Columbia to be furnished by Mr. McLean, who will notify these four B.C. members by letter; Geo. A. Perrier, Halifax, N.S.; members ex-officio: A. I. Garvock, Ottawa, chairman General Contractors' Section; W. A. Mattice, Ottawa, chairman Sub Contractors' Section; W. E. Ramsay, Montreal, Chairman Supply Section

The register showed a total attendance of one hundred and ninety-one delegates at the conference, comprising sixty-five general contractors, ninety-two supply men and thirty-four sub-contractors.

DELEGATION MEET GOVERNMENT.

At the close of the session, which ended the business of the conference, the delegates were accorded an interview with members of the Federal Cabinet, at which the first eight recommendations embodied in the report of the committee on Building Situation were presented. This interview took place in the Railway Commission offices, where the delegates were received by Sir Thomas White, acting Premier; Hon. F. B. Carvell, Minister of Public Works, and Hon. J. B. Reid, Minister of Railways and Canals.

President Anglin explained that this was the first time that the contracting and supply interests had met as a national body, and that they did not come in a spirit of criticism, but with the desire to offer their services in any way conducive to the best interests of the country during the reconstruction period.

The requests incorporated in the resolution presented were then briefly explained by Mr. Armstrong, and were listened to attentively by the Ministers.

Sir Thomas White, in reply, referred to the present time as a very critical period, and said that there might be considerable unemployment. It was hoped, however, to devise some means whereby this, to a great extent, would be avoided. One way to help the situation was to obtain large export orders from Belgium and France. Another expedient would be to undertake domestic work extensively. Railways were run down and industrial plants were suffering from the lack of repairs, and he believed that the business which would result from overseas and domestic reconstruction, would absorb a very considerable amount of labor. In reference to housing, Sir Thomas stated that he appreciated the seriousness that this problem involved. The premiers of the various provinces met recently at Ottawa and this was one of the subjects discussed. He had seen some difficulties in the Government going into the housing business as a national undertaking, although it was desirable that something should be done. It was undoubtedly a matter with which the provincial and municipalities could most effectively deal, and at the recent meeting of the premiers they had been advised that if any financial assistance was required to meet their needs, the Government would be willing to help them out. Regarding the use of Canadian materials, the Minister assured the delegates that their recommendations would be given sympathetic consideration, both on account of financial reasons and because the request was economically along sound lines.

Hon. F. B. Carvell, Minister of Public Works, emphasized his remarks of the previous day by again stating that his department would not hesitate to make expenditures on reasonably useful projects. As regards the use of Canadian materials, he said that he had always adhered to this in the past and did not intend to depart from that principle. There was nothing in his department which gave more trouble than Canadian marble and stone. Regarding the Dry Dock Subsidy Act there seemed to be misunderstanding, as this provided for the subsidizing of private firms who built dry docks on their own plans and specifications. In the case of government built docks, plans and specifications were prepared and tenders called for in the manner suggested.

Hon. J. B. Reid, speaking for his department, stated that for the past four years the railways had been allowed to run down and that a large amount of materials would be required to again put them on an efficient basis. Already the matter had been taken up and the representatives

Concluded on page 408.

New Canadian Northern Terminal Vancouver

The new station recently erected by the Canadian Northen Pacific Railway Company at False Creek, right in the centre of the city of Vancouver is fireproof and up-to-date in all respects. It has been designed along dignified classic lines, with a strong central arched feature and supporting features at the extreme corners of the building. The total frontage is 321 feet with a depth of 105 feet, with basement and three storeys above street grade.

The ground floor contains the large general waiting room and ticket lobby, immediately adjacent to which and entering directly from it are waiting rooms for men and women, dining and lunch counter, barber shop, ticket office for rail and steamship, commercial telegraphs, hand baggage, general baggage, government mail, express and sleeping and dining car departments.

The two upper floors accommodate the general offices of the Canadian Northern in Vancouver, the entrance to these offices being kept distinct from that to the station proper, and elevator service provided to all floors.

Directly in front of the main entrance on the opposite or rear side of the station are situated the doors leading to a covered concourse 50 feet in width, running along the entire length of the rear of building. From this concourse access to the various train platforms is had; these platforms also being covered. In all there are 16 tracks leading into the station, the average length of the platforms being about 1200 feet.

As designed, the building is amply supplied at all points with natural light and ventilation, the form of the building on upper floors permitting of direct light and air to all rooms and corridors. The large waiting room which has a lofty ceiling, is lit not only from the top, but also by means of clear storey lights on three sides, which windows also afford splendid means of natural ventilation.

