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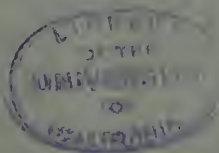
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THE PLANNING AND CONSTRUCTION OF BOARD SCHOOLS

By T. J. BAILEY [F.]

ARCHITECT TO THE SCHOOL BOARD FOR LONDON

READ BEFORE THE ROYAL INSTITUTE OF BRITISH ARCHITECTS, MONDAY, 29th MAY 1899
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THE PLANNING AND CONSTRUCTION OF BOARD SCHOOLS.

By T. J. BAILEY [F.],

ARCHITECT TO THE SCHOOL BOARD FOR LONDON.

Read before the Royal Institute of British Architects, Monday, 29th May 1899.

WHEN our Secretary did me the honour to invite me on your behalf to read a Paper on "The Planning and Construction of Board Schools," I felt compelled to undertake the task, although I am obliged to limit the subject to my own experience—viz. the Building work of the London School Board—and it is as well, perhaps, that the Institute should be aware of the varied nature of the buildings required for the purposes of elementary education. It might be supposed that, given a certain number of children to be educated, the requisite number of schools erected in the required spots would meet the want; but when it is considered that the number of children in London coming within the Elementary Education Act, according to the scheduling of 1898, was, between three to five years, 176,030; five to thirteen years, 656,978; and over thirteen years, 56,864, making a total of 889,872, it will be well understood that, although by far the larger proportion of this number are of the ordinarily intelligent and law-abiding type, still there are a large number who have to be provided specially for, from the higher intellectual development, on the one hand, to the mentally and physically defective and incorrigible truant and criminal type on the other.

An account of the building work of the London School Board may therefore be divided into the following heads, under each of which I purpose to give such details as the time at our disposal will allow, viz. :—

I. THE PUBLIC ELEMENTARY SCHOOL.

Sites.	Warming and ventilation.
Buildings.	Furniture.

II. THE HIGHER GRADE SCHOOL.

III. BUILDINGS FOR SPECIAL INSTRUCTION.

Cookery.	Manual training (in wood and metal).
Laundry.	Swimming baths.
Domestic economy.	

IV. MENTALLY AND PHYSICALLY DEFECTIVE.

Feeble-minded.	Deaf.	Blind.
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V. PUPIL-TEACHERS' CENTRES.

VI. INDUSTRIAL AND TRUANT SCHOOLS.

VII. DIVISIONAL OFFICES.

With regard to the ordinary elementary school, the London Board, with its enormous area of work and requirements, has formulated a standard of its own based on an experience of twenty-five years. When the Board commenced building schools in 1872 there was a very meagre Code of the Education Department as compared with the present, and the building rules were of a most elementary description, illustrated with specimen plans which would not now be recognised, owing to the high standard arrived at since Mr. Robson has been Consulting Architect to the Department. It is therefore not surprising that, as an acutely urgent demand existed for school places in all districts of the metropolis, a large number of schools were erected which, while fulfilling the requirements of their day and time, are now felt to be far short of present-day needs. With these, of course, we have nothing to do; I refer to it as I know there is a feeling abroad that there is extravagance and recklessness of expenditure by the Board, chiefly on the part of those who merely compare the expenditure of the present with the past, without knowing what are the differences in the Code, the number of extra subjects to be provided for, and other matters which could provide a complete answer to such criticism, to say nothing of the enhanced cost of building during the last ten years, a fact with which we, as architects, are only too familiar.

I. THE PUBLIC ELEMENTARY SCHOOL.

SITES AND PLAYGROUNDS.

I may preface this by saying that the School Board are entrusted with Parliamentary powers for scheduling and acquiring such lands as they may require for the various purposes imposed upon them by the Act, subject to the approval of the Education Department. But this does not necessarily mean that they can acquire sites as and how they please. There is frequently strong local opposition to the site they may consider best for the purpose of a new school, which forces them to a site which they would not have chosen preferentially; then, again, considerations of economy prevail to avoid compensation or complication with adjoining owners. Further, there is a standing order of the House of Lords, that any public body demolishing more than a certain number of houses of the working class in one parish in a single session are liable for re-housing. This clause seriously curtails the practicable limits of sites in London proper, as the Board have always avoided responsibilities outside their own functions.

Provided there are no difficulties in the way, the first point that should be taken into consideration is the careful selection of a site. In the crowded districts of London, where streets are narrow and houses thick, the largest schools are necessarily required and the smallest sites obtainable, coupled with the unfortunate fact that there is also less choice available than in the suburbs, where land is cheaper and not so thickly covered. An ideal site to my mind is one of about two acres, rectangular, with the longest side as a street frontage and having a western aspect streetwards. When we come to the description of the building, my preference in this direction will be understood. What should be aimed at for the building is proper provision of light and air, immunity from noise of traffic for the class-rooms, an open playground space of at least 30 superficial feet for each child, and of such a shape that it is available for games such as football for the boys, tennis, &c., for the girls. There is no objection to the girls and infants using the same playground, although with a site such as I have described they can be divided if preferred. It is also important that the site should be selected as level as possible, as in the suburbs occasionally the only unbuilt-on piece of land is of such a contour that the utilisation of it is costly in building and the playground somewhat dangerous, especially in winter-time, to the

children using it. Sites of fantastic shapes or presenting acute angles in their boundaries are not good, as they are not entirely useful, and frequently present untidy appearances. In the heart of London and crowded districts of course there is no choice, and the ideal 30-foot minimum of playground cannot be realised in these cases. As, whatever the difficulty, sufficient space to ensure light and air *must* be obtained, the playground question is usually best solved by providing on the ground level for the boys and infants, and putting a flat over the whole top of the building to form a playground for the girls, which should not be enclosed entirely by a wall, but should have either panels filled with iron grilles or some lengths of railing, as otherwise the natural curiosity of the child to see what is beyond might lead to unpleasant, not to say dangerous, consequences. Such playgrounds do not give more than 10 or 12 feet to each child, however. A portion should be roofed in, and, of course, closets provided. In the playgrounds, where sufficiently large, there should be a covered space about 50 or 60 by 18 feet, preferably in an angle, with the sides enclosed, open in front to the sun, and with a seat against the wall at the back. There should also be one or two drinking-taps in each playground, with cups and water laid on direct from the service main, and with slate or asphaltic backs to protect the brickwork from soakage. Projecting slabs of stone (millstone grit by preference) should also be built into the walls at intervals for sharpening slate pencils, as otherwise the brickwork is liable to be utilised for this purpose and so become defaced. The position of these stones should be carefully selected to prevent them being used as stepping stones to reach roofs of closets, adjoining property, &c. A few tidy-boxes should also be fixed against the walls, and the children instructed to put the paper therein which is too frequently fluttering about the playgrounds after lunch. The playgrounds should be enclosed with walls about 7 feet high, and the entrances should have iron gates. These are frequently requisitioned to be covered with sheet iron to prevent annoyance from outside, but I must say I prefer to see the playground and buildings through these gates; besides, it frequently happens that there is a better chance of gaining admittance. The best and cheapest material for covering the surface of playgrounds is tar-paving (which should be properly drained). All existing trees not in the way of buildings should be carefully preserved and protected. Top playgrounds should be covered with two thicknesses of asphalt to ensure dryness. A house or lodge for the school-keeper should be placed adjacent to one of the entrances, and in as good command of the playgrounds and premises generally as possible. This house should consist of a good-sized living-room, with scullery, yard, and wash-house, and three bedrooms. Houses for teachers, though generally attached to country schools, are never provided by the London Board, as it is considered better on the score of health and their own probable convenience that teachers should live away from their work.

BUILDINGS.

All buildings erected by the Board are paid for with money raised by loan spread over fifty years for repayment, and, as such loan cannot be raised unless recommended by the Education Department, the plans, specifications, and estimates have to conform to the Code and be approved by the Department. Tenders are only accepted by the Board subject to such approval.

The buildings of the Board, although erected under Parliamentary powers, are not exempt from the London Building Act.

Public elementary schools are divided into departments as follow: boys' schools, girls' schools, senior mixed schools, junior mixed schools, infant schools. Where the sites are sufficiently large and level, schools of all one story are usually built—as a rule, a senior mixed school, consisting of class-rooms grouped round a central hall, with an infants'

department as a separate building. Another type is to put the boys' and girls' as a two-story building, again with separate infants' school. This type is suitable for a large site where the levels are inconvenient for a one-story school. The majority of sites will only allow for three-story schools, and, where additional accommodation is required in a neighbourhood where there is already a complete school or group of boys', girls', and infants' departments, it is usually provided by acquiring another site and erecting a separate junior mixed or senior mixed department, according to the needs of the district—the junior mixed providing for children between the infants and fully graded, and generally suited to a poor neighbourhood; the senior mixed usually providing for the higher grades, and requiring rooms and facilities for teaching more advanced subjects. I will describe a three-story school as being the most usual type. [See figs. 1 and 2, Cobbold Road School, Chelsea.] The infants are naturally on the ground floor, on a level with their playground, the girls

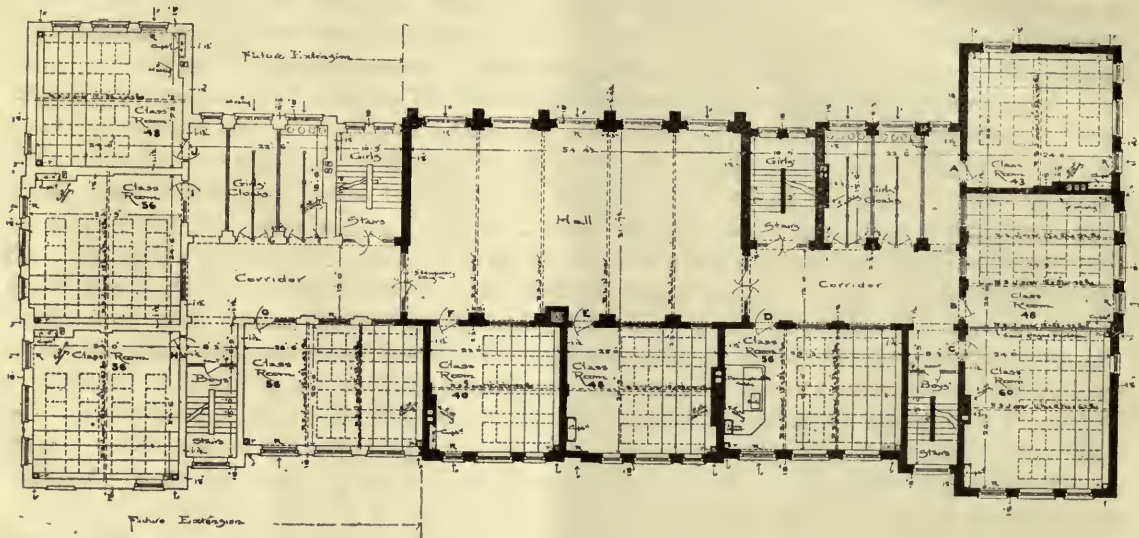


FIG. 1.—COBBOLD ROAD SCHOOL, CHELSEA DIVISION. FIRST FLOOR PLAN (GIRLS').

on the first floor, the boys above. The London School Board consider a hall indispensable to every department of a school. Experience has shown that nearly every school built in London has required enlargement. There must naturally, however, be a limit to the size of a school, so that the departments do not become unwieldy. The maximum size or accommodation of a group should not exceed 1,548—in departments of boys 516, girls 516, infants 516—and if further accommodation is required, it should be provided by a separate mixed department (either senior or junior), as already described. On the other hand, if a smaller school is needed to begin with, it is convenient to take the figures named as a maximum and build a portion first, leaving it to be added to as needs arise. Of course the one and two-story schools can be treated similarly. The hall for this type of school is a very good size at 54×30 feet, the class-rooms, ten in number to each department, graduating from sixty to forty in accommodation, thereby providing the necessary elasticity as the lower standards, requiring the largest class-rooms, are periodically reinforced by drafts from the infants' or junior mixed departments. As the numbers decrease as the higher standards are reached, the Board builds accordingly—one room for forty, two for forty-eight or fifty, and the remaining rooms for fifty-six or sixty will be found convenient. The Board have abandoned the use of sliding partitions, as each class is self-contained with

