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FROM AN ARCHITECT'S NOTEBOOK.

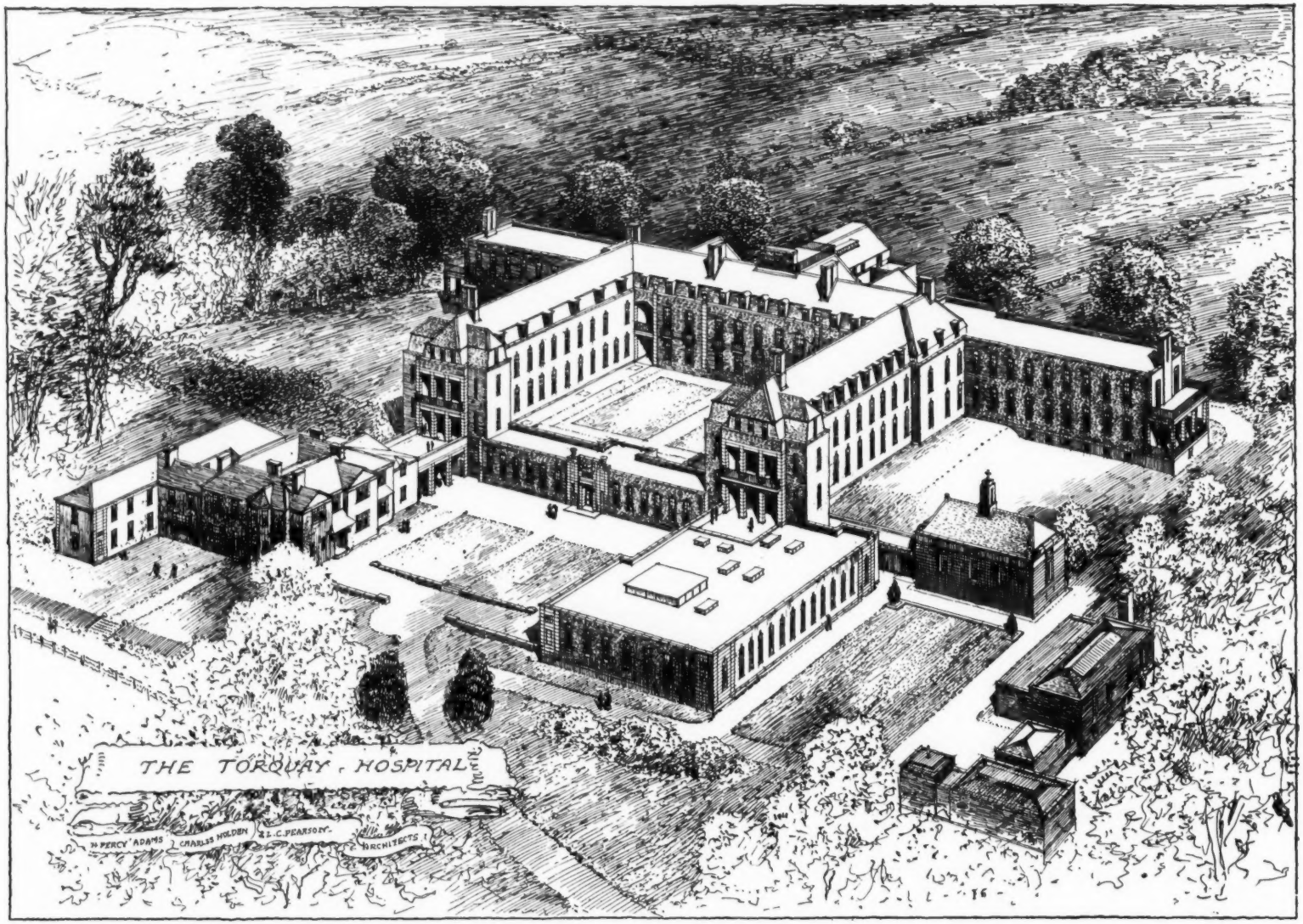
There is no art without love. Every artist who has produced anything worthy has had a love of his subject. The old artists, as Raphael and his school, had a true love of religion, and therefore painted true works of art in a religious spirit. A scorn of the subject produces satire, and therefore satire, however clever, is no more true art than a caricature is an artistic painting.

WILLIAM BARNES.

9 Queen Anne's Gate, Westminster.

The New Torquay Hospital

Adams, Holden, and Pearson, Architects



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The Hospital

TO trace the vicissitudes of hospital planning down through the ages leads one to believe more in fashion than in development, less in progress than in change. For it is even now open to doubt whether we should continue to build monumental hospitals or construct slighter buildings, which might be destroyed and rebuilt from time to time. It is an old saying, known well by members of both the architectural and the medical professions, that the wards of a hospital should be burnt down every ten years, and only the administrative units be allowed to stand.

Perhaps a close study of other things brings one to the same stage of doubt.

In Hippocrates, the "father of medicine," one discovers again many of the views of modern medical practice, and what he has to say about "the housing and care of the sick" would have done the builders of the first London hospitals good. For Hippocrates pronounces himself "in favour of as much light and fresh air as is to be got," recommends that the patients be placed not too near one another lest all catch each other's complaints, and urges that their house be kept "clear of all garbage and often cleaned." The history of all arts and sciences repeats itself.

It is interesting to study how closely hospital planning has adhered to the prevailing medical ideas of the day. The dark dens of misery and disease existing even as late as the nineteenth century were at one with the blistering and the bleeding and the black draughts believed in; the rough-and-ready surgical practice of the Saxons, their herbals and their simples, were such as one might expect of ancestors of ours who had no hospitals at all. The superstitious "remedies" and exorcisms of the ancient Egyptians are faithfully reflected in the low secret lazar houses painted with mystical symbols and staffed by priests. In later days, Listerism, inoculation, anæsthetics, the X-ray, and radium, have all in turn modified and qualified, taken from and added to, the plan.

In few other works of man besides ships and hospitals has the design depended so absolutely upon the use. The best hospitals are those in which the self-effacement of the architect has been most complete—leaving his genius to be guessed at, as does the Supreme Architect himself. Sir Douglas Galton long ago pointed out how, as a general rule, it was quite certain that those hospitals in which the external architectural design had been the first care of the architect, and the free circulation of air a secondary consideration, had produced results in deaths and in difficulty of cure far exceeding those which took place in hospitals where the architect had endeavoured, in the first instance, to arrange a plan which would secure free permeation of fresh air and an absence of dark corners as the main conditions of the design. Wherefore the building of one of our large modern hospitals should be an inspiring commission for any architect. The problem of composing the various units, the opportunities given him by the clean straight lines of the projecting wards, the dominance of the administration block, the difficulties to be fought with, the dire need of economy of all material and labour, the elimination of all unessentials—all these are influences which should inevitably lead to the production of something fine.

The first hospital illustrated in this issue—the new Torbay Hospital, which Messrs. Adams, Holden, and Pearson are to erect at Torquay — may perhaps be taken as one from which to look back—and mark change. Designed by a famous firm of hospital architects, besides being the "last word" in modern hospital practice, this hospital probably comprises and solves in its planning most of the problems of modern hospital construction. As we write we have before us an illustration of St. Bartholomew's as it was just over two hundred years ago. The sick lie about in what look more like mangers than wards; light, fresh air, and cleanliness seem to have been unthought of. Calcutta itself could not provide a blacker place. Little wonder that, though intended for the succour of the sick, such places too often became charnel houses of the dead, and that it should not infrequently have been debated whether hospitals were or were not gigantic evils to be razed to the ground. Looking again at the Torquay Hospital, certainly there is change here, and, if one did not remember Hippocrates, one might have used the word progress, too.

More and more in modern hospital work is the tendency towards the skeletonizing of structure and the free letting-in of all the healing powers which sun and air possess. Indeed, the hospital construction of the last century owed its rise, in England at least, to the experience derived from the last two centuries, when it was found that military patients, housed in huts and tents, and exposed to conditions of cold and wet, produced more numerous and rapid recoveries than those kept in the permanent hospital buildings then in use. And most modern practitioners would choose the tents of Cæsar rather than the over-built pest-houses of the seventeenth and eighteenth centuries.

The Design and Equipment of Modern Hospitals

By A. SAXON SNELL, F.R.I.B.A.

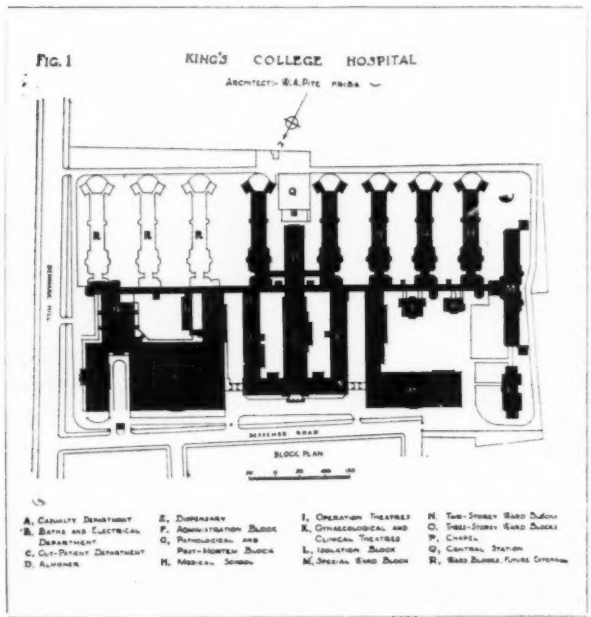
THIS article must be restricted to a few brief general remarks, some notes upon sites, the "lay-out" of the plan, and the several buildings or departments included in a general hospital (without a medical school) of, say, 300 beds. Certain departments in which there has been considerable development will be described in more detail.

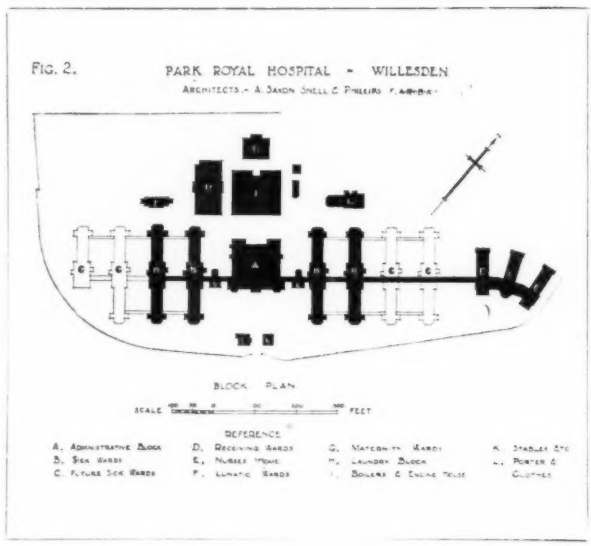
Site.

This should be open country, but within convenient distance by rail or road of the town or area from which the patients will mostly be drawn. It should be on light soil overlying gravel or permeable chalk, sloping gently towards the S.E., and protected by hills or rising ground or trees from the N., N.E., and N.W. A good water supply should also be available, and facilities for disposal of sewage. The more air and sunlight we can get into our wards the better. Neither can be obtained in the fullest degree without fairly large areas of land and wide spacing of ward blocks, so that air can move in large columns around and, I may add, over and under the buildings, with as little restriction as possible. In this country we are niggardly in the area of hospital sites, for the obvious reason that land is costly, especially in and around cities, where large institutions are required. I am inclined to think that what we may call ultimate cost is not reduced to any great extent by economy in the cost of the site, whilst the loss in light and air and means of efficient ventilation is real, if not at first sight very obvious.

Lay-out of Buildings.

The approach to the buildings should be on the north side, leading direct to the administrative buildings, the south side being reserved for the ward blocks. If the site is wide enough from east to west, the greater part of the administrative block may be concentrated in the centre. Fig. 1 is the block plan of King's College Hospital, with the whole of the administrative buildings on the north side, and Fig. 2 is of Park Royal Hospital, Acton Lane, N.W., in which they are centrally placed. From the administrative block the general service of the building radiates, and it is therefore best planned centrally.





In a large hospital it is convenient to have a lodge at the entrance gates, with a weighbridge for checking deliveries of supplies.

The out-patients' department should be near the entrance, and quite cut off from the main buildings, or connected to them only by a covered way. In small hospitals that is not always possible; but in any case the department should have a separate entrance.

Receiving wards are essential, and they, too, should be separated from the main buildings. At Park Royal Hospital they adjoin the main corridor, which, at this point, is open on one side. Small observation wards should be attached to the receiving wards, for new cases under suspicion of infectious disease. These observation wards should not be confused with isolation wards, which are required for definite cases of infection arising in the hospital. Such cases should at once be removed to an infectious diseases hospital, where this is practicable.

A pathological block (or room) is now essential in every hospital. This is sometimes—wrongly, I think—placed in the administrative block. It is better near the mortuary and post-mortem room.

The nurses' home is now always a separate building, removed, as far as is conveniently possible, from the ward blocks, and with a pleasant garden attached.

The place for the boiler-house, coal store, and laundry is rather difficult. For economy and efficiency they should be centrally placed, and, for the avoidance of nuisance, well away from the wards. In the front of the buildings they are apt to be eyesores, and so are often placed in some odd corner, at some sacrifice of economy. As a compromise,

they may be placed in the rear of the administrative block, where they (as at Park Royal Hospital) are placed centrally between the ward blocks. In urban hospitals they can be hidden in a basement.

Lodge.

The lodge comprises an office for the porter (in which is placed the steelyard in connection with the weighbridge) and his living-rooms.

Out-patients' Department.

The out-patients' department may conveniently be planned with the casualty rooms, so as to avoid duplication of services required in common.

The arrangement and accommodation depend entirely on the size of the hospital and its requirements. In a small hospital much may be omitted which is essential in a large one. In the first place, it should be disconnected from the main buildings as far as possible. At the very least, the entrances and exits should be outside the main building, and as near as possible to the public road. Dirt and disease are largely cause and effect, and nothing unclean should be permitted in the hospital.

A waiting hall is required, large enough to accommodate the greatest number attending at any one time; 6 ft. super per person is a bare allowance. A porter's office, large enough to store admission cards, should adjoin the entrance lobby, and close by the almoner's room—the almoner being nowadays an important official.

In a large hospital there is generally a special room or office near the entrance for the R.M.O., who has to see new patients, and to determine to which of the consulting rooms they should be sent.

On one side (sometimes both sides) of the waiting hall the consulting rooms are ranged. They should be separated from the hall by a lobby, which may serve two rooms. Each consulting room requires one or more examination rooms, and small dressing-boxes, which should have their exits into the lobbies. Time and confusion can be saved if the patients have not to go back to the waiting hall after examination and treatment; but generally this is possible only when the consulting rooms are mainly top-lighted. It can be done otherwise, of course, but only at great waste of corridors, etc. An enclosed corridor between the consulting room and the waiting-room does not meet the case satisfactorily. A small testing-room, fitted with a sink and shelves, can be placed with advantage adjoining the consulting room. A lavatory basin and a small sink are essential for the use of the medical staff in every consulting room.

In a large hospital there may be several consulting rooms, so that medical, surgical, and dental cases can be separated. Ophthalmic work also requires a separate room, with a dark-room or cubicles from which it should be possible to exclude all daylight. A small rest-room for patients recovering from slight operations, such as the removal of adenoids, is desirable. It should be fitted with a sink, with h. and c. water, and a drinking-water tap.

A dispensary with a waiting lobby is required, fitted with sinks, shelving, etc. A small rinsing sink is wanted close to each hatchway for handing out medicines. A store for goods in bulk is also required.

Conveniences for patients, also for the staff, should easily be reached from the waiting hall.

A counter for the sale of light refreshments to patients is now considered indispensable in all but the smallest hospital. Also a drinking-fountain of the type requiring no cup.

X-ray and electrical treatment departments, besides a room for minor operations, are required in connection with this department. To avoid duplication, these should be so placed as to be available also for treatment of in-patients.

Casualty Department.

This department, attached to the out-patients' department, should have direct access from, and be nearly level with, the public road. An eminent surgeon impressed these points on me many years ago, observing that "a jolt or awkward handling of an accident case may be so disastrous that it should be almost possible to drive the ambulance right up to the operating table; at any rate—avoid steps."

A room 14 ft. square is sufficient for a small hospital, and it should be fitted with a sink and lavatory basin. A waiting-room for friends is desirable, also a store for linens, dressings, splints, etc. Easy and direct access to the X-ray room is convenient.

The finishings of floor and walls should be as for operating rooms.

Mortuary.

In far-off days the mortuary was little more than a bare whitewashed room, placed out of the way, attached, perhaps, to the coal store and other inferior parts of the building. Nowadays it is generally in a separate block on the north side of the site, not too far from the entrance gates, and out of sight of the ward blocks.

In practice, bodies are placed in the mortuary proper, which is severely and coldly practical in its construction and finishings, with its washable walls and floors and ample ventilation. When friends or relatives come to see their dead, the body is brought into the viewing room or chapel, to spare them the gruesomeness of the mortuary. It has always seemed to me that there should be a separate exit from the mortuary yard to the public road, as a hearse and funeral procession is not a cheerful sight for either the patients or staff.

Attached to the mortuary, or in close proximity, should be the post-mortem room and pathological laboratory. Both rooms must be severely plain, with washable and impervious walls and floors. The danger of blood-poisoning awaits the careless operator in these rooms. Pathological theatres are seldom used now. Instruction in pathology is given in the lecture-rooms, and practical demonstrations are held with small classes.

Administrative Block.

This block contains the rooms, offices, etc., used in the general administration of the hospital, including the dispensary, stores, general kitchen, etc. Offices are required respectively for the medical officer, matron, and secretary, and a small waiting-room; also a board or committee room, including cloak-rooms and lavatories. Quarters are required for the resident medical officer, matron, and steward, and generally the working staff, other than nurses, are accommodated in this building.

One large kitchen really suffices for a hospital. In many cases, a separate kitchen is provided in the nurses' home, but this makes for increased cost of administration. It is better to provide the nurses' and other staff's dining-room next to the main kitchen. Kitchens, scullery, pantry, larder, etc., should be well lighted and ventilated. Tiled floors and walls fully repay, in cleanliness and upkeep, the initial cost.

Boiler-house, Laundry, Coal Store, etc.

In any institution larger than a cottage hospital—steam being essential for all kinds of purposes, from heating to sterilizing—a large and well-equipped boiler-house is necessary. A great mistake is often made in providing too small a space. The engineering equipment of a hospital is generally best placed in the hands of a competent consulting engineer, unless the architect has sufficient experience (and few have it) to enable him to instruct engineers and others, or to appreciate the sufficiency of their proposals. Plenty of boiler power is really economical; it is cheaper to work a large boiler at comparatively low pressure, than a small one at high pressure.

X-ray Department.

X-ray work is no longer confined to radiographic work; nowadays electrical rays are used for treatment, and the

apparatus is so immensely more powerful, that special precautions must be taken to stop their penetrating power, and even their action upon the air of the room. Ozone and nitrogenous gases are generated, the effects of which must be overcome by efficient ventilation. An electrical fan is necessary.

A properly equipped department should have a radiographic room, say 300 sq. ft., a smaller screening-room, a dark-room, and dressing-room or boxes for patients. The treatment-room should be much larger and high (not less than 16 ft.), and well ventilated with a fan. The walls (or those at least which are in the line of the rays) should be insulated, either with thick lead or barium plaster—the latter is less costly. The floors should be of wood, and well ventilated underneath. A damp floor direct on to the ground is dangerous. The rooms should have easily opened windows closed at will by light-tight shutters. Doors must be equally light-tight. Dead black walls are not necessary; if the room can really be made light-tight, there is no point in them. Operators now ask for light and cheerful colouring, for the benefit of the nurses and others working in the rooms between-times. The screening-room may be comparatively small, the screens being most conveniently placed along a long shelf.

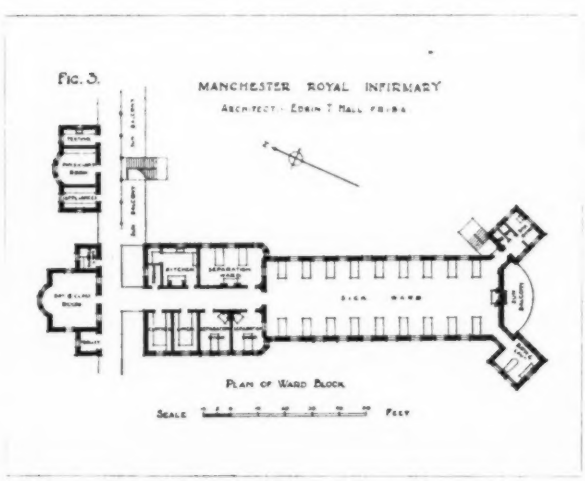
The dark-room should be approached by a lobby—a sort of "light lock," and fitted with a sink and benches. A shelf with a drain at the back is convenient for draining plates quickly. Two cupboards, at least, are required, one, which should be lined throughout with thick lead, for "live" photographic plates, and the other for storing developed plates.

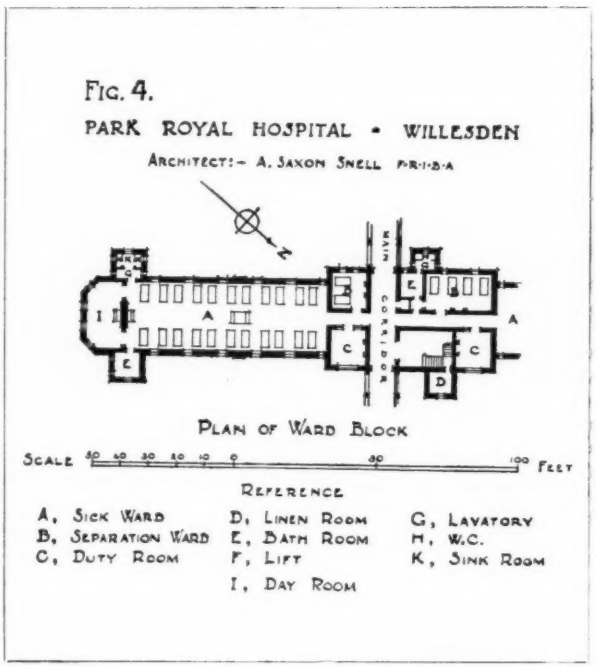
Electrical Treatment.

This work in a hospital may range from one or two rooms to a complete and elaborate department. Fitting up is the work of specialists, and the architect is called upon to do little more than house the apparatus in suitable rooms, erecting the necessary partitions, and fitting up lavatory basins, etc. In all this kind of work the architect should be guided by the specialists, more especially as requirements vary.

Ward Blocks.

The general arrangement of ward blocks has changed little within the last fifty years, but there has been much alteration and improvement in detail. The "pavilion" type survives. There are signs of yet further alteration, which in due time will modify the "pavilion" type beyond recognition. A ward 80 to 100 ft. in length presents some inconvenience in supervision, and in respect of the distance of some of the beds from the sanitary towers. Classification of patients in smaller groups demands either smaller or sub-divided wards. More extensive use of open-air treatment calls for larger balconies.





In the main wards, nowadays, twenty to twenty-four patients are usual. From 1,000 to 1,200 cub. ft. per patient is enough, and floor space should be from 90 to 100 sq. ft. With the present greater use of open windows, floor space is regarded as more important. The beds should be spaced at 7 to 8 ft. centres, and there should be a window between each pair of beds.

Figs. 3 and 4 are plans of the ward block at the Manchester Royal Infirmary, and Park Royal Hospital. They are fairly typical of the older (improved) type. In both, what are quaintly and delicately called "sanitary towers" are placed at the south end of the ward, where to some extent they intercept much valuable sunlight from the wards. At Manchester the window in the south wall direct into the ward does indeed admit some portion of south light, but as the sun is at its meridian when in the south, the direct rays cannot penetrate far into the ward. At Park Royal the south end is occupied as a good sun-room.

Of late the sanitary towers have been shifted to the north end, adjoining the general annexes, so leaving the south end of the ward quite free from obstruction. In the most modern practice projecting towers are abolished, and the sanitary conveniences, sink-room, etc., are incorporated in the annexes, with a cut-off lobby. Some measure of cross-ventilation of this lobby is effected in the way shown by Fig. 6, an arrangement to be adopted in the new ward block of Uxbridge Union Infirmary. In this case the conveniences are equally available from the separation wards.

To obtain more classification, long wards are sometimes divided into two or three sections, with partitions glazed, at 3 ft. above floor level, with clear plate glass. It is surprising that these partitions really affect so little the view of the ward as a whole. It is of great importance that all the beds should be clearly seen from any part of the ward, for at times there may be but one nurse in attendance.

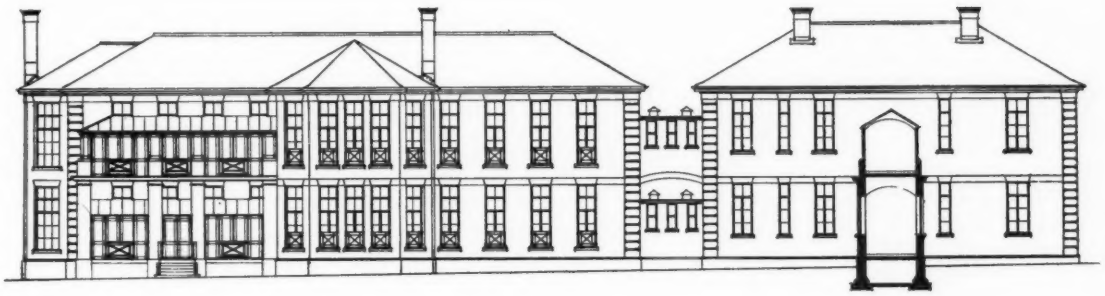
Separation wards, one of which should be for one bed only, are desirable for a few beds each.

A special room for the "sister" in charge is sometimes asked for, but one may be forgiven for suggesting that it is not required, and, indeed, may be detrimental. Any work required may just as well be done in the clinical room.

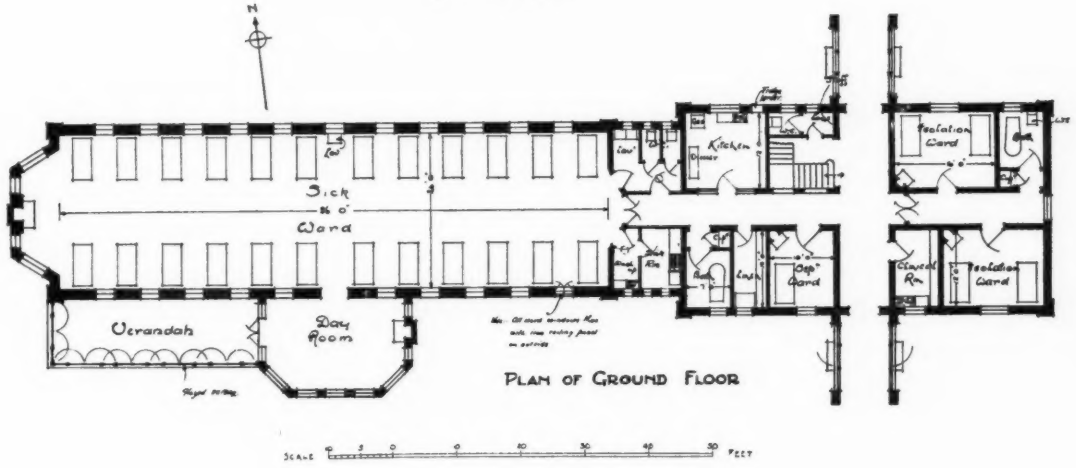
A clinical room is now required in connection with every ward. It is set apart for several small operations which were at one time divided between the ward kitchen and sanitary annexe, or in the ward itself—testing and sterilizing

FIG. 5. UXBRIDGE UNION INFIRMARY

ARCHITECTS:- A. SAXON SNELL & PHILLIPS F.R.I.B.A.



SOUTH ELEVATION



for instance. It should be fitted with an ordinary sink, a shelf or table, a vessel for boiling water, and two sterilizers, one for instruments and one for bowls. It may be quite small, say 10 ft. by 8 ft., or less.

The growing popularity of more or less open-air treatment has called for a greater area of balconies facing south. This is met to some extent (now that sanitary towers are not required) by extending the balcony at the end of the ward, and in cases where it has not been possible to obtain the north and south orientation of the block, by a balcony along one side. This naturally takes away much direct sunlight from the ward. Fig. 5 shows a plan and elevation of the new ward block at Uxbridge Infirmary. The day- or sun-room is in the centre, with the balcony extending from it only to the open end of the ward (which has the benefit of direct light from the end wall). These balconies can be entirely enclosed in bad or unduly cold weather. Through ventilation is obtained by means of the fanlight above the glazed roofs of the balconies.

The walls and floors of ward blocks should be of fireproof material. Excellent reinforced concrete or hollow tile block floors are fairly cheap; there is but little steelwork required. For the internal partitions, not required for strength, light concrete or breeze blocks set in cement are excellent.

The wall surfaces should be finished in hard plaster—Keene's, Sirapite, etc.—and painted and enamelled, all internal angles well rounded to a 3-in. radius at least.

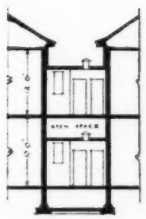
Tiling to walls, except in sanitary annexes, bathrooms, etc., is a luxury. As to the right colour for ward walls medical men are not all of one mind

FIG. 6.

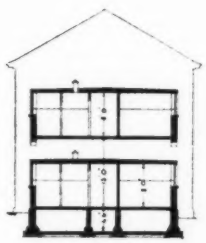
UXBRIDGE UNION INFIRMARY

DETAILS OF SANITARY ARRANGEMENTS TO WARD BLOCK

ARCHITECTS:- A. SAXON SNELL & PHILLIPS F.R.I.B.A.



SECTION BB



SECTION AA

PLAN

The most usual form of window for wards is the ordinary sash window with a fanlight above. There are, of course, several variations of this form, the "Austral" window, for instance, which is used at King's College Hospital. The defect in sash windows is the impossibility of making them without innumerable dust-holding cavities, mouldings, etc. Casements can be fixed in solid frames, which are easily kept clean. My personal preference is for French casements, taken down to within a foot of the floor and opening inwards, and, of course, with a fanlight over. At Uxbridge Infirmary they will be constructed in steel. Another form of window which has proved very successful is that in the new wards at Charing Cross Hospital, which is a variant of the Middlesex window.

All joinery should be of hardwood wax-polished, but soft wood, being so much less costly, is generally used, painted and enamelled. For doors, the plain surface hospital type is, of course, the best. Unless the other joinery is of teak or oak, these doors may be faced with the cheaper hardwoods and painted.

Bed lockers are of various patterns, and perhaps the best is that described by Mr. Percy Adams in his paper upon "Cottage Hospitals" read before the R.I.B.A. As, in reality, furniture, they should be made of hardwood, varnished or polished, and glass tops are good and not costly.

Soft-wood floors are quite out of date. A hard and easily cleaned surface is essential, and one with no open joints. There is no general agreement as to the best material, unless it is for the best Moulmein teak, in narrow widths, but it is generally too expensive. Terrazzo and even tile floors have their advocates, but they are surely too cold and tiring to the feet. For wood floors, kiln-dried maple, tongued and secret-nailed in narrow widths, is excellent, and reasonably cheap. There is also a teak—a little softer than Moulmein, of reasonable price.

Patent jointless flooring is quite good if of the best quality. Red is the best colour. As with terrazzo, the coved skirtings can be worked up from the floor without joint. Square skirtings to floors are an abomination. Coved angles can be made out of solid wood, so that the edges are flush respectively with the floor and walls.

In former times constant ventilation in wards was provided for by some form or other of "Tobin" tubes in the walls, but I have abandoned them, being content to rely upon the windows only. Examination of the interiors of these tubes after a few months' use shows that they become lined with dust and soot—surely a bad surface for the passage of incoming air? Ventilating channels in the ceilings have also gone, for the same reason.

There is no need in these days to discuss the various forms of mechanical or forced ventilation; it is generally agreed that natural ventilation, i.e., that which is secured by open windows and fires, is the best and safest. Forced ventilation has had its brief day for hospitals.

Bathrooms are most conveniently entered off the corridor leading to the wards. They should never be less than 7 ft. wide and from 9 ft. to 12 ft. long. The bath need not be placed in the middle of the room, but certainly not nearer than 12 in. to 18 in. from the wall. Terrazzo or tiled floors are desirable, jointless floors are also used, but are permissible only when the floor construction is of wood. Jointless flooring is soon spoiled by much wetting or washing. The ceiling and walls above the tile dado should be painted.

The best form of bath is the old glazed fireclay; but best quality roll-edge enamelled iron is less costly and, for its lifetime, equally good. Either kind is best bedded on a solid base, not legs or bearers. Hot and cold taps are best fixed on the wall at the head of the bath, not on the bath itself. A heated towel rail is desirable, and this may be of the usual nickel-plated copper kind, connected to the hot-water service pipe, or it may be made more cheaply with a galvanized iron coil. A glazed fireclay wash-basin is always useful in a bathroom.

The sanitary offices comprise w.c.s and slop-sinks. At one time the latter were generally placed in the lobby giving access to the former; now the slop-sink is placed in a separate and larger compartment—in fact, a small room. 8 ft. by 6 ft. is a fair size. Hospital matrons and sisters differ in their opinions as to the best form. The most elaborate kind is in the form of an elongated w.c. pan with a flushing rim and two water jets operated, for choice, by arm or knee valves. The premature operating of either of these jets is liable to be disastrous, and many nurses prefer to do without them. They say that an ordinary valve with a piece of indiarubber hose may be used with as good effect and more safely. An ordinary washing-sink, emptying into the waste pipe of the other, is used for washing other utensils. A warmed rack is useful for storing the bedpans. Also cloth-drying rails.

An experienced matron or ward sister, if consulted, will suggest to the architect many small points which may relieve the arduous and unpleasant work of the nurses.

W.c.s should be of the usual pedestal type, with lift-up seats (urinals are a nuisance), and easily operated flushing-cisterns. The doors should always open outwards, and if fitted with latches they should be capable of being opened readily from the outside by a railway key. One or two lavatory basins may be conveniently placed in the cut-off lobby to the w.c.s. A point to be remembered is that the doorways leading into this lobby should be wide enough to pass a wheeled chair.

The ward kitchen is used for the storing and cleaning of crockery, etc., used for meals in the wards, and for cutting up and preparing food, making tea and cooking, or keeping warm small dishes. It should be fitted with a gas stove, sink and drainer, cupboards, table, and plate-racks.

Leading out of most ward kitchens there is often a small larder, but it is scarcely necessary to have them so large. A comparatively small cupboard let into the external wall, and directly ventilated from the outer air, is better, and takes up much less space. Quite a good form is made of glazed fireclay.

Good cupboards, opening direct on to the corridors, are required for storing bed and other linen, blankets, etc. A small room is better, as it is possible to fit up a small folding table, which is a great convenience. They should be well warmed and ventilated. Also a room for patients' clothes, which must be equally well warmed and ventilated.

Open fires in wards are often deprecated on the score of economy in coal and labour and the dust made. It is a question whether these matters weigh heavily enough against the undoubted cheerfulness they impart to a ward. A good and satisfactory central stove can be built up with fire-brick slabs bedded in solid brickwork or concrete, the whole covered with a marble slab.

The artificial lighting of wards is usually effected with one or more central pendants, each with a dimmed light for night, and a single bracket at the back of each bed. A shaded lamp is also required for the nurses' table.

Low-pressure hot-water heating is undoubtedly the best and most economical form of heating for wards. Radiators under each window appear to find the most favour; but two rows of, say, 3-in. or 4-in. pipes along the walls are equally effective, and are more easily kept clean.

In a new system—the "panel"—pipes of small diameter are buried in the wall and ceiling plaster. This system does away with dust-collecting surfaces, distributes the heat more evenly, and, it is claimed, is more economical in coal consumption.

Staircases should be wide, not less than 4 ft., and of easy going, say, $11 \times 6\frac{1}{2}$ in. Plain handrails and balusters reduce cleaning. "Winders" are not permissible.

In large hospitals there is often a lift for each ward block, but if connecting corridors are of more than one story that is unnecessary. Electric, automatically governed lifts, if costly to install, are surprisingly economical in running expenses. They should never be less than 7 ft. 6 in. long, and 4 ft. wide. A foot more each way is an improve-

ment. Where possible, the entrance should be at one end; lift cages can be made without unnecessary mouldings, and with rounded angles and coves.

Where lifts are placed in the well of the staircase they must be enclosed. The old form of grille is now superseded by a light framework with wired glass panels.

Operating-Rooms.

The operating-room unit is a very important part of the hospital, and it would not be difficult to enlarge upon the subject for at least half the length of this article.

Meticulous care should be exercised to reduce the danger of dust in the air, anywhere near the operating area, to a minimum. Ease of access and concentration of the various rooms are also important. About 300 sq. ft., and an average of 14 to 15 ft. in height, are sufficient for the operating-room. One side should face due north as far as possible. The more light there is the better, but there should certainly not be less than half the area of the floor. The most popular form is a "studio" window, i.e. a vertical light merging into a roof light. Side light may be useful, and a certain amount may be obtained by making the whole window a large bay.

The floor is best formed with white terrazzo, with a very gentle slope to a channel. Much water, etc., may be splashed about, which should run off quickly.

The best surface for the walls and ceilings is the finest enamel paint. All angles and skirtings should, of course, be rounded. The windows should be of plate glass in light unmoulded steel frames, and doors of the "hospital" pattern in solid rounded frames without architraves. As few fittings as possible should be in the room, but it is essential that instruments and dressings, etc., be as close as possible. An instrument sterilizer and a table to hold dressings, drums, and another for instruments and "gadgets" generally, lotion bottles, etc., must be at hand. Years ago the sinks and lavatory basins were placed in the operating-room. Later, they were banished to an adjoining "sink-room," but lavatory basins for the surgeons and nurses have been re-admitted for the great help they are in saving time. And it must be remembered that, in major operations, seconds are often of importance.

The sink-room must adjoin the operating area, with a wide open doorway between them. It should be fitted with slop and washing sinks, with marble or slate draining boards. The walls and floors of the room would be similar to those in the operating-room, but a tile dado is permissible, and even desirable.

The sterilizing-room, which may conveniently adjoin the sink-room, is used for the general sterilizing of instruments and dressings. A large steam-heated (or even gas-heated) sterilizer is required for dressings, which are placed in "drums." It is generally of sufficient size to do this work for the whole of the hospital. Separate sterilizers are required for instruments and bowls. Some storage space is also required for dressings and glass shelves for lotions, etc. In addition to this, means must be provided for sterilizing the bowls used in operations, and the instruments. Admirable fittings are made by instrument makers generally. It is convenient to have an instrument sterilizer also in the operating-room itself, for use during operations.

Separate cloak-rooms, with lavatories, are required respectively for surgeons and nurses.

The anæsthetic-room should adjoin the operating-room, with wide doors between them, also into the entrance lobby. It should be well lighted and ventilated.

A small room, fitted with air-tight cupboards for instruments and stores for warmed blankets, etc., is useful.

The whole unit should be cut off from other parts of the hospital by a well-ventilated lobby.

Nurses' Home.

This should be literally a "home" for the nurses, not a barrack, nor even an hotel. The work of a nurse is hard, and in many matters unpleasant; and she works, or should work, under strict discipline. It is only right, then, that as a matter of compensation, the living quarters should be made as pleasant and homelike as possible. I have myself carried this principle as far in some cases as to differentiate even the external appearance as far as possible from the "institutional" character of the wards and other buildings.

For economical planning the building is best with two stories above the ground floor, as the area of the day accommodation generally works out at just half that required for the bedrooms. The average area for bedrooms is 100 ft., giving somewhat more to the sisters, and less to probationers. Fireplaces are needed only in sisters' rooms, and then more for ornament than use. The matron, or more usually a "home sister," will have a small self-contained flat, consisting of a sitting-room, bedroom, and bathroom.

A large general sitting-room with a deep bay or two, and "cosy corners," should be provided for the nurses and probationers, and a separate one for sisters. (About 20 sq. ft. of area per person is sufficient.) A quiet-room, which may be fitted for reading and writing, is desirable. Of late years a special "sister tutor" has been added to the staff, and she requires a sitting-room to herself, in addition to a fairly large lecture-room. There must be ample room for desks, a blackboard, the inevitable skeleton, and fascinating—if gruesome—models of parts of the human body.

A smaller room is desirable, properly fitted for teaching nurses the elements of cooking.

It is a pity that these rooms are placed in the nurses' home, but it appears to be the most convenient place for them.

Lavatories and conveniences are required on the ground floor for day use. It is a growing practice also to provide rooms on the bedroom floors for lavatories, to avoid the necessity of hand-basins in the bedrooms; though in some cases a fixed lavatory basin, complete with hot and cold water supplies and waste, is provided in each bedroom. Bathrooms, one to every seven nurses, must be placed on the upper floors, with a lavatory basin in each. A very necessary fitting is a special hair-washing basin or basins, which may be placed in the day lavatory. A sink or tub for washing blouses and other small things is also desirable, as well as a short ironing table. If a cloak-room is provided, it should be fitted with separate lockers, one for each nurse. Near the sitting-room there should be a small tea kitchen or large pantry, with a store for food. The dining-room is best placed near the main hospital kitchen.

Electric Lighting.

The most generally approved method of installing is to lay the wires in screwed iron pipes, which can be buried in the walls and floors. There are differences of opinion in the matter of burying pipes. I personally prefer them on the surface, except where their dust-collecting quality is detrimental, as, for instance, in wards, operating-rooms, etc.

Generally.

The essence of successful hospital planning is attention to numberless small details. If the architect will try to visualize, or, better, go and see the work to be done, he may learn the best way to lighten the task of nursing and help towards the comfort and well-being of patients. The greatest mistakes made in hospital plans are mostly due to inadequate knowledge of the work to be done, the way in which, and the conditions under which, it is done. Even the most experienced architect lacks an intimate knowledge of these matters, and it is always well to ask the advice of the staff who have to work the institution. It is exacting work, but well repaid, if he exercises judgment and discretion in eliminating from what he is told all that is impracticable, or merely trivial.

The New Torquay Hospital

ADAMS, HOLDEN, and PEARSON, Architects

Extracts from the Architect's Report

THE SITE.

IT is proposed to place the buildings in such a way that the whole of the wards are situated on the highest part of the site, on an approximately level plateau (250), and with the out-patient department and part of the administration on a level with the existing house (which will form part of the new nurses' home), and at a level some 11 ft. below (239).

The boiler-house, laundry, and the pathological blocks would be isolated a few feet lower (232) and at the south-east of the main buildings.

THE OUT-PATIENT DEPARTMENT.

This is on the ground-floor level and the first building reached from the road.

The Entrance Lobby with Porters' Registry Office, 7 ft. 6 in. by 7ft., adjoining.

The Waiting Hall, 36 ft. by 31 ft. and 16 ft. high, well lighted and ventilated with clerestory windows all round the room. The floor of terrazzo and the walls with tiled dado 5 ft. high and plaster above and heated by radiators with fresh-air inlets where possible. Entered from the waiting-hall is a lavatory and W.C. for each sex.

The Eye, Ear, and Throat Consulting Room, 23 ft. by 16 ft., and 10 ft. 6 in. high, well lighted on two sides, fitted with sink and lavatory with tiles on wall at back, and heated by radiators under the windows and with fresh-air inlets.

The Examination Room, 9 ft. by 8 ft. 6 in., with radiator under window, and *Dark Room,* 9 ft. by 7 ft. 6 in., specially ventilated with inlet and extract flues.

The Consulting Room, 16 ft. by 12 ft. 6 in. and 10 ft. 6 in. high, fitted with sink and lavatory and heated by radiator under window with fresh-air inlet, and with a door to the examination room.

The Surgery, 20 ft. by 18 ft. and 10 ft. 6 in. high, for casualty cases and surgical dressings, fitted with sink and lavatory, and radiator under window with fresh-air inlet. There are two cubicles, each 9 ft. 6 in. by 6 ft. 6 in., and with entrance to the *In-patients' Entrance Hall,* 24 ft. by 17 ft., and this has separate external entrance on the level of the courtyard, and here all casualties and in-patients would enter.

THE DISPENSARY.

The Dispensary, 20 ft. by 18 ft., top-lighted and so arranged to serve the out-patients by means of two sliding hatches to the waiting-hall, and a hatch to the electrical department, and also accessible for in-patients' medicines; the room would have shelves around the walls with cupboards and drawer under with sinks in the benches. The floor here and in the laboratory would be of acid-proof asphalt, and the department is easily accessible for carts to bring in hampers, carboys, etc.

GENERALLY.

The whole of the walls and ceilings would be plastered and distempered. The floors, except where before-mentioned, of terrazzo, and the large hall laid in sections to prevent cracking. The woodwork would be stained and finished with dull varnish (this would be more economical in upkeep than paint).

At the junction of floor and walls would be a cove of terrazzo and taken 6 in. up the walls as a skirting with a 1 in. line painted above this skirting.

ELECTRICAL DEPARTMENT.

This is on the ground floor and adjoins the out-patient department—it is essential that it should be dry and damp-proof and consists of the following:

Radio Therapy Room, 17 ft. 6 in. by 14 ft. and 10 ft. 6 in. high, fitted with lavatory and the windows with light-tight blinds and lead-linded door and special plaster walls and radiators with fresh inlets and extract flues.

Consulting Room, 12 ft. by 11 ft. by 10 ft. 6 in. high, fitted with lavatory and radiators with fresh air inlet and extract flue.

Radiography Room, 23 ft. by 17 ft. 6 in. and 10 ft. 6 in. high, fitted with sink and windows with light-tight blinds and lead-lined door and special plaster walls and radiator with fresh air inlet and extract flue.

Developing Room, 10 ft. 6 in. by 9 ft., with lead-lined sink and teak drainer and windows with light-tight blinds.

Viewing Room, 10 ft. 6 in. by 8 ft. 6 in., with special light-tight access to the developing room and fitted with special viewing cabinet with enclosed concealed lights and sloping glass front for exhibiting plates.

Printing and Filing Room, 12 ft. by 8 ft. 6 in., entered from developing room.

Waiting Space, 12 ft. by 8 ft. 6 in., adjoining electro therapy room.

Electro Therapy Room, 28 ft. by 24 ft. by 10 ft. 6 in. high, with six cubicle recesses 7 ft. 6 in. by 6 ft. 6 in., and with sink and lavatory and sink under for emptying foot-baths. Radiators with fresh-air inlets and with extracts next the ceiling.

GENERALLY.

The whole of the walls and ceilings would be plastered and distempered, the special rooms requiring same would be covered with Barium plaster. The floors of corridors and waiting spaces would be of terrazzo and the rooms with wood block floors and coved skirtings; the woodwork generally would be stained and finished with dull varnish.

The department has been arranged so as to allow for extension.

MAIN ENTRANCE AND ADMINISTRATION.