Externally the front and both side walls are constructed of granite up to base, and above, in stone, both of which materials were procured locally.

The general waiting room is finished in marble about 6 feet up, above which caen stone is used to the ceiling, the latter being panelled in ornamental plaster. The floors are finished in terazzo. Marble is used in all corridors and toilets, with terazzo floors.

NEW CANADIAN NORTHERN TERMINAL, VANCOUVER.

The cost of the passenger station with its concourse and platforms, total about $1,000,000.

The new freight offices and sheds occupy a two storey block, having a frontage of 100 feet and a depth of about 55 feet, giving ample accomodation for the various departments. The building is designed along simple but attractive lines, its exterior walls being constructed generally with brick and having stone dressings and features. The floors except basement are constructed of timber finished with maple, the basement floor being cement, finished on concrete slab. Sufficient toilet accomodation is provided for both men and women, on each floor, and ample light and ventilation is available in all parts of the building. The building is supported on pile foundation.

The freight shed, constructed immediately east of the freight office block is 40 feet wide and 800 feet long, supported on pile foundations. The roof is supported on steel columns and constructed of steel trusses carrying wood purlins and covered with 2 inch plank finished with tar and gravel roofing. The floors are of heavy timber construction finished with 2 inch rough and 7-8 inch finished flooring. The walls to level of door heads are constructed of studding with 7-8 inch sheeting outside and inside. The outside surface is finished with galvanized corrugated iron. Along the entire length of building above door heads is a continuous glazed transom light. On the track side of shel, doors are alternate and on teaming side, doors occur only in alternate 16 foot bays. The shed has been divided into four compartments by the introduction of three 13 inch fireproof walls at equal intervals along the length of shed. Provision is also made at the extreme east end of shed for cold storage, and at the west end (that is at the end nearest the freight office block) rooms are provided for the shed foreman, porters, and for staff toilets. About midway up the shed is located the Customs Office.

Electric light will be used in both freight offices and shed.

PUBLIC SPACE, NEW CANADIAN NORTHERN TERMINAL, VANCOUVER.

Along the track side of shed will be run three lines of tracks, and beyond the farthest out of these tracks, will be run a distributing platform 13 feet wide, the platform being continued along the entire length of the shed.

These buildings have been designed by the company's architects, Messrs. Pratt & Ross, of Vancouver and Winnipeg, and the cost, exclusive of tracks and teamways, will probably run to about $150,000.

Destruction of Architectural Monuments in France

A correspondent to the New York "Times" commenting on the destruction of architectural monuments in the fighting zone, and with particular reference to the neighborhood of Soissons, writes:

"Since their defeat by General Mangin the Germans have undertaken the destruction of the architectural masterpieces of Soissons. With the methods previously employed in burning or blowing up every structure in the region out of which they have been driven, they are proceeding with the demolition of churches and other edifices in this town, rich in specimens of the best work of the architects of the thirteenth century.

"The Cathedral of St. Gervais is now the principal target. Enormous breaches have been made in the splendid facade. The upper gallery is three-quarters destroyed, while the lower gallery has been wrecked. The statues fall one by one from the tower.

"The ancient Abbey of St. Jean-des-Mignes, in which Thomas a Becket spent several years, is also gradually crumbling. Both towers have been decapitated, while the facade has been pierced in many places. The vault has fallen in, and the rich ornamentation of the left tower has disappeared, with the exception of the statues of two saints that remain facing the enemy."

CONSTRUCTION

A · JOURNAL · FOR · THE ARCHITECTURAL ENGINEERING · AND · CONTRACTING INTERESTS · OF · CANADA

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CONTRIBUTIONS.—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and returned.

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Vol. XI Toronto, Dec., 1918 No. 12

Taking Up the Labor Slack

A well thought out editorial in the "Engineering News-Record, N.Y.," advocates a speedy resumption of all public works as a means of taking up the labor slack which will result through the shutting down of war industries and the return of soldiers to civil life.

"Each day," says our contemporary, "that labor is unemployed there is an economic loss to the community. Every man not employed is either a public charge or an idle-producing unit, and since it is certain that return to peace basis will take some time, public works should absorb labor as fast as possible, even under conditions which might seen uneconomical on account of high wage scales and high prices of materials. Even if the public pays a greater price for public improvements, it prevents the economic loss due to idle man-power. If, to prevent unemployment, the army is demobilized slowly, the public pays for the maintenance of the soldiers. It would be better to demobilize as promptly as the military situation permits, increasing the amount of public work to such an extent as to prevent unemployment. Such a course would mean permanent and substantial returns for the money spent, whereas the maintenance of men in camp after the military necessity ceases is a dead loss."