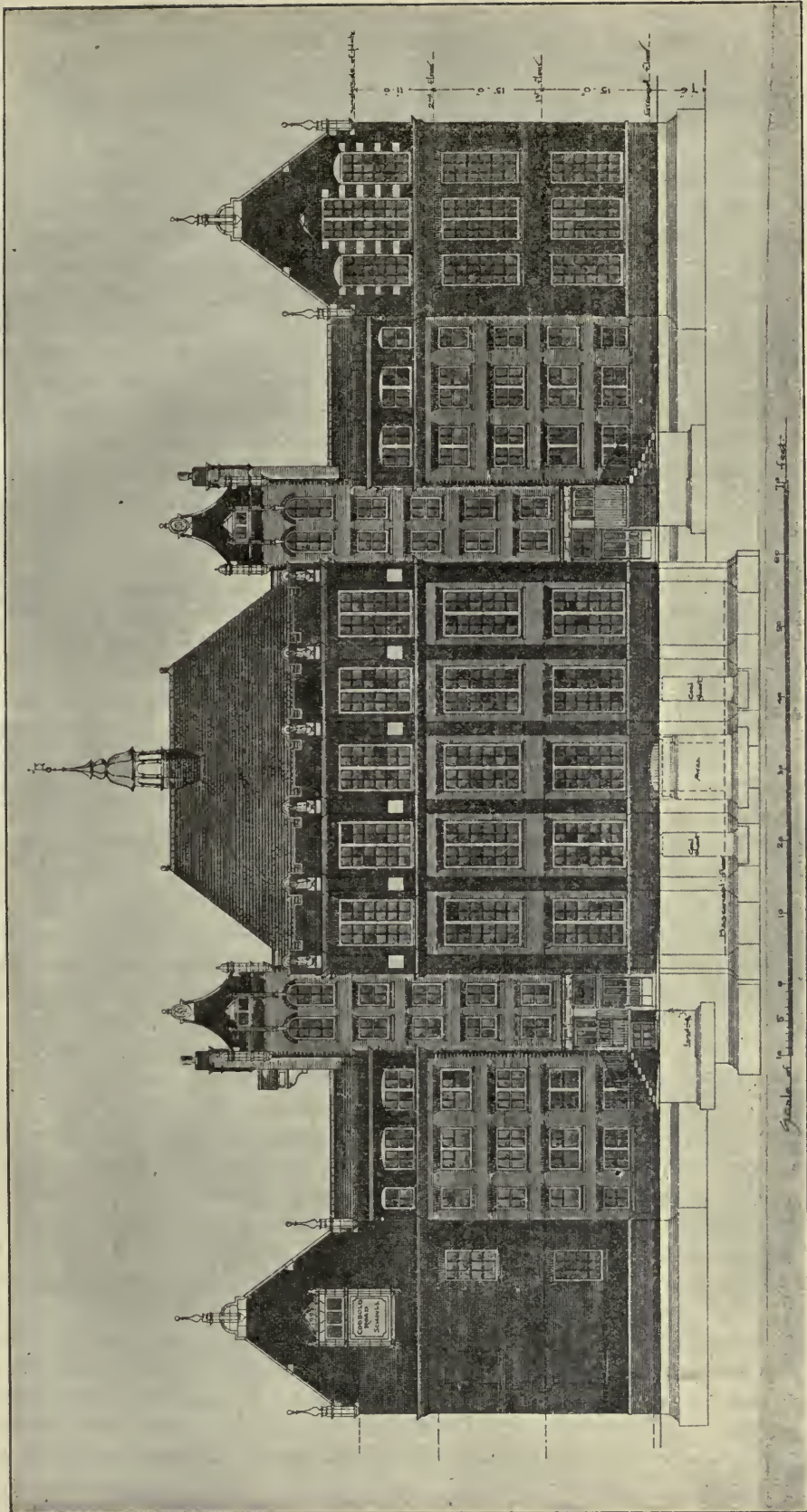


FIG. 2.—COBBOLD ROAD SCHOOL.

its own teacher. In an ideal state of things the class-rooms would be full at the same accommodation all through the school, and if that were so they would be all of one size. In every new school a drawing class-room is provided, lighted from one side only (north or east), and provided with water supply, clay box and sink for instruction in modelling, and accessible from both boys' and girls' departments. The main line of class-rooms should, if possible, face the playgrounds rather than a noisy road, and draw their light from the east, as that aspect suns up the rooms in the early morning and does not disturb them for the day. I never build them to the cheerless north if I can avoid it, and the need of lowering the blinds on a sunny side seriously interferes with the lighting; the class-rooms in the wings cannot be so considered, but it would be impracticable and unworkable in a large school to place them all in one line. The hall, facing west, provides a good reservoir of sun-lighted air to help the class-rooms, and, not being seated or reckoned in the accommodation, is a cheerful place into which to march the classes for recreative or collective purposes. Architecturally also, this elevation, being the more broken up (comprising, as it does, the main lighting of the hall, the staircases, cloak, and teachers' room and blocks, and gable ends of wings), is more desirable for a street front than the long unbroken line of class-rooms, though the aspects of the site do not always allow of this.

For a complete school with departments of the above size two staircases for each senior department are required, as also two entrances for the infants on the ground floor. Not more than 300 children should be allowed to each staircase or entrance, and there should be easy access to the staircase landings through swing doors, with no power of fastening, so that, in the event of a panic, the children have an uninterrupted run from their floor to the open playground. The staircases should be not less than 3 feet 9 inches or more than 5 feet wide, with flights not more than seven or eight steps in length, and with ample landing-spaces, without winders; the treads of steps about 13 inches and the risers 6 inches, and with no elaborate nosings to become chipped and disfigured by carrying furniture and heavy goods up and down. The steps may be of the many artificial stones now made, spandril steps with square seatings being preferable, care being taken to select a material that does not wear slippery. The landings are perhaps best of hard York stone. The staircases should be well lighted; the walls should be faced with glazed bricks, and a plain mop-stick handrail provided on each side of the flights, but not round landings. The outer doors at bottom must be made to open outwards as well as inwards. The class-rooms and halls should be 14 or 15 feet clear height, the walls faced with a glazed brick dado and gault or similar bricks above, distempered; the upper hall and corridor floors constructed of iron or steel and concrete, and covered with wood blocks—all hall floors should be strong enough to stand marching and drill and gymnastics without undue vibration. The class-rooms should all be arranged so that the desks receive their daylight from the left, and the furthest desks should not be more than 20 feet from the windows; beyond that there should be subsidiary lighting, preferably at the back. The sills should be 3 feet 6 inches above the floor and the windows extend as high as the ceiling. Above the ground floor these should be fitted with an arrangement by which they can be cleaned entirely from within the room. The doors into halls or corridors should swing both ways or open outwards, and should have the upper panels of glass, so that complete supervision can be ensured. There must be sufficient lock-up cloak-room accommodation provided to give each child on the roll of the school a peg, the rows being two tiers only in height, and the cloak-rooms amply lighted from the ends, with accesses so arranged as to prevent crowding. An air inlet under the windows and the upper panels of doors being wired will ensure a current of air through the room, and there should be a coil of heating-pipes in each cloak-room. At the ends under windows

a channel and outlet may be formed in the floor, with a rail fitted across to form a stand for umbrellas. There should be no connection with the class-rooms, but the cloak-rooms should be approached from the corridors. The lavatories are best in a separate room—in the proportion of rather more than one per cent. of basins to the accommodation of the department for boys, and two per cent. for girls and infants. A sink with draw-off tap for cleaning purposes should be provided on each floor, properly protected from misuse. Where the school is of full size there should be one of these at each end of the block. The cloak-rooms and lavatories are best placed in juxtaposition to the staircases, and, as half the height of the story is really sufficient for these when properly ventilated (as they can further be by gratings at their ceiling line on to the staircases furthest from the windows), the intermediate spaces or mezzanine floors can be utilised for rooms for the teachers to retire to during the mid-day interval. There should be one such good-sized room to each department, say 20 × 16 feet, fitted with hat-pegs and a fixed lavatory basin with supply and waste pipes; and it should be fitted with a small range so that the teachers can cook their lunch if so desired. Each department should also be provided with a lock-up stock-room fitted with shelves. There should be no w.c.'s in the main building for the children, but one or two should be provided for the female teachers. The w.c.'s for the children should be in the open playground, a convenient and reasonable distance from the entrances without being obtrusive, and should *not* be connected by covered ways with the building. The number provided should be two per cent. for the accommodation for the boys and rather more for the girls and infants. Troughs should not be used, but single pans and water-waste preventers. As in London everybody is subject to the various local authorities with regard to their drainage and sanitary arrangements, these are tolerably well known, and there is no need to describe them. The blocks of w.c.'s should be provided with iron gates to protect them from intrusion and damage by unauthorised persons.

WARMING AND VENTILATION.

This is a subject which, perhaps, has not received a sufficient amount of consideration in the past, it having generally been considered sufficient to put a fireplace in each room and rely upon the opening of the windows for a supply of fresh air. We all know the effects of the close atmosphere of a crowded room without proper change of air, and in these days it would be simply criminal to force a large number of children into school where they would be compelled to spend several consecutive hours daily in rooms of this description, to say nothing of the effect on the teachers, who, from my own observation, look jaded and weary after a day's work under such conditions. There is no need to say more to absolutely condemn this system (or rather want of system). It is interesting to notice the efforts which have taken place to improve the ventilation of schools during the last twenty years. Realising the danger of open windows, and that they were frequently not open at all in the winter-time, fresh air shafts (commonly known as Tobin pipes) were introduced for inlet of fresh air, and a separate flue built in the chimney stack with opening at ceiling line for extraction; but I have too frequently found the lid of the fresh air inlet closed, or, where no lid was supplied, books piled upon it, as draughts were complained of; the heat of the room then converts the extract shaft into an inlet with very confusing effects, sometimes resulting in the mouth of *that* also being closed up. It is perhaps needless to add that the introduction of *cold* fresh air from outside brought into a warm room, by whatever method, is fraught with discomfort, and even danger to its inmates. A system of low-pressure hot-water, with pipes round the walls and just above the floor, where the desks are placed, and a few ventilating radiators bringing in warm fresh air, is very good; but I feel that, even with this system, an open fire

in the room is needed, and, for extraction, I do not consider the brick flue simply connecting with the outer air sufficient, as, when the room is warm, it is apt to act as an inlet. I have tried trunks from the ceiling line of each room gathered into groups with a single outlet equal to the combined area of the group, and with a coil of hot pipes in it to produce an upcast. This has the desired effect as far as the ventilation is concerned, but I cannot recommend it for schools of more than one story in height, for where I have adopted it for three-story buildings it has an effect *not* desired, it being found that it conveys the sound from the rooms below to those above, to the disturbance of the classes. The great desideratum in a school is to change the air in the rooms pretty frequently, without producing draughts. In all the cases I have described, the air in winter is not changed sufficiently, and I am afraid the methods employed can only be considered "haphazard" ventilation. It must be remembered that, in public elementary schools, where large numbers of children are crowded together, in many cases their clothes none of the sweetest (nor their habits), the greatest care should be taken to get continued purity of air, and with as little trouble as possible; this can only be attained by changing the air of the room eight or ten times an hour, and it would not be possible to live in rooms with such a changing of air going on unless it was almost, if not quite, imperceptible. The system known as the "Plenum" has effected this in the only satisfactory way, so far as I am aware, introducing, as it does, fresh filtered air above the heads of the occupants of the room, warm in winter and cool in summer, and diffusing it over the area and extracting it at the floor level on the same side as the inlet, carrying away with it all the unpleasant odours of damp and evil-smelling garments. The effect on the general spirits of teacher and class is incalculable. Another and great advantage of this system is, that in London and other large towns the noise of traffic, and frequently perhaps the proximity of railways, render closed windows and, in some cases, even double windows necessary, and this emphasises the perfection of this system of ventilation, as there is always a quiet side from which the supply of air can be drawn, and the closed and double windows improve the working. I have also noticed that it is the only system of mechanical warming with which one does not seem to miss the presence of an open fire in the winter season, as, coming into a room with summer temperature and the air as pure and fresh as in summer in the open, it is not looked for. The cost of an installation such as this is not appreciably more, in itself, than an ordinary hot-water installation, but I am bound to say that the builder's work involved in the formation of ducts, flues, &c., is a rather costly item, though, of course, as supplies of water, hot and cold, methods of artificial lighting by gas or electricity cannot be obtained without more or less cost, it can hardly be expected that warm or filtered air can be introduced into a building, circulated and extracted, without costing more in its initial stage than an unsatisfactory and unscientific primitive arrangement. My experience of the cost of fuel for hot-water schemes is that it is not greater than for warming by open fires. I have not had sufficient experience of the "Plenum" system to be able to give you data from my own knowledge on this point, but I may say that the engineering requirements for working and maintenance do not involve more skill than should be expected from the ordinary intelligence of an artisan with a reasonable knowledge of attending to boilers.

FURNITURE.

The pattern of desk proposed to be adopted should of course control the shape of the class-room. It is almost needless to say that the London School Board mainly adopt the dual desks, as they give facility to the teacher to get to the side of every scholar; these are graduated in size to the classes—thus, the smaller size is provided for the larger class-rooms, these being, as before remarked, occupied by the junior children. The desks

are always arranged so that they receive their daylight from the left, and the three or four back rows are placed on steps rising four to five inches, the front rows (two to four deep) being on the flat, with the teacher's desk placed on a small platform raised about four inches in front, with a black-board, size 48 inches by 36 inches, affixed to the wall at the left side of the teacher. It has been found that glass blackened at the back is best for this purpose. One good-sized classroom in each (boys' and girls') department should be furnished with a demonstration table, raised on a platform six inches high, fitted with sink with glass front, gas and water laid on, and an evaporation niche provided at side of it on the platform, for teaching elementary physics. Behind this table a panel of cement, six feet by four feet, should be arranged on the wall, with small moulding around, for lantern displays; but, as there is no further available space left on the wall for a black-board, this can be arranged below, with balance weights, to slide up over panel when required. The windows of this room should be fitted with black blinds, to pull up from the bottom in grooves, to keep out all daylight when lantern instruction is given. The stepping for desks in this room should be considerably more than in the ordinary class-rooms, four tiers graduating from six inches to fifteen inches rise; and it will be well if one or two of the class-rooms for the more advanced pupils are fitted with single desks for examination purposes. The School Board are now adopting this for Standards VII. and Ex. VII.

In the infants' department the class-rooms should be fitted with desks corresponding with the junior and senior divisions, into which this department is usually divided, and one room furnished with a Kindergarten gallery for the accommodation of the youngest class. This room should not accommodate more than fifty, and should have roomy flat floor space for marching and games, with easy access to the playground and offices.

All the rooms for teaching boys, girls, or infants should be planned and seated so as to give a minimum of ten feet superficial per child. On the score of health and comfort both for teacher and children, it is quite clear that infants require as much cubic air space as the older children, and this is now recognised by the Education Department, who have agreed to allow the London Board a concession on the building loan to provide for this. About 140 cubic feet for each child should be provided. Each class-room should be provided with a cupboard for daily replenishing from the stock-room.