The main entrance of the hospital is in the centre of the forecourt at a level of 239 and consists of:

Central Entrance Hall, 19 ft. 6 in., with porters' office and telephone box.

The main corridor, 8 ft. wide and top-lighted, runs east and west and would have on one side of hall:

Waiting Room, 19 ft. 6 in. by 15 ft., and 11 ft. high.

Medical Staff Consulting and Library, 30 ft. 6 in. by 19 ft. 6 in., and 11 ft. high. Lavatory and W.C. for use of medical staff, committee, etc., terrazzo floor.

On the other side:

Board Room, 30 ft. 6 in. by 19 ft. 6 in., and 11 ft. high, deal block floor, plaster walls and open fireplace.

The Secretary's Office, 19 ft. 6 in. by 15 ft. by 11 ft. high, and over-looking the patients' entrance and also the corridor leading to the lifts and staircase of the wards. The floor of the above would be of deal block and the walls plastered and distempered.

The Ground Floor corridors and the main and patients' entrances would all be on the level of the courtyard and the Ground Floor level of the patients' wards (250) would be reached by the staircases and lifts.

The central portion of the main building would consist, on the *Ground Floor* facing south, of the Matron's Quarters and:

MEDICAL OFFICERS' QUARTERS.

Medical officers' sitting-room, 15 ft. by 12 ft.
Medical officers' bedroom, 15 ft. by 11 ft.
Medical officers' bedroom, 13 ft. by 9 ft.
Medical officers' bathroom, 9 ft. by 6 ft.
Medical officers' w.c. (also can be used by male staff).

All the above sitting and bedrooms would have deal block floors and plastered walls and the chief rooms have open fireplaces, but all would be heated with radiators having fresh-air inlets.

On the north side of the main corridor is the *Clinical Pathological Laboratory*, 18 ft. by 17 ft., with large north window and fitted with sinks and teak-topped benches, and would have deal block floor, plastered and distempered walls and be heated by radiators with fresh-air inlets and extract ventilators next the ceiling.

Shut off from the main corridor by a glazed screen is the *Operating Theatre Department*, consisting of: *The Large Operating Theatre*, 24 ft. by 17 ft., with north and top-light, fitted with two sinks, white fireclay slabs, two lavatories and glass shelves and heated by radiators with fresh-air inlets, and electric extract fan next the ceiling.

The Small Operating Theatre, 17 ft. by 17 ft., with north light, fitted with two sinks and white fireclay slabs, lavatories and glass shelves and heated by radiators with fresh-air inlet and electric extract fan next ceiling.

Anæsthetic Room, 17 ft. by 10 ft., with cupboard for apparatus, heated by radiator with fresh-air inlet and extract ventilator.

Sterilizing Room, 17 ft. by 9 ft., fitted with sink and slab and glass hood and extract flue over the sterilizers and heated with radiator having fresh-air inlet and extract ventilator.

Theatre Sisters' Room, 17 ft. by 8 ft., heated with radiator with fresh-air inlet and fitted with lavatory.

Surgeons' Room, 17 ft. by 8 ft., fitted with lavatory, coat-hooks, and heated by radiator with fresh-air inlet.

A Spare Room, 17 ft. by 14 ft., heated by radiators with fresh-air inlets.

The whole of the floors of this department will be of terrazzo, with coved skirting taken 6 in. up walls, the walls plastered and finished in enamel paint and white enamel; tiles at the back of the sterilizers, sinks, and lavatories; the doors will be flush hardwood, french polished, and the door furniture and sanitary fittings of white metal; the radiators and pipes finished in aluminium paint.

The two central staircases would have granolithic steps 4 ft. 6 in. wide, and with slightly-sunk treads, into which strips of linoleum would be fitted with metal nosing.

The patients' lift would be the most up-to-date electric automatic lift, the inside measurement of polished teak car 7 ft. 6 in. by 4 ft. 6 in. The service lift would be similar, but of smaller size, and serve the kitchen department direct from the receiving stores.

In the eastern wing on the ground floor is the medical unit, and in the western wing the surgical unit.

MEDICAL UNIT.

The two large Medical Wards of sixteen beds each for men and women, are 70 ft. by 24 ft. by 13 ft. high. This allows a floor space of 105 ft. per bed, a cubic area of 1,360 ft. per bed and head space of 8 ft. 6 in. per bed.

At the entrance to the ward is a lavatory for the use of medical staff.

At the farther end of the ward is an open fire, adding to the cheerfulness of the ward and useful for convalescents, also supplementing the general heating scheme, which, in mild weather, would not be needed.

The heating would be by radiators with fresh-air inlets under every other window, and extract ventilator in ceiling.

The three side wards are 12 ft. by 12 ft. by 13 ft. high. This allows a floor space of 144 ft., and a cubic area of 1,872 ft.

The ward floors would be of 1 in. teak blocks laid in mastic, and wax polished, and with a teak cove next to the walls.

The windows would be double-hung sashes with deep bottom rails to lower sash, and 4 in. vertical board on the cill, so as to obtain ventilation at the meeting rail without draught, and above the sashes would be a "fall in" or hopper with glass cheeks to prevent down-draught. The window-boards of polished teak.

The walls would be of plaster and distempered (and eventually painted).

The ward doors would be of hardwood, slightly stained and polished, and flush on both sides.

The door furniture white metal all through.

The electric light brackets—one to every other bed—would be of white vitreous enamel and white metal switches.

The Sanitary Annexe at the end of the large ward is reached by a cross-ventilated lobby, and contains two w.c.s for patients, a sink-room 8 ft. 6 in. by 6 ft., containing a bed-pan sink, a mackintosh sink and scrubbing-slab alongside and rail for drying mackintoshes, a cross-ventilated fæces' cupboard, and a heated rack for bed-pans (by utilizing the hot-water service pipes) and shelf for spare bed-pans.

The floor of this annexe would be of terrazzo, with a cove next the walls, and the terrazzo taken up 6 in. as skirting. The walls will be plastered and distempered (and eventually painted); there will be tile slabs at the back of the fittings.

The annexe will be warmed by a radiator having fresh-air inlet and with extract ventilator next the ceiling.

There are covered balconies at the end of each large ward, one 24 ft. wide by 17 ft. deep, one 24 ft. by 10 ft., and, in addition to these, an open flat 24 ft. by 17 ft., and a terrace 24 ft. by 10 ft.

At the end of each large ward is a fire-escape iron staircase 4 ft. wide, without winders, and with large landings, so that a stretcher can be carried down.

A Bathroom 12 ft. by 8 ft. (one for each sex), fitted with white vitreous enamel iron bath and taps, and lavatory basin, also a heated towel rail, the floor of terrazzo, and the walls plastered and distempered.

Linen-room, 12 ft. by 8 ft., fitted with open rack shelves, and the hot-water service taken through it, the floor of terrazzo, and walls plastered.

Ward Kitchen, 13 ft. by 12 ft., fitted with sink with hot and cold, a draining-board of teak, a plate-rack and a dresser; also gas stove for minor cooking operations, with glass hood over same having extract ventilator. The floor would be of red adamantine tiles, and the walls plastered and distempered, and tiles fixed at the back of sink and gas cooker. A small service lift would serve directly to the kitchen floor.

A Small Food Store, 8 ft. by 5 ft., well ventilated and fitted with slate shelves, with tile skirting above the shelves.

Two Patients' Clothes Stores, 8 ft. by 7 ft., well ventilated and fitted with open racks for clothes; terrazzo floor and plastered and distempered walls.

Housemaid's Room, 8 ft. by 3 ft., fitted with sink, having hot and cold water and a broom and pail cupboard.

A W.C. for the Nurses in this unit.

A Sisters' Room, 12 ft. by 7 ft. 6 in., with south aspect, and radiator with fresh-air inlet; floor of wood-block and walls plastered and distempered.

SURGICAL UNIT.

The two large Surgical Wards, one for men and one for women, 82 ft. by 24 ft. by 13 ft. high. This allows for a floor space of 100 ft. per bed, a cubic area of 1,300 ft. per bed, and a head-space of over 8 ft. per bed. At the entrance to the ward is a lavatory for the use of the medical staff, and at the farther end an open fireplace.

The two side wards, 12 ft. by 12 ft. and 13 ft. high, with a floor space of 144 ft., and a cubic area of 1,872 ft.

The finishings of these wards and the following rooms would be similar to those in the medical unit. There are similar balconies, escape stairs, sanitary annexes, ward kitchens, 13 ft. by 12 ft.; bathrooms, 12 ft. by 8 ft.; linen

room, 8 ft. by 8 ft.; food store, 8 ft. by 5 ft.; patients' clothes store, 8 ft. by 5 ft.; sisters' room, 12 ft. by 9 ft.; and nurses' W.C., and also in connection with this unit a small sterilizing room, 9 ft. by 8 ft., fitted with sink.

THE FIRST FLOOR.

The central portion facing south consists of: *Special Wards for Eye, Ear, and Throat*, three four-bed wards each 24 ft. 6 in. by 15 ft. 6 in. by 13 ft. high, with floor space per bed of 95 ft., and a cubic area of 1,235 ft., and two single wards each 15 ft. 6 in. by 12 ft. by 13 ft. high, with floor space per bed of 186 ft. per bed, and a cubic area of 2,418 ft. (these wards might be utilized for two beds each). Centrally placed is the ward kitchen, and in connection with these wards are two bathrooms, two W.C.s, sink room, linen room, and patients' clothes stores.

On the north side, and shut off from the main corridor, are the *Septic Wards*, six in number, and each 17 ft. by 11 ft. 6 in. by 13 ft. high, with a floor space of 195 ft., and a cubic area of 2,160 per bed, a ward kitchen 17 ft. by 10 ft. 6 in., food store 6 ft. 6 in. by 6 ft., W.C.s for each sex, a sink room 9 ft. by 7 ft. 6 in, linen room 11 ft. by 6 ft. 6 in., and bathroom 9 ft. 6 in. by 7 ft.

A large balcony, 21 ft. by 9 ft., on the south-west side is arranged for the use of these wards.

The eastern wing consists of:

THE CHILDREN'S UNIT.

The large ward, 70 ft. by 24 ft. and 13 ft. high, with a floor space of 105 ft. per bed, and a cubic area of 1,360 ft. per bed (extra cots for babies could be placed down the centre of the ward). The walls of this ward might with advantage be tiled with picture tiles.

Two side wards each 12 ft. by 12 ft. by 13 ft. high, with a floor space of 144 ft., and a cubic area of 1,872 ft.

Ward kitchen 13 ft. by 12 ft, food store 8 ft. by 5 ft., bathroom 12 ft. by 8 ft., fitted with child's bath and lavatory, linen store 10 ft. by 8 ft., fitted with open rack shelves, heated by the hot-water service-pipes, children's clothes store and toy room 10 ft. by 8 ft.

The sanitary annexe would have one W.C. for nurses, and a large sink room with child's W.C., bed-pan sink, mackintosh sink and scrubbing slab, hot towel rails, and fæces cupboard with external open gratings.

At the south end of children's ward is a balcony 24 ft. by 18 ft., and only partly covered with a roof.

THE MATERNITY UNIT.

This unit consists of:

Large Ward for eight beds 38 ft. by 24 ft. by 13 ft. high, with a head-space of over 9 ft. to each bed, a floor area of 114 ft., and cubic area of 1,482 ft. The floor of wax-polished teak blocks, and the walls and ceilings plastered and distempered.

Two Labour Wards each 17 ft. by 15 ft. by 13 ft., fitted with sink and lavatory, and hood and vent for sterilizers. The floor would be of terrazzo, and the walls and ceilings plastered and enamelled.

The Ward Kitchen, 17 ft. by 10 ft., fitted with sink, drainer, plate rack, dresser and gas stove, the floor of adamantine tiles.

Food Larder, 6 ft. by 4 ft., with slate shelves.

Milk Sterilizing Room, 8 ft. by 6 ft., for babies' food.

Bath Room, 15 ft. by 13 ft., fitted with full-size bath and babies' baths, hot towel rails, and cupboard for clothes; the floor of terrazzo.

The Sanitary Annexe is so arranged as to be available from large ward and labour wards and would contain two W.C.s, one entered from the sink room for use of nurses, a bed-pan and mackintosh sink with scrubbing slab, bed-pan (heated) rack and fæces cupboard. The floor of terrazzo and the walls and ceilings plastered and distempered.

Linen Room fitted with open racks and heated by pipes from hot-water service.

THE PAYING PATIENTS' UNIT.

This consists of four single wards for men and four for women, each approximately 17 ft. by 11 ft. 6 in. by 13 ft. high with floor area of 195 ft. and cubic area of 2,500 ft.

Two two-bed wards for men and two for women each approximately 17 ft. by 17 ft. by 13 ft. high with floor area per bed of 145 ft. and cubic area 1,885 ft.

A large common sitting room, 26 ft. by 19 ft. by 13 ft. high.

All the above heated by radiators with fresh air inlets and having extract ventilators next the ceiling.

The floors of wax polished teak block, the walls plastered and distempered.

The Sanitary Annexes with two W.C.s and sink room for each sex similar to those for general wards.

Bath Room, 10 ft. by 8 ft., one for each sex, fitted with bath and lavatory.

The Ward Kitchen. 14 ft. 6 in. by 11 ft., fitted with sink, drainer, plate-rack and dresser and gas stove, the floor of red adamantine tiles.

Food Larder, 8 ft. by 4 ft. with slate shelves.

Linen Room, 12 ft. by 8 ft., fitted with open racks and heated by pipes from the hot water service.

A Sisters' Room, 14 ft. by 8 ft., central for the whole unit and with wood block floor.

Large balconies, 24 ft. by 17 ft. and 24 ft. by 9 ft., are available on the South and West sides of the block.

EXTENSION.

Can be made at any time of forty beds by building a floor over the East and West wings, and further extensions can be made by building on the North end of the two Southern pavilions.

The patients' accommodation is for 203; the staff accommodation for 77.

THE SECOND FLOOR.

The central portion, facing south, consists of:

The Nurses' Dining-room, 46 ft. by 13 ft. by 12 ft. high, the tables so arranged that they would all have the outlook from the windows, the sisters having a special table at one end of the room.

The Pantry, 13 ft. by 10 ft. 6 in., adjoins the dining-room, and would be fitted with two sinks, with teak draining-boards, plate-racks, and cupboards for plate, glass, and china.

The Maids' Dining-room, 24 ft. by 13 ft. by 13 ft. high, the floor of deal blocks.

The Maids' Sitting-room, 13 ft. by 12 ft. 6 in., also has south aspect.

The Linen-room, 26 ft. by 13 ft. by 13 ft. high, would be fitted with large linen cupboards, 7 ft. high, and adjoining this room a *Sewing and Cutting-out Room*, 13 ft. by 12 ft. 6 in., with south aspect, wood-block floors, and walls plastered and distempered, and heated by radiators. These rooms are close to the lifts for easy access to all parts of the hospital and laundry.

The Kitchen Department is on the north side of the main corridor, and centrally situated for the whole hospital. (The receiving-room for stores is on the ground floor, and directly connected to this department by service lift.)

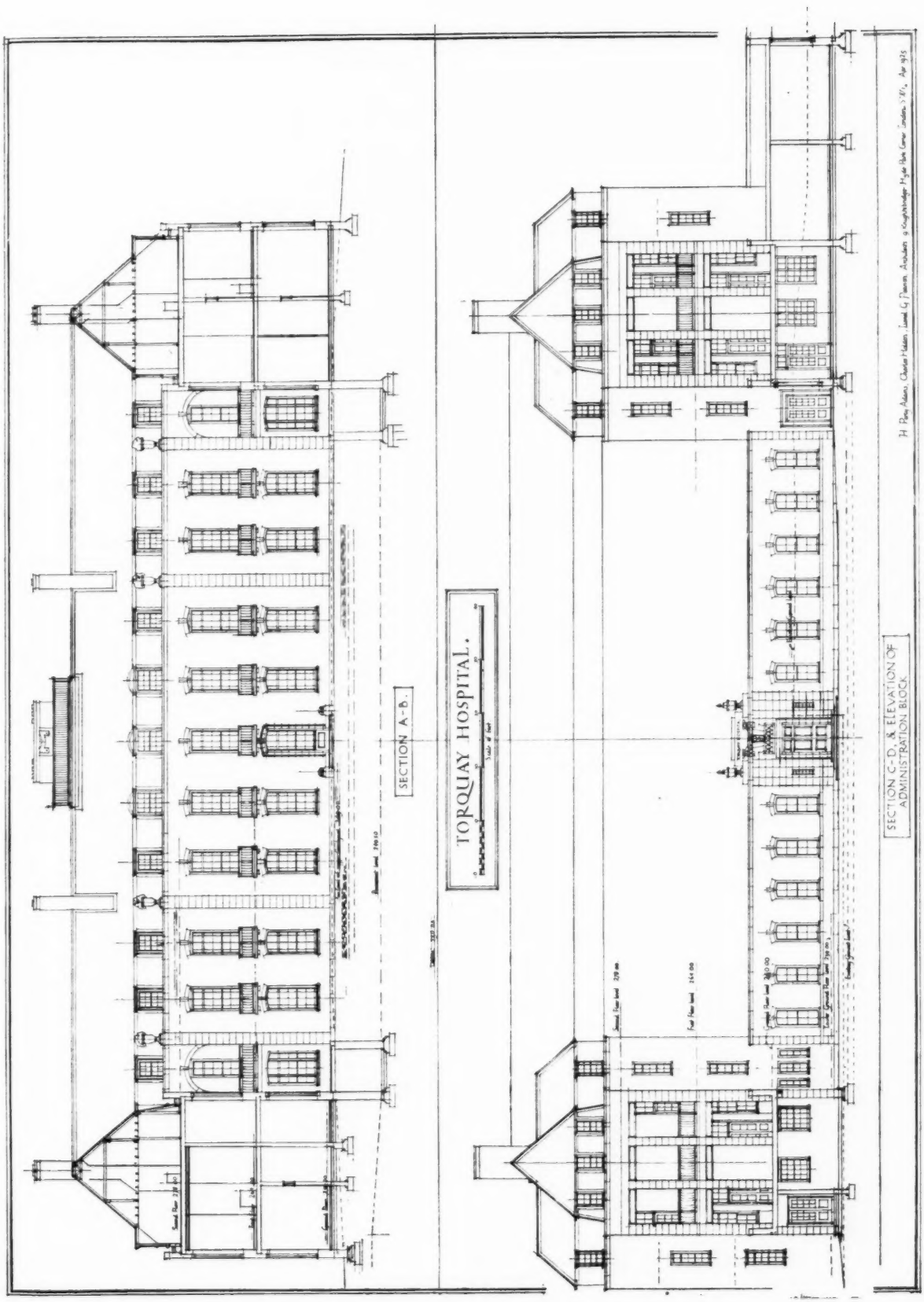
The Servery, 27 ft. by 8 ft., is between the kitchen and main corridor, and top-lighted.

The Kitchen, 37 ft. by 27 ft. and 13 ft. to the ceiling, and 16 ft. to the ceiling of skylight, and with east, west, and clerestory lighting; near the counter would be a steam-heated hot closet and a central gas-heated cooking range, and table. On one side would be roasting and steaming ovens for meat, fish, vegetables, etc., and on the other side steam-jacketted boilers for soup, beef-tea, etc., and a sink and hot-water boiler. At the end of the kitchen a large dresser.

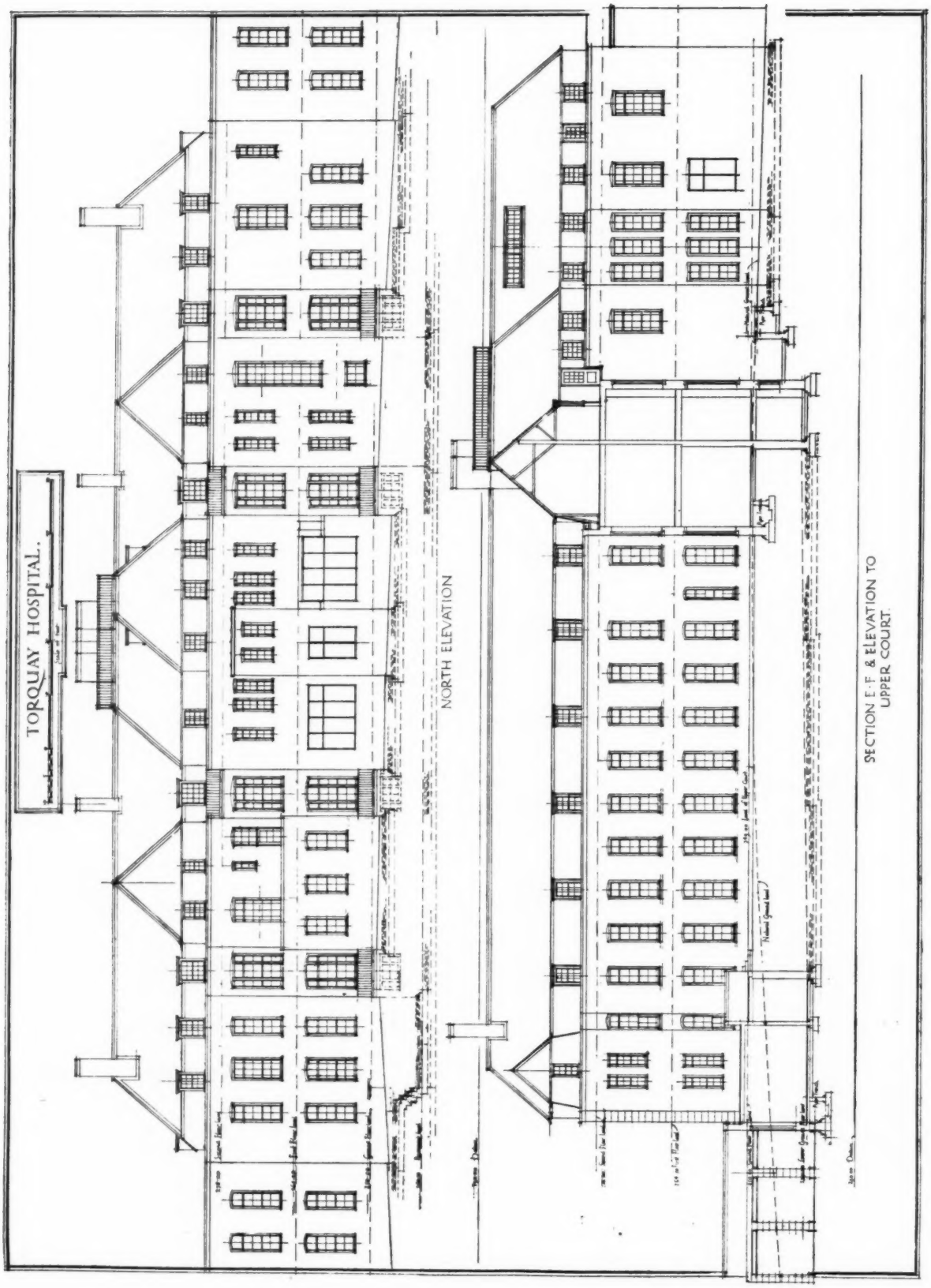
The Scullery, 18 ft. by 17 ft., fitted with hardwood, and iron sinks with plate-racks over.

On the north side, cut off by a cross-ventilated passage, are:

The Two Larders and Store-room, each 13 ft. by 8 ft. 6 in., and fitted with slate and wood shelving, and one larder insulated as cold storage.



TORQUAY HOSPITAL. ADAMS, HOLDEN, AND PEARSON, ARCHITECTS.



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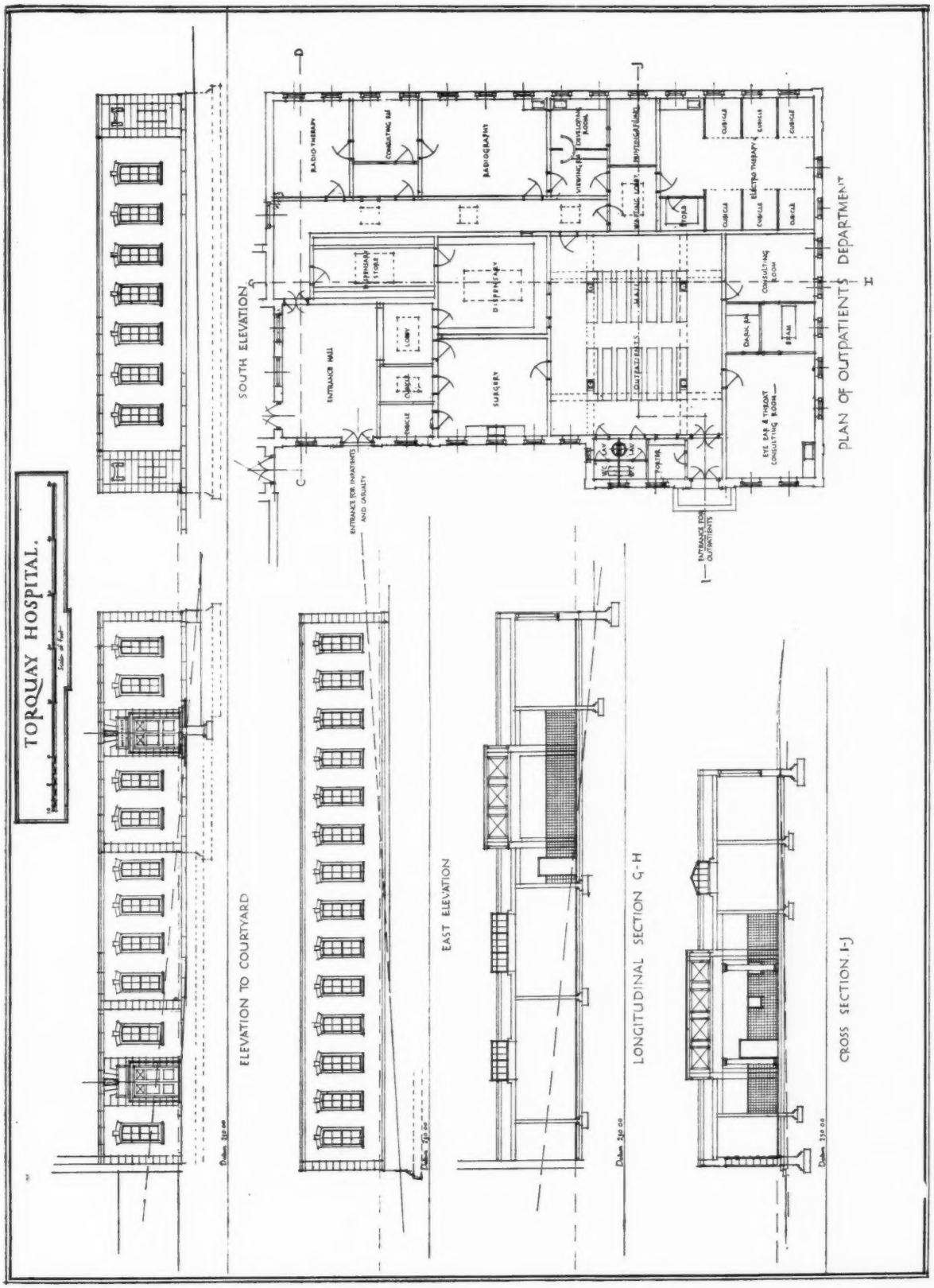

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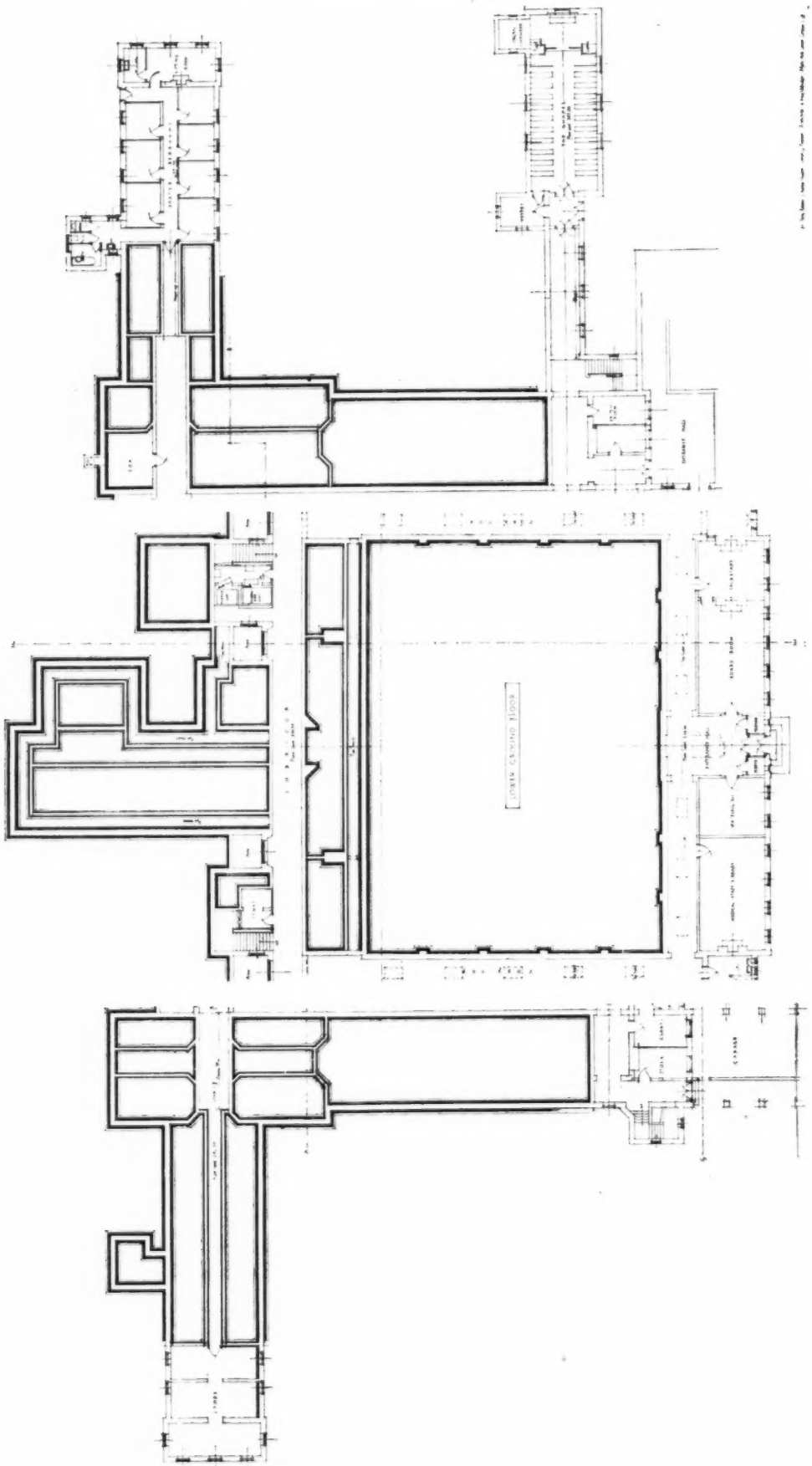
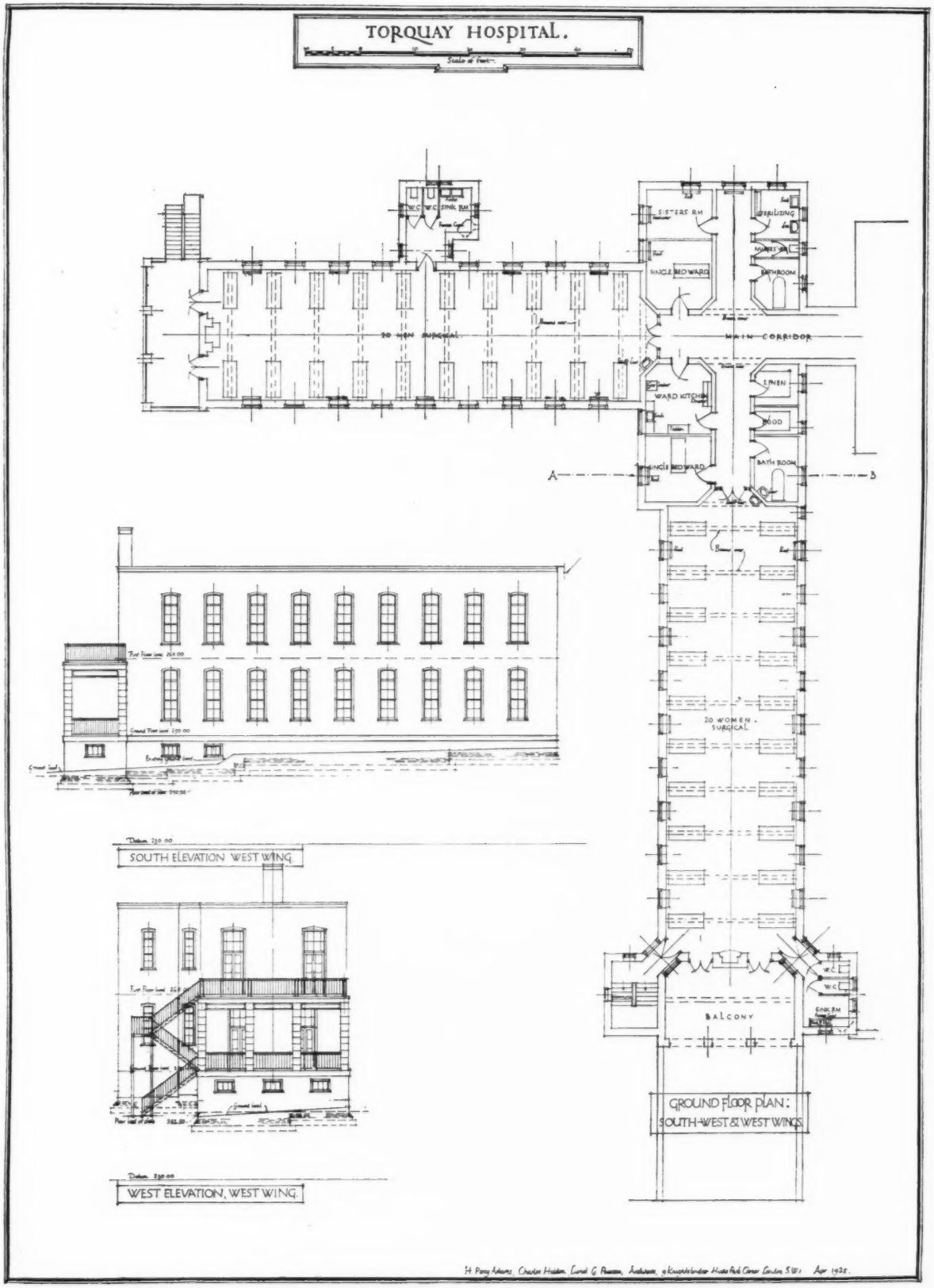


TORQUAY HOSPITAL: LOWER GROUND FLOOR PLANS. ADAMS, HOLDEN, AND PEARSON, ARCHITECTS.



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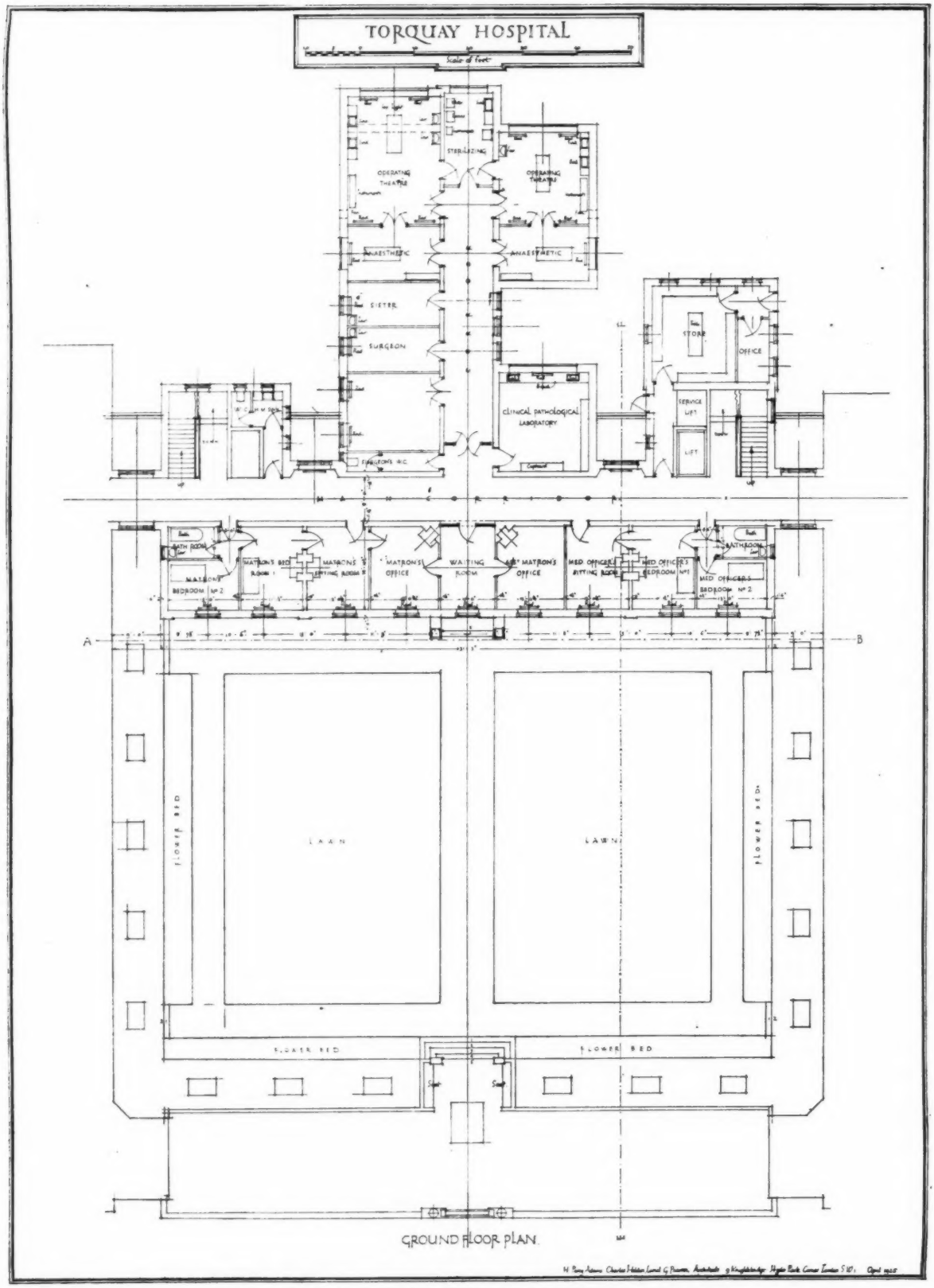

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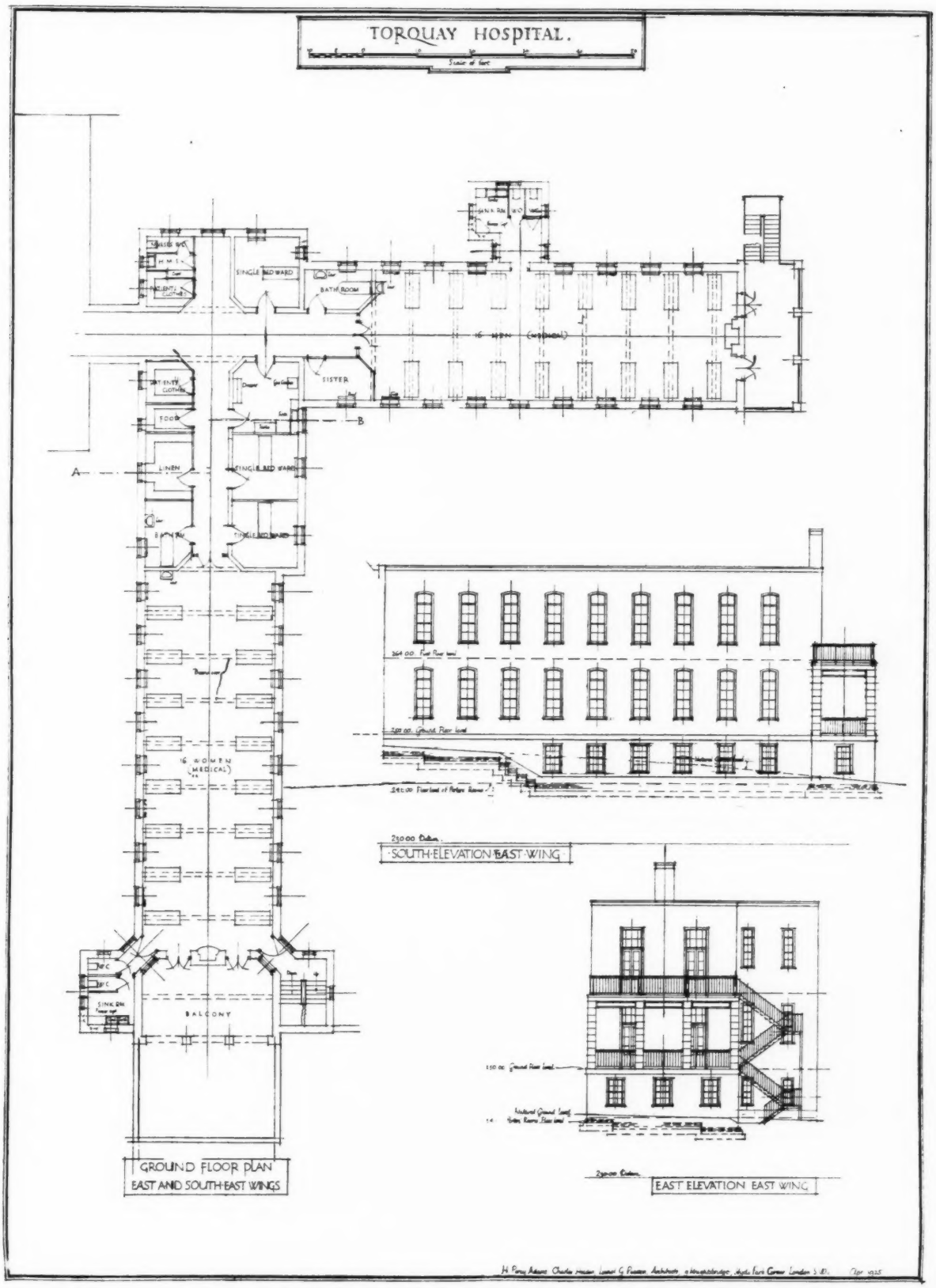

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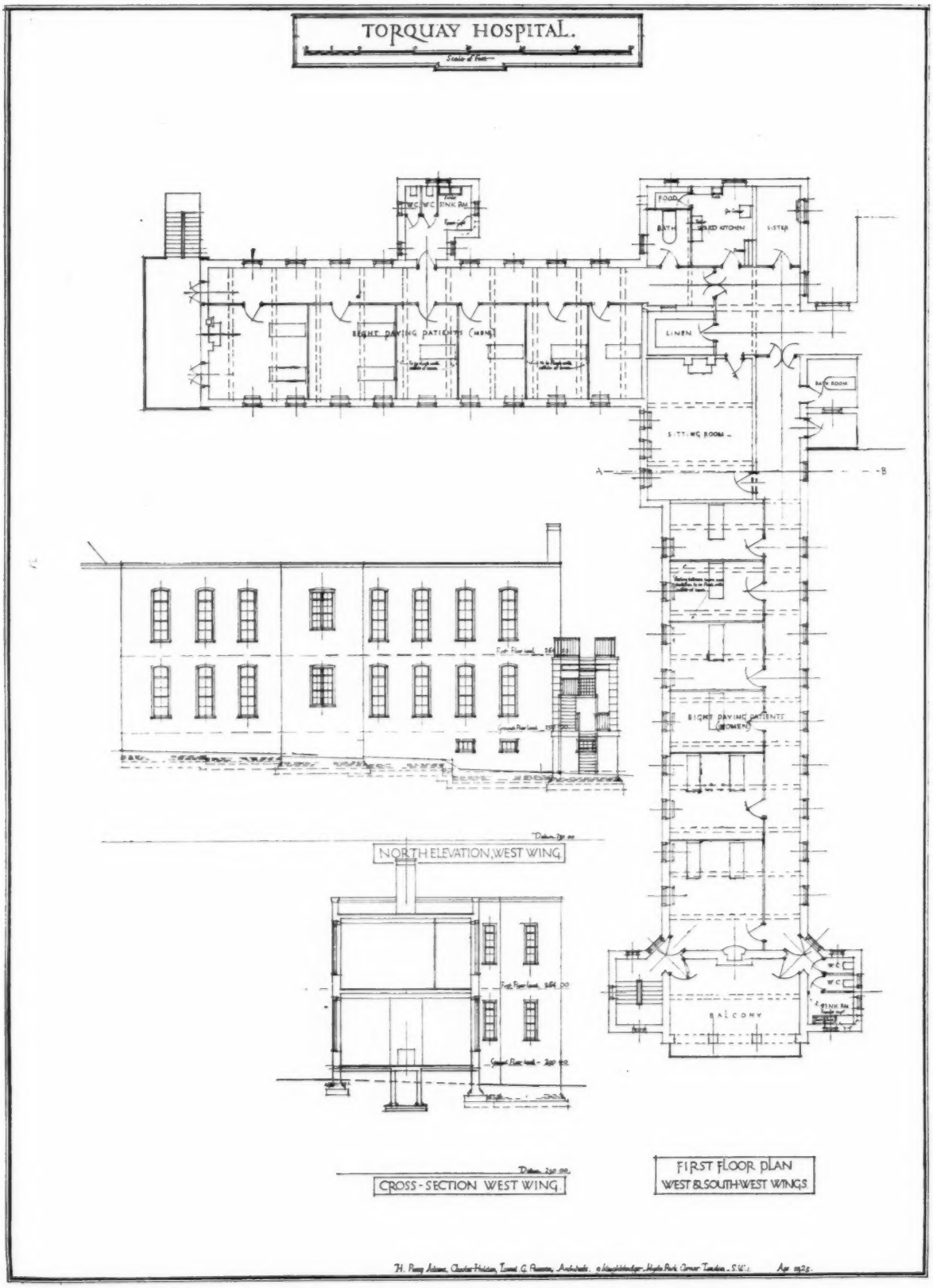

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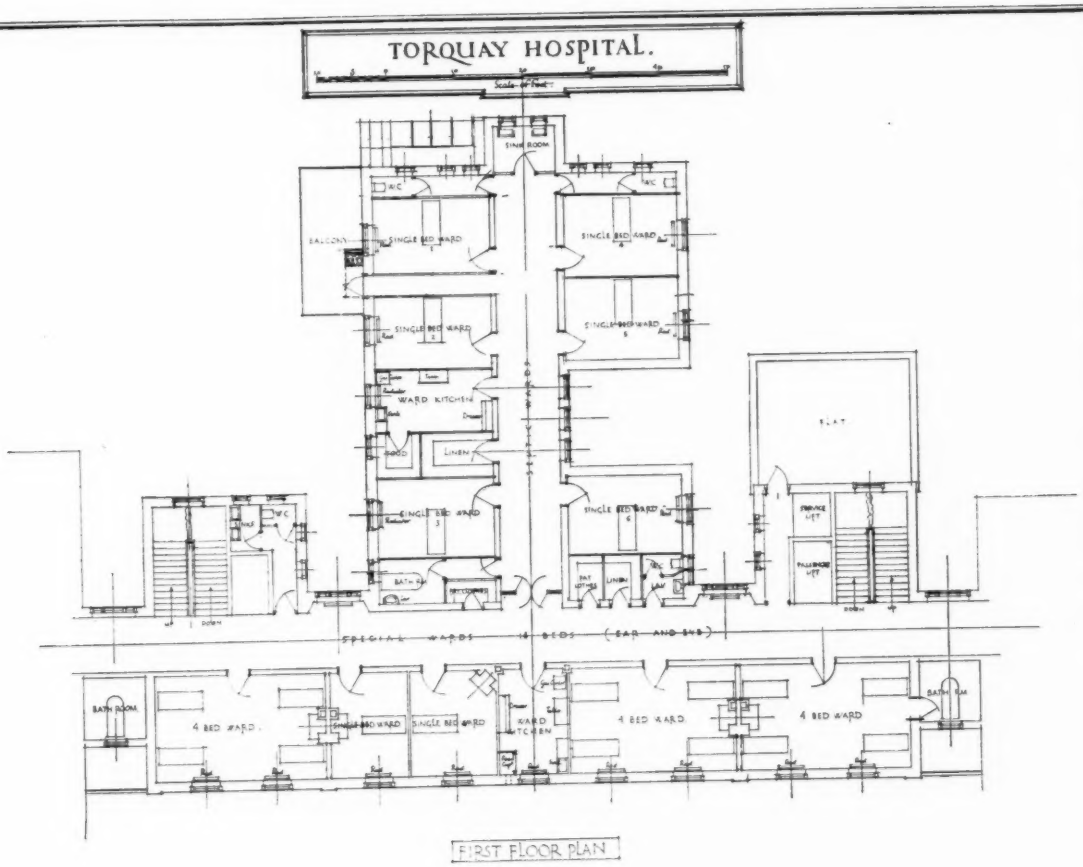
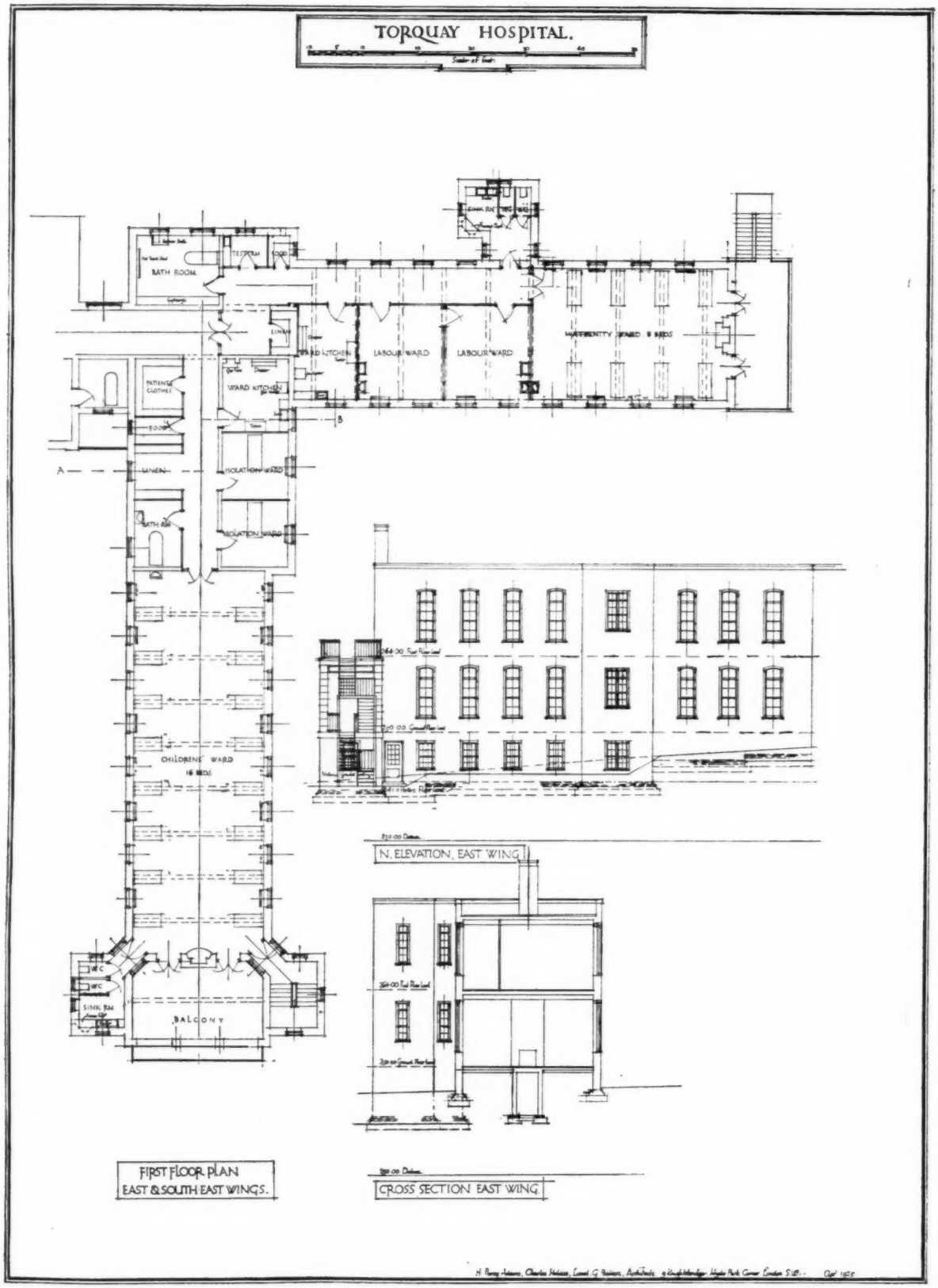


FIRST FLOOR PLAN

TORQUAY HOSPITAL. ADAMS, HOLDEN, AND PEARSON, ARCHITECTS.