This represents careful and progressive reasoning. It coincides with the attitude of the Association of Canadian Building and Construction Industries at the Ottawa conference in urging the Dominion authorities to commence operation as speedily as possible on all delayed government work. A resumption of activities along such lines would create a decided feeling of confidence and give employment to thousands of men. Moreover, it would go a long way in acting as a stimulus on private enterprise, besides being a potential factor in stabilizing business conditions both as regards manufacturing and mercantile lines.

The United States government has already decided to follow this course in its plan of reestablishment; and unless similar action is taken in this country, we are liable to encounter a somewhat serious and undesirable condition. The announcement from Ottawa that immediate employment will be found for four thousand men in completing the construction of Welland canal, however, may be taken as a hopeful sign. It offsets in a measure an earlier news despatch indicating that only a limited amount of work would be gone on with, and that the government did not propose to start operations merely to give employment. Work for four thousand men will at the best take up only a small portion of the slack. It will be necessary to find employment for many more, and public improvements is one of the best channels through which this can be done. Moreover, it can be done by confining the whole thing strictly to legitimate enterprise, and without resorting to the "pork barrel" principle which represents the expenditure of public funds in the way of political patronage.

The immediate program of the United States government even extends to the development of irrigation projects. It is perhaps hardly necessary for Canada to go this far, but it is important that all unfinished public work and all contemplated necessary improvements, should be authorized to start without delay. The statement made by the Minister of Public Works and other Cabinet members to the delegates at the Ottawa Building Conference, that the Government would proceed with any undertaking of real economic value, at least gives promise that some sort of schedule will be formulated.

The Ottawa Conference

Continued from page 404.

of the government railways were now trying to work out some policy which would result in the utilizing of considerable labor. An effort was also being made to do something in reference to the government canal systems, and this also would be the means of giving employment.

After the interview the final luncheon was held, after which the delegates were shown over the new Parliament Building by Mr. John Pearson, the architect. The guest and speakers at the luncheon were: Senator Gideon Robertson, Minister of Labor, and Mr. Thomas Moore, President of the Canadian Trades and Labor Congress. Other guests were Mr. H. B. Thompson, chairman of the Canada Food Board; Dr. McGill, of Winnipeg, Grain Commissioner; and Mr. H. Daley, Director of the Repatriation and Employment Committee of the Cabinet.

New Theories of Ventilation

The Editor of Construction,

Sir.—The two articles on ventilation that appeared in your November issue, viz. "Developments of the Theory of Ventilation" by Charles L. Hubbard and "Elimination of Mechanical Ventilation of New York Schools," make reading as interesting as it is important.

In both articles many pet theories of the past are thrown on to the scrap heap as a result of experiments, the conclusions from which leave but little room for doubt. On the other hand, there is in both instances an entire absence of constructive endeavour. Mr. Hubbard leaves the impression that it matters little whether we breathe foul air or pure, (surcharged with the supposedly harmful Carbon dioxide or almost free from it on the one hand, or reeking with all kinds of mal-odors or sparkling as mountain or sea air on the other), the two all-important provisions for health and comfort being a correct temperature and moderate humidity, and yet he lays down no rule for determining what is correct in temperature and humidity, and leaves the reader in entire ignorance of how to obtain the desired conditions.

The second article seems to prove first, that the open window method of ventilation is superior to that of mechanical movements of the atmosphere, and second, that respiratory diseases do not result from an excess or lack of humidity. These are certainly illuminating facts, but what is the poor reader to decide when Mr. Perry West states with emphasis that the comparative conditions upon which the above results were based, were not similar and therefore did not necessarily lead to logical conclusions?

A further discussion of this all-important subject of ventilation on scientific lines would be interesting to your readers, and especially so if it results in the laying down of some practical hygienic rules and the outlining of suggestions as to practical methods of applying them to residences, offices and buildings where large numbers of persons come together.

H. K. S. HEMMING.
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Dec. 10th, 1918.

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Marble Columns, Ardolino Bros.

CONSTRUCTION

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ILLUSTRATIONS.

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ILLUSTRATIONS, ACCORDING TO AUTHOR.

ILLUSTRATIONS, ACCORDING TO AUTHOR—*Continued.*

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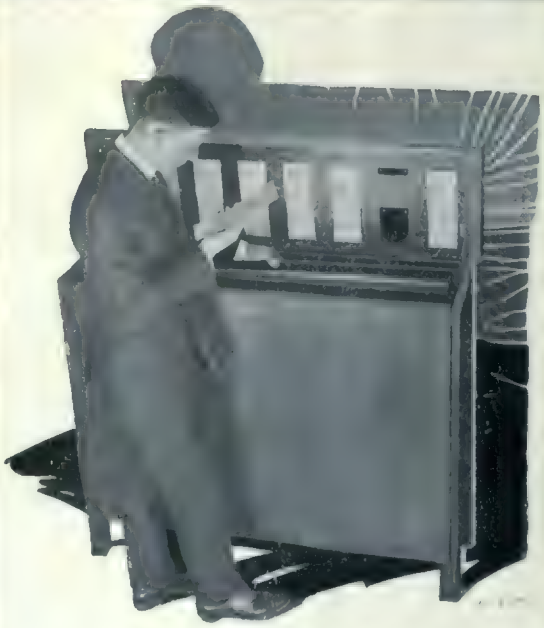

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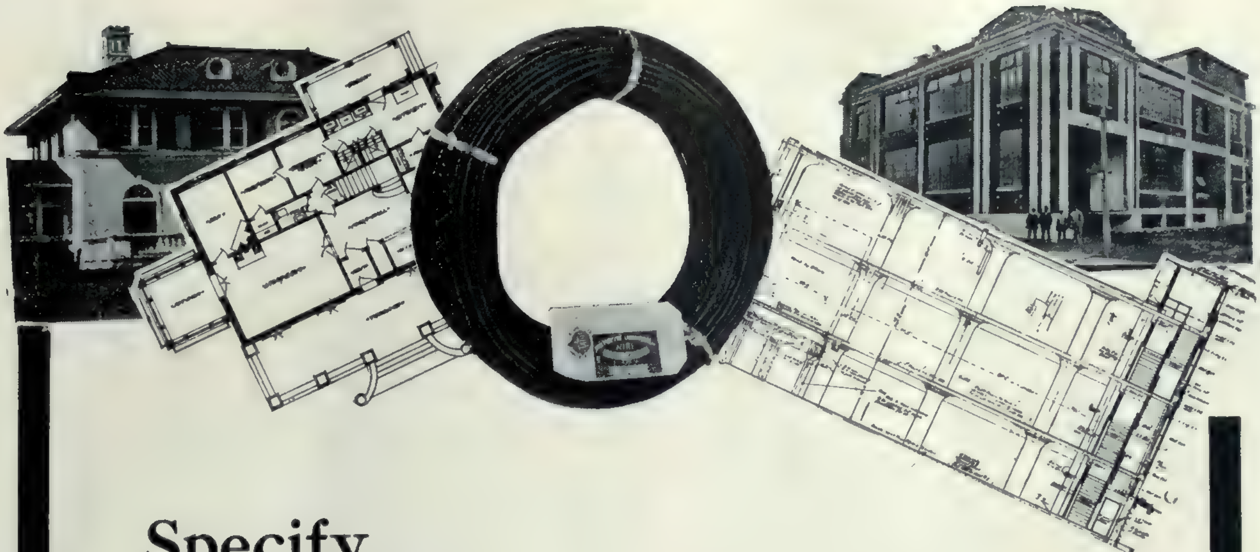

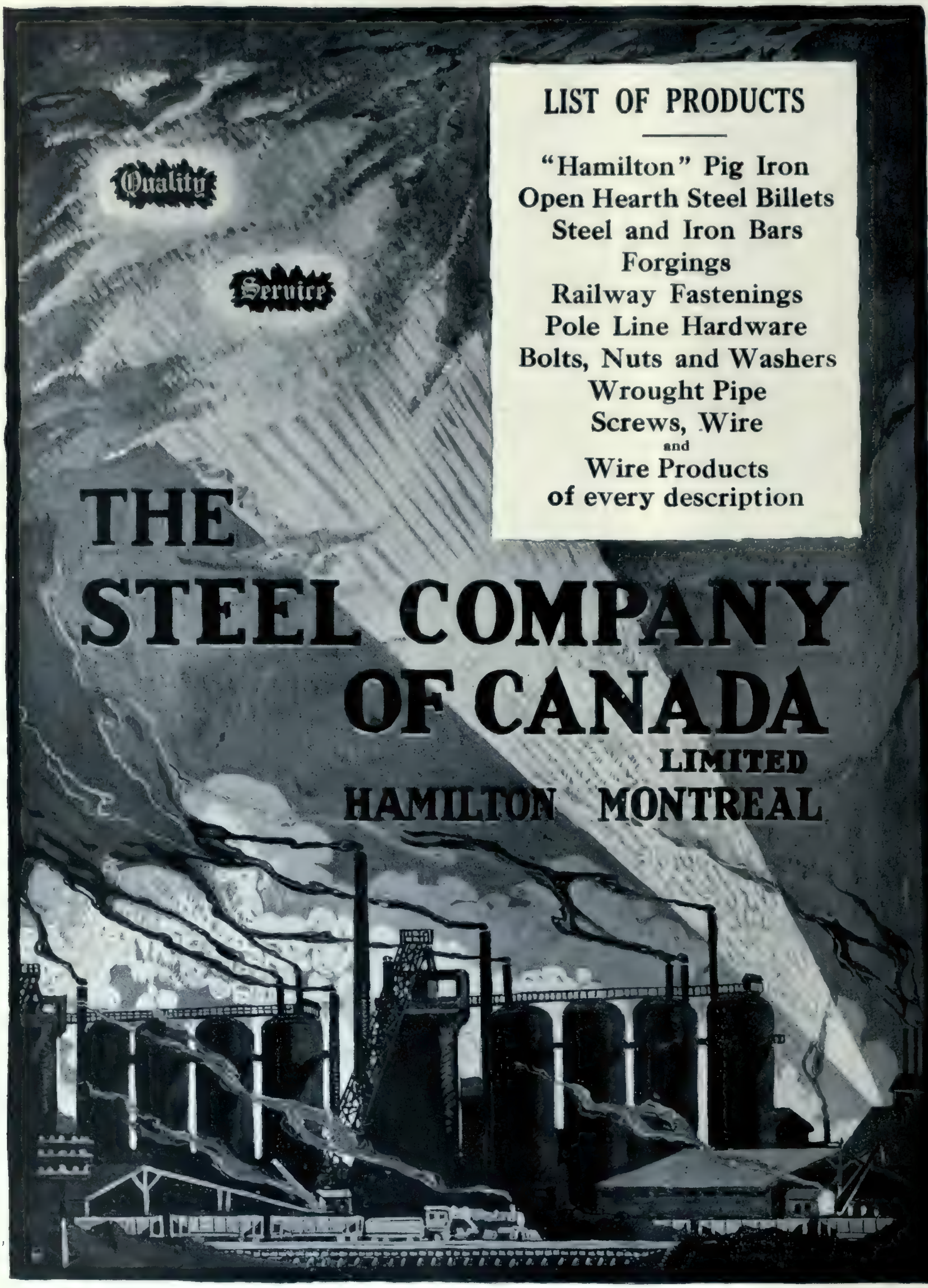
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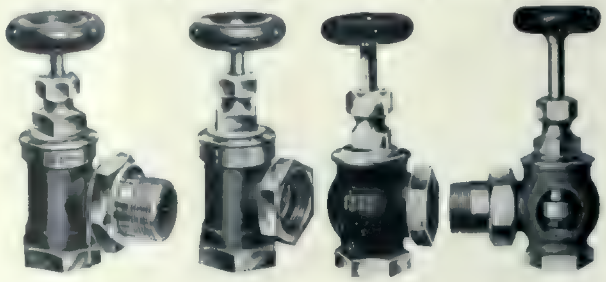

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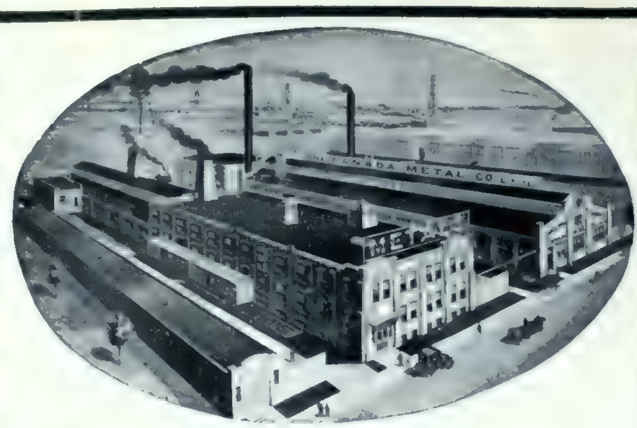

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