The halls, not being required for teaching, or rather class purposes, do not require seating, although, where there is a good basement or available space, 200 or 300 light chairs might well be stored for prize distributions, entertainments, &c. It is, of course, possible to hire these, but where a school is very popular, chairs are now so frequently needed that it is well to have them on the premises if practicable, though the hall should not be always cumbered with them. In an ordinary hall of the approximate size already mentioned, there should be a small platform, 5 feet 6 inches by 4 feet 6 inches, about six inches above the floor, on which the head teacher's desk should stand. In the cases of one-story mixed schools where the classrooms are grouped round a central hall, this latter is naturally much larger, say eighty feet by forty feet, and with these dimensions a more important platform may be provided, designed perhaps to form an architectural feature in the room, raised about 3 feet 6 inches; but I have found that where an ornamental balustrade has been placed in front it has sometimes been objected to on the ground of interference with the view, the teachers frequently liking to organise a display of drill or gymnastics on this platform when an entertainment is given.

A piano is considered to be an advantageous adjunct to the furniture of girls' and infants' departments, for musical drill, singing, marching, and rhythmic movements in the hall.

Each hall should have one or two museum cupboards, about four feet high, with glass doors, for the collection and display of objects of interest which the children may be encouraged to collect, and, as the top forms a shelf for the arrangement of graceful drawing models, &c., they may form a desirable adornment to the hall.

The halls and class-rooms should be fitted with picture rods for the hanging of the pictures or charts which are supplied by the Board; and, in the classrooms, a fillet of wood about four inches deep, fixed above the dado round three sides of the room, for the occasional display of the children's work, drawings, &c. I should like here to note that the Board have wisely issued an order to each department of all their schools for a plan of the department to be prepared by the scholars under the direction of the teacher, measured and drawn to a scale of four feet to an inch, the furniture delineated, and the walls coloured in, and submitted to the architect for approval before being framed and hung up in the school. I have had 200 or 300 of these plans before me, and have been much surprised and pleased at the generally high quality of the work. Very few have been returned for revision; some even would have been no discredit to an architect's drawing office. Generally speaking, these plans bear a high testimony to the practical drawing instruction given in the schools, and should produce an interest in buildings too frequently absent on the part of these scholars.

GAS-LIGHTING.—There is nothing exceptional about the gas-lighting of the schools, beyond saying that in the class-rooms the lighting should be by pendants, not brackets, and so arranged that no child is more than five feet from a burner; about four pendants with three or four arms each are generally found sufficient. The halls are best lighted with five-point star burners; the drawing class-rooms with Wenham lamps arranged for screening for shadows. The question of applying electric lighting to some of the schools is under consideration at the present time.

The number of day schools built and opened by the Board to the 30th November 1898 is 430. A further 45 are projected, of which a good many are now in course of erection or being planned.

II. THE HIGHER GRADE SCHOOLS.

There are a certain number of schools dotted about the Metropolis which receive children whose parents are not satisfied with the cessation of their education at the elementary stage which is all the law insists upon, although the subjects in the Government Code go far beyond these, and encourage their adoption by liberal grants. These schools are equipped with rooms for science teaching in addition to those for art and manual work, which are more general. The rooms for science teaching comprise chemical and physical laboratories, with balance room and small dark room for experiments in photography, and a store for chemicals, also a demonstration and lecture room. The chemical laboratory is usually fitted with benches for twenty to thirty students, a sink, with water and gas supply to each pair of scholars. These benches will be better understood by a reference to the detail drawing, as a description of them would practically mean a specification. There should be a fume closet to each ten students in this room, 2 feet 9 inches by 1 foot 11 inches, supplied with water and gas and flue for extraction. The physical laboratory should have three strong tables fitted with gas, accommodating eight students to each table, and a working bench along one side of the room, with sinks at each end, also a slate shelf for balances, and a cupboard.

The balance-room should have a slate shelf for the balances, with a strong light so that the indexes can be read with facility. Cupboards under this shelf will be found useful.

The demonstration and lecture room should have a gallery with desks for about forty

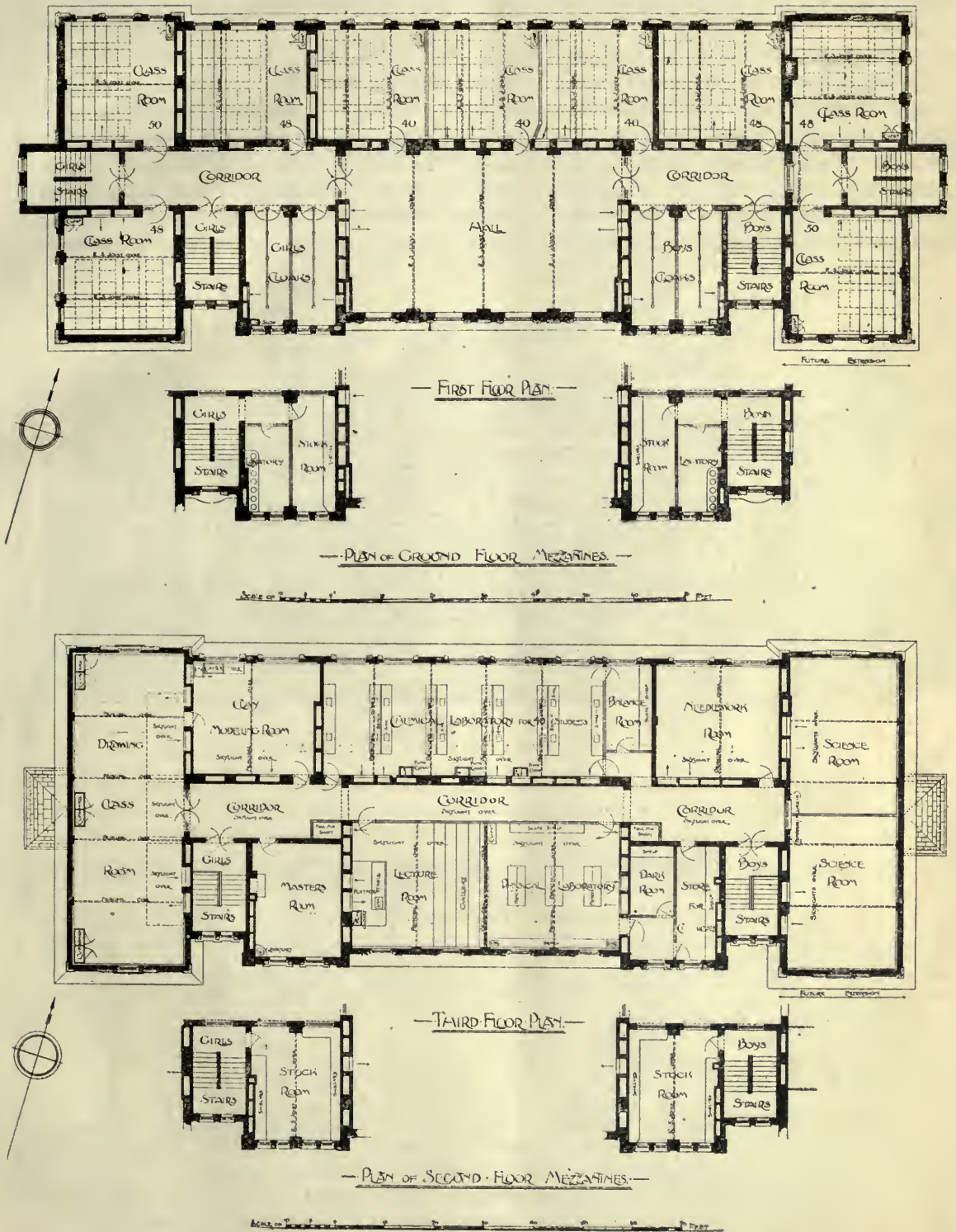


FIG. 3. -CASSLAND ROAD HIGHER GRADE SCHOOL.

scholars, in good view of the demonstrator's table, fume closet, and lantern panel, as previously described.

These schools are known as Higher Grade Schools, and have long been established in some of the larger towns in the North—Leeds, I think, being the first—this town having built its Central Higher Grade School some ten years since, Sheffield, I believe, following suit. I went over the Leeds school a short time ago, and although it was considered a very perfect specimen of what these schools should be when it was built, I gathered it is so far behind modern requirements that they would like to pull it down and rebuild it. The London Board have only recently established these schools, adding the necessary additional rooms to existing schools, and, as will be understood, they are schools central to districts or groups of elementary

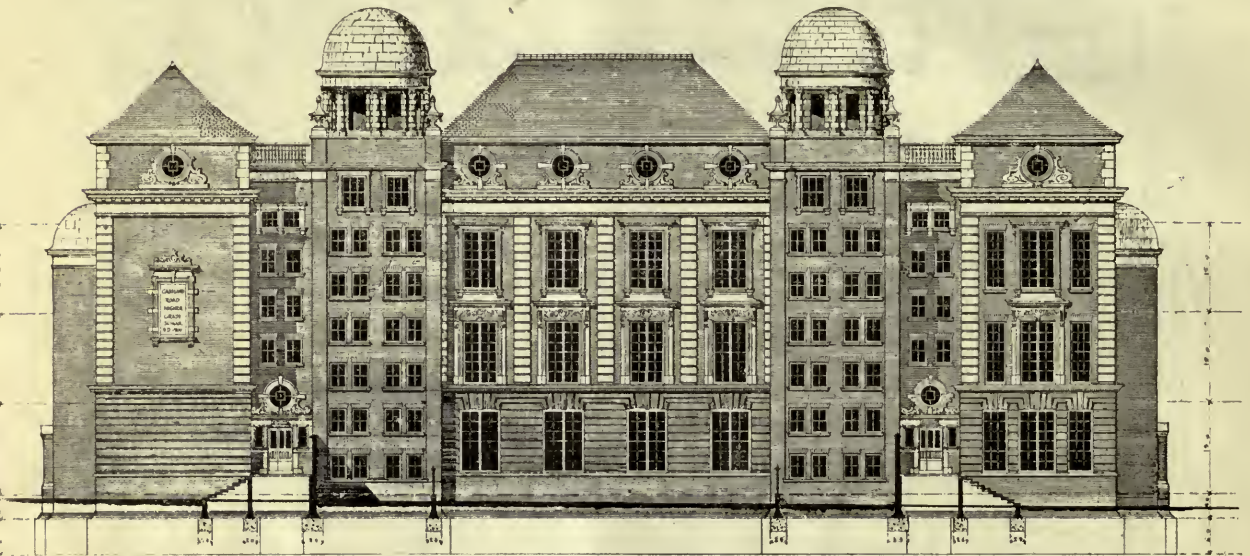


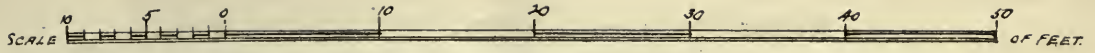
FIG. 4.—CASSLAND ROAD HIGHER GRADE SCHOOL. SOUTH ELEVATION.

schools, where they are easily accessible to boys and girls who have reached the seventh standard and are prepared to extend their school period. The new schools will be built for boys and girls only, no accommodation for Infants being necessary. The classes, being more advanced, are smaller in size, the classrooms being graduated from 50 to 40; they are so arranged that they can be worked as mixed classes in the classrooms with separate entrances and exits; cloak-rooms, lavatories, and conveniences as usual. The three illustrations of Cassland Road School, Hackney, will explain the general arrangement. They will be fully provided with halls for examinations, and special class-rooms for science, art, manual, gymnastic, and other training for both boys and girls. There are 44 of these Higher Grade Schools in operation under the London School Board.

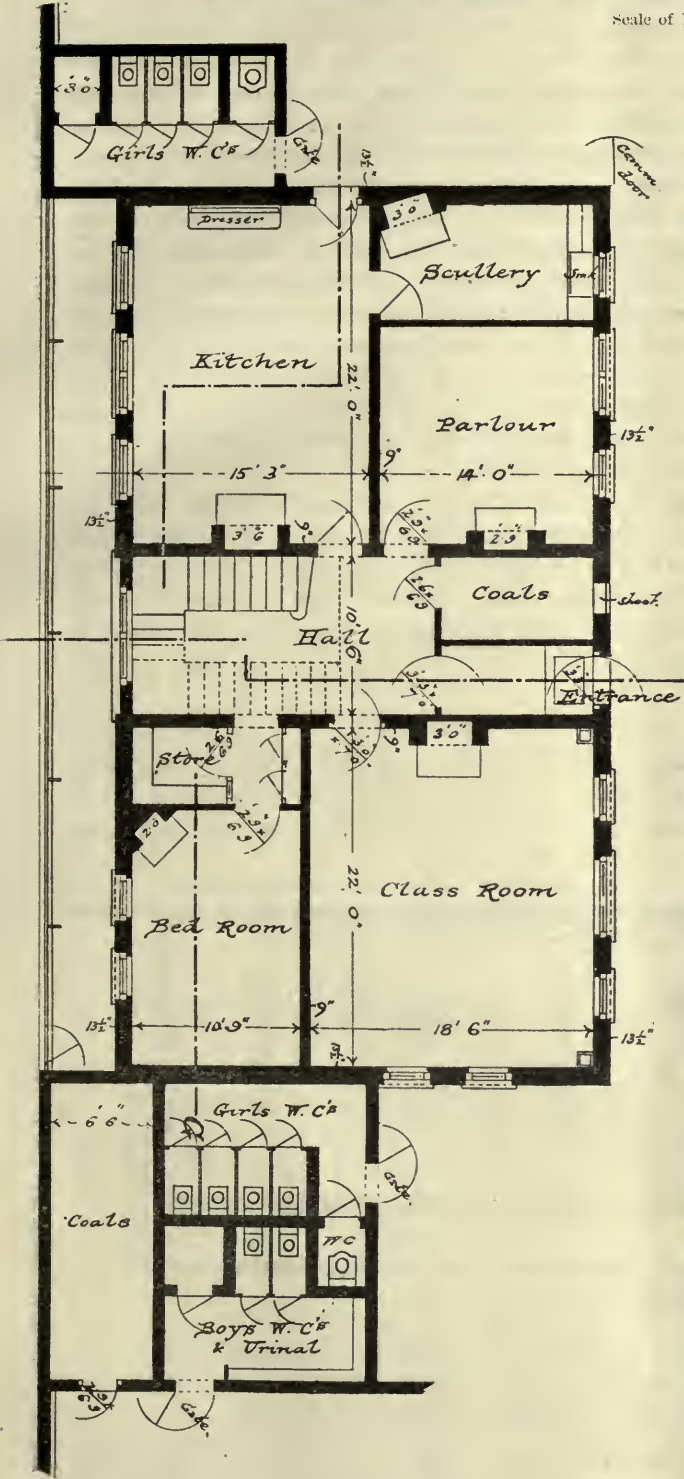
III. BUILDINGS FOR SPECIAL INSTRUCTION.