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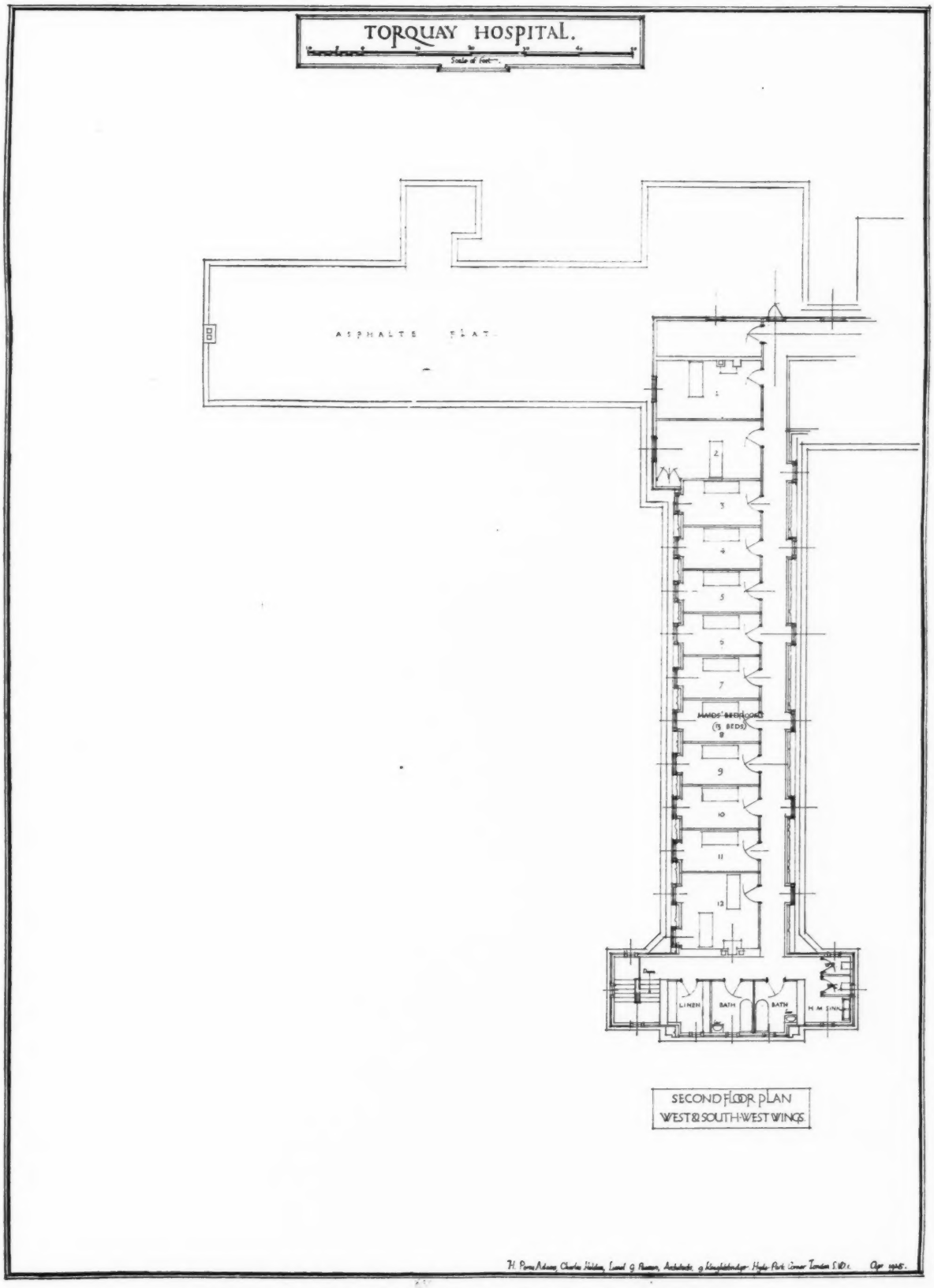

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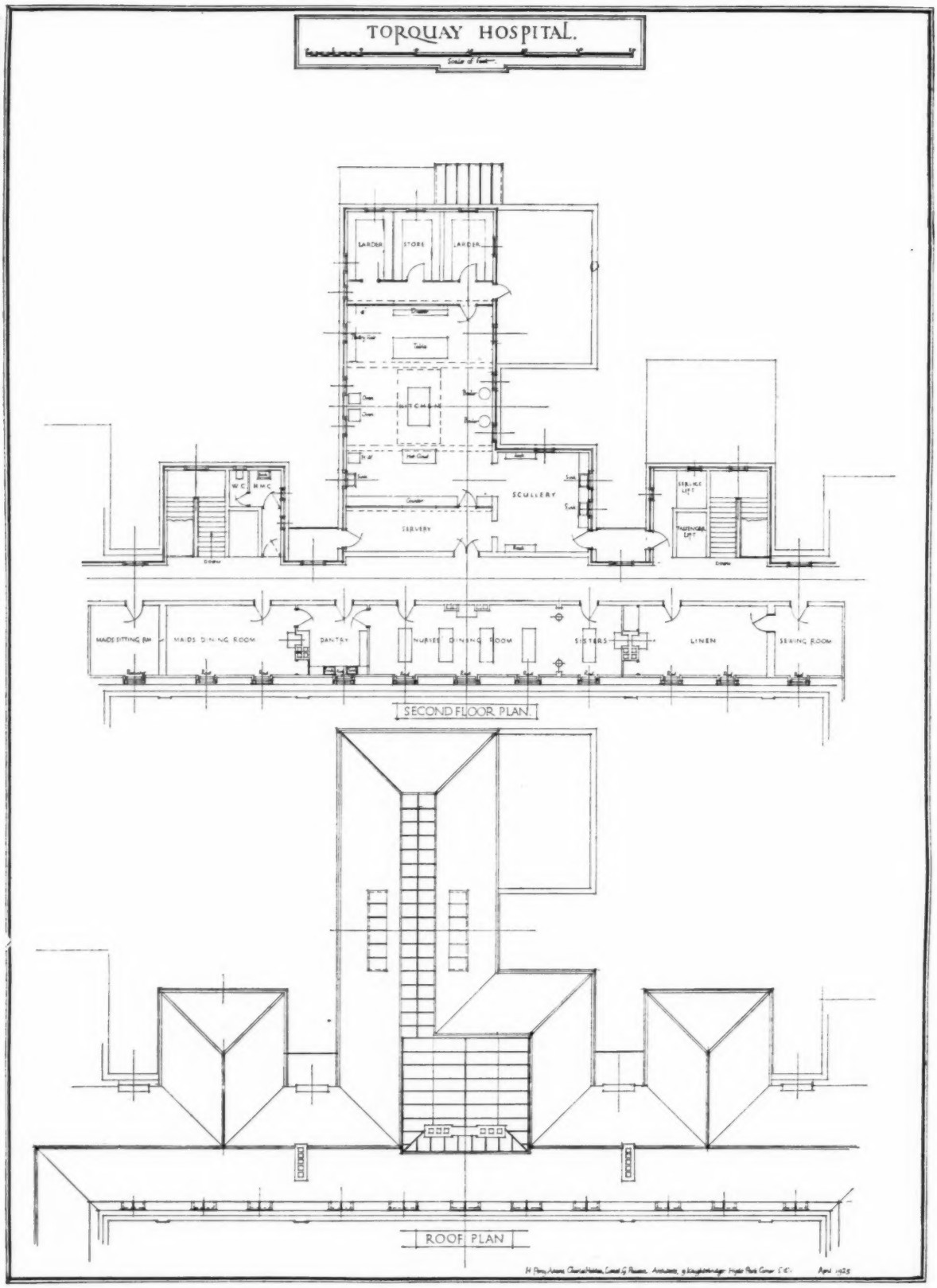
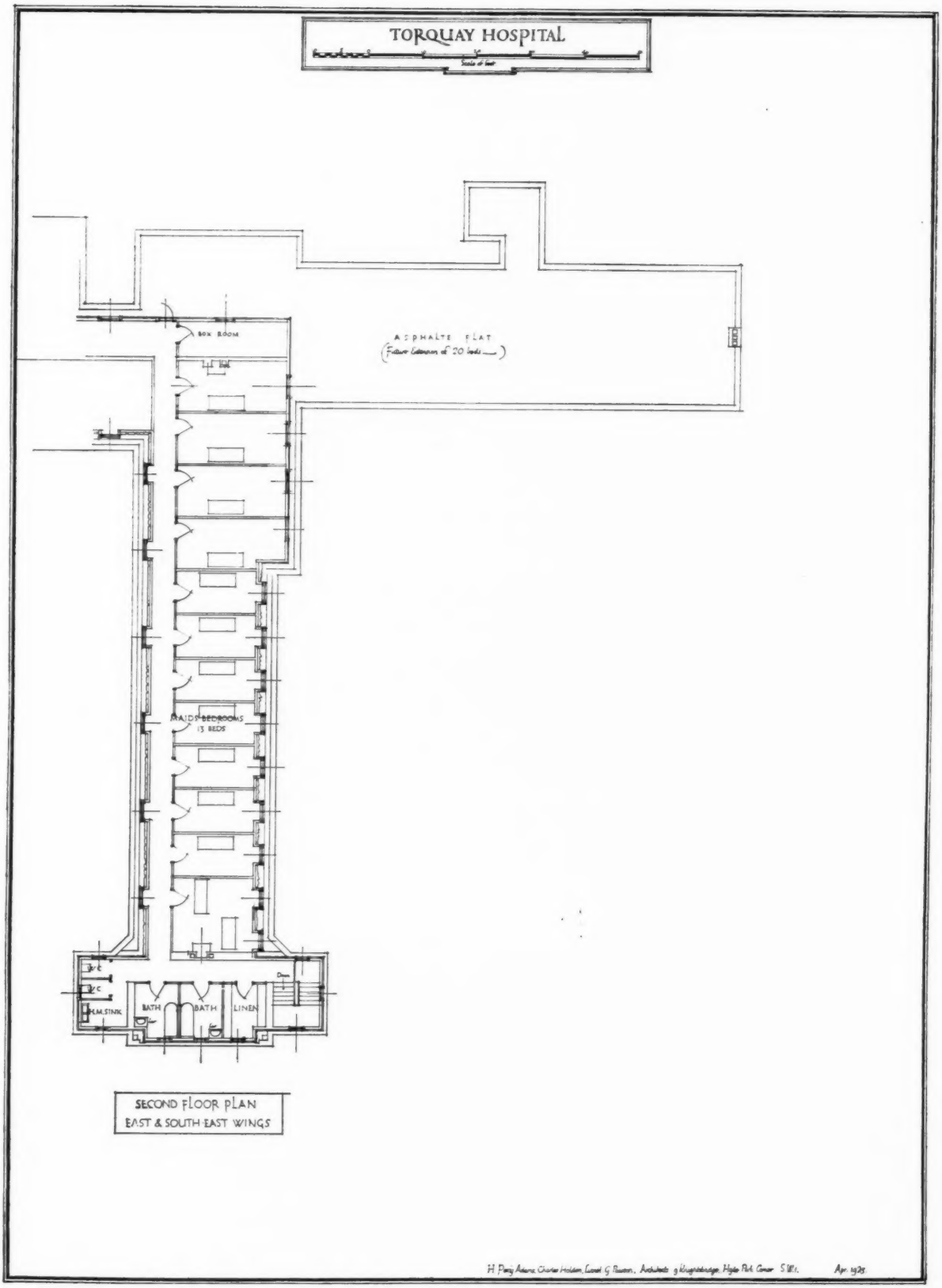


TORQUAY HOSPITAL. ADAMS, HOLDEN, AND PEARSON, ARCHITECTS.



TORQUAY HOSPITAL. ADAMS, HOLDEN, AND PEARSON, ARCHITECTS.

Hospital Operating Theatres*

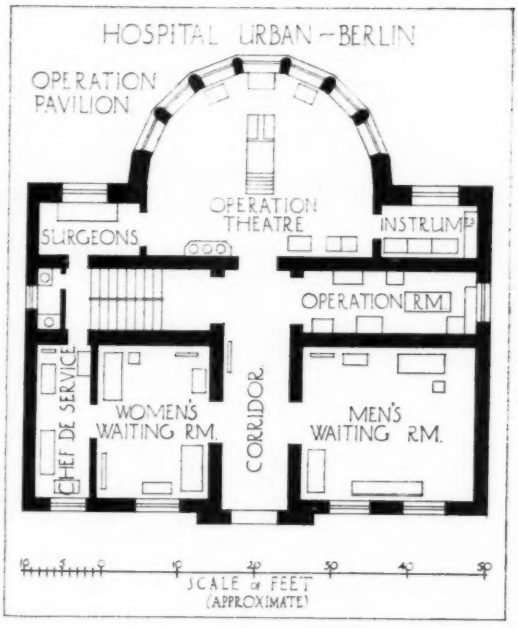
By WILLIAM A. PITE, F.R.I.B.A.

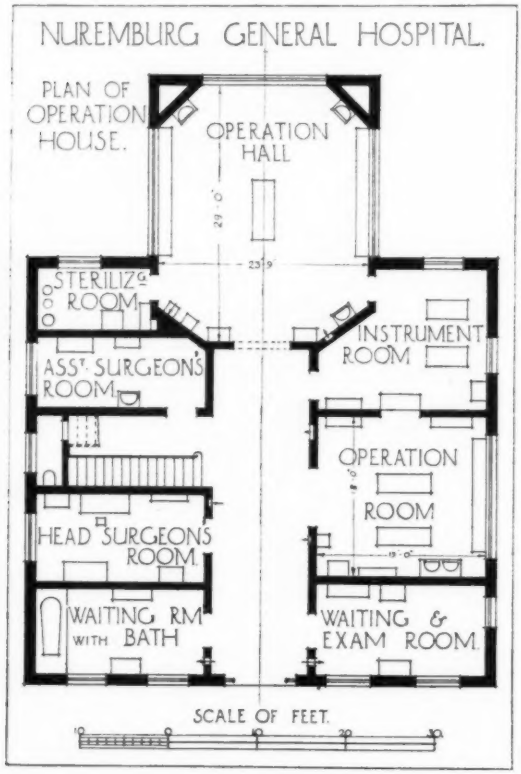
TO set forth adequately the requirements of modern hospital operating theatres, and to discuss the many and varied considerations that should govern their design and administration, would afford sufficient matter for many chapters in a special volume. This, so far, has never been attempted in this country, and an examination of the subject in such detail cannot be effected in these brief notes, which it is hoped will, notwithstanding their fragmentary nature, afford useful and suggestive information and prove of some assistance in the matter of direction and advice.

The class of theatre the writer has in mind is such as may possibly be required to meet the needs of a small general hospital in a country town. It is assumed that the hospital would be served by its own local medical staff in association with the leading practitioners, and perhaps further augmented by a consulting operating surgeon of some eminence connected with one of the large adjacent hospitals of the district.

The whole of the arrangement of the theatre, together with its requirements, will no doubt have been already the subject of prolonged and keen discussion before the architect appears upon the scene, and he will find ready to hand many ideas prevailing—some of them valuable, and others possibly somewhat far-fetched. In any event, it may be safely concluded that these suggestions—whatever they may be—are worthy of attention, and therefore they should not be lightly set on one side.

It is customary for such suggestions to be submitted, in the first instance, to the consulting surgeon. They should then be collated and carefully studied in conjunction with the sister-matron, whose opinion is generally sound—especially on the nursing aspect—and will be found to be of value, as they will be based upon long and varied experiences. The committee (being laymen) will naturally be largely guided by the advice so proffered, especially as the local success of the hospital must depend upon the effective character of the surgical services rendered. While in order to secure this end it is essential that no expense should be spared, it is equally necessary to avoid extravagance in its attainment.





The responsibility of the architect is to direct often varying and diverse opinions into sound lines of action, and to assimilate and give expression to the instructions and requirements of his clients. By so doing he will produce the best and most approved result, but the task will call for the exercise of much skilful discrimination.

The marshalled requirements will generally need to be compressed, and that without loss of spaciousness or the introduction of waste spaces.

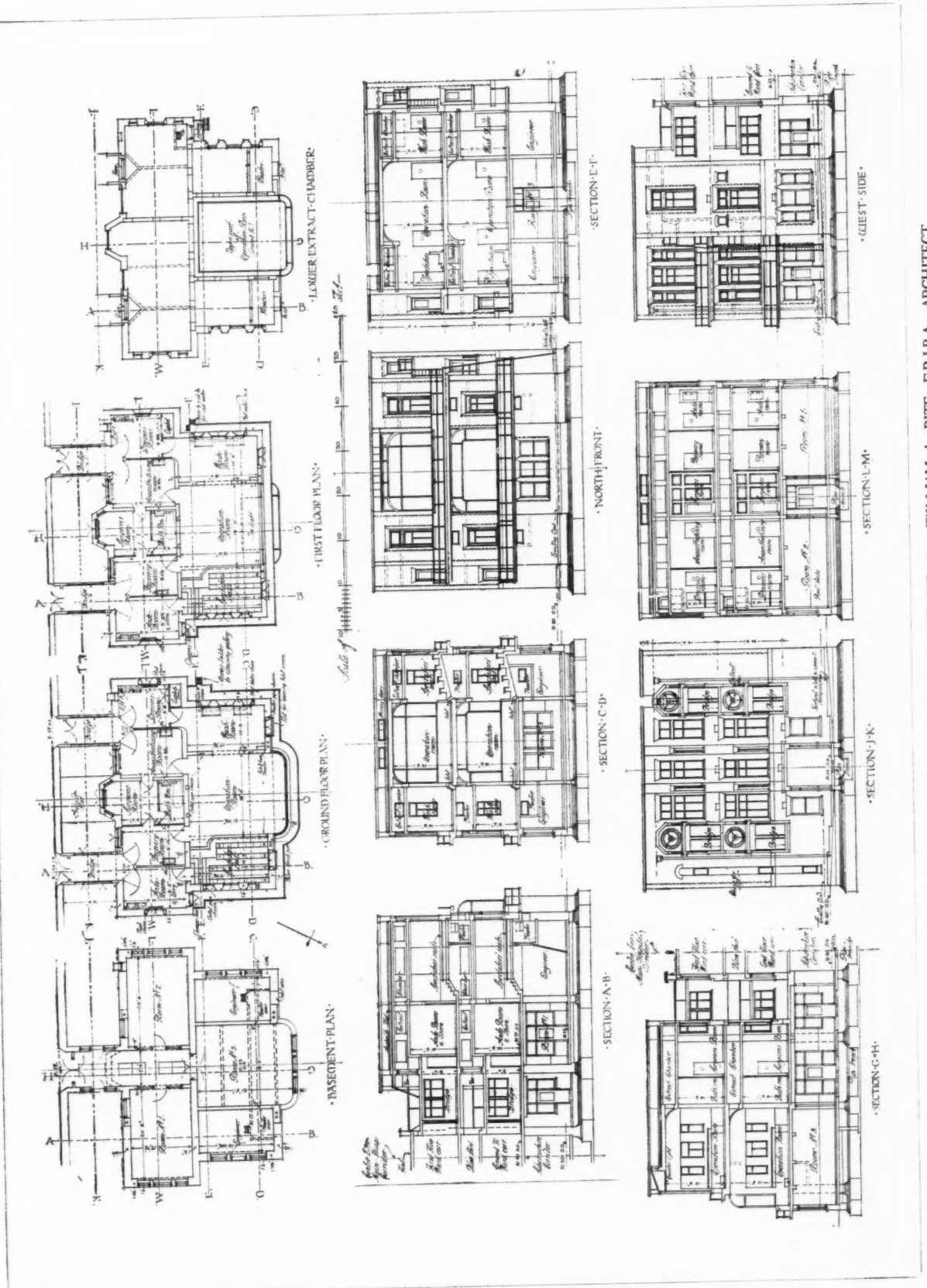
Character and conciseness of design can only follow from long and patient study of this very technical subject, which, in addition, is peculiarly liable to constant modification as a result of changing circumstances; and even when such knowledge is the outcome of experience acquired by highly qualified hospital architects, it is often found by them to be still of an incomplete character. Details will require to be thoroughly mastered before a serious attempt at planning can usefully be undertaken. It might, therefore, if a disappointing result is to be avoided, be desirable at this stage to seek the advice and criticism of an architect of known experience.

Surgeons and physicians, by their training and outlook, are naturally well informed on matters of detail, and though prone to devote much time to the consideration of points which really are not essential, they not only know what they want, but are insistent upon securing it. It is the architect, however, upon whom the onus will ultimately fall of successfully co-ordinating these varying and sometimes opposite views, and translating them into a consistent and logical arrangement.

Having this briefly outlined the circumstances likely to be encountered, we may now proceed to consider the main requirements of the general operating theatre.

Its position should be central, and preferably adjacent

* This paper originally appeared in "Specification," and it is by the courtesy of the Editor of that paper, and of the author, that we are enabled to reprint it in this Hospital Number.



KING'S COLLEGE HOSPITAL, LONDON: OPERATING BLOCK, NO 1. WILLIAM A. PITE, F.R.I.B.A., ARCHITECT.

to a lift; for even if the hospital is only two stories in height, it will be found quite impracticable to contemplate the negotiation by staircase access of a patient who should be smoothly conveyed upon a trolly. It is equally clear that the avoidance of jolting, both before and after an operation, is essential. This also applies to certain *X*-ray apparatus which in a small hospital may have to be taken into the wards.

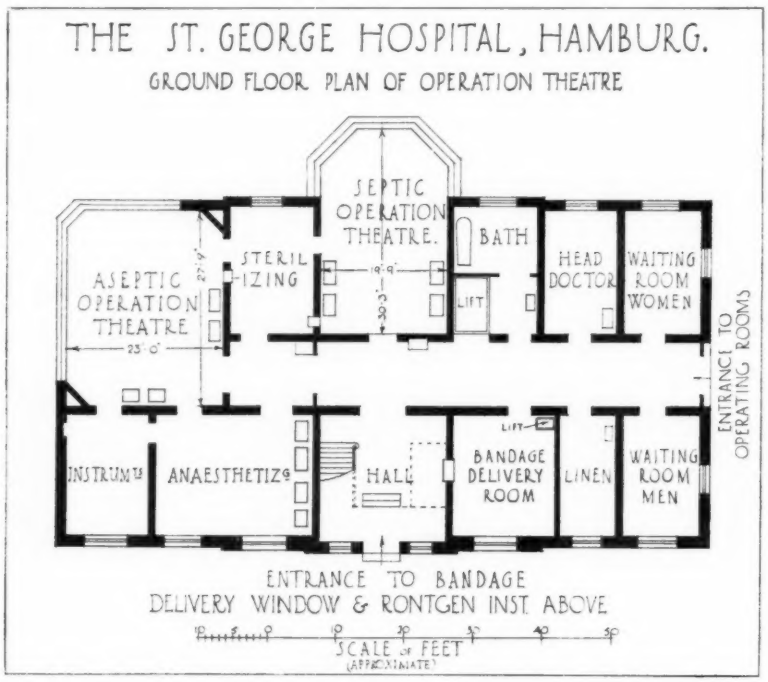
The theatre should, however, be situated where privacy and complete quiet can be secured, and its aspect such that it has an uninterrupted northern light. If circumstances permit, the operating "unit" should be isolated from the main building and cut off from the main corridor by a bridge approach.

We are here considering the instance of a hospital where it is only possible to secure one theatre, although it will be found to be desirable to have a second operating-room, which might be available in case of emergency—when, for instance, the general theatre may be temporarily out of action on account of necessary repairs, cleaning, or disinfection after a septic case.

gully, which may be made to close. Above the gully a tap should be fitted. The natural lighting of the theatre should be from the north, augmented with some top lighting. The framing of the window should be of the character of a studio light, unimpeded by bars, and constructed with side lights to open. On the window side, the theatre is best treated as a square end rather than as a bay with canted sides, although the latter form has advantages in certain circumstances. But in the case of a single theatre, which must at times be used for purposes necessitating reduced lighting, the fixing of a light-tight blind for its regulation is impossible to provide if the window has splayed sides.

All the windows in the unit should be of metal with rounded angles, and should be glazed with plate glass, the lower part of the studio light being ground with a polished finish for about 2 ft. up or more.

Upon the outside a balcony should be arranged and provided with an external access ladder, so that the entire window can be readily reached for the purpose of cleaning. It is desirable, if possible, for the theatre to be planned so that windows occur on opposite sides of the unit. This



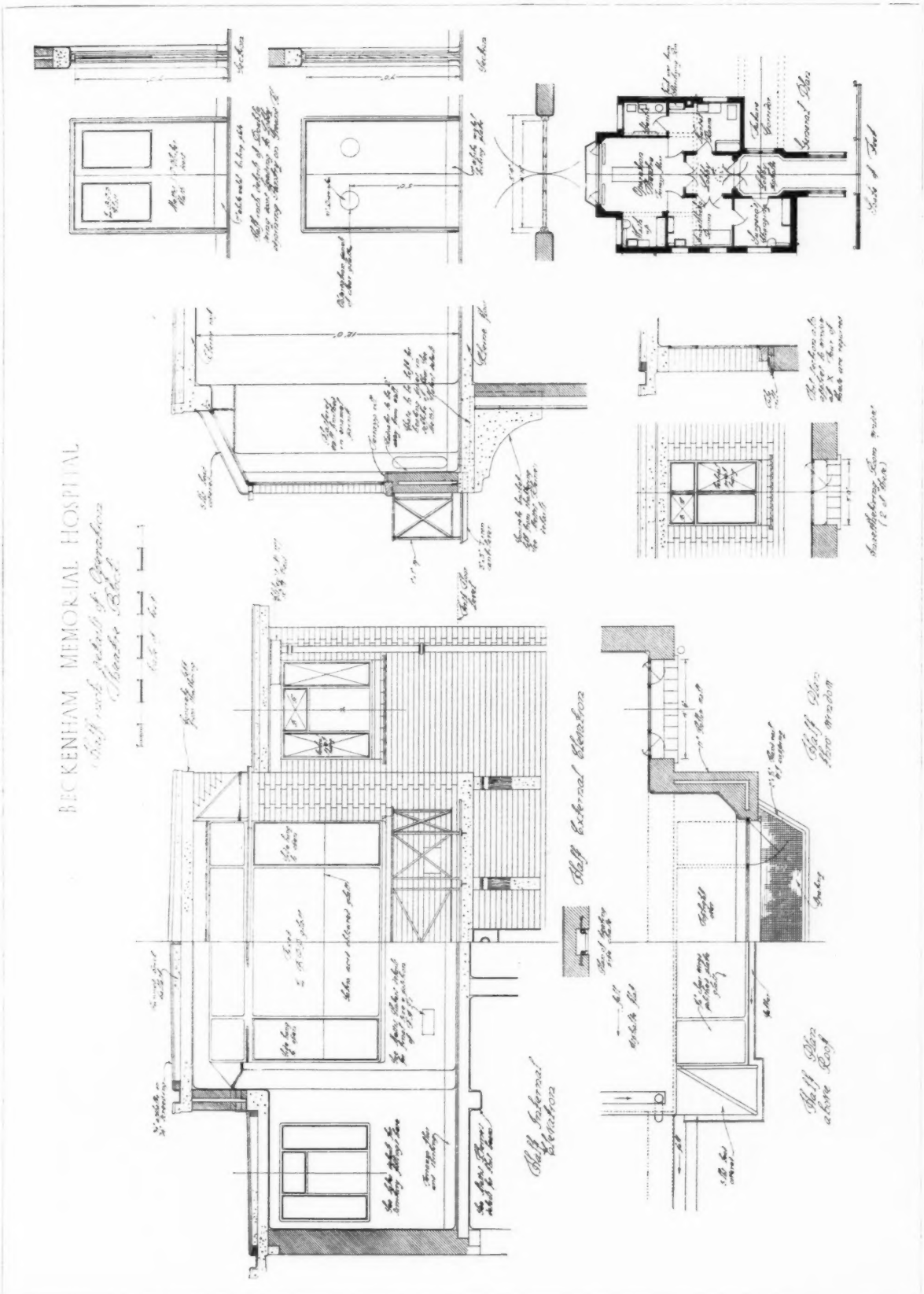
It is generally possible to provide a small operating-room (but without the usual accessory rooms) attached to the casualty department, which even the smallest hospital should possess, and here operations could be carried out during the period of dislocation caused by the temporary closing of the general theatre.

The theatre unit should contain the following minimum accommodation here described: Entering from the main corridor there should be a "cut-off" lobby fitted on both sides with double swing doors provided with kicking plates and lever handles. The springs should allow the doors to stand open so as to obviate hooking them back.

The cut-off lobby should lead into an inner lobby about 7 ft. wide, and from this the several accessory rooms should open. These comprise the theatre proper, of about 350 sq. ft. in area; a sterilizing room, of 220 sq. ft.; a surgeon's room, 144 sq. ft.; a wash-up room, 144 sq. ft.; an anæsthetic room (opening to the theatre), of about 110 sq. ft. minimum; a nurses' room, store, and cloaks. In some cases a recovery room may also be required.

The area of the theatre is best kept as a free space without basins or sinks—the floor being laid with a slight fall to a makes it possible to flush the intervening space by cross ventilation between operations, provided that the outside temperature conditions are suitable.

Adjacent and opening directly to the theatre area should be the washing space, which will be a suitable annexe; doors are not required. Within this space will be disposed the various lavatory basins and sinks for the service of the theatre, and it is here that the surgeon will do his final wash before operating. The fittings should be plated and furnished with arm lever valves and mixing boxes. The wastes must be arranged with open legs to discharge into an open channel to a single gully having a removable grid. The necessary glass shelves should be fixed above the basins, away from the wall, on porcelain-enamelled brackets. The sinks should have adjacent to them, and at the same level, porcelain-enamelled slabs on which instruments may be placed. These slabs are sometimes made of teak. It will be necessary to provide an instrument cupboard upon one side of the washing space, so placed that it will be in convenient proximity to the theatre and available for immediate access. Such a cupboard is best constructed in a recessed space in the walls, which can either be lined with white



BECKENHAM MEMORIAL HOSPITAL: OPERATING THEATRE BLOCK. WILLIAM A. PITE, SON, AND FAIRWEATHER, ARCHITECTS.

terrazzo or plastered with hard material and finely enamelled. The glazed cupboard doors and their frames should be of metal with rounded angles, the plate-glass shelves supported on metal brackets, and the whole made air-tight. A special radiator should be installed for the heating of blankets.

The sterilizing room should also adjoin the theatre, but it should be situated upon the opposite side. Communication is effected by an up-sliding teak-wood hatch, through which the required materials can be passed. The object of this separation is to prevent the admission of steam from the sterilizers. The sterilizing room will need to be fitted up to suit the necessary services required, with sinks for cleaning rubber gloves, steam sterilizers, glass shelves, and glass-fronted cupboards for storing bandages, sterilized sponges, ligatures, swabs, and the like. The lotion jars in this room may rest on brackets, with tubes leading from them through to the theatre.

The anæsthetic room should open directly out of the central lobby and be in immediate communication with the theatre. There should be little in it excepting a sink and a teak cupboard with sloping top for the materials. A clear side wall is sometimes regarded as essential. Adequate ventilation should be provided, and good lighting by means of windows. The doors leading to the theatre should have glazed spy-holes, flush upon both sides. A cloak room is useful for overalls and storage. A nurses' room may with advantage be included, provided with ample cupboard accommodation. This will be found especially acceptable in such a hospital as that under consideration, where separate storage for surgical stores and appliances is not available elsewhere. A w.c. is sometimes included in this section, but it is very undesirable in such a position, and should be kept entirely separate, and is better situated upon the opposite side of the main adjacent corridor.

It need hardly be said that a really first-class and abundant heating and hot-water supply must be available, and the former should be capable of maintaining the theatre at a temperature of from 75 to 80 deg. Careful proportionate inlet ventilation is also essential. Detailed consideration of these important requirements is hardly possible, however, in the present article.

Radiators of the "Ideal" swing type are desirable in the theatre, while elsewhere they may be bracketed well away from the walls for cleaning access, and have ample inlet ventilation. The "Aircomin" ventilator is both useful and inexpensive, and permits a clear way between the radiator columns for cleaning through the wall, which is not possible with the lowered types.

Provision for mechanical extraction by electrical fans is essential, and while speaking of electricity, a cautery box must be provided in the theatre in the centre of the window space.

The construction and the finish of the whole unit is a matter of the utmost importance. It is generally recommended that the walls be covered with a two-coat hard plaster, brought to a perfectly smooth and even face. When the plaster has matured, the wall surfaces throughout —as well as those of the ceilings—should be enamel painted with the best material. The glare of the white can be obviated by adopting a soft grey colour. There are, however, other wall finishings which are well worth considering as alternatives, such as opaque silica wall linings, which are manufactured in large sheets. From the surgeon's point of view, this material may be said to possess a perfect surface.

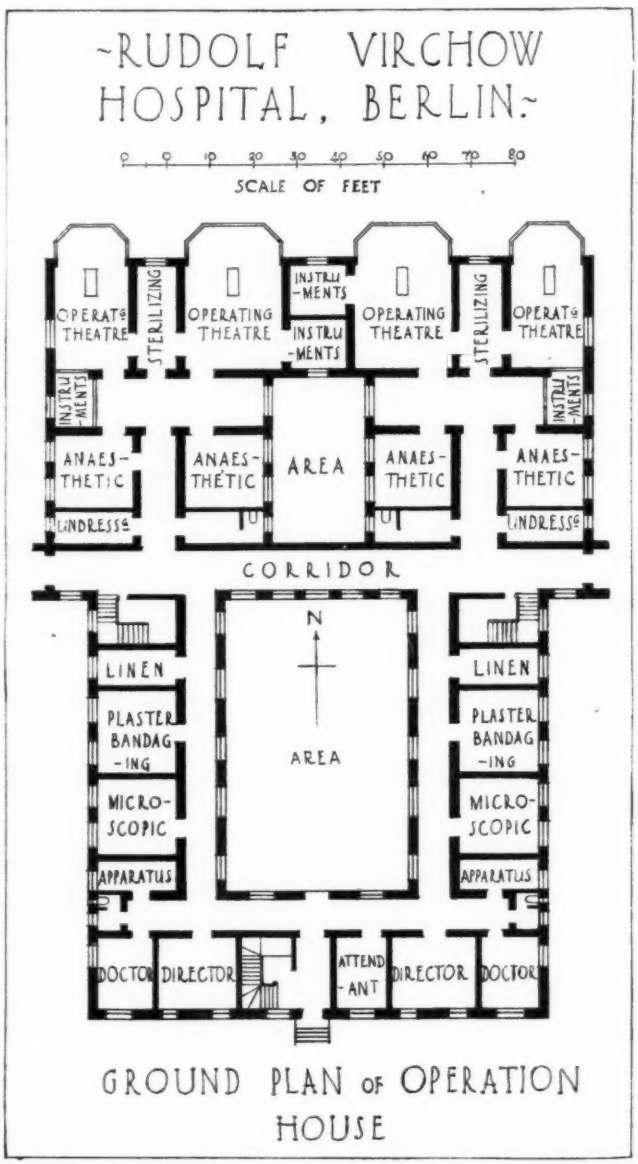
Flush surfaces should be provided for the window frames and as near the inner walls as possible. Rounded internal and external angles, as well as flush doors, are essential. Certain excellent types of solid doors which were obtainable before the war at a reasonable cost are now so expensive that their use can no longer be entertained. There is, however, a most hygienic and reliable flush door—known as the "Knowledge" door—now available, which meets all requirements and does not exceed pre-war cost. The doors should, where so required, have eyelets, with flush glass on either side.

The door fittings should have elbow-turn handles. Fittings, generally, may be of white metal.

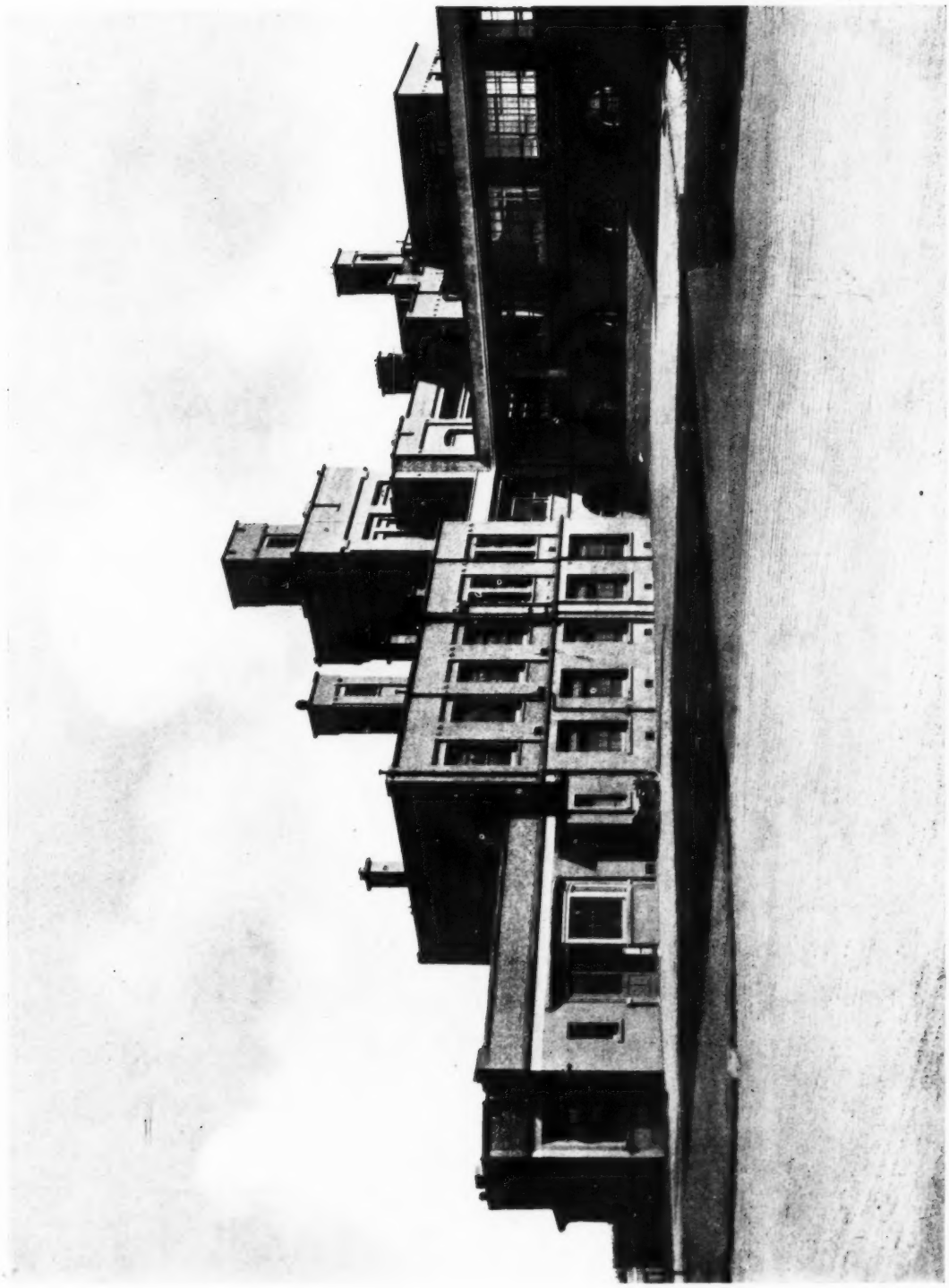
Floors should be impervious and free from cracks; but these qualities are not easily obtained, and hesitation is felt in making any recommendation, even after long experience in the search for a really reliable floor covering. One looks ahead to the employment of sheet rubber which, we believe, has not yet come into general use for theatre floors. Coloured asphalts have been recently produced, but the quality of hardness has to be secured and maintained.

Hospital architecture naturally has its own expression, and if the resulting restrictions are consistently observed and no liberties taken, a pleasing appearance and characteristic appeal will be secured.

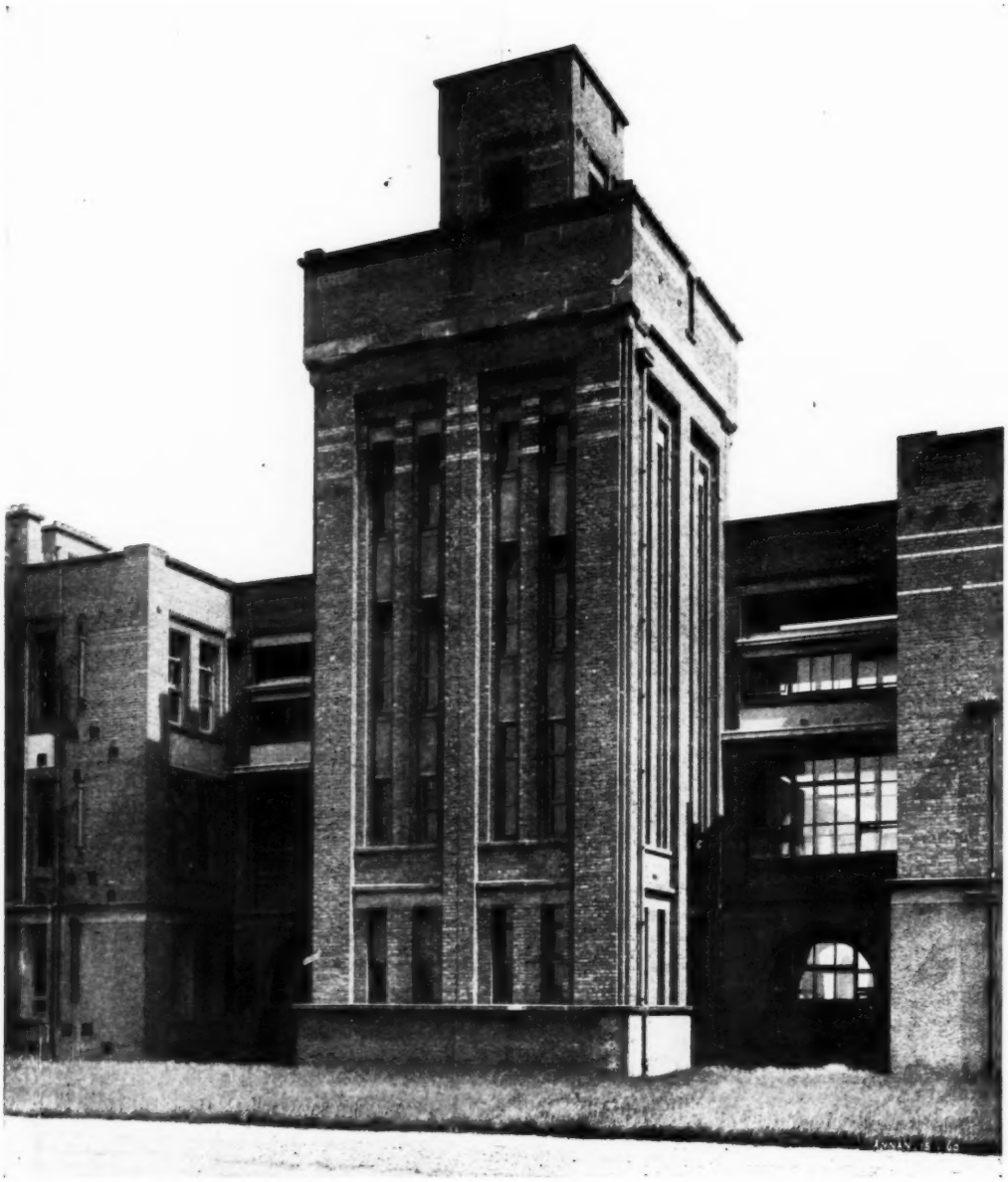
A close inspection of the various plans here reproduced—which include those of one of the larger theatre units of King's College Hospital at Denmark Hill—may give a lead to further development; but with regard to the latter, it must be pointed out that its date is just anterior to the great war, and many changes in the direction of simplification are taking place. It must, however, be remembered that all hospital planning is ephemeral. *Sic transit.*



GROUND PLAN OF OPERATION HOUSE

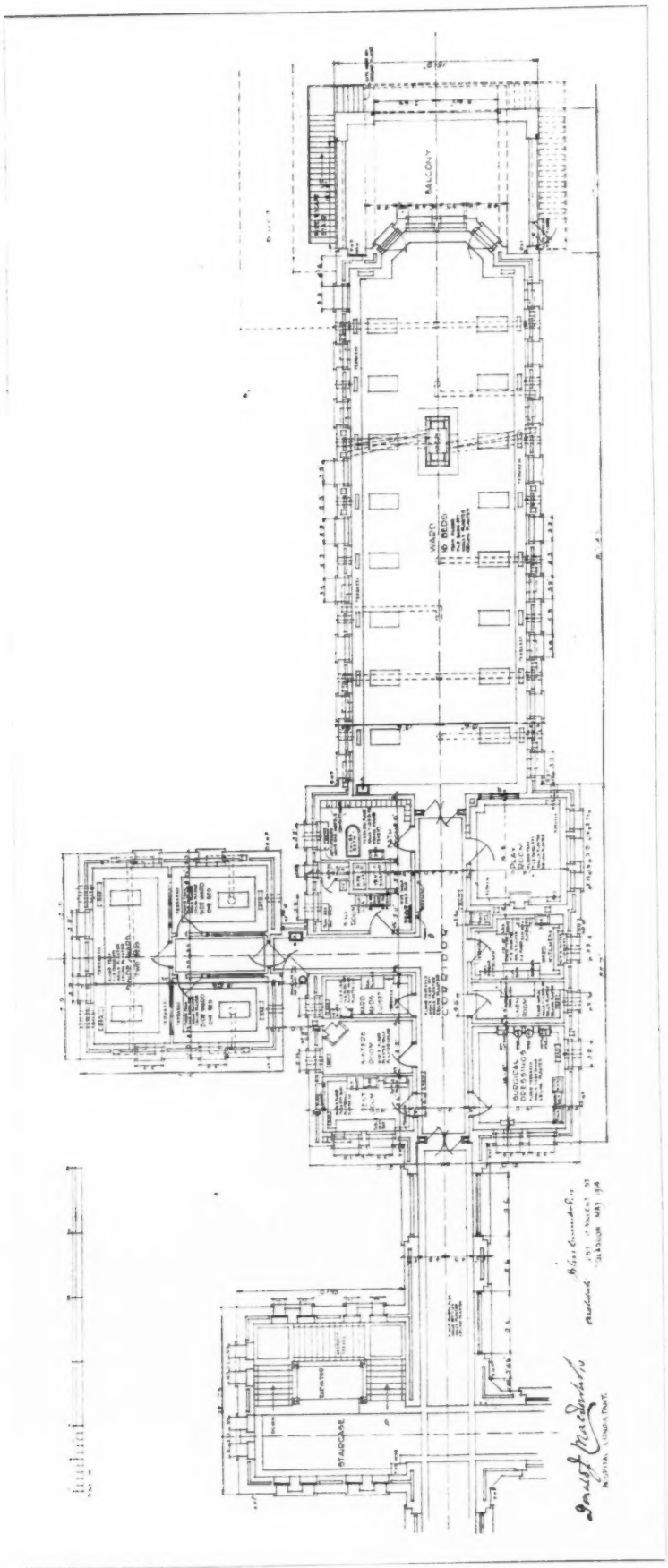


ROYAL HOSPITAL FOR SICK CHILDREN, YORKHILL, GLASGOW: EAST WING—ADMISSION BLOCK.
SIR JOHN BURNET, SON, AND DICK, ARCHITECTS.



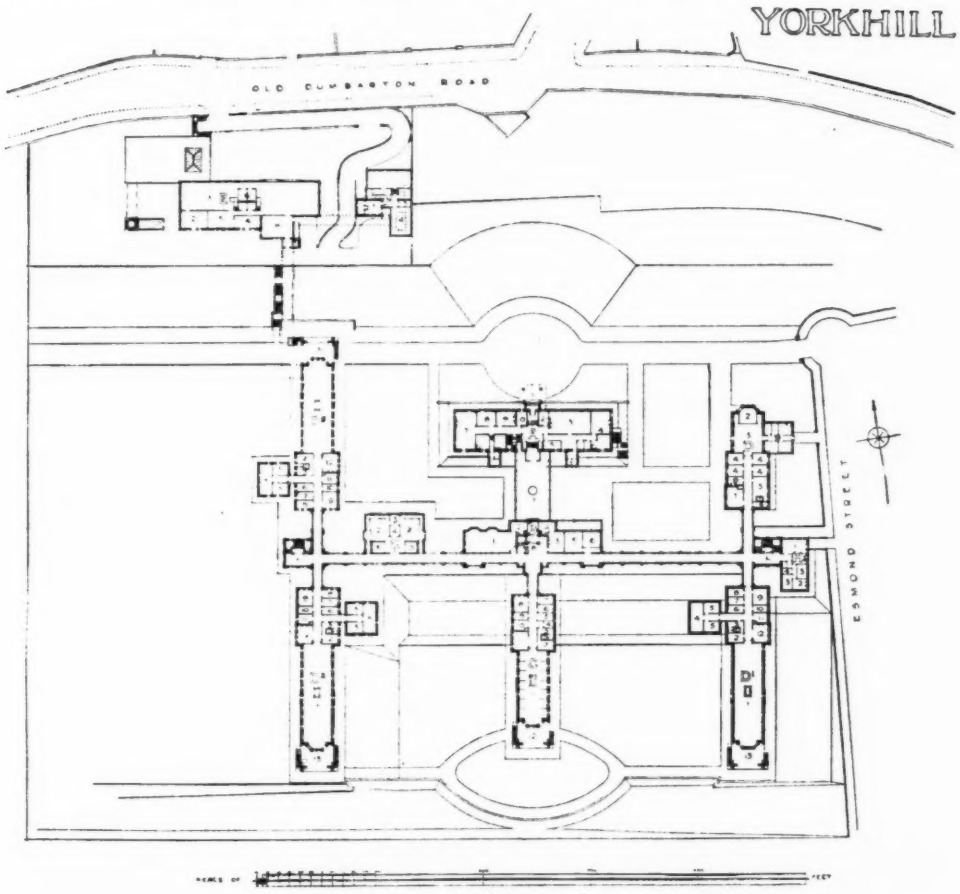
ROYAL HOSPITAL FOR SICK CHILDREN, YORKHILL, GLASGOW: STAIRCASE AND HOIST TOWER.
SIR JOHN BURNET, SON, AND DICK, ARCHITECTS.

ROYAL HOSPITAL FOR SICK CHILDREN, YORKHILL, GLASGOW: WARD BLOCK AND STAIRCASE TOWER.
SIR JOHN BURNET, SON, AND DICK, ARCHITECTS.

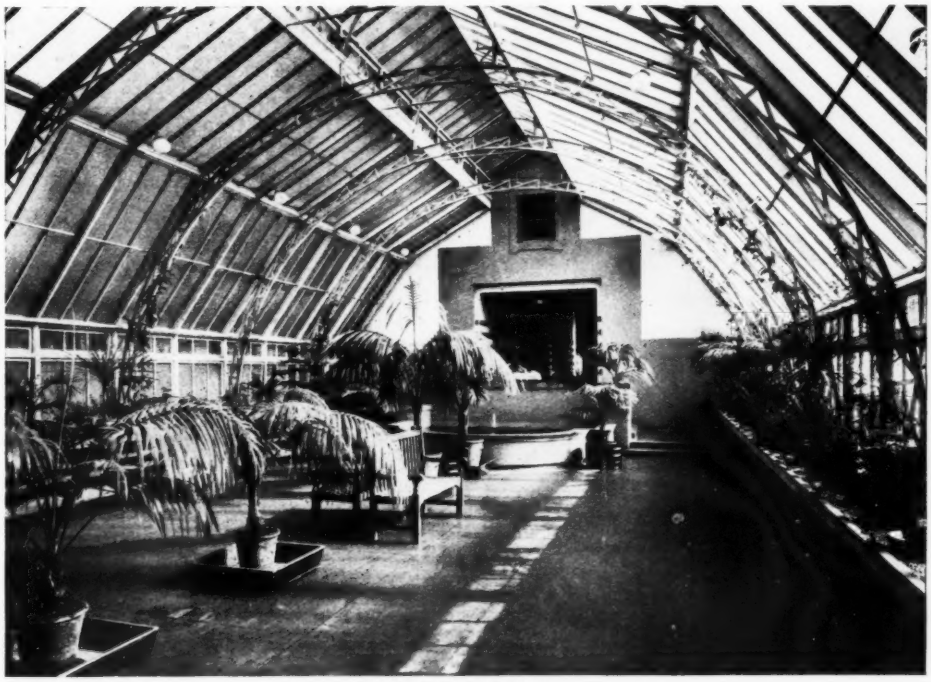


ROYAL HOSPITAL FOR SICK CHILDREN, YORKHILL, GLASGOW. PLAN OF WARD BLOCK.
SIR JOHN BURNET, SON, AND DICK, ARCHITECTS.

ROYAL HOSPITAL FOR SICK CHILDREN

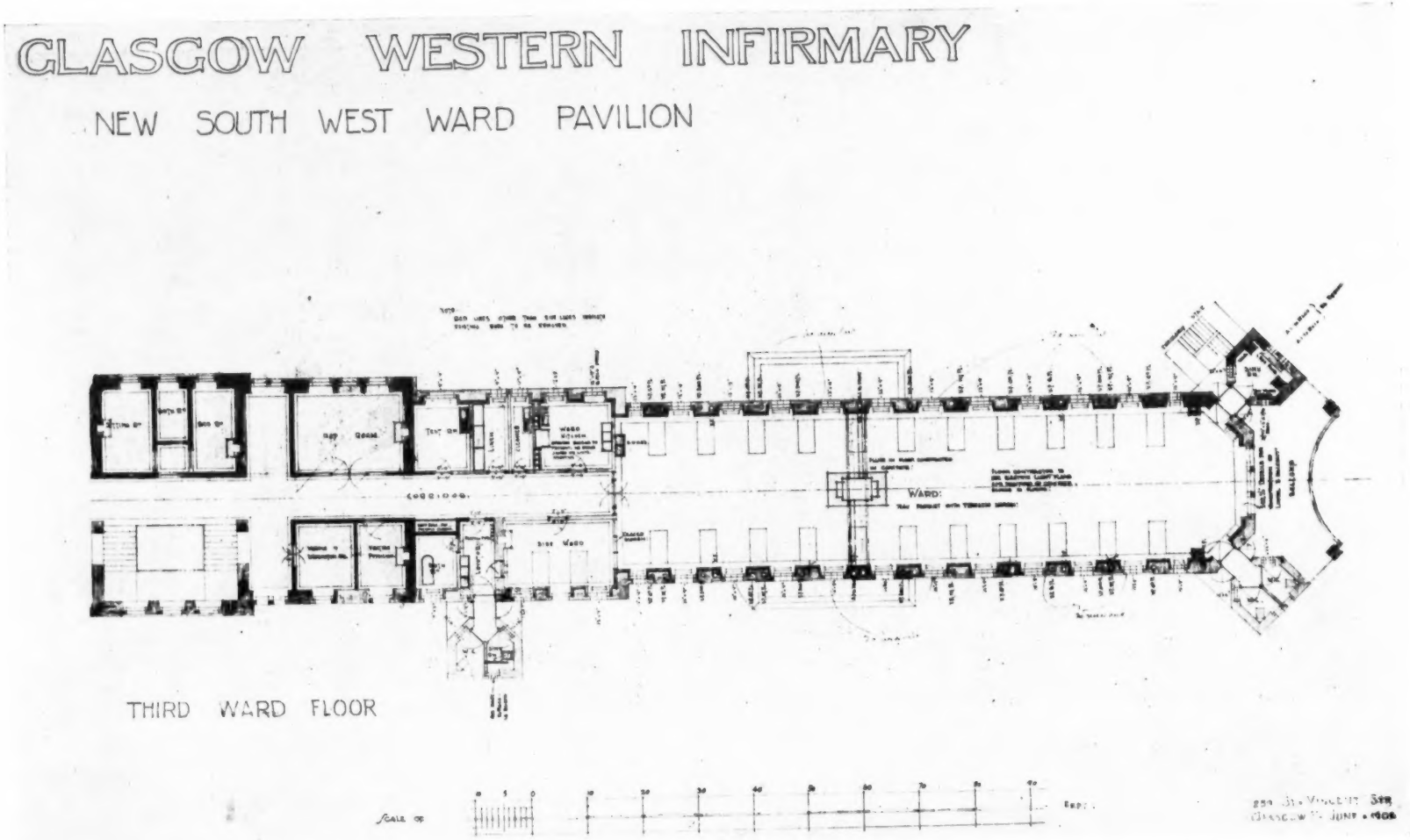


LAY-OUT.

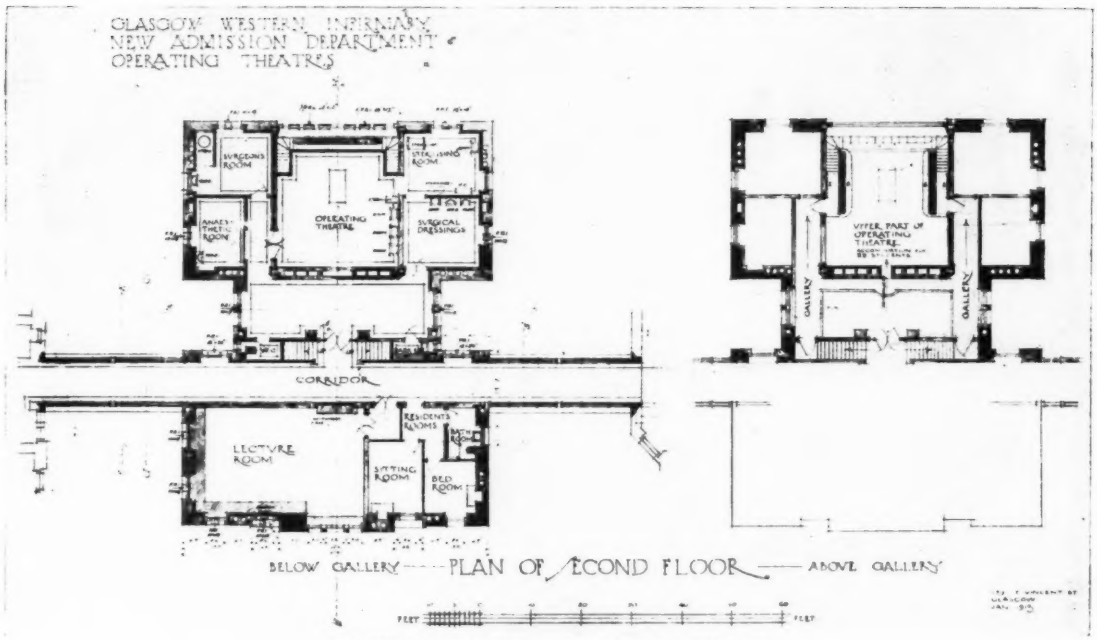


THE CONSERVATORY.

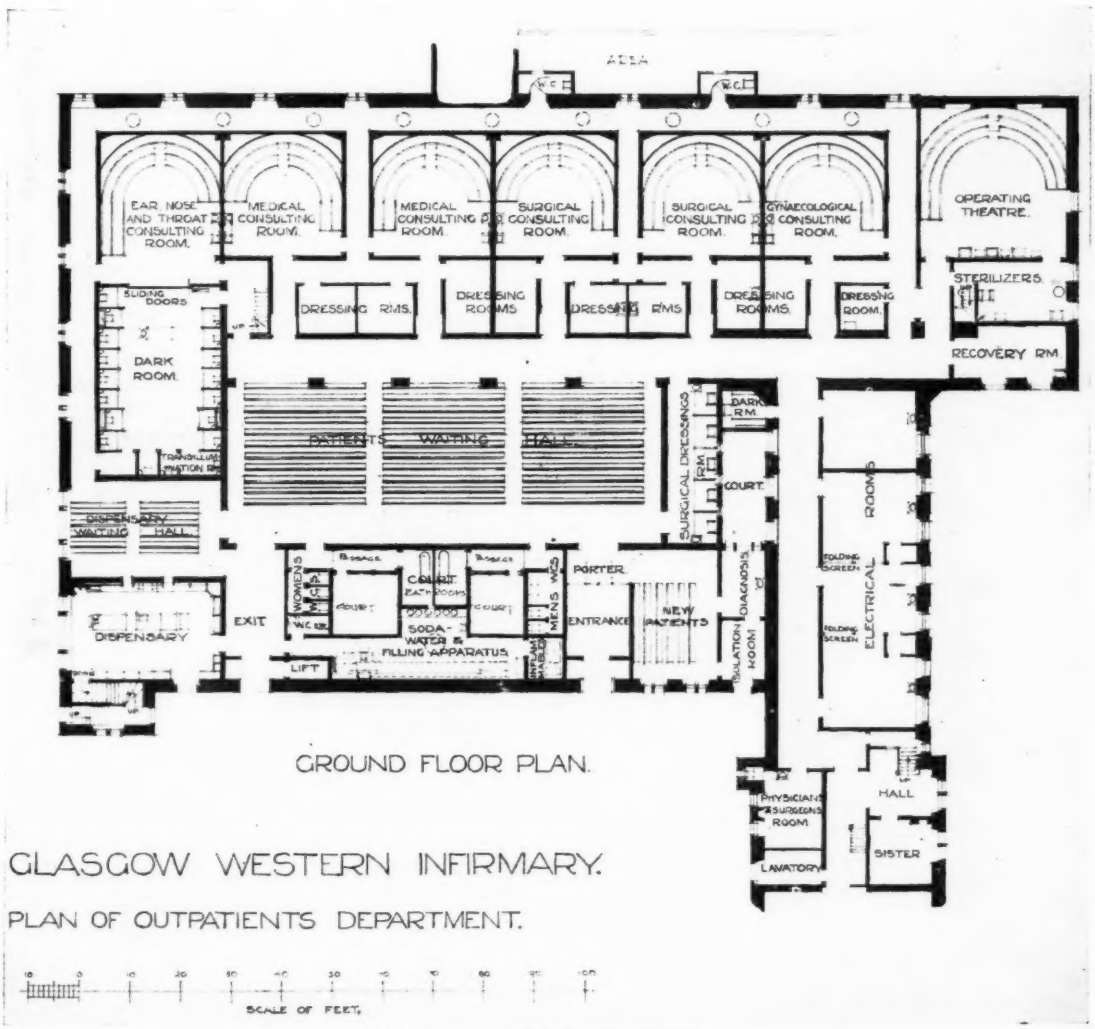
ROYAL HOSPITAL FOR SICK CHILDREN, YORKHILL, GLASGOW.
SIR JOHN BURNET, SON, AND DICK, ARCHITECTS.



GLASGOW WESTERN INFIRMARY: SOUTH-WEST WARD PAVILION. SIR JOHN BURNET, SON, AND DICK, ARCHITECTS.

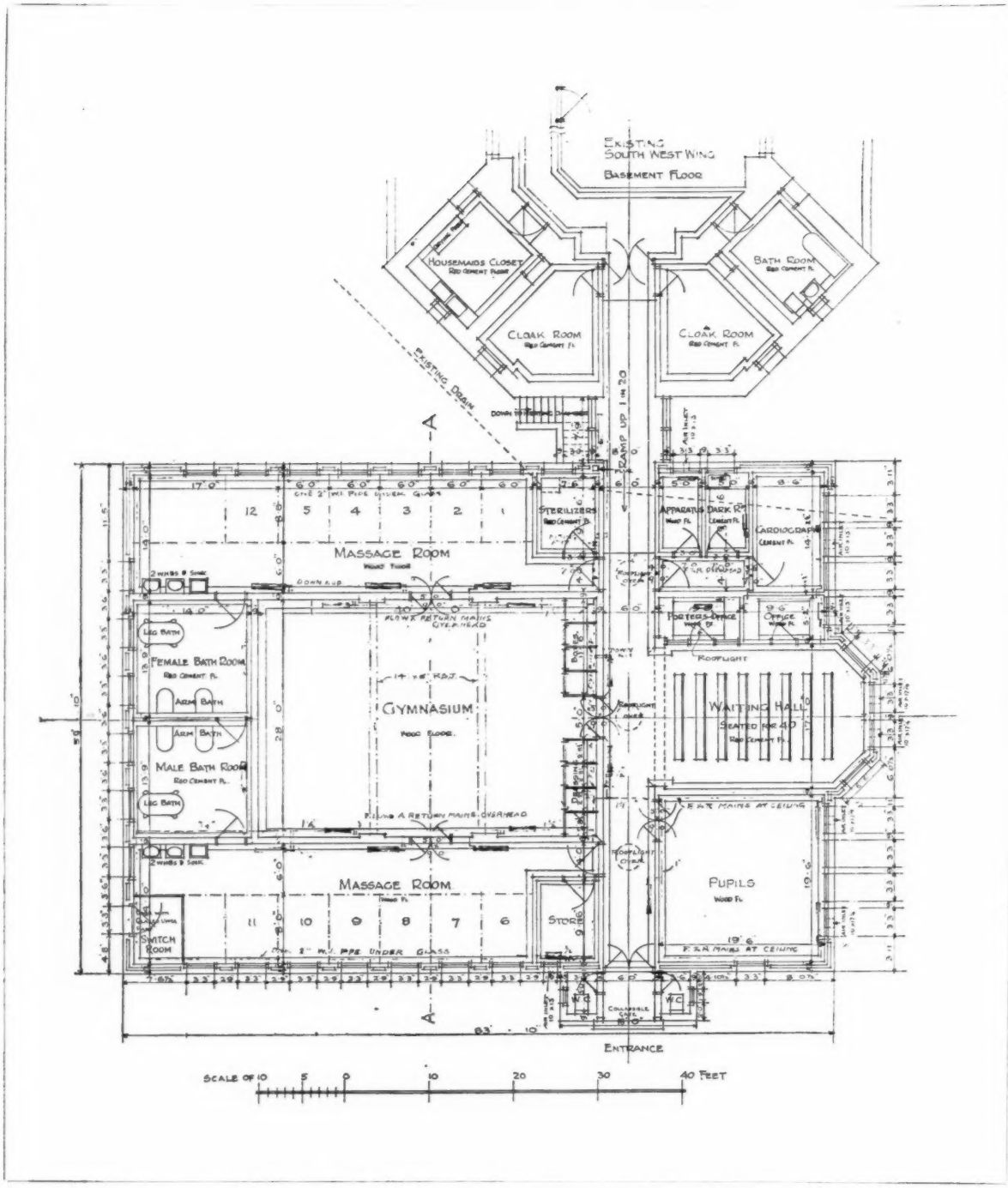


ADMISSION DEPARTMENT. OPERATING THEATRES.

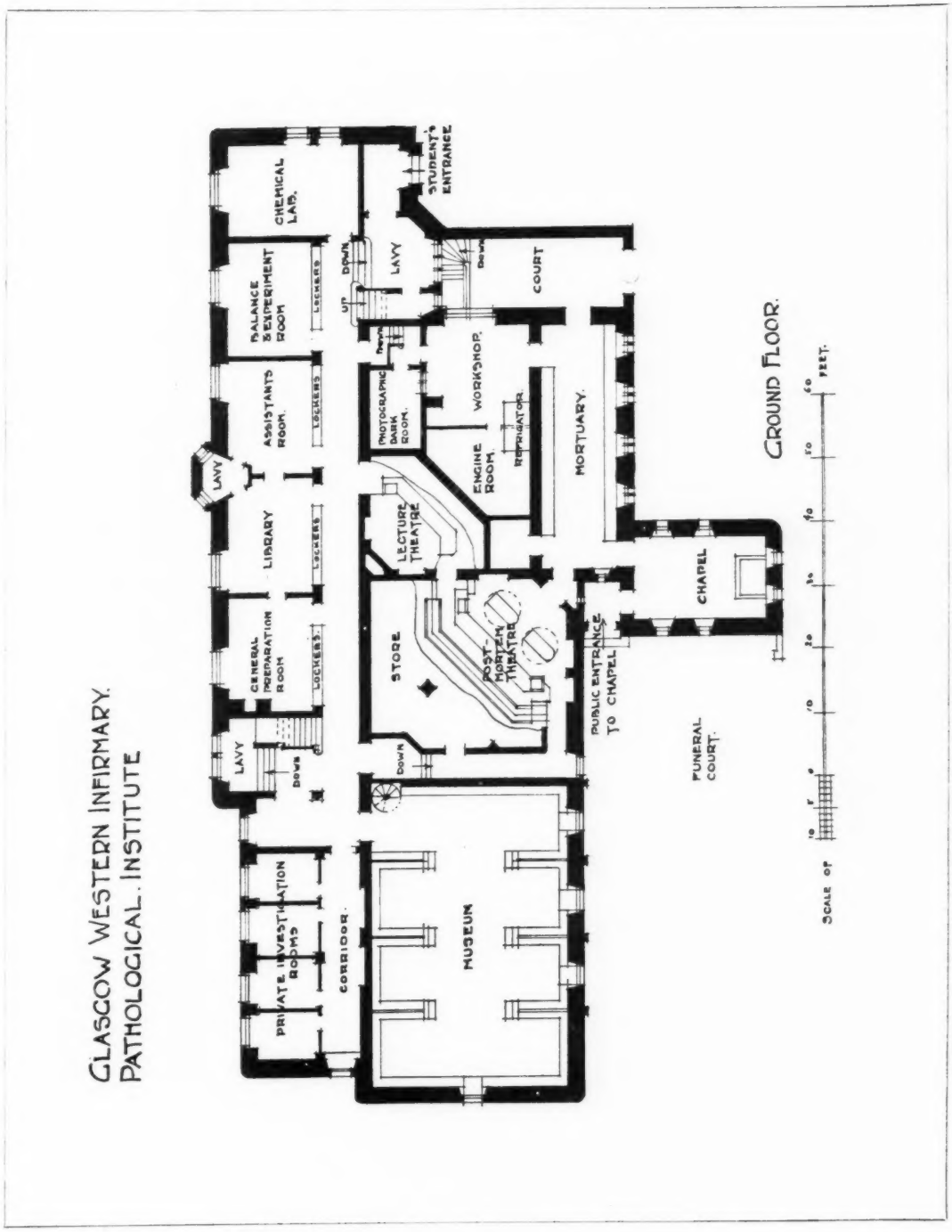


PLAN OF OUT PATIENTS' DEPARTMENT.

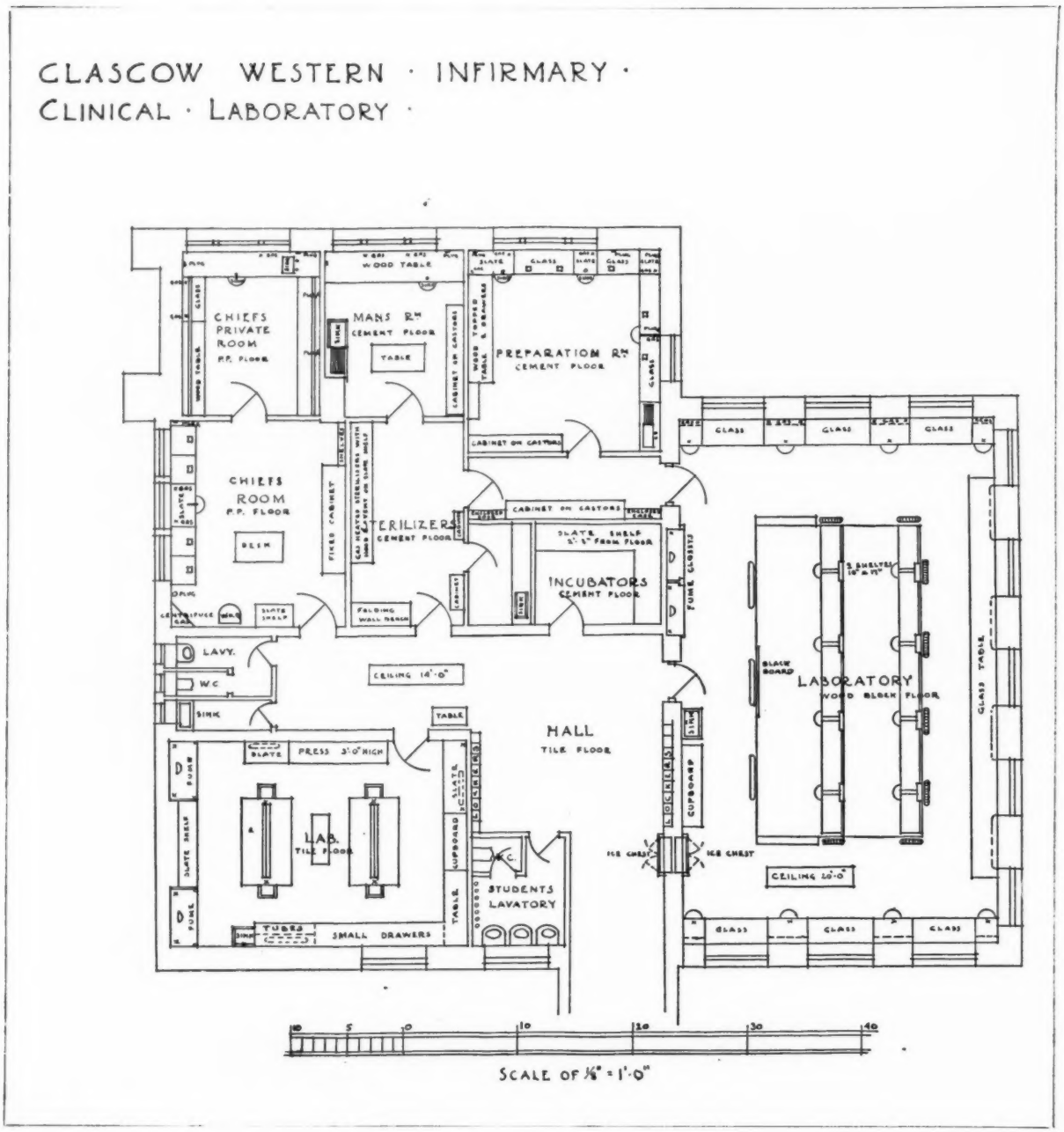
GLASGOW WESTERN INFIRMARY. SIR JOHN BURNET, SON, AND DICK, ARCHITECTS.



GLASGOW WESTERN INFIRMARY: THE MASSAGE BUILDING
SIR JOHN BURNET, SON, AND DICK, ARCHITECTS.

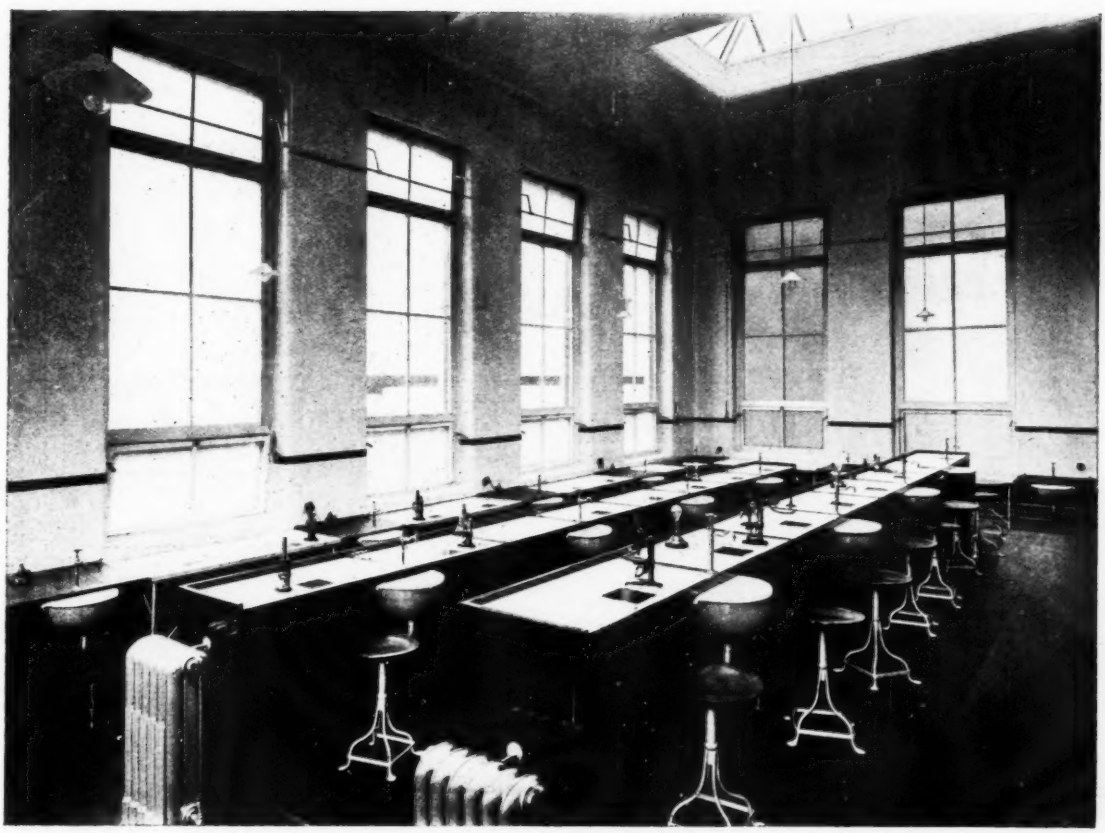


GLASGOW WESTERN INFIRMARY: PATHOLOGICAL INSTITUTE. SIR JOHN BURNET, SON, AND DICK, ARCHITECTS.



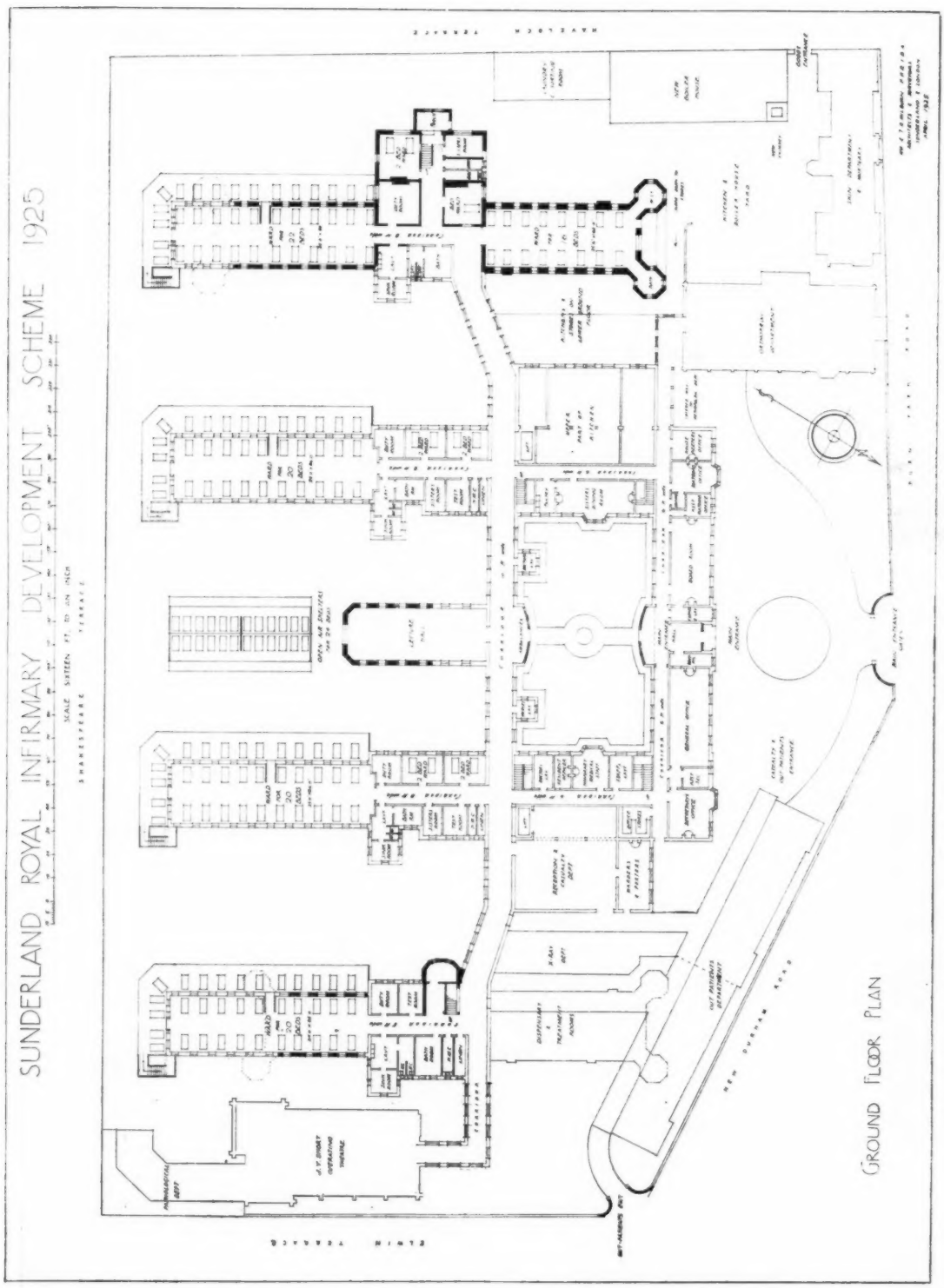
GLASGOW WESTERN INFIRMARY: CLINICAL LABORATORY.
SIR JOHN BURNET, SON, AND DICK, ARCHITECTS.

A WARD.

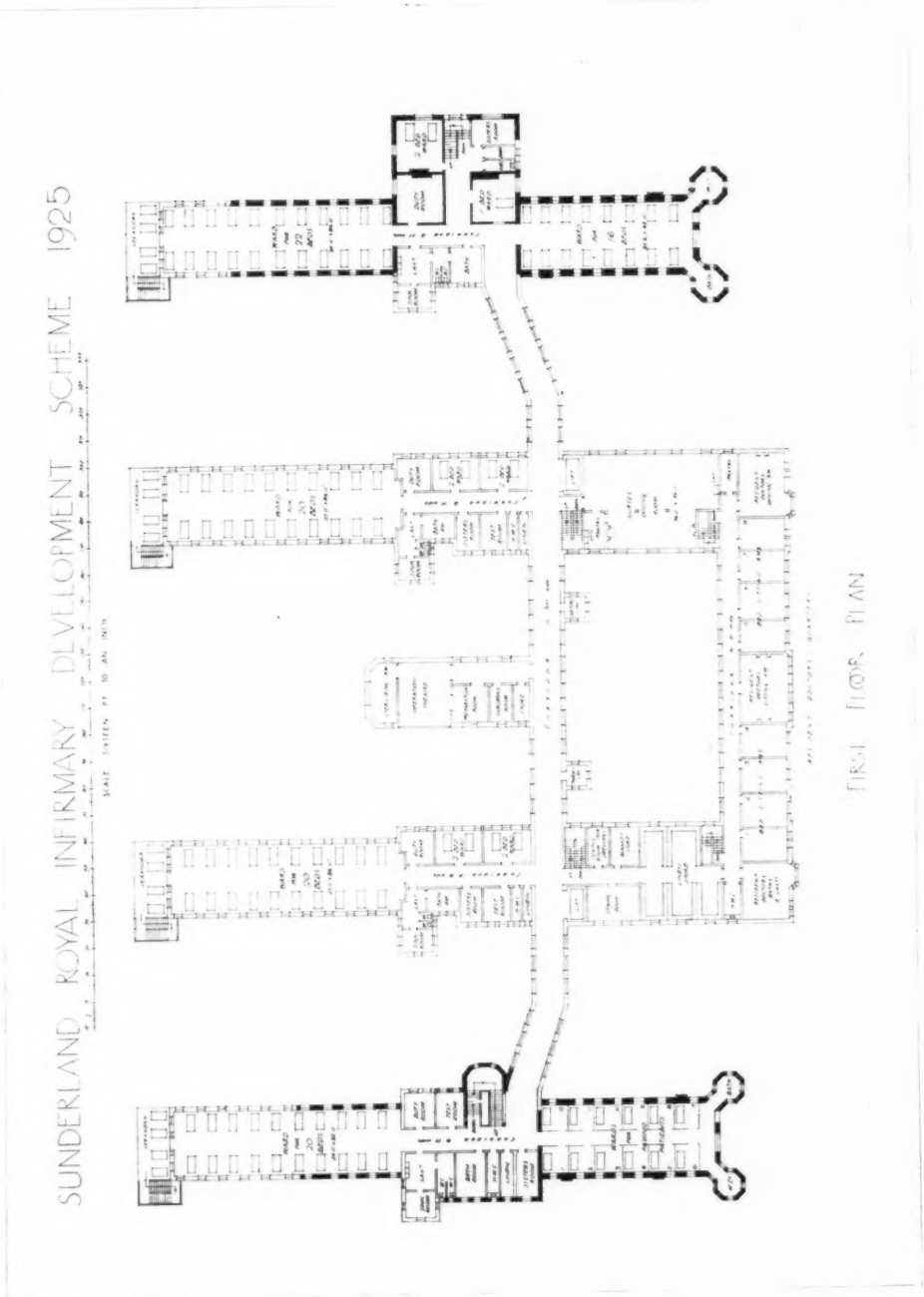


THE CLINICAL LABORATORY

GLASGOW WESTERN INFIRMARY. SIR JOHN BURNET, SON, AND DICK, ARCHITECTS.



SUNDERLAND ROYAL INFIRMARY DEVELOPMENT SCHEME. W. AND T. R. MILBURN, FF.R.I.B.A., ARCHITECTS.



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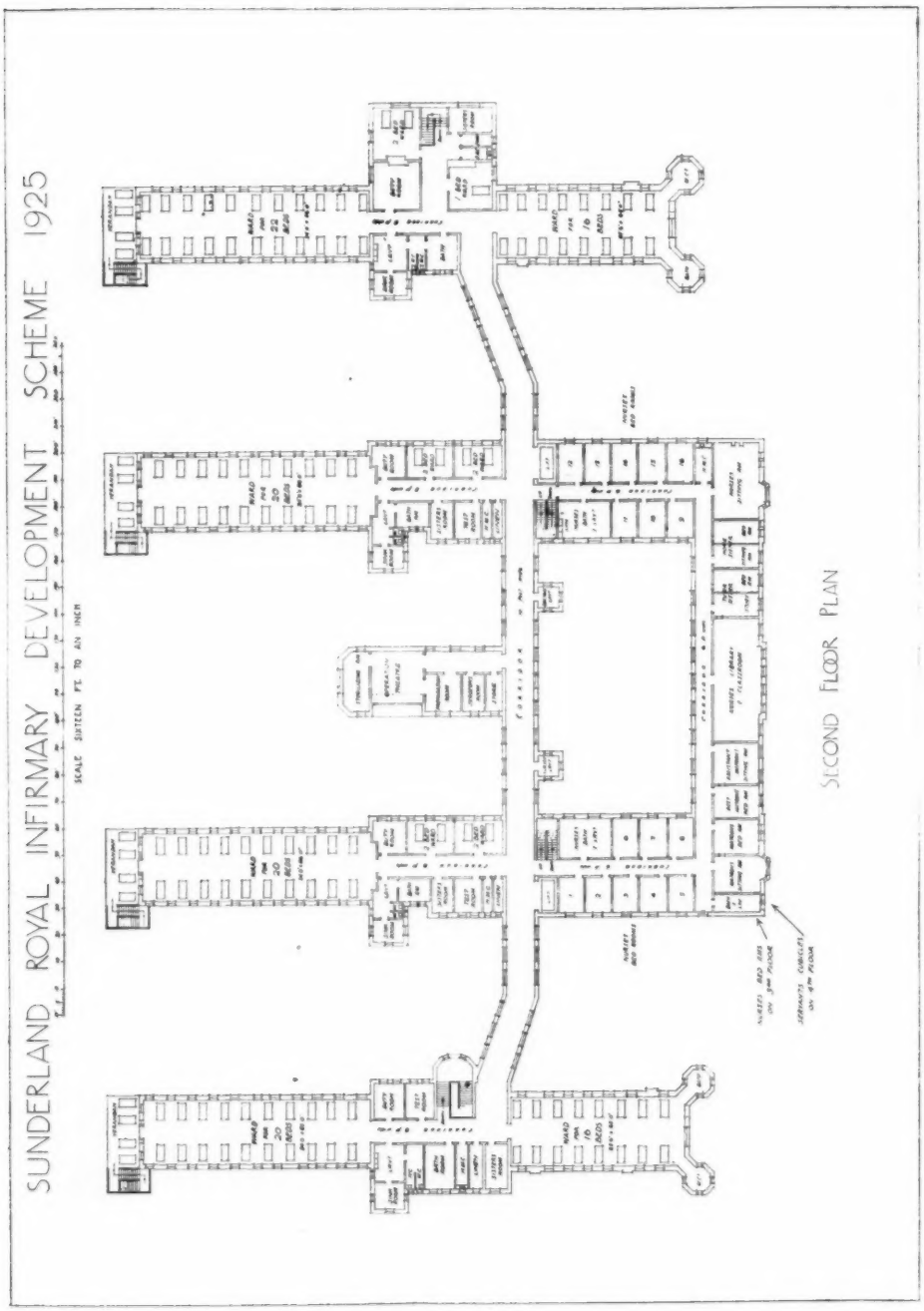

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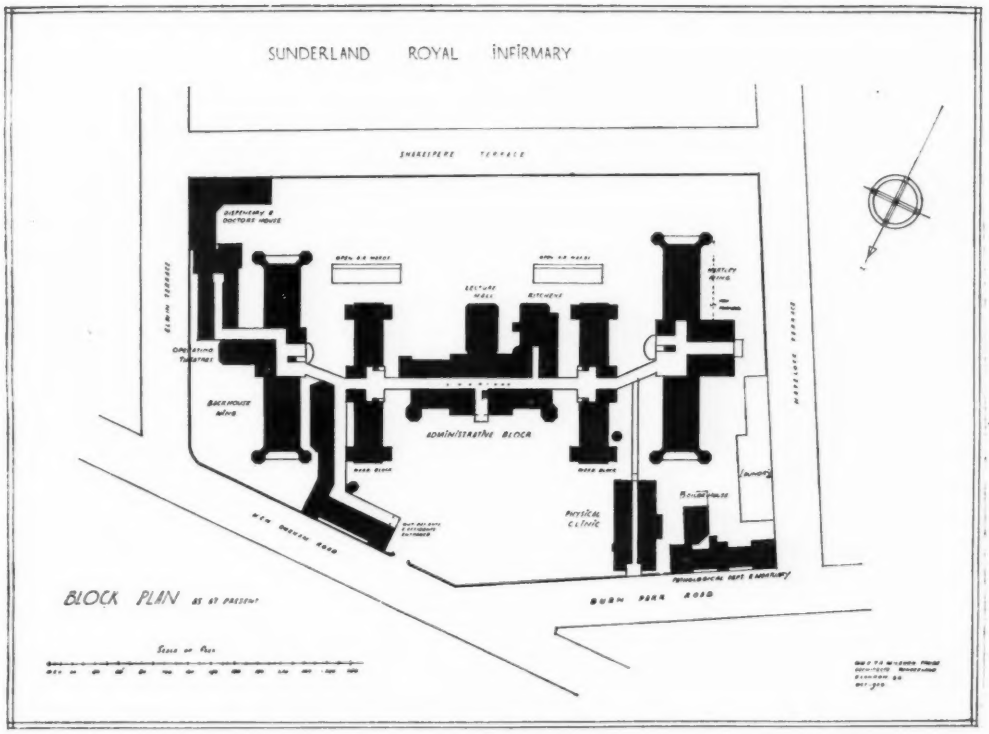
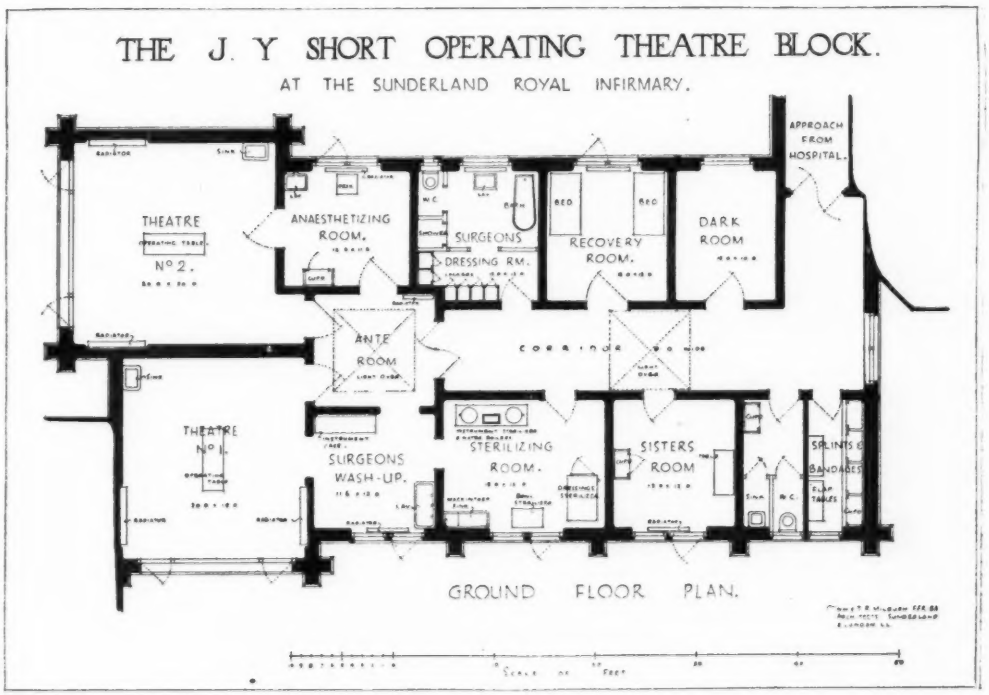
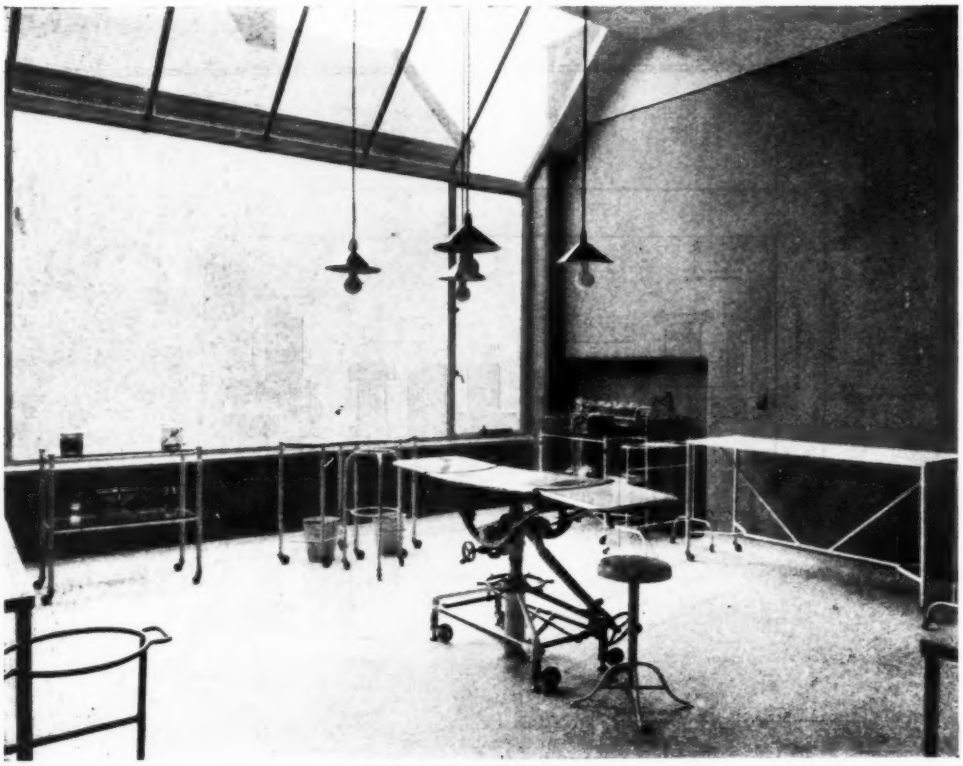


BLOCK PLAN.

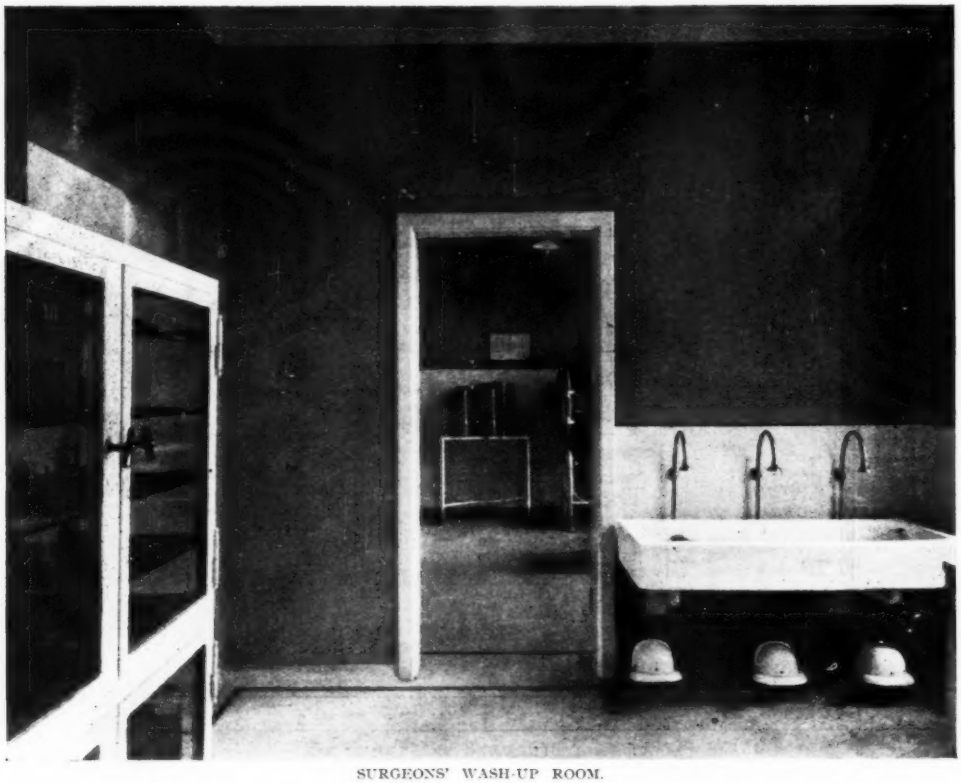


PLAN OF OPERATING THEATRE BLOCK.

SUNDERLAND ROYAL INFIRMARY. W. AND T R. MILBURN, FF.R.I.B.A., ARCHITECTS.

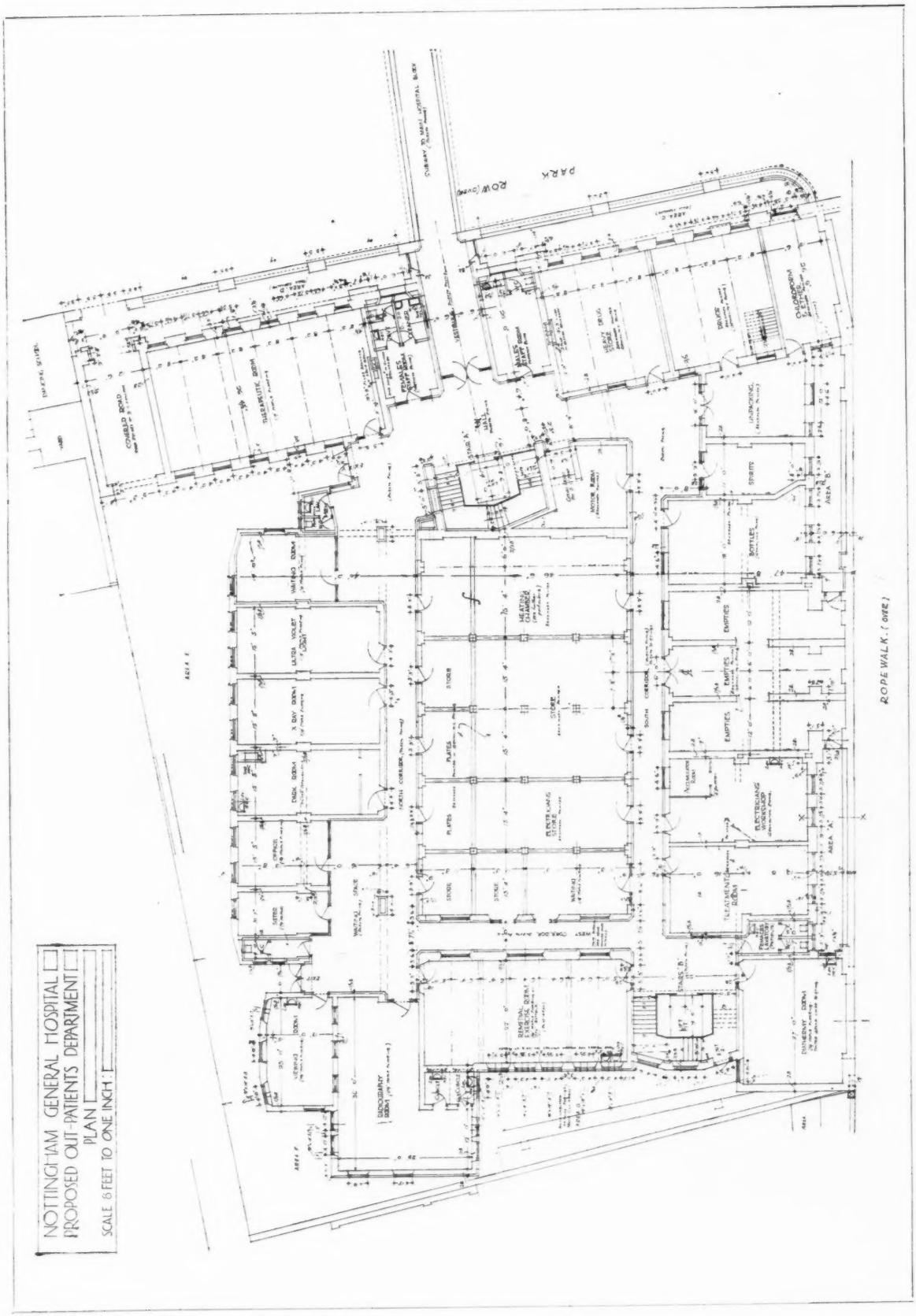


OPERATING THEATRE No. 1.



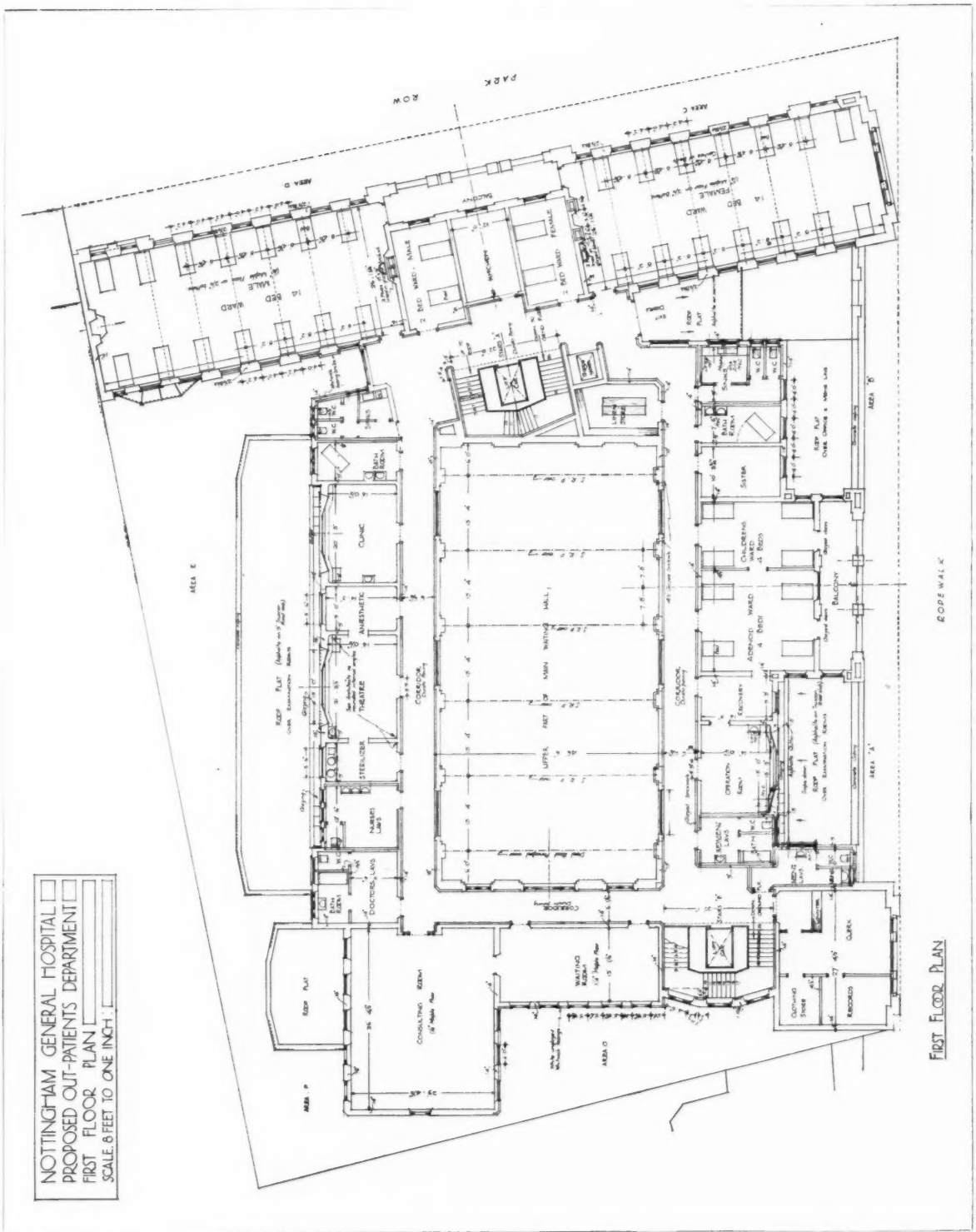
SURGEONS' WASH-UP ROOM.

SUNDERLAND ROYAL INFIRMARY: THE J. Y. SHORT OPERATING THEATRE.
W. AND T. R. MILBURN, FF.R.I.B.A., ARCHITECTS.



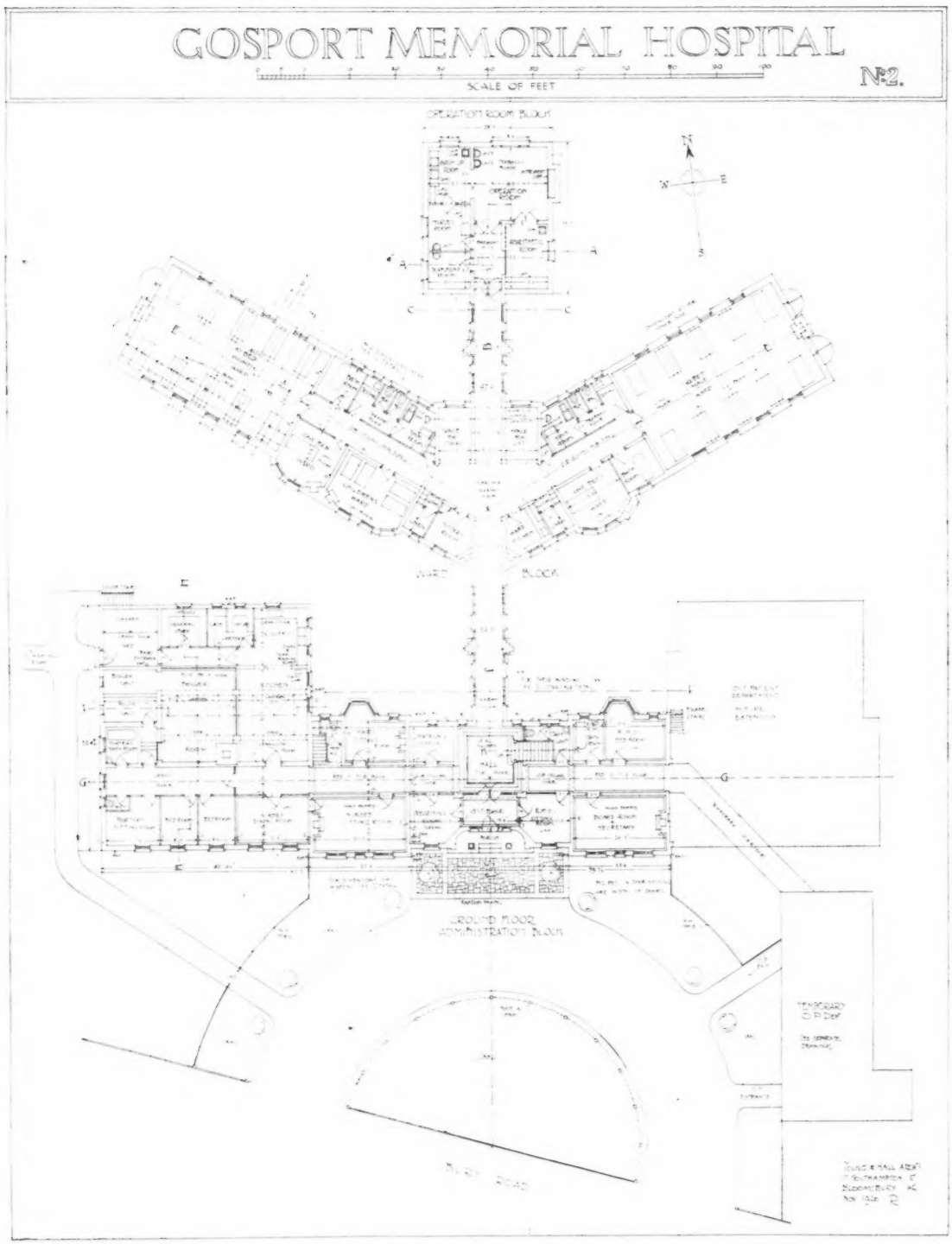
NOTTINGHAM GENERAL HOSPITAL: BASEMENT PLAN EVANS, CLARK, AND WOOLLATT, ARCHITECTS.

NOTTINGHAM GENERAL HOSPITAL.: GROUND FLOOR PLAN EVANS, CLARK, AND WOOLLATT, ARCHITECTS

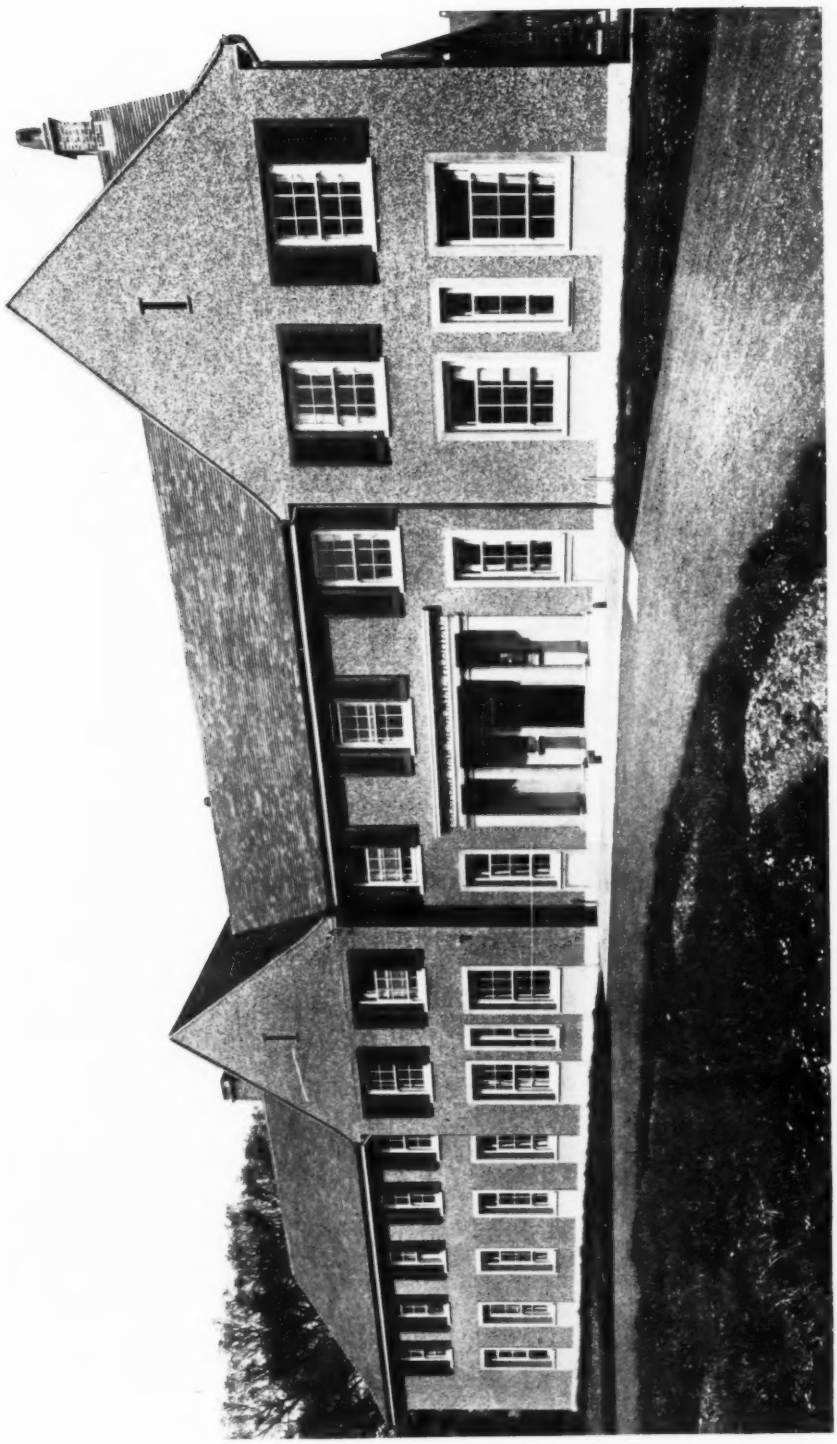


First Floor Plan

NOTTINGHAM GENERAL HOSPITAL EVANS, CLARK, AND WOOLLATT, ARCHITECTS.



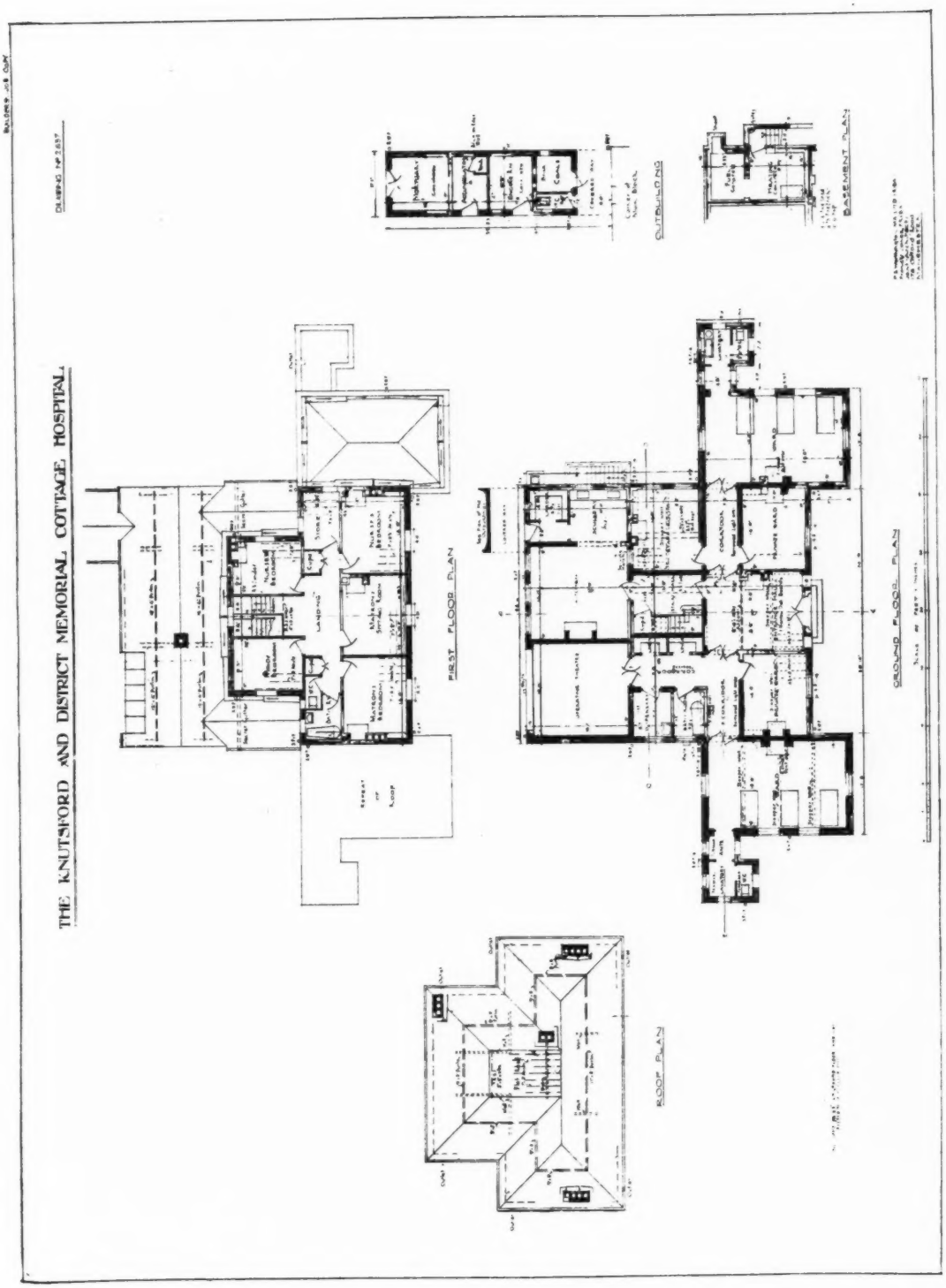
GOSPORT MEMORIAL HOSPITAL. YOUNG AND HALL, FF.R.I.B.A., ARCHITECTS.



GOSPORT MEMORIAL HOSPITAL. YOUNG AND HALL, F.F.R.I.B.A., ARCHITECTS.

THE KNUTSFORD AND DISTRICT MEMORIAL COTTAGE HOSPITAL.

P. S. WORTHINGTON, M.A. LITT.D., F.R.I.B.A., AND FRANCIS JONES, F.R.I.B.A., JOINT ARCHITECTS.



THE KNUTSFORD AND DISTRICT MEMORIAL COTTAGE HOSPITAL.

P. S. WORTHINGTON, M.A., LITT.D., F.R.I.B.A., AND FRANCIS JONES, F.R.I.B.A., JOINT ARCHITECTS.

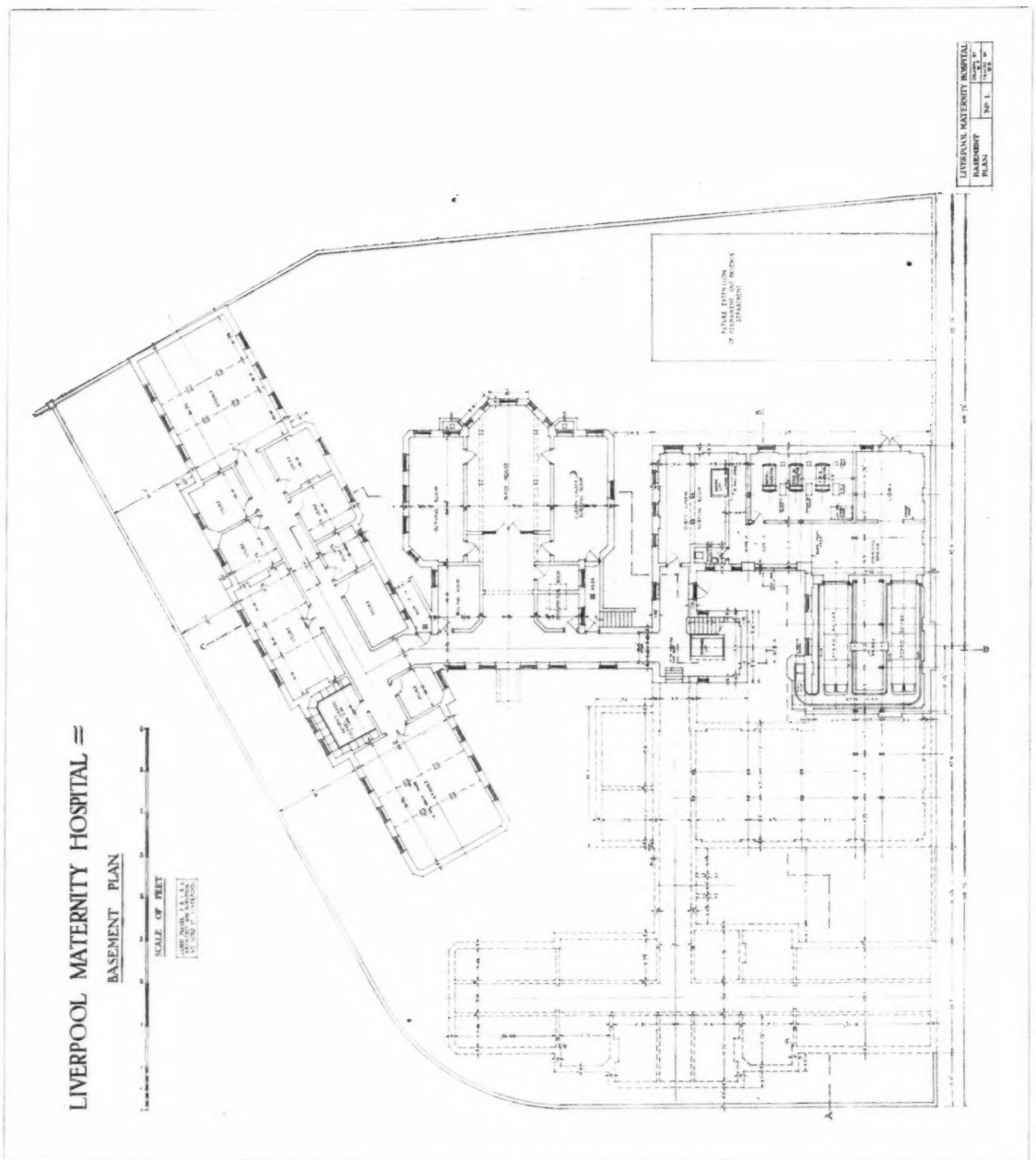
THE OPERATING THEATRE.

A WARD.

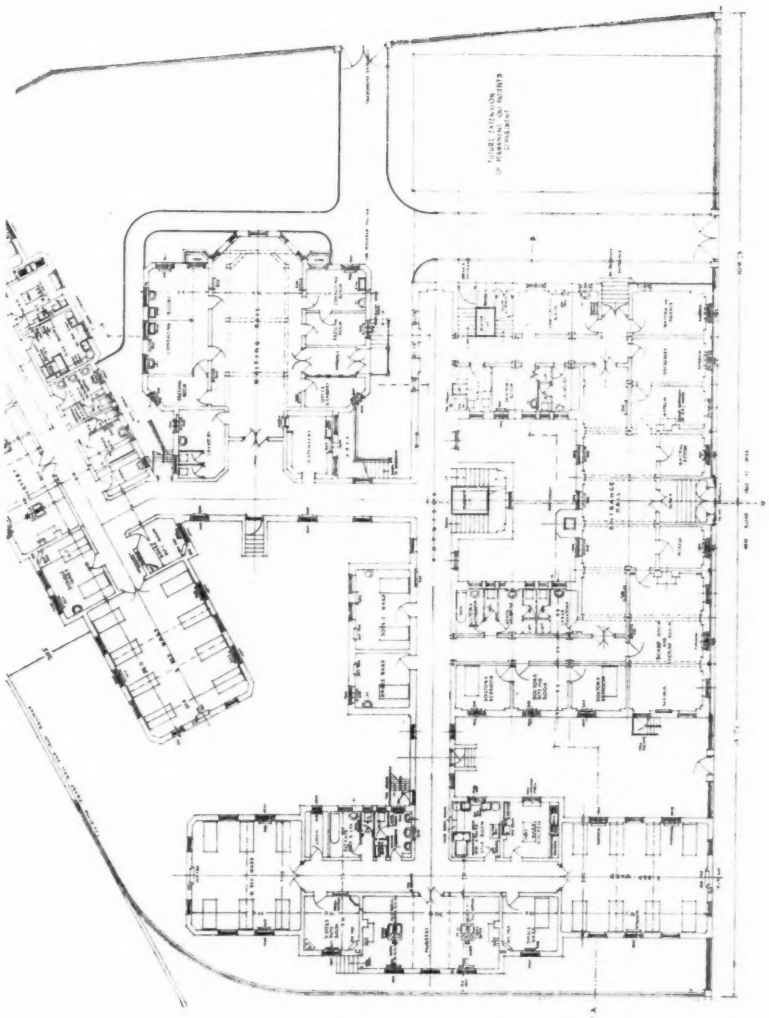
THE KNUTSFORD AND DISTRICT MEMORIAL COTTAGE HOSPITAL.

P. S. WORTHINGTON, M.A., LITT.D., F.R.I.B.A., AND FRANCIS JONES, F.R.I.B.A., JOINT ARCHITECTS.

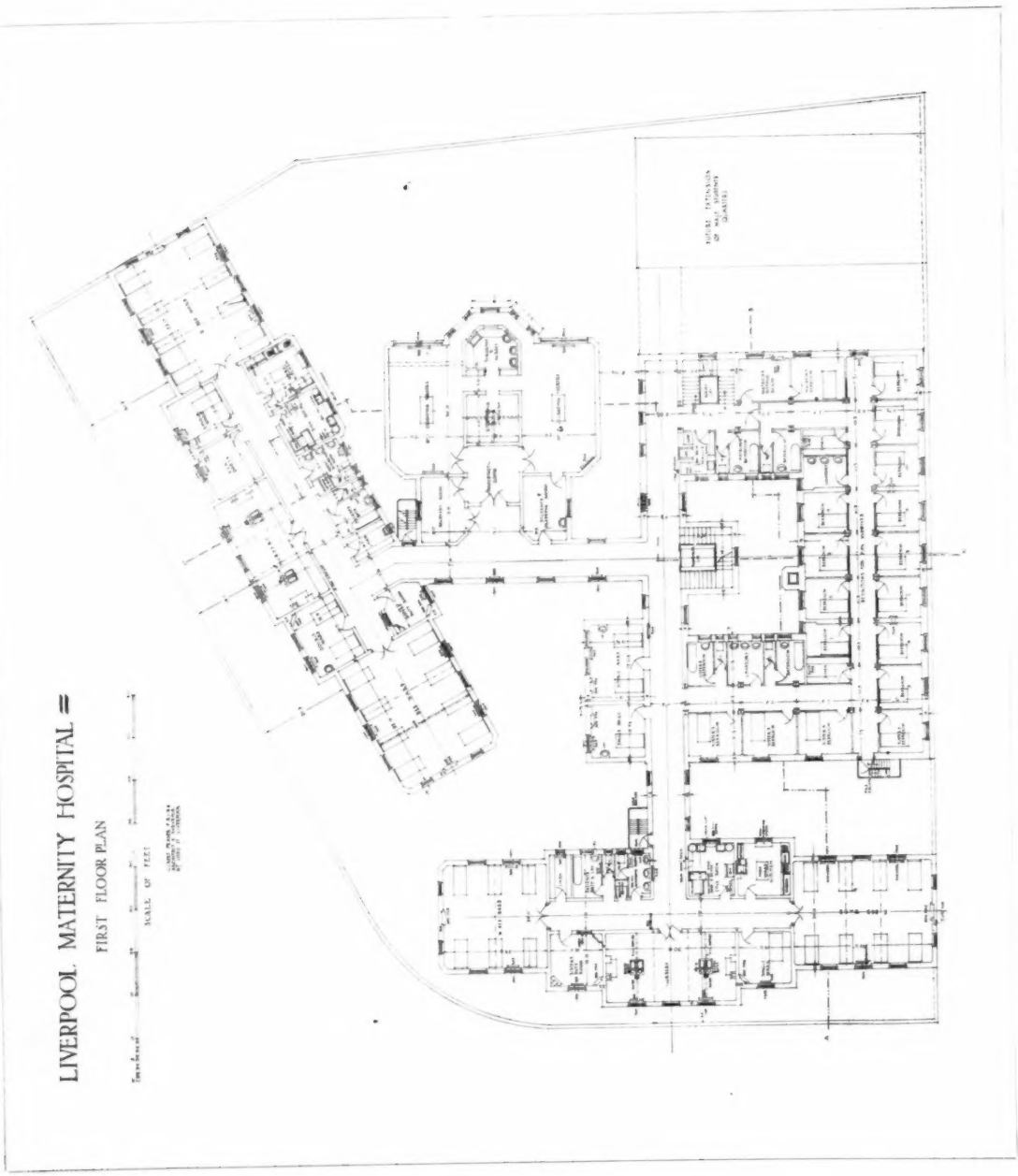
THE KNUTSFORD AND DISTRICT MEMORIAL COTTAGE HOSPITAL: THE ENTRANCE HALL.
P. S. WORTHINGTON, M.A., LITT.D. F.R.I.B.A., AND FRANCIS JONES, F.R.I.B.A., JOINT ARCHITECTS.



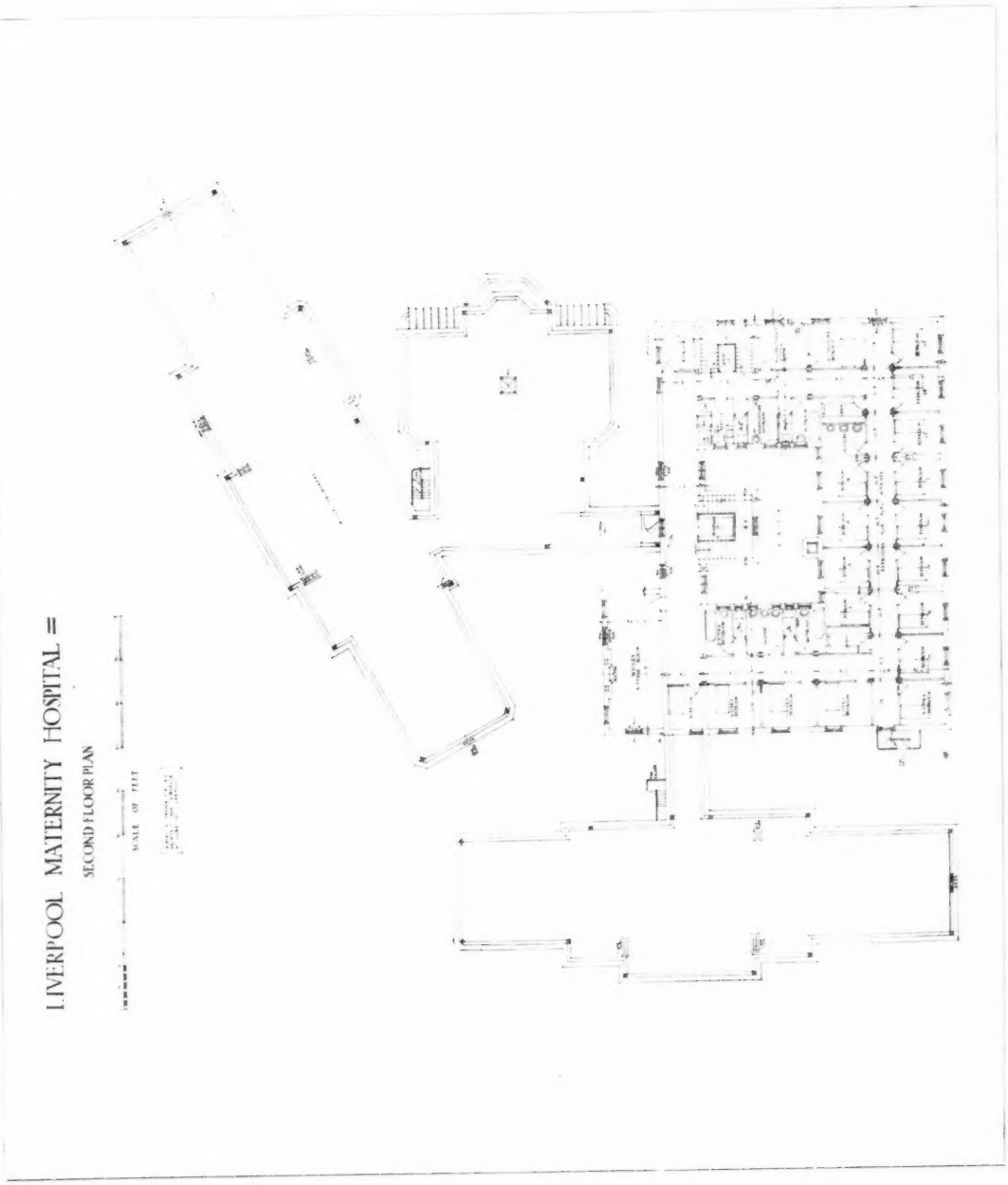
LIVERPOOL MATERNITY HOSPITAL: BASEMENT PLAN GILBERT FRASER, M.C., F.R.I.B.A., ARCHITECT.



LIVERPOOL MATERNITY HOSPITAL: GROUND FLOOR PLAN GILBERT FRASER, M.C., F.R.I.B.A., ARCHITECT.



LIVERPOOL MATERNITY HOSPITAL.: FIRST FLOOR PLAN. GILBERT FRASER, M.C., F.R.I.B.A., ARCHITECT.

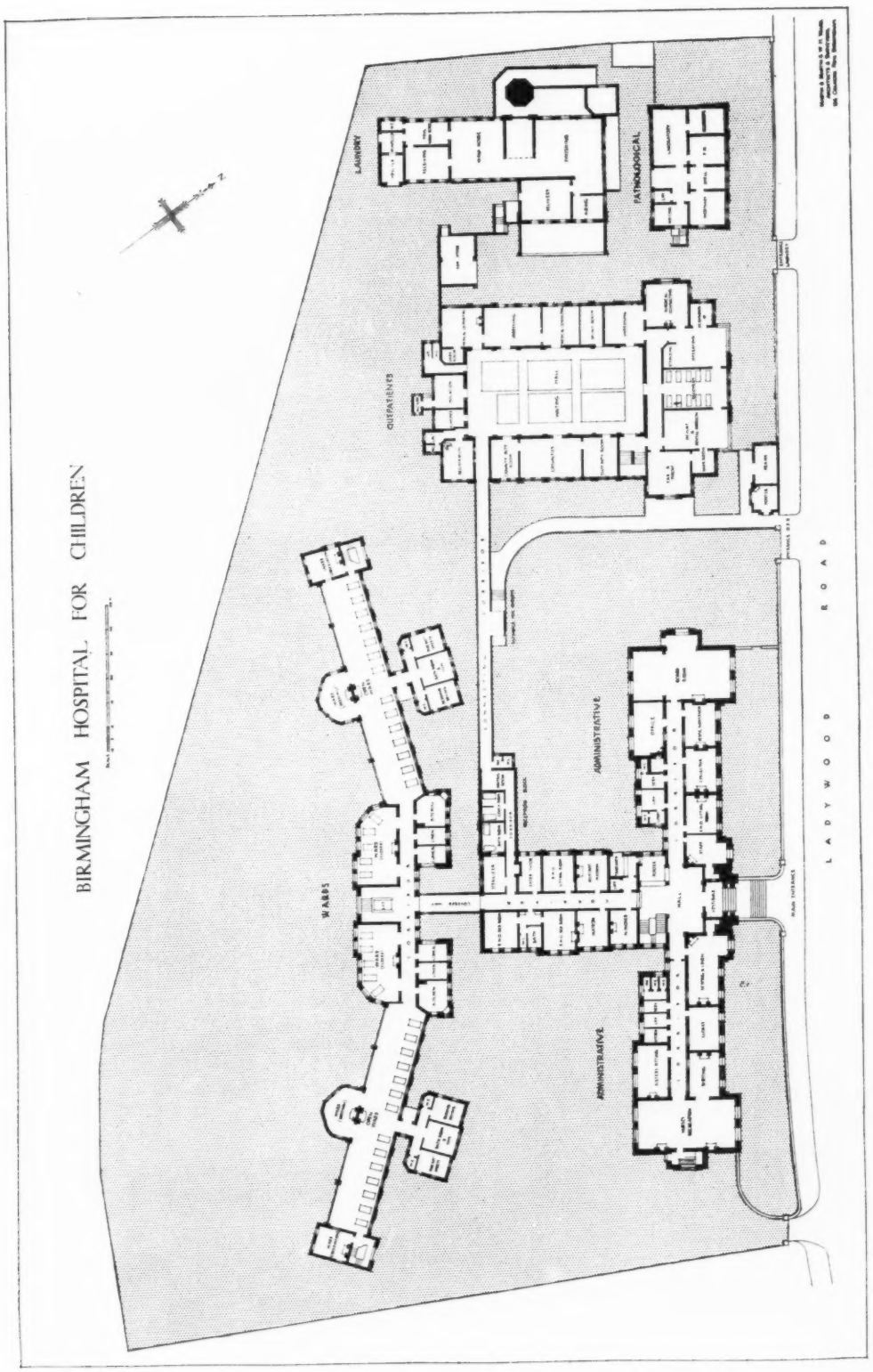


LIVERPOOL MATERNITY HOSPITAL: SECOND FLOOR PLAN. GILBERT FRASER, M.C., F.R.I.B.A., ARCHITECT.

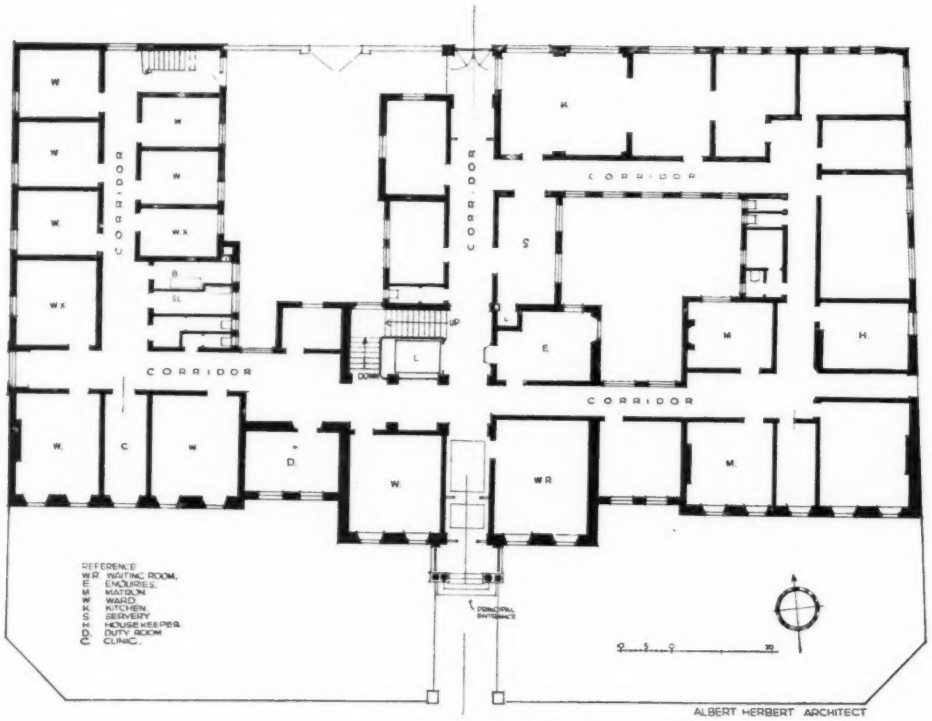
VIEW FROM LADYWOOD ROAD.

EXTERIOR VIEW OF THE WARD BLOCK.

KING EDWARD VII MEMORIAL HOSPITAL FOR CHILDREN, BIRMINGHAM
MARTIN AND MARTIN AND W. H. WARD, ARCHITECTS.



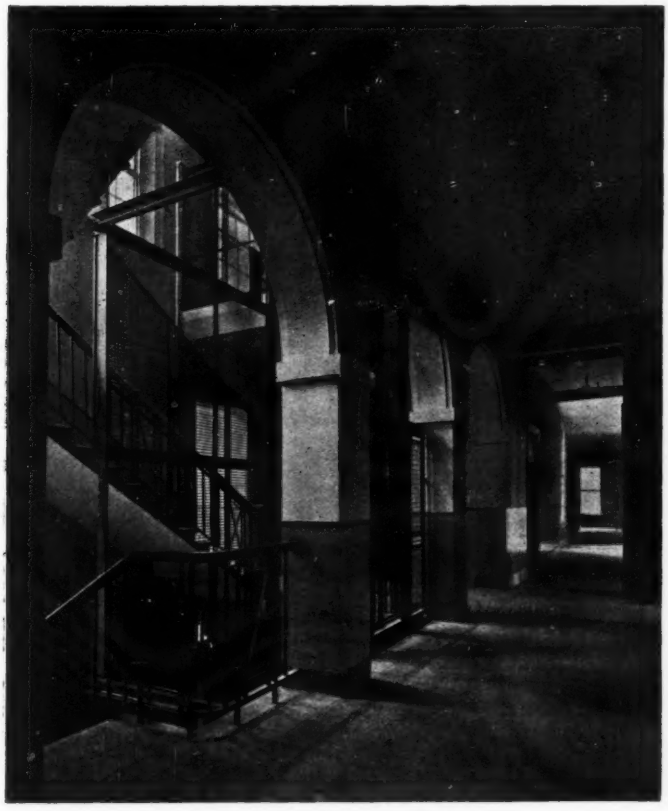
KING EDWARD VII MEMORIAL HOSPITAL FOR CHILDREN, BIRMINGHAM.
MARTIN AND MARTIN AND W. H. WARD, ARCHITECTS.



GROUND FLOOR PLAN.

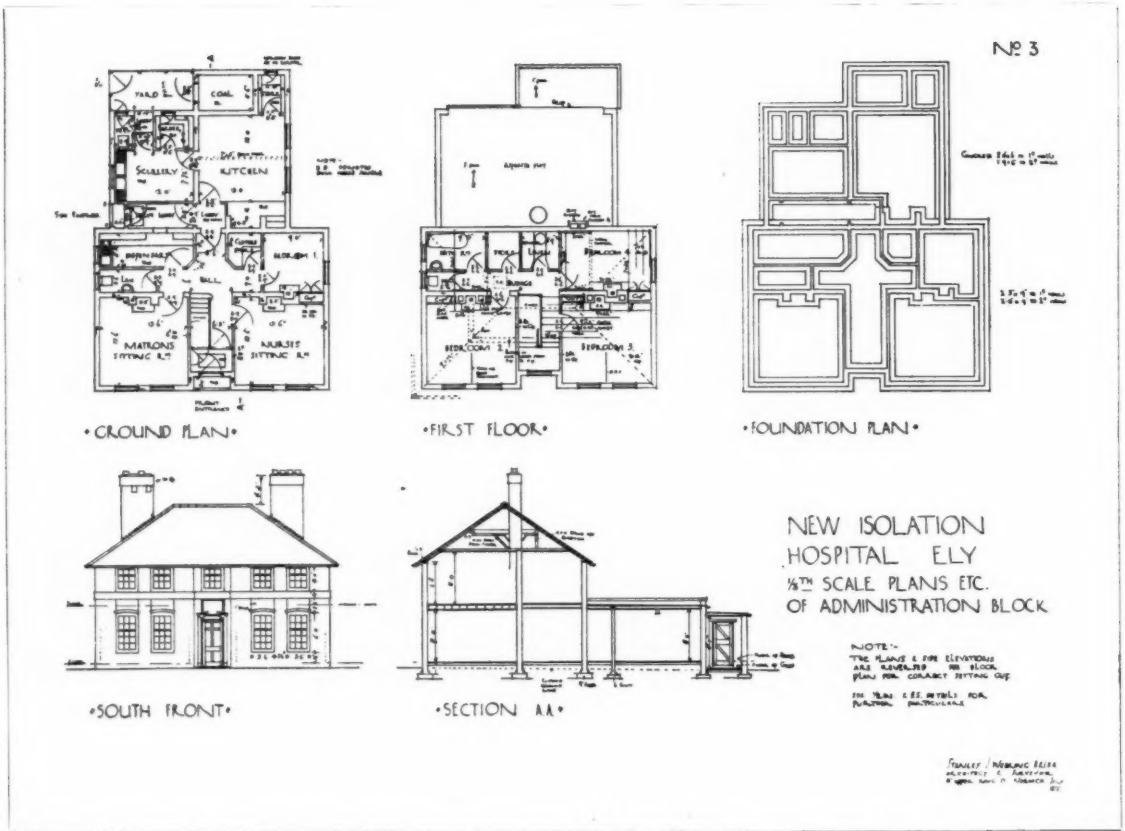
LEICESTER PRIVATE HOSPITAL. ALBERT HERBERT, A.R.I.B.A., ARCHITECT.

THE ENTRANCE FRONT.

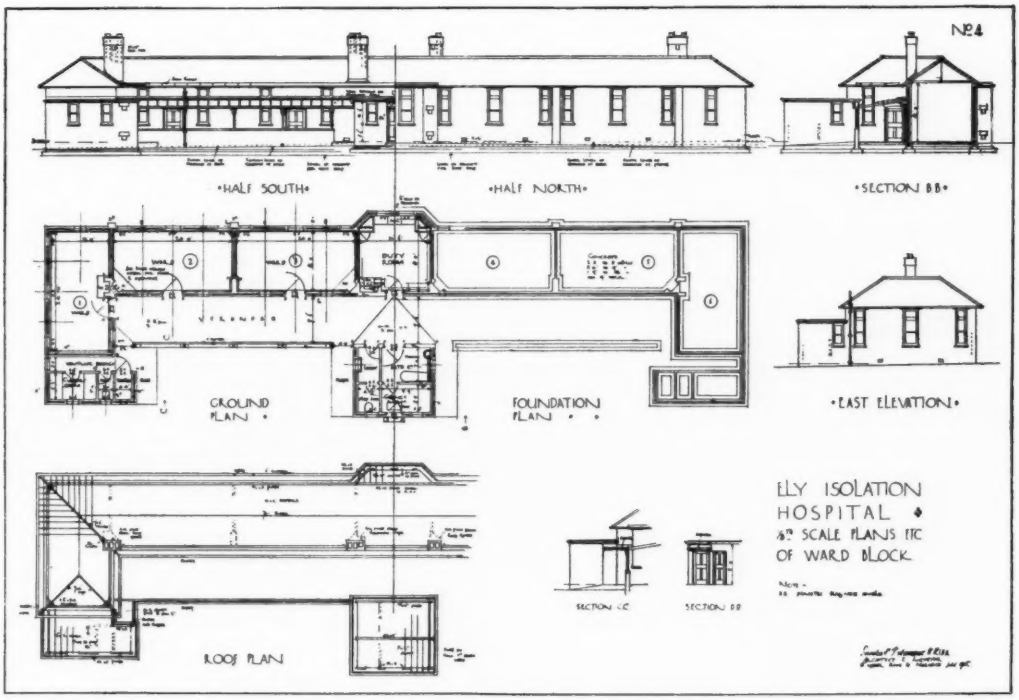


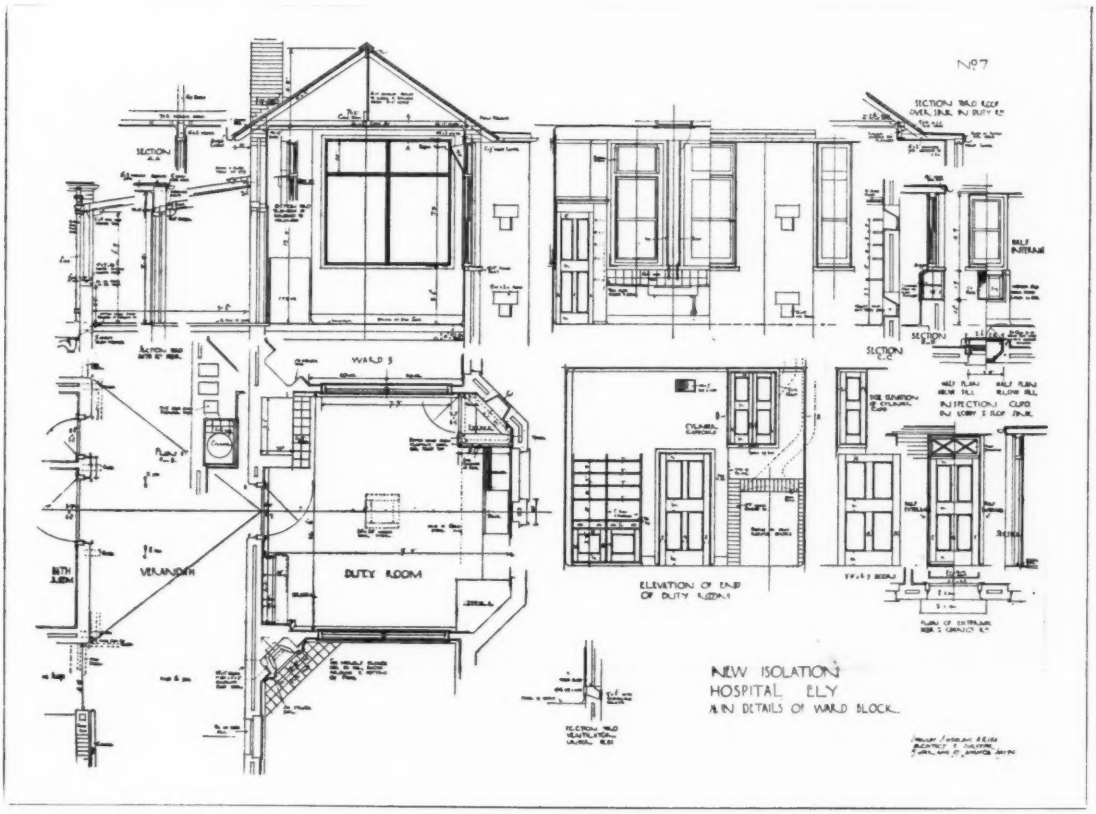
THE MAIN STAIRS AND LIFT.

LEICESTER PRIVATE HOSPITAL. ALBERT HERBERT, A.R.I.B.A., ARCHITECT

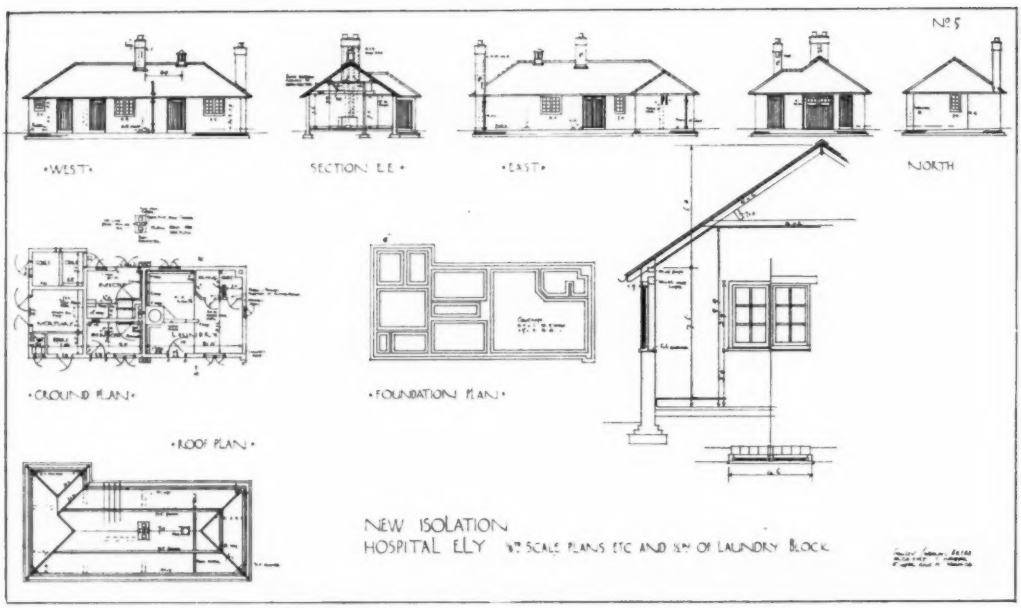


ELY ISOLATION HOSPITAL: THE ADMINISTRATION BLOCK STANLEY J. WEARING, A.R.I.B.A ARCHITECT.

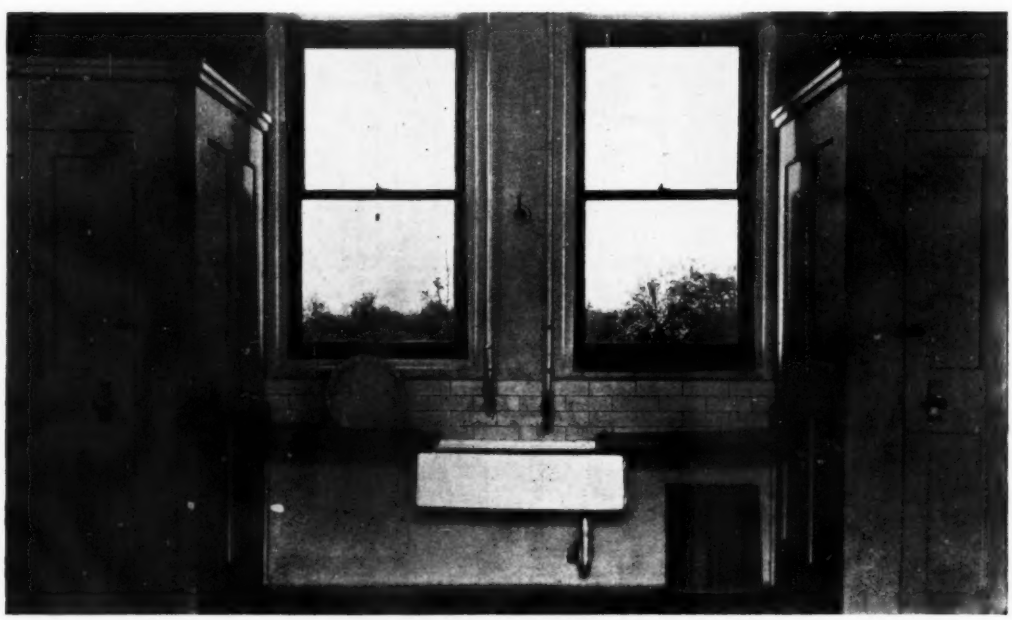




ELY ISOLATION HOSPITAL: PLANS, ELEVATIONS, AND DETAILS OF WARD BLOCK.
STANLEY J. WEARING, A.R.I.B.A., ARCHITECT

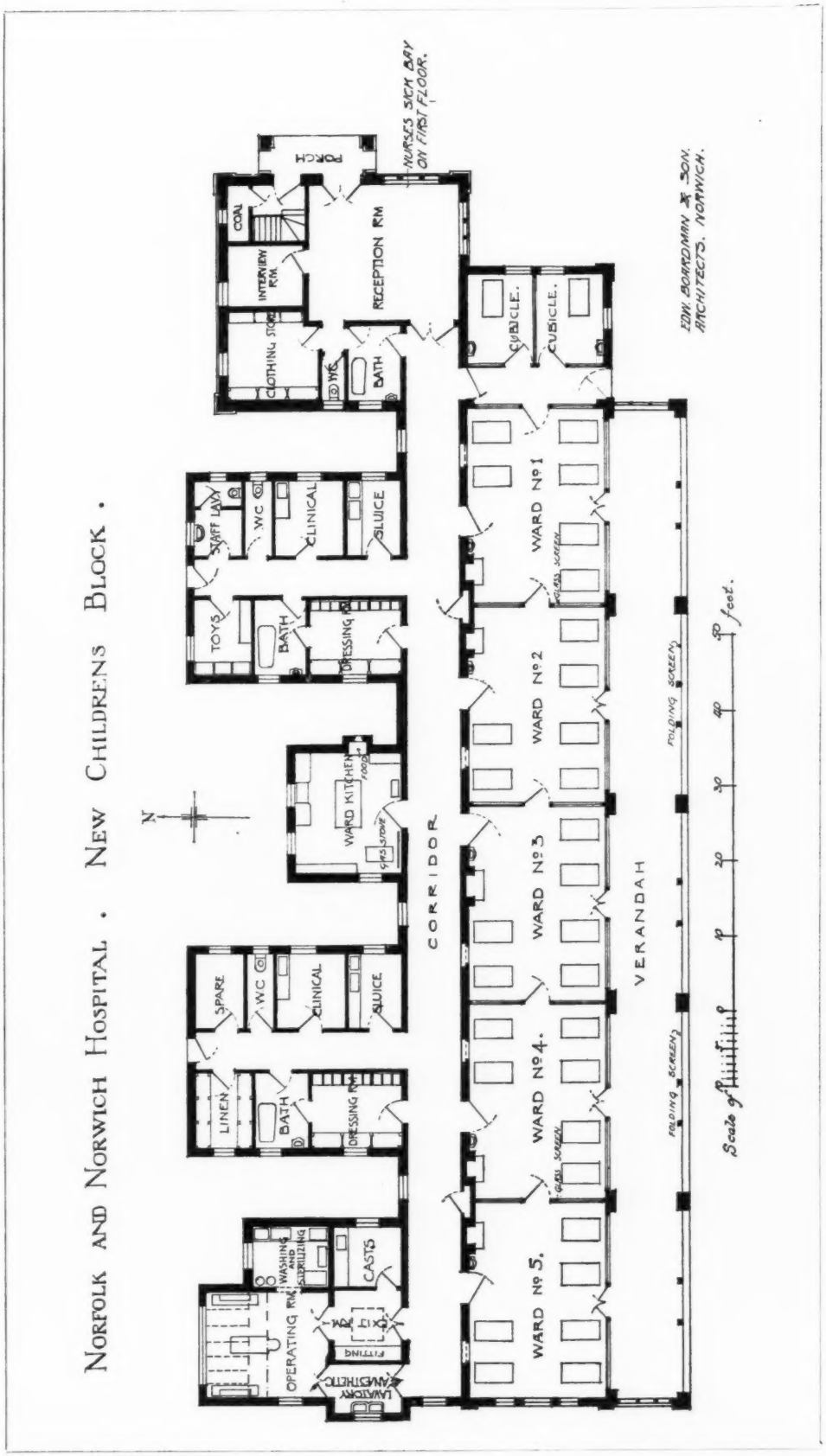


PLANS AND ELEVATIONS OF LAUNDRY BLOCK.

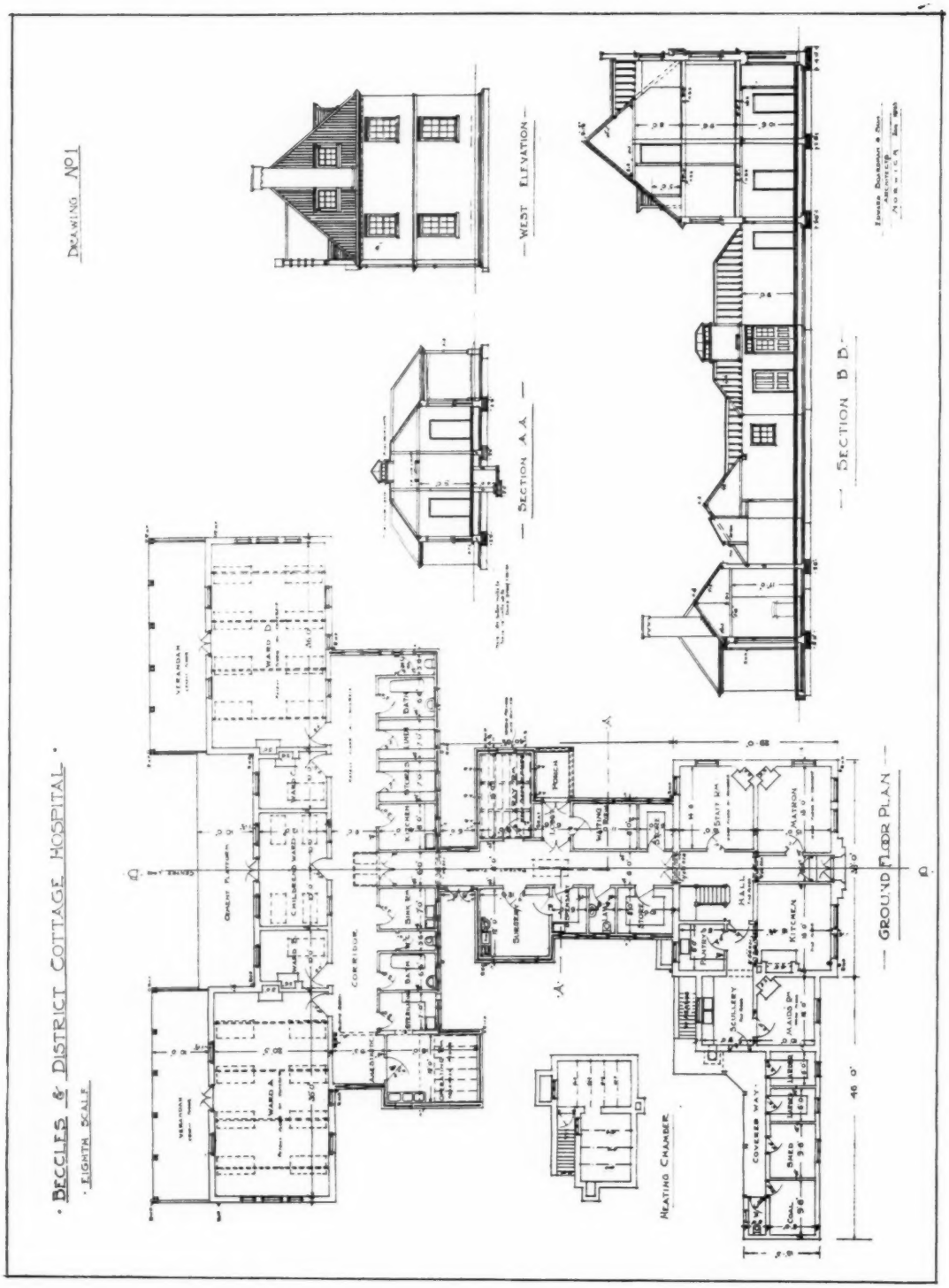


WASH-UP SINK IN DUTY ROOM.

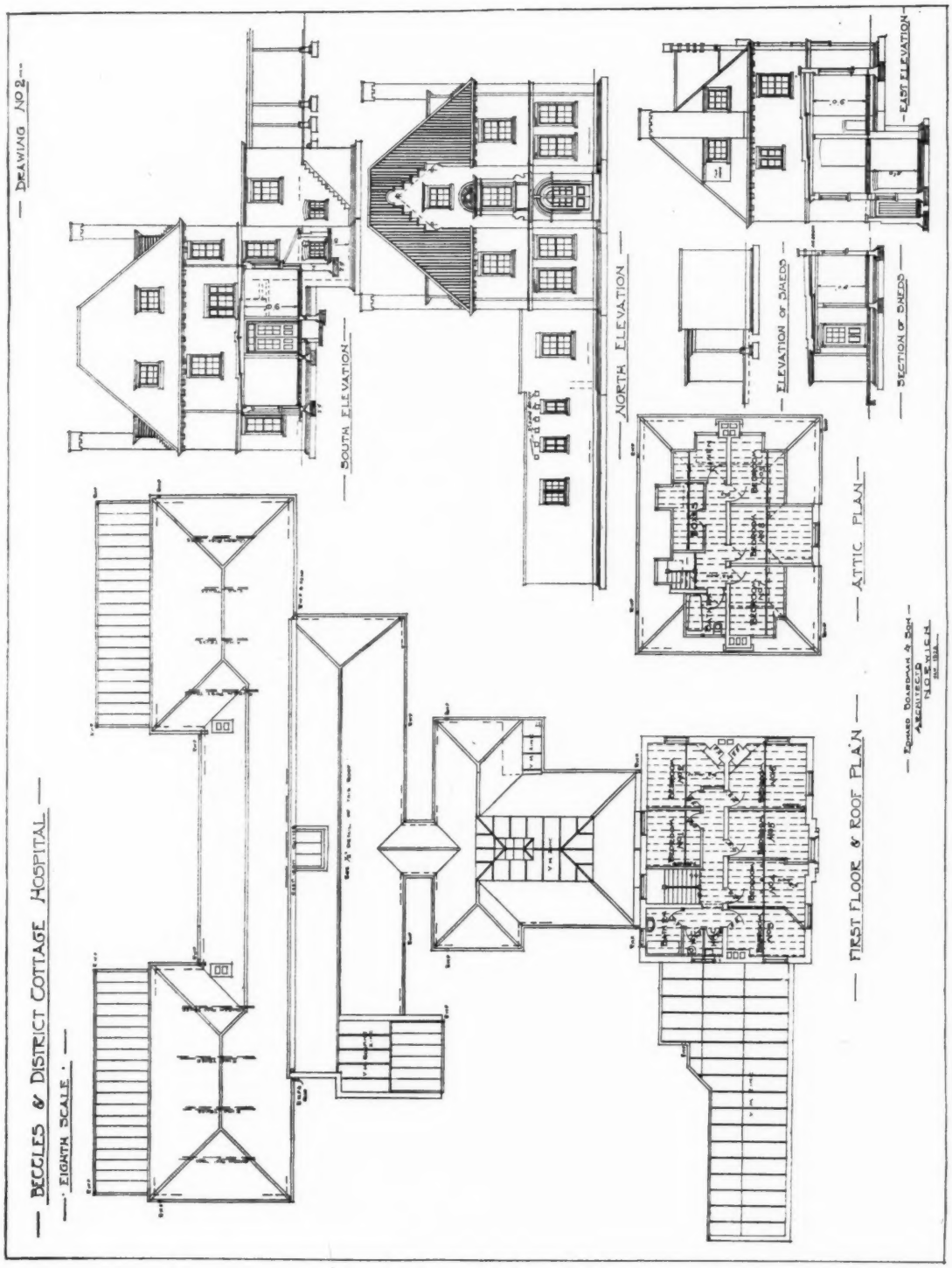
ELY ISOLATION HOSPITAL. STANLEY J. WEARING, A.R.I.B.A., ARCHITECT.



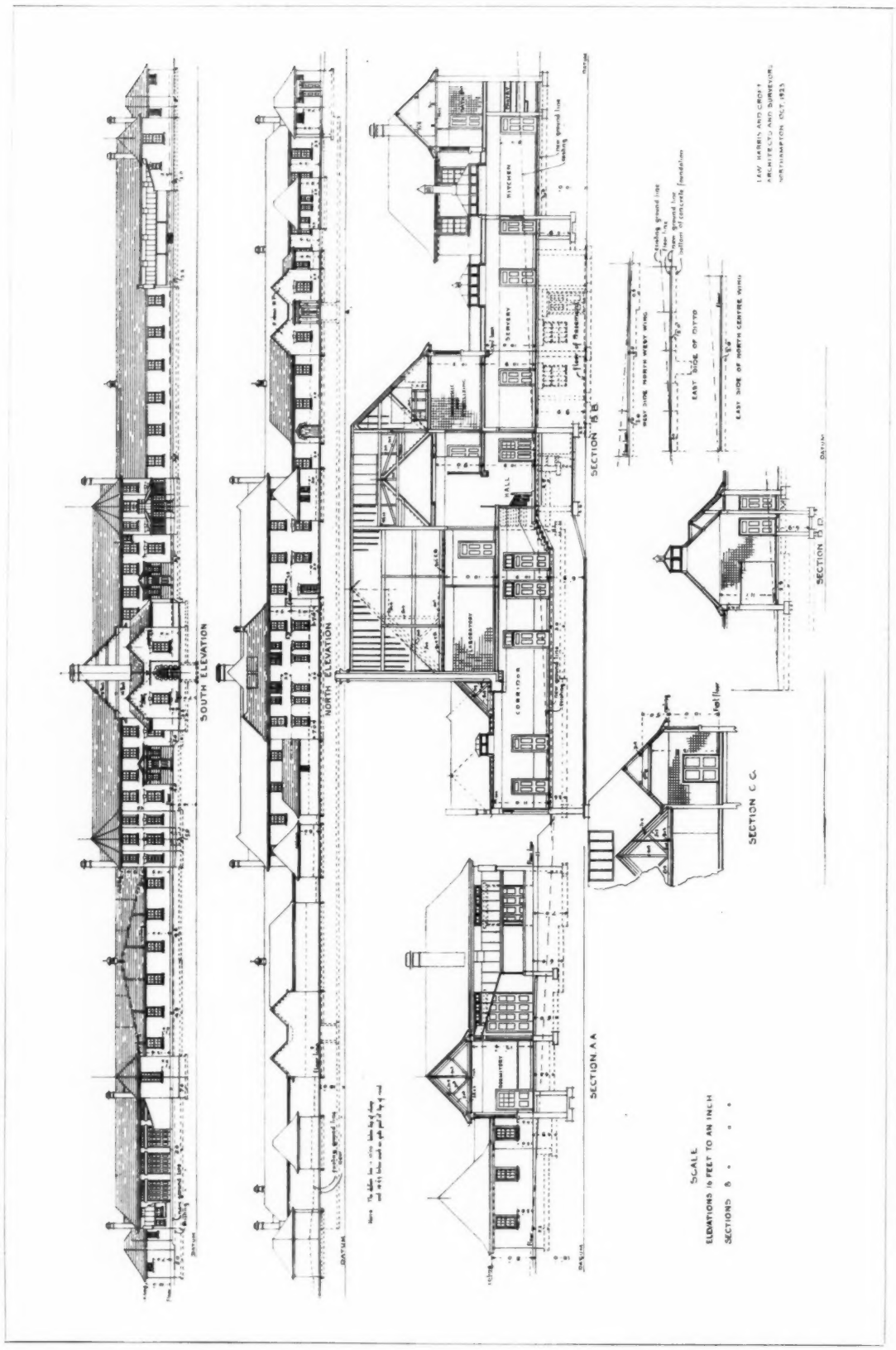
NORFOLK AND NORWICH HOSPITAL: NEW CHILDREN'S BLOCK EDWARD BOARDMAN AND SON, ARCHITECTS.



BECCLES AND DISTRICT MEMORIAL COTTAGE HOSPITAL. EDWARD BOARDMAN AND SON, ARCHITECTS.

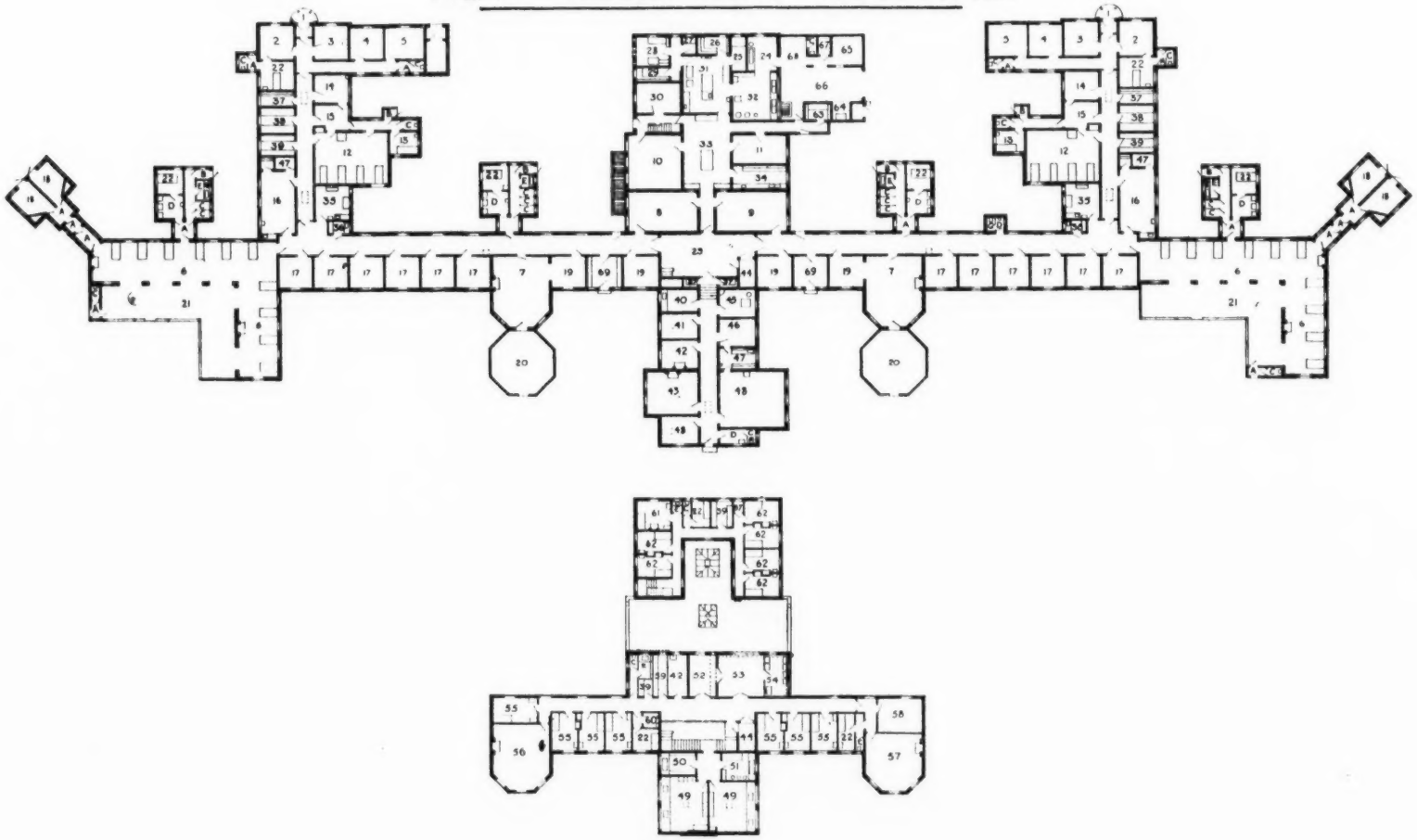


BECCLES AND DISTRICT MEMORIAL COTTAGE HOSPITAL EDWARD BOARDMAN AND SON, ARCHITECTS.

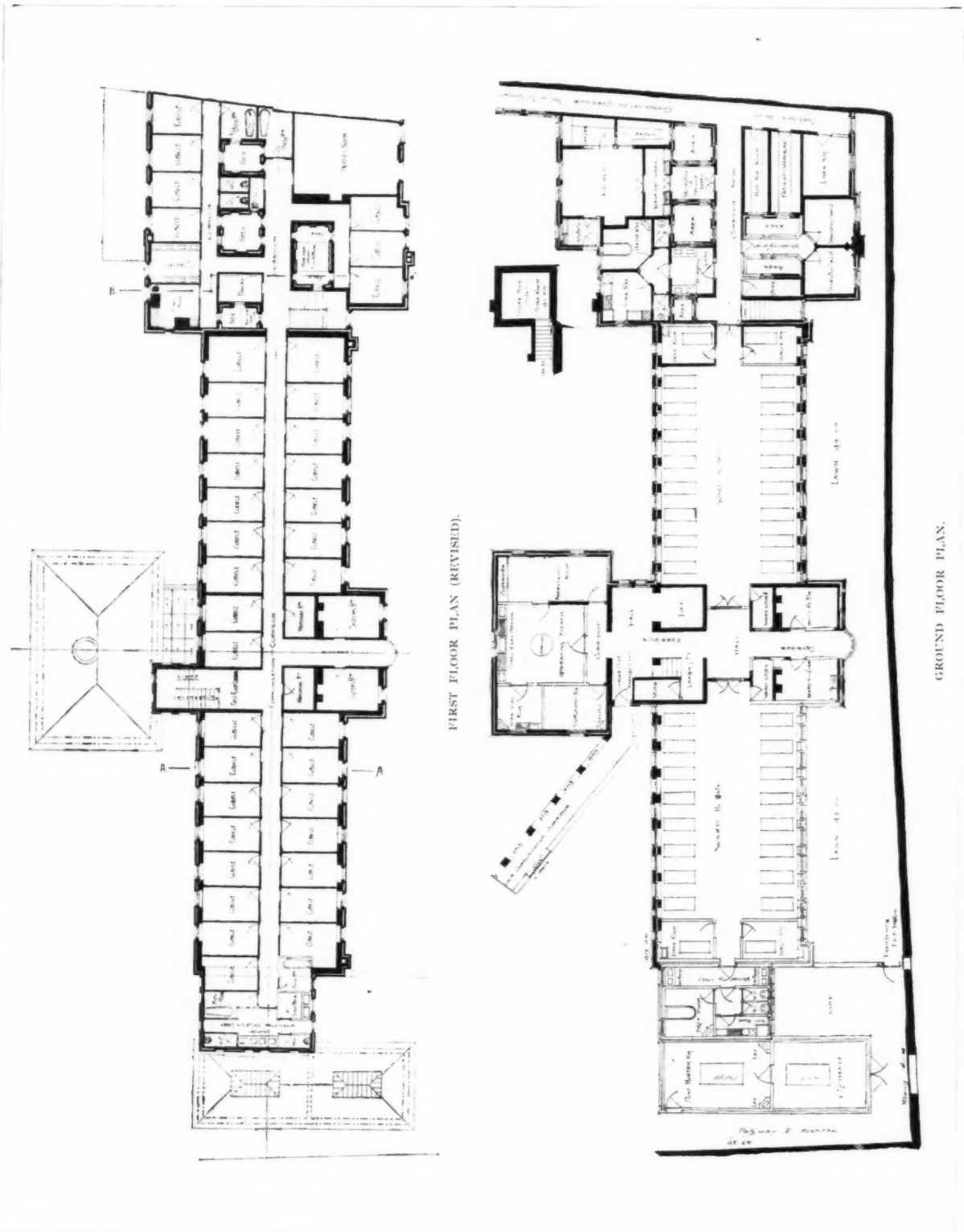


ST. ANDREW'S HOSPITAL FOR MENTAL DISEASES, NORTHAMPTON: NEW RECEPTION HOSPITAL LAW, HARRIS AND CROFT ARCHITECTS.

S. ANDREW'S HOSPITAL FOR MENTAL DISEASES, NORTHAMPTON.
NEW RECEPTION HOSPITAL.



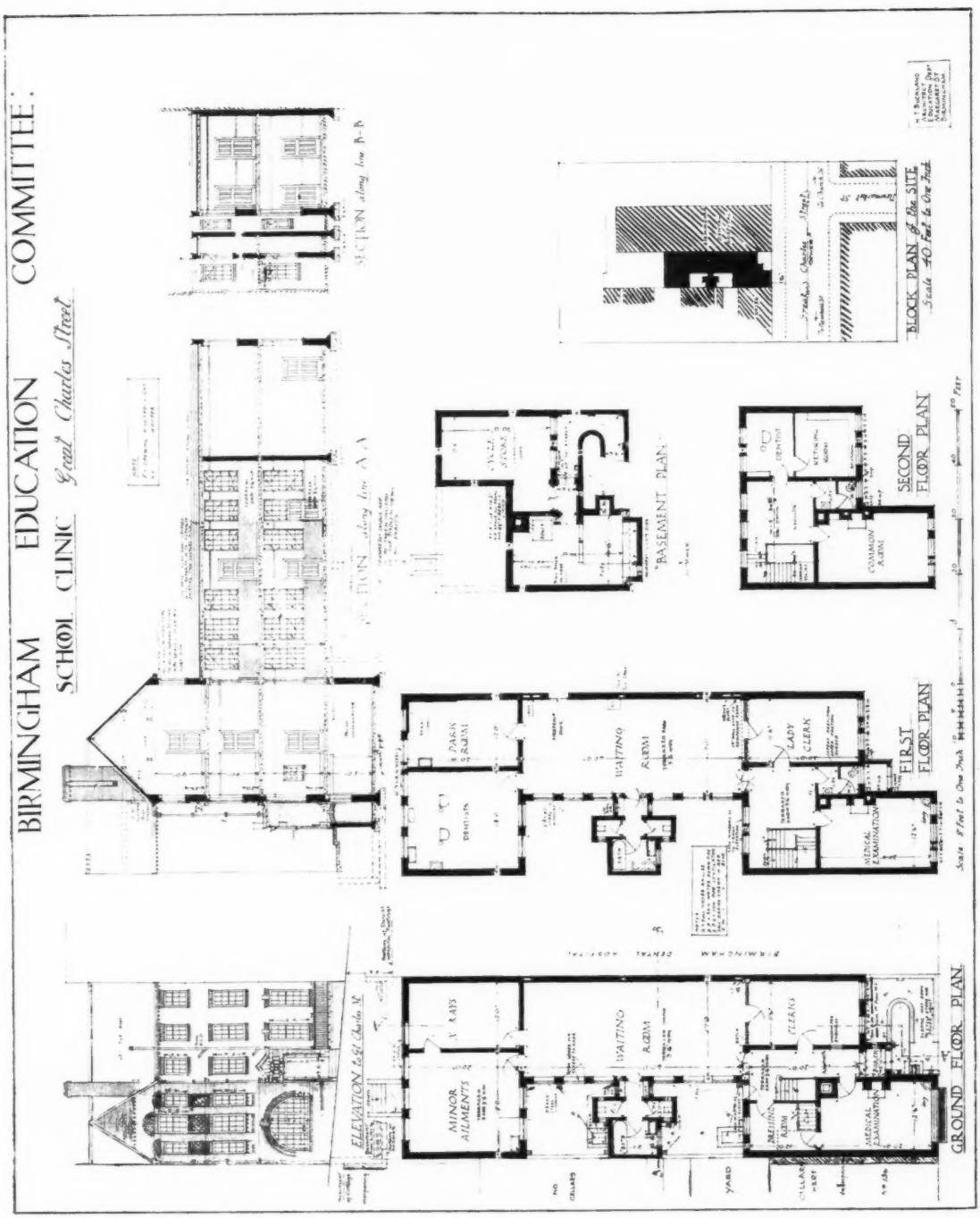
S. ANDREW'S HOSPITAL FOR MENTAL DISEASES, NORTHAMPTON: NEW RECEPTION HOSPITAL. LAW, HARRIS, AND CROFT. ARCHITECTS.



FIRST FLOOR PLAN (REVISED).

GROUND FLOOR PLAN.

THE ROYAL DEVON AND EXETER HOSPITAL: NEW VICTORY WING. E. H. HARBOTTLE & SONS, ARCHITECTS.



BIRMINGHAM SCHOOL CLINIC. H. T. BUCKLAND, F.R.I.B.A., ARCHITECT.

Architectural Effect in Hospital Design

THIS short article is mainly concerned with the more spiritual aspects of hospital design. Professor Budden has well said: "When an architect designs a building, he means it to produce on the minds of those who behold it an impact identical with that made by the conception on his own consciousness. He wants it to set up the same intellectual and emotional reaction; to have the same spiritual effect." This I may take to imply that a true architect will design a hospital that will be entirely suitable for its purpose. This, again, implies that he will remain true to architectural ideals in spite of the strongest temptation to subordinate them to mere utilitarianism; and his duty to his profession coincides with his duty to suffering humanity. The attribute of utility will follow as a matter of course. It will receive due attention, but it will not be allowed to destroy architectural effect.

Where the utilitarian and the more spiritual issues seem unhappily to be in conflict, the true architect may be trusted to solve any real problem that may arise from such conditions; and the extent of his success or failure in such a contingency may be fairly taken as a measure of his competency as an architect—a pretty severe test, no doubt.

Personality, force of character, will count for much in guiding the event. These rare and valuable qualities will serve to enforce the sound views which may chance to be opposed by urgent and perhaps overbearing demands for economy and utility. The architect, whether he be designing a hospital or any other kind of building, when once he has formed and matured his conception, must be resolute to have it carried out, admitting only such modifications as commend themselves to his judgment as being fair and reasonable; but he will remain constant to his conception.

It is only thus that the true architect can hope to leave ultimately, and in spite of all opposition and obstruction, the stamp of his own individuality. Such a mark of distinction proclaims him a true architect, following faithfully an authentic vocation. As an architect, his true function is to lead, not to be swayed hither and thither by contrary gusts of opinion, nor to yield weakly to utilitarianism, commercialism, or other non-spiritual influences, if I may, without offence, so designate them. He will not, of course, obstinately insist on asserting his own will and having his own way, but he will stand firm for architectural principles, which he may regard as an almost sacred trust.

This process of externalization, as I take leave to call it, seems to be the gist of the whole matter. It is the expression of the spirit of a building, the embodiment of that spirit in terms of architecture. It is significant that the able writer of "Confessio Medici" lays stress on the *genius loci* of the hospital, and its influence on health or unhealth. It would almost seem that the spiritual, the psychological influence of the hospital, expressed by both its interior and its exterior aspect, is even greater than its material influence. Hence the supreme importance of its right design and equipment. An architect should be free to ask himself, "What is the fundamental idea of a hospital, and how shall I express it in terms of architectural form and treatment?" But, alas! too often the daunting question is: "How much money is to be spent, and what is the cheapest way of doing things?" Ugh!

As the main purpose of a hospital is the healing of body, mind, and spirit, it follows that its situation and environment are of immense importance; and that such ideas as hospitality, sympathy, orderliness, cleanliness, spaciousness, hope, reverence, should find free expression, and should bring forth a noble architectural conception. This is the modern view of hospital design. Its full realization, however, is but seldom evident in Britain. In some of our older hospitals noble and inspiring characteristics are less apparent than a depressing dulness that suggests only by way of direct negation the cheerful optimism that is in itself a potent curative agency.

Only to-day are the spiritual and psychological aspects of the healing art recognized as being hardly less important and effectual than those that are materialistic and utilitarian. Yet, nevertheless, evidences are not wholly wanting that architects long ago sought to give expression to spiritual values in hospital façades. Take, for example, that jovial old be-stuccoed pile, St. George's Hospital at Hyde Park Corner; who could fail to be impressed by its generous air of cheerfulness and loving-kindness? It has such a right pleasant bedside manner! It breathes strength, dignity, and courage, without any attempt at the grandiose or the mysterious. It seems to invite you to come in and be cured. Nay, it relieves you of minor ailments even while you gaze upon it with a reciprocated smile.

It may be said that the Crimean War gave rise to the more modern type of hospital—the pavilion type. Two other wars—the American Civil War and the Franco-German—brought out the great importance of fresh air and of cleanliness.

Recently built hospitals reveal, I think, less of the experience gained from the Great War than one might have expected—fewer signs of the impressions which all architects must have received during those world-shaking and world-wrecking events. During the war I was particularly impressed by the methods adopted to free fit people from the incubus of the sick; which, after all, is a necessary function of the medical profession and its hospital system. The Erewhonians' idea of sickness being criminal might help us somewhat in thinking out the methods to be adopted in organizing hospitals in relation to towns. When a soldier had "gone sick," the three disabilities that had to be considered were: (a) The temporary disorganization of our internal machinery—generally through personal carelessness; (b) disease, or the invasion of our system by destructive or paralysing forces—always due to the carelessness of others; and (c) injury, or the violent breakage, laceration, or disruption of our bodily or mental structure—generally due to the cleverness of the enemy or the dulness of our military superiors. Our bodies were "wounded," or our minds were "shocked"; but, given fresh air, heat, water, and sleep, repairs were effected with but little outside help; that help consisting mainly of nursing and medical or surgical skill. This, we learned, was all that was necessary in a large percentage of our casualties, which we cleared from the immediate vicinity of the fit and healthy. Such casualties, retained under medical supervision, and free from all worry, usually made a good recovery; and this experience conveyed obvious lessons.

Where, for instance, is the wisdom of building so many hospitals in and around our towns? Why not provide a fleet of hospital ships, deporting our casualties to hospital islands, towns, or villages according to some definite national, continental, or even world plan?

These, I submit, are the sort of ideas which we, as architects, must nurture if we are to help in the general trend of progressive functioning of civilization. Either we must get rid of the towns or make them more healthy to live in.

In conclusion, I would say this—that before we go on thinking about the design of hospitals as mere buildings or blocks arranged in rows this way and that way, and placed where fancy pleases, or to catch the sun, we must consider the functions of the human system, and the effect our institutions will have on the minds and senses of their beholders and users. We must be brave, and tell the governors matrons, medicos, and the rest, that there are higher considerations than labour-saving and staff-reducing "gadgets" in the design, general lay-out, and planning of our hospitals. Above all, we must "think big," think right, and do correctly, remembering always that an architect is "a thinker, an organizer, a placer of parts so that the whole, no matter what it is, may be right, strong, true, and therefore useful."

A.

Some Notes on the Hospitals Illustrated

The Royal Hospital for Sick Children, Yorkhill, Glasgow

Sir John Burnet, Son, and Dick, Architects

This hospital (pages 973 to 977) is situated on an open site at Yorkhill, Glasgow, on high ground overlooking the River Clyde. The buildings were erected to the design of Sir John J. Burnet, and were opened by H.M. the King. The buildings consist of ward blocks, admission and administration block, nurses' home, laundry, boiler-house, etc., and are all built of Bothwell Park bricks, with stone dressings. The fireproof floors are finished throughout with maple and terrazzo flooring. The dado walls are tiled, and the upper walls and ceiling are finished with Keene's cement. The most modern apparatus is installed throughout the institution. Alterations and extensions are now being carried out to the nurses' home and maids' quarters, kitchen, and servants' block, etc.

Following are the principal contractors engaged in the erection of the buildings: John Cochrane, Glasgow (carpenter and joiner work); Jas. Boyd & Sons, Paisley (heating and ventilation); London & Inglis, Coatbridge (digger, mason, and brick works); Wm. Forbes & Sons, Glasgow, and George Rome & Co., Ltd., Glasgow (plaster and granolithic works); P. White & Co., Glasgow, and A. McKenzie Ross, Glasgow (slater work); Archd. Low & Sons, Ltd., Glasgow (plumber work); Bradshaw & Co., Glasgow, and Thos. Faldo & Co., Ltd., Manchester (roof asphalt work); Wm. Little & Son, Ltd., Glasgow, and John Emery & Sons, Glasgow (fireproof floors); R. Waygood & Co., Ltd., Glasgow (electric lifts); D. and J. Tullis, Ltd., Clydebank (machinery (special)); Robt. Brown & Son, Ltd., Paisley (tile, terrazzo, and marble works); Telford, Greir & Mackay, Ltd., Glasgow (electric lighting installation); W. F. S. Holt, Glasgow (revolving shutters); Walter MacFarlane & Co., Glasgow (screen partitions); E. H. Shorland & Bros., Ltd. (Manchester stoves); D. M. Tyre, Glasgow (wrought ironwork, etc.); Wm. Kemp & Co., Glasgow (grates, etc.); L. Sterne & Co., Ltd., Glasgow (refrigerating plant); Jas. Slater & Co. (Engineers), Ltd. (baling coppers, etc.); Baird & Tatlock, Glasgow (bread presses and special fittings); Hayward Bros. and Eck-tein, Ltd., Glasgow (fire escape stairs, etc.); W. Vickers, Glasgow (Carving and modelling); W. and T. Avery, Ltd., Glasgow (cart weighing machine); A. and J. Main & Co., Ltd., Glasgow (railings, gates, etc.); J. and W. Guthrie and A. Wells, Ltd., Glasgow (glass screen and special painting); M. Bryce & Son, Glasgow (blinds); Bennett Furnishing Co., Ltd., Glasgow (seating and standards); MacLean & Co., Glasgow (baluster and handrail); Thos. Whyte, Ltd., Glasgow (grand stand, etc.); A. and J. Scott, Glasgow, and John Orr & Sons, Glasgow (painter work); W. G. Walker & Sons, Glasgow (tennis courts).

The Western Infirmary of Glasgow

Sir John Burnet, Son, and Dick, Architects

The original Infirmary buildings were erected to the design of John Burnet, I.A. (the father of Sir John J. Burnet, R.A., R.S.A.), whose plans were approved in 1869. Building operations commenced soon after this, and in 1874 the Infirmary was opened for the reception of patients. The total expenditure at this date on site, buildings, and equipment amounted to £88,690. In the year 1881 the Infirmary had so increased in size that its beds were doubled. In 1896 the erection of the Pathological Institute was completed to the design of Sir John J. Burnet. Following upon this the Infirmary has increased rapidly in size. New clinical laboratories, operating theatres, ward blocks, kitchen and laundry block, massage department, nurses' home extensions, nurses' lecture theatres, and a new memorial chapel, have been completed to Sir John's designs, in collaboration with the medical superintendent and medical consultant, Colonel Donald J. Mackintosh, C.B., M.V.O. Messrs. Thomas Young, Son, and Miller, of Glasgow, have been consulting engineers to the Infirmary for over thirty years. Illustrations of the Infirmary buildings appear on pages 978 to 981.

The principal contractors engaged in the erection of the buildings were as follows: Robert Murdoch & Son, Glasgow (mason, etc., works); John Cochrane, Glasgow, and Cumming and MacDonald, Ltd., Glasgow (joiner, etc.); Redpath, Brown & Co., Ltd. (steel work); The Allen Construction Co., Ltd., Glasgow, and Melville, Dundas, & Whitson, Glasgow (fireproof floors); P. White & Co., Glasgow, and A. McKenzie Ross, Glasgow (slater work); Archd. Low & Sons, Ltd., Glasgow, and Duncan Stewart, Glasgow (plumber and gasfitter); George Rome & Co., Ltd., Glasgow, and Wm. Forbes & Sons, Glasgow (plaster work); Robert Brown & Sons, Ltd., Paisley, and Galbraith & Winton, Glasgow (tile and terrazzo works); The Limmer Asphalte Co., Ltd., Glasgow, and W. G. Walker & Sons, Glasgow (asphalt work); John Orr & Sons, Glasgow (painter work); Claud Hamilton, Ltd., Glasgow (electric lighting); Jas. Boyd & Sons, Paisley (heating); Waygood Otis, Ltd., Glasgow (lifts); D. M. Tyre, Glasgow, and The Winsor Engineering Co., Ltd., Glasgow (railings and gates); W. Kemp & Co., Glasgow, and Gibson & Goold, Glasgow (fireplaces); The Bennet Furnishing Co., Ltd., Glasgow (seating and desks); Doulton & Co., Ltd., Paisley (sanitary fittings); Dykes Bros., Glasgow (electric clocks); Wm. McGeoch & Co., Ltd., Glasgow (ironmongery); Holmes & Jackson, Glasgow (stone carving); Baird & Tatlock, Glasgow (special fittings).

Sunderland Royal Infirmary Development Scheme

W. and T. R. Milburn, FF.R.I.B.A., Architects

This scheme (pages 984 to 987) has been prepared by Messrs. W. and T. R. Milburn, the architects, in consultation with Col. D. J. Mackintosh, C.B., M.V.O., of Glasgow. It has been designed to enable the work to be carried out in sections from time to time, and to cause, during execution, as little disturbance as possible to the normal administration of the hospital. The alterations consist chiefly in the rebuilding of the administrative block, the enlargement of the out-patients' department, the building of two pavilions, three stories high, on the south side of the main corridor, and the construction of a third floor upon the existing east and west wings.

The new administrative block will be five stories high, with kitchens, etc., on the lower ground floor. The main entrance-hall, secretary's and general office will be accommodated on the ground floor. The matron's rooms, house surgeons' quarters, nurses' bedrooms, and dining-room, and servants' cubicles, will be situated upon the upper floors. Food lifts will be provided to deliver direct from the service-room to all floors of the hospital.

The new ward blocks will be designed in accordance with the best modern hospital practice, and special attention paid to obtaining the maximum amount of sunlight to the various rooms. Each floor in the ward blocks will comprise a twenty-bed ward, with a balcony at the south end, and two two-bed side wards, with a duty-room and the necessary offices. There will also be a large glass-roofed sun balcony on the ground floor west side of each ward.

The out-patients' department will be altered and extended and brought thoroughly up-to-date, with the addition of five special consulting-room suites.

The Backhouse wing will be remodelled to accommodate paying patients, each patient being provided with a separately enclosed cubicle.

The Hartley wing will extend towards the south and new sun balconies added.

The whole of the heating and hot-water arrangements of the institution will be reorganized, new stairs and bed lifts provided, and a 10-ft. wide connecting corridor provided between the old and new wards on all floors.

As before mentioned, special consideration has been given to the possibility of the scheme having to be carried out in sections.

It is proposed that the first portion to be built should be the new east ward block. This would give immediately an additional accommodation to the Infirmary of eighty-nine beds. Each further stage of the development undertaken is similarly designed primarily to increase the bed accommodation of the Infirmary. The completed scheme will give a total of 472 beds, compared with the present figure of 240. The estimated cost of the completed scheme, exclusive of furnishing, is approximately £130,000.

The plans illustrated are still in a preliminary stage, and subject to alterations in detail before the work proceeds.

The new J. Y. Short operating theatre (pages 987 to 988), built and equipped in memory of the late Mr. J. Y. Short, forms a very much-needed addition to the Infirmary. The accommodation is provided in a compact single-story block with a flat roof, and comprises twin operating theatres, which are approached by an 8-ft. corridor, opening off which are the various preparation, sterilizing rooms, etc. The structure is of brickwork, with a concrete and asphalt roof, and the walls and ceilings are plastered throughout in Parian plaster, painted and enamelled.

The contractors for the operating theatres were as follows: D. and J. Ranken, Sunderland (building); Reid, Ferens & Co., Sunderland (electrical work); Henry Hope & Sons, Ltd., Birmingham (metal windows); J. P. White & Sons, Bedford (flush doors); Shanks & Co., Newcastle (sanitary fittings); Arnold & Sons, London (sterilizing apparatus); Marbello, Ltd., Birmingham (terrazzo flooring); R. T. Vaux & Sons, Sunderland (heating).

Nottingham General Hospital, New Outpatients' Department

Evans, Clark, and Woollatt, Architects

The new out-patients' department (pages 980 to 991) is in course of erection on a site adjoining the main entrance to the hospital. The existing out-patients' department is quite inadequate to contend with the rapidly growing number of casualties and out-patients, and the various sections dealing with the nose, ear, and throat cases; X-ray and orthopædic treatment are in great need of enlargement. The new building is of three stories, and is connected with the main hospital by means of a subway under the road, through which also the mains for heating and hot-water supply and steam are carried. The out-patients' department on the ground floor consists of a large waiting-hall, 90 ft. by 45 ft., with three blocks of consulting-rooms, dressing-rooms, and examination rooms, connected by an outer passage round the hall. On the first floor is a nose, ear, and throat department for forty beds, with operating theatre, kitchen, and other adjuncts, and on the lower ground floor are an electrically equipped department for radiography, X-ray, ultra violet rays, and therapeutic treatment, and a complete orthopædic department with gymnasium. The main construction is of brick, with facings of Staffordshire brindled bricks and Portland stone, the floors and roof being of reinforced concrete covered with Val de Travers. The building is being erected on the site of the old reservoir, which was cleared away by Messrs. Fred. Evans and Sons, contractors, Bulwell.

The contractors for the new work are Messrs. Gilbert and Hall, Castle Boulevard, and Messrs. Jackson Bros. are the masons. The sub-contractors are as follows: The Trussed Concrete Steel Co. (artificial stone and reinforced concrete work); A. R. Knight (plumbing); H. Foster (plastering); J. Riley & Sons (painting); Waygood Otis (lifts); Henry Hope & Sons (steel windows, etc., for the operating theatres). Mr. C. J. Clarke is Clerk of the Works.

Gosport Memorial Hospital

Young and Hall, FF.R.I.B.A., Architects

The site of this hospital (pages 992 and 993) is at the corner of two roads. The building has south and west aspects, and is built upon gravel subsoil. The ground floor is divided into three blocks—administration, ward, and operation-room—planned one behind the other, and joined by what is practically one corridor. The administration block, in the front portion of the building and facing south, is entered through a spacious porch and a vestibule into the hall, from which leads the corridor to the ward and operation-room blocks. To the right of the corridor, in the ward block are the male wards, and to the left are the women's and children's wards.

The general contractor was Mr. John Hunt, Gosport, and the sub-contractors were as follows: Frescoe Asphalte Co. (asphalt); Fawcett Construction Co. (Steel work and fireproof floors and partitions); Teale Fireplace Co. (stoves, grates, and mantels); Dent & Hellyer, Ltd. (plumbing and sanitary work, sanitary ware and fittings); Hants Electrical Co., Gosport (electric wiring and electric light fixtures and telephones); Local Gas Co. (gas fixtures); Tom Jones, Lock & Co. (door furniture); Stuarts Granolithic Co. (stair treads); James Slater & Co., Ltd. (heating and ventilating).

Knutsford and District Memorial Cottage Hospital

P. S. Worthington, M.A., Litt.D., F.R.I.B.A., and Francis Jones, F.R.I.B.A., Joint Architects

This cottage hospital (pages 994 to 997) has been built just outside Knutsford, Cheshire, on a fine open site. It is built of 2 in. red bricks, and roofed with sand-faced tiles. It has been designed for twelve patients, with accommodation for matron and staff.

On the ground floor are four wards, the staff-room, operating theatre, dispensary, kitchen, and scullery, and on the first floor the matron's bed and sitting-rooms, two nurses' and one maid's bedrooms. An interesting feature of the equipment is the electric lighting installation. The generating plant consists of a National 5-h.p. single cylinder vertical oil engine, starting with petrol, and then run on paraffin, direct coupled to a dynamo, all on a self-contained bedplate. This plant supplies current through a hand-controlled switchboard to a storage battery consisting of fifty-six cells in glass boxes, with a capacity of 150 ampere hours at the ten-hour rate. The plant is housed in the outbuildings at the back of the hospital. The operating theatre is electrically ventilated, and is equipped with a 1,000 watt "Bolwald" daylight lamp unit, finished in enamelled white.

The general contractors were Messrs. L. Brown and Sons, Ltd., of Wilmslow, Cheshire, and the sub-contractors were as follows: Conway & Co., Manchester (tiles wall, ceiling, and floor); Wm. Bailey & Co., Ltd., Manchester (drainage); Humphries, Jackson & Ambler, Ltd. (metal operating-room window); Shanks & Co., Ltd. (sanitary ware and fittings); J. L. Mott Iron Works, Ltd. (plant, electric wiring, and ventilating); Laidlaw and Thomson, Ltd., Manchester (door furniture, locks); Saunders and Taylor, Ltd., Manchester (heating and ventilating); John Faulkner, Manchester (lightning conductors); Earp, Hobbs and Miller, Manchester (marble fireplace, memorial tablet, and fibrous plaster niche). Recent extensions have been executed by Messrs. John Shaw & Sons, Knutsford.

Liverpool Maternity Hospital

Gilbert Fraser, M.C., F.R.I.B.A., Architect

The Liverpool Maternity Hospital (pages 998 to 1001) is now in course of erection on an elevated site in Mount Pleasant, Liverpool. It is in close touch with the Liverpool University and the hospital quarter of the city. The building is designed to act as a maternity hospital and as a teaching centre for the education and training in midwifery for doctors, midwives, and nurses. The hospital is self-contained, and designed in several units, comprising administrative block (with doctors' and nurses' quarters), wards, dual operating theatres, bacteriological sections, and out-patients' department. The wards are for eight beds, and single wards and dual wards, with a special ward for sick babies, are provided. The introduction of a nursery (to allow of the infants being separated from the mothers), fitted with special infants' baths placed in the centre of the room, for utility as well as instructional purposes, is a feature of the design. The kitchen is placed at the north-east corner of the building on the top floor, with service lifts and goods lift for administration of the supplies. Fireplaces have been avoided as much as possible, and the carrying of fuel reduced to a minimum. The walls are covered with a composition of polished marble, and the centres of the corridors are paved with asphalt, with a narrow border of terrazzo paving to secure silence. The accommodation is for a total of eighty beds, and a staff to administer same, with a residential doctor, matron, and housekeeper. Every effort has been made to obtain the best equipment possible in the interior of the hospital, and to prevent the expenditure on useless ornamental and elaborate details on the exterior. The total cost of the complete scheme is £100,000. Storton stone has been used for the building.

The general contractors were Messrs. Tysons, of Liverpool, and the sub-contractors were as follows: Penmaenmawr and Trinidad Lake Asphalt Co., Liverpool (asphalt); J. C. Edwards, Ruabon (terra-cotta); Maxwell and Fage, Liverpool (steel work); Pearson Bros. and Campbell, Liverpool (fireproof floors and partitions); Houghton and Jones, Liverpool (Coniston green slates, plaster work); Rea Metal Casement Co., Liverpool (casement and casement fittings); W. & A. Piercy, Liverpool (plumbing, gas fitting, and sanitary work); Musgraves, Ltd., Liverpool (sanitary ware and fittings); W. Macfarlane & Co., Glasgow (lead downpipes and R.W heads); R. W. Brooke & Co., Ltd., Liverpool (flooring, wood block and parquet); Art Pavement and Decorations Co., Ltd., London (mosaic and marble floors and decoration); A. Griffiths & Co., Ltd., Liverpool (electric wiring); Express Lift Co., Liverpool (lifts); W. Griffiths, Sons and Cromwell, Liverpool (heating and ventilating apparatus, boilers, cooking, and laundry machinery.

Private Hospital, Leicester

Albert Herbert, A.R.I.B.A., Architect

The urgent public need of a surgical hospital for Leicester, at which private patients can be received, has been met by the enterprise and munificence of Mr. T. Fielding Johnson, J.P., who, succeeding to his late father's long course of public service as president of the Leicester Royal Infirmary, has been equally active for many years in promoting the interests of that institution. The new hospital (pages 1004 and 1005) is near, but not in any way connected with, the Royal Infirmary. It is centrally situated in a quiet residential district in the heart of the city, and is secured against disturbance by wide lawns opposite its entire main frontage. It occupies an island site, bounded by four thoroughfares, with a main frontage to Regent Road of 164 ft., a total frontage of 554 ft., and an area of 18,676 sq. ft. The building consisted originally of three adjoining residences of exceptional size, and of comparatively modern date; these have been remodelled with the addition of a new wing. The building now forms one large rectangular block, affording accommodation for forty-five patients and the complete staff, on four floors, which, by reason of the compactness of the site, give the best facilities for the treatment of patients, and the easiest means of internal communication. On the lowest, or basement, floor are fifteen important offices, including a large centrally situated dining-hall, a heating-chamber supplying a low-pressure hot-water system, and other installations

needful in working the establishment on the best modern methods. The ground floor is designed with a view to administrative efficiency. In addition to eight wards, two X-ray rooms, and a clinic are offices, stores, kitchen, servery, scullery, etc., sitting and bedrooms for matron, nurses, and servants, a large waiting-room, porter's room, etc. On the first floor seventeen wards are grouped about a central surgical block. Much thought and care have been bestowed on the adaptation of this block to requirements indicated by recent science and experience. The large operating theatre, supplied with a scyalytic light over the table, has no incommoding accessory; all sinks, sluice basins, lavatories, and other necessary adjuncts being provided in a room immediately opening from it, with the anæsthetic theatre, the sterilizing-room, and the surgeons' apartment also communicating, but separate. The second floor provides for maternity cases, and has, in all, eleven wards. Sanitation, ventilation, light, and warmth have, of course, received special attention. Comfort, it may be added, has also not been neglected, as the provision of an electric bell and a reading-lamp to each bed may be taken to indicate.

The contractors were Messrs. Wm. Moss & Sons, Ltd. of Loughborough.

King Edward VII Memorial Hospital for Children, Birmingham

Martin and Martin and W. H. Ward, Architects

This hospital (pages 1002 and 1003) stands in Ladywood Road, Birmingham. The main buildings were built some years ago, but an extension has just been made by the erection of the out-patient department. This is situated to the right of the main buildings, to which it is connected by a corridor.

The general contractors for the out-patients' department were Messrs. J. Barnsley and Sons, Birmingham, and the sub-contractors were as follows: Gibbs Bros., Loughborough (bricks); E. C. and I. Kery, Ltd. (steel work); Siegwart Fireproof Floor Co., Ltd. (fireproof floors and partitions); Stourbridge Glazed Brick Co. (tilesand walls); Henry Hope & Sons, Ltd. (patent glazing and fittings); Doulton & Co. (sanitary ware and fittings); Walker Bros. (electric wiring); North of England School Furnishing Co. and Educational Supply Co. (special fittings); G. N. Haden & Sons (heating and ventilating).

Ely Isolation Hospital

Stanley J. Wearing, A.R.I.B.A., Architect

This hospital (pages 1006 to 1008) has been erected to serve the Ely Urban and Rural District Councils. It stands on a site adjoining the workhouse at Ely. The buildings were the gift of Mr. and Mrs. W. Cutlack, and the cost of the roads, drains, and fencing, etc., was borne by the councils. The site is an open one, and the ward block faces south-east. The standard regulations for the distance apart of blocks, and for the floor area, cubic capacity, and the distance apart of the beds in the wards, have been observed. The administrative block was designed to allow for future additional bedroom accommodation, which has since been added.

The laundry is fitted with Messrs. Manlove, Alliott & Co.'s hand-power fittings, and a "Thresh" disinfector is installed.

The wards are heated by ventilating stoves, and these, together with the windows, provide natural ventilation.

The walls are built hollow, with local hard bricks, and the roofs are covered with asbestos cement slates. The floors are covered with linoleum in one piece, without a joint. All angles are rounded, and the walls are distempered.

The cost, including all sanitary and laundry fittings, gas installation, drains, roads, fencing, and water supply, worked out at the low figure of £260 per bed.

The contractors were Messrs. Parren & Son, of Erith, the sanitary fittings were supplied by Messrs. Adamsez, Ltd., and the laundry fittings by Messrs. Manlove, Alliott & Co., Ltd.

Norfolk and Norwich Hospital, New Children's Block

Edward Boardman and Son, Architects

This new children's block (page 1009) has been erected in the grounds of the present hospital. It has a south aspect, and is built upon sand subsoil. There are five wards and two cubicles, extending along the whole of the south side of the building; and in front of the wards is a long veranda, with folding screens. On the other side of the wards, and running practically the whole length of the building, is a corridor, to the north of which are the operating-room, washing and sterilizing-room, two clinical departments, and the ward kitchen. At the east end of the corridor, from which the building is entered, are the reception-room, interview-room, and clothing store.

The general contractors were Messrs. W. J. Hannant, Norwich, and the sub-contractors were as follows: Trussed Concrete Steel Co. (fireproof floors and partitions); Barnes and Pye, Norwich (steel work); Henry Hope and Sons, Birmingham (casements and casement fittings); Pennycook (patent glazing and fittings); Doulton & Co. (stoves, grates, and mantels); W. J. Taylor, Norwich (plumbing and sanitary work); Doulton & Co. and Adamsez (sanitary ware and fittings); E. & C. Gates, Ltd., Norwich (electric wiring, telephones); W. G. Crotch & Son, Norwich (plaster work); British Gas Light Co., Norwich (gas fixtures); Z. D. Berry, London (heating apparatus).

Beccles Memorial Cottage Hospital

Edward Boardman and Son, Architects

All the wards of this cottage hospital (pages 1010 and 1011) are on the ground floor. There are two wards, 36 ft. by about 20 ft., two 12 ft. by 10 ft., and a children's ward, 20 ft. by 10 ft. These are all planned side by side, and along one side of the two big wards are verandas, and on the same side, at the back of the children's ward and the two smaller wards, is a spacious cement platform. In front of all the wards is a corridor providing easy access to the operating-room, the surgery, and the X-ray room. In close proximity to these are the sterilizing rooms, bathrooms, stores, dispensary, and the waiting-room. On this floor also are the staff-room, matron's room, and kitchen. In the basement is the heating chamber. Nine bedrooms are provided, six on the first floor and three in the attic.

The general contractors were Messrs. Thurman, Ltd., Felixstowe, and the sub-contractors were as follows: The Art Pavements and Decorations, Ltd. (wall, ceiling, and floor tiles); Pennycook (patent glazing and fittings); Doultons & Co. (stoves, grates, mantels, sanitary ware and fittings); Mann, Egerton & Co., Ltd., Norwich (electric wiring); W. G. Crotch & Son, Norwich (plaster work); Jordan & Shryaker, Wolverhampton (door furniture); E. G. Reeve & Son, Norwich (heating apparatus).

New Reception Hospital. St. Andrew's Mental Hospital, Northampton

Law, Harris, and Croft, Architects

This new reception hospital (page 1012) has been erected for St. Andrew's Mental Hospital, Northampton, from the designs of Mr. S. F. Harris, F.R.I.B.A., of the firm of Law, Harris, and Croft, architects. In the planning of the hospital special care has been taken that noisy and turbulent patients shall not upset or annoy the rest. It is also the intention of the Governors that those patients who benefit shall complete their treatment in convalescent villas, so that even severe cases could recover without having come into contact with patients of distressing habits and ideas. Before the erection of the building a sub-committee, accompanied by the medical superintendent and the architect, visited all the mental hospitals in England where any attempt had been made to separate the recently admitted from the chronic insane. The sub-committee also visited Harrogate in order to make a special study of hydrotherapy. The psychiatric and neurological clinics at Utrecht and Amsterdam were also inspected. They also visited the St. John's Hospital at Brussels. The new reception hospital, which occupies a site gently sloping to the south, will provide accommodation for sixteen patients of each sex. It will have its own separate entrance and will be surrounded by its own gardens. It can, if necessary, be extended. Special attention has been paid to hydrotherapy, and a comprehensive system of baths is installed. There is an operation-room, with anæsthetic and sterilizing-rooms adjoining, with a bed-lift from the ground floor. There are also bacteriological, pathological, and chemical laboratories, consulting-rooms for psychotherapy, clinical rooms, an oculist's room, a dentist's room, photographic room, rooms for X-ray and electrical treatment, and a medical library. In the erection of the building Kenilworth 2½ in. broken colour wire-cut bricks, Empire reconstructed stone, and glazed bricks, have been used.

The general contractors were Messrs. Henry Martin, Ltd., Northampton, who also carried out the plumbing and sanitary work and the gasfitting, and the sub-contractors were as follows: Leeds Fireclay Co. (glazed bricks); Kleine Patent Fire-Resisting Flooring Syndicate, Ltd. (fireproof floors); Diespeker & Co. (mosaic wall tiles and flooring, decoration, and stair treads); Wilkins and Bedford (laying of Stamford stone tiles); The Limmer and Trinidad Lake Asphalt Co. (asphalt); Henry Hope & Sons, Ltd. (casements and casement fittings); Johnson and Wright (stoves, grates, and mantels); Shanks & Co. (special sanitary ware and fittings); Jos. F. Ebner (wood block and parquet flooring); Northampton Electric Light and Power Co. (electric wiring and electric light and bell fixtures and telephones); Henry Martin, Ltd. (special woodwork); J. P. White & Co. (special doors); James Gibbons (door furniture and cloak room fittings); Educational Supply Association, Ltd. (folding gates and shutters); Smith, Major and Stevens (lifts); G. N. Haden & Sons (heating and ventilating); James Slater & Co. (cooking machinery).

The Victory Wing, Royal Devon and Exeter Hospital

E. H. Harbottle and Sons, F.R.I.B.A., Architects

This new wing (page 1014) has been erected with a south aspect, in the grounds of the present hospital. The subsoil is marl. The new wing has a connecting corridor to the existing buildings. It comprises two wards on the ground floor, measuring 45 ft. by 28 ft. each, and containing sixteen beds, and four additional single rooms, with isolation wards, sanitary blocks, intercepting ventilating lobbies, general offices, operating theatre, post-mortem room and mortuary. On the first floor are the nurses' quarters, comprising forty single rooms, offices, and the day room.

The building is of brick, with a Bath stone plinth and a slate roof. The fireproof floors and staircases are of reinforced concrete. Patent composition floors are used throughout the building except in the sanitary blocks, offices, and the operating theatre, which have mosaic floors and Biancola wall linings, all constructed with rounded angles and coves for easy cleaning.

The general contractors were Messrs. E. C. Lea & Co., of Exeter, and the sub-contractors were as follows: Hancock & Co., Exeter (sandfaced bricks); Thomas Shillitoe, Upper Norwood (reinforced concrete construction and fireproof floors); The Art Pavements and Decorations, Ltd., Camden Town (wall, ceiling, and floor tiles); Old Delabole Slate Quarries, Cornwall (slates); James Gibbons, Wolverhampton (casements and casement fittings and door furniture); Downe & Baker, Exeter, Godsland & Son, Exeter (plumbing and sanitary work); Shanks & Co., Barrhead, Scotland (sanitary ware and fittings); Thomas Shillitoe and Art Pavements and Decorators, Ltd. (mosaic floors); Downe & Baker, Exeter (gasfitting); Hubbier & Son, Exeter (electric wiring and electric light fixtures); Gardener, Sons & Co., Ltd., Bristol (gates, railings, hand-rails, balusters, etc.); G. N. Haden & Sons, Trowbridge (heating and ventilating).

Birmingham School Clinic

H. T. Buckland, F.R.I.B.A., Architect

This clinic (page 1015) has been built in Great Charles Street, on the site of old property, which was demolished to make way for the new building. The clinic abuts on both sides against existing buildings. This has necessitated certain modifications in planning. Every child who presents itself for treatment has to be accompanied by a responsible person, and this necessitates large waiting-rooms, and a considerable amount of clerical work, for which generous accommodation has been provided. At the entrance is the medical officer's room. In this room the child, when necessary, is disrobed in the presence of its guardian, who then takes the child through to the dressing-room. The remedial work is of the usual type, consisting of dental treatment, extractions, the examination and treatment of ear, eye, nose, and throat troubles, and curative treatment by X-rays of such diseases as ringworm, etc. A cycle store is provided in the basement, and a covered pram shelter in the area immediately behind the dressing-room. The floors throughout consist of solid concrete floors, suspended where necessary, and covered with thick cork carpet. Dadoes have been provided in terrazzo 3 ft. 6 in. high. Woodville stocks have been used for the front, and the stone is mottled Hollington.

The general contractor was Mr. H. H. Crump, of Birmingham, and the sub-contractors were as follows: Josiah Smart, London (asphalt and corridor roof flats); Moss & Sons, Loughborough (reinforced concrete construction and fireproof floors); Tuckers (sand-faced hand-made roof tiles); Henry Hope & Sons (casements and casement fittings); Parker, Winder, and Achurch, Birmingham (stoves, grates, mantels, and door furniture); H. H. Crump (plumbing and sanitary work); Doulton & Co. (sanitary ware and fittings); Hyde and Son, Birmingham (gasfitting); Ellis and Ward (electric wiring); Hart, Son, and Peard (now Birmingham Guild) (gates, railings, handrails, and balusters); Diespeker (terrazzo dadoes); Rosser and Russell (heating apparatus and boilers); Marsh & Co., Birmingham (clocks); Midland Educational Co. (special furnishings); The Dreadnought Fireproof Door Co., London (fireproof curtains and doors).

Glass Screen for Broadcasting in Operating Theatres

An interesting and important use of broadcasting is about to be made at the London Temperance Hospital, the new nurses' home and operating theatre of which was opened by Prince Arthur of Connaught on June 10.

This theatre is believed to be the most efficient in the world, and will possess, it is hoped, an entirely novel feature in the shape of a glass screen separating the operating surgeon, his assistant, and the nurses in attendance from doctors, students, and nurses who may have come to study the operation in progress. The reason why these screens have not formerly been employed is that they made it impossible for the surgeon to explain his work while it was proceeding, and thus rendered teaching impossible. But now, by the installation of broadcasting equipment, it should be possible to talk to visitors and explain all procedure without admitting to the floor of the theatre any but the necessary staff.

Leeds and West Yorkshire Architects: New Pupilage Scheme

At a special general meeting of the Leeds and West Yorkshire Architectural Society, held in the Leeds Philosophical Hall, it was resolved unanimously to recommend to members accepting pupils that as a general rule it is desirable that the first two years of pupilage should consist of a full-time course of study at the Leeds School of Architecture, and that the remaining two or three years be divided between office and school training, by day attendance at the former, and by attendance on three evenings per week at the latter.

This arrangement will operate generally throughout the whole of the Leeds and West Yorkshire area; within a radius of ten miles the arrangement is expected to apply without distinction, and outside this boundary the arrangements would be governed by convenience of travel and the ability of students to meet the additional expenditure entailed.

It was realized that concurrently with the closing of the profession to the unqualified practitioner youths entering upon an architectural career should receive a broad and liberal education.

Qualification in the school entrance examination, which is equivalent to probationership R.I.B.A., will form a condition of articles of pupilage, and it is hoped by this means to establish a definite "filter barrier" whereby only pupils possessing natural ability for the work will be allowed to enter the profession.

Competition Awards

Constantine Technical College, Middlesbrough.

The Governing Council of the Middlesbrough Education Committee have, upon the recommendation of Mr. Percy Thomas, F.R.I.B.A., who acted as assessor in the competition promoted by them for a technical college, selected the designs of Mr. G. R. Dawbarn, M.A.Cantab., A.R.I.B.A., who will receive the sum of £200.

Mr. Dawbarn was the winner, in conjunction with Mr. Cyril Farey, A.R.I.B.A., of the Raffles College, Singapore, competition, adjudicated in January, 1924, the buildings being now in course of erection. He was also placed third in the Holmside and South Moor Cottage Hospital Competition in March, 1924.

The Bethune Memorial.

The Imperial War Graves Commission announce that the Assessor, Sir Aston Webb, R.A., has made the following award in the competitive design for the Memorial to the Missing Dead at Bethune:

(1.) Mr. J. Reginald Truelove, A.R.I.B.A.
(2.) Mr. C. T. Armstrong, A.R.I.B.A.
(3.) Mr. John B. Mendham, A.R.I.B.A., F.S.I.

[For the List of Competitions Open see page 1023.]

The 1925 Sculpture Medal

The medal (in silver) of the Royal Society of British Sculptors "for the best work of the year by a British sculptor in any way exhibited to the public in London" has been awarded to Mr. William McMillan, A.R.A., for his work in marble, "Syrinx," at present on exhibition at the Royal Academy. The work was referred to in our issue for May 6.

Law Reports

Covenant to Repair—Liability

Lee v. *Roberts.*

Court of Appeal. Before Lords Justices Bankes, Scrutton, and Sargant.

This was an appeal by the defendant from a judgment of Mr. Justice Rowlatt. The facts of the case were that defendant was a statutory tenant under the Rent Acts of a house built in 1906, and a lease was granted by the father of the plaintiff to one Norris for three years at a rental of £38 per annum and thereafter yearly. In 1908 the defendant took over the lease from Norris, and in 1919 the plaintiff took an assignment from his father. Under the lease the tenant covenanted to replace broken and cracked glass, clean out cisterns, and otherwise keep the premises in tenantable repair, reasonable fair wear and tear and damage by fire and storm excepted. The landlord wishing to raise the rent under the Rent Act, application was made to the County Court Judge, and an order was made by consent that the rent net be increased by £9 10s. in respect of repairs, of which amount three-fifths was apportioned to the landlord, and as to the remainder to the tenant. Defendant's plea was that he regarded himself as not liable for the repairs, as they were always done by the plaintiff's father. Mr. Justice Rowlatt made an order for possession, with £12 10s. damages, and for mesne profits to the date of possession, holding that there were certain things which the defendant had not done which he clearly ought to have done, and that worst of all he had refrained from cleaning out the gutters, so that the water overflowed and soaked the walls and tended to bring about the rust and decay of the pipes.

The Court, after hearing the legal arguments, which were directed to the issue of costs, allowed the appeal, holding that in the circumstances the appellant was entitled to his costs, and directed that the judgment of the learned judge should be amended so as to be a judgment for the plaintiff, but without any costs, upon the ground that the plaintiff had elected to bring the action in the High Court, whereas he could have brought it in the County Court.

Architect's Fees

Abbott v. *Richman.*

Court of Appeal. Before Lords Justices Bankes, Scrutton, and Sargant.

This matter came before the Court upon an appeal by the defendant, Mrs. Richman, against a judgment of Mr. Justice Sankey, sitting in the King's Bench Division, in favour of Mr. Ernest Henry Abbott, an architect, of Warwick Court, Holborn, for the sum of £275, for work done as an architect.

Mr. S. Duncan appeared for the appellant, Mrs. Richman, and Mr. Craig Henderson, K.C., and Mr. Englebach represented the respondent, Mr. Abbott.

Mr. Duncan said his client wished to get a building agreement and erect a building at Mare Street, Hackney, but was anxious that the cost of the building should not exceed £6,000. Defendant's husband interviewed the plaintiff and pointed out to him that his wife was not anxious to run into any unnecessary expense. In February, 1923, were arranged between the plaintiff and the husband of the defendant the terms on which the plaintiff should do the work. At first there was no provision for the payment of any sum to the plaintiff for the scheme and sketch plans, but on March 15, at another interview, it was agreed that plaintiff should have the sum of ten guineas for preparing the scheme and sketch plans, and that if a factory were erected on the site he should act as architect, and should have remuneration calculated on the scale of the R.I.B.A.

Lord Justice Bankes: What is the point in the case?

Mr. Duncan said the £275 was the plaintiff's fees on the abandonment of the work calculated on the R.I.B.A. scale, viz. two-thirds of the scale rate. Counsel's submission was that there was a special agreement between the parties, and that payment to the plaintiff was to be conditional on defendant obtaining a building agreement, and upon the building being erected. That was the only contract ever made. Defendant was only to be liable to pay plaintiff in the event of her obtaining a building agreement from the L.C.C. It was in the contemplation of the parties that the matter might go off, and if it did, defendant was only to be liable for ten guineas.

Lord Justice Bankes said it appeared from the evidence given in the court below that the plaintiff was instructed to prepare the working plans, and that was not included in the ten guineas.

Mr. Duncan said it was impossible to prepare working plans until one had the building agreement.

Lord Justice Bankes replied that he did not share that view. Besides, the plaintiff had said he was told to go on and prepare the plans.

Mr. Duncan then put before the Court the correspondence, and submitted that it appeared from it that the parties were joint adventurers in this matter.

Lord Justice Scrutton pointed out that Mr. Justice Sankey awarded plaintiff his £275 on a quantum meruit basis.

Lord Justice Sargant said it appeared that the appellant adopted the preliminary plans and then told the plaintiff to proceed with the work and act as her architect.

After further argument, and without calling upon Mr. Craig Henderson, the Court dismissed the appeal with costs.

Lord Justice Bankes, in giving judgment, said, in his opinion, Mr. Justice Sankey took quite the right view, and, indeed, the only view of the correspondence and evidence before him. All the contract between the parties provided for was for the performance of preliminary work for a preliminary fee, and this was the view taken by the architect, who pointed out that he could only act in accordance with the provisions of the schedule of the Institute of Architects, which provided for payment on abandonment of the work. Plaintiff had made his position abundantly clear—payment for preliminary work, and after that the Institute schedule. Plaintiff repudiated the suggestion that he was to have nothing if the scheme were abandoned. The learned judge found that further work was done, and plaintiff having established his case, he was entitled to be paid.

Lords Justices Scrutton and Sargant agreed.

Parliamentary Notes

[BY OUR SPECIAL REPRESENTATIVE.]

Colonel Ashley, the Minister of Transport, informed Mr. Cyril Lloyd that the responsibility for the design of the new Lambeth Bridge rested with the London County Council.

Sir Kingsley Wood, Parliamentary Secretary to the Ministry of Health, informed Sir W. Davison that during the three months ended May 1 last, 21,674 houses were completed in England and Wales in connection with State-assisted schemes, and 56,202 were in course of construction on May 1.

Mr. N. Chamberlain, the Minister of Health, informed Mr. T. Thomson that up to May 1 last, fifty-eight local authorities had undertaken work by direct labour on schemes approved under the Housing Acts of 1923 and 1924. He was quite prepared to authorize local authorities to undertake building by direct labour if satisfied that the authority can make efficient arrangements for the supervision of the work, and that the method is likely to prove financially advantageous to the ratepayers.

Mr. N. Chamberlain informed Mr. T. Thomson that on May 1 the number of houses completed in connection with schemes under the Housing Acts of 1923 and 1924 were 76,809 and 3,259 respectively.

Mr. N. Chamberlain informed Mr. Montague that apart from the demonstration houses, approval had been given for the erection of Telford houses as follows: Bolton, 100; Birmingham, 8; Bristol, 20; Smethwick, 6; Woolwich, a small number, not exceeding 20. All these were non-parlour houses, and the average price per house was £490, including foundations, drains, paths, fences, etc. So far as he was aware, the only Atholl houses at present being erected by local authorities in England and Wales were for demonstration purposes. These were non-parlour houses, and the price was £450 per house, including foundations, and all work inside the foundations, but excluding paths, drains, and fences.

Unionists and Housing.

New methods of house-construction were discussed with their inventors by the Unionist Housing Committee at the House of Commons. Lord Weir, Mr. Humphreys (Braithwaite houses), Commander Burney, M.P., Lieut.-Colonel Nissen (the Nissen-Petren roof), and Mr. Galbraith (representing the Duke of Atholl) were present for the purpose of answering questions. It is stated to be the intention of the London County Council to erect specimens of some or of all these houses, and the Moir Committee will then advise which of them should receive the Government subsidy. The information acquired as the result of cross-examination of the inventors will be the subject of discussion at a further meeting of the Unionist Housing Committee.

Enquiries Answered

Enquiries from readers on points of architectural, constructional, and legal interest, etc., are cordially invited. They will be dealt with by a staff of experts, whose services are specially retained for this purpose. If desired, answers will be sent direct through the post. In no case is any charge made for this service. Whenever diagrams accompany an enquiry, they should be clearly drawn and lettered and inked in.

ROOF DRAINAGE.

"C. Y." writes: "Please tell me how to overcome the following difficulty in connection with roof drainage: The gutter AB is about 9 in. higher than CD, and CD is about 6 in. higher than BE. The water from AB is collected at B, and runs down into the gutter BE. The gutters CD and BE are about a foot wide. The gutter HE, into which the above three gutters discharge is only about 3 in. wide. There is a down pipe at H, but owing to the gutter sloping the wrong way, the whole of the water collected by the four gutters has to find its way from the roof down the 3 in. pipe at F. This pipe runs down inside the wall till it arrives below the floor of the room below, when it takes a right-angle turn along the ceiling of the lower room (a pantry), then another right-angle turn down the outside of the wall to the trap. The gutter JL also runs the wrong way, so that the water from it has to run through a lead-lined and covered channel round the small bathroom (inside) JK. The inner of the two gables between which it runs is 5 ft. or 6 ft. higher than the outer one, so that this gutter is really along the wall of the inner one. The room under which the pipe FG discharges has been added at some time to connect the wing NO with the rest of the house, and it is built of lath and plaster, lined with matchwooding. Before this was done the pipe FG was probably just adequate to do its work with the rather less roof-space to drain, and at the worst the gutter HE might overflow into the yard. But now, if this gutter gets stopped up with leaves, or there is a heavy fall of snow, the water overflows down inside the house, and, of course, damp in confined spaces is quite liable to occasion dry-rot.

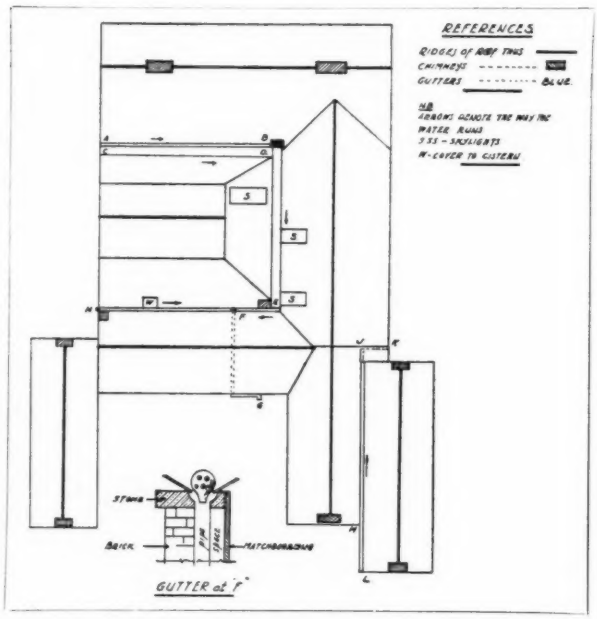
"Various builders have been consulted, but none of them have been able to suggest any remedy. I suggested to them the following:

"1. Do away with the roof over the pipe FG (it is of light wood construction covered with shingles and corrugated iron), and substitute a roof without a ridge, sloping to the back of the house so as to run the water into the yard. They said that the span was too much for this, that there was not enough slope, that in any case it would be a very expensive job, and that my suggestion would probably be a failure.

"2. Alter the slope of the gutter HE by lowering the end at H. Upon investigation they reported that this could not be done, because it was grooved out of the coping stones, upon which rested the old slated roof on the one side, and the light roof of the connecting room on the other.

"I have since wondered whether, considering the much greater height of the gutters AB and CD over the others, it would be possible to so fill in the gutters from B to H with bricks and cement that there would be a gradual and sufficient slope from B to H. If this could be done it would also have the effect of widening the gutter from E to H. The chimney at E is unused, and ought, in any case, to be removed, as it now serves no fireplace. To me the difficulty would appear to be as to how the edges of the proposed cement drains could be sloped to meet the tiling, especially where the skylights, etc., come down to the gutters. The roofs, except that at HF, which is covered with shingles, are tiled with very large, heavy, old-fashioned slates. The latter have been put on in the obsolete way, beginning with the top row below a stone ridge, and are much inclined to slip down."

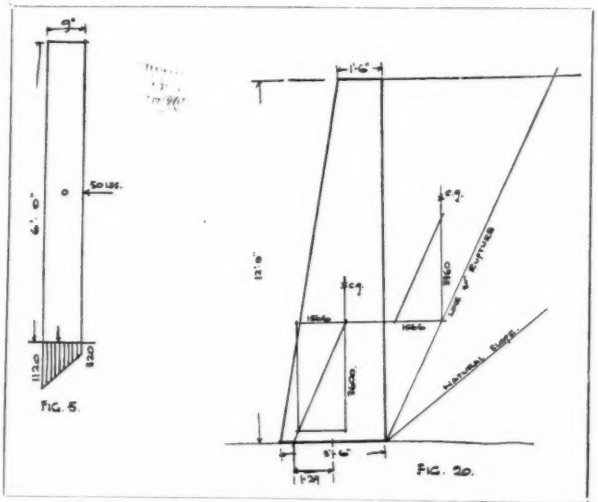
—From the description and sketch it would appear that the trouble is due to insufficient depth in the gutter HE. With severe loading, the water level in this gutter is raised to such a height that leakage to the interior of the building is set up through capillary action. None of the suggestions mentioned by the querist is likely to yield improvement; and reduction in the depth of the gutter HE (e.g. by partial filling) would almost certainly aggravate the trouble. It should not be difficult to devise an effective and comparatively inexpensive remedy. One course which seems to promise a complete solution is to provide a new gutter HE, of waterway section (rectangular) at least 6 in. width and 4 in. depth. There would seem to be little difficulty in the way of fixing such a gutter in the space between the wall and the matchlining; and it might be supported by the studding—this probably needing some slight modification to support the light roof to which the matchlining is fastened. The new gutter should be horizontal throughout, and the down pipe at H could then assist in clearing it. Above all, the proposed gutter should be sufficiently below the existing roof construction and coverings on both sides to prevent capillary action. E. G. B.



ROOF DRAINAGE.
(*See answer to* "C. Y.")

THE STABILITY OF WALLS.

"L. W." writes: "I have been studying the series of articles appearing in THE ARCHITECTS' JOURNAL of May 10, 1922,



THE STABILITY OF WALLS.
(*See answer to* "L. W.")

onwards, on the 'Stability of Walls,' by Professor Henry Adams. A point of uncertainty with reference to the interpretation of the formula $\frac{W}{A} \pm \frac{M}{Z}$ has arisen, as follows:

"Article No. 1, p. 695, states the formula for max. and min. pressures on base as $\frac{W}{A} \pm \frac{M}{Z}$ which, applied to Fig. 5, gives

$$= \frac{2160}{4 \times \frac{9}{12}} \pm \frac{50 \times 3 \text{ ft.}}{\frac{1}{6} \times 4 \times (\frac{9}{12})^2} = 720 \pm 400.$$

"In Article No V, p. 863, a similar formula is used in determining the pressures on the base of a retaining wall, Fig. 20, reproduced above, and reads—

$$\frac{W}{A} \pm \frac{M}{Z} = \frac{3600}{3{\cdot}5} \pm \frac{3600 \times 1{\cdot}29}{\frac{1}{6} \times 1 \times (3{\cdot}5)^2}$$

"But Article I states that M is the 'bending moment due to side load, or force × leverage.' In the example above, 3,600 lbs. is the weight of the retaining wall, and 1·29 is the distance from centre of base to the point where resultant of forces cuts the base. But the 'force' acting upon the wall is 1,566 lbs., the horizontal component of the pressure of earth, and its 'leverage' about the base is 4 ft. I cannot therefore quite understand why M in the above example should not read (1,566 × 4) in lieu of (3,600 × 1·29).

"I enclosed the two Figs. (reproduced) referred to, and shall be glad if you will kindly clear this point of doubt."

—The formula $\frac{W}{A} \pm \frac{M}{Z}$ is an extremely useful one and often crops up in calculations. It applies to the distribution of pressure on any surface subject to a direct load and a bending moment. W is the load, A the area over which it acts, M the bending moment, and Z the section modulus of the surface under pressure. With the retaining wall as given, the thrust of 1,566 lb. acting in conjunction with the load of 3,600 lb. pushes the resultant 1·31 ft * beyond the centre line of the base, and so produces a bending moment of 3,600 × 1·31 = 4,716 lb. ft. = M in the formula. This might have been worked another way, but not quite so simply. For example, the weight of wall 3,600 lb. has its centre of gravity ·43 ft. from the centre line of base towards the back. This will give a negative bending moment of 3,600 × ·43 = 1,548 lb. ft. Then the thrust alone produces a bending moment of 1,566 lb. × 4 ft. leverage = 6,264 lb. ft., so that the resulting M from the combined forces will be 6,264 − 1,548 = 4,716 lb. ft. as found by the first method.

HENRY ADAMS.

* This was previously scaled as 1·29 ft., but calculation gives it as 1·31 ft.

R.I.B.A.

R.I.B.A. New Members.

At the last general meeting of the R.I.B.A. the following members were elected:

As Fellows (14).

Adams, Percy Tidswell
Best, Halstead
Dunn, Herbert Henry
Glencross, Leslie Harold
Guthrie, Leonard Rome, M.C., M.R.I.
Hobson, Captain Joseph Reginald, M.C.
Holt, Harold Guy
Swannell, Charles Malcolm
Thompson, Morris
Trench, Gilbert Mackenzie, F.S.I.
Walker, Edward Holsworth
Walker, Marshall Eyre
Ward, Bernard Michael
Welch, Roland

As Associates (5).

Ashburner, Edward Heathcott, B.Arch. Liverpool
Bloodworth, Charles Thomas, B.Arch. Liverpool
Jenkins, William Victor, B.Arch. Liverpool.
Maw, Samuel Herbert
Velarde, Francis Xavier

As Hon. Associates (4).

Dearmer, the Rev. Percy, M.A., D.D.
Earle, Sir Lionel, K.C.B., K.C.V.O., C.M.G., J.P.
Shaw, Evelyn Campbell, M.V.O.
Turner, Laurence Arthur, F.S.A.

R.I.B.A. Council Meeting.

Following are notes from the minutes of the last meeting of the Council of the R.I.B.A.:

The R.I.B.A. Visiting Board.—The report of the Board on the Department of Architecture, Surveying and Building of the Northern Polytechnic was approved by the Council, and certain exemptions from the intermediate examination of the R.I.B.A. will be granted to students of this school.

L.C.C. Scholarships in Architecture.—As a result of representations made by the R.I.B.A. Conference on Prizes, the London County Council have decided that all applications for L.C.C. scholarships in architecture shall be referred to the Board of Architectural Education for a report on their order of merit.

The Manchester Society of Architects.—The new articles of association of the Manchester Society of Architects were approved by the Council under By-law 82.

The British School.—A cordial vote of thanks was passed in favour of Dr. Thomas Ashby, the retiring director of the British School at Rome, for his many services to architecture and architects during his long tenure of the directorship.

Retired Fellowship.—Mr. C. R. Guy Hall, elected Associate in 1888 and Fellow in 1904, was transferred to the class of Retired Fellows.

The R.I.B.A. Statutory Examination.

The following notice has been issued by the R.I.B.A.:

The attention of architectural students is called to the statutory examination of the Royal Institute of British Architects. The Building Acts require every candidate for a district surveyorship to hold the certificate of competency of the Royal Institute of British Architects. In addition to certificates of competency for the office of district surveyor under the Metropolitan Building Acts, certificates of competency for building surveyors under the Public Health Acts are also granted. The Royal Institute of British Architects examination qualifying for candidature as a building surveyor under local authority has recently been adopted by the Building Surveyors' Association as the examination for membership of their Association. The Royal Institute of British Architects statutory examination was started in 1856, and from that date to 1914 an average number of five candidates passed each year. From the list of these candidates it is seen that many architects in the past have sat for it who have never applied for a district surveyorship or for a building surveyorship, but have taken the examination as a qualification for private practice. A knowledge of the Building Acts is of great use to provincial architects, as well as to architects practising in the metropolitan area. It is often found that when provincial architects start building in London, their designs have to be modified to meet the requirements of the London Building Acts. The examination is a thorough test of a knowledge of the Building Acts and building construction, and requires a careful study of these subjects, with which every architect ought to be acquainted.

List of Competitions Open

Date of Delivery.	COMPETITION.
*June 30	**Lay-out of open spaces and fortifications between Valletta and Floriana and those encircling Floriana. Premiums £1,000 and £500. An indemnity of £100 will be awarded to three other designs showing conspicuous merit. Assessors, Mr. E. P. Warren, F.S.A., and Professor Patrick Abercrombie, A.R.I.B.A.**
June 30	War Memorial for Marley. Maximum cost £2,000. Apply Town Hall.
July 1	**An extension building adjacent to the Shirehouse, Norwich, for the Norfolk County Council. Premiums £150, £100, and £50. Assessor, Mr. Godfrey Pinkerton, F.R.I.B.A., on the whole of the designs submitted, and to make the award. Apply Mr. H. C. Davies, Clerk of the Council, The Shirehouse, Norwich.**
Sept. 1	**High bridge over Copenhagen Harbour. Three prizes to the value of Kroner 35,000. Apply City Engineer's Office, Town Hall, Copenhagen. Deposit of Kroner 100 (returnable).**
Sept. 5	Proposed new out-patient and casualty department for the Board of Management of the Wolverhampton and Staffordshire Hospital. Assessor, Mr. T. R. Milburn, F.R.I.B.A. Premiums, £200, £150, and £100. Apply, with deposit of £1 1s., to Mr. W. H. Harper, House Governor and Secretary, Wolverhampton and Staffordshire Hospital.
Oct. 1	The Municipality of Drammen, in Norway, invites Norwegian and foreign architects and engineers to compete for the construction of a new bridge across the river of Drammen (Drammenselven) between the two neighbourhoods Bragernæs and Strömsö. Judging Committee: Professor Otto Linton, Stockholm, appointed by the Norwegian Engineers' Association; Mr. Arne Eide, architect, Oslo, appointed by the Norwegian Architects' Association; Mr. M. E. N. Saxegaard, district-chief, appointed by the Norwegian State Railways; Mr. Olaf Stang, engineer-in-chief, Oslo; Mr. U. Lied, chief physician, chairman, appointed by the Municipality of Drammen; Mr. Otto K. Römcke, wholesale merchant, Drammen; and Mr. A. Heitmann Arntsen, secretary, Drammen. Mr. Lied and Mr. Saxegaard are respectively president and vice-president of the committee. The following prizes are offered for the best designs: First prize, 10,000 Norwegian crowns; second prize, 8,000 Norwegian crowns; third prize, 6,000 Norwegian crowns. Apply Bureau of the Government Engineer (Statsingeniörkontoret) at Drammen. Deposit 40 Norwegian crowns.
Oct. 8	Proposed Fire and Police Station at Marlborough Crescent, Newcastle-upon-Tyne. Premiums: £500, £300, and £100. Assessor, Mr. Percy S. Worthington, D.Litt., M.A., F.R.I.B.A. Apply, with deposit of £2 2s., to Mr. A. M. Oliver, Town Clerk, Town Hall, Newcastle-upon-Tyne, by July 4.
Dec. 31	**The Argentine Government offer prizes of 10,000, 5,000, 4,000, 3,000, and 2,000 Argentine gold pesos for the best architectural designs for a National Institute for the Blind. Apply Enquiry Room, Department of Overseas Trade, 35 Old Queen Street, Westminster, S.W.1.**

* Date of application passed.

Waterloo Bridge

Lord Crawford's Hope

Lord Crawford, speaking at the annual meeting of the Society for the Protection of Ancient Buildings last week, at the headquarters of the Royal Institute of British Architects, referred to the report which has been prepared for submission to the L.C.C. in support of the claim that Waterloo Bridge need not be demolished, and said it would triumphantly vindicate the contention that it was possible and safe to maintain the bridge practically as it was to-day.

The annual report submitted to the meeting described the part the society has taken in the agitation for the preservation of the bridge, and added: "So important does the committee think this case that it has decided, if necessary, to spend all its capital in defence of the bridge, believing that members of the society will not allow it to be crippled for want of funds in this matter, and that they will come forward to make good any loss sustained in the effort to protect the bridge." The accounts showed a balance in hand of only £3.

Moving the adoption of the report, Mr. J. Frederick Green, who presided, mentioned that the Norwich City Council had decided to follow the example of Newcastle and Salisbury in appointing an ancient buildings committee. On the question of the City churches he said that as the result of a conference between their society, the Royal Academy, and the Institute of British Architects, a petition had been sent to the Ecclesiastical Committee of the Houses of Parliament urging that the measure which had passed the Church Assembly should not be approved until it was clear that no more churches in the City were to be destroyed. They had also had the advantage of the advice of several experts on the subject of St. Paul's, and had asked to be allowed to give evidence before the new Commission which was dealing with this matter. They had further decided to support an appeal which would be made shortly by the Dean and Chapter of St. David's for help towards the preservation of some interesting old buildings at St. David's which would afterwards be used for cathedral and diocesan purposes. Alluding to the old saying that they were always having to fight architects and parsons, he declared that nowadays they frequently found themselves on the best of terms with both. The report was adopted.

Lord Crawford spoke of the anxieties the society had had during the year. With regard to the Union of Benefices measure, which affected the City churches, they had at last secured that if the Bill received the sanction of Parliament, they and analogous societies and interests should be represented on the committee which dealt with the case. They would so have gained the power of stating their case, and he hoped to secure a measure of delay. One other question of vital importance was that of Waterloo Bridge. They, in common with others, had waited on the Bridges Committee of the London County Council and stated their case for preservation.

This report will triumphantly vindicate the claims advanced months ago by this society that it is perfectly possible and perfectly safe to maintain Waterloo Bridge practically as we see it to-day.

The past year had been very largely a bridge year for the society, and they were glad that the Minister of Transport had proved such an enthusiastic supporter in these matters. No public department ought to show a spark of enthusiasm unless it knew it had public opinion behind it. Opinion was slow to change, and the local mentality of the civic authority was difficult to rouse, but there was clearly a growing desire on the part of public authorities to do the right thing and to secure sound advice without being scolded into doing it. Wherever he turned he saw support growing on the part of the public for the principles embodied in their creed.

The thanks of the meeting to Lord Crawford and the chairman were expressed by Mr. Thackeray Turner and Mr. R. Minton Turner.

Croydon Town Planning Schemes

Mr. G. F. Carter, M.Inst.C.E., M.T.P.I., in reading a paper before the Town Planning Institute made the following interesting remarks with regard to the Croydon (East) and Addington Town Planning Scheme, one of the three schemes of the Corporation; and the North-east Surrey and West Kent Joint Advisory Town Planning Committee:—

Croydon (East) and Addington Town-planning Scheme.

The Corporation, by resolution of the Council on July 18, 1921, adopted a third town-planning scheme of an area of 1,590 acres on the east side of the borough and known as the Croydon (East) Town-planning Scheme, and by a further resolution on October 24, 1921, and by arrangement with the Godstone Rural District Council, decided to extend this town-planning scheme to include 2,606 acres within the parish of Addington. Subsequently the area was further extended by resolution of the Council on September 29, 1924, to include the remainder of the parish of Addington, 999 acres.

These schemes were united to form a joint town-planning scheme to be known as the "Croydon (East) and Addington Town-planning Scheme," with an area of 5,195 acres.

By reason of the rapid development of 317 acres known as the Ham Farm Estate, lying within the town-planning area and partly within the borough and the rural district, the Council adopted on May 19, 1922, a preliminary statement to cover this area only, and this was approved by the Minister of Health on November 8, 1922, under the title of the "Croydon (East) and Addington Town-planning Scheme —Preliminary Statement as to Ham Farm Estate," the Corporation being the town-planning authority for this area.

This procedure was found necessary in order to deal quickly with the difficult points which had arisen in connection with building development on this estate for which the ordinary powers of the Corporation were found inadequate.

The preliminary statement of the main area was approved by the Minister of Health on January 29, 1924, the Corporation and the Godstone Rural District Council being the town-planning authorities for their respective areas.

The area within the borough includes the unbuilt-on and better residential neighbourhoods towards Croham Hurst, Addington Hills, and Shirley, and the open land of Addiscombe, the Beckenham and Shirley Park golf links, and in the parish of Addington the famed Addington Hills recreation ground, belonging to the Corporation, the large residences and grounds of "The Ballards," "Heathfields," and "Addington Park" (one-time palace of the Archbishop of Canterbury), and the Addington Park golf links, and the old village and farm lands of Addington, and the wooded areas and farm lands towards West Wickham and Beckenham.

It is undoubtedly a first-class residential area, and is far-famed for its hills and great sylvan beauty.

The area has presented some difficulties from a town-planning point of view, both by reason of varying levels for arterial roads, and the density of the zoning to be adopted, more particularly in the parish of Addington.

North-east Surrey and West Kent Joint Advisory Town-Planning Committee.

The formation of this committee was the result of meetings convened by the Minister of Health, of representatives of town-planning authorities in North-east Surrey, held in February and June, 1922. The object sought, being the co-ordinating of the town-planning proposals of the various authorities.

The committee was designated the "North-east Surrey Joint Advisory Town-planning Committee," and its first meeting was held at the Ministry of Health on October 16, 1922. Eight other meetings have subsequently been held at the Town Hall, Croydon. The annual meeting is held on the first Monday of May in each year.

The original authorities joining the committee were: Croydon Corporation, Wimbledon Corporation, Beddington and Wallington U.D.C., Carshalton U.D.C., Coulsdon and

Purley U.D.C., Merton and Morden U.D.C., Mitcham U.D.C., Godstone R.D.C.

As the work of the committee progressed the necessity arose for co-operating with the authorities in West Kent, and consequently in 1923, the undermentioned Town-planning authorities in West Kent joined the committee, which was thenceforward designated "The North-east Surrey and West Kent Joint Advisory Town-planning Committee": Bromley Corporation, Beckenham U.D.C., Chislehurst U.D.C., Penge U.D.C., Bromley R.D.C. Wimbledon and Chislehurst resigned from the committee in 1924.

The total acreage comprised in the committee's area is 127,416 acreas, and the total population 512,159 (1921 census). East to west the district extends about 18 miles, and north to south an average of about 9 miles.

An interesting item in connection with the work of the committee was the formation of a sub-committee, consisting of surveyors of all the constituent authorities, established for the purposes of considering technical questions arising on matters brought before the committee.

The committee have obtained considerable assistance from officers of the Ministry of Health, and in particular from Mr. G. L. Pepler, who has attended many of the meetings.

The committee have received preliminary statements and town-planning schemes prepared by the constituent authorities, and have considered matters arising thereon, and after careful consideration and consultation have had prepared a regional hand-map of the district showing the town-planning proposals.

Swedish Green Marble

By "ARGECIE"

ALTHOUGH there are several green marbles quarried in Sweden, the expression "Swedish Green" usually implies in this country the variety (or varieties, for there are three) quarried at Kolmarden in the Ostergothland province, about a dozen miles from Norrköping, the centre of the cotton and woollen industry. The quarries are situated on the northern shores of the Braviken, half bay, half lake, amid the most charming scenery, and local legend has it that the marble was first discovered by some Italians from the Carrara district, who sighted an outcrop from the deck of their vessel as she sailed up to Norrköping. In any case, the quarries were first worked in or about the year 1650, but between that date and the early part of the nineteenth century the marble was only worked intermittently.

A narrow-gauge railway connects the quarries with the main Swedish railway line, but the nearest station for visitors is Krokek, three and a half to four hours' train journey from Stockholm. To the Englishman the smaller Swedish stations are likely to present a difficulty, especially if one is doing the trip alone and is not well versed in the language. Under such circumstances one must perforce reduce one's inquiries to a minimum, and rely a great deal on one's eyes. Now the little country stations in Sweden do not display the name in the bold type customary here, and the Statens Järnvägars Kompaniet manage to tuck the name away in some inaccessible spot where only the experienced will look, a spot readily discovered by the foreigner just as the train begins to move off to the next station.

Krokek is typical of these smaller stations. It has a detached villa of red brick to serve for the booking-office, goods department, and station-master's residence. Its one platform stands between the two sets of metals. Having arrived at Krokek the rest of the journey is by a road which winds along between the hills and finally down by the side of Braviken. The surrounding hills are all of granite, and the roadside is scattered with boulders from the hills.

The quarries are owned and worked by the Nya Marmorbruks Aktiebolaget, under the management of Herr Carl Lönnquist. The offices for the clerical and drawing staffs are under the same roof as the works, for not only is the marble quarried here, but there is also a splendid manufacturing plant for working it. Much of the manufactured work in this marble, indeed, which one sees about Sweden, has been carried out at Kolmarden. Surrounding the office building is the storeyard, with a tremendous stock of green marble: slabs, blocks, pieces, and strips innumerable. At the top of the hill, overlooking the offices, are the main quarries, but, to the right, on the way up, are some new workings. These latter are actually on the site of the original quarry which until recently had not been used for very many years. When marble was needed for an extension to the Royal Palace in Stockholm, at the time of the marriage of the Crown Prince in 1923, a few blocks were quarried at this spot again by way of experiment to secure a variation from the standard types. The result was most satisfactory, for the marble proved to be a much deeper tone of green than the others, and had black vein masses showing up in effective contrast. The deposit seems to be smaller than those at the top of the hill, but a wire saw has been fitted up and good blocks are being quarried.

At the hill-top, 200 ft. above sea-level, are two large workings. Nearly three years ago, however, the more easterly one was discovered unsafe, and it was decided to abandon the quarry. Work had only been stopped a few hours before the first fall of rock occurred. The present working is something like 15 ft. wide and 130 ft. deep. It is a narrow chasm, and, from the footbridge which spans the top, the workmen in the half light at the bottom of the cutting look like ants, while, rising up, comes the drone and spatter of the pneumatic drills. In many places the sides lean over at an ugly-looking angle, several degrees out of the vertical. Dowelled to the farther side is an iron ladder for the quarrymen. There is a large overburden of unsound material at the surface, and this makes the quarrying a fairly costly proposition, although the most up-to-date methods are used.

Geologically, according to Herr Asklund, of the Institute of Geological Research in Stockholm, the Marmorbruket marbles belong to the oldest Archean strata of Sweden, and occur as large layers in the so-called "Leptite" formation, the ancient Archean volcanic formation of Sweden, which is generally, as it is also in the case of the Marmorbruket field, strongly folded and invaded by granites. During the Archean folding processes the Leptite formation became altered, and its rather marly limestones were converted into crystalline marbles containing abundant silicates, as pyroxenes, olivines, amphiboles, and spinels. Later on these minerals were altered to a large extent into serpentine, to which the beautiful colour of the marble is due, and the variable distribution of this gives rise to the available series of types.

In addition to the new green already described there are two varieties of Kolmarden marble on the market, the "G," a light shade with mottled markings (the tone of which can be considerably improved by cutting the slabs through the bed of the material) and the "NY" a good deep green. The marbles are very reliable, consistent in texture, and extremely sound; great considerations when marble is required for exterior work. The crushing strain is given as 925 kg. to the square centimetre, or nearly six tons to the square inch.

The colouring of the Kolmarden marbles will satisfy most tastes, especially as green seems to be the vogue to-day. For flooring tiles the marbles rank with Sicilian and Belgian black for durability, and planned with either the white or the black in any type of pattern will be much more effective and considerably less tiring to the eye than the more ordinary black and white designs.

There are many examples of the Kolmarden green marbles in England, although most of the more notable, at least so far as London is concerned, date back to pre-war days, because since the war the material has suffered through the unfavourable Exchange between this country and Sweden. This disadvantage has now, however, practically disappeared, and the prices at which the marbles are offered to-day are not at all prohibitive. The following are some of the buildings where the marbles may be seen: London: Coliseum (internal decorative work); Strand Palace Hotel (wall-linings); Lyons' Popular Café; Piccadilly Arcade. Liverpool: Colonial House; the Cathedral. Edinburgh: North British Mercantile Insurance Co.'s offices. Glasgow: Anchor Line buildings.

The list of European palaces, royal and commercial, hotels and banks where the Kolmarden marbles have been used is a very formidable one. Germany and Russia in particular were big buyers before 1914.

The Week's News

100 More Houses for Worksop.

A plan for the erection of 100 houses has been approved by the Worksop Urban District Council.

Perth to Build 150 Houses.

The Perth Town Council are to proceed immediately with the erection of 150 houses.

Two New Secondary Schools for High Heaton.

The Newcastle City Council have resolved to erect two secondary schools at High Heaton at a cost of about £130,000.

Plymouth's New Park.

The Plymouth Corporation propose to purchase 200 acres of land, at a cost of £88,000, from Lord St. Levan for a central park.

Maltby Improvements.

The Maltby Urban District Council have decided to acquire land for the erection of Council offices, swimming baths, and public halls. The Council have also resolved to erect fifty houses under the 1924 Act.

Redcar's New Building Estate.

The Redcar Town Council have adopted a scheme for the development of an estate of 33 acres recently acquired by the Corporation. The estate provides sites for over 380 houses and an open space of about 6½ acres in extent.

New Schools for Wakefield.

Mr. Percy Morris, city architect of Wakefield, has received instructions to prepare plans and quantities for the erection of a new central school for 250 scholars, a new middle school for 300, and an infants' school for 300 scholars.

Extension of Mary Datchelor School.

It is proposed to rebuild a portion of the Mary Datchelor School, Camberwell, in order that permanent accommodation may be found for 600 scholars. It is also proposed to improve the accommodation at Sir Walter St. John's School, Battersea.

Chester-le-Street Rural Housing.

The Chester-le-Street Rural District Council have resolved to apply to the Ministry of Health for sanction to borrow £51,300 for the erection of 100 houses at Fatfield; £30,780 for sixty houses at Lumley; and £35,910 for seventy houses at Edmondsley.

The Coventry Housing Scheme.

The Mayor of Coventry laid the foundation-stone of the first of 250 dwellings to be erected on a Corporation estate as an instalment of a larger scheme for over 1,600 houses. The total cost of the complete scheme is estimated at £700,000 or £800,000.

Proposed New Mossley School.

In connection with the proposed new school at Mossley the Sites and Buildings Committee of the Mossley Education Committee have recommended a suitable site at Station Road, Micklehurst. A plan of the site is to be submitted to the Board of Education.

Housing at Hemsworth.

The Hemsworth Rural District Council have decided to apply to the Ministry of Health for sanction to borrow £53,684 to defray the cost of the erection of 102 houses at Grimethorpe. Plans are being prepared of fifty houses proposed to be erected at South Kirkby.

Housing at Reigate.

The Reigate Corporation have informed the Ministry of Health that during the period ending October, 1926, they contemplate erecting 100 houses. The Reigate Rural District Council contemplate building seventy-five houses during the same period.

A Canadian Skyscraper.

A twenty-six-story building is being erected at the intersection of Yonge and King Streets, in Toronto, two of the city's main thoroughfares, costing five million dollars. When it is completed, at the end of this year, it will be the highest building in the British Empire.

Mr. E. F. Spurrell.

We regret to record the death of Mr. E. F. Spurrell, borough engineer of Holborn. He was responsible for the inception of the newly formed Institution of Public Lighting Engineers, of which he became a member of the Council, a position he held at the time of his decease.

Hull Improvement Scheme.

A scheme has been prepared for abolishing thirteen level crossings in Hull, fifty of which hold up 35,000 vehicles daily. The cost of the scheme will be £1,200,000, of which the London and North Eastern Railway have agreed to pay £100,000, and the Ministry of Transport has been asked to pay £800,000.

South Wales Housing Scheme.

The Bedwas and Machen Urban District Council have resolved to apply to the Ministry of Health for sanction to a loan of £21,465, for the erection of forty semi-detached, parlour-type houses on the Brynyfran site, Trethomas, and also for the construction of the necessary roads.

Medal for Best Sculpture of the Year.

The Royal Society of British Sculptors have instituted a medal, to be awarded "For the best work of the year by a British Sculptor in any way exhibited to the public in London." This has been made possible by the generosity of Sir Otto Beit, who has provided the fund for its establishment and endowment. It is hoped shortly to announce this year's award.

Preserving an Ancient Dover Building.

Under the Ancient Monuments Act, the Commissioners of the Office of Works have consented to supervise the renovations of the ancient Maison Dieu Hall at Dover. The Maison Dieu was built by Hubert de Burgh in 1203 as a rest-house for pilgrims from the Continent proceeding to the shrine of Thomas à Becket at Canterbury.

Big Housing Scheme at Merton.

The Cannon Hill estate and the adjoining lands in the Merton and Morden urban district are to be developed by private enterprise on garden city lines; 250 acres of land are affected. It is proposed to build 2,000 houses and leave 75 acres for sports grounds and open spaces, and build houses of various sizes around these.

Brighton Aquarium.

A scheme for the remodelling of the Brighton Aquarium is to be considered at a special meeting of the Council. The plans provide for an entertainment hall with a promenade, a café restaurant, Alpine gardens, and alcoves with brilliant lighting effects. The reconstruction scheme is estimated to cost about £80,000.

Dr. Thomas Ashby Retires.

On the occasion of the retirement of Dr. Thomas Ashby from the directorship of the British School at Rome, the Council of the Royal Institute of British Architects has passed a special resolution expressing appreciation of Dr. Ashby's valuable services to architecture, to architects, and to students of architecture during his long tenure of the position.

Lincoln's Inn Old Hall.

The old hall at Lincoln's Inn, W.C., is to be restored to its early sixteenth-century appearance, inside and out. The plaster coating is being scraped from the outside and the Tudor brickwork, with its criss-cross pattern, restored to view. Inside, the hall has been altered many times since its erection in Henry VII's reign. In 1919 a modern ceiling was substituted for the open roof of oak, which it is hoped now to restore.

Proposed New City Suburb for Manchester.

A proposal is being put forward to develop a large area in Unsworth and Pilsworth, about six miles north of Manchester. The scheme will provide for a new town with a population of between 25,000 and 30,000. The area included in the suggested scheme is bordered by Bury, Heywood, Whitefield, Prestwich, and Middleton, and is under the jurisdiction of the Bury Rural District Council.

Trade and Craft

The Sentry Gas Fires.

Messrs. Wood, Russell & Co., of 34 and 36 Oxford Street, London, W.1, manufacturers and patentees of "Sentry" hot water boilers, have placed on the market three types of "Sentry" gas fires: the inset, self-contained fires, and dog grate.

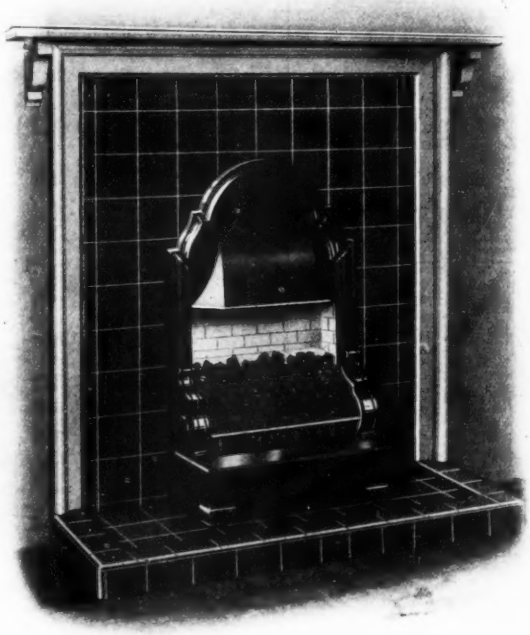
Each fire has the realistic appearance of the traditional coal grate, and is made in the inset form (see accompanying illustration) in 12 in., 14 in., 16 in., and 18 in. sizes. It is thus readily fitted into almost any existing coal grate. Great care has also been taken to give the fire the appearance of a component part of the existing grate.

The same fire unit in all its sizes is used for the self-contained type, the frame and canopy being designed in the decorative style of the William-and-Mary period. The frame projects only 1¼ in. from the face of the surround. The self-contained fire thus has the appearance of a built-in fire, and it is stated that it can be easily fixed by a fitter without the assistance of other skilled tradesmen. The canopy contains a hood for the removal of the products of combustion and for the efficient ventilation of the apartment.

The dog grate is made in the 18 in. size, and is fitted with an iron fire-back of the "Sussex" type. It is designed expressly to fit into existing tile and brick recesses, where the other types of gas fires would not be suitable.

An important feature of the whole series of the "Sentry" gas fires is that the measurement representing the size of fire is the actual width across the radiants. Thus, a 14 in. fire fits the ordinary 14 in. coal grate, and is actually 14 in. across the radiants. An interesting feature of the "Sentry" fire is the introduction of a radiant combining the advantages of the vertical radiant with the charm of the inclined loose black fuel. While an inclined pattern of fire can be made to more nearly resemble a coal fire, it is claimed that this has not been effected at the expense of the direct radiant heat. The lower and vertical portion of the radiant is unobstructed, and direct radiation of heat is assisted by the highly polished trivet and fuel bar.

Messrs. Wood, Russell & Co. have recently opened extensive showrooms at 34 Oxford Street, where the new series of gas fires are displayed in attractive mantel settings. The showroom decoration and the reconstruction have been executed from designs by Major F. Cornelius-Wheeler. At the showrooms all types of fires can be seen daily in operation under ordinary working conditions.



SENTRY SELF-CONTAINED GAS FIRE.

"Stantonite."

A sample of "Stantonite," for waterproofing walls, floors, roofs, and reservoirs, has been sent us by the Stantonite Ironworks Company, Ltd., near Nottingham. "Stantonite" for flooring is claimed not only to seal the minute interstices, but to bond the surrounding structure, giving as a result a dense, compact, homogeneous surface. "Stantonite" is therefore claimed to be wearproof, waterproof, oilproof, and dustless. It is largely used for floors in engineering shops, waterworks, gasworks, garages, generating stations, quays, docks, laundries, dairies, breweries, warehouses, and many other works where a hard-wearing surface is demanded, or where water or oil is in constant use. For walls, tanks, reservoirs, etc., it is claimed that "Stantonite," mixed in the form of a grouting in the proportion of "Stantonite" 1 lb., cement 3 lb., and applied by brush will render the most porous brickwork, breeze blocks, or concrete absolutely waterproof.

Following are the results of tests to ascertain rate of wear of concrete paving slabs and paving slabs faced with "Stantonite," carried out by Messrs. David Kirkaldy and Son.

Test No.	Description.	Dimensions.	Weight. Before test.	Weight. Loss by Attrition.	Calculated mean loss of thickness.
		Inch.	lb.	lb.	Inch.
GGG	Dimensions of exposed surface to wear 22×10 in. Samples thoroughly dried before test. Age 11 weeks.	24×30×2½ (two tests made from each slab).			*
	No. 2.—Slab made at Nottingham. Machine-made. Top ½ in.				
474	2 parts granite dust .. .. 1 part Leighton Buzzard sand.	.. ..	70·75	3·07	—
474A	1 part cement .. .. Rest of Slab. 5 to 1 slag concrete.	.. ..	69·27	2·87 (mean 2·97)	—
	No. 4.—Slab made at Nottingham. Machine-made. Top ½ in.				
476	2 parts granite dust. 1 part sand	.. ..	67·20	1·28	—
476A	1 part cement and "Stantonite" .. .. Rest of slab. 5 to 1 slag concrete.	.. ..	69·42	1·28 (mean 1·28)	—

Slabs tested in standard apparatus specified by the Institution of Municipal and County Engineers for rate of wear of concrete flags; number of revolutions in each direction 86,400; speed of rotation 58 per minute. The apparatus contains 1,000 hard-steel balls ½ in. diameter. In the specification the allowable loss of weight upon a surface 22×10 in. is 1½ lb.

* The slabs were not of uniform mixture, and the average density differed from the density of the wearing surface.

(Signed) DAVID KIRKALDY & SON.

The Willcox-Penberthy Cellar Drainer.

Messrs. W. H. Willcox & Co., Limited, of 38 Southwark Street, London, S.E.1, have sent us two leaflets dealing with their Willcox-Penberthy cellar drainer, and Willcox-Penberthy valves. The new model "R" Penberthy automatic cellar drainer is designed to operate with economy at from 10 to 100 lb. water main pressure, with lever and link motion adjustable to different pressures. It is an improved type of the Penberthy drainer which has been on the market for many years for disposing of flood water or seepage in basements of buildings, and removing water from fly wheel or elevator sumps, etc., where such are situated below the natural drainage level of the sewer.

The Elizabeth Garrett Anderson Hospital at Wembley.

An example of millboard at its best is seen in the Elizabeth Garrett Anderson Hospital Exhibit, in the Palace of Housing and Transport at the British Empire Exhibition. This hospital in miniature, which is a memorial to the overseas nurses who died during the Great War, consists of three rooms, all of which are panelled in "Sundeala." On entering one is impressed by the quiet, rich brown of the walls in the reception-room, which are lined with "Sundeala" of a crocodile pattern. Passing into the operating theatre one gets an immediate impression of clean, germ-free wholesomeness, which is adequately conveyed by the white tile pattern of "Sundeala," with which the walls and ceiling are lined. The third room of the exhibit is a sterilizing chamber, decorated in tile designs of green and white, which again conveys an impression of complete hygiene.

A Novel Fitment.

We have received particulars of a "proper adjustable foot-rest" for users of w.c.'s from the P.A.F.R. Co., 36 Northgate, Newark, Notts. This appliance is claimed to be correct from the medical, scientific, and practical point, and is recommended by members of the medical profession as an aid to the retention of perfect health. It has been specially designed by a doctor, an engineer, and a child-welfare worker. Particulars of the appliance can be obtained from the company.

Heating and Cooking Equipment.

Recent issues of "A Thousand and One Uses for Gas" describe, and illustrate with a series of interesting photographic engravings, a number of services to which gas has been applied in, respectively, the Westminster Hospital, and St. Thomas's Hospital on the Albert Embankment. A charming picture shows the "Mary Celeste" ward for children in the first-named hospital; the ward being heated partly by radiators and partly by a large gas fire. All the wards in this hospital are heated by modern hygienic gas fires of handsome design, and gas-cooking is used in the kitchen. In No. 45 of the above-mentioned periodical, there is a useful illustrated article by Mr. Thomas A. Pole, A.R.I.B.A., on "The Use of Gas in Hospitals."

"Triolin" Floor-covering.

"Triolin," which is made in various self-colours and in mottled patterns, is specially recommended by the makers as a floor-covering for hospitals and other institutions where the first consideration is durability. Quality and economy are stated to be the aims in making it, and the makers, F. A. Hughes & Co., Limited, 204-206 Great Portland Street, London, W.1, claim that it always looks well, and that it meets all the demands made on a good flooring material as regards elasticity, insulation against cold and heat, non-inflammability and non-susceptibility to the usual cleaning mediums, such as soap, soda solution, etc.; it is impervious to wet, and will not oxidize or perish, the cost of upkeep being reduced to a minimum, the wear and tear in daily use being almost negligible. If it is laid properly on a flat surface, the joins are hardly discernible. Where it is essential that the joints should be absolutely watertight, the various lengths can be welded together. Other claims are that it is non-susceptible to the oxygen of the air, and does not need oiling to keep it in good condition—a high polish can be obtained by light rubbing; that it is extremely pliable, and there is, therefore, no danger of cracking during laying.

"Shell Brand" Floor Treatment.

In a booklet on "Shell Brand" floor treatment, Messrs. Archd. H. Hamilton & Co., Limited, lay stress on the importance of the correct treatment of the floors of new institutions. Explaining the "Shell Brand" treatment, the firm state that on receiving instructions to treat and polish a floor after being planed and traversed, their mode of procedure is as follows: "First, we apply one coat of our special petrifying liquid preparation. This preparation penetrates into the fibrous parts of the wood and saturates it thoroughly. In the process of drying the liquid solidifies and hardens the softer grain of the wood and prepares it for the second process. Second, we next apply a coat of our intensifying composition, which incorporates with the first coating, fills up the surface, and brings out the natural beauty in the grain of the wood without giving, as in the case of varnish, a surface skin to chip off. Finally, the floor is finished and polished by the application of our concentrated 'Shell Brand' floor polish. The floor will now have lost its bare new look and will have taken on a rich mellow appearance, which is the charm of a well-polished floor. Further, the life of wood so treated will be greatly increased." As an illustration of this, the firm point out that many of the floors of institutions treated by them thirty years ago are better to-day than when first laid. The preparations used in the treatment are not fixed and uniform; they are made to suit the requirements of the particular wood concerned. These variations entail the closest supervision of the work undertaken. The staff are trained to apply the best treatment for each particular job, and to do the work thoroughly in any part of the country. The firm suggest to architects intending to entrust them with the work that they specify the treatment in schedules as follows: "Floors to be treated by the 'Shell Brand' petrifying process, and the work to be carried out by Archd. H. Hamilton & Co., Ltd., specialists in the treatment of wood floors, Possilpark, Glasgow."