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Hospitals and Health Centres

THE special issue of THE ARCHITECTS' JOURNAL dealing with hospitals, published last June, placed before our readers opportunities for making themselves familiar with recent developments in hospital design, and the present issue, illustrating further aspects of the subject, will, it is hoped, meet with the same gratifying reception. But it has been pointed out to us by a medical reader conversant with the hospital world that there is an aspect of the relation of architecture to medical practice that as yet remains inchoate: we quote our correspondent's words: "If a medical man were to express a professional view upon the subject as usually dealt with, he would find himself in the position of one who, being invited to say what he thought of county cricket-grounds, should reply by notes upon the development of cricket on the village green. The analogy is not flippant, but a fairly close one. It is extremely important that great central hospitals and special institutions, such as architects have always in mind, should be built in accordance with medical views, and with all the knowledge and skill which architects can provide to render them practical and comely; but while the erection of these structures must, and will, go on, and while, therefore, thought must be taken to perfect their construction and amenities, the great development of the future will be, probably, the provision of smaller buildings to meet local needs—the cricket on the village green."

This is a message of importance to our readers which should be thought about and possibly acted upon. On consideration of existing circumstances, it becomes clear that our correspondent's words have many facts behind them. One of the great London hospitals has removed recently to the suburbs from its valuable position in the centre of things, the extension of its original home being impossible; and it is easy to think of two or three more of the metropolitan hospitals whose re-erection where they stand would be unthinkable. Further, it would not be surprising to learn that the schemes preliminary to the re-erection of other London hospitals on their old sites were opposed by those who regarded the proposal as one for spending money oblivious of the menace of the future from an overcrowded or over-valuable environment. The obvious alternative would be the retention of a modest establishment in the metropolis and the erection at the periphery of supplementary buildings, each far smaller than the old parent, though providing in the aggregate more beds, many of them designed to meet particular needs. Here is an indication from London, the point of which is applicable elsewhere, that smaller hospitals may be needed both of general and special character in the vicinity of large cities. But when the country as a whole is looked at it will be seen that all over its face the provision of a large number of small hospitals has become the avowed ideal of the medical profession.

The policy of the Ministry of Health was outlined some five years ago in an Interim Report to the Ministry, and in the first section of that document there is a pattern of organization designed to meet the needs of the modern community in the matter of local hospitals. The Report was published in the "Lancet" on May 29, 1920, and was made in reply to a request from the Ministry of Health to its Consultative Council on Medical and Allied Work for a plan: making systematized hospital provision for the inhabitants of a given area. The Report was a very detailed one. Beginning with treatment of patients in the home, it proceeded to a scheme for domiciliary service in a district, and so to a group of these district services, which would constitute "a secondary health centre." The secondary health centre, it was proposed, should contain the appropriate hospital, and the Report asked for full information as to the extent and existing provision of these smaller hospitals, especially in rural areas. The secondary health centres were in turn to be brought into relation with the teaching hospital having a medical school. It is the large hospitals upon which the secondary health centres would be based which provide for the moment the principal problems in hospital provision and construction. They will continue to do so, but it is clear from the evidence just given that in the future there will be a great call upon architects to provide hospital accommodation suitable for smaller country towns, or in selected areas, where the shortage of beds becomes obvious. It need hardly be said that there are many such areas, while the whole direction of medical progress is towards the increase of institutional treatment both in general and in special pathological conditions.

The construction of these hospitals will set new problems before the architect, especially when they have to be erected in growing communities, and these surely will be the communities where the lack of hospital accommodation is first felt. To some extent here the idea of the permanent palace will have to be eliminated, and this for economical reasons of double force, inasmuch as, first, permanency means heavy initial expense; and, secondly, permanency will not be a certain requirement. The difficulty which has presented itself in London, and other large cities, of being unable to make necessary extensions owing to the crowded and valuable nature of the surrounding property, will have to be avoided, for it will not always be possible to purchase so much adjoining land that indefinite additions can be contemplated. The small hospitals, general and special, which will be needed may, in some instances, be the result of transformation instead of new building, for there are certain infirmaries connected with poor-law administration which, being no longer required for their original purposes, might lend themselves to conversion; but the extent to which this procedure can be carried out has not been ascertained. Thus the net result of the consideration of the possible work in regard to hospitals which lies before the architect in the immediate future appears as follows: he will have to be ready to meet the needs of local communities for buildings, which will be small where a modest demand does not seem likely to become more acute, which will be large in growing areas, and which yet will not be of a definitely permanent character. Some central block of these latter buildings will remain on the original site for emergency purposes, while the increasing demand for beds is being met by the erection farther afield of auxiliary buildings. This, at any rate, appears to be the position, and if it is so we feel that our readers might well consider the types of hospital which are postulated by the Interim Report of the Ministry of Health. The shortage of beds in the country has just been given as 10,000 by the Voluntary Hospitals Commission, and it has been estimated that a capital sum of £5,000,000 would be required to build, equip, and staff the new hospitals is thus implied, though a more modest figure of £400 per bed has been widely quoted.

Hospital Planning

From Notes by Messrs. Nicholas and Dixon-Spain

PROBABLY the most satisfactory method for obtaining the best results for a large hospital is by means of a competition, and provided that the conditions fulfil the requirements of the R.I.B.A. we do not think that any improvement can be made in the existing system. Time spent in working on a competition is never wasted, and it is absurd to endeavour to assess this in monetary terms. A more proper way is to regard it as training, or, if you prefer, as a sport.

Hospital competitions are particularly interesting, because the lines which must be followed are more or less standardized. Moreover, they call for a quick grasp of the essentials, and at the same time a consideration of the details: so much so, that it is frequently necessary to make detail studies of parts for one's own use, over and above the drawings which may be demanded by the conditions.

Sir John Simpson, in writing about the plans submitted for the Egyptian State Hospital at Cairo, says:—

"The essential qualities in architectural design are dual, i.e. (A) the scientific, which deal with the conditions and requirements imposed by utility; (B) the artistic, which resolve these needs in the form of an ordered architectural composition.

"These two qualities are inter-related and cannot be dissociated. The technician who best combines them is also he who gives the fullest measure to each; for the perfect solution of the scientific problem is also the most artistic. It is, moreover, the most economical, both in first cost and in subsequent administration.

"You will therefore bear in mind when studying a design, that a great plan is not merely an ingenious arrangement of individual rooms, their connections, and separations, but a homogeneous composition, a work of art as well as of science.

"Every great composition—whether in music, literature, architecture, or other art—is a series of compromises. Themes of secondary importance must be subordinated to the primary essentials; values of component parts being continually adjusted and exchanged in order to attain the highest perfection of the whole work. While, therefore, every detail must be excellent, constant vigilance is needed lest its excellence be obtained at the cost of undue sacrifice of other parts; and especially at that of the completed organism."

Sir John then proceeds to group the various requirements of the Cairo Hospital under the following heads:—

1. Treatment of patients. 2. Training of students. 3. Administration and services. 4. Housing of staff and students.

These groups are then further analysed; No. 1 into (a) male wards and their offices; (b) harem wards and their offices; (c) out-patients. No. 2 into (a) the medical school proper, comprising four sub-divisions of physiology, anatomy, pharmacology, and pathology, with a medical library; (b) the dental school and clinic; (c) clinical instruction; (d) pharmacy laboratories; (e) mortuary and post-mortem. No. 3 into (a) administration and direction; (b) admission of patients and treatment of casualties; (c) special services (operation theatres, radiology, and other treatments); (d) food preparation and stores, for patients and resident staff; (e) general services (central pharmacy, laundry, power-house, workshops, etc.). And No. 4 into housing for (a) sisters and nurses; (b) male resident staff; (c) students.

"All these units have to be considered, *first*, in the relation of one to another and the directness of their communications; *secondly*, in the disposition of their internal parts; *thirdly*, in their grouping as an architectural composition; with the utilization of the site to its best advantage. There must be ample space between the various pavilions in order to maintain thorough aeration of the site; and, for the same reason, the buildings should be as low in height as is consistent with economical administration and construction. Sufficient open ground must also be reserved for the recreation of the in-patients of both divisions, the resident staff of both services, and the students."

Although these remarks refer specifically to the Cairo Hospital, they afford an invaluable summary of the conditions which hold good in designing any large hospital. The first thing to be considered, then, is the main arrangement of the parts, having regard to circulation and communication. From the block plan of the Cairo Hospital it will be seen that the various blocks of buildings are articulated on a covered way, 12 ft. wide, which forms the main artery of the entire institution. This covered way, which is open at the sides, is terminated at its northern extremity by the sisters', nurses', and probationers' homes, and at its southern by the laundry and power-station. At its centre it picks up the services from the central kitchen, and central pharmacy, service to operations block, central clinic, access to administration block, in-flow from out-patients' division, and access to clinical instruction block and the medical school. Intermediately, north and south of the centre, it picks up the ward-units blocks of the female and male divisions respectively.

The main entrance approach leads directly to the administration block, and this, with the central kitchen and stewards' and storekeepers' department, is convenient for all parts of the hospital. On the north of the entrance approach is the out-patients' block, balanced by the medical school on the south.

So much for the general arrangement; coming now to the parts themselves we have first the wards, and it is worth noting by the way that the modern tendency would seem to be towards a steady reduction in the number of beds per ward, and this of course is not surprising in view of the ever more precise classification of diseases. The Cairo wards are planned in twenty-five units of a pair of main wards of twenty-two beds each, and at the head of each pair of main wards are the smaller wards of one and two beds, and the unit offices; kitchen, waiting-room, nurses' and sisters' room, testing room, linen and store, etc. Each ward has its lavatory block with cross-ventilated lobby, and each opens on to verandas on its south and west sides. The beds are at 8 ft. centres. The surgical, clean, and septic units have ready access to their appropriate operation theatre groups. The venereal ward is in a retired position, with its own airing ground. The children's half unit is on the ground floor, and opens on to the female airing ground.

Next take the operation-theatre block. This block is situated midway between the male and female divisions. The theatres themselves have been grouped into 1, clean; 2, ophthalmic, throat and ear; 3, septic; and 4, gynæcological. Each group consists of two theatres with a sterilizing and anæsthetizing room. The theatres are on two floors, and on each there are a staff and students' changing wing, male and female waiting-rooms, sisters' rooms, store and instrument rooms, etc.

The reception and casualty block contains waiting, examination, and surgical dressing rooms, and bath suites for both sexes. It is planned for the convenient reception and disposal of cases. Above it are infectious and observation wards. This department is an extension of the out-patients' department, but has separate outside access.

The radiological section includes waiting-rooms for both sexes, electrical treatment, X-ray, radiography, and consulting rooms. It has easy accessibility from the out-patients' department, and good communication with the wards.

The isolation wards are planned in two separate blocks for males and females, surrounded by a disconnection zone of 40 ft.

The central kitchens prepare the food for the entire hospital with the exception of the sisters' home and students' hostel, and its arrangement and connection with stewards' and storekeepers' departments and service to the wards has been carefully thought out. The food to the wards is taken by means of trolleys, which are served from a long recessed issue counter, those for the upper floor wards of both sexes being hoisted by adjacent lifts. The steward's stores are connected direct to the kitchen, and all his storage is on the ground floor, so that handling is reduced to a minimum. There is a good service approach for lorries and carts.

The problem which had to be faced in connection with the planning of the out-patients' department is one which does not occur in Western countries, since it was necessary to arrange for entirely separate circulation for the sexes, and at the same time to enable either of them to visit the appropriate consulting suite. Both sexes have their distinct entrances, from which they pass to a series of waiting-rooms, and from there they reach the appropriate suite. They then pass out to their own dispensary waiting-room, and make their exit round the perimeter of the block. By this means one-way circulation for both sexes is maintained throughout.

The mortuary and post-mortem block includes two post-mortem theatres of three and two tables, and seating for 100 and 50 students respectively, exposure room, cold storage, attendants' room, etc. In connection with the block is a courtyard for the accommodation of mourners.

The medical school and pathology department are in a block on the south of the entrance approach. It is closely linked with the central pharmacy, clinical instruction, and post-mortem block, and communicates via the main covered way with ward units. A series of rooms, museums, lecture theatres, and laboratories provide for anatomy, physiology, pharmacology, and pathology departments for 600 students. There is also a library.

The dental school is planned over the out-patients' block, and contains waiting-rooms, extraction, anæsthetic, recovery, correction work, appliance rooms, laboratories, lecture theatre, operating room for fifty dental chairs, library and staff rooms.

The administration block is in the centre of the institution, and contains offices for the director and council, the medical staff, the Ministries of Public Health and Education. Over these are the resident and house officers' quarters.

A special block is provided for the requirements of infant welfare, and this section opens on to the female airing ground, and at the same time is easily accessible for the public. In connection with it is grouped a nurses' clinical instruction lecture room.

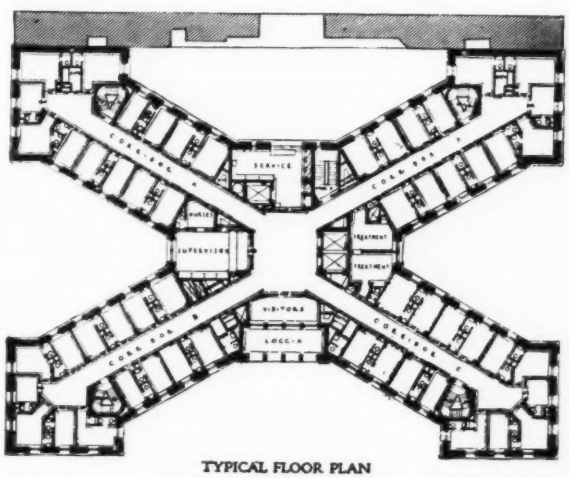
The sisters', staff nurses', and probationers' house provides accommodation for fifty sisters, with their own dining-room and kitchen service, and 120 pupils and 20 staff nurses with dining accommodation served from the central hospital kitchen. There are ward units for sick nurses and probationers.

It will be observed that the Cairo Hospital follows the European tradition insomuch that the disposition is horizontal rather than vertical, and very few of the blocks have more than two floors. And so it comes about that the greater the requirements the larger the area that is covered. This is especially so with regard to out-patients' departments, and it is with reluctance which well-nigh amounts to dead refusal that we take an out-patient upstairs. Our Western arrangement is to bring all out-patients into a hall and thence dispatch them to one or other of the consulting suites. This arrangement, however, is not invariably followed in American hospital designing. The Boston City Hospital, for example, has an out-patients' department on seven floors. Each floor has its own waiting hall served by lifts at the junction of an L-shaped plan. The organization is ground floor, entrance and children's clinic; first floor, male and female surgical clinics; second floor, massage and electro-therapy clinic and orthopædic and fracture clinics; third floor, male and female medical clinic; fourth floor, eyes clinic, nose and throat clinic, gynæcology, obstetrical and pre-natal clinic; fifth floor, skin, nerves, and serum-therapy clinics. It is an interesting plan.

The out-patients' department in Europe is more or less stereotyped, and good and recent typical examples are Nottingham General Hospital, Glasgow Western Infirmary, and Sunderland Royal Infirmary (all in course of erection, we believe), but these show no development beyond the tendency to increase the number of consulting suites. With the advance of out-patients' treatment, and the multiplication of consulting room suites, it would seem probable that in the large general hospital of the future the waiting hall may develop into a series of smaller halls, more on the lines of the Boston City Hospital.

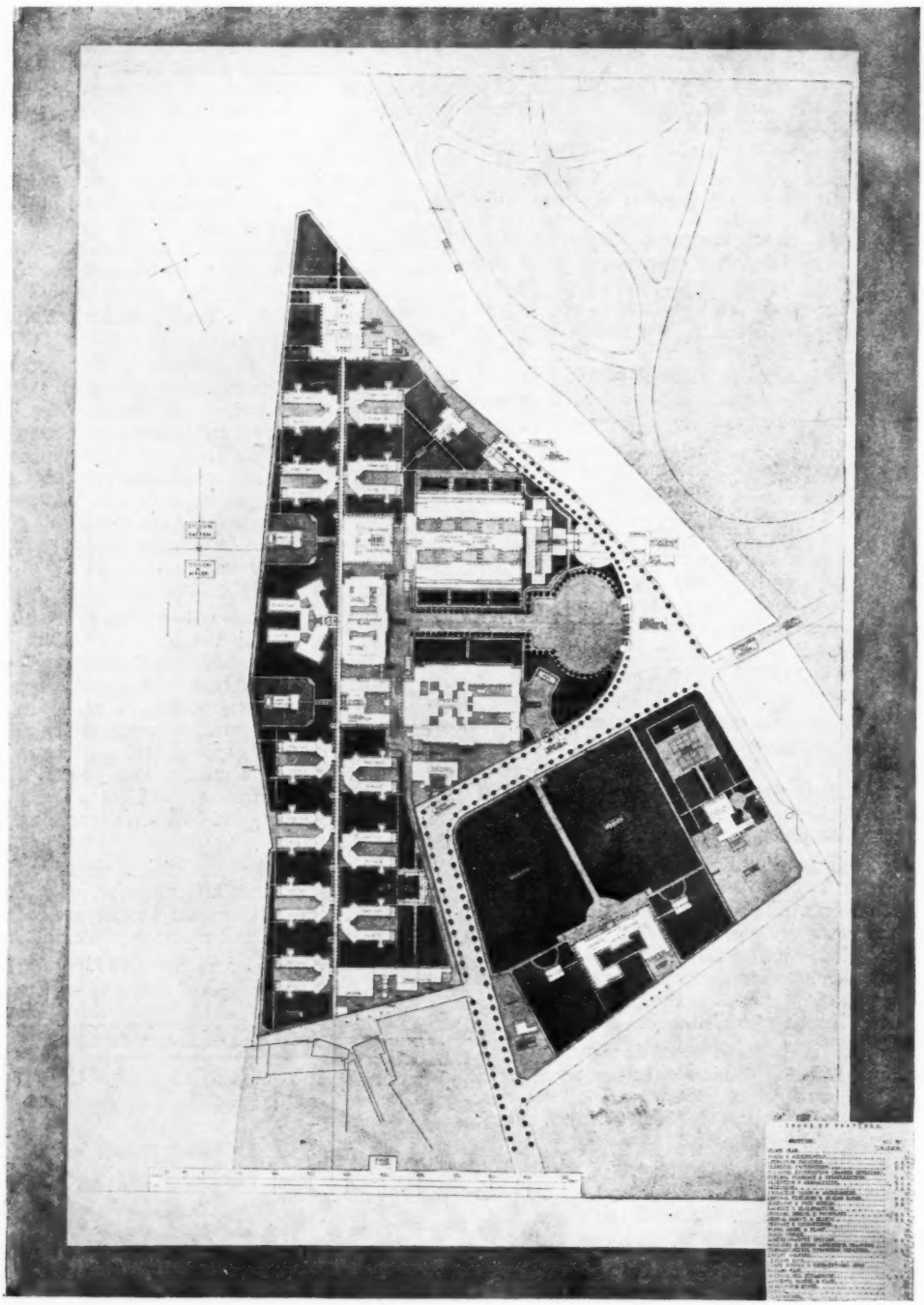
The American tendency to reduce the number of beds in the wards is shown in the New York Fifth Avenue Hospital. This hospital, which has an interesting X-shaped plan, is devoted entirely to private rooms, and is characterized by centralized service. Nurses' bedrooms, with demonstration and recreation rooms, are on the ninth floor; boiler room, machinery room, and mortuary are in the sub-basement; kitchen, laundry, and pharmacy are in the basement; administration, and nurses' dining-room are on the ground floor, and children's wards are on the first floor.

In addition to the tendencies already noted towards smaller wards and increasing number of consulting suites, perhaps the most influential factors are the development of the teaching side and research work which result in an increasing demand for well-equipped and extensive laboratories.

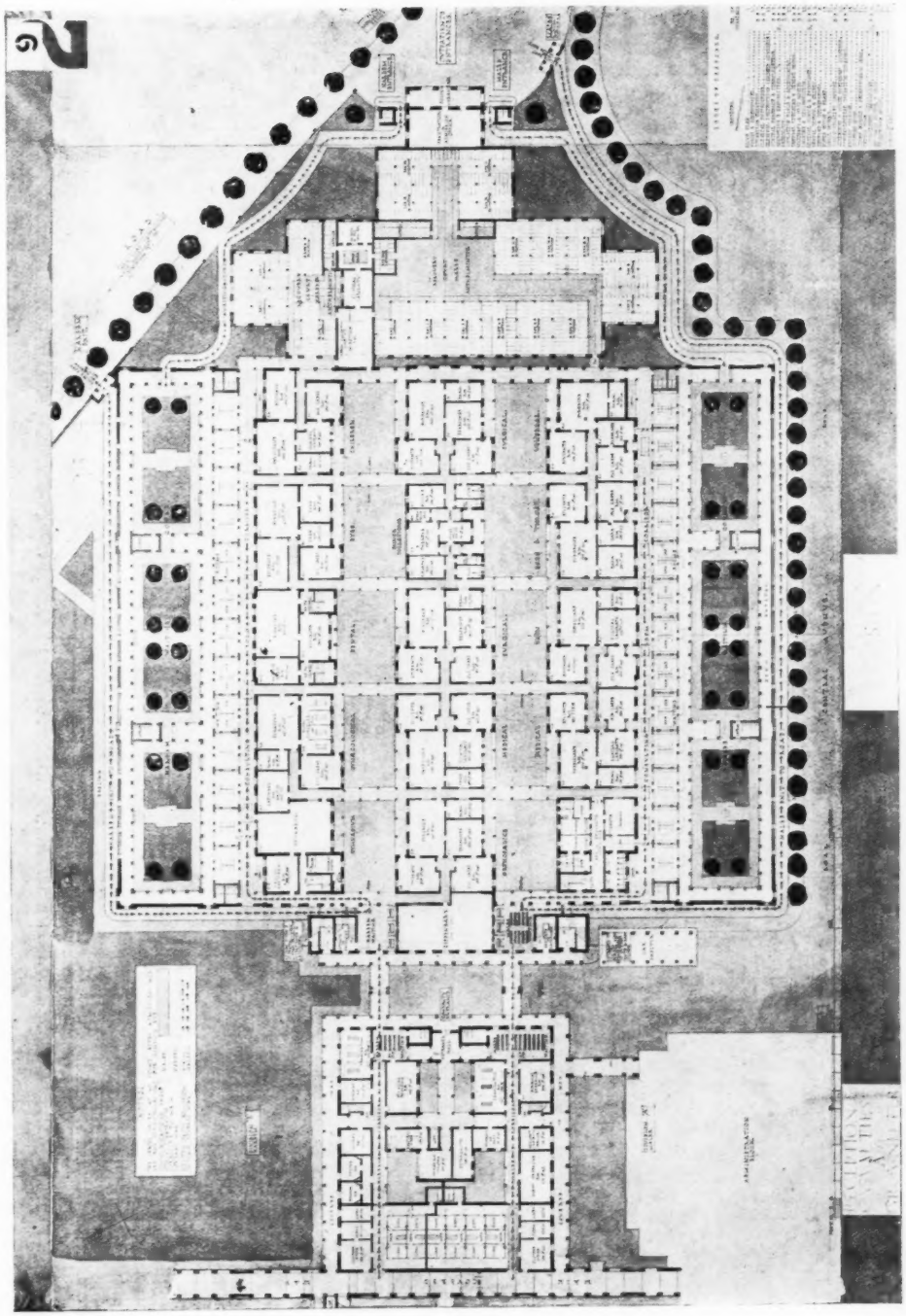


TYPICAL FLOOR PLAN

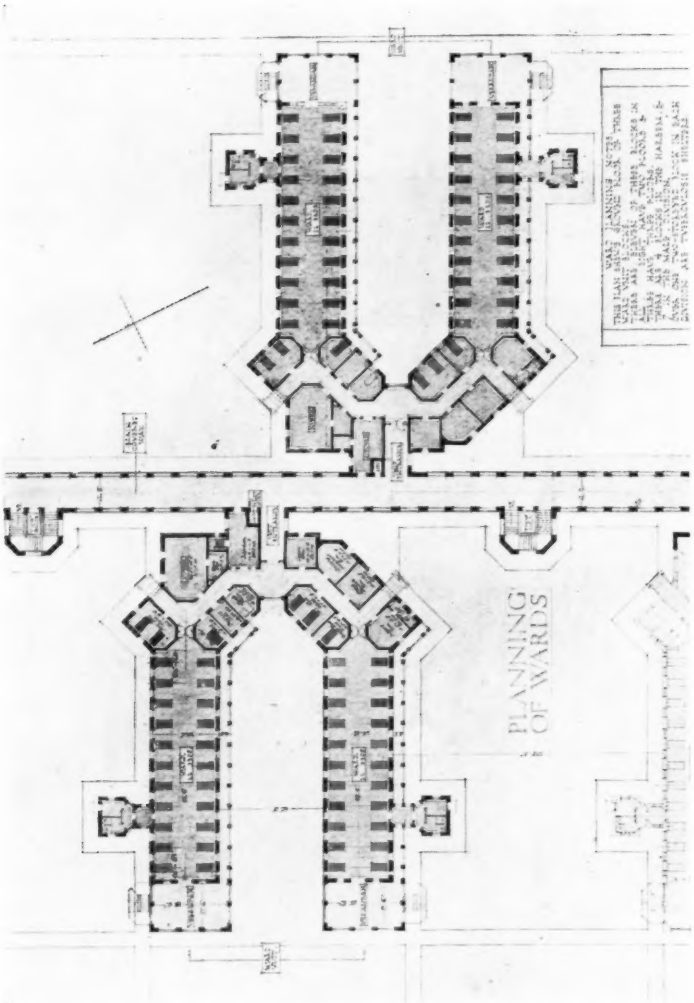
FIFTH AVENUE HOSPITAL, NEW YORK.
YORK AND SAWYER, ARCHITECTS.



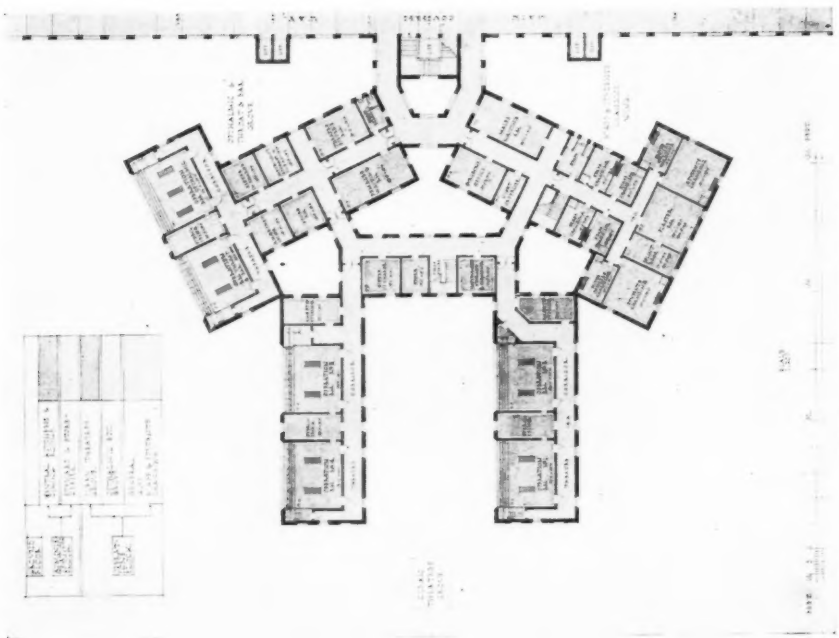
QASR-EL-AINI HOSPITAL: PLAN OF LAY-OUT.
NICHOLAS AND DIXON-SPAIN, FF.R.I.B.A., ARCHITECTS.



QASR-EL-AINI HOSPITAL: GROUND-FLOOR PLAN OF RECEPTION, CASUALTIES, AND OUT-PATIENTS' DIVISIONS
NICHOLAS AND DIXON-SPAIN FF.R.I.B.A., ARCHITECTS

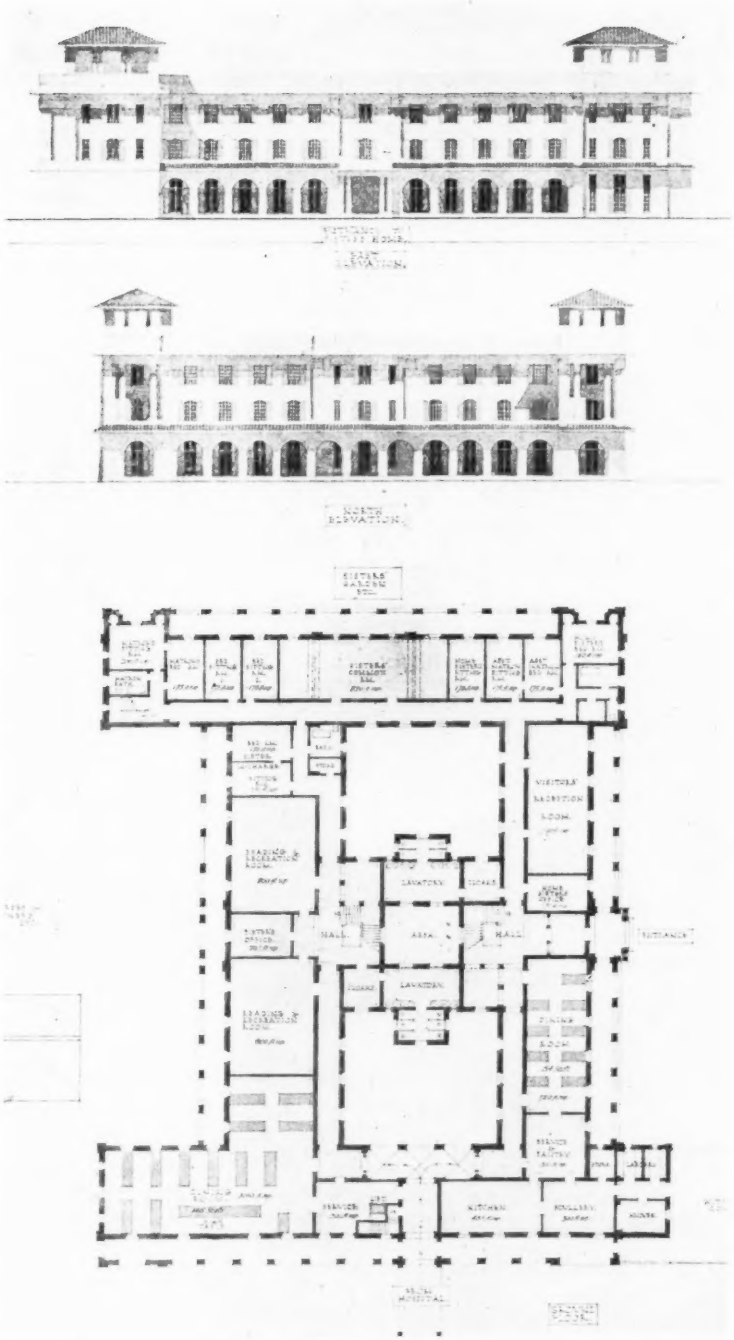


PLANNING OF WARDS.



CENTRAL OPERATIONS BLOCK.

QASR-EL-AINI HOSPITAL. NICHOLAS AND DIXON-SPAIN, FF.R.I.B.A., ARCHITECTS.



QASR-EL-AINI HOSPITAL : SISTERS' HOME AND STAFF NURSES' AND PROBATIONERS' HOME.

NICHOLAS AND DIXON-SPAIN, FF.R.I.B.A., ARCHITECTS.

The Conversion of a Country Mansion into a Consumption Hospital

By E. STANLEY HALL, M.A., F.R.I.B.A.

THROUGHOUT the British Isles are to be found numbers of the larger country houses which, as private houses, have, alas! had their day. The necessary retinue of servants is no longer practicable. Taxes and death duties have made the upkeep of the houses impossible. Some have been turned to other uses: others eke out a "decayed gentlewomanly" existence in the hands of a caretaker; the rest precariously await the ravages of time or the housebreaker.

Many of these houses have been designed on generous lines. Lofty well-lighted rooms look out on to sunlit lawns and over wide expanses. It is surely a matter for congratulation when such places can be turned to other uses. Stowe House is a case in point. Some of the ancient glories must be changed for modern wants. Bathrooms must be added, and kitchens modernized. These alterations cannot always be made without some sacrifice; but the alternative is, as a rule, the scrap-heap of decay.

The Welsh National Memorial Association for the Prevention of Tuberculosis have on more than one occasion purchased old houses and made them the nucleus of a sanatorium or hospital. The inflated prices to which the cost of building soared after the war made building so expensive a matter as to be almost prohibitive. Yet beds were wanted urgently to combat this disease; and so the expedient of building round an old house was tried.

There are many points in favour of such a scheme. Consumptive patients, in the early stages at any rate, are not bedridden. An open-air life is theirs more and more as they progress towards recovery. The principle of the treatment is to prepare them for a return to their own homes. The effect of environment is therefore more important than on patients confined to their beds. These old "stately houses" are less stamped as institutions. Their wide lawns and century-old trees have an effect on the patient which no modern institution can convey. They have their history and their personality, which help to cure. Such converted houses also are as a rule far less costly than a new building. Costly, however, their adaptation certainly is. Electric plant, water supply, drainage, and sanitary annexes are essential and expensive additions.

On the other hand, the problem of conversion is a difficult one. The patients are of course the first concern, and it is well to see that, if the accommodation of the old house is not sufficient for all purposes, the patients should be housed in new quarters specially erected. These may well be of a semi-permanent construction only—capable of lasting, say, a generation or so. By the end of that period the treatment may have changed and present-day ideas be out of date. The patients can thus sleep in a building specially designed for their cure and better suited than most converted old buildings, and at the same time they can benefit by the established domesticity which comes from the old mansion and its grounds.

The mansion is a suitable home for the Administration and Staff. Here too may be the kitchen, dining-hall, and recreation rooms; and here the X-ray suite. The old stables will lend themselves to conversion into garage and laundry; and other outbuildings will accommodate the post-mortem room and power-house.

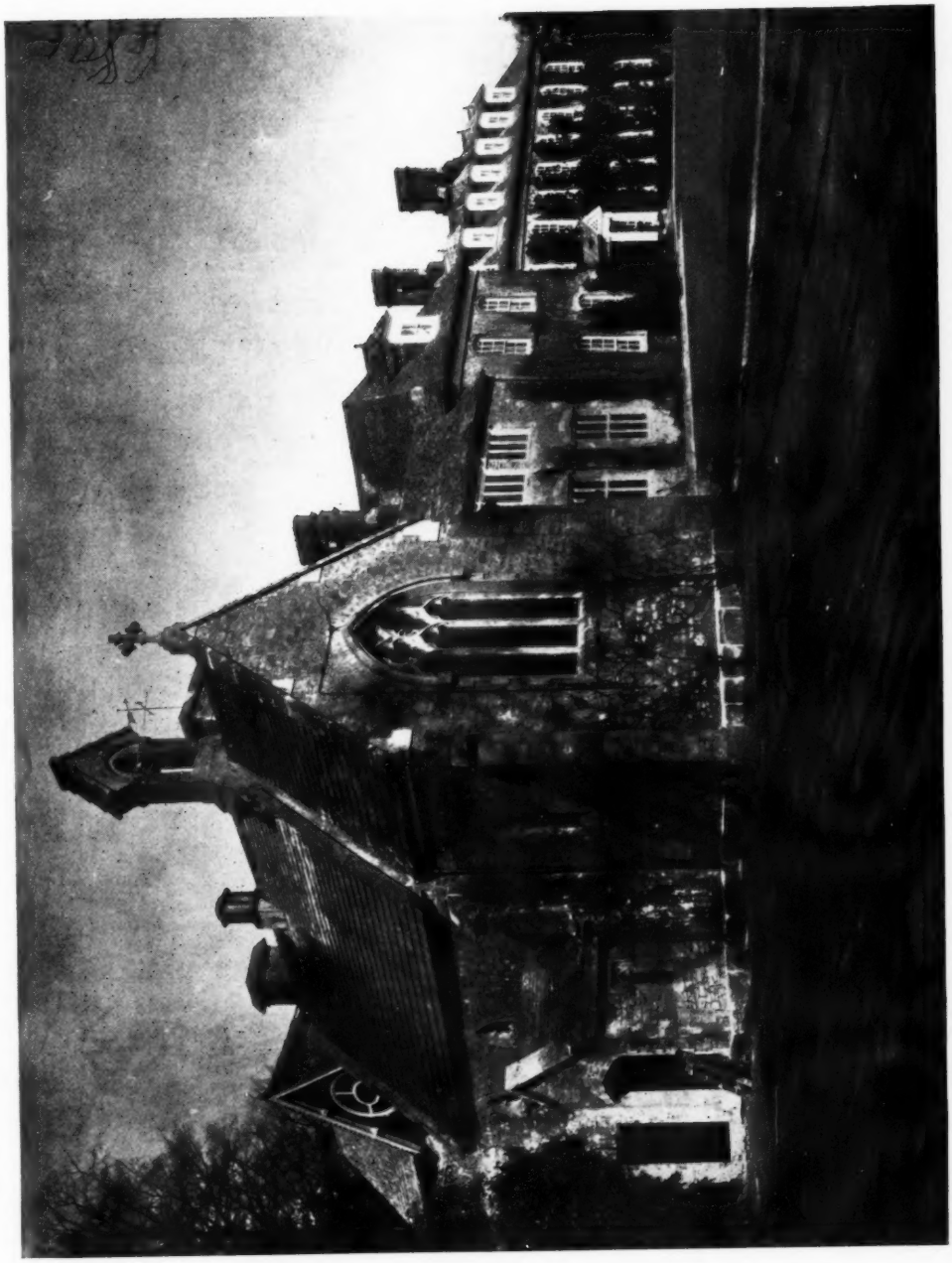
The Welsh National Memorial Association were singularly fortunate in having Cefn Mably handed over to them at a nominal rent by its owner, Lord Tredegar. It stands on high land some six or seven miles north of the Bristol Channel, and half-way between Newport and Cardiff. In plan the house is a quadrangle, with a long wing at its south-west angle, consisting of two long galleries on ground and first floors, with a chapel at the western extremity. It has a total frontage to the south of some 250 feet. The original house was built in the twelfth century; an oak screen of this date still remains behind the hall panelling. It was the old border home of the Kemeys family, and was besieged by the Roundheads. Charles I is said to have hidden there after the battle of Worcester. It has its own tradition of a secret passage, ghosts, and its own private gallows. The chapel and gallery wing would appear to date from the fifteenth or sixteenth century, and remain very much in the form in which they were originally built. About the time of George I the main block must have been remodelled, probably on the return of its owner from banishment. Large sash windows have been substituted for the mullioned casements; characteristic panelling of the period in some instances covers panelled partitions of a much earlier period.

The prospect to the south is one of singular charm. In front of the house is a level lawn some 18,000 square feet, with a great clump of old plane trees at the corner, and a flagged path leading to a stone "view place" at the other. Below the lawn to the south is a long terrace; and south of that the view extends over falling meadows, to the Bristol Channel and the coast of Somerset. On the north the house is well sheltered by high trees; and the ground again falls northwards and eastwards.

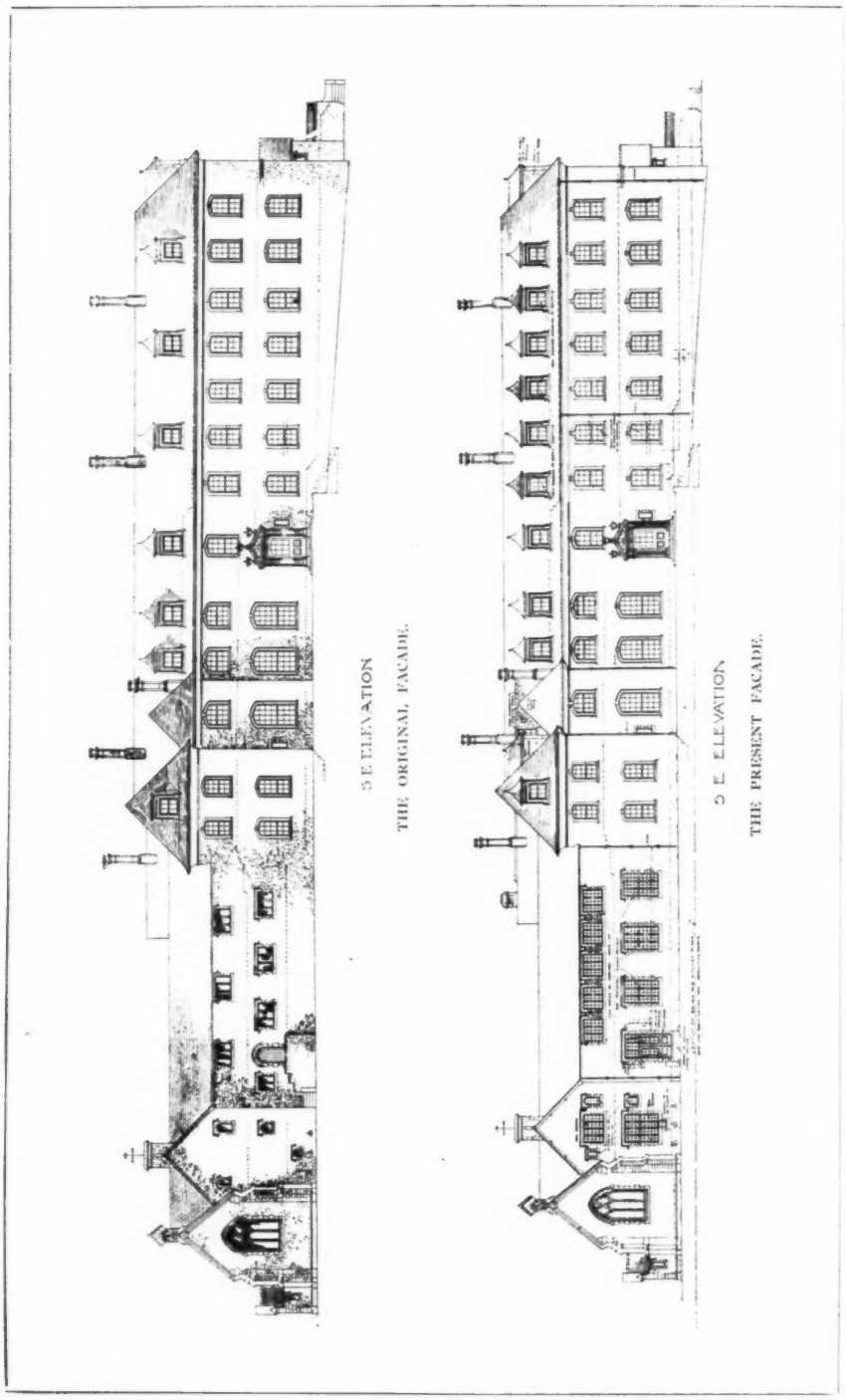
In considering the problem of adaptation, it was clear that the north, east, and west sides of the quadrangular portion would form the offices of the institution, leaving the long south front available for patients.

The entrance hall was enlarged by the removal of a screen partition. A small space under the central staircase was made into a cloak-room for patients, where they could change boots, etc., after coming in from exercise. The south-east corner, where was the old kitchen, was divided into medical officer's room, examination room, and clerk's office, matron's office, and dispensary. The east wing, formerly occupied by still-rooms and butler's quarters, now contains the X-ray department, nurses' sitting-room, and medical officer's house. The nurses' dining-room is in the north-east angle, where was the servants' kitchen. In the north-west angle are the store-rooms and larders. In the west wing are the kitchen and maids' dining-room. New sculleries were built, one for patients and one for staff; and the old smoking-room now becomes the patients' servery. The old panelled dining-room remains as the patients' dining-hall. An extra window has been opened out in the north-west corner, and radiators have been installed in the window recesses. The drawing-room is divided into two children's wards, with glazed screens to the corridor. A new sanitary annexe and ward kitchens were built at the back of the building. The two long galleries make excellent ten-bed wards. In the soldiers' gallery on the ground floor the floor was lowered five feet, and the windows increased, and fresh windows were opened out on the north wall. The priest's sitting-rooms on two floors each became a three-bed ward; here, again, new windows were made for adequate light and air. The priest's bedroom gave way to a new sanitary annexe on two floors. On the first floor, the south rooms are occupied by women patients, and the rest of the quadrangle is given over to nurses' bedrooms, with the matron's flat in the north-east corner. The second floor is occupied by maids. A new iron escape staircase was erected inside the quadrangle; and the gallows staircase was carried up to the second floor.

The old house thus holds 64 patients, 18 nurses, and 17 maids, as well as the M.O.'s residence, and the matron's rooms. The patients in the house are all women and children.



CEFN MABLY SANATORIUM, GLAMORGAN. E. STANLEY HALL, M.A., F.R.I.B.A., ARCHITECT



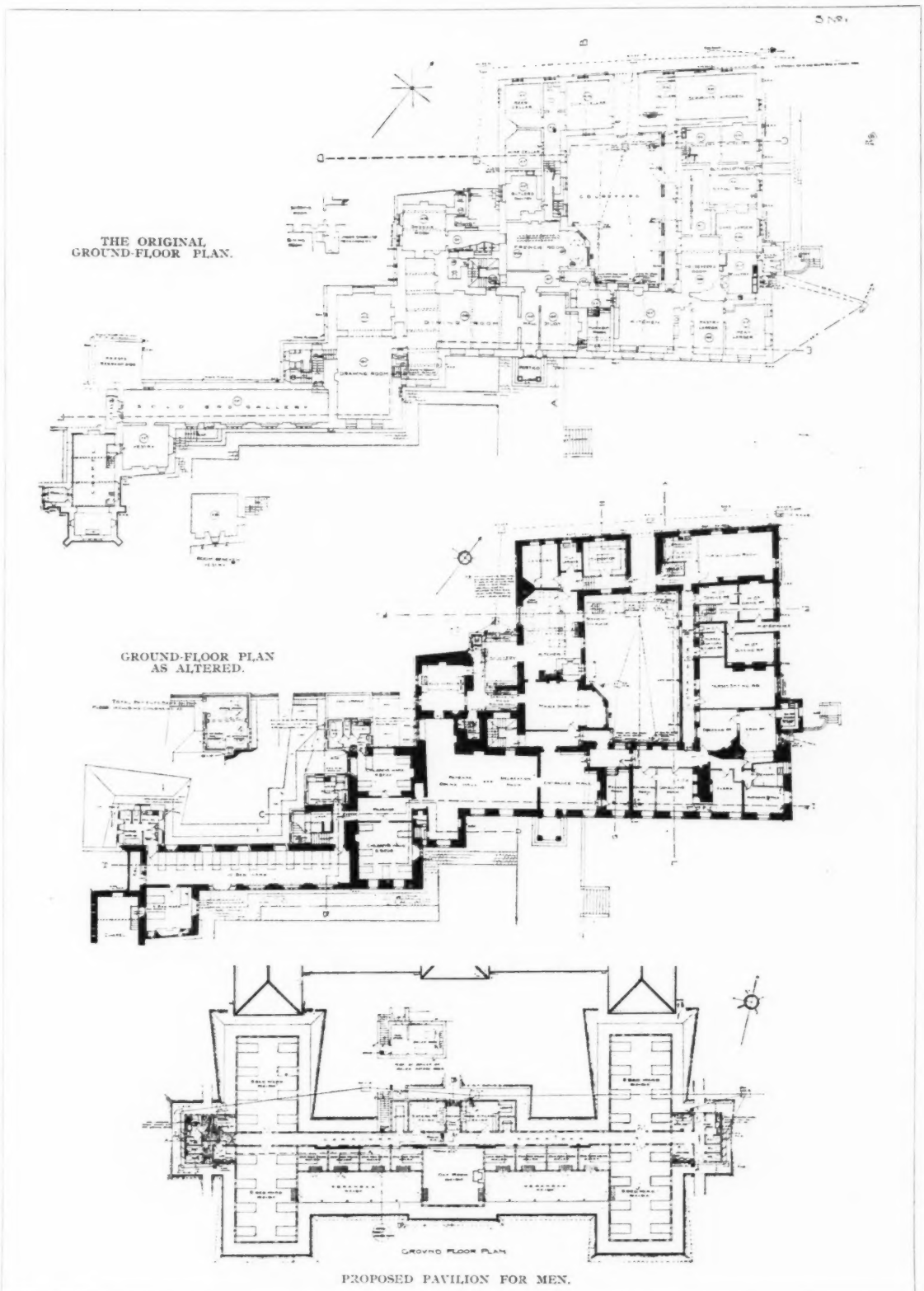
S E ELEVATION

THE ORIGINAL FACADE.

S E ELEVATION

THE PRESENT FACADE.

CEFN MABLY SANATORIUM, GLAMORGAN. E. STANLEY HALL, M.A., F.R.I.B.A., ARCHITECT.



PROPOSED PAVILION FOR MEN.

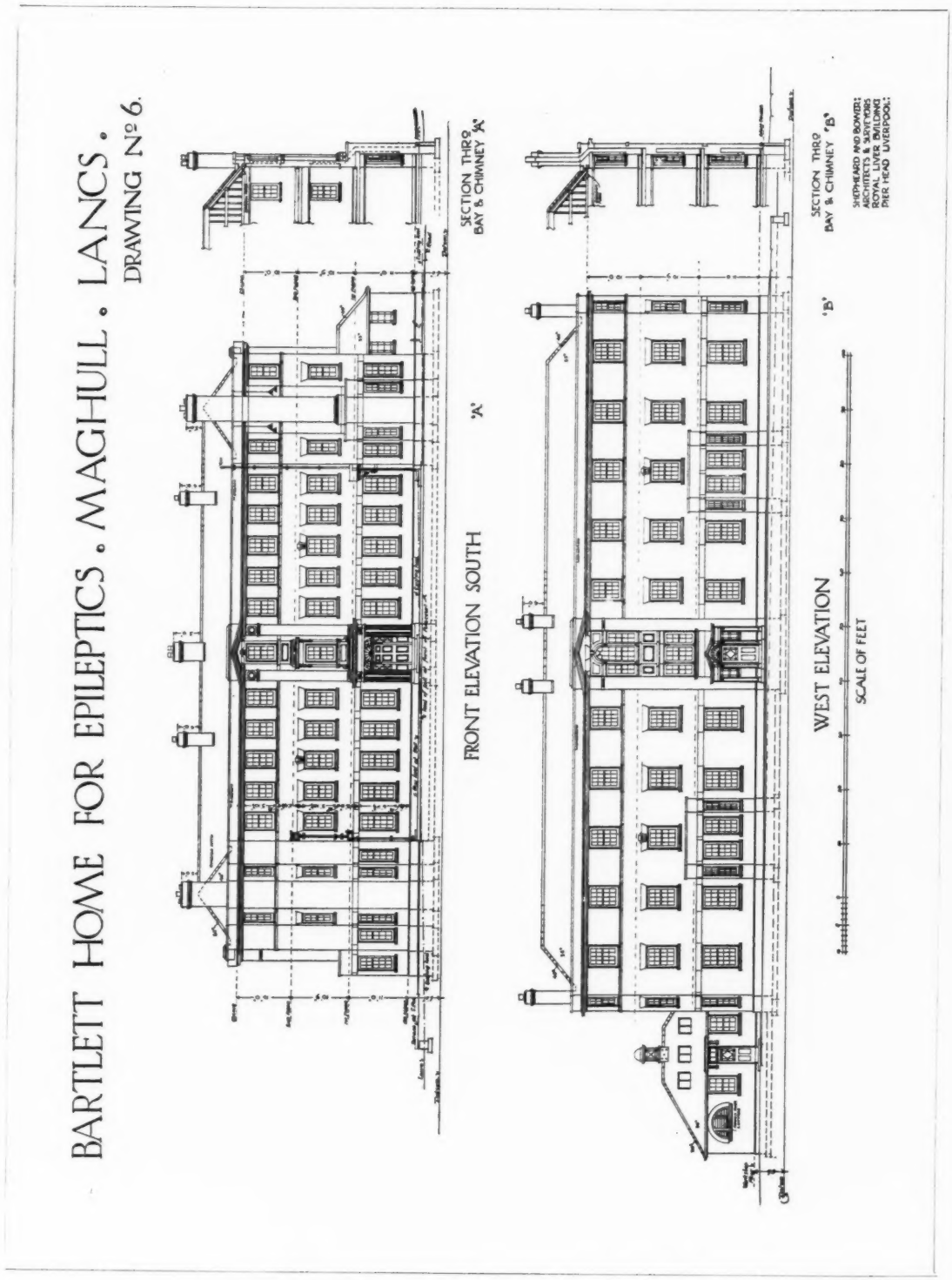
CEFN MABLY SANATORIUM, GLAMORGAN. E. STANLEY HALL, M.A., F.R.I.B.A., ARCHITECT.

BARTLETT HOME FOR EPILEPTICS, MAGHULL, LANCASHIRE: THE ENTRANCE FRONT.

SHEPHEARD AND BOWER F. AND A.R.I.B.A., ARCHITECTS.

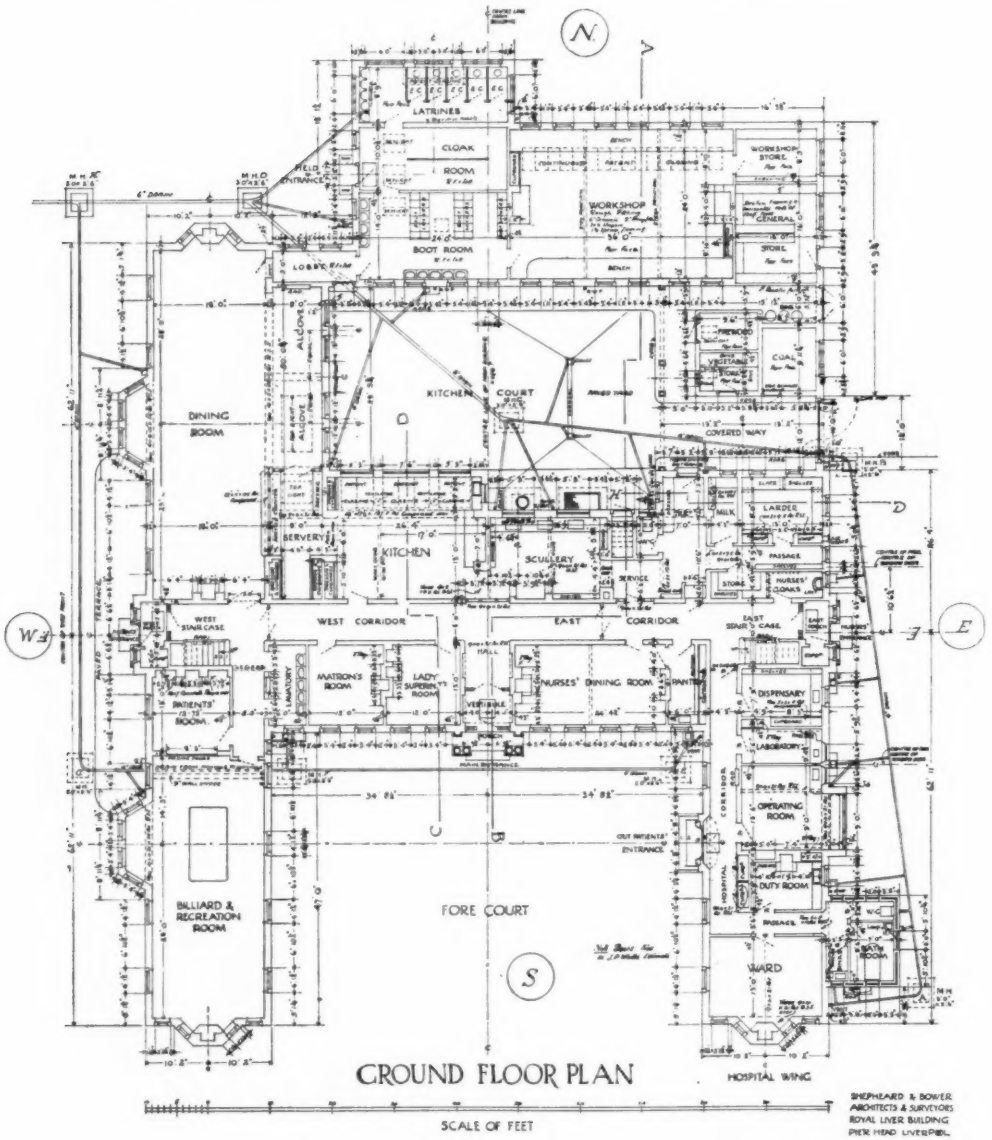
BARTLETT HOME FOR EPILEPTICS, MAGHULL, LANCASHIRE: VIEW FROM SOUTH-WEST.
SHEPHEARD AND BOWER, F. AND A.R.I.B.A., ARCHITECTS.

BARTLETT HOME FOR EPILEPTICS, MAGHULL, LANCASHIRE: THE MAIN ENTRANCE.
SHEPHEARD AND BOWER, F. AND A.R.I.B.A., ARCHITECTS.


BARTLETT HOME FOR EPILEPTICS . MAGHULL . LANCS.
DRAWING Nº 6.
SECTION THRO BAY & CHIMNEY 'A'
FRONT ELEVATION SOUTH 'A'
SECTION THRO BAY & CHIMNEY "B"
WEST ELEVATION 'B'
SCALE OF FEET
SHEPHEARD AND BOWDEN
ARCHITECTS & SURVEYORS
ROYAL LIVER BUILDING
PIER HEAD LIVERPOOL

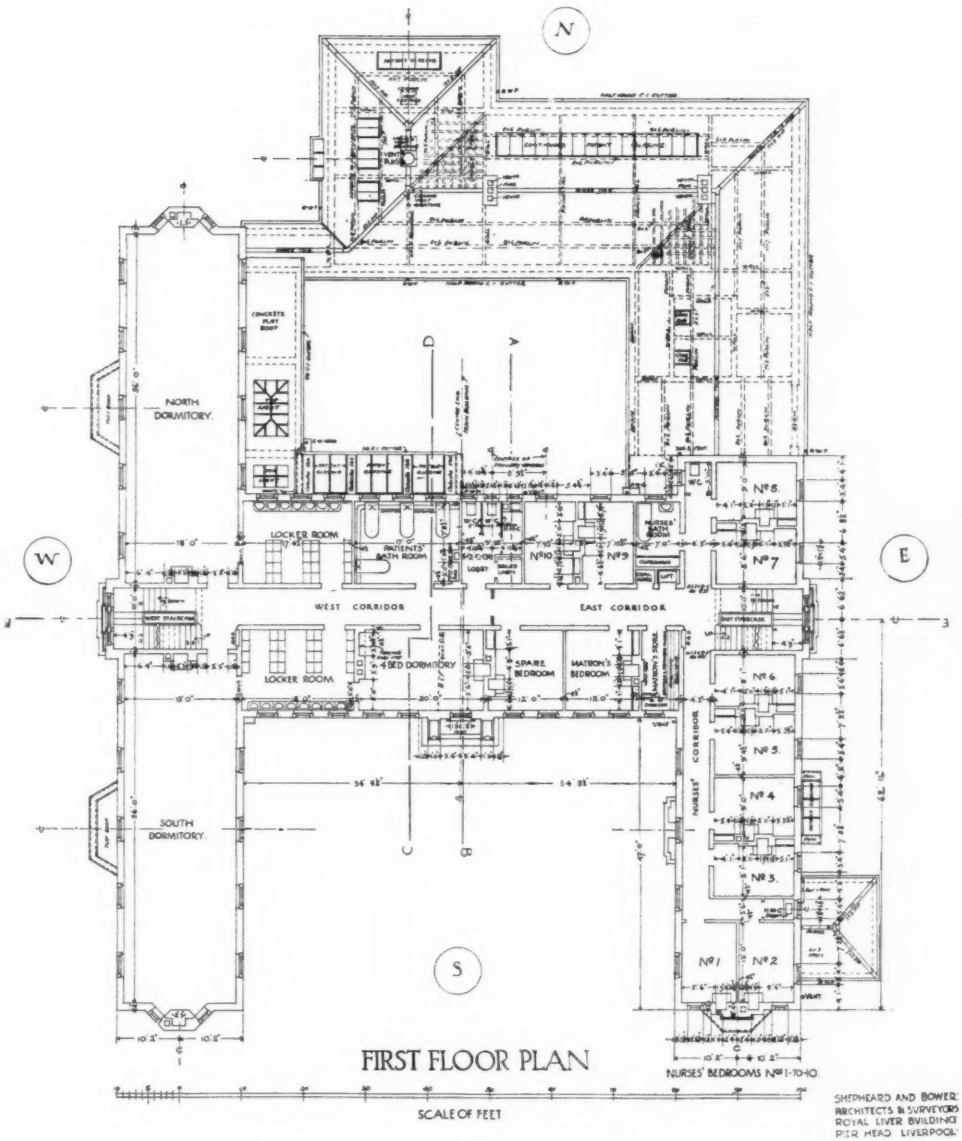
BARTLETT HOME FOR EPILEPTICS MAGHULL. LANCS.

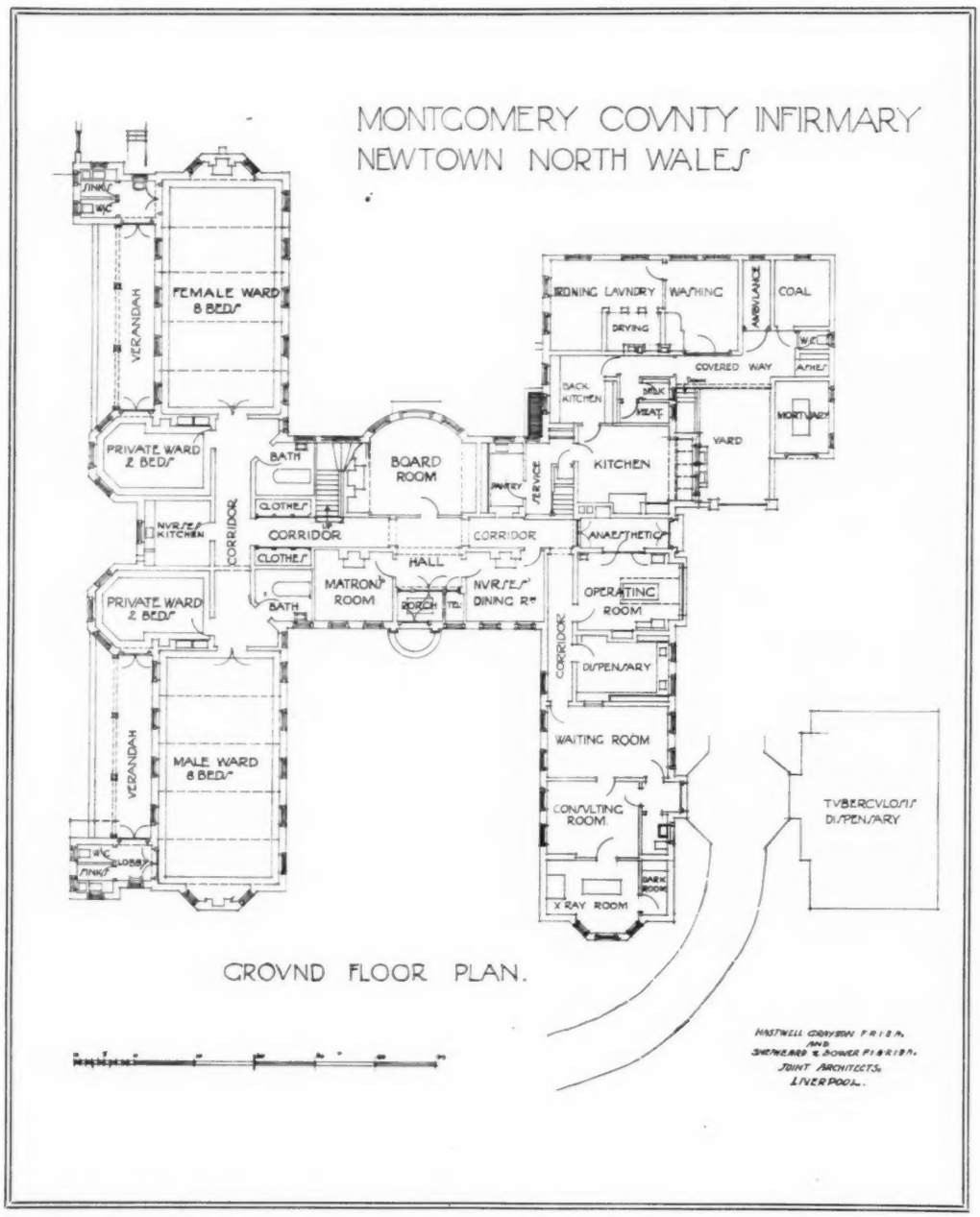
DRAWING Nº 1.



BARTLETT HOME FOR EPILEPTICS MAGHULL. LANCS.

DRAWING Nº 2.




MONTGOMERY COUNTY INFIRMARY
NEWTOWN NORTH WALES
SINK
W.C
VERANDAH
FEMALE WARD 8 BEDS
PRIVATE WARD 2 BEDS
BATH
CLOTHES
NURSES KITCHEN
CORRIDOR
BOARD ROOM
PANTRY
SERVICE
KITCHEN
IRONING
LAUNDRY
WASHING
DRYING
AMBULANCE
COAL
W.C
APPLES
COVERED WAY
BACK KITCHEN
MILK
MEAT
MORTUARY
YARD
ANAESTHETIC
HALL
MATRONS ROOM
PORCH
TEL
NURSES DINING R.M
OPERATING ROOM
DISPENSARY
WAITING ROOM
CONSULTING ROOM
DARK ROOM
X RAY ROOM
TUBERCULOSIS DISPENSARY
PRIVATE WARD 2 BEDS
MALE WARD 8 BEDS
CLOSET
SINK
GROUND FLOOR PLAN.
HASTWELL GRAYSON F.R.I.B.A.
AND
SHERWARD & BOWER F.R.I.B.A.
JOINT ARCHITECTS.
LIVERPOOL.

VIEW OF ENTRANCE FRONT

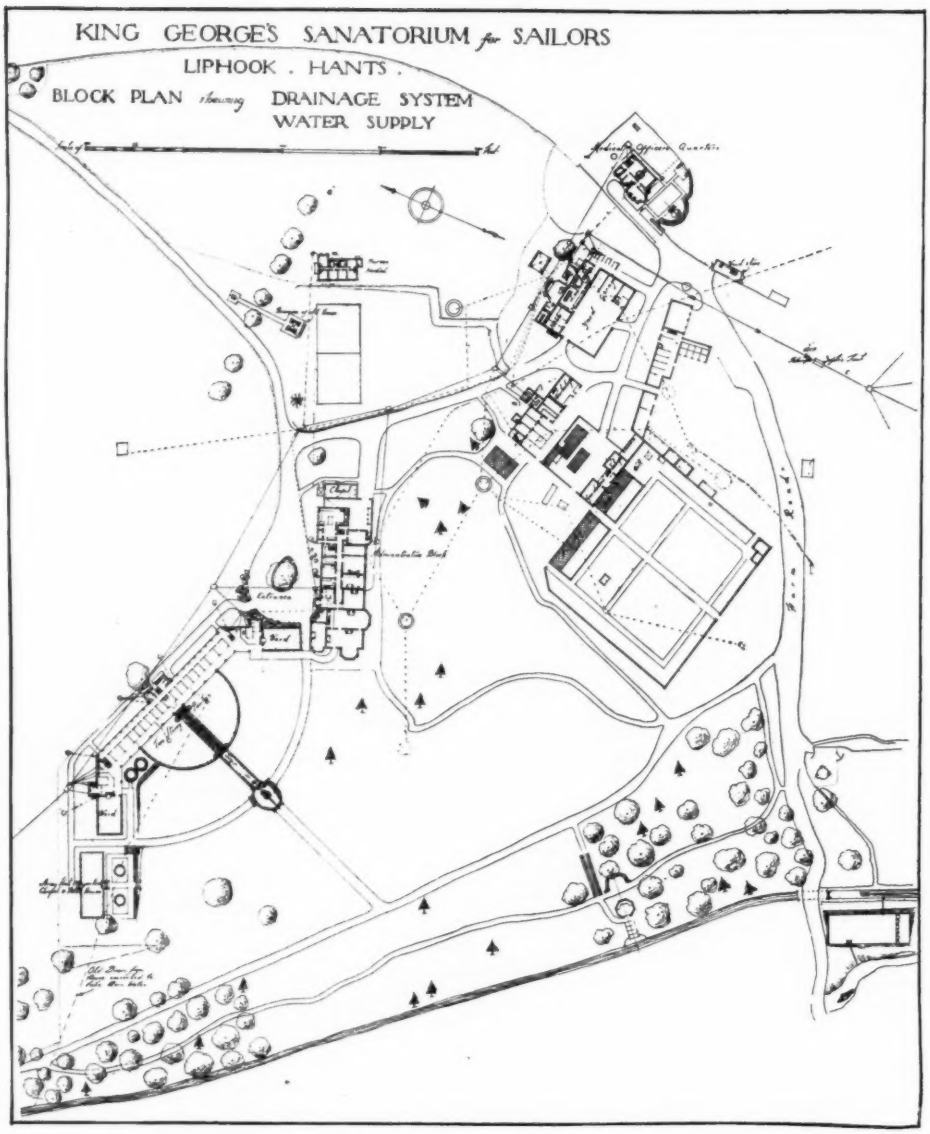
VIEW OF WARDS (SOUTH).

ROYAL INFIRMARY, NEWTOWN, NORTH WALES.

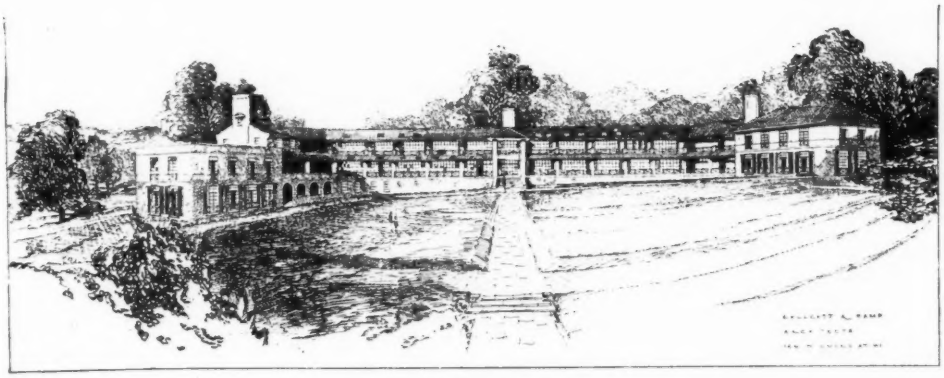
HASTWELL GRAYSON, F.R.I.B.A., AND SHEPHEARD AND BOWER, F. AND A.R.I.B.A., ARCHITECTS

KING GEORGE'S SANATORIUM FOR SAILORS, LIPHOOK, HANTS: WARD BLOCK AND OLD HOUSE (NOW ADMINISTRATIVE BLOCK).
STANLEY HAMP, F.R.I.B.A. (COLLCUTT AND HAMP), ARCHITECT

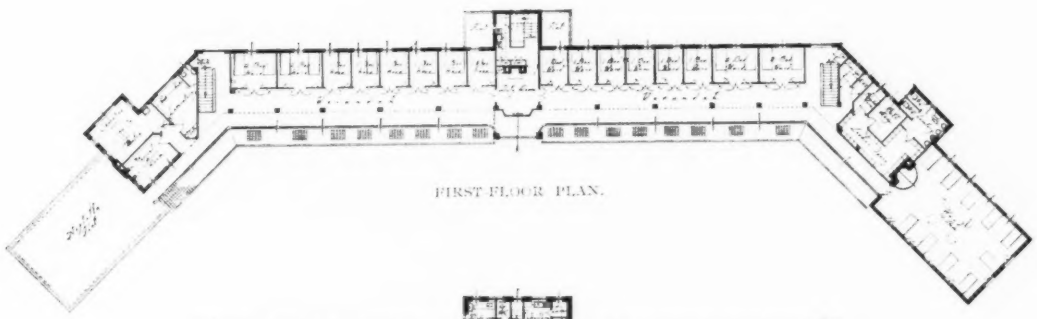
KING GEORGE'S SANATORIUM FOR SAILORS, LIPHOOK, HANTS: AN UPPER BALCONY.
STANLEY HAMP, F.R.I.B.A. (COLLCUTT AND HAMP), ARCHITECT.



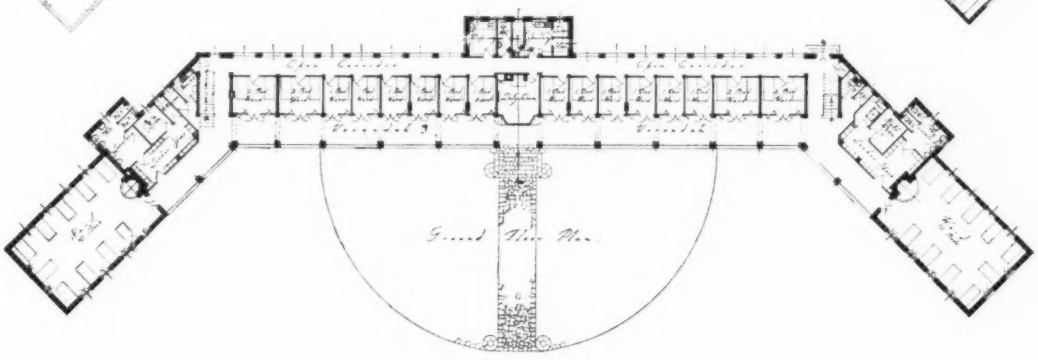
KING GEORGE'S SANATORIUM FOR SAILORS, LIPHOOK, HANTS: BLOCK PLAN.
STANLEY HAMP, F.R.I.B.A. (COLLCUTT AND HAMP), ARCHITECT.

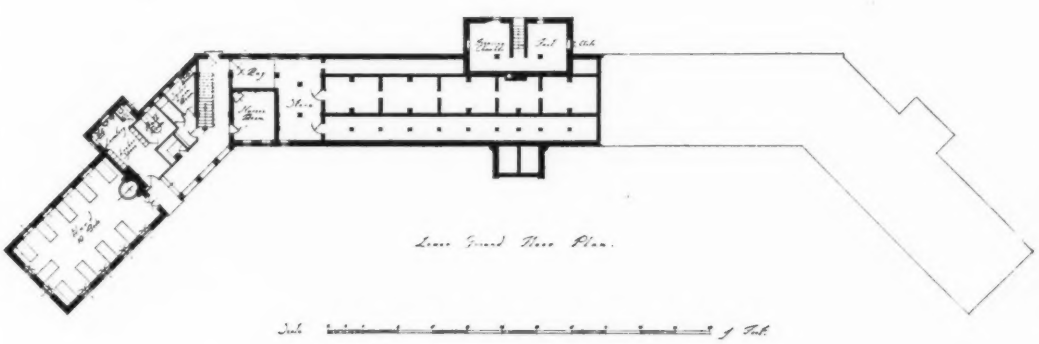


A PERSPECTIVE VIEW.

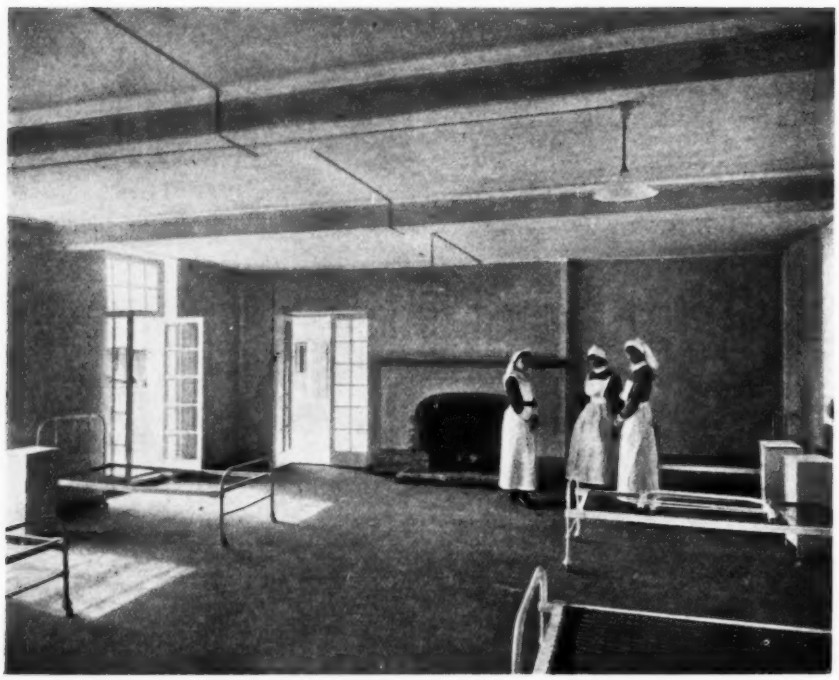


FIRST FLOOR PLAN.

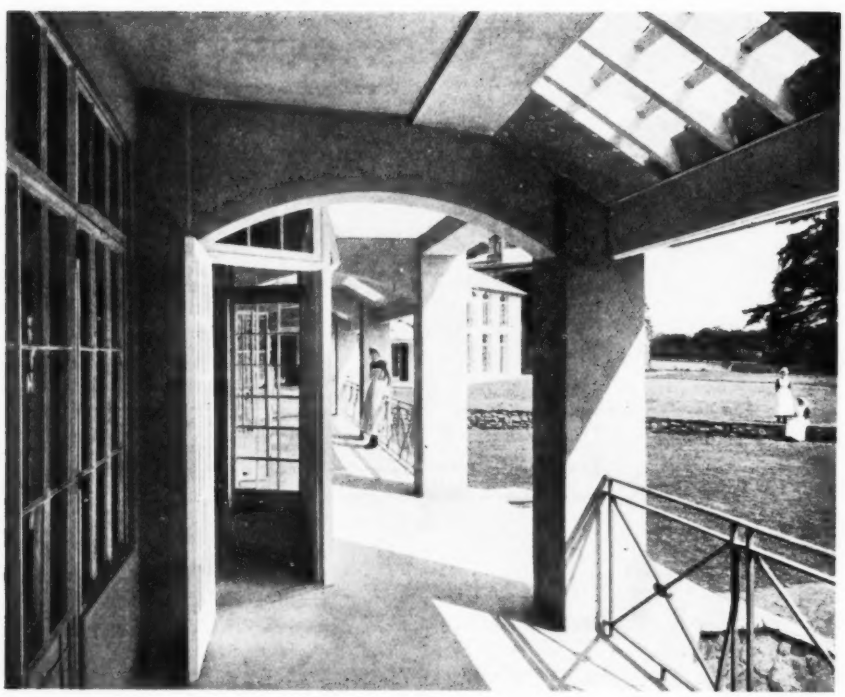




KING GEORGE'S SANATORIUM FOR SAILORS, LIPHOOK, HANTS.
STANLEY HAMP, F.R.I.B.A. (COLLCUTT AND HAMP), ARCHITECT.

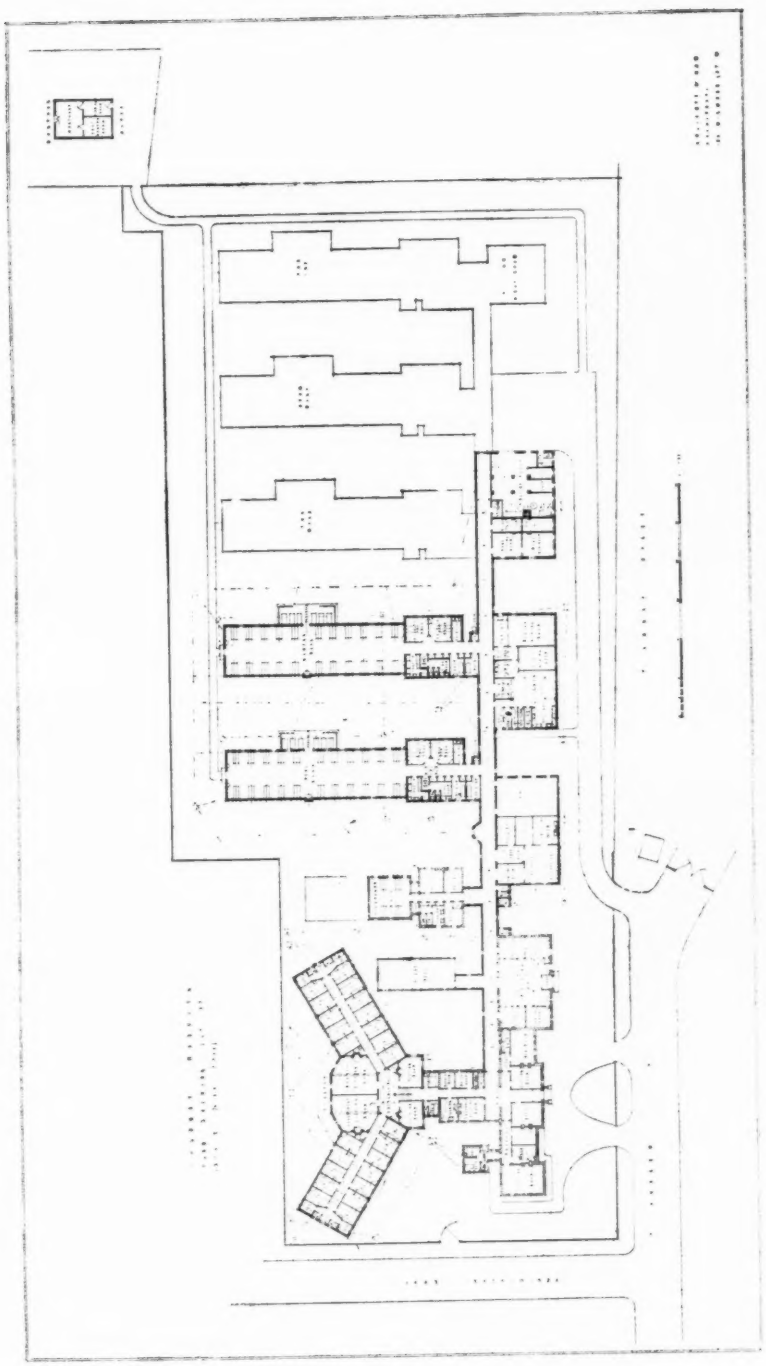


A WARD.

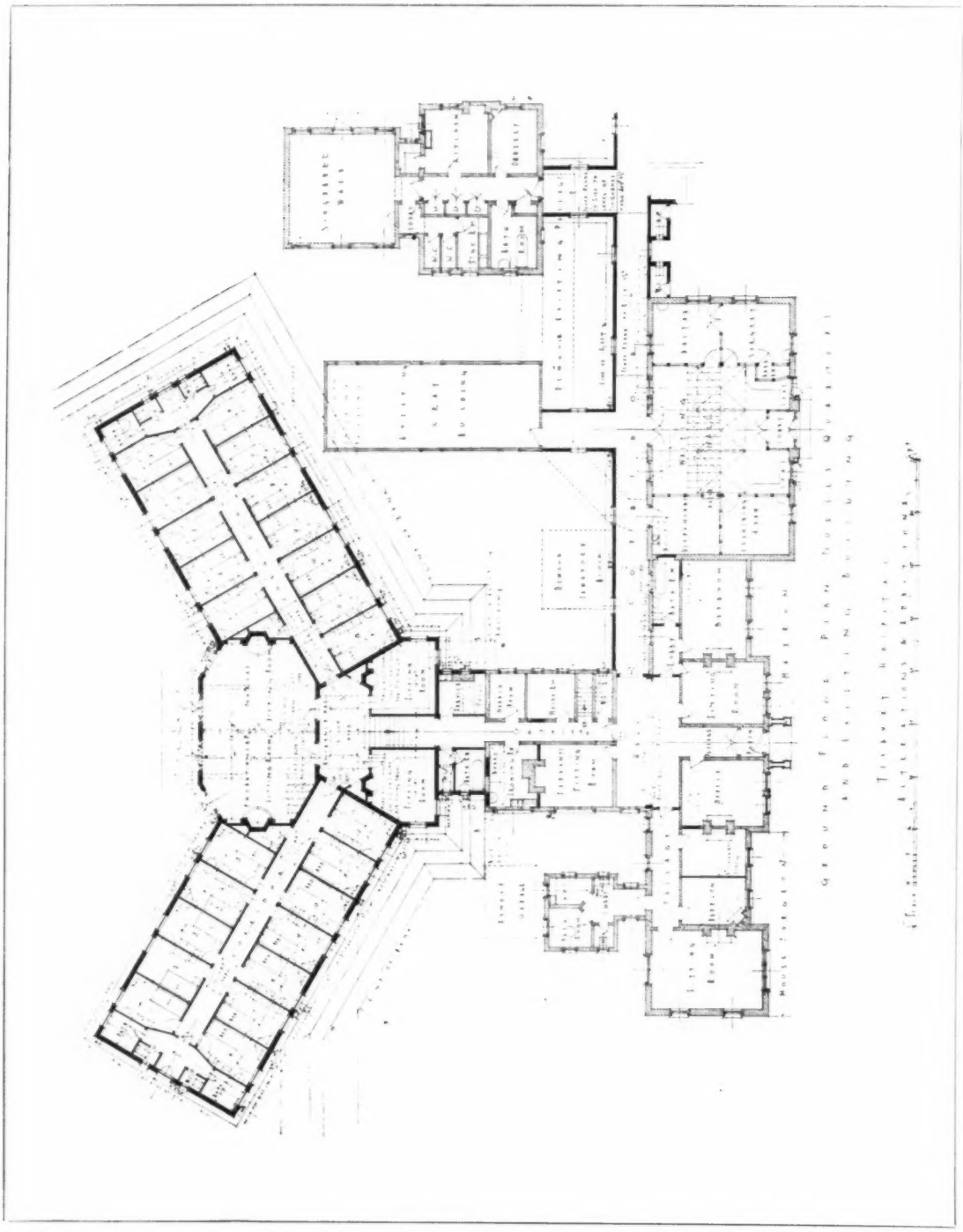


A BALCONY.

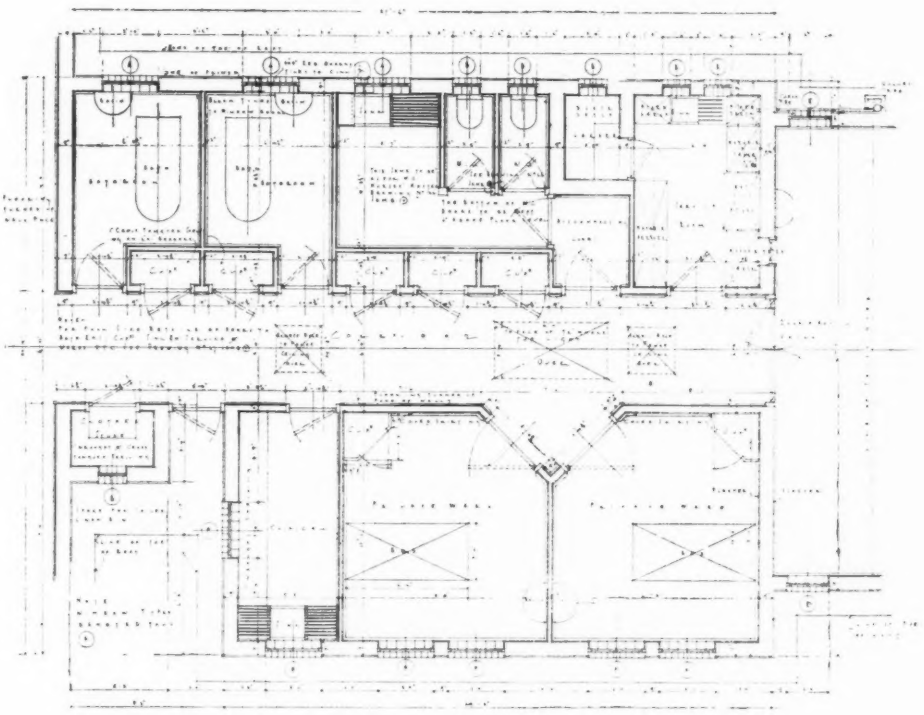
KING GEORGE'S SANATORIUM FOR SAILORS, LIPHOOK, HANTS.
STANLEY HAMP, F.R.I.B.A. (COLLCUTT AND HAMP), ARCHITECT.



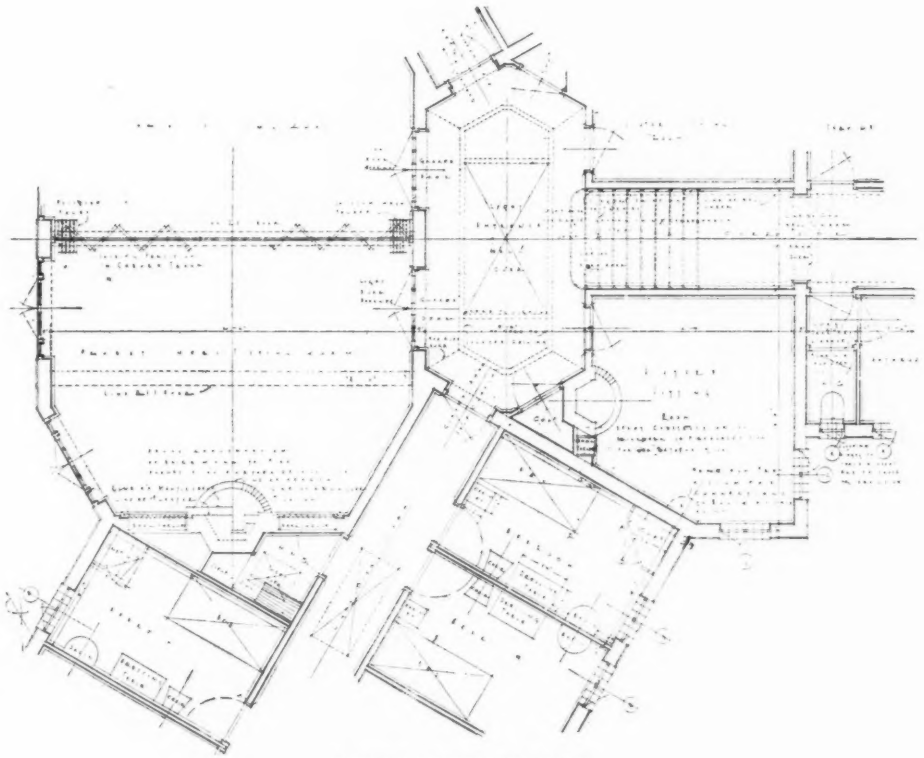
TILBURY HOSPITAL FOR SEAMEN: PLAN OF LAY-OUT.
STANLEY HAMP, F.R.I.B.A. (COLLCUTT AND HAMP), ARCHITECT.



TILBURY HOSPITAL FOR SEAMEN: GROUND-FLOOR PLAN OF NURSES' QUARTERS AND EXISTING BUILDING.
STANLEY HAMP, F.R.I.B.A. (COLLCUTT AND HAMP), ARCHITECT.



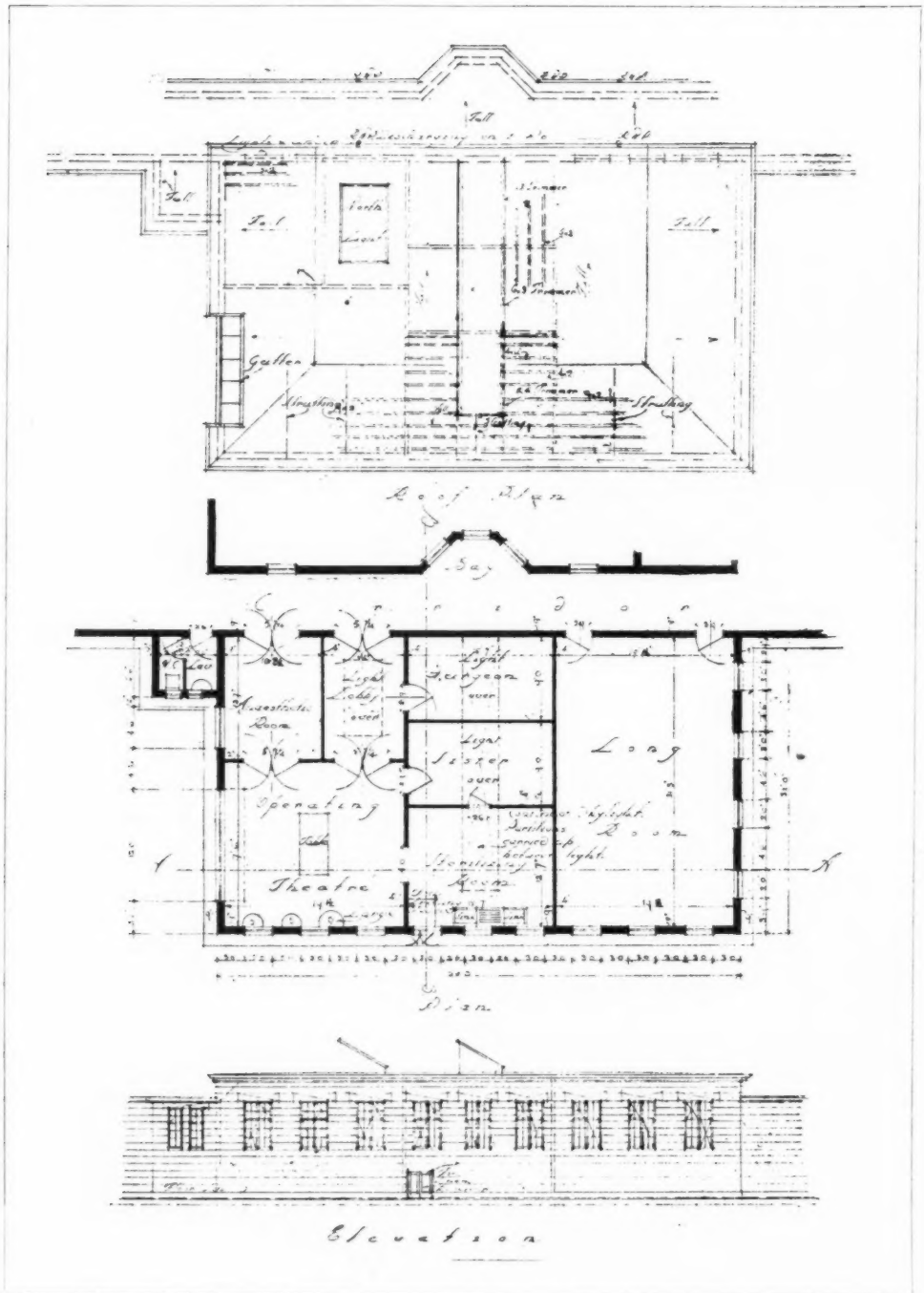
SETTING-OUT PLAN FOR WARDS.



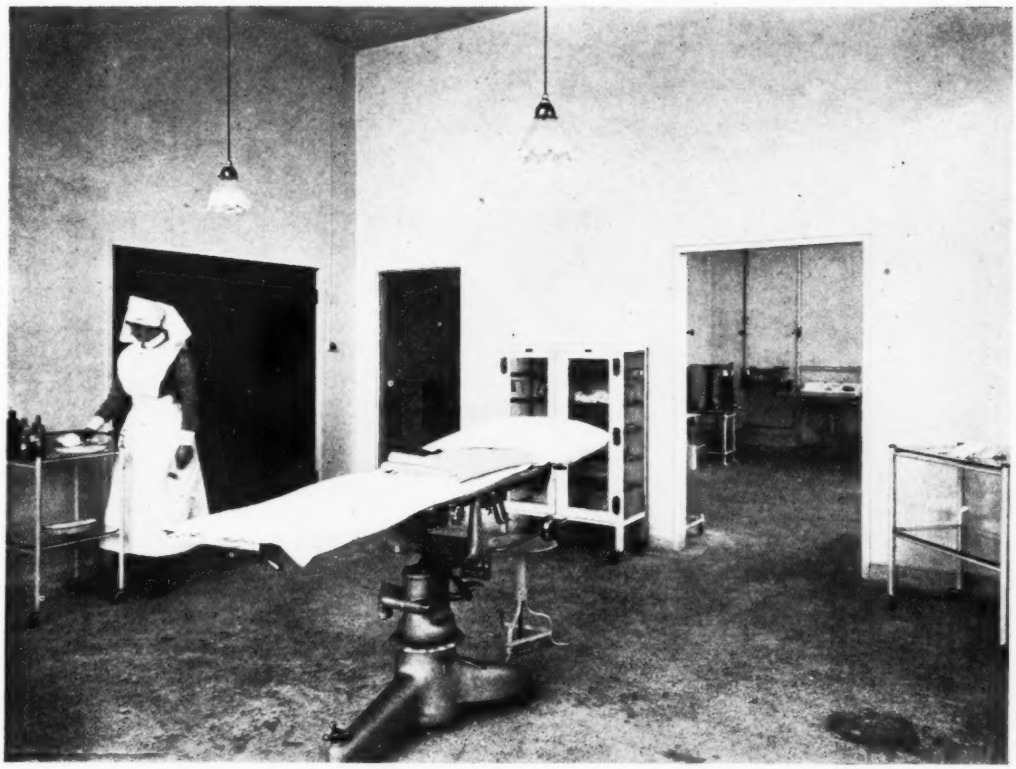
DETAILS OF NURSES' HOSTEL.

TILBURY HOSPITAL FOR SEAMEN.

STANLEY HAMP, F.R.I.B.A. (COLLCUTT AND HAMP), ARCHITECT.



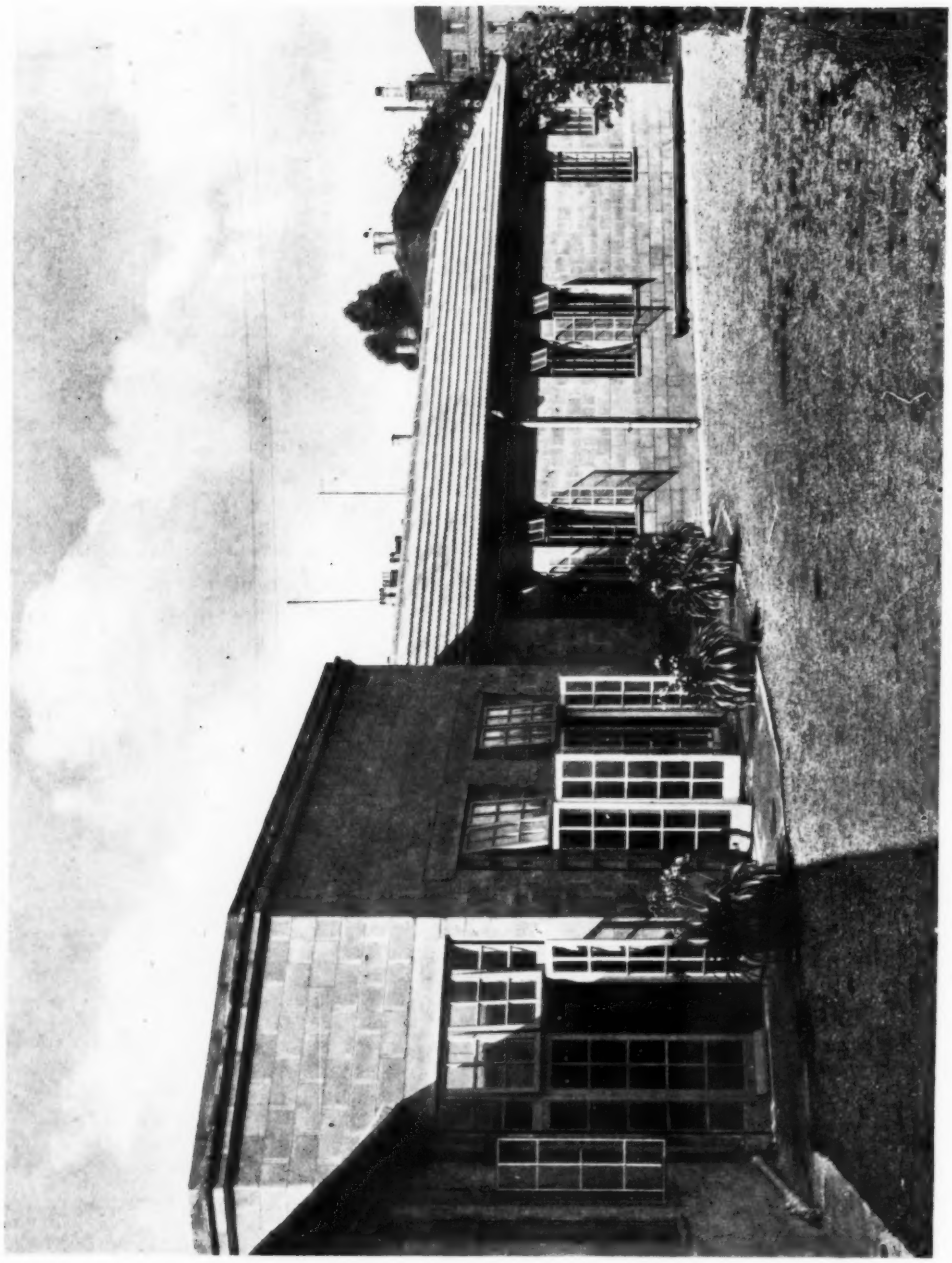
TILBURY HOSPITAL FOR SEAMEN: THE OPERATION BLOCK.
STANLEY HAMP, F.R.I.B.A. (COLLCUTT AND HAMP), ARCHITECT.



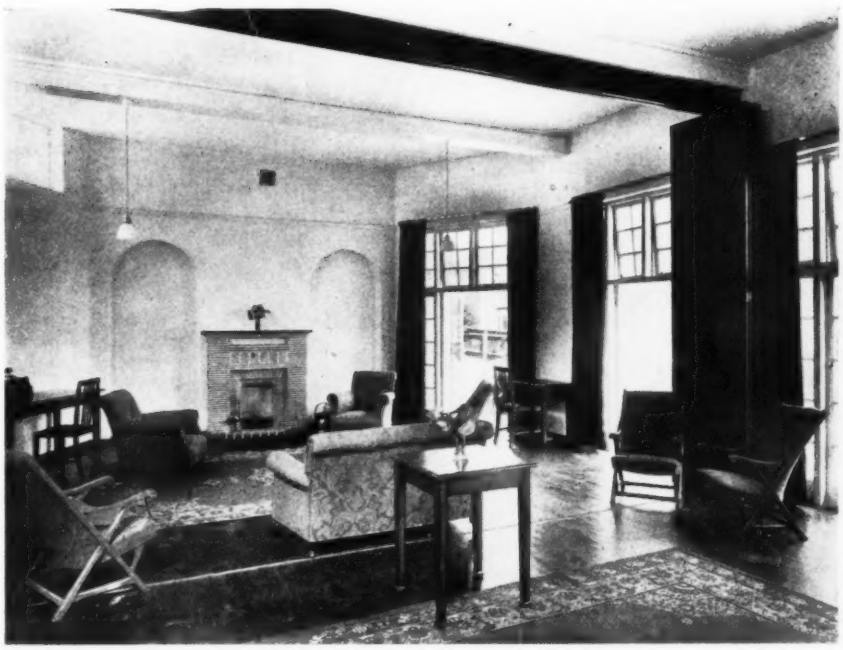
VIEW IN OPERATING THEATRE, LOOKING TOWARDS STERILIZING ROOM.

MEN'S WARD: VIEW FROM SERVICE END.

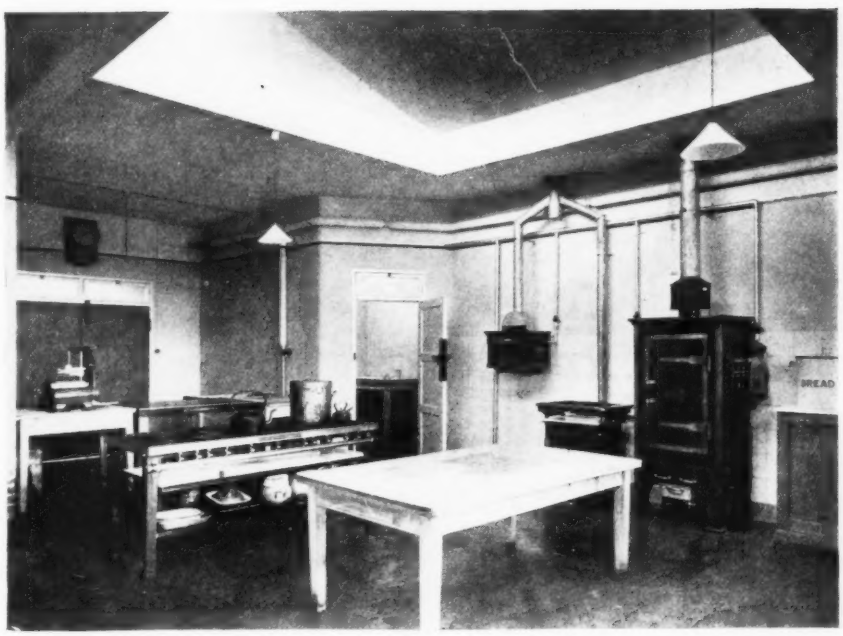
TILBURY HOSPITAL FOR SEAMEN. STANLEY HAMP, F.R.I.B.A. (COLLCUTT AND HAMP), ARCHITECT.



TILBURY HOSPITAL FOR SEAMEN: THE NURSES' HOSTEL.
STANLEY HAMP, F.R.I.B.A. (COLLCUTT AND HAMP), ARCHITECT.



NURSES' AND PROBATIONERS' SITTING-ROOMS.



THE KITCHEN.

TILBURY HOSPITAL FOR SEAMEN.

STANLEY HAMP, F.R.I.B.A. (COLLCUTT AND HAMP), ARCHITECT.

THE MAIN FRONT.

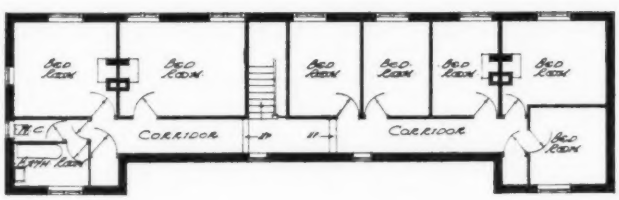
A VERANDA TO ONE OF THE WARDS.

COTTAGE HOSPITAL AT CLYDACH, SOUTH WALES.

CHATTERS, SMITHSON, AND RAINGER, A.A.R.I.B.A., ARCHITECTS.

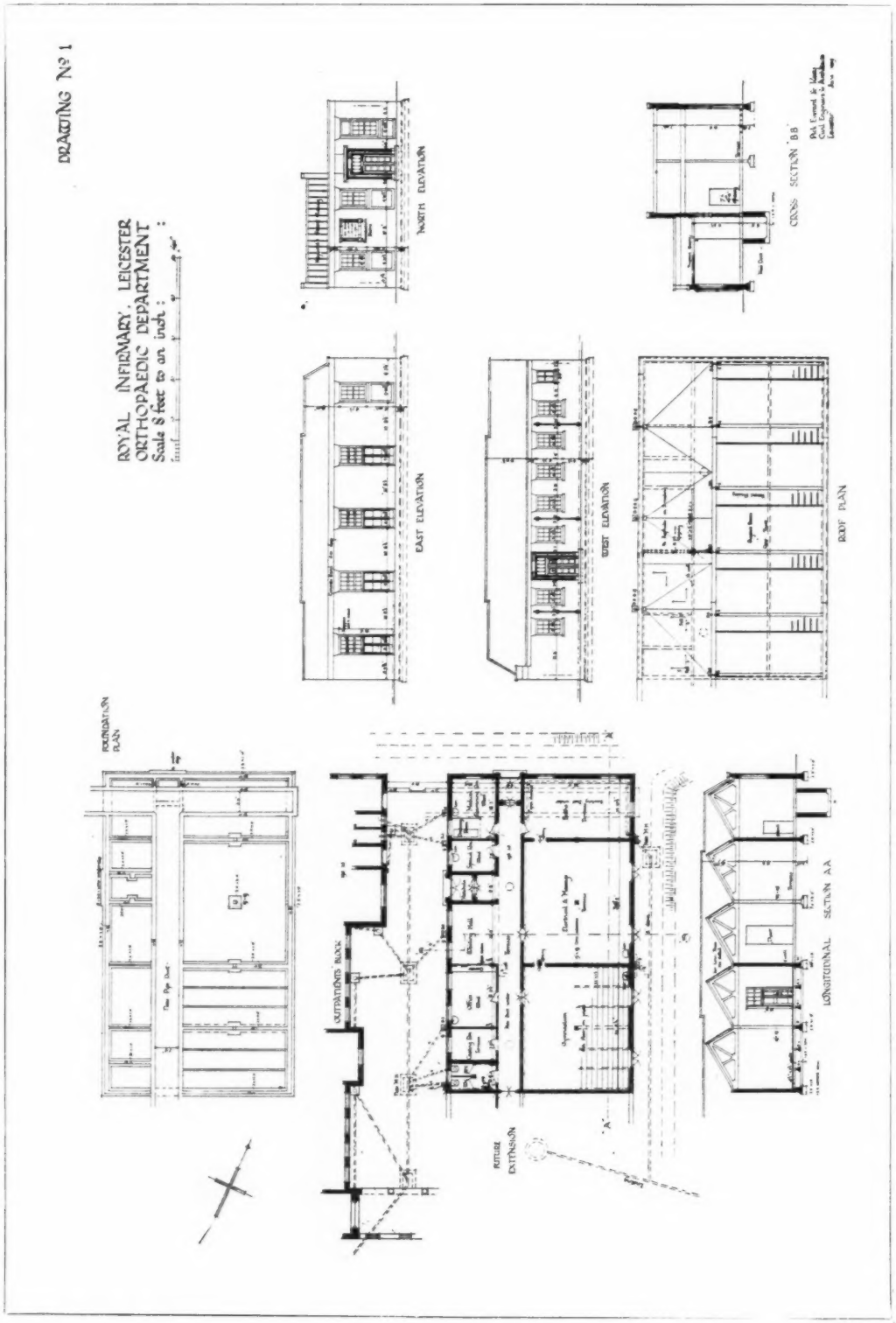
COTTAGE HOSPITAL AT CLYDACH S. WALES

GROUND FLOOR PLAN

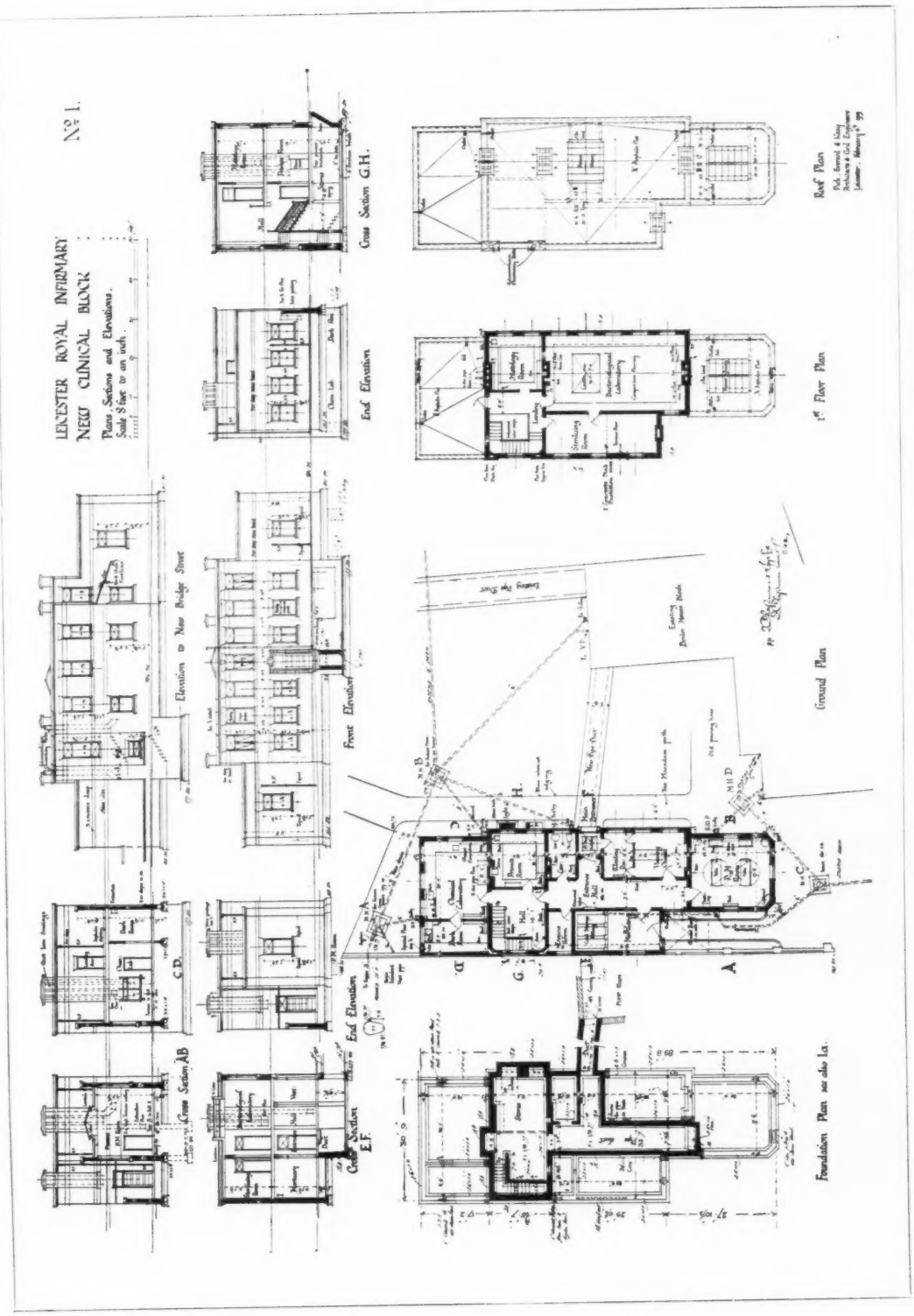


FIRST FLOOR PLAN

"Chatfield" Johnson & Eastgate
Architects
17 Regent St. Cheltenham



ROYAL INFIRMARY, LEICESTER: ORTHOPÆDIC DEPARTMENT. PICK, EVERARD, KEAY, AND GIMSON, ARCHITECTS.



ROYAL INFIRMARY, LEICESTER: CLINICAL BLOCK. PICK, EVERARD, KEAY, AND GIMSON, ARCHITECTS.

The Rothschild Hospital, Paris

THE building of the Rothschild hospital had been finished in July, 1914, just before the war broke out. It was employed immediately and for four years for the reception of wounded soldiers, and its normal civilian service did not begin until 1919.

It is a general hospital with about 250 beds, and contains all the different departments of a large hospital. The pavilions are either one or two stories above the ground floor.

Opposite the principal entrance is the administrative and out-patients' block pavilion containing :

To the right (marked II) the porter's lodge, waiting-rooms, and lobbies, the administrative offices, a conference room, the assistant doctors' living-rooms and lodgings. At the first floor the directors' apartments, and at the second the female servants' rooms. To the left (marked I) are the out-patients' department, medical and surgical consulting rooms, the emergency operation theatre, and the chemistry department. In the basement are a complete hydrotherapic service, medical baths, etc. On the first floor are special departments : Dentist, eye, laryngology, radio and electrotherapy. On the second the male servants' rooms.

To the right of this first pavilion is the lying-in pavilion, a small hospital by itself, with its own entrance (No. III). It comprises, on the ground floor, three parts, viz. : to the west, the department for women before delivery; to the south, entirely separate, the operation-room for septic cases, and the isolated bedrooms; to the east, the out-patients' department. On the first floor are two large wards for lying-in, with all necessary services. On the second floor comprises the delivery wards with operation theatre and sterilization apparatus; three wards for single beds (isolation after delivery); the midwives' home. On the third floor are a large schoolroom and laboratory.

The pavilion marked XIII is an isolation pavilion for infectious diseases. It is built on the box system, and has an enclosed garden.

The pavilion No. XII includes the post-mortem operation-rooms, laboratories, and museum. On the ground floor, opening on a special area, concealed by trees from the other pavilions, are the chapel and rooms for funerals. In the basement are the mortuary appliance, and the disinfection department.

The second line of pavilions contains to the east the surgical, and to the west the medical departments. In the middle are the kitchen and stores.

The surgical block comprises two pavilions—No. IV septic, and No. V aseptic—men on the ground floor, and women on the first floor. Between these pavilions is a low building which contains the two operation theatres (facing north), with provision for sterilization, etc.

The kitchen pavilion (No. VI) communicates with the surgical and medical pavilions through a warmed roofed passage on the ground-floor level. The kitchen requirements are served by installations of steam and gas. This pavilion contains also a dining-room for servants, and, at the first floor, bedrooms for the staff. In the basement are the stores, cold-storage room, etc.

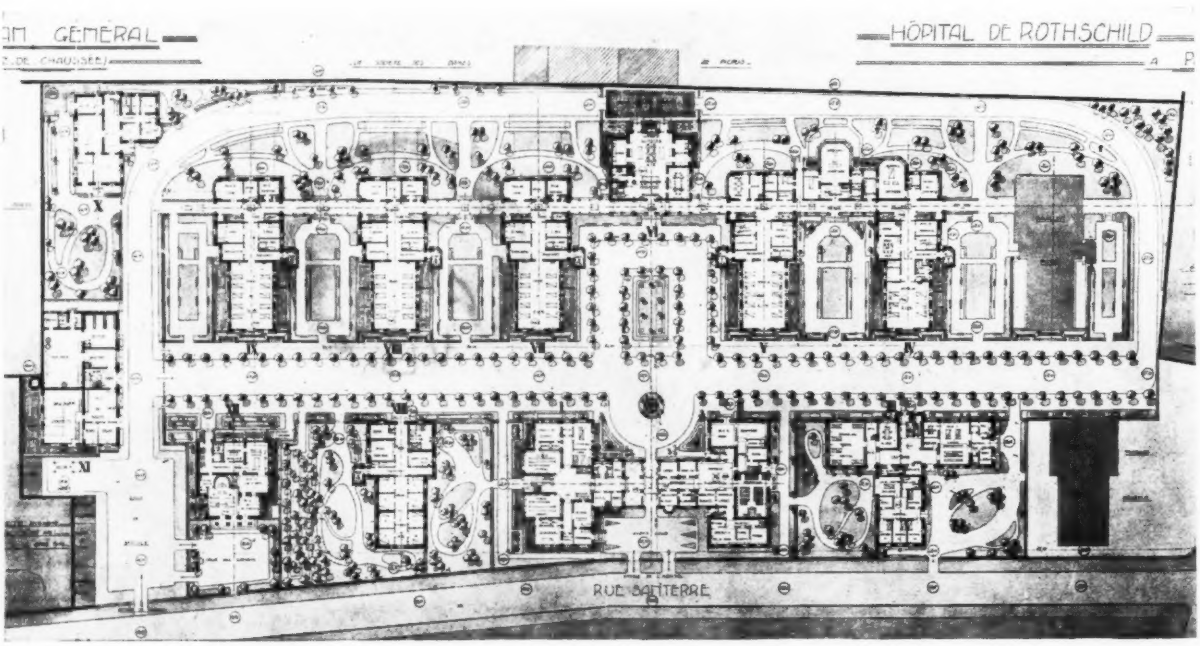
The medical pavilions for men, women, and children are Nos. VII, VIII, and IX respectively. All the wards face south, with balconies to the east and west, so that the beds can be moved outside into sun or shade as seems expedient. All the windows have steel sashes. The w.c.'s are in turrets, with effective cross-ventilation.

The pavilion marked No. X is the nurses' home, to which a private garden is attached.

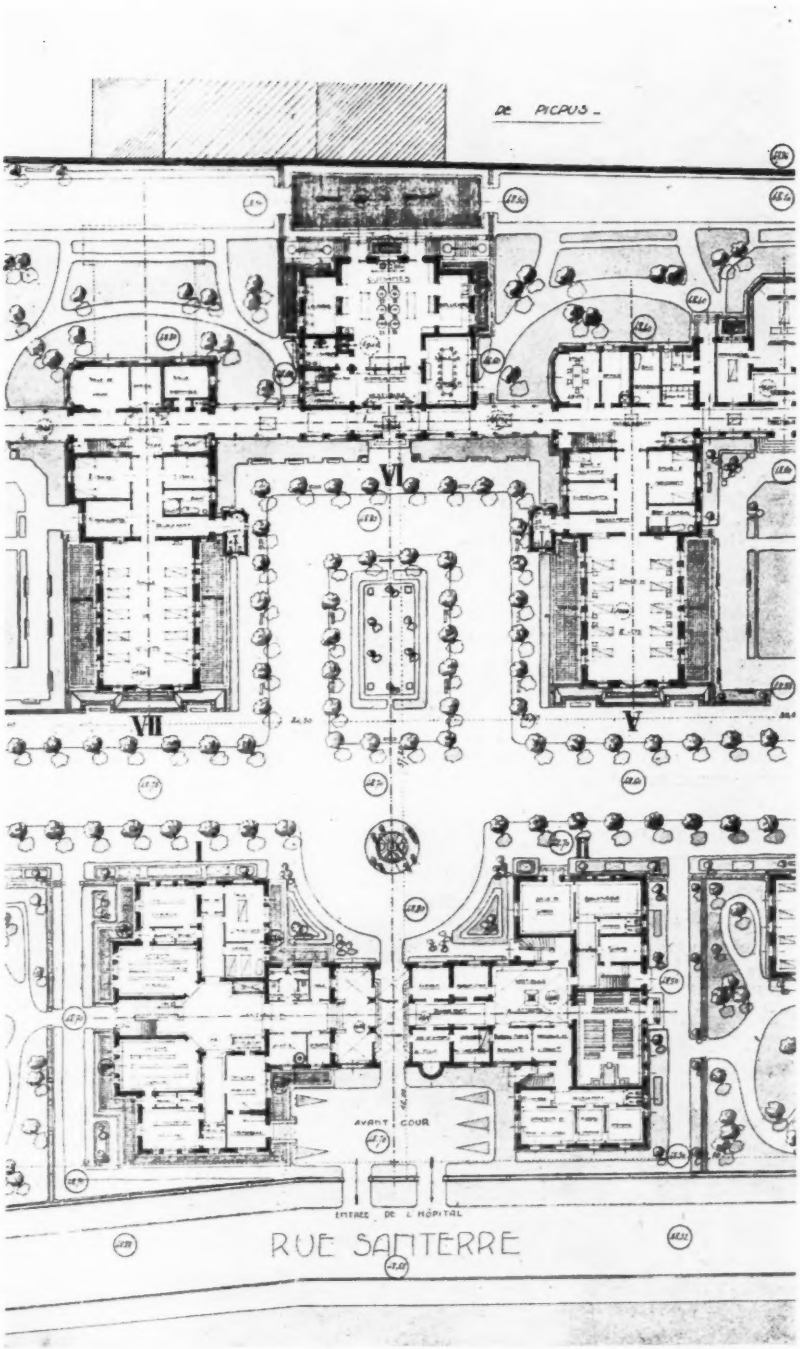
In pavilion No. XI are the laundry, boilers, the engine-room, electrical plant, hot-water supply, etc. On the first floor are the linen stores and mending-room. Lodgings for the staff occupy the second floor. Carriages reach this pavilion and the kitchen pavilion by a service entrance without crossing the gardens, where the patients can remain undisturbed.

All the pavilions are connected by a large underground gallery, permitting all transportation to be made, and accommodating all pipes for hot and cold water, low- and high-pressure steam, gas, etc.

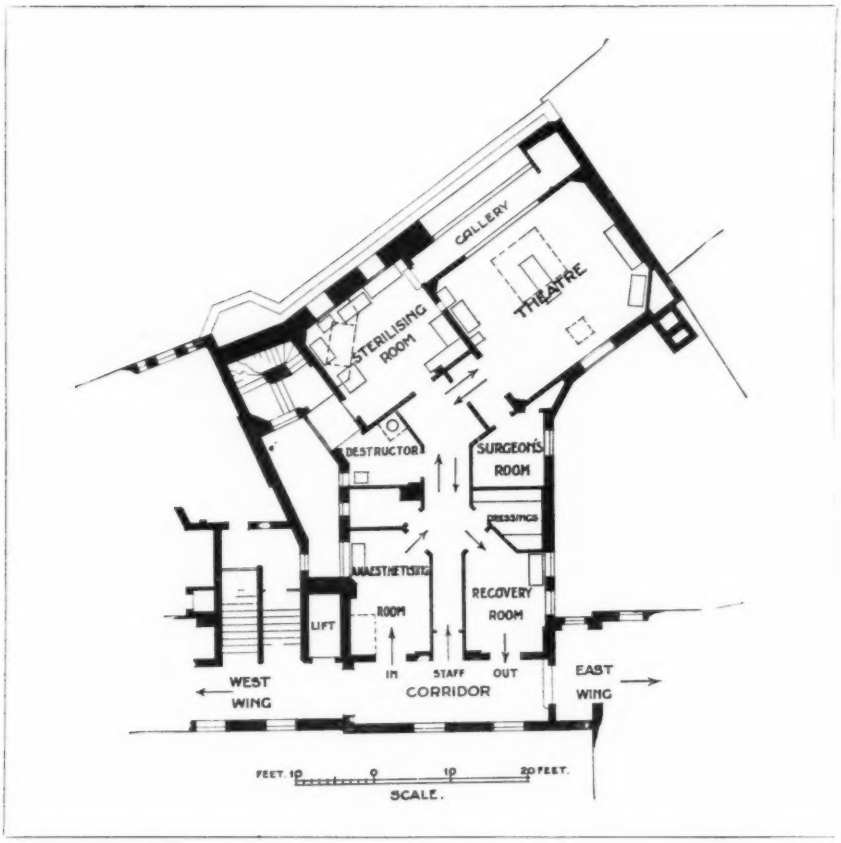
To the east space is reserved for the future building of two more pavilions.



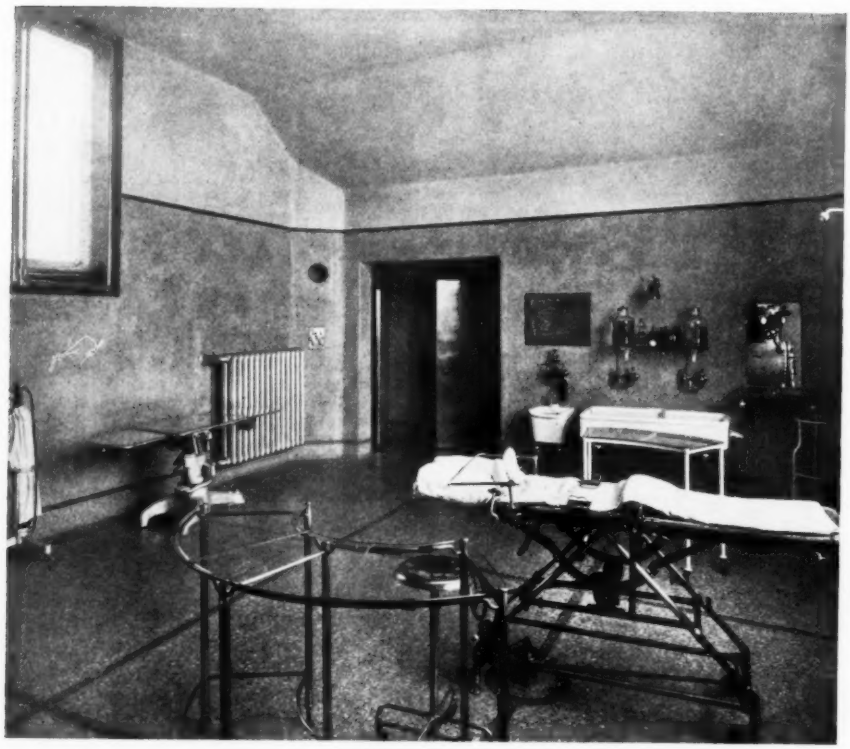
THE GROUND-FLOOR PLAN. M BECHMANN, ARCHITECT.



THE ROTHSCHILD HOSPITAL, PARIS: CENTRE PART OF GROUND-FLOOR PLAN.
M. BECHMANN, ARCHITECT.



PLAN OF ADDITIONS.



THE OPERATING THEATRE.

LONDON TEMPERANCE HOSPITAL, HAMPSTEAD ROAD. CLAUDE FERRIER, F.R.I.B.A., ARCHITECT.

Some Modern American Hospitals

By LIONEL H. PEARSON, F.R.I.B.A.

The Arrival in New York

THE thirty-story Shelton Hotel in New York City, where I stayed on landing, towers above Lexington Avenue like some gigantic campanile, and architecturally, with its stone base and upper mass of dun-coloured brickwork, strikes the Italian note which seems to suit New York particularly well.

A stay there makes a very good beginning to a professional visit to American hospitals, as so many of them nowadays are run on hotel lines. The handsome hall, with its row of elevators, and cafeteria and Italian roof-garden on the sixteenth floor, the mail-chute (by which letters can be posted on any floor), iced-water taps, the individual sanitation to every bedroom, are all characteristic features of modern American life. It takes the traveller a day or two to adjust his neck to looking at the tall buildings, and his mental vision to the new ideas which crowd on him after his 3,000-mile trip across the Atlantic Ocean.

The next step is to look through the letters of introduction and to get the hang of the place. This is not too difficult, as the long lines of the avenues run up Manhattan Island due south to north until they die on the Harlem River, away towards the Bronx. The backbone is, of course, represented by Fifth Avenue, and the centre of the town (which shifts every few years) is now about the region of 42nd Street, where is located the Grand Central Terminal. Here, also, are to be found the offices of the well-known architectural firm of York and Sawyer, to whom I had an introduction. This was a great piece of good fortune, as Mr. Sawyer was extremely kind; and as they have designed more than fifty hospitals, not to speak of innumerable banks and public buildings, I was allowed to see something of the workings of an office which had at times a staff of more than fifty assistants, and to realize the perfect organization required to run a business of this kind. The attention devoted to the technical side of hospital planning is typical of the work of this firm. They in turn introduced me to Dr. Goldwater, the distinguished hospital consultant, who, in addition to directing the Mount Sinai Hospital in New York, finds time to advise on scores of hospital plans all over the country. The result of this specialization is that great attention is given to the organization of the various services in drawing out the plans, and nothing seems ever left to chance, (perhaps our more happy-go-lucky methods have the advantage of being more elastic and capable of alteration).

The American love of statistics amounts almost to a national vice, and the elaborate schedules prepared for the purpose of comparison in working out schemes are often most impressive. As an example, there appeared an interesting article, in " The Modern Hospital," by Mr. Perry Swern, of Chicago, on the problem of private rooms versus wards, which was illustrated by comparative diagrams giving figures for nursing radius, areas, cubic contents, costs, and the "Five Most Frequent Calls in Nursing," and this is typical of the way planning is evolved. There is no doubt the result is good from the point of view of organization and efficiency, though to English eyes it may appear somewhat over-elaborate.

As there are many terms in American technical language which differ from ours, the following list is an attempt to give the American and English equivalents in hospital buildings: Location = position; first floor = ground floor; elevator = lift; freight elevator = goods lift; dumb-waiter = small service lift; private room = single-bed ward; semi-private room = two-bed ward; pharmacy = dispensary; dispensary = out-patients' department; diet kitchen = ward kitchen; utility room = sink room; toilet = w.c. and lavatory; running water = lavatory basin; closet = cupboard or store; scrub-up room = sink-room for operations; nurses' station = sisters' room; female help = ward maid; intern = resident medical officer; morgue = mortuary; autopsy room = post-mortem room.

Single-room Hospitals

5th Avenue Hospital.

New York is particularly rich in hospitals, and one of the finest of them is the 5th Avenue Hospital. This was built in 1921, to the designs of York and Sawyer, to provide accommodation for 320 patients of the "white-collar-men" class (clerks and people of small means), and the rates authorized by the Board of Trustees are from "nothing up."

The building, which is nine stories in height, is constructed on the plan of the letter X, and overlooks the Central Park. All the patients are provided with single rooms, 16 ft. by 9 ft. each, furnished with a toilet, lavatory and necessary equipment. Centralization of control is the keynote of the plan, and the central service department is located in the centre of the basement, and is flanked by the main kitchen, the diet kitchen, pharmacy, store-rooms, surgical supply departments, and linen rooms. The surgical supply division is particularly well arranged, as sterilized dressings are prepared in the basement and sent up on special trays to the patients' rooms. Soiled instruments and dressings from the various floors are taken down by a special dumb-waiter to the disinfecting room, and if possible sterilized, reclaimed, and passed into the supply department. The main kitchen provides food service for the whole building, and is lighted and ventilated by artificial means.

The first floor contains the administrative offices, staff quarters, and a special feature in the form of private offices for physicians, where they can receive private patients, who can enter by a private entrance. The entrance hall is oval in plan, and is architecturally treated with a Travertine marble pavement. The second floor is devoted to children, and is arranged in the form of large open rooms, together with a number of glass cubicles. The typical floor plan has the four wings of patients' rooms radiating from a central rotunda, where are located the supervisor's office (in a commanding position), the service pantry, visitors' reception room, two passenger elevators, and two treatment rooms. In attending to the ordinary wants of the patient, the nurse will travel about 4 ft. to the small toilet room.

On the sixth floor is the maternity department, and by the use of glass doors and sound-proofing materials to the ceilings, the problem of isolating the labour rooms has been assisted considerably.

The loggias on the roof and in the centre of the building are a particularly successful feature of the design, which is pleasantly carried out in a simple Italian style.

Mount Sinai Private Pavilion.

Within a few blocks of the 5th Avenue Hospital is the famous Mount Sinai Hospital, of which Dr. Goldwater is the director. The private patients' pavilion was built in 1921, to the designs of the late Arnold Brunner, to accommodate 131 private patients, on a plot of 200 ft. by 70 ft., with long axis north and south, and facing Central Park on the west side. The building has seven floors above street level, and the northerly section

of the first floor is given over to business offices, etc., while the corresponding section of the seventh floor is appropriated for operating rooms and accessories, the eighth or roof story being used for convalescents. The kitchen is in the basement, also the dining-room for 112 nurses, store-rooms, workrooms, staff-rooms, housekeepers' stores for mattresses, linen, etc. The entrance to the building is in the centre of the block. The usual information clerk faces the visitor, and close by are offices and reception rooms.

There is a rear entrance for stretcher-cases. The corridor ceilings are arched, and the floors finished with rubber tile on the first floor and battleship linoleum on the upper floors, with borders and skirtings of terrazzo. A special feature are the night-lights installed in flush metal boxes twenty inches from the floor. Of the twenty-two rooms on each floor, four have private baths and toilets, two have private toilets, and there are utility rooms for the other sixteen; but there is "running water" in every room.

The size of the patients' rooms varies from 16 ft. by 12 ft. 6 in. to 15 ft. by 10 ft. 9 in., and a feature of every room is the "combination metal cabinet" built flush into the wall and divided into four sections—1, clothes' closet; 2, surgical dressings; 3, portable refrigerator; 4, bed utensils (this last opens into an exhaust ventilating duct). The doors are 4 ft. wide, and are equipped with silent door-closers. In addition there is a screen door about 5 ft. high and 1 ft. 6 in. from the floor, constructed of a wooden frame with casement-cloth panels. This is much used in hot weather, when the solid door can be left open, the screen door ensuring privacy. Many of the rooms have balconies 3 ft. wide, so that the head of the patient's bed may be in the open air if necessary.

Henry Ford Hospital.

Both the hospitals above described are examples of the "single-bed" type, which is now the fashion in America; and another of the same class is the Henry Ford Hospital at Detroit, Michigan. This was built at a cost of 7½ million dollars (the gift of Henry Ford). It covers a ground area of twenty acres, with a frontage to West Grand Boulevard of 700 ft. It is in a style which is described as of "a Western type," and is architecturally uninteresting.

The building is in form of an **H**, with long horizontal bar. It is six stories in height, with main entrance in the centre, and administrative offices, pharmacy, diagnostic offices and rooms, record department, and library.

There are three units, each of which can be operated independently, each having a capacity for 96 patients, 24 on each floor. In addition there is a unit to accommodate 48 mothers and babies and 96 children. Every patient has a separate room, with a bathroom and toilet attached (the toilet has a special spout and lever for cleaning bed-pans). These rooms are built in pairs, with a service shelf between for access to pipes and conduits. There is a nursing station to every 24 patients, so that the station is within 60 feet of the most distant room. There is a charge, varying from 4½ to 8 dollars a day, made for every patient. The nurses' home (in a style of architecture very superior to the main hospital) has 309 single rooms, 16 ft. by 10 ft. each, with a bath; and each section has an elevator, a porch, sitting-room, tea-room, and kitchenette. The lounge, library, eight parlours for visitors, music-room, etc., are luxuriously fitted up and furnished. There is a very fine power-house, where oil fuel is used exclusively.

Hospitals attached to Medical Centres.

There is a marked trend in America towards linking up hospitals with medical teaching centres, and there are several in course of development at the present time at Baltimore, Boston, New York (where the Columbia-Presbyterian will consist of twelve hospital units, one on each floor of the new building), Chicago, Philadelphia, Rochester, and Nashville. The last-named is a good example of this class, and the new buildings for the Vanderbilt University Medical School and Hospital, designed by Coolidge & Shattuck, with Dr. Winford Smith as consultant, are located at the south end of the campus of the university.

The court containing the laboratories will open towards the north, facing the campus; while the court containing the hospital wards will face towards the south, with space for future buildings on the west.

On the first floor the medical dispensary is under the medical wards, the surgical dispensary is under the surgical wards, and the library is placed in the centre of the building. The dining-rooms for staff, etc., on the second floor, are placed immediately over the kitchen. The ward unit consists of 30 beds—16 beds in an open ward divided into cubicles of 4 beds each; the remaining 14 beds into 4-bed, 2-bed, and single bedrooms.

On the third floor there are two wings to the east, containing 14 private beds, with a flat roof accessible for good weather.

The laboratories consist of a series of units measuring 19 ft. by 12 ft., as this was considered to be the best working size. North of the hospital building will be a nurses' home for 100 nurses.

City Hospitals of Medium Type

The Union Memorial Hospital at Baltimore

is one of the best examples of this type, and the buildings recently erected on 33rd Street to the designs of Joseph Sperry provide accommodation for 177 patients, with space left for a future block of 110 private rooms.

The basement contains dispensary, kitchen supplies, etc. The first floor, with the main entrance in the centre of the building, contains waiting-rooms, offices, living quarters for doctors and superintendent (who at the present time happens to be a lady—Miss Ball). The second floor has two wards of ten beds each, which project from the main face of the building—six men's cubicles, six women's cubicles, ten 2-bed wards, and six isolations. On the third, fourth, and fifth floors, there are 32 private rooms. Eight of these rooms connected with private baths.

On the sixth floor there are located the operating suite, X-ray department, observation ward, and children's ward.

The floors of wards are hardwood, corridors terrazzo, X-ray rooms, etc., linoleum with terrazzo border.

The whole hospital is run on very attractive lines, and all ward windows are provided with white curtains, which give a cheerful look to the place.

The Maternity Hospital at Boston, Mass.,

is another very attractive hospital, built from the designs of Coolidge & Shattuck, in 1923, among the group of handsome buildings which surround the Harvard Medical School. The exterior is charming, and is designed in a refined Italianesque style of buff mottled bricks, with concrete stone trim. The lay-out plan is the shape of a **U**, open to the south, main building in centre, nurses' home on east, and future private-room block on the west. The principal wards, which are on the second and third floors, consist of two 12-bed wards divided down the centre with glazed screens, and one 6-bed ward in the centre with balcony. On the north side of the corridor are the serving-room, nurseries, washing-rooms, toilet-room, etc. The fourth floor is given up to delivery-rooms and operating suites.

The heating and ventilation system is very elaborate, and special devices are employed to regulate the temperature and percentage of humidity in the premature nursery.

The floors and wards and corridors are of battleship linoleum, except the first-floor corridor, which is black and white rubber tiles; and grey rubber flooring is used in all operating-rooms, delivery-rooms, and toilet and bathrooms, with a 4 in. sanitary terrazzo base at a 45-degree angle to corridors and rooms. The operating-room has an installation of artificial daylight, which provides a lighting intensity of 80 foot-candles per square foot over the entire working area.

The nurses' home is of simple plan, with rooms about 12 ft. by 8 ft., and lavatories and toilets about one to every four nurses, and baths one to eight nurses.

Out-patients' and X-ray Departments.

The most up-to-date out-patients' departments in America are buildings of several stories in height, attached to, but separated from, the main hospital buildings.

As examples of this, the Johns Hopkins at Baltimore are now erecting a large building of this type, and the City Hospital at Boston, Mass., have recently completed a particularly well-equipped O.P. building, with large waiting-hall on first floor, connected with smaller halls on the upper floors for each department by the usual elevators.

But perhaps the most interesting developments are the "pay clinics" some of which are run on the "combined medical service" principles. One of the best-known of these is the Cleveland Clinic, founded by Dr. Crile and three other doctors, who run it on a paying basis with ten full-time assistants seeing about 300 patients daily. The entrance of the building is on the first floor, and leads to the registration desk, behind which is the record-filing room. Small lifts convey the records (there are now nearly 150,000 of them) to desks in the reception room and to the upper floors.

The X-ray department occupies the west side of the first floor, the pharmacy and clinical laboratories are on the east side. The reception rooms on the second floor form the heart of the building, and rise to the skylight, with galleries around on the third and fourth floors. Round this well are grouped the examining rooms of the various departments. Over the doors of these are signal lights, different colours indicating the member of the staff required by the patient. Viewing-boxes for the examination of X-ray plates are located in the corridors.

Immediately associated with the clinic is a hospital for 150 patients. All patients pay according to their means.

X-ray Department.

The increasing importance of X-ray work is nowhere more fully recognized than in America, where the use of X-ray for diagnosis has reached such a point that in one important hospital more than 75 per cent. of the patients are now X-rayed.

The result is that there are now many well-planned and splendidly equipped X-ray departments, and one of the best of these is to be found at the Roosevelt Hospital, New York City, where the architects, York and Sawyer worked out a plan in conjunction with Dr. Steiner. The department is situated on the ground floor, near the operating block, and conveniently placed for the out-patients, and consists of a radiographic room, dark-room with special light-excluding pass-boxes of a revolving type, cystoscopic room, fluoroscopic room, viewing room, with an excellent set of viewing-boxes made of enamelled steel, and filled with Cooper-Hewitt lights, and a room for Files. The treatment rooms are in a corner of the building, cut off by corridors from the rest of the department, and special precautions are taken against rays, as the whole of the walls and ceilings are treble-lined with lead, wire-mesh, and finally glazed tiles, and the floor is lead and cork.

There is another very fine X-ray department at the Boston City Hospital, in the New Thorndike Memorial Building. This department is on two floors—on the ground floor, waiting-rooms, radiographic rooms, viewing room, and records; in the basement are the treatment rooms (with machines enclosed in a room 6 ft. wide, between two treatment rooms in every case), an exceptionally fine dark-room, with smaller rooms for wet plates, plate-loading, etc., and special attention has been paid to the ventilation—an important point, unfortunately too often overlooked with resultant damage to the health of the assistants. There is a lecture hall at the end of the corridor, two floors in height, for the use of the department; so that altogether this is in many ways a model of what an X-ray department should be. The colour of the walls found to be most satisfactory by the X-ray men is orange or buff, several departments have plastered walls coloured to these tints, and the floors are usually tiled like an operating theatre, or covered with battleship linoleum with a border and skirting of terrazzo.

English and American Methods Compared

One of the first things that strike a visitor from England is the importance of mechanical means of heating and ventilating in America. In summer the electric fans and cooled air, in winter the use of radiator and heated air, have had the result that even in hospitals the open window which we consider the first consideration of health is not quite so much a matter of course over there.

The pavilion type of hospital, with the cross-ventilated ward of between twenty and thirty beds, no longer meets present-day requirements in America. Even where the large wards exist, the tendency now is to divide these with glazed screens, so that cases can be classified and segregated.

Dr. Winford Smith, of the Johns Hopkins Medical School, Baltimore, Maryland, advocates the use of wards 40 ft. wide, so that the patients' beds may be at right angles to the window, in order to avoid light in the patients' eyes, and this width also is useful in planning the lower floors for other departments.

The low-pavilion type of ward building is also unsuited to the city site on which the majority of hospitals are of necessity located.

The new Columbia-Presbyterian Hospital in New York City is to be fifteen stories. The Fifth Avenue Hospital, N.Y.C., is ten stories. St. Luke's Hospital, Chicago, is nineteen stories, and even on a comparatively open site it is not uncommon to have a six-story building.

This is not only a question of the value of the site, but also very much a question of service. The American believes very strongly in concentration, and vertical buildings are much more suitable to the elevators and chutes and all the mechanical equipment of the present day than the spread-out horizontal type of building where the staff must walk long distances, and the plumbing, heating, refrigerating, and drainage services must be less concentrated and less efficient.

The elevator plays an important part in modern American life, and in hospitals as in other buildings the staircase is relegated to an inferior position, and used mainly for fire-escape and floor-to-floor services. The elevators must of course be near the main entrance hall, which is generally made as attractive as possible architecturally, and as far as possible follows the lines of the hotel. This idea is also noticeable in the waiting-room, which is invariably comfortably furnished in the style of an hotel lounge, and in the private room adjoining the superintendent's office, where financial matters may be discussed without disturbance. But perhaps the most characteristically American side of the administration is the record system, to which a great deal of attention is directed. A large room near the entrance is usually assigned to this department, and in the out-patients' department of the Boston City Hospital there is a Lamson system of carriers for conveying the records to various departments, such as X-ray, skin, etc., on different floors of the building.

The food service is usually very efficient, and as great attention is paid to diet a portion of the main kitchen is frequently separated for this purpose under a special dietician. In the larger hospitals the food is conveyed from the kitchen (which is as near as possible to the elevators) to the diet kitchens on the ward floors in electrically heated trucks, but in the smaller hospitals, where the food trays are set up in the main kitchen, these are conveyed to the diet kitchens in dumb-waiters (small service lifts). The main kitchen is too often in the basement, and it is questionable whether this is good for the health of the staff, however perfect the mechanical ventilation may be. The kitchen at the Peter Bent Brigham Hospital, Boston, Mass., which is on the top floor, is a pleasant contrast in this respect. In this section it should be noted that the food is stored in refrigerators, not larders as with us, and the same applies to kitchens on the ward floors. The nurses' and staff dining-rooms are frequently arranged as a cafeteria (this is a popular form of self-service restaurant throughout the States), but it is doubtful whether, in spite of its many advantages, the tired nurse altogether appreciates this system.

Laundry arrangements are, as one would expect, very much up to date and efficient, and the system of dealing with linen and surgical dressings is thoroughly considered in the planning of the building. The linen chute is a feature of American hospitals, and consists of a circular glass-lined tube, 2 ft. in diameter, with a port-hole opening on every floor, and a flushing ring at the top, with drain connection at the bottom. This is a labour-saving device much in use in hotels and private residences, but it has the objection that it may convey foul air from the disinfecting-room at the bottom of the chute to the various floors. However, there is no doubt that as far as labour-saving devices are concerned, America leads the way, though one feels that in a hospital the health of the patient is sometimes of even more importance than the question of service-economy.

The system of "signal lights" by which patients summon the nurse at night, and the doctor is "warned for duty," is another device without any drawbacks.

The sanitary arrangements are fundamentally different from those in this country. The chief cause of difference is that the soil and waste pipes, partly on account of the severe winters, are placed on the inside walls of all buildings, and it is not considered objectionable to open a toilet-room direct off a bedroom, and to rely on mechanical means of ventilation rather than on a window direct to the open. This attitude to plumbing has profoundly influenced the planning of hospitals, where the sanitary tower with cross-ventilated lobby is almost unknown. In the ordinary ward, the toilet and bathrooms open off the corridor leading to the ward and the utility-room (which contains the sinks, bed-pan sterilizer, etc.), is also placed in a similar position. With respect to the private room, in some instances there is a separate toilet and bathroom to each room. In others, the bathrooms are shared between two or more, but there is usually a lavatory basin in every room, and the w.c. is provided with a jet or special swivel tap, so that the bed-pan can be emptied without any travelling. As regards baths, Dr. Daugherty, of the Brooklyn Lewin Hospital, found these were unnecessary in his paying-patients' blocks, as he only admitted acute cases.

Another fundamental difference between American and English plumbing is that in the former case the pipes are not usually exposed on the surface of the wall or ceiling, but are "buried" in the case of the wall in a wide cavity, and in the case of the ceilings covered by a sub-ceiling. This results in a very smart appearance, especially in operating theatres, and is undoubtedly excellent from the point of view of cleaning. But several medical superintendents spoke rather sadly of the results when a pipe burst, when the ceiling had to be "torn down," or the wall opened up at great expense, although this can be obviated to some extent by inspection openings situated at junctions, etc.

The nurses' station in large wards overlooks the wards; in private rooms it is placed centrally either in the corridor or in a room divided from the corridor by a glazed screen.

The provision of scrubbing-rooms, flower-rooms with sinks, a laboratory for routine work, and a comfortable waiting-room is usual on every floor.

The operating theatre suites are very much on the same lines as the English model. There is usually a sterilizing-room and a scrub-up-room (with borrowed light) between two operating theatres, and the instrument cases are neatly arranged sunk into the wall flush. The floors and the walls (up to door height) are now invariably covered with light-grey or light-green tiles, as this is considered more restful to the eyes of the operator; in one instance—at the Crile Hospital, Cleveland, Ohio—the floors and walls of the operating theatres are covered with rubber tiling, but this is not considered so sanitary as the tiling or terrazzo. The window is usually double up to transome level, and the air between the two windows is warmed so that there is no draught on to the operating table.

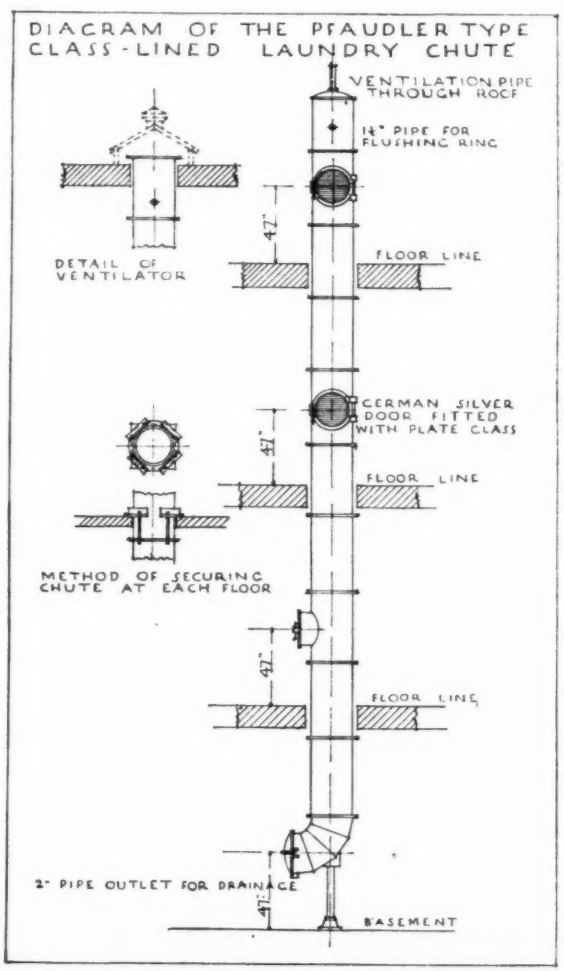
There are various types of electric light in use, such as "Scanlan-Morris Noshadowite" (eight converging lights in a ring); "Frink Operating Table Reflector" (with automatic ventilation to counteract heat generated); but the "Portable Skialitique" seems the favourite at the moment. The American surgeon appears to have little use for natural light, and operations are usually performed by artificial light.

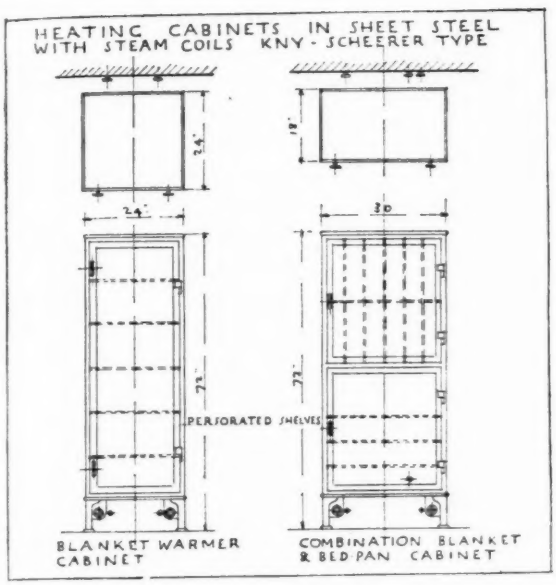
Dr. John Clark, of Philadelphia, has arranged an operating theatre at the University Hospital with a dropping shutter behind which the patient is prepared, while the operator can use the front of the shutter for slides and diagrams facing the students' seats—at the time of operation the shutter is, of course, raised.

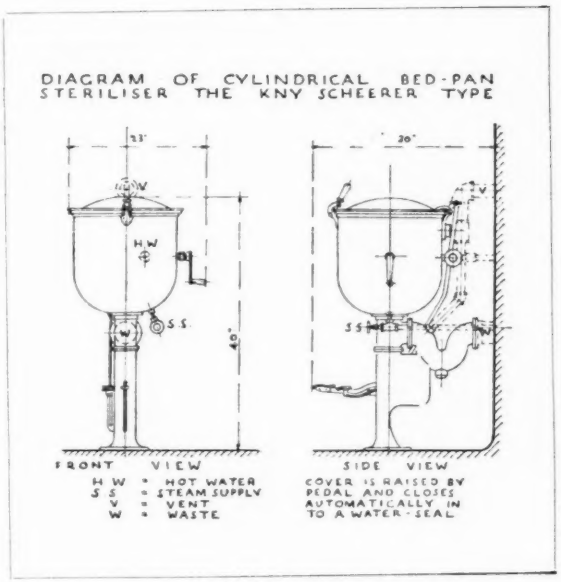
The exposure of patients to fresh air and the sun's rays has affected the design of American hospitals considerably. The covered-in balcony at the south end of the ward block is still a favourite arrangement, as it is in England, but there is a development of this idea which is in many ways preferable by the provision of a loggia in a central position, as in the Fifth Avenue Hospital, where it does not shut off any light or air from the patients' room, or more frequently by the use of a sun-room on the top of the hospital, furnished with easy-chairs and with French windows opening on to a flat roof. In the case of private pavilions, a separate small balcony is quite often allowed to each room, so that the patient's bed can be partly in the open air.

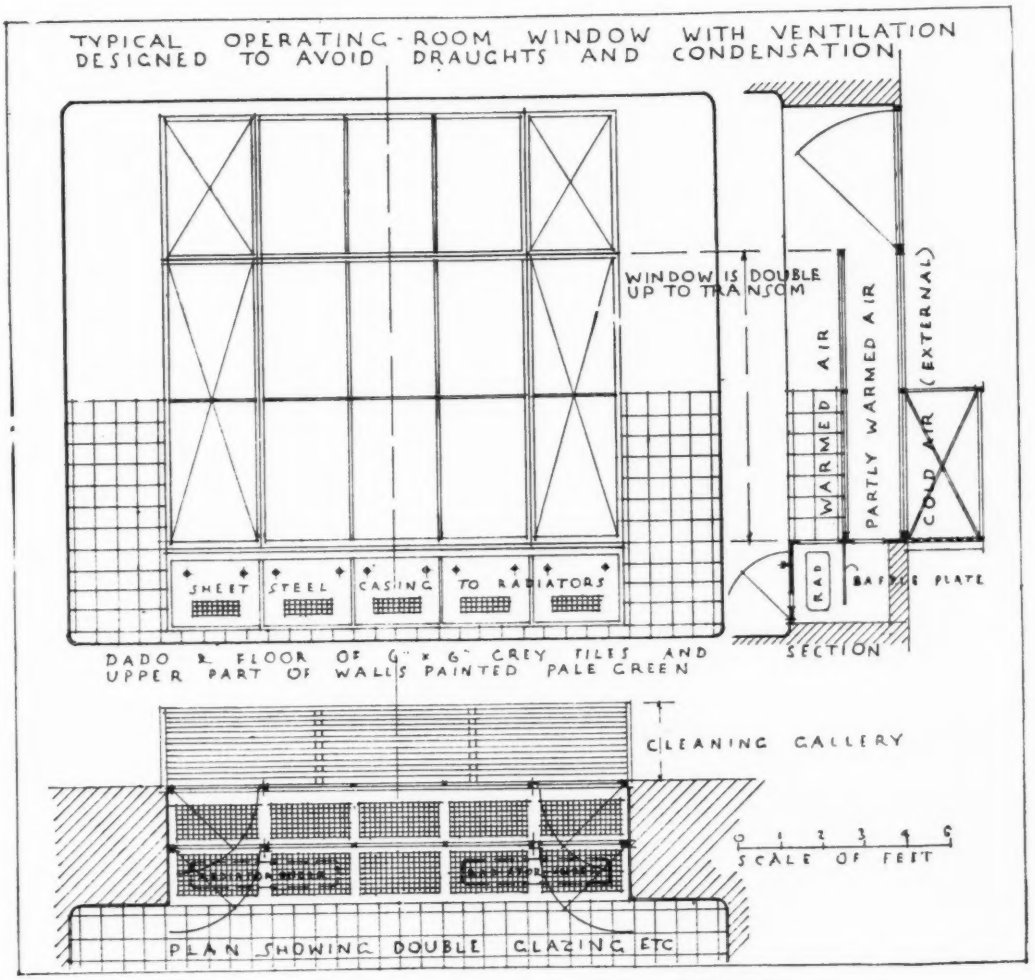
In conclusion, I think the general impression I received from my tour is that smartness and efficiency are the rule in the best American hospitals. Americans are a very practical nation, and, in spite of much elaboration of detail, there is a directness and simplicity in their methods which are very attractive. Also at the present time there is more money available in the States than anywhere else in the world, and in the case of hospitals it is used to the best advantage. The architecture is of a very high order, especially in New York, Boston, and the east.

I believe that in California the architects have worked out a style which is rather Spanish in type (the so-called "Mission Style"), and is very suitable to the climate, but in my case time did not allow of the 3,000-mile journey across the continent.

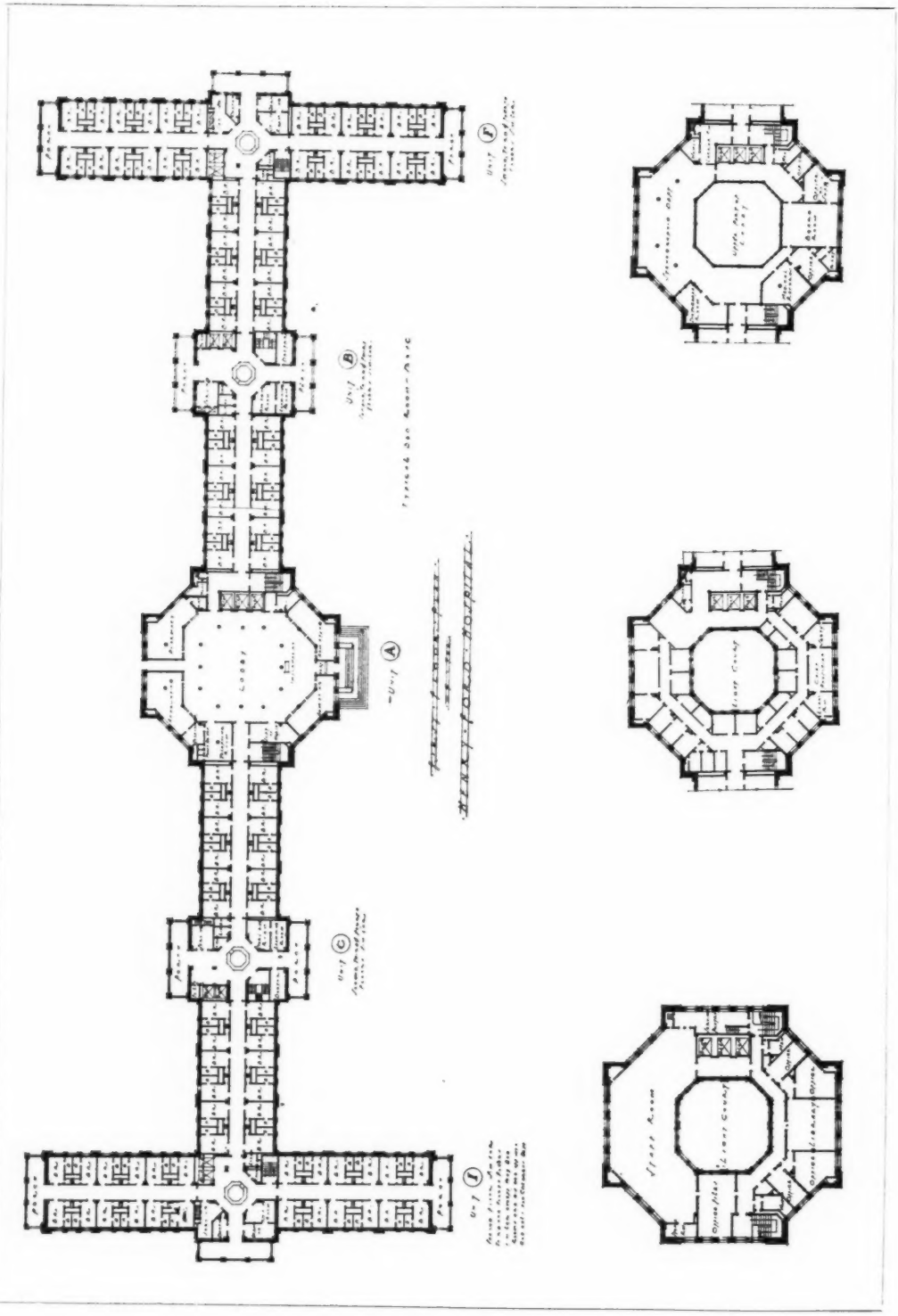




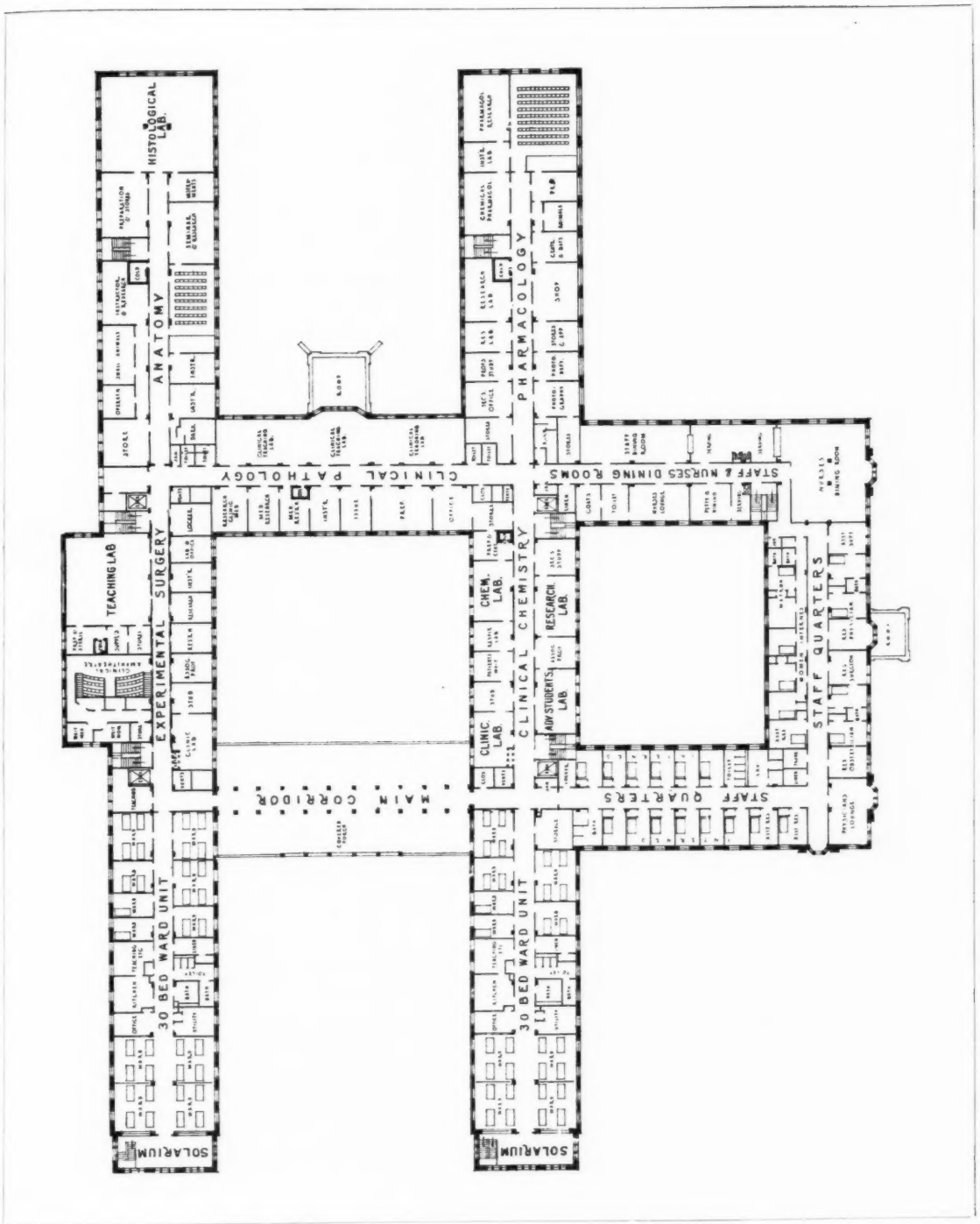




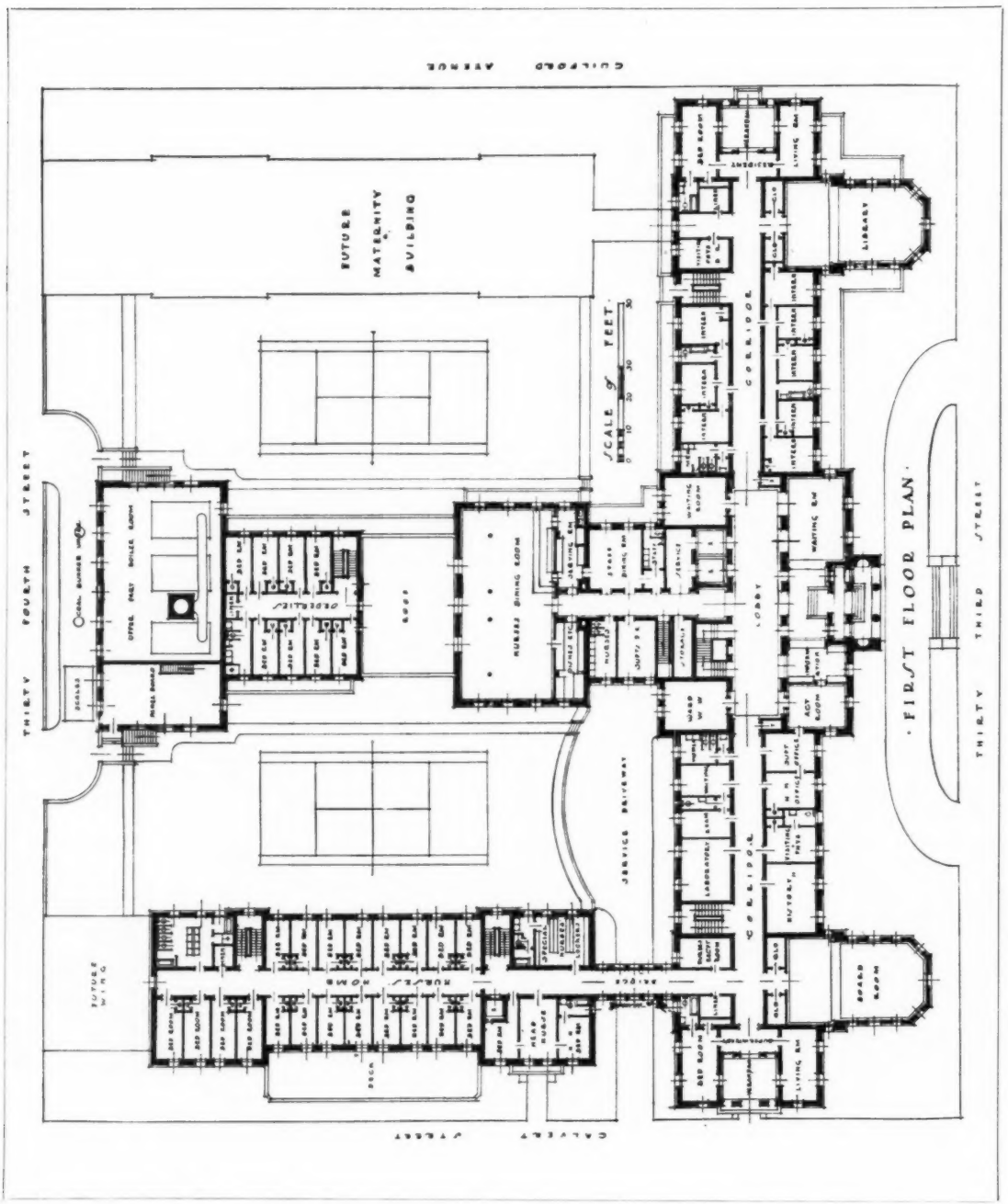
SOME MODERN AMERICAN HOSPITALS: DIAGRAMS.



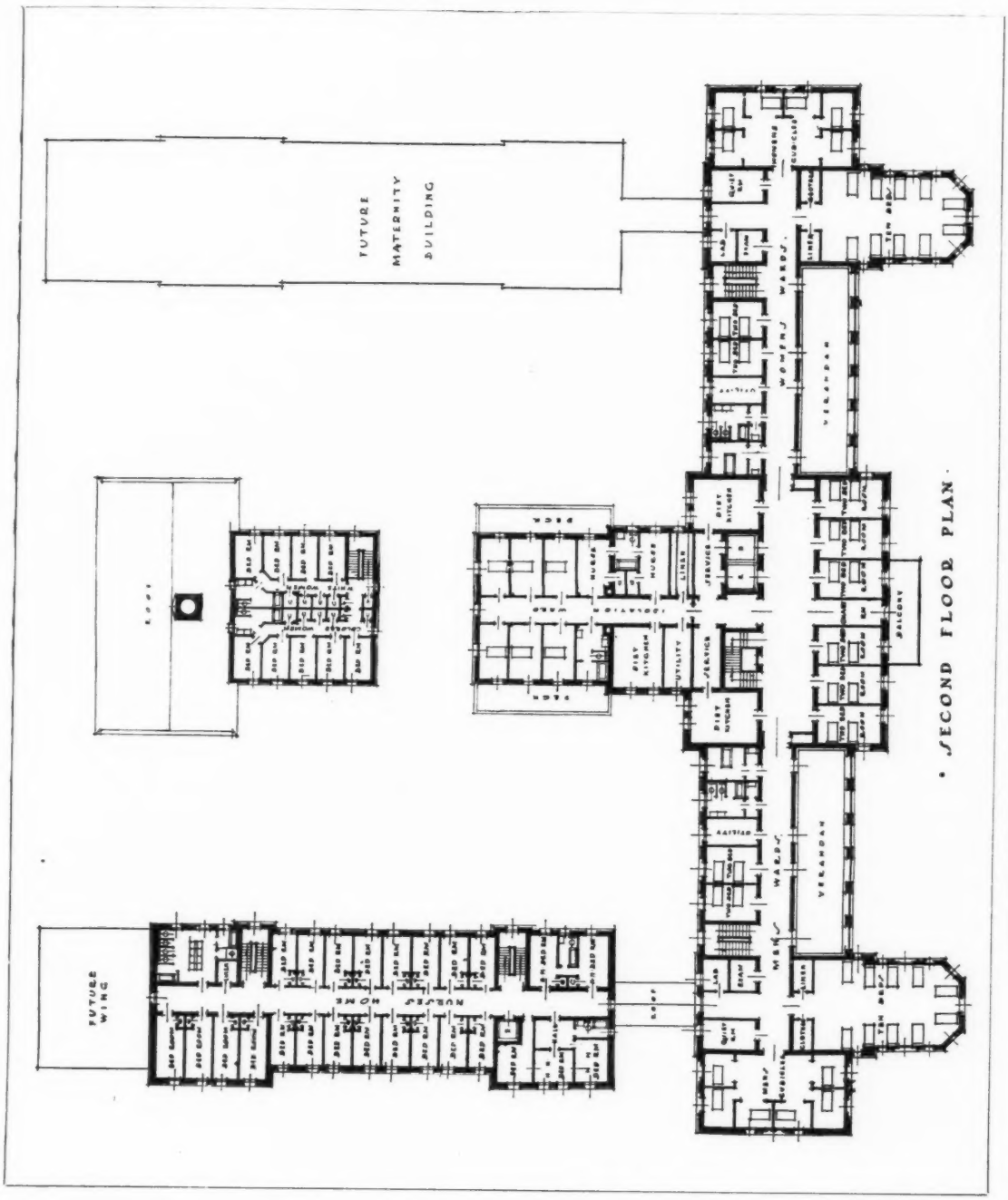
THE HENRY FORD HOSPITAL, DETROIT, MICHIGAN.



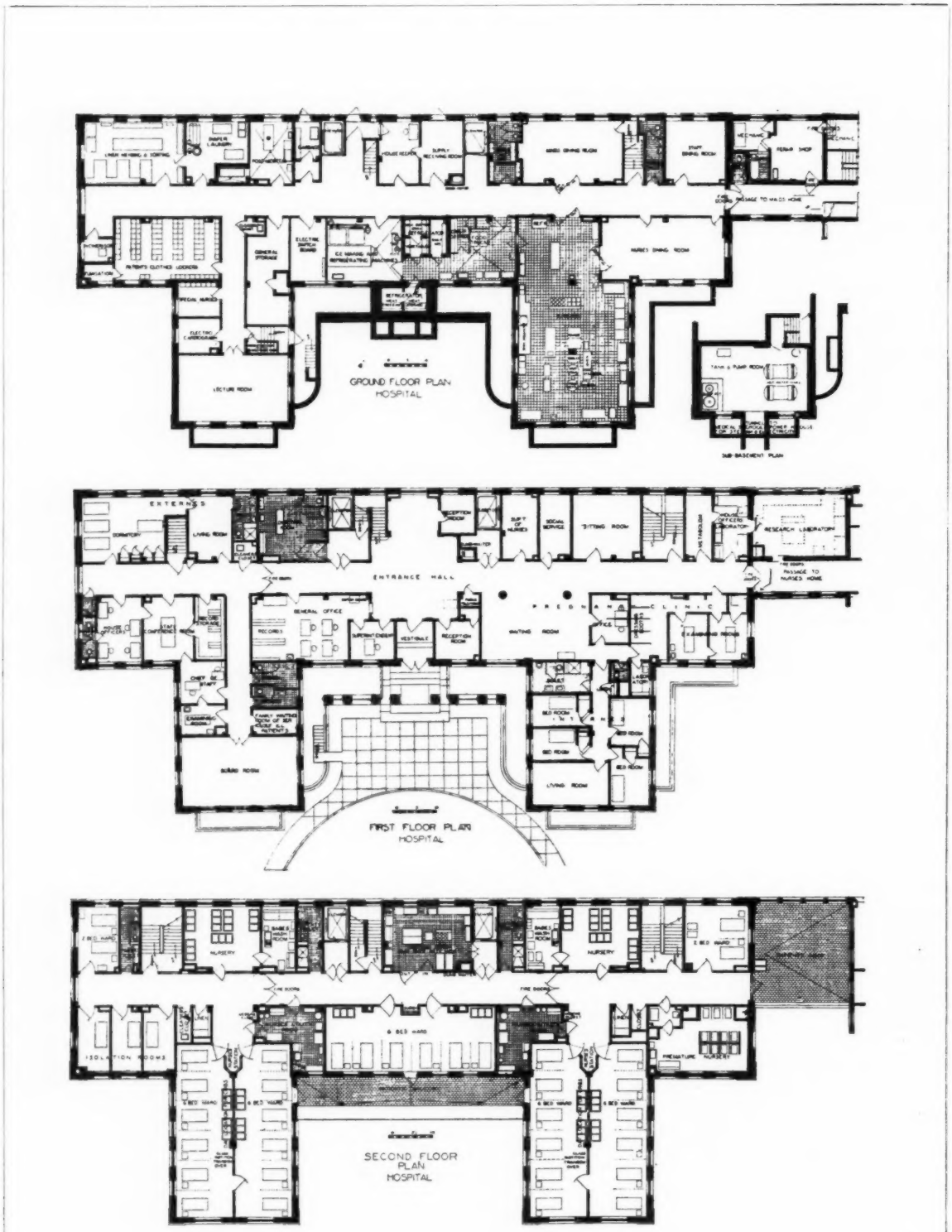
VANDERBILT UNIVERSITY HOSPITAL, NASHVILLE, TENN.: SECOND-FLOOR PLAN.
COOLIDGE AND SHATTUCK, ARCHITECTS, AND DR. WINFORD SMITH, CONSULTANT.



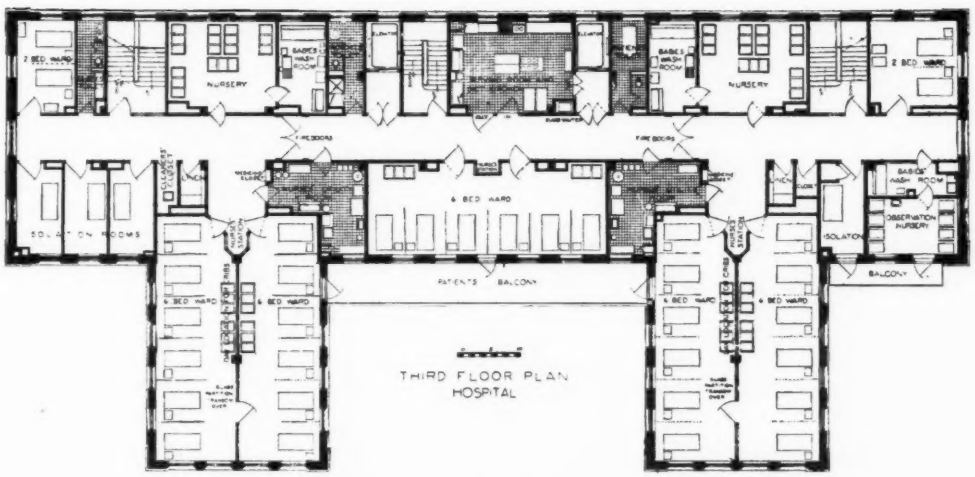
UNION MEMORIAL HOSPITAL, NEW YORK. JOSEPH EVANS SPERRY, ARCHITECT.

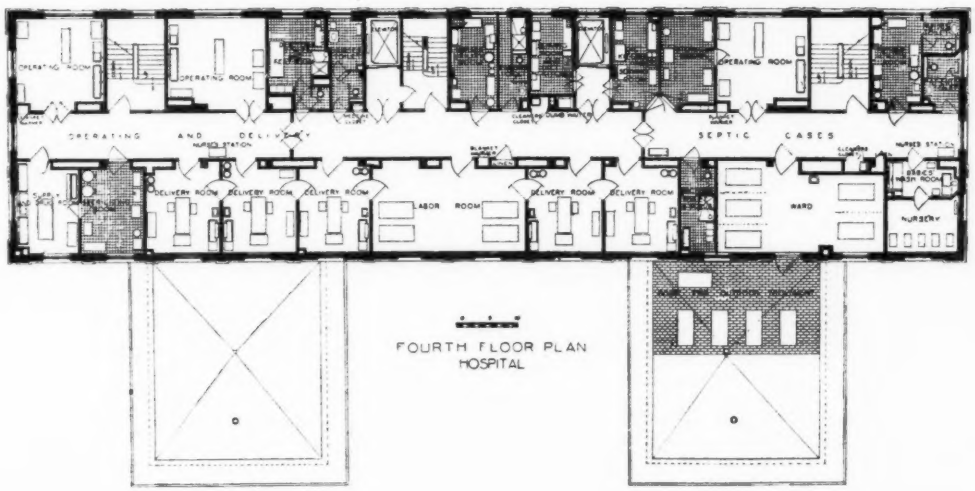


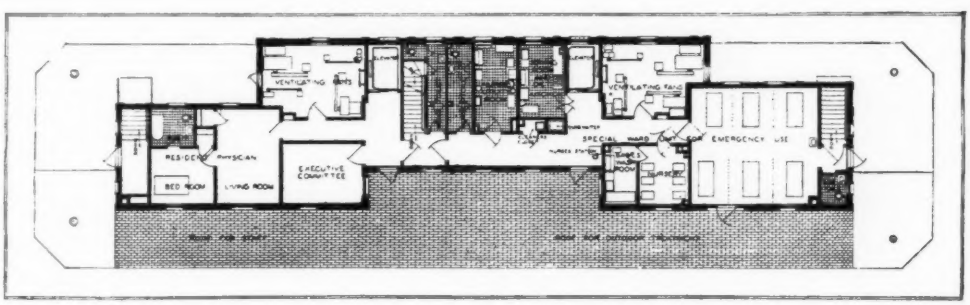
UNION MEMORIAL HOSPITAL, NEW YORK. JOSEPH EVANS SPERRY, ARCHITECT.



THE NEW BOSTON LYING-IN HOSPITAL, BOSTON, MASS.
COOLIDGE AND SHATTUCK, ARCHITECTS, AND JOSEPH B. HOWLAND, M.D., CONSULTANT.

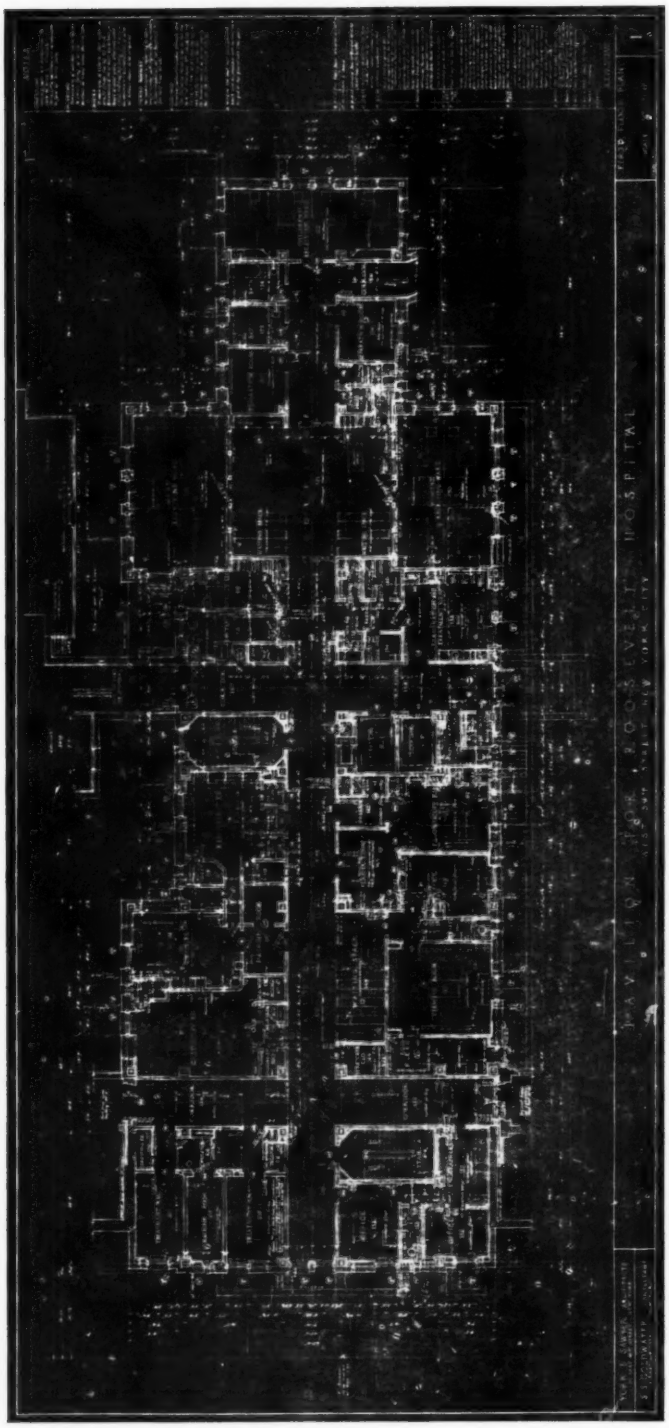




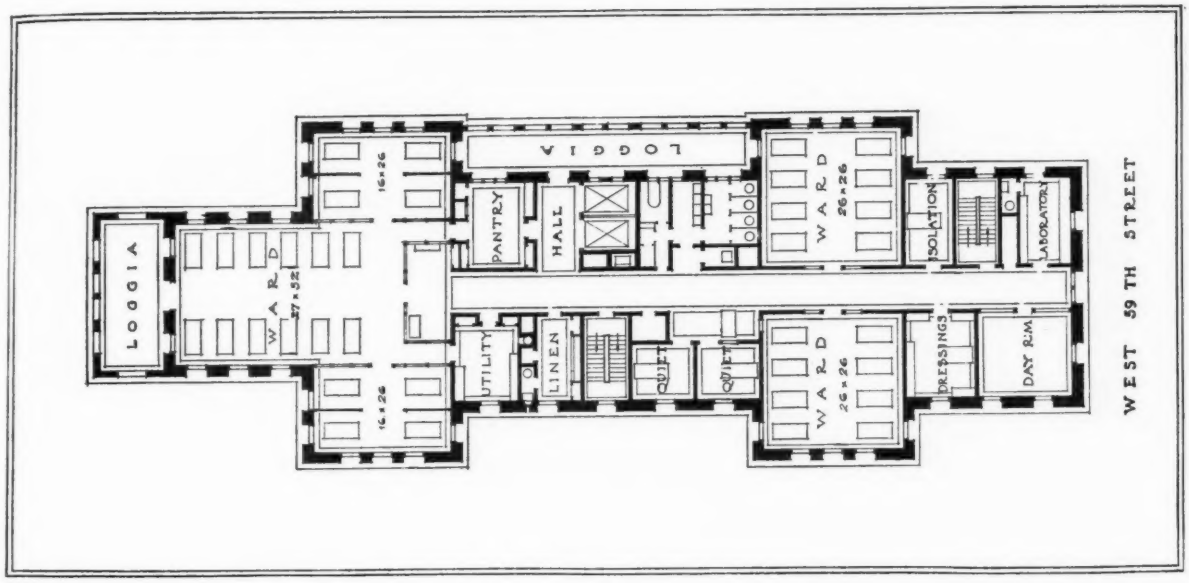


FIFTH FLOOR PLAN

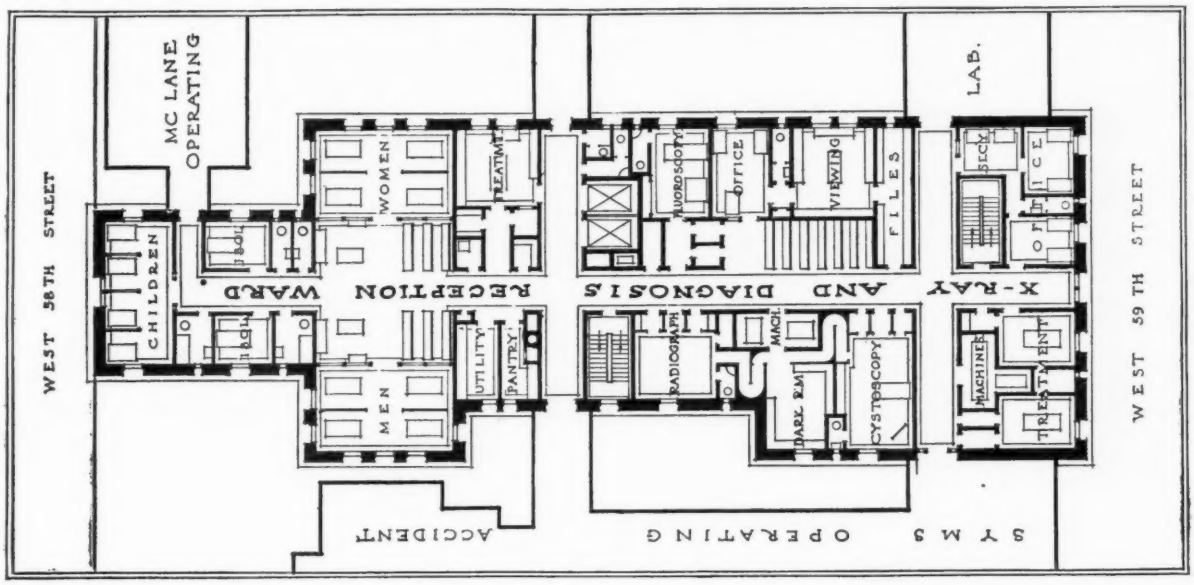
THE NEW BOSTON LYING-IN HOSPITAL, BOSTON, MASS.
COOLIDGE AND SHATTUCK, ARCHITECTS, AND JOSEPH B. HOWLAND, M.D., CONSULTANT.



PAVILION FOR ROOSEVELT HOSPITAL, NEW YORK: A WORKING DRAWING (REPRODUCED FROM A BLUE PRINT ORIGINAL).
YORK AND SAWYER, ARCHITECTS.

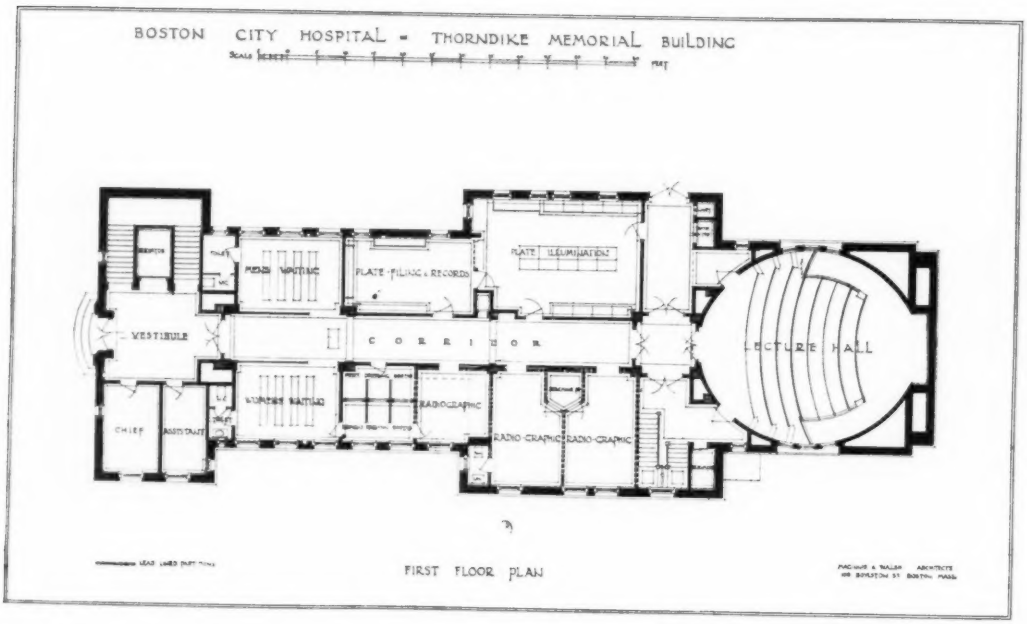


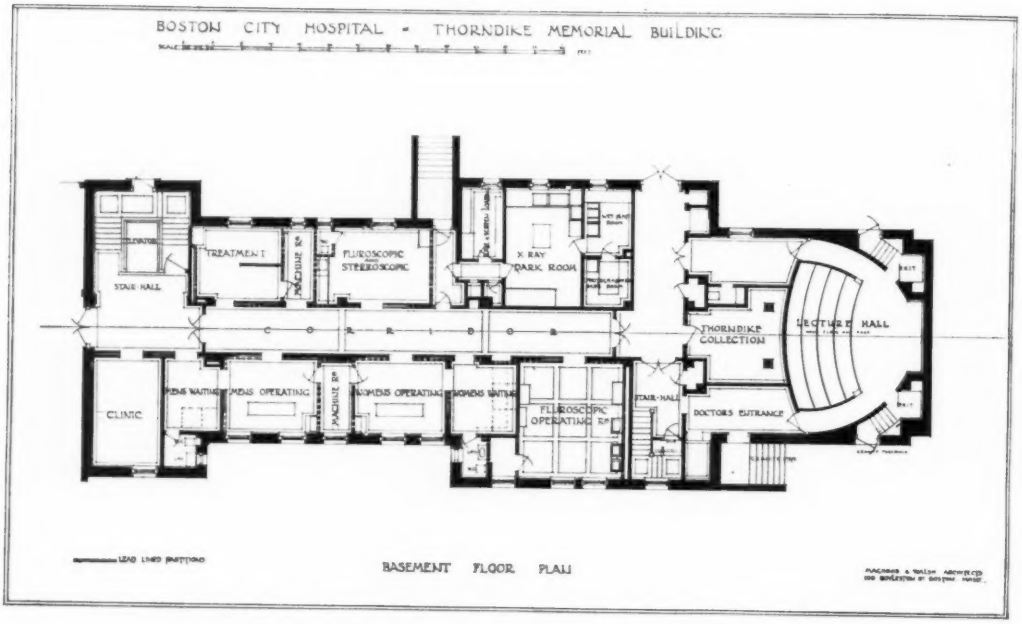
PLAN OF TYPICAL FLOOR.



PLAN OF GROUND FLOOR.

NEW PAVILION FOR ROOSEVELT HOSPITAL, NEW YORK CITY. YORK AND SAWYER, ARCHITECTS.





BOSTON CITY HOSPITAL. MAGINNIS AND WALSH, ARCHITECTS.

Nurses' Homes

By JOHN WILSON, F.R.I.B.A., Chief Architect, Scottish Board of Health.

A HOSPITAL of any considerable size should have a nurses' home as a separate building. In smaller hospitals the nurses' quarters sometimes form a part of the general administrative block, but never, if it can be avoided, should these quarters be in the same building as the wards. A portion of the nurses' home in smaller hospitals is set apart for the housing of the maids. The same conditions generally should apply to maids as to nurses.

It is necessary that nurses should be housed far enough away from the wards to take them out of the hospital atmosphere when they are off duty, and also to allow of their engaging in social recreation without disturbing the sick patients. A position for the home on the site which will obviate the passing of the wards by nurses returning at night from leave is an important consideration.

Dr. Mackintosh has pointed out in his "Construction, Equipment, and Management of a General Hospital," that a comfortable and well-equipped home will attract the better type of well-educated young women to the nursing profession.

The first essential to consider is the provision of *a separate bedroom* for each nurse. The minimum size of the room should be 100 superficial feet of floor area.

Much larger rooms should not be provided, as the tendency is, when a demand is made for more staff accommodation, to place two beds in the room, and thus to destroy the original idea of privacy. In some nurses' homes, especially in recent American practice, a clothes press is formed by a partition across the end of the room. This is a very desirable provision, but the additional cubic space entailed increases the cost considerably. A cheaper method is to form a corner hanging press with a curtain, and to add a small movable wardrobe.

It is advisable to provide a small suite of two or three bedrooms with separate toilet facilities for nurses suffering from minor ailments.

The accommodation for nurses on night duty should be placed in a quiet part of the home.

The provision of adequate toilet facilities must next be considered. A cloakroom, a lavatory and w.c.'s, are required on the ground floor for day use. On each of the bedroom floors the toilet facilities should consist of a minimum of one bath for eight to ten, one w.c. for eight to ten, and one basin for four nurses. It is essential to have these apartments so planned that each can be used separately. In place of having washhand basins in nurses' bedrooms, it has been found more convenient to provide large lavatories with basins. This arrangement has been found to obviate the labour of removing slops from each bedroom, and to work satisfactorily. Occasionally fixed lavatory basins are provided in each bedroom, but the extra cost of fittings and piping is considerable. Where a nurse makes use of her room for other than sleeping purposes the basin is perhaps better omitted. It is usual to fit up a special basin for hair washing in the lavatories.

The public rooms should consist of a general sitting-room for the nurses with a writing or reading room adjoining, a sisters' sitting-room, and a visitors' room. It is advisable to have folding doors between two of the larger public rooms, to provide a large apartment when required for recreation. A suite of sitting-room, bedroom and bathroom, is required for the matron, and a similar suite of rooms if a resident lady doctor is appointed. A class-room for lecture and demonstrations, with a large press adjoining, is usually provided on the main floor.

Because of the difficulty always experienced with fine laundry work when sent to the main laundry, a simply equipped laundry should be provided in the home, so that nurses can do their own fine work. The laundry can be equipped with a set of two tubs, a wringer, two ironing boards, and some rows of hot-water pipe-rails. A linen-room and sewing-room, or a combined room, should be provided, so that linen for the home can be kept separate from that for the hospital.

It is suggested that the nurses' home might be placed in close proximity to the central kitchen, where dining-rooms for nurses and maids can be placed. A covered way can join up the two buildings, and by this arrangement a considerable saving in administrative expenditure will be made in comparison with a scheme in which the food would have to be delivered from the central kitchen to the detached nurses' and maids' homes.

A small tea kitchen, with gas-stove and sink, should be provided for social purposes and also for use in connection with the nurses' sick-rooms. A well-ventilated and heated trunk room, with ample space to move in, is an essential requirement. Small linen presses and housemaids' closets, with brush presses, should be provided on each floor. In the larger homes of three stories or more in height the provision of a lift is essential.

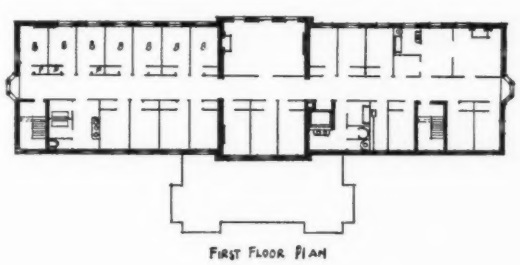
If cost will allow, a veranda on the south side of the home is a desirable adjunct. Tennis lawns should also be provided close to the home.

A serious fault in at least the competition plans of some large nurses' homes is that of long internal corridors without sufficient light and ventilation. Corridors of this character should always be avoided, and some of the plans of the homes illustrated show how this difficulty can be surmounted. The end of long internal corridors should be carried through to an outside wall for the purposes of light and ventilation. If possible, the placing of staircases at the end of these corridors should be avoided. Homes should be planned with a view to possible future extensions, and the provision of fire-escape stairs in three-story buildings should not be forgotten.

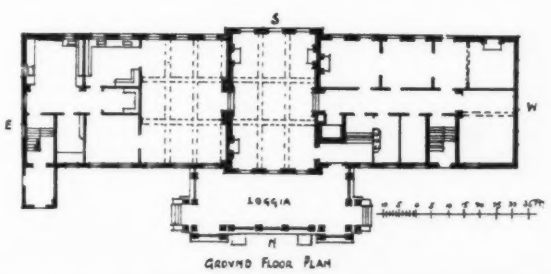
There is no intention of dealing with details of construction and general finish; but the question of heating is one that usually calls for some consideration. In a large institution, the general heating of the home will be from the central-heating installation. The low-pressure hot-water system by means of radiators is possibly still the most satisfactory. Open fires should only be provided in the public rooms, and possibly in the sick-rooms, for the sake of cheerfulness. Bathrooms and lavatories should always be heated.

Some of the nurses' homes of modern American hospitals have been equipped on a scale that the funds of general hospitals or local authorities in this country cannot quite rise to. One of the best-equipped nurses' homes is that of the Hospital for Sick Children at Toronto the plans of which are illustrated. This home was built by a private benefactor. It is five stories in height. There are a general reception room, a sitting-room, a music-room, a writing-room, a library, a lecture hall, dining-rooms, a swimming pond, a gymnasium, and a roof garden. The bedroom floors have each 21 bedrooms, with parlour and the requisite toilet facilities. It will be noticed that each nurse's bedroom has a clothes press attached, and that the bathrooms are screened off from a general lavatory without any direct lighting from an outside wall. This arrangement is seen in many American hospital plans, and according to British ideas is not a desirable one.

The great loggia or portico, 50 feet by 20 feet, is a striking feature in the design.

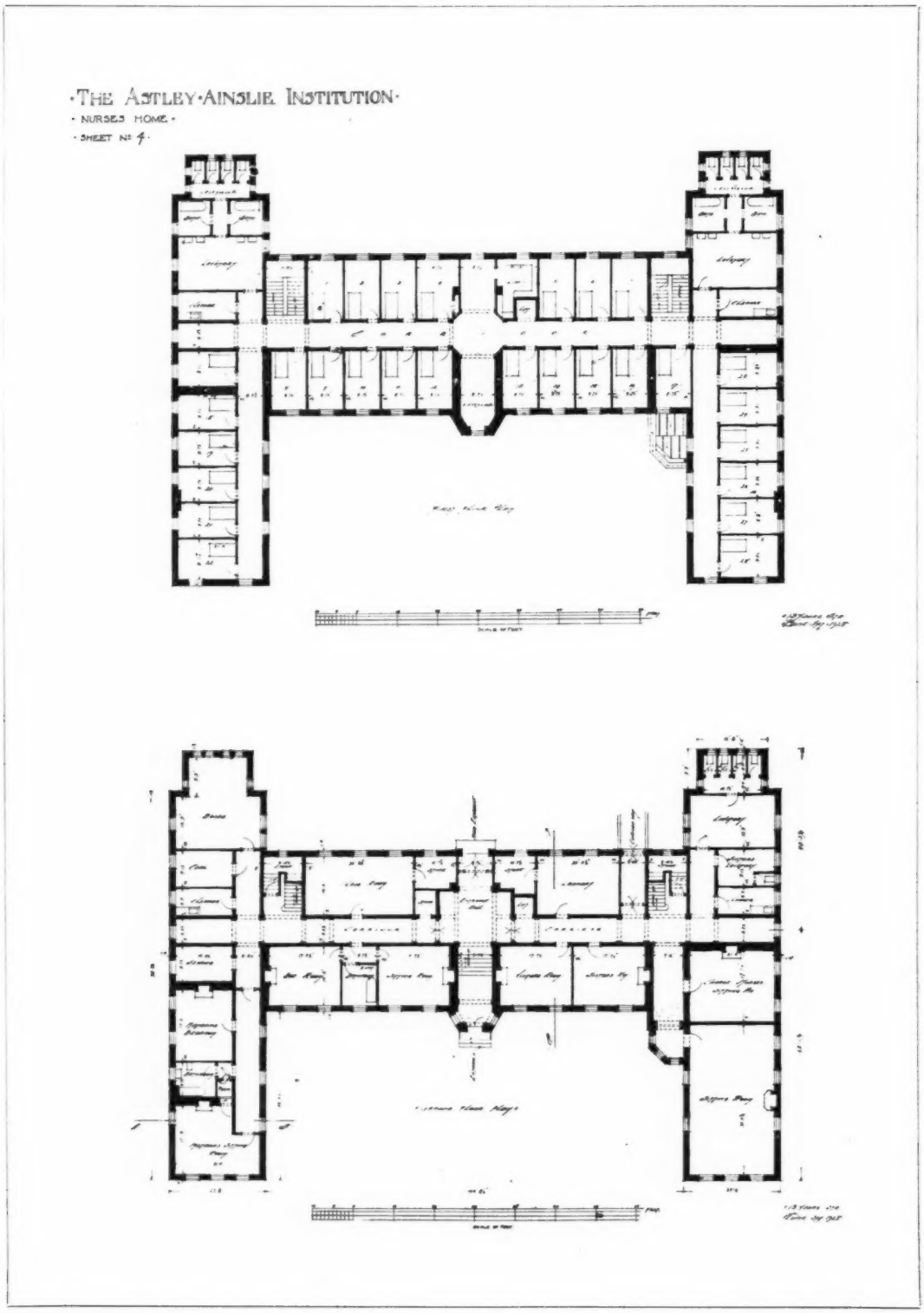


FIRST FLOOR PLAN

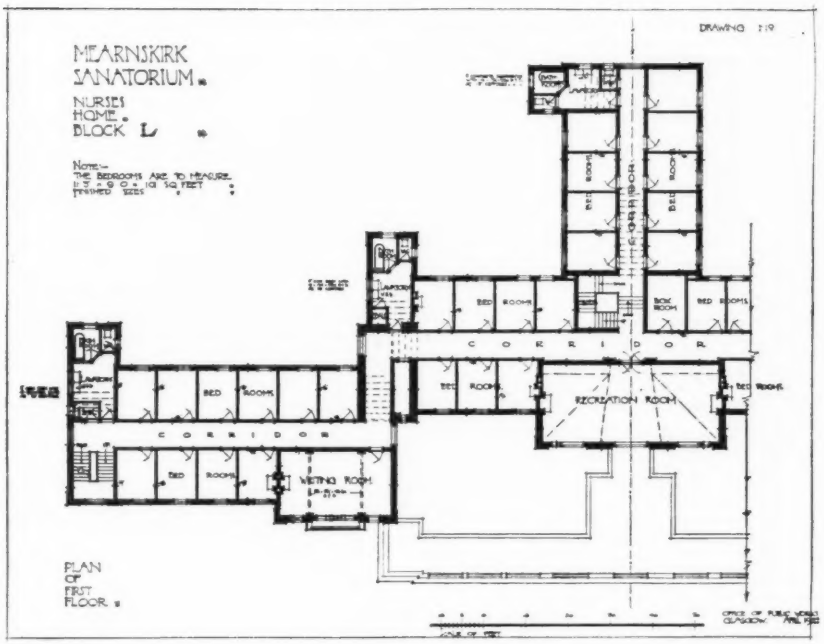


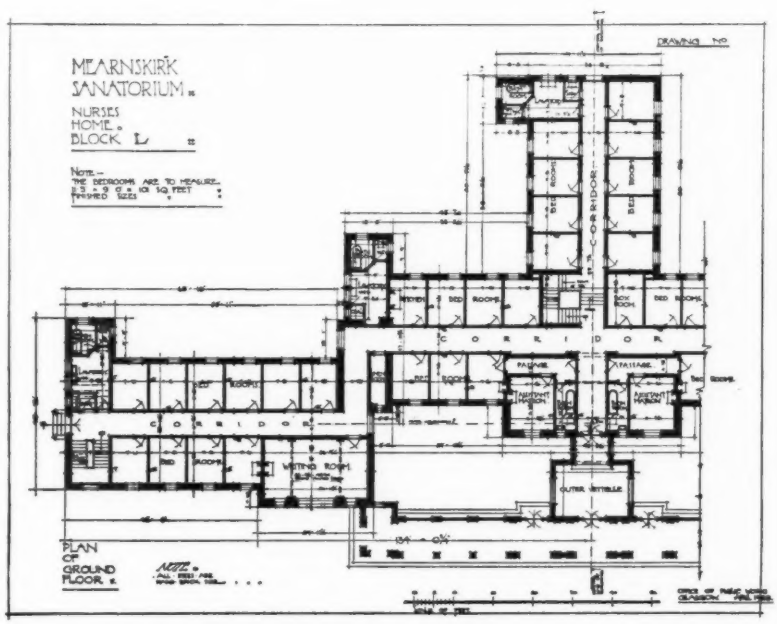
GROUND FLOOR PLAN

NURSES' HOME, SICK CHILDREN'S HOSPITAL, TORONTO.

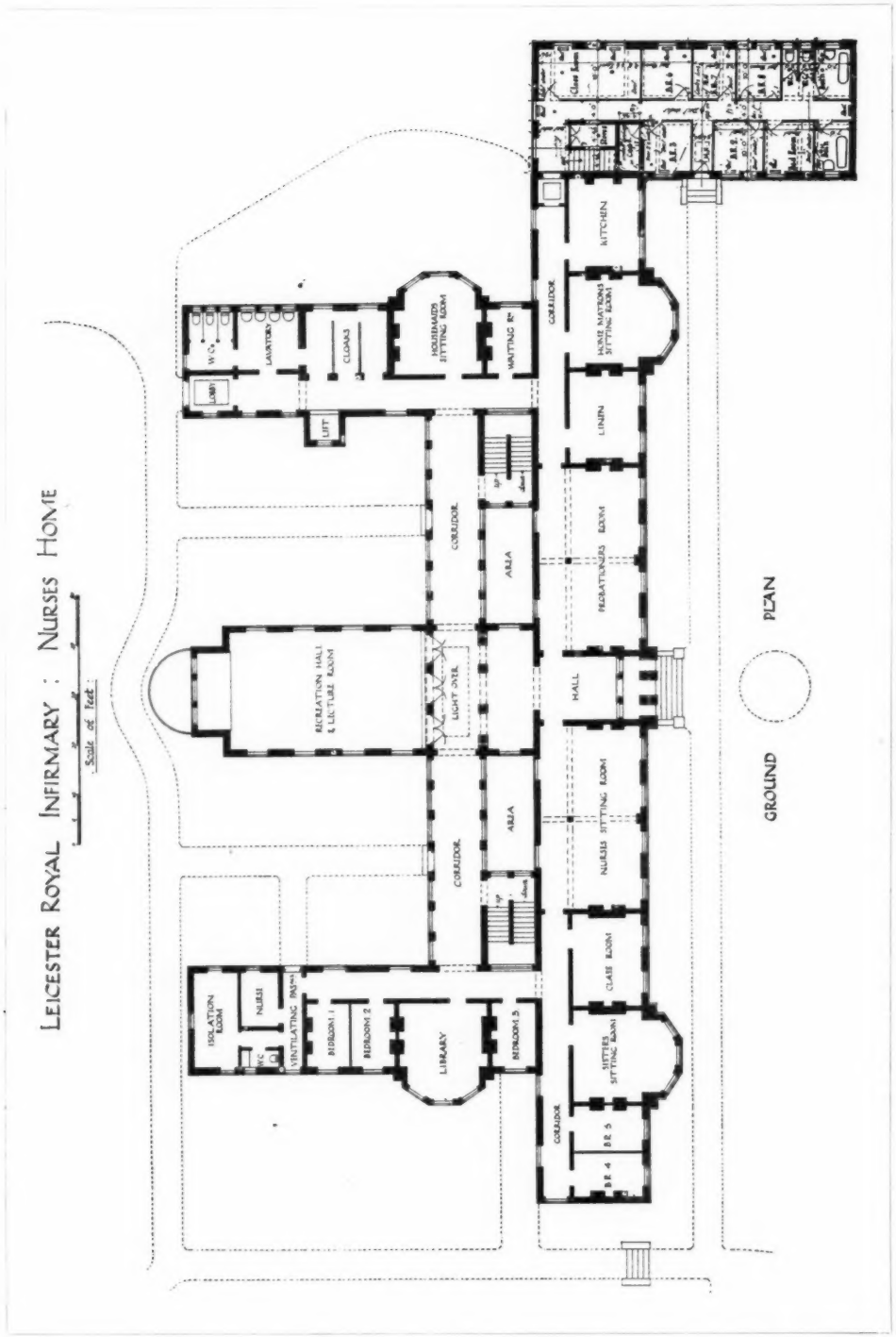


THE ASTLEY AINSLIE INSTITUTION: NURSES' HOME. SYDNEY MITCHELL AND WILSON, ARCHITECTS.

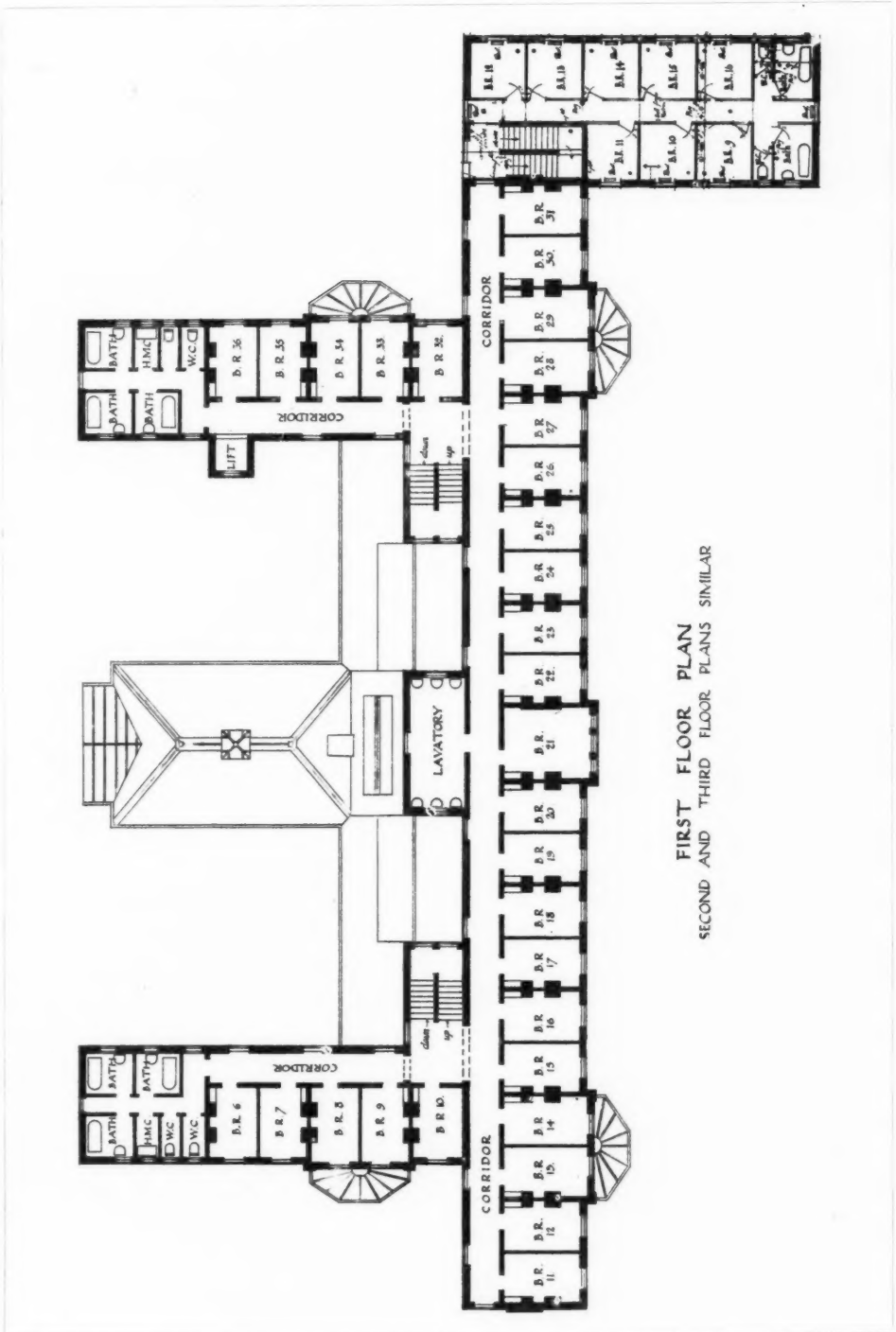




MEARNSKIRK SANATORIUM: NURSES' HOME.
DESIGNED IN CORPORATION OFFICE OF PUBLIC WORKS, GLASGOW.



LEICESTER ROYAL INFIRMARY: EXTENSIONS TO NURSES' HOME.
PICK, EVERARD, KEAY, AND GIMSON, ARCHITECTS.

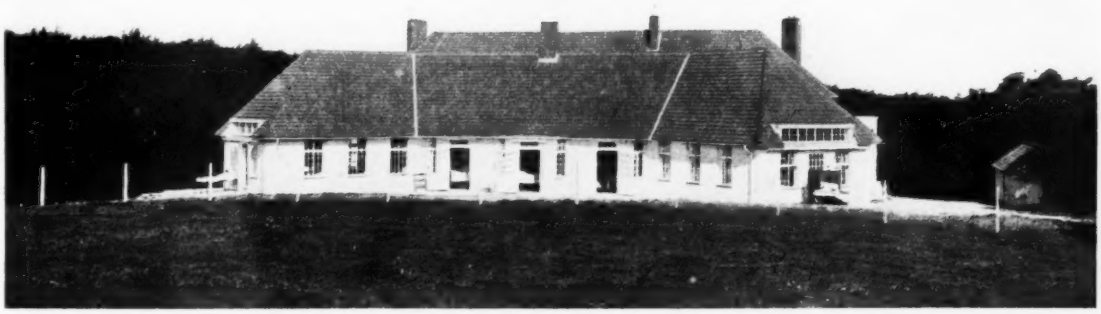


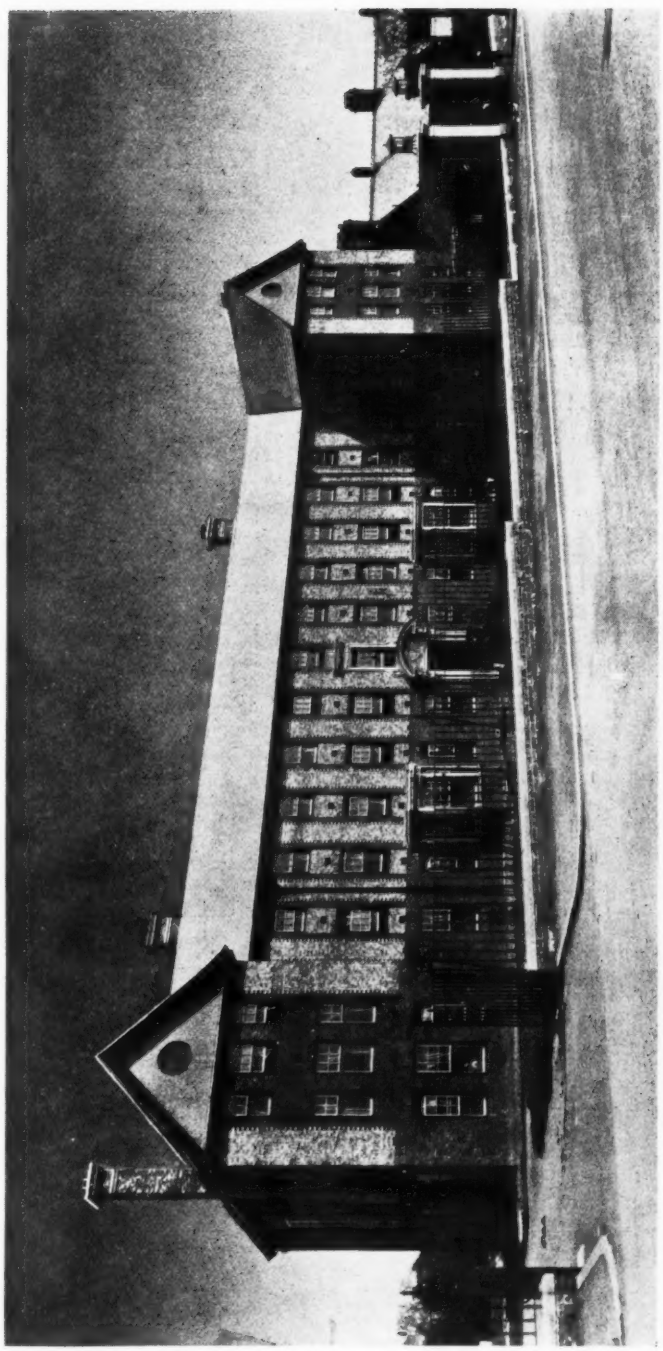
FIRST FLOOR PLAN
SECOND AND THIRD FLOOR PLANS SIMILAR

LEICESTER ROYAL INFIRMARY: EXTENSIONS TO NURSES' HOME.
PICK, EVERARD, KEAY, AND GIMSON, ARCHITECTS.

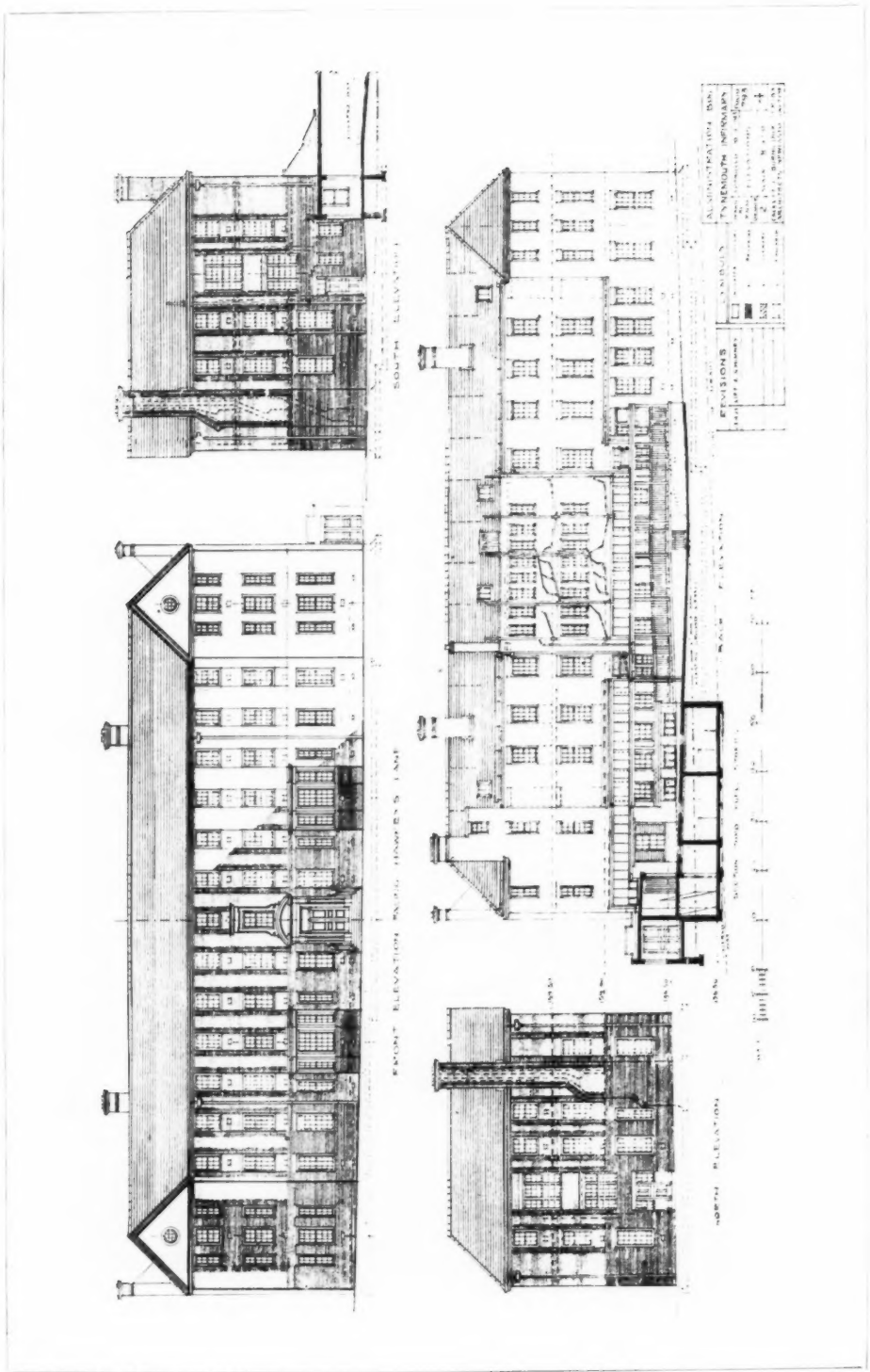
LEICESTER ROYAL INFIRMARY: NURSES' HOME.
PICK, EVERARD, KEAY, AND GIMSON, ARCHITECTS.

IN designing the Royston Hospital, two views of which are shown on this page, the architect, Mr. Barry Parker, F.R.I.B.A., determined—to use his own words—"To entrap more sunlight into Royston Hospital than is vouchsafed to any other." It was, therefore, natural that he should choose a permanently white exterior—"Atlas White" stucco. An "Atlas White" concrete rendering, with an aggregate of coarse white silica sand, applied in accordance with the "Atlas White" specifications (which are sent to all who ask for them), is ideal for hospital walls—inside and out. To obtain a copy of "Guide to Good Stucco and Textural Finishes," write to The Adamite Company, Limited, Regent House, Regent Street, London, W.1

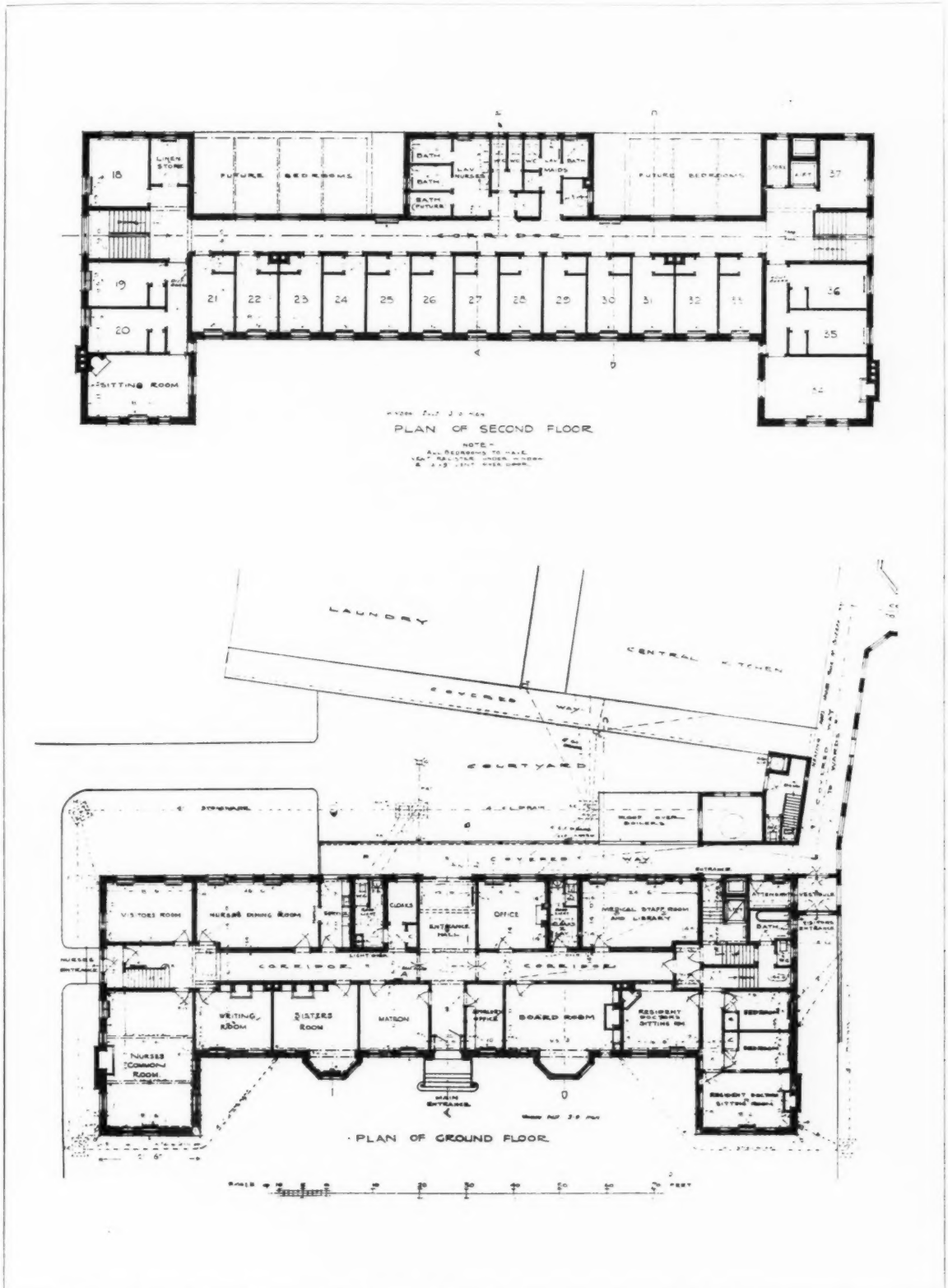




TYNEMOUTH INFIRMARY: NURSES' HOME AND ADMINISTRATION BLOCK.
CACKETT AND BURNS DICK, FF.R.I.B.A., ARCHITECTS.



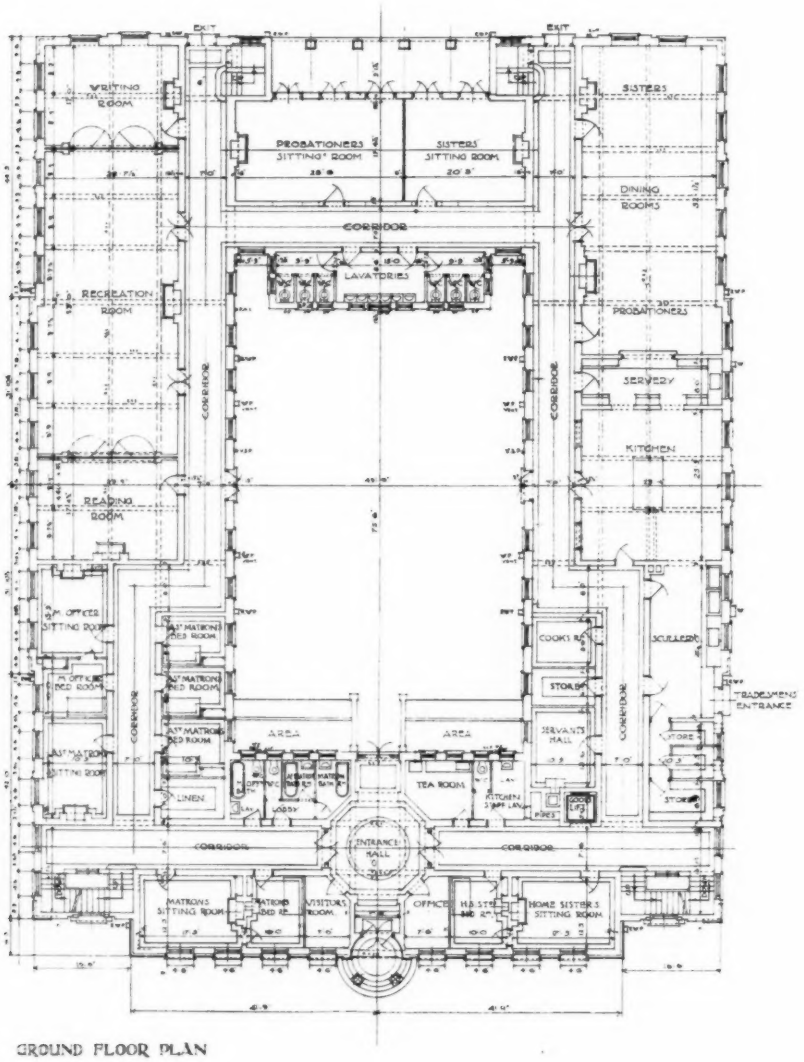
TYNEMOUTH INFIRMARY: NURSES' HOME AND ADMINISTRATION BUILDING.
CACKETT AND BURNS DICK, FF.R.I.B.A., ARCHITECTS.



TYNEMOUTH INFIRMARY: NURSES' HOME AND ADMINISTRATION BUILDING.
CACKETT AND BURNS DICK, FF.R.I.B.A., ARCHITECTS.

(3)

NURSES HOME for the NEWCASTLE GUARDIANS.



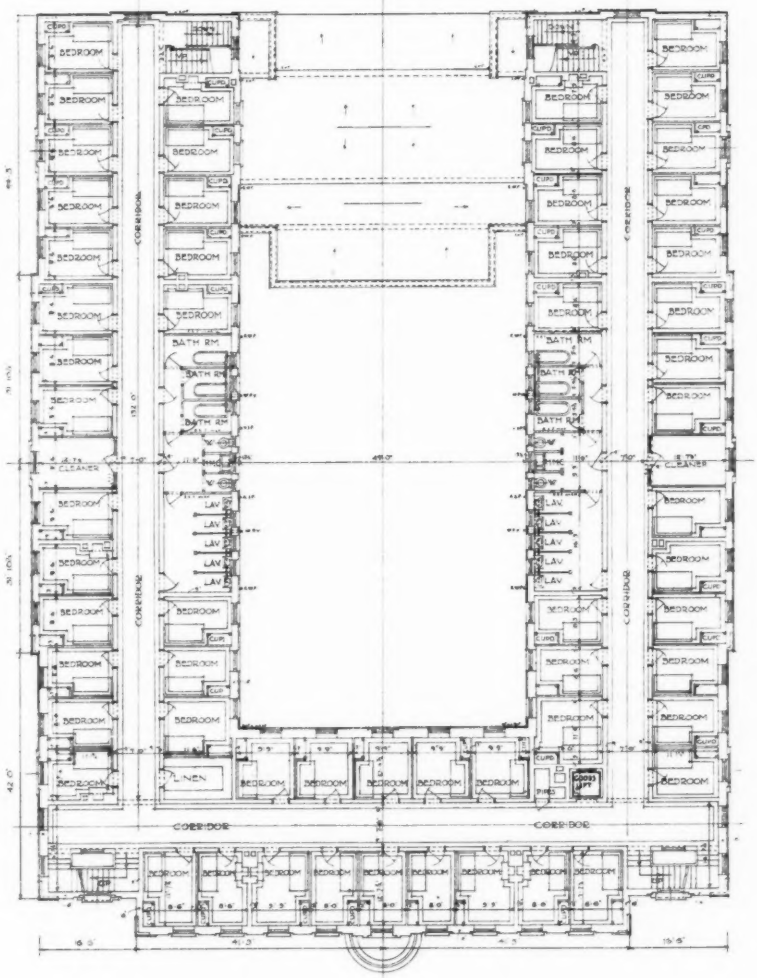
GROUND FLOOR PLAN

SCALE · EIGHT · FEET · TO ONE · INCH ·

· HARRISON · & · ASH · F.R.I.B.A. ·
· ARCHITECTS · 23 · ELLISON · PL ·
· NEWCASTLE · UPON · TYNE ·
& · AT · ALNWICK · NORTHD

(4)

NURSES HOME for the NEWCASTLE GUARDIANS.



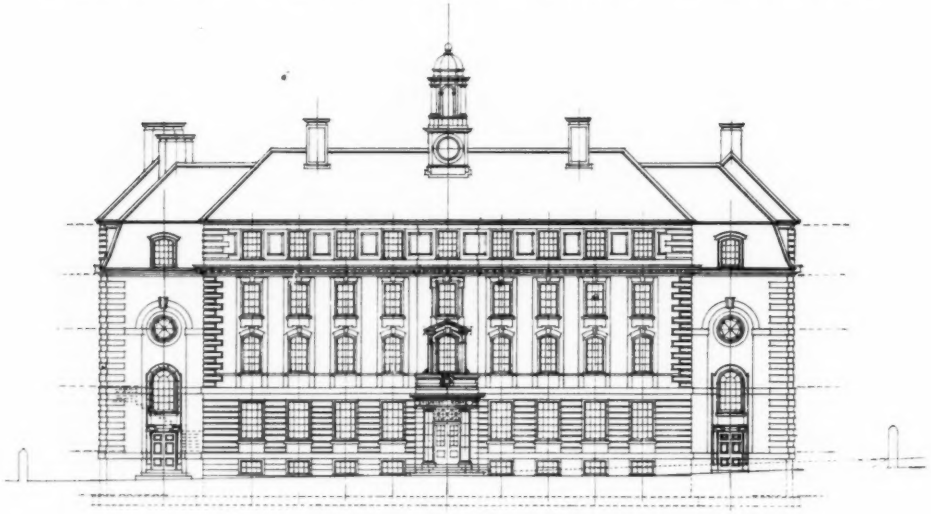
FIRST FLOOR PLAN
SECOND & THIRD FLOOR PLANS ARE SIMILAR.

· SCALE · EIGHT · FEET · TO · ONE · INCH ·

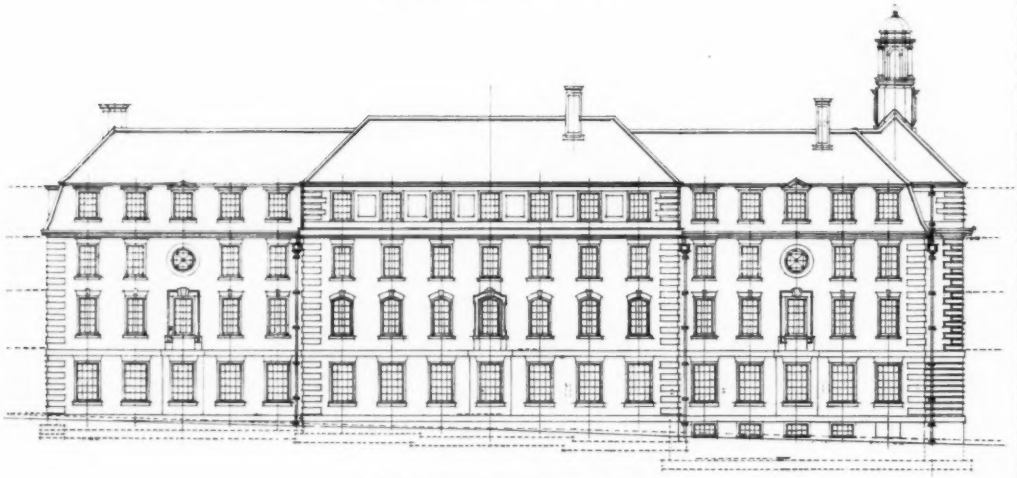
· HARRISON · & · A.S.M · F·R·I·B·A ·
· ARCHITECTS · 44 · ELLISON · PL ·
· NEWCASTLE · UPON · TYNE ·
· & · AT · ASHINGTON · NORTHD ·

7

NURSES HOME *for the* NEWCASTLE GUARDIANS.



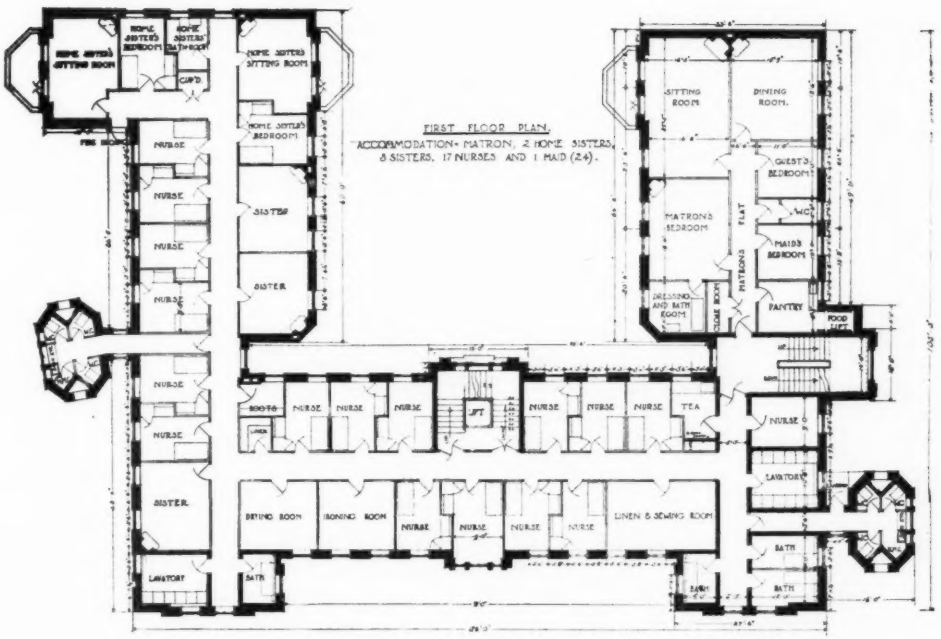
ELEVATION TO WESTGATE ROAD.

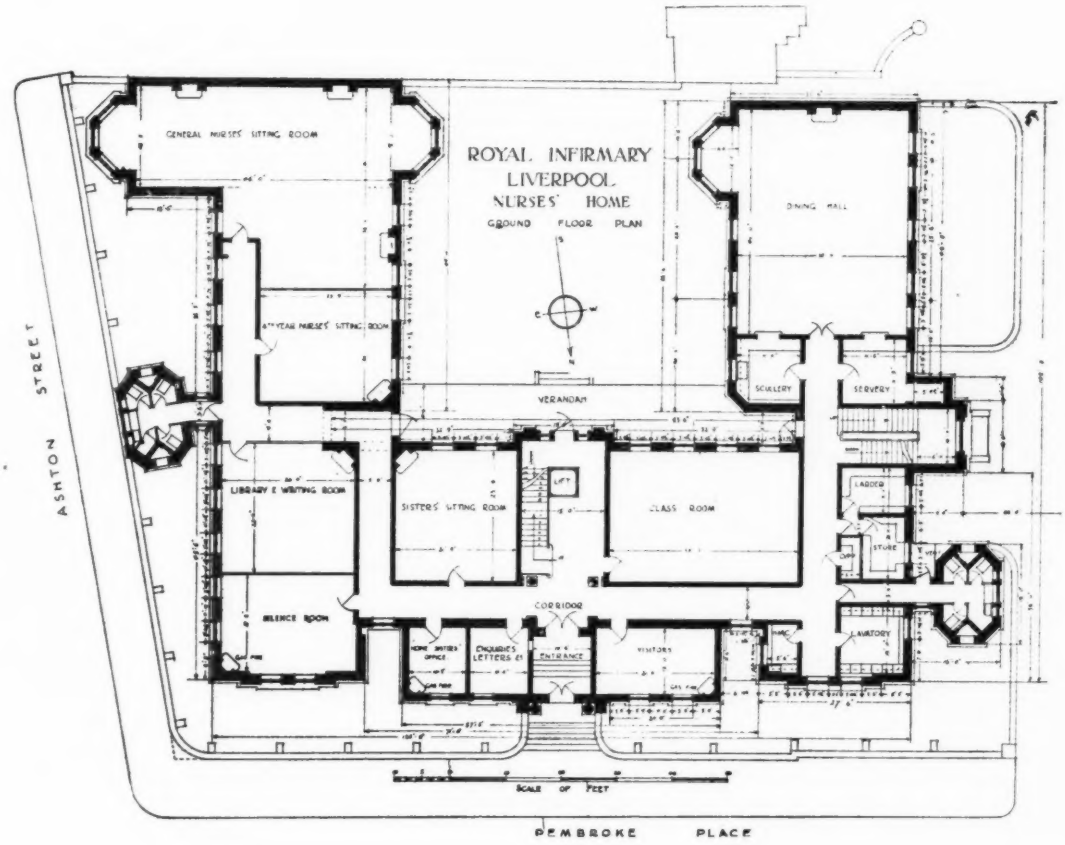


ELEVATION TO DUNHOLME STREET

SCALE EIGHT FEET TO ONE INCH

HARRISON & ASH F.R.I.B.A.
ARCHITECTS 22 ELLISON PL.
NEWCASTLE UPON TYNE
& AT ASHINGTON NORTH





ROYAL INFIRMARY, LIVERPOOL: NURSES' HOME. EDMUND KIRBY, F.R.I.B.A., AND SONS, ARCHITECTS.

ROYAL INFIRMARY, LIVERPOOL: NURSES' HOME. EDMUND KIRBY, F.R.I.B.A., AND SONS, ARCHITECTS.

Some Notes on the Hospital Buildings Illustrated

Cefn Mably Consumption Hospital

E. Stanley Hall, M.A., F.R.I.B.A., Architect

This hospital is described in the article on page 610.

The general contractors were Messrs. Harold Arnold and Son, Ltd., of Doncaster, and the sub-contractors were as follows: Thomas Faldo & Co., Ltd. (asphalt); Leeds Fireclay Co., Ltd. (glazed bricks); British Fibrocement Works, Ltd. (roofing of temporary pavilion); Wainwright and Waring, Ltd. (casements and casement fittings); G. Matthews, Ltd. (stoves, grates, and mantels); Beaven and Sons, Ltd. (plumbing and sanitary work and fire hydrants); Shanks & Co., Ltd. (sanitary ware and fittings); Bell's United Asbestos Co., Ltd. ("Decolite" flooring); G. E. Taylor & Co. (electric wiring); Gillham and Jones (electric light fixtures); Carter and Aynsley, Ltd. (door furniture); Patent Victoria Stone Co., Ltd. (stair treads); G. N. Haden and Sons, Ltd. (heating and ventilating); Manlove, Alliott & Co., Ltd. (disinfector and sterilizer); S. W. Clapham (baker's oven); Benham and Sons, Ltd., and D. & J. Tullis, Ltd. (laundry and cooking machinery); Safety Tread Syndicate, Ltd. (fire-escape staircases); South Wales (Fire Protection) Engineers, Ltd. (fire extinguishers). Local Cefn stone was used for the building.

The Bartlett Home for Epileptics, Maghull, Lancashire

Shepheard and Bower, F. and A.R.I.B.A., Architects

This building (pages 614 to 619) stands on an open site on the land belonging to the Epileptic Homes, Maghull. It has a southerly aspect. The main entrance and the out-patients' department are entered through a spacious forecourt on the south front, and a covered way on the east front leads to the kitchen court. Two prominent features on the ground floor are the dining-room and the billiard and recreation room. The other accommodation on this floor includes a ward, operating room, laboratory, dispensary, nurses' dining-room, lady superintendent's and matron's and patients' rooms, workshop, workshop and general stores, kitchen and other service rooms. On the first floor are two large dormitories, a small four-bed dormitory, matron's and nurses' bedrooms, etc. There are two staircases, one in the western portion of the building and the other in the eastern.

The models for the terra-cotta stoneware were made by Mr. H. Tyson Smith, of Liverpool, sculptor.

The general contractors were Messrs. J. and G. Chappell Walton, Liverpool. The sub-contractors were: Trinidad Lake Asphalte Co. (asphalt and roof tanks); Pearson Bros. and Campbell, Ltd., Liverpool (fireproof floors); Burlington Slate Quarries (slates); E. A. Clarke, Liverpool (stoves, grates, and mantels); Griffiths Sons and Cromwell, Liverpool (plumbing and sanitary work); Musgraves, Liverpool (sanitary ware and fittings); John P. White and Sons, Ltd., Bedford (special hospital doors); Elsley, Ltd., London (fanlights); Quiggin Bros., Liverpool (door furniture); W. Macfarlane & Co., Glasgow (railings and balusters); Killick and Cochran, Liverpool (heating apparatus); Saunders and Taylor, Manchester (ventilating apparatus). Ravenhead Upholland rustic bricks and Shaw's unglazed stoneware are used in the building.

The Montgomeryshire Infirmary, Newtown, North Wales

Hastwell Grayson, F.R.I.B.A., and Shepheard and Bower, F. and A.R.I.B.A., Architects

This new building, pages 620 and 621, has been erected on a site across the River Severn, just outside the town. The infirmary is the outcome of a limited competition. There is accommodation for twenty beds in four wards, an

operating theatre, an out-patients' department, and a board-room. Adjoining, but separate from the out-patients' department, is a tuberculosis dispensary, the gift of the chairman of the Welsh National Crusade against Consumption, and intended to be worked by and under the control of the Welsh National Committee. The infirmary serves a beautiful county, but one of the poorest and most thinly populated in Wales, and could not have been built without most liberal help from Mr. David Davies, M.P., and his family. The site is a gift from Mr. E. Powell. The cottage character has been maintained as far as possible, both externally and internally. The fittings are simple. Rustic bricks made with an excellent variation of colour have been used externally.

The general contractors were Messrs. Treasure and Sons, Ltd., of Shrewsbury, and the sub-contractors were as follows: Wilson and Williams, Buckley (bricks); Chaddock Co. (ward windows); J. P. White and Sons, Ltd., Bedford (doors to wards, etc.); Art Pavements and Decorations, Ltd. (floors); Killick and Cochran, Liverpool (heating); W. Griffiths and Sons, Liverpool (hot-water supply); John Bolding and Sons, Ltd. (sanitary fittings).

King George's Sanatorium for Sailors, Liphook, Hants

Stanley Hamp, F.R.I.B.A. (Collcutt and Hamp), Architect

In 1920 the Seamen's Hospital Society purchased the estate and house known as Bramshott Place, Liphook, Hants. The existing house was used as an administrative block, and the various outbuildings and lodges were adapted to the purposes shown on the general block plan (pages 622 to 626). An entirely new ward block was erected adjacent to the administrative quarters, and contains the general wards, together with separate ward cubicles, all opening from sun balconies facing due south. The detailed arrangement of this block on its several floors is clearly shown on the plans. Generally the building is of brick, the external face being finished in stucco. The roofs are covered with red sandfaced pantiles; the windows and doors to the cubicle wards are in metal; and the bays between the balcony piers are filled in with wrought-iron grilles. The floors are of reinforced concrete on the B.R.C. system, and the floor coverings generally are in patent composition material. The brick fireplaces in the wards are emphasized in order to give interest and colour to an otherwise necessarily severe finish. Messrs. Heap, Digby, and Riley were the electrical consulting engineers.

The general contractors were Messrs. A. Cæsar and Sons, of Liphook, Hants, and the sub-contractors were as follows: British Reinforced Concrete Co. (reinforced concrete construction and fireproof floors); E. Parkinson (pantiles); Humphries, Jackson, and Ambler (casements and casement fittings, gates, railings, handrails, etc.); Matthew Hall & Co. (plumbing and sanitary work, sanitary ware and fittings and heating apparatus and boilers); Wilfley Co., Ltd., (composition flooring); Tyler and Freeman (electric wiring and electric light fixtures); Wm. Randall, Ltd. (laundry machinery); Tuke and Bell, Ltd. (sewage disposal); Barford and Perkins (disinfector).

Cottage Hospital, Clydach-on-Tawe, near Swansea

Chatters, Smithson, and Rainger, AA.R.I.B.A., Architects

The erection of this hospital (pages 634 and 635) was supervised by Sir Charles Ruthen & Son. The site slopes sharply towards north and east; this was an important factor in planning. The main lines of the building, as planned roughly, follow the contour lines and so avoid an excessive amount of levelling or too many steps. On the ground floor the accommodation includes two large wards with verandas, emergency ward, and private ward with veranda, operating room with sterilizing, preparation and anæsthetic rooms, an X-ray room, surgery, consulting room, waiting room, and two sitting-rooms, one for the matron and one for the nurses. A separate entrance is provided for the surgery. On the second floor are seven bedrooms.

The general contractors were Messrs. Thomas Bros., of Pontardawe, near Swansea, and the sub-contractors were as follows: Standard Roofing Co. (flat roofs); J. Gibbons, Wolverhampton (casements and casement fittings and door furniture); Candy & Co., Ltd. (Devon fires); Farrer, Webb & Co., Birmingham (sanitary ware and fittings); Marble Mosaic Co. (flooring and dadoes); D. O. Williams & Co., Swansea (electric wiring); North of England School Furnishing Co. ("Utod" flush doors); Holophane Co., Ltd. (electric light fixtures); Messrs. Gardiner and Sons, Bristol (gates, railings, etc.); Henry Hope and Sons (heating apparatus); Manlove, Alliott & Co., Nottingham (disinfecting apparatus, etc.).

Extension of the Tilbury Hospital for the Seamen's Hospital Society

Stanley Hamp, F.R.I.B.A. (Collcutt and Hamp), Architect

The site of this hospital adjoins the Tilbury Docks of the Port of London Authority, and consists of made-up ground from soil deposited when the Tilbury Docks were constructed. The old hospital has been adapted for administrative purposes. The old men's ward is now used as the out-patients' department, and the old women's ward now forms the surgeons' quarters. A new nurses' hostel has been erected behind, and in continuation of, the old building. New wards for men and women and children have been erected on adjoining land, together with kitchen block, operating block, and boiler-house block. All these are connected to the old hospital by one long main corridor, with provision for additional wards, if and when required. An existing mortuary on adjoining ground has been absorbed, modernized, and connected with the hospital. Owing to the nature of the soil (newly made ground) the new buildings are erected on concrete rafts reinforced with B.R.C. fabric. In order to reduce the weight to a minimum the walls are built of hollow concrete blocks on the Triangular system. The roofs are constructed with light steel principals to the wards, and covered with tiles. Generally the roofs are of timber, covered as for the wards, and where flat they are finished in asphalt. Metal windows and skylights are used throughout. The floors of the corridors and wards are finished in patent composition material; those of the nurses' bedrooms are finished in cork slabs; those of the kitchens, lavatories, and pantries are in quarry tiles; and that of the operating theatre is in white terrazzo. Low-pressure hot-water heating is installed, with steam for sterilizing, etc. The walls throughout are plastered except those of the lavatories, kitchens, etc., which have tiled dadoes. Mr. W. H. Wright carved the stone inscription. The hospital is illustrated on pages 627 to 633.

In the instructions given to the architect by the Hospital Committee, special emphasis was placed on the urgent need for economy in design and construction, while not in any way impairing the efficiency of the building as regards meeting the requirements of an up-to-date hospital. Considerable time was spent in pursuing inquiries as to the most economical form of building adaptable to this purpose, and it was finally decided to adopt a scheme by which the super structure was placed on a concrete raft reinforced on the system devised by the British Reinforced Concrete Co., thus reducing the cost of excavation to a minimum. For the outer walls hollow concrete blocks as patented by the Triangular Construction Co., were used, so allowing of a wall only 9 in. in thickness being used throughout, including those to the larger wards. Where required to support the roof principals a suitable means of reinforcement to the wall was devised in order to render unnecessary any piers or other breaks. In the roofs again, everything possible was done to reduce weight and save material and the scheme of light steel principals with a maximum spacing of rafters helped considerably in this direction. Windows throughout were in metal standardized in size and section in order to reduce cost. All the items mentioned are examples of the policy pursued throughout, thus reducing cost to a minimum without affecting the efficiency of the building as a hospital. The result was that the inclusive cost per bed in respect of the ward blocks amounted to £275, while the nurses' hostel (in which each room had fitted lavatory basins with hot and cold services and low-pressure hot-water radiators) worked out at £335 per bed.

The general contractors were Messrs. John Mowlem and Sons, and the sub-contractors were as follows: Carter, Stabler and Adams (Della Robbia tablets); Triangular Construction Co., Ltd. (concrete blocks for walls); British Reinforced Concrete Co. (reinforced concrete construction); Redpath, Brown & Co. (steelwork); Martin Van Straaten & Co. (wall and floor tiles); Everlasting Tile Co. (roof tiles); Henry Hope and Sons (casement and casement fittings); Matthew Hall & Co. (plumbing and sanitary work); Musgrave & Co. (sanitary ware and fittings); H. W. Cullum & Co. (cork flooring); Wilfley Co., Ltd. (composition flooring); Carter & Co. (terrazzo flooring); Speedy and Eynon (electric wiring and light and bell fixtures); W. H. T. Kelland and Sons (special doors); Charles Smith, Sons & Co. (door furniture); Benham and Sons (heating and ventilating, boilers, cooking, and laundry machinery); Haywards, Ltd. (enclosure to verandas); Educational Supply Co. (folding partitions); Barford and Perkins (disinfector plant).

Additions to Leicester Royal Infirmary

Pick, Everard, Keay, and Gimson, Architects

The Leicester Royal Infirmary occupies a central position in the city, and covers an area of seven acres. The new south-west wards accommodate one hundred beds, and are contained in a three-story building. The total accommodation of the hospital is 400 beds. The works recently completed are the nurses' home extension, the remodelling of the laundry, new pathological and orthopædic departments, casualty and out-patients' extension, new doctors' quarters, and the new X-ray department in course of preparation. The building in which the wards are housed is of fireproof construction, and there are reinforced concrete sun balconies to each ward. Each ward is 26 ft. wide by 134 ft. long, and has a marble terrazzo floor, plaster walls, and a flush ceiling. Efficient ventilation is effected by sash windows with hoppers above.

The general contractors were Messrs. J. Chapman and Sons, Ltd., of Leicester. The sub-contractors were: Seyssel Asphalt Co. (asphalt roofing); Empire Stone Co., Narboro' (artificial stone); J. Chapman and Sons, Ltd. (reinforced concrete construction); G. Potter and Sons, and Gimson & Co. (steel work); Siegwart Floor Co. (fireproof floors); Craven, Dunnill & Co., Shropshire (wall tiles); Henry Hope and Sons, Birmingham (steel casements and gearing); Geo. Wright & Co., London and Rotherham (ward stoves); Wm. Freer, Leicester (plumbing and sanitary work); Shanks & Co., Manchester (sanitary ware and fittings); J. Ellis and Sons, Leicester (terrazzo flooring); T. H. Wathes & Co., Leicester (electric wiring); Infirmary Staff (special doors and furnishings); W. and R. Leggott, Ltd. (door furniture); G. Potter and Sons, Leicester (railings, handrails and balusters, etc.); Gimson & Co., Leicester (lifts and boilers); Young, Austin and Young, Leicester (heating apparatus); The British Aluminium Co., London (aluminium shelves); James Slater & Co., London (plate racks). Ellistown wire-cut bricks were used in the building.

The orthopædic building (page 636) is situated in the south-east angle of the site, and adjoins the out-patients' department. The administration rooms have a westerly aspect. The treatment rooms face east, and are further lighted from the roof. The building is one story high. The treatment rooms are on the north-light principle, with reinforced concrete trusses, and Siegwart beams and Ruberoid roof covering. The administration rooms and the corridor have flat roofs covered with asphalt. The walls are of brick, with Weldon stone dressings to the entrances. The floors of the electrical and massage department, the baths, and the waiting hall, are finished with terrazzo. The gymnasium and administration rooms have oak-boarded floors. The building lends itself readily for future extension. The foundation stone bears the following inscription: "This stone was laid by Edward Holmes, Provincial Grand Master of Leicestershire and Rutland, on behalf of the Freemasons of the Province, who, in loving memory of those brethren who fell in the great war, subscribed the sum of £5,000 towards the erection of this building, 28th July, 1919."

The general contractors were Messrs. J. Chapman and Sons, Ltd., and the sub-contractors were as follows: Val De Travers (asphalt); Empire Stone Co. (reinforced concrete construction); Craven, Dunnill & Co., Shropshire (wall tiles); Ruberoid Co., Ltd. (Ruberoid roofs); Siegwart Fireproof Floor Co., Ltd. (Siegwart beams); Thomas Elsley, Ltd. (casements and casement fittings); W. H. Heywood & Co. (patent glazing and fittings); Wm. Freer, Leicester (plumbing and sanitary work); Shanks & Co. (sanitary ware and fittings); Gent and Hurley, Leicester (electric wiring); Dryad Works, Leicester (door furniture); Ashwell and Nesbit, Ltd. (heating and ventilating).

The clinical building (page 637) is situated in the south-west angle of the site, and has a frontage to New Bridge Street. Entrance gates are close at hand for the removal of the bodies from the mortuary. The building is mainly a two-story detached one, with flat roofs. There is ample ventilation in all the rooms, and top lights to the post-mortem room and laboratories. The walls are of brick, and there are Siegwart beams to the floors and the roofs. The floors have a terrazzo finish, and the roofs are of asphalt. The walls are lined internally with white glazed tiles.

The general contractors were Messrs. J. Chapman and Sons, Ltd., and the sub-contractors were as follows: J. Hewitt & Co., Leicester (asphalt); Empire Stone Co. (concrete blocks); Siegwart Floor Co. (fireproof floors and partitions); Craven, Dunnill & Co., Shropshire (wall tiles); Dryad Works (casements and casement fittings); W. H. Heywood & Co. (patent glazing and fittings); Wm. Freer (plumbing and sanitary work); Morrison and Ingram (sanitary ware and fittings); Ashwell and Nesbit, Ltd., (heating and ventilating); The Lightfoot Refrigeration Co., Ltd., London (refrigerating plant).

The nurses' home (pages 658 to 659) stands in a southern position on the six-acre site of the infirmary, and has a frontage to Knighton Street. There is a private entrance for nurses from Knighton Street. The home was erected in 1907, and comprises ninety-eight bedrooms, a recreation hall, sitting-rooms, library, lift, isolation annexe, and sanitary annexes. In 1920 a new wing was added at the south-east angle. This comprises thirty-two bedrooms, and a further extension was made over the recreation hall, three stories high and containing thirty bedrooms—making a total of 160 bedrooms. The nurses' home is a brick building (Leicestershire bricks) with Ketton stone dressings, and a slated roof. The floors consist of Siegwart beams or reinforced concrete, with terrazzo pavings to the corridors, Doloment flooring to the bedrooms and oak flooring to the recreation hall and common rooms. The furniture and equipment was designed by the architects and made by the infirmary staff.

The general contractors were Messrs. Henry Herbert and Sons, Leicester (first portion, 1907), and Messrs. J. Chapman and Sons, Ltd. (extensions). The reinforced concrete work in the extensions was executed by Messrs. J. Chapman and Sons. The sub-contractors were: J. Hewitt & Co. (asphalt); G. Potter and Sons, and Gimson & Co. (steel work); Siegwart Fireproof Floor Co. (floors); Craven, Dunnill & Co., Shropshire (wall tiles); Ellis, Partridge & Co. (slates); R. Pochin and Sons (stoves, grates and mantels); Wm. Freer (plumbing and sanitary work); Doulton & Co. (sanitary ware and fittings); Gent and Hurley (electric wiring); J. Gibbons (door furniture); Gimson & Co. (lifts and cranes); Ashwell and Nesbit, Ltd. (heating and ventilating); Gent & Co. (clocks);. Ellistown wire-cut bricks were used in the building.

The London Temperance Hospital, Hampstead Road, N.W.

Claude W. Ferrier, F.R.I.B.A., Architect

Additions have recently been made to the London Temperance Hospital, together with a number of alterations and improvements to the main building. The new wing comprises boiler-room and kitchens in the basement, an X-ray department and sitting-rooms for the nursing staff on the ground floor, three intermediate floors of nurses' bedrooms, and an operation department on the top floor. The planning presented a certain amount of difficulty owing to the cramped dimensions and awkward shape of the site, and to the fact that this building has to link the east and west ward blocks, which are at slightly different levels. The operation department is planned for rapid succession of operations, and, there being only one theatre, the elimination of painting and other work involving time in maintenance has received special attention. The whole of the internal surfaces of the theatre are formed of terrazzo, the floor and the walls to a height of about 8 ft. being greenish-grey, and the frieze and the ceiling a soft cream. These tints were adopted with a view to avoiding eye-strain occasioned by the glare of white surfaces, and the medical staff are finding the result satisfactory in practice. The nature of the material enables the rounding of angles to be very perfectly carried out; and, to prevent cracking, the floor is laid on a thick cement screed reinforced with light expanded steel, and is detached from the concrete sub-floor by a layer of Willesden paper. Daylight is admitted by a very large window facing north, by a lay-light in the ceiling above the operating table, and by a smaller window facing south; all these being in smooth frames of German silver, which needs very little cleaning. The north window has an outer gallery with glazed front and roof which serves as an insulating air-space, and also affords accommodation for several observers to watch an operation without entering the theatre itself. Explanatory remarks by the operator are conveyed to them by a loud-speaking telephone. The additions are illustrated on page 640.

The clerk of works was Mr. I. F. Genders, of Brockley.

The general contractors were Messrs. Perry & Co. (Bow), Ltd., and the sub-contractors were as follows: Leeds Fireclay Co., Ltd. (glazed bricks); Redpath, Brown & Co., Ltd. (steel work); W. B. Simpson and Son (tiles—wall, ceiling, floor, and roofing); F. Bradford & Co. (granolithic paving); Fenning & Co. (marble steps to porch, vestibule, etc.); The Luxfer Co. (pavement lights); J. A. King & Co. (ferro-glass roof lights); The Crittal Manufacturing Co., Ltd. (casements and casement fittings); British Challenge Glazing Co. (patent glazing and fittings); Bratt, Colbran & Co. (stoves, grates and mantels); Doulton & Co., Ltd., Dent & Hellyer, Ltd., and Tylors Ltd. (sanitary ware and fittings); The Art Pavements and Decorations, Ltd. (floors); Wilfley Co., Ltd. (composition floors); Gas Light and Coke