DOMESTIC ECONOMY (COOKERY, LAUNDRYWORK, AND HOUSEWIFERY).

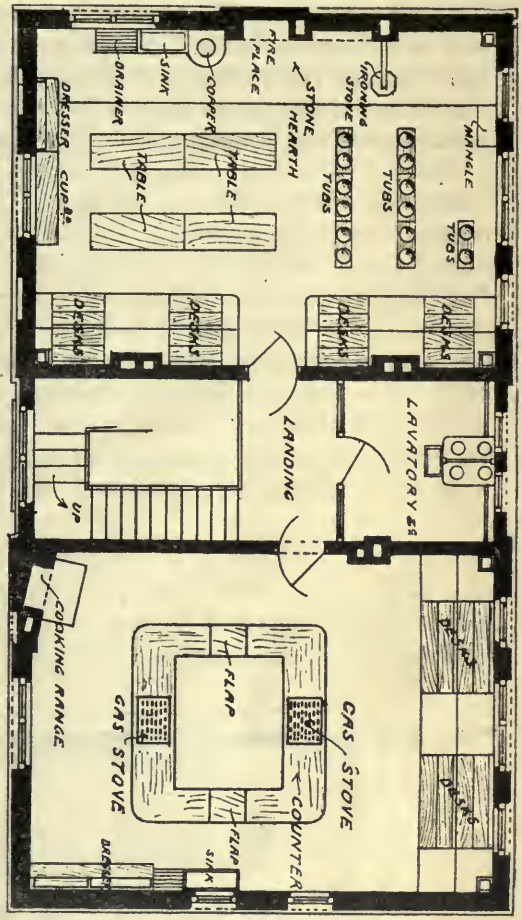
In or about the year 1875 the Board established classes for the teaching of cookery, and for this purpose small kitchens were erected in various centres to accommodate classes of eighteen for teaching, practice, and demonstration. This, as usual, was on a very small scale, and, in fact, the Education Department only allowed £250 on the erection of each kitchen or centre. As the work developed the classes were increased in number, necessitating the rooms



Scale of Plans.



FIRST FLOOR PLAN.



Landing

Gas Stove

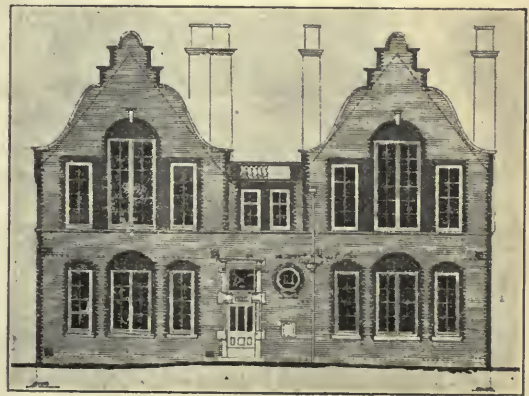


FIG. 5.—TENNYSON'S STREET SCHOOLS, LAMBETH. DOMESTIC ECONOMY CENTRE.

being increased in size and adaptability, and the Education Department now allow £500. Fifteen years after starting the teaching of cookery, the Education Department included laundrywork as a Code subject, and centres were established for this instruction in specially built rooms planned for the purpose. At the end of last year there were 163 cookery centres and 108 laundry centres in operation. In many cases the same school was selected as a centre for both cookery and laundrywork, and in these cases two adjoining rooms were usually built with a common entrance. All these rooms have gradually grown in size and capacity to suit the growing requirements of special instructors, inspectors, &c., and in the year 1897 an experimental scheme of instruction in domestic economy, combining cookery, housewifery, and laundrywork was inaugurated. At this time, the cookery and laundry centres were built with temporary roofs, and sufficiently strong walls to support an upper story for the provision of rooms for the new curriculum should it prove a success. This is now established at six centres, and many others are in an active stage of provision, it having advanced beyond the experimental stage. The combination of subjects has naturally led to the requirement of a building in each case capable of giving proper facilities for the teaching. An illustration is shown of one such typical building. This has been planned after consultation with the committee in charge of these subjects, and the specially qualified lady expert who superintends them. On the ground floor is a class-room 22 feet by 18 feet, seated for a class of forty girls; a kitchen, sitting-room, scullery and bed-room, plainly furnished; an entrance lobby and staircase leading to the laundry and cookery class-rooms on the upper floor, the object being to provide for instruction to girls in general housework in addition to cookery and laundrywork.

MANUAL TRAINING IN WOOD.

With regard to the manual room for woodwork, the best size for this is 60 feet by 22 feet, about 12 feet high, with a store about 10 feet wide partitioned off at one end for wood, and containing a sink and water-tap; there should also be two stoves for heating glue, and racks

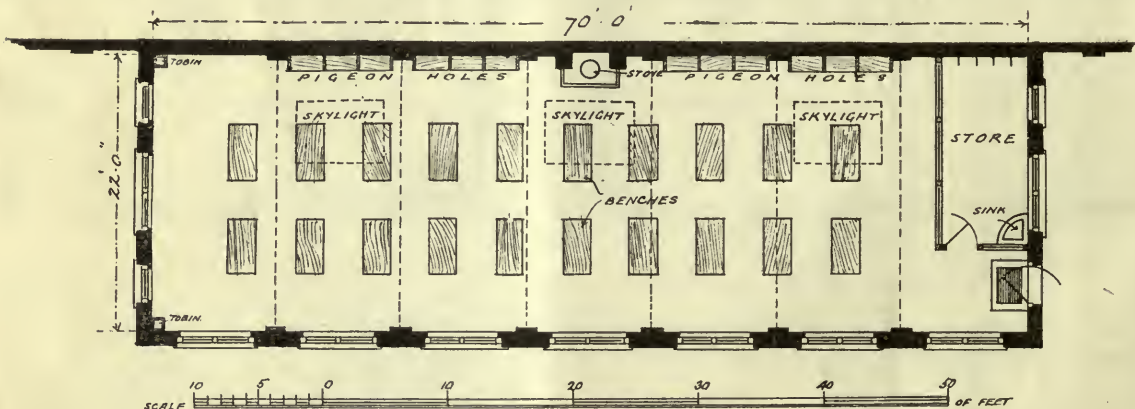


FIG. 6.—PLAN OF MANUAL TRAINING CENTRE.

on the walls for tools, &c. This room will take twenty benches, two boys working at each bench. There should be a small room adjoining the entrance, with two lavatory basins and hat-pegs. The Board have 145 of these centres at work, and 55 more projected.

MANUAL TRAINING IN METAL-WORK.

There is a good centre for metal-work established in connection with the school at Thomas Street, Limehouse, and the work turned out is really remarkable. There is a class of thirty-

two boys in a room 68 feet long by 20 feet wide, lighted one side and end. It is fitted with a bench along one side under the windows, with lockers beneath. There is a gas-engine enclosed in the room to drive the machinery, a row of fourteen vices, three lathes, a drilling machine, two forges, three anvils, grindstone, sink, cupboards, desk, &c. The room was fitted up in accordance with the requirements of the very able instructor, who, I think, is perfectly satisfied with it, and certainly produces very high-class results from the intelligent lads under his care. It would be interesting to see this branch further extended, and I am glad to say the Board has had under consideration a proposal to establish another of these centres in the neighbourhood of Greenwich.

All these classes should be in buildings apart from the main school, as disturbance from various causes, such as noise, steam, &c., would be likely to ensue.

SWIMMING.

With the sanction of the Education Department the Board have decided to establish three swimming-baths in connection with the Schools at Marlborough Street, Southwark; "Hugh Myddelton," Finsbury; and Lyham Road, Brixton. The first of these is on a very small site, and, as the school is raised on arches, the bath is provided under part of the school: it cannot be considered a model, as the circumstances are prohibitive. That at Lyham Road will be a building separate from the school, and, as it will probably be used at separate times, it will have a distinct and separate entrance, with superintendent's office and towel storage. The swimming-pool will be 50 feet by 20 feet, 2 feet 9 inches deep at one end and 5 feet 6 inches at the other, lined with white glazed bricks, and having steps, diving-board and handrail, dressing-boxes—2 feet 6 inches wide and 3 feet 6 inches deep, merely formed as partitions with half-doors—for the children along two sides, and a small number of larger dressing-boxes for teachers' use; four spray baths, w.c.'s and urinals, the spray baths being considered necessary for cleansing purposes before entering the swimming-pool. Also, in connection with the warming apparatus, a washing and drying room for towels and bathing-dresses. The water will be warmed by the injection of steam round the sides close to the bottom of the bath, the pipes being in chases and cased for protection, this system of heating the water being recommended by the Board's warming engineer.

IV. SCHOOLS FOR THE MENTALLY DEFECTIVE, THE DEAF, AND BLIND.

THE MENTALLY DEFECTIVE.

The School Board, being entrusted with the elementary education of the whole of the children of the Metropolis, has, unhappily, found that a considerable proportion of these children are mentally weak—not being absolute lunatics, who are provided for by other public bodies. As in these cases the mixing with children of normal intellect in school and playground is productive of undesirable effects on both sound and weak, it has been found necessary to provide accommodation for these in specially planned buildings. They are treated as centres drawing their attendance from moderately accessible groups of schools. The unit for class-room in schools of this description is less than that for the ordinary school, as so much more individual attention is required. And the number of class-rooms to each centre varies according to the density of the neighbourhood in which it is erected, four or five being about the average number. These are 20 feet square, and are seated for twenty children. It is important that they should be all on the ground floor, as so many of these imperfectly developed children are cripples physically as well as intellectually. A good hall corridor 15 or 20 feet wide, and as long as the building will allow, well warmed, and made as cheerful as

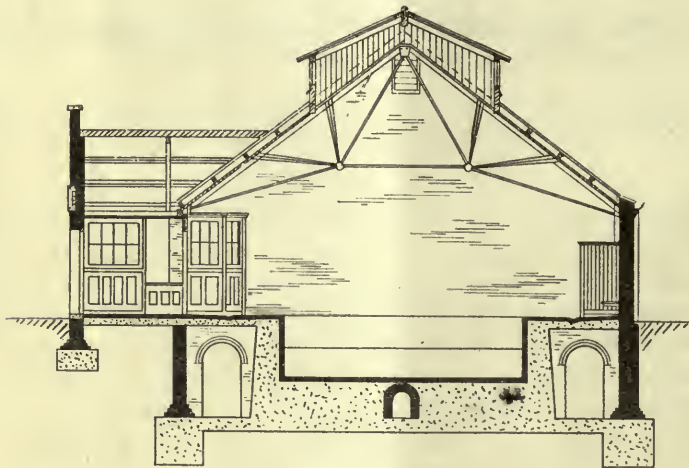
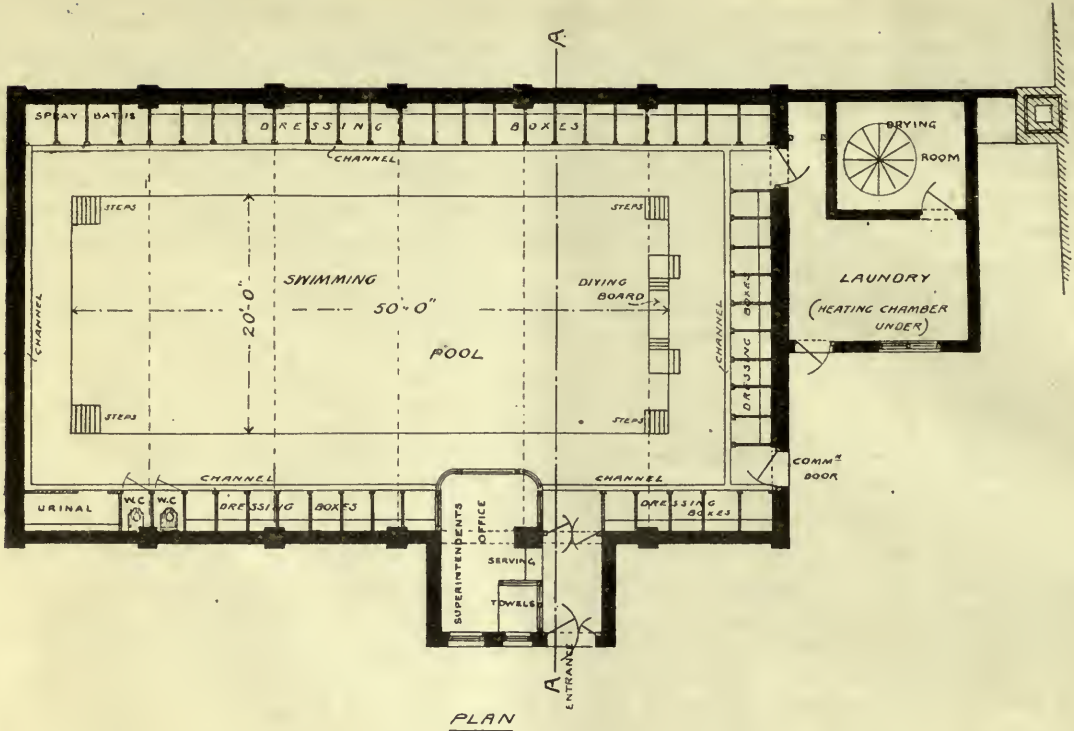


FIG. 7.—SWIMMING BATH.

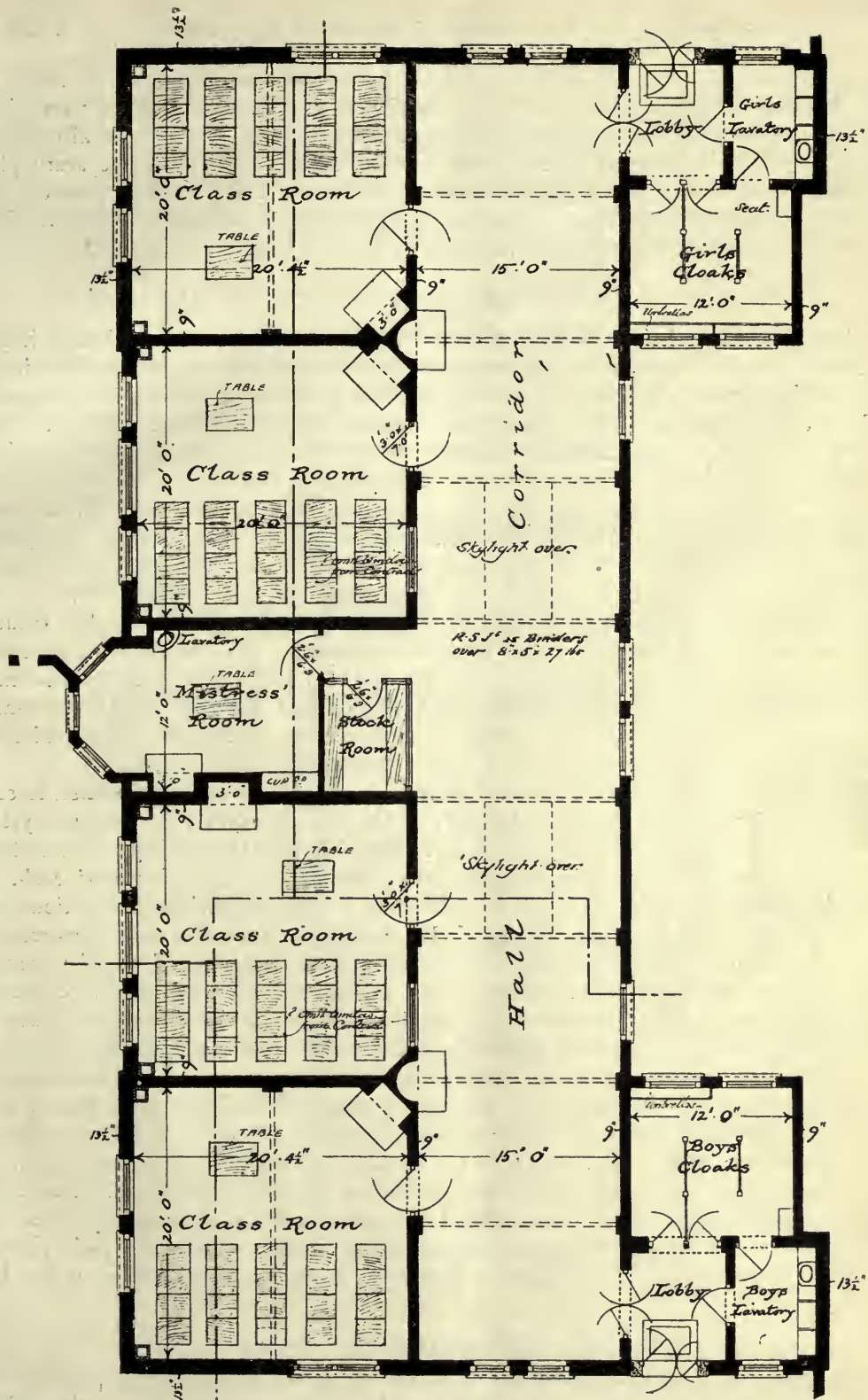


FIG. 8.—SPECIAL OR DEFECTIVES' SCHOOL.

possible, is provided for exercise, drill, &c. The class-rooms for these schools, unlike the ordinary school, should be so placed as to receive plenty of sun, and should be warmed by open fires. In addition to the indispensable cloak-rooms, baths are provided, as also a good lavatory, boys and girls being frequently taught in mixed classes, but with separate playgrounds and offices. There are thirty-nine of these centres in actual work in London, with 1,597 children on the rolls on the 31st October, 1898: and about thirty-five more are either in course of building or immediately contemplated.

THE DEAF.

Provision for what are known as the deaf and dumb also has to be made, although it may here be noted that the Board does not recognise dumbness, their work in the direction of training these children proving to their satisfaction that dumbness is contingent on deafness, and can be greatly minimised, and in many cases practically cured. These schools are also provided on the "centre" system, and are very much on the same plan as the "defective," similar conditions applying. The class-rooms, however, are smaller, 18 feet square, and seated for ten. The method of seating in these rooms is different from the ordinary class-room, being arranged in a circle; and the rooms should have a strong high or top light so that the lips of the children can be watched and studied, they being taught to read what is said by the lip movement. The result is very wonderful, as I have found from my own observation, having had many opportunities of visiting these classes with the late General Moberly, who took a keen interest in all these unfortunates. The Board have seventeen centres in operation, with 513 children on the rolls on the 31st October 1898, and seven in course of provision. The Board and Education Department consider that these centres should, as a rule, consist of four classes, giving a complete course of instruction for junior and senior scholars, as being more effective than a larger number of smaller centres.

Some five years ago the Board determined, in the exercise of their responsibilities, to erect an institution for 150 deaf children at Anerley. This was planned on the cottage system, having five separate cottages for thirty each—three for girls and two for boys—the cottages having day-room and dormitory, with accommodation for the nurse in charge of each. A central block contained school, dining-hall, instruction rooms for various occupations, and quarters for the governor in charge of the whole, committee-rooms, &c., recreation-grounds, drill-hall, swimming-bath, and all accessories. In consequence, however, of a difference with the Education Department, the abandonment of the scheme will probably result. Since this stage the Board have further considered the question, and have applied to the Education Department for authority to establish a home for the boarding and instruction of about forty deaf children who, on account of their mental deficiency, were unsuitable for instruction in the oral classes, and had to be taught on the sign system. To this the Department have consented on the condition that it is built on the cottage-home principle, that the number in each home should not exceed ten, that the sexes should be rigorously separated except for lessons and meals, that the homes should be established outside London, and manual and industrial training should be largely agricultural or horticultural, as on these lines something useful may be done with the children, and that attention should be given to their physical condition from time to time. This scheme will afford a fresh planning problem to be solved in due course.

THE BLIND.

Happily, most of those children of the class for which the School Board provides who are afflicted with this distressing infirmity are reached by some of the institutions which

private benevolence, or municipal or other funds have provided. There are, however, a few children in most divisions for whom school accommodation has to be provided. These number about 150 distributed over eight centres, and it is generally sufficient to provide two small classrooms at each centre with separate entrances, cloak-rooms, and lavatories, the classes being mixed. Separate play-yards and closets are, of course, necessary apart from those of the ordinary school to which the centre is attached.

V. BUILDINGS FOR THE TRAINING OF TEACHERS.

PUPIL-TEACHERS' CENTRES.

In consequence of the large demand for teachers, and the difficulty of meeting such demand, the Board adopted about fourteen years ago the principle of training their own pupil-teachers, and so bringing them up to their service. Like everything else, this departure had small beginnings, and the accommodation in the first cases consisted of a few rooms

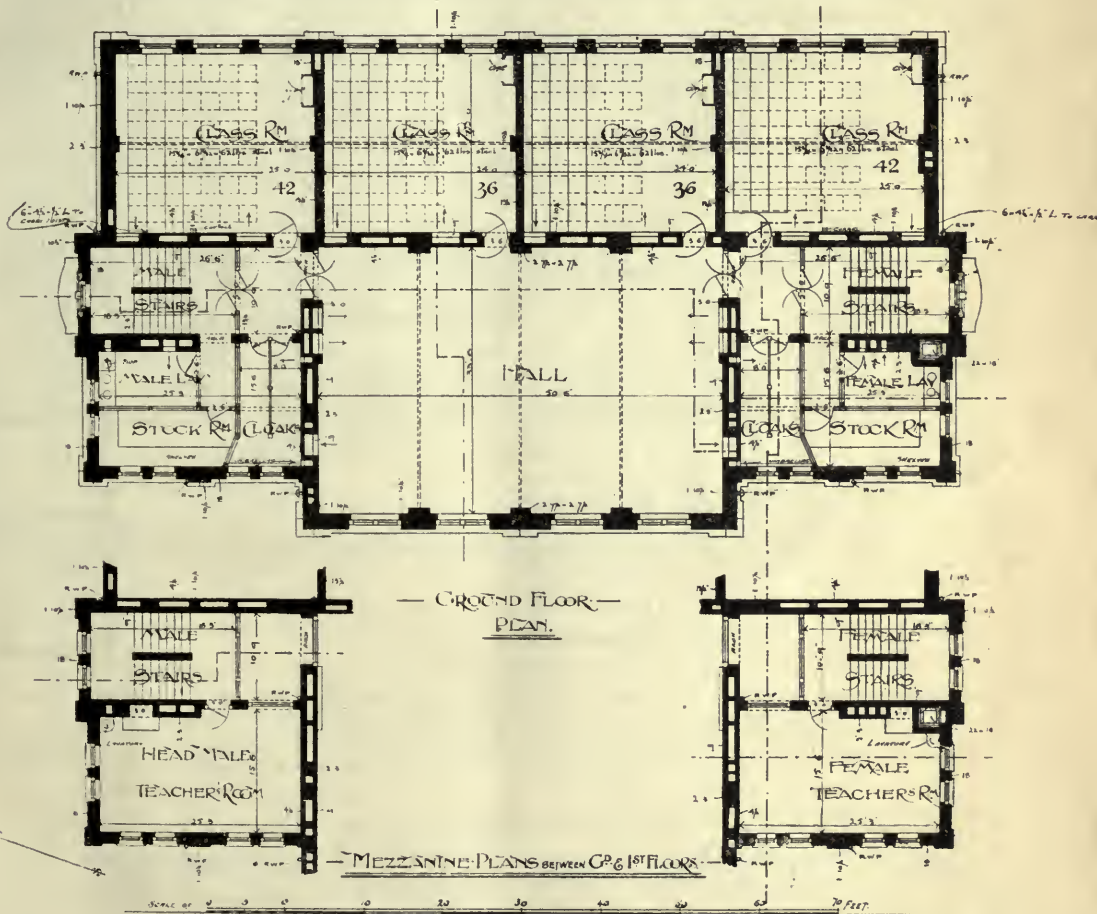


FIG. 9.—FINSBURY PUPIL-TEACHERS' CENTRE, OFFORD ROAD.

attached to an ordinary elementary school and specially set apart for this purpose. It was soon found that the facilities provided by this means for science, art, and other teaching was altogether inadequate, and in 1888 the first building expressly designed and erected as a pupil-teachers' centre was opened,

It consisted of a three-story building comprising, on the ground floor, three class-rooms each for thirty-six mixed pupils, and seated with single desks; a central hall, 44 ft. 6 in. by 30 ft.; separate staircases, lavatories, and cloak-rooms at each end for the two sexes. On the first floor are three class-rooms coinciding with those on the ground floor, whilst over the hall is a chemical laboratory and corridor fitted with lockers for the students. On the top floor is an art room and covered gymnasium, whilst a flat over the laboratory provides an open gymnasium and space for exercises. There are also retiring rooms for the teachers of

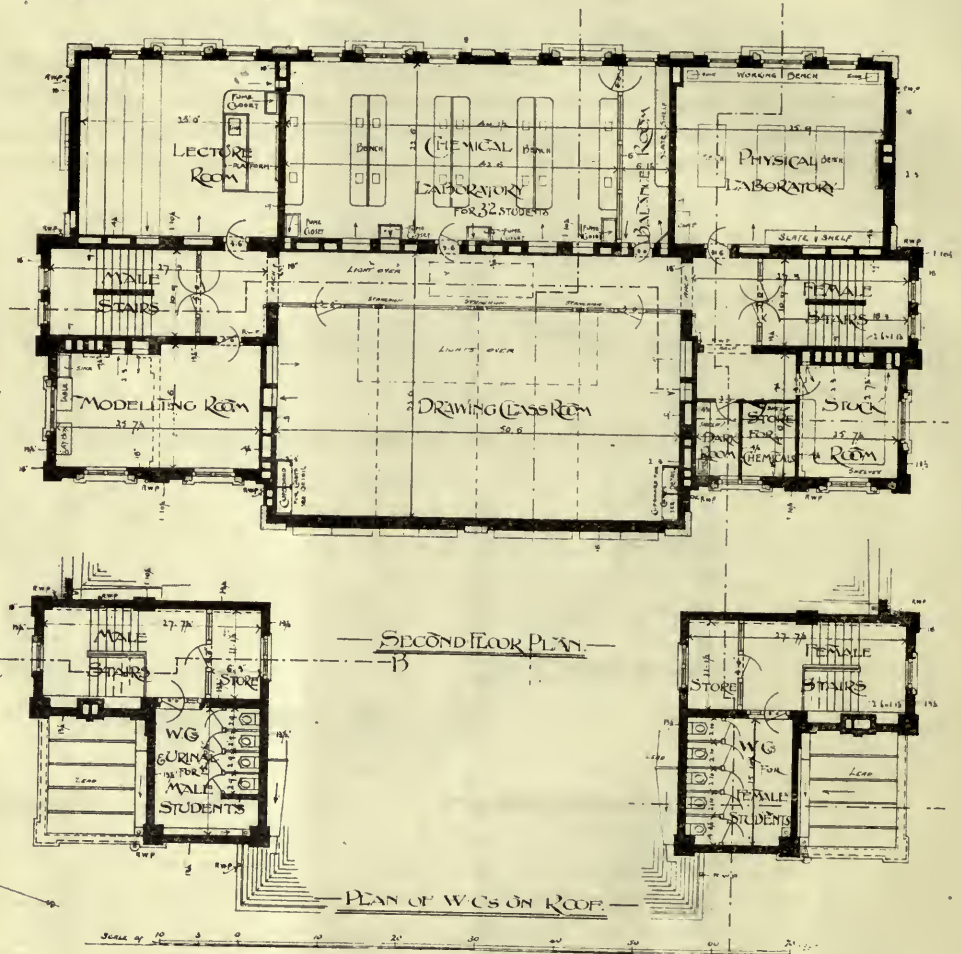


FIG. 10.—PINSBURY PUPIL-TEACHERS' CENTRE, OFFORD ROAD.

both sexes, and one for the superintendent in charge of the whole establishment. In view of the experience of ten years, and an enlargement of requirements by the Education and Science and Art Departments, even these provisions have proved to be meagre and insufficient: and now that the system has spread so far beyond what was contemplated at its inception, the Board have found it necessary to replace the first of its ventures in this direction by a properly planned building capable of accommodating the numbers using it, and far in advance of the existing provision, containing as it does rooms for special instruction at present non-existent. On the ground floor are provided four class-rooms for forty-two and thirty-six, two of each, seated with single desks, a central hall 50 ft. 6 in. by 33 ft. 6 in.,

with staircases, &c., at each end as before described: on the first floor are four class-rooms, and a properly-equipped gymnasium over the hall; on the upper floor an art room (over the gymnasium), the remainder of the floor being devoted to chemical and physical laboratories, lecture-room, balance and dark rooms. A basement is provided for the engineering apparatus, and also a kitchen for the provision of luncheons; a very necessary accessory where numbers of young people spend many hours daily. The site is, happily, large enough to give space for lawn tennis on the girls' side, and for football on the boys. This may be fairly considered



FIG. 11.—OFFORD ROAD PUPIL-TEACHERS' CENTRE.

as a very complete scheme, and may safely be said to embody all that is likely to be required in the future [see figs. 9, 10, 11]. There are twelve pupil-teachers' centres established and at work under the Board. Five of these may be considered inadequate for their purpose, being incorporated with other buildings and generally inconvenient. They will probably be replaced in due course by more modern erections.

VI. INDUSTRIAL AND TRUANT SCHOOLS.

The buildings for this purpose must naturally be of an essentially different character from other buildings of the Board, as they are necessarily boarding establishments. The Industrial Schools are occupied by boys or girls who have been charged before a magistrate for offences under the Industrial School Act, and are committed to these schools until the age of 16 is reached.

Truant schools, on the other hand, are tenanted by incorrigible truants who are only admitted for a few months in the hope that a little taste of discipline may have the desired effect of producing a respect for the amenities of law and orderly life. The Board's industrial and truant schools at present consist of the following :

1. *Davenport-Hill Boys' Home, Brentwood*.—An adapted building acquired by the Board twenty-five years ago and accommodating 100. But, as it cannot be said to be satisfactory, being far behind modern requirements, the Board are about to substitute a new building.

2. *Drury Lane Day Industrial School*.—Established in a school originally built for ordinary day-school purposes. The character of the neighbourhood changed to such an extent, however, that its dwindling attendance could easily be accommodated in surrounding schools, and the building was adapted as a day industrial school for 200 boys and girls, but not a residential establishment. It was opened in 1895.

3. *Gordon House Girls' Home, Isleworth*.—This is a home for fifty girls committed under the Industrial School Act, and established in a large mansion purchased by the Board on advantageous terms and adapted for its new tenants; opened in 1897.

4. *Highbury Truant School*.—A disused building purchased by the Board and adapted for the accommodation of 200 boys; opened in 1891.

5. "*Shaftesbury*" *Training Ship*.—Established in 1878, stationed off Grays, and accommodating 500 boys. In connection with this the Board have recently erected an infirmary and observation building on land adjoining, it being considered desirable when boys are committed to the ship to isolate them from the main body for a week or two in case of their developing infectious complaints. The observation building contains two wards—one of four beds, the other of two, with room and scullery for use of nurse attendant. The infirmary building consists of receiving ward, disinfecting chamber, three dormitories of six, five, and three beds respectively, with bath-rooms and sanitary necessaries, dispensary, store, living-room, bed-rooms, and kitchen for nurse attendants. The dormitories are all warmed by open fires, and have inlet and extract flues for change of air.

6. *Upton House Truant School*.—This is the only building as yet erected specially for the purpose. It is a four-story building for 140 boys, comprising, on the ground floor, dining-hall, school and class-rooms, lavatory, dressing and bath rooms, officers' quarters, a large kitchen with steam cooking apparatus and accessories, a reception, disinfecting, bath and dressing room for the boys, and (in separate buildings) a laundry and infirmary with four wards, nurses' accommodation, day-rooms, &c.; on the first floor of the main building are two dormitories for thirty and twenty beds respectively, containing about 540 cubic feet of space to each bed, properly supervised from masters' bed-rooms; on the second floor there is similar accommodation; and on the top floor are two dormitories for twenty each, two punishment cells, with w.c.'s and bath-rooms on each landing. There are a large recreation-ground, drill-shed, and work-room for industrial occupations. A swimming-bath is about to be added.

7. The Board are negotiating for a large site of some 15 acres in a locality in the neighbourhood of London for the purpose of erecting two establishments—an industrial school for about 120 boys, to take the place of the Davenport Hill Boys' Home, and a truant school for about the same number. These two institutions will be entirely separate as far as their occupation and management are concerned, but will probably be under the control of one superintendent and body of managers. The building is planned as a square block enclosing a courtyard about 146 ft. by 94 ft. divided for the two occupations. The east and west sides, three stories high, are allotted to the separate use of the industrial and truant schools respectively, and contain dining-hall, kitchen, and accessorial apartments; on the upper floors, dormitories and bed-rooms

for the masters in charge. The connecting side of the square to the front or south contains the entrances, reception wards, governor's office, waiting-rooms, and covered connecting passage from side to side. Over this will be the committee-room and the superintendent's quarters. On the north side the connecting block will comprise class-rooms on each side of a drill-shed, over which will be a large hall, about 80 feet by 32 feet, in which examinations, functions, &c., can be held. At the rear are the lavatories, dressing-rooms, swimming-bath, workshops, &c., and separated by a yard, the laundries, drying-rooms, and necessary buildings for this purpose. On the site will also be erected an infirmary and observation building for each institution. A large cricket field and recreation-ground, common to both, are also secured. Buildings of this nature can only be erected subject to the approval of the plans by the Home Office; the Board are therefore compelled strictly to conform to their requirements, and are precluded from limiting their expenditure for accommodation to what *they* might consider sufficient from an economical point.

VII. DIVISIONAL OFFICES.

For the purposes of the administrative work of the Board, London is divided into eleven divisions as follows:—City, Chelsea, Finsbury, Greenwich, Hackney, East Lambeth, West Lambeth, Marylebone, Southwark, Tower Hamlets, and Westminster.

A description of the building work of the London School Board would not be complete without a reference to the buildings for offices for each of the above-named divisions. The requirements for scheduling the children in each division year by year necessitate the employment of an army of visitors under a superintendent, whose duty it is to see that proper attendance is made at school and that school-places are projected where they are deficient. In addition to this, the several schools, when built, are placed under groups of voluntary managers, an official correspondent with the necessary clerical staff being required for each division; and it is also necessary that there should be a local headquarters for these, who are, for convenience, generally placed under the same roof. A typical block is now in course of erection in the Peckham Road for the East Lambeth Division—on the ground floor is the entrance hall, a large room 57 feet by 22 feet for the visitors to perform their clerical work, a room for the assistant-superintendent, and an office for the check clerk, also the lavatories, w.e.'s, &c.; on the first floor a committee-room, used also by the superintendent, and a clerks' office; on the second floor the correspondents' and clerks' offices, and caretaker above.

GENERAL.

In conclusion, I may be expected to say a word on the subject of the cost of the schools, and I shall confine myself to the actual ascertained cost of an ordinary day school. As a typical case the Princess May Road School, Kingsland, tenders for which were received on March 20 of the present year, may be cited, so that we have it "up to date." This building was planned as a complete school of three stories for 1,548 children, on a site of about $1\frac{1}{4}$ acre; a portion, containing accommodation for 916 and including the halls, art room and other expensive accessories, forming the first contract, and the lowest tender working out at £15 15s. 6d. per head for the main building, and about $8\frac{1}{2}$ d. per foot cube. When the school is completed for the full number, the cost per head will be reduced to £13 18s. 4d. per head, calculating it on the same basis. This amount includes for building the whole of the brickwork in cement, also the provision of glazed bricks to staircases, corridors, and dados of class-rooms and halls, but does not include furniture. A building

of three class-rooms for sixty children, and hall, for defectives, is also provided on the site at a cost of about £2,000. The cost of enclosing the whole site with walls and railings, tar-paving, drainage, and provision for deep foundations below a normal depth of 6 feet is about £5,000 more.

The Education Department have a veto on the estimated cost of the schools, and limit their allowance of expenditure (or loan) to £10 per head on the accommodation as seated for in the class-rooms, with an additional £1 per superficial foot floor space for the halls, and from 15s. to £1 per foot for other rooms for special teaching; also an allowance for the extra cost of glazed brick internal facings on the score of saving in maintenance. In addition, extra allowances are granted for enclosing, paving, and draining the sites and for deep foundations, which are almost always necessary in London. But the Board are expected to keep the cost of furniture and superintendence within the £10 limit. The Princess May School just quoted is being built for about £750 within the limit allowed.

The Board have from time to time gone carefully into the subject of cost, and many suggestions for cheapening have been made, but, as the Board have never been content to forego any of their requirements, and properly have not been disposed to relax the standard of high quality of work, all this has to be paid for, and, bearing in mind the state of the labour market and cost of materials as compared with that of, say, ten years ago, it is not surprising that schools, like other buildings, do not get cheaper. There was a suggestion a few years back that unnecessary expenditure was incurred on architectural adornment, and the committee dealing with this branch of the work ordered two or three schools to be built of stock bricks and slate roofs, with no architectural features about them. Then it was found that the difference of cost between bare utilitarianism and buildings designed in some sort of style and regard for materials and colour was rather less than 5 per cent., and I venture to say there are few members of the Board who would be prepared to make such a sacrifice to effect so trivial a saving; nor would they, I think, have the sympathy of the Institute in doing so, considering that the schools are educational public buildings erected on freehold sites. Besides, they can hardly be accused of extravagance on this head while they keep within the limits of the Education Department.

DISCUSSION OF MR. BAILEY'S PAPER.

Professor AITCHISON, R.A., *President*, in the Chair.

Prior to the reading of the Paper, the following letter was read from LORD REAY, Chairman of the London School Board, who had been furnished with an advance proof of the Paper:—

6 Great Stanhope Street, W.: May 23rd 1899.

SIR,—I much regret that I cannot attend the Meeting on May 29th, as I am going abroad.

Mr. Bailey's paper is of great interest to architects and educationists, and deserves to be widely read and translated into foreign languages, as it is sure to attract the attention of foreign educationists.

Mr. Bailey speaks with authority. The building operations of the London School Board are on such a large scale, the problems which have to be solved are so varied, they have been so carefully

considered by a number of experts, that Mr. Bailey's admirable review of this branch of the School Board's work cannot fail to meet with the full recognition due to the care with which it has been written.—Your obedient servant,

The Secretary R.I.B.A.

REAY.

THE HON. E. LYULPH STANLEY (Vice-Chairman of the London School Board) said he had not expected to be called upon to address a meeting of architects on a question of architecture, but as all that Mr. Bailey had recounted to them was a matter with which he (the speaker) was very familiar, having been associated with Mr. Bailey for a great many years, his only doubt was whether, in the compression that was necessary to bring so many matters into the space of a Paper, even architects could fully follow all that

was implied by the Paper. To build a public elementary school was a matter which could not be approached simply by architectural skill and knowledge, because the conditions were very special. The architect had to follow the policy of the particular School Board or other managers of schools who employed him. An architect, thoroughly to know what a school ought to be, should be familiar with what had to be done in a school. Just as an engineer in planning works had to consider the business of the man whose works he was putting up, so an architect in planning a school was planning a building of quite a technical character, and the exigencies of his work must follow the requirements of his employer. If, for instance, it was intended to employ a considerable number of pupil teachers, or other teachers of that type, the school would have to be planned somewhat differently from a school in which all the teachers were thoroughly competent and fit to be trusted with classes apart. Mr. Bailey had given a description of what sort of a building should be planned for the instruction of pupil teachers. There, too, the way in which the School Board or other managers intended to teach their pupil teachers would be the policy the architect must follow; and therefore, although Mr. Bailey had laid down a great many propositions as to what was best and most desirable, at the same time, in some things, his idea of what was best must have been limited by the parsimony of his employers. For instance, in describing what a class-room should be, he mentioned that he would put glazed bricks as high as the dado, and then above that he would have the wall of some ordinary type of brick. Now a provincial School Board, say Liverpool or Birmingham, would probably demand that the walls should be thoroughly finished with plaster, not left in the rough brick; therefore he did not think because Mr. Bailey, working for very economical, not to say parsimonious, employers, had indicated certain roughness and want of finish in the building, that that really indicated the type of building an architect free to advise his employer would consider was the proper way of finishing his building. He had not the slightest doubt that, however good the bricks, they must be somewhat rough, and if they were left uncovered, dust and possibly even germs of infection would collect; whereas if the wall had a smooth surface it was easily cleaned and was less likely to harbour dust. He agreed with Mr. Bailey that the furthest scholars ought not to be more than 20 feet or 22 feet from the windows, getting their light from the left; but Mr. Bailey had not mentioned in how many of these matters the School Board for London had had to carry these educational points almost by force against the Education Department. Only quite recently

the Board had been invited to make their furthest row of seats some 24 feet from the light. There were many things in the Code and in the rules of planning which had at length come to be considered axiomatic by the Department, but this had not always been so. In the first set of schools the Board submitted to the Department where the class-rooms had side lighting, those plans were in the first instance returned by the Department because their rules were violated; and though the Board called the attention of the Department to the fact that if the class-rooms were planned according to the requisition of the Department, they would have back lighting or front lighting, and not side lighting, at last they got the plans passed, with a warning that it was not to be taken as a precedent. With regard to the use of halls in dealing with the discipline and education of children, that was a school-manager's question, not an architect's. There was not the slightest doubt that if a room was to be used for one purpose, it had better be constructed for that purpose: they should not attempt to make it answer some other purpose. In the interest, however, of supposed economy the Department sometimes suggested that they should put a class in the hall. It would be apparent to architects how bad it was to have a class in a room, some 50 feet by 30, which was used as a passage for children going to and from the various class-rooms. Apart from that, it put a great strain upon the voice of the teacher. Although in such matters the Board usually got their way, they got it with trouble and friction, which was a very serious drawback to a public body discharging a very responsible duty. Mr. Bailey, in his desire to cover the whole ground, may have given an excessive impression of the importance of some branches of the Board's work which were only subsidiary. For instance, the building of such institutions as truant schools and industrial schools was not the ordinary work of the Board, but merely incident to it. Architects, in considering a school plan, should concentrate their attention first and foremost upon the arrangement of the class-rooms. There were many disputed questions in school planning. Mr. Bailey spoke about the stepping of the floors, but experts were not at all agreed as to whether the floors of the class-rooms should be stepped or not, and whether the platform from which the teacher delivered instruction should not be raised and the floor flat. On the Continent, where people were supposed to have paid much more attention to school planning than in England, the rule was against stepping a floor; and a great expert in school management—Mr. McCarthy, Chairman of the Birmingham School Board, and also Head Master of a Secondary School—was against stepping the floor.

In the higher grade school at Brighton he noticed that they had scrupulously abstained from stepping the floors. These things could not be treated as questions absolutely decided; but such questions as the size of a class-room and the cubic content depended very much upon the rapidity with which the air could be changed. A large room in which the air was not often changed might be much closer and more unwholesome than a moderate-sized room in which the air was often changed. There was not the slightest doubt that for the facility of a class seeing the blackboard, and for the diminution of the strain upon the teacher's voice, and for lighting the room quite to the back from the windows, it was not desirable to make the class-room a bit larger than was absolutely necessary for the health of the children. Teaching was much more pleasantly conducted in a moderate-sized room than in a large one; but they must have air. The system of ventilation by impulsions was a fine system if properly carried out, and in some places he had seen it very well carried out, but unless they got a really good man, and unless they were prepared to spend a considerable sum of money in extensive tunnels and underground corridors, they might either have the draught too violent or else insufficient, or be disturbed by the noise and vibration from the too great speed of the engine. An architect building a school should be extremely careful with these new methods; he should not be satisfied with a guarantee from the maker, or with some theoretical scheme that seemed satisfactory; there should be a careful examination and testing of the system before it is adopted. Mr. Bailey, he thought, had not fully brought out the importance of varying the size of the class-rooms. The work of teaching in the more advanced classes made smaller class-rooms necessary for the higher divisions, in order to lessen the strain on the teacher. There had been days when the Education Department recognised in its Code a class of eighty, and in those days an economical School Board built class-rooms for eighty. One result of planning schools in that way in the earlier days was that, now, that people had a higher idea of what was due to the teaching of children, a certain amount of space was wasted. Fifty children, for instance, were put into a class-room originally planned for sixty, with the result that ten places had to be written off and were unavailable. But coming back to his former proposition: it was policy that determined plan, and it was not the architect who determined the policy; it was the Education Department, or the particular Board who employed him, and the public opinion of the country. Still, if architects made themselves familiar with the requirements

of school planning, they could make recommendations to the Board when they were called in, and their influence might do something to educate the Board who employed them. He hoped architects would make themselves, as far as possible, acquainted with these questions, so that they might bring their influence to bear in the direction he had indicated.

Mr. C. J. DAWSON (Head Master of the Aldenham Street School, St. Pancras), who rose at the invitation of the President, said he could only speak as a teacher in one of the Board Schools, a building which certainly was not designed on the plans described in the Paper, as it had nearly all the defects which Mr. Bailey said should be guarded against. The subject was one that appealed to everyone interested in education, and especially to teachers, who had to work in the buildings planned for them. He appreciated what Mr. Stanley had said about the need of adapting the building to the exact requirements; and it was important, from a teacher's point of view at any rate, that the requirements should be framed in accordance with possibilities—the possibilities that is to say, of what a teacher could do. In the building he was constantly engaged in there was one large room that accommodated over eighty scholars, according to the dimensions laid down in the Code, and it was only separated from another room by a sliding partition—the other room accommodating sixty; so that it was practically a large room for 140, separated by a sliding partition. Two other rooms at each end of the building were also separated partly by slight walls and partly by sliding partitions, and those accommodated rather over forty each. If they were taken together they were very inconvenient, and too large for a teacher properly to manage; and if they were taken separately the classes were smaller than the Board and the Education Department required to be placed under the control of a single teacher. The question of ventilating and warming was a combined question, because if scientific principles could be thoroughly applied, there should be a system possible by which the warming should help the ventilation and the ventilation assist the warming, in one way, for example, by supplying cool air in the summer-time and warmer air in the winter. If the system referred to by Mr. Bailey fulfilled all that was claimed for it, it ought to be put into operation in every school where it was possible, and, at all events, in every new school, unless the cost was so large as to be utterly prohibitive. But in many schools he was acquainted with the ventilation by the system provided was an entire failure. The only way fresh air could be obtained in many of the buildings was by opening the windows wide, and that in winter time was a source of

danger both to the children and the teachers. Teaching in a class-room which interfered with the voice production, or in a room with a cold draught, was the cause of much of the voice trouble that teachers suffered from.

THE PRESIDENT said they were very much obliged to Mr. Dawson for his remarks. Any remarks that he would favour them with on the size of the rooms and the number of scholars that could be properly accommodated in them would be interesting and useful to architects.

MR. DAWSON said he thought Mr. Stanley had given the main points with regard to the size of the rooms, the arrangement of the light—which should come from the left-hand side—that no one should be seated too far from the light, and that there should be no dark corners. That was a very important point, both for the sake of the teacher and the scholar and on the ground of discipline. In his own school there were corners where the light from the windows did not reach at all, and the children could not see properly there, so that a part of the room was wasted which could have been utilised if the light had been better distributed. With regard to the size of the rooms, Mr. Stanley had called attention to a very important point, namely, that the rooms should not be larger than was absolutely necessary for the health of the children and to permit of sufficient air-space. That was an important consideration also from the point of view of the teacher's voice. It was very wearing indeed for a teacher giving oral lessons, such as were required in science teaching or object lessons, if the voice had to be sent into different parts of a room often not well adapted for sound. Nothing had been said about the acoustic properties of rooms where teaching had to go on. Sometimes the rooms in a school were not at all well adapted for sound. He did not understand the principles of construction which would make the sound more effective, but before he came under the London School Board he had had to manage the whole of a school in a large room, over 60 feet by 30 feet, and fully 20 feet high. Several classes were taught in that one large room, and the echoes were so confusing that it was a very great strain upon the teachers' voices, and yet they had a difficulty in making themselves heard distinctly by the scholars. The time of those large rooms seemed to have passed, and the class-room system was now generally adopted in the newer schools. This matter of acoustics certainly affected the question referred to by Mr. Stanley as to classes being held in school halls. In such cases the voice of the teacher was carried round and up by the ceiling, and was lost to the scholars, and raising the voice very often made matters worse by increasing the echoes. It was very difficult to

pitch the voice so as not to produce confusing echoes in a room of that sort, and the fact that the class only occupied one-fourth of the room made it worse. If the room were full it would be less difficult to make the voice heard all over it than if only a small portion of it were occupied and the rest empty.

MR. E. W. MOUNTFORD [F.] proposed a vote of thanks to Mr. Bailey for his very useful Paper. They were greatly indebted to him for having laid bare all the secrets that he had been putting into practice for so many years. He had this advantage over most of them—that he need not fear competition in his particular class of work, because, owing to the policy of the School Board for London, no one else was allowed to compete with him. It struck him, in listening to Mr. Bailey's paper, that he must be dreadfully overworked; they heard of these hundreds of schools being built in the last few years, and of the large number that were coming on, and for Mr. Bailey's own welfare it seemed advisable that some of the work might be given to other architects. What had interested him most was the reference to the warming and ventilation of the buildings. Only five or six years ago some plans of his had to go before the late Mr. Ewan Christian, acting on behalf of the Charity Commissioners, and he, with the later buildings of the Board before his eyes, absolutely refused to allow any kind of mechanical ventilation to be put into the building. Mr. Christian said he had recently examined, at the request of the Board, some of the London schools, and had come to the conclusion that there was nothing in the way of ventilation to equal windows. Windows that went up to the ceiling and opened at the top provided absolutely the best ventilation that could be got. Acting on his command, he (the speaker) had to cut out his system of ventilation, and he had been more or less abused for several years past in consequence. The "Plenum" system, which Mr. Bailey seemed to favour, was probably the best system; but he should like to hear his opinion of that system in, say, ten years' time. Only quite lately several members of the Institute Council were taken over a large building in Birmingham which had recently been fitted with this system, and he had been struck with the considerable accumulation of very black dust in the ducts through which the warmed air was forced into the various wards. Now, that dust represented simply the thicker and heavier particles which the fans had not been able to force into the wards, and it seemed an absolute certainty that a great deal of finer dust had been forced into the wards and swallowed by the patients. In a new building there was not much objection to that, possibly; but as time went on

and soot accumulated, more and more would be forced into the lungs of the patients, and it would become a very big question whether the "Plenum" system should not be taken out of those buildings and something of a different nature put in. It was said of the "Plenum" system that it was equally available in summer for forcing in cool air. That, he thought, was a great mistake. People did not mind having air forced into a room so long as that air was very warm, but when they began to force in cold air the inevitable result would be that the occupants of the room would block up the large openings.

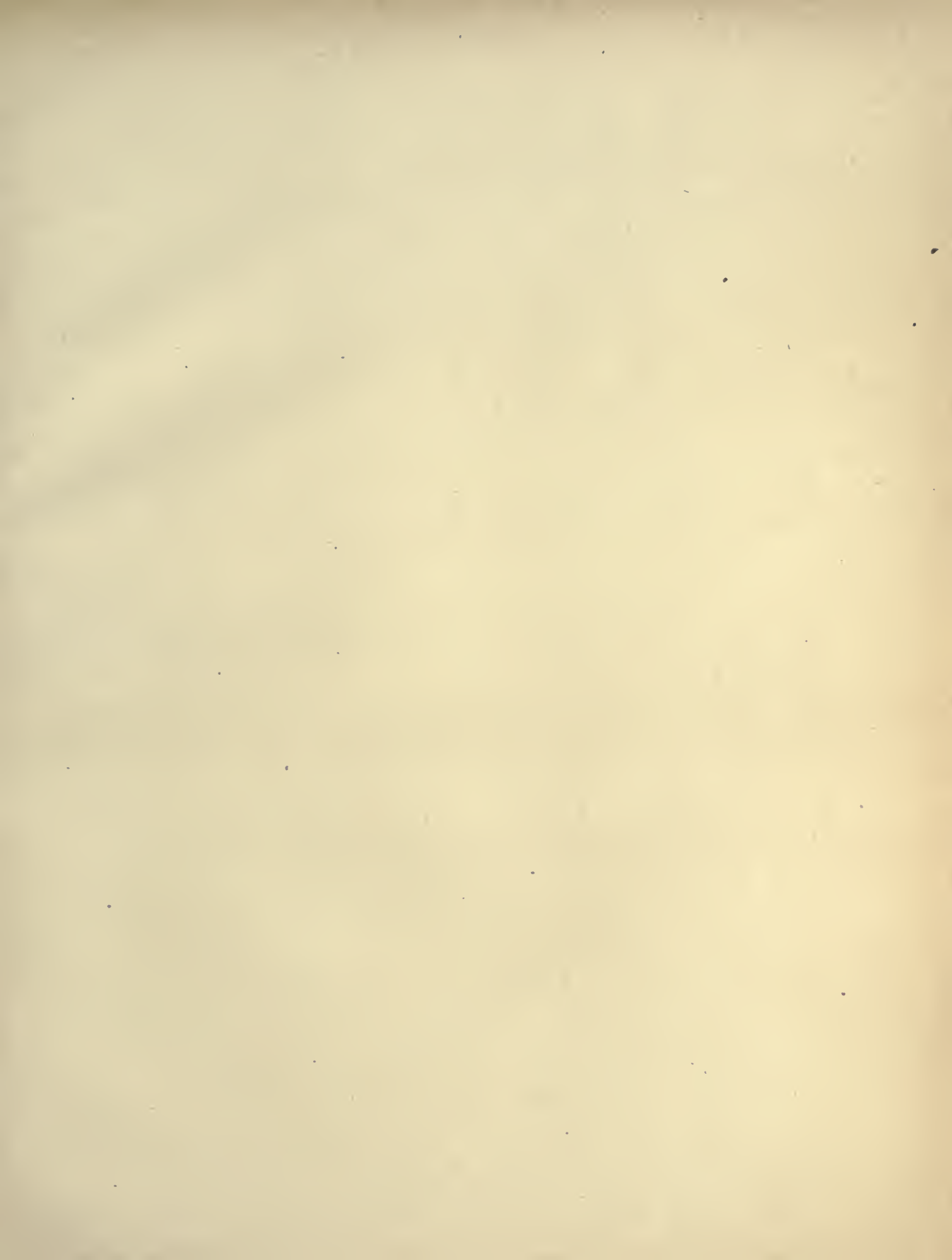
MR. R. PHENÉ SPIERS [F.], F.S.A., seconded the vote of thanks. He had built two of the first Board schools, and he could see now that they were in many points wrong, but they were built according to the policy of the Board at that time. What struck him most in the Paper was the admirable way in which Mr. Bailey had marshalled his facts. They could not have had a more valuable lesson in the way of bringing information before them than that afforded by his Paper. It was a record, one might say, of a lifetime's experience, and had been placed before them in such a clear and distinct manner that it would be one of the most valuable records to be found in the Institute TRANSACTIONS.

MR. BAILEY, in responding, said he was glad his Paper was considered a useful one. He had tried to make it as comprehensive as he could, as he thought it right that the Institute should be acquainted with the details of the extensive work the School Board were carrying out.

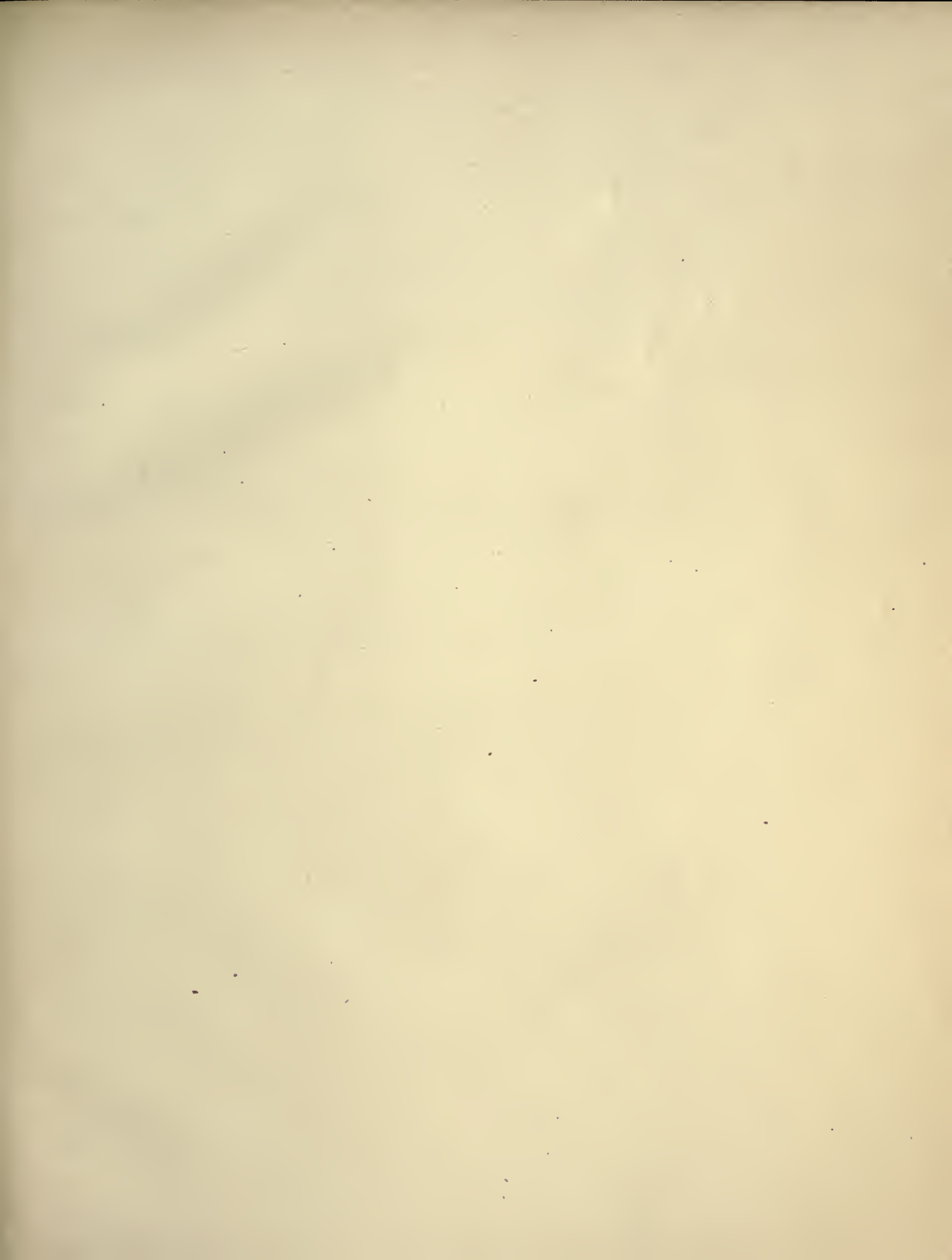
THE PRESIDENT said that he could not let

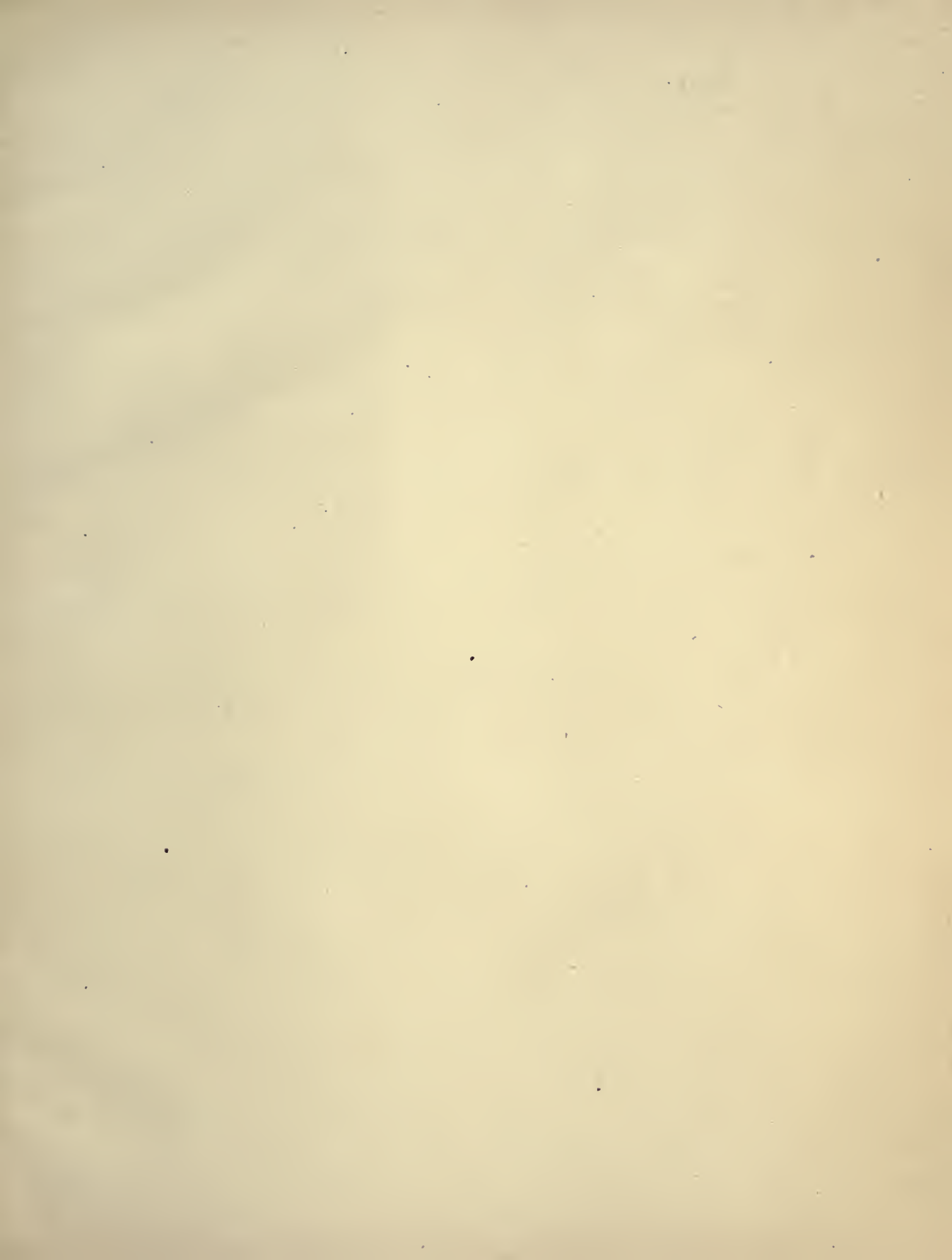
Mr. Bailey's most interesting and practical Paper pass without making a few comments. The great thing that England was noted for—at least till recently—was the want of any kind of artistic refinement in her industrial products. It might be safely said that if children were put into rough, unattractive, or ugly places, they could not be expected to gain that admiration for beauty of form and colour which was necessary to human happiness; nor could the children of towns, brought up among the purely utilitarian aspects of their school-rooms, be expected to produce artistic articles for savages and other artistic people—and this led to a diminution of trade. He was of opinion that the internal walls of the schools should be covered with the most beautiful tiles or enamelled bricks that the best art of England could supply, and that every fitting should be as simple as possible, but graceful and beautiful in colour, so that the faculties of the pupils might be cultivated to admire the beauties of nature which they saw around them. He had had some small experience in that kind of thing, and he found that even those students who were specially devoted to form and colour had remarkably small observation for the objects of nature by which they were surrounded in the fields, in their gardens, and on the sea-shore—the simple flowers, the simple leaves, the simple shells. If that was the case with people who were trained to study the beautiful, how much more was it with those whose artistic faculties were left dormant, and who were surrounded with ugliness! He hoped the gentlemen more particularly interested in the work of the Board would give a thought to the subject he had mentioned.

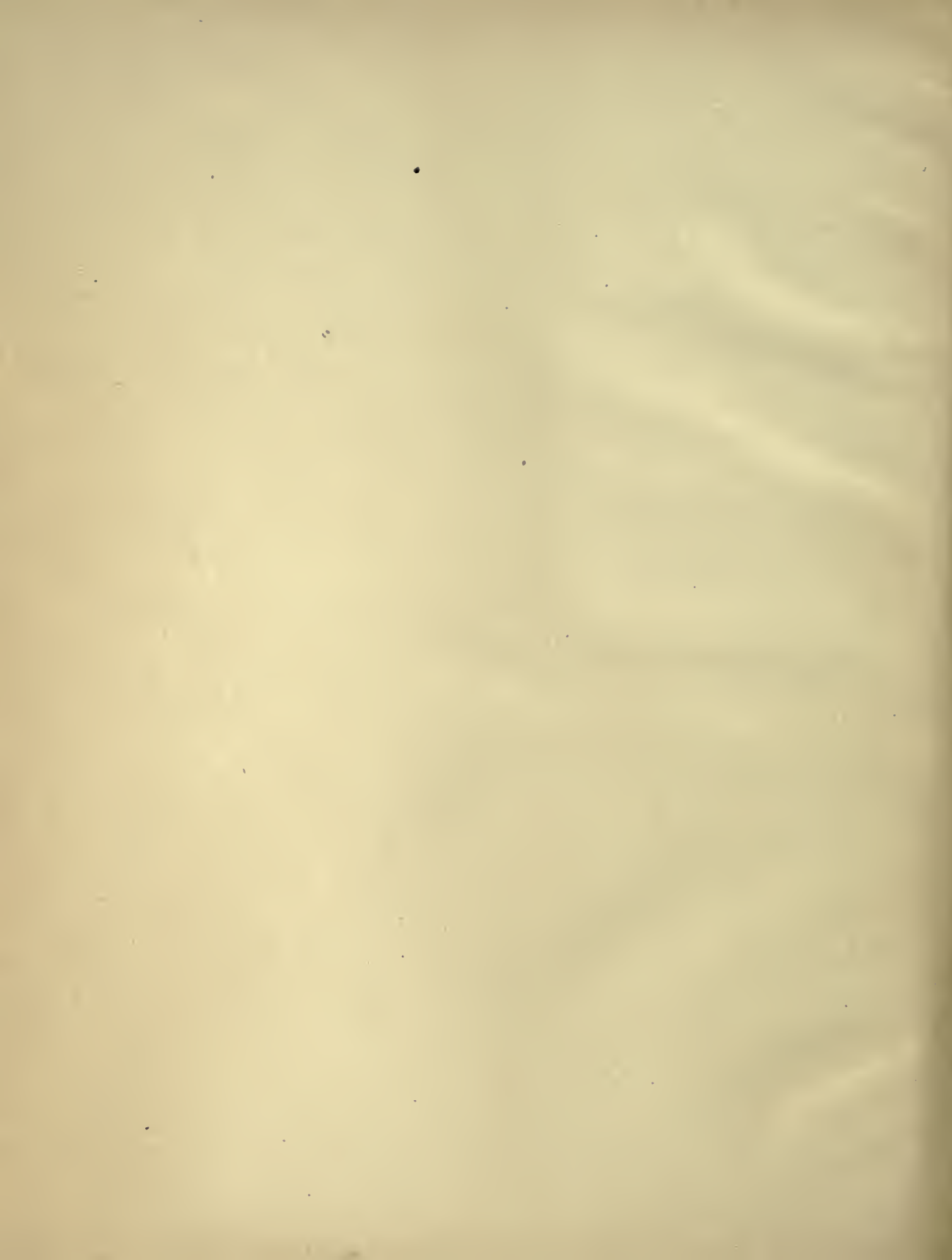












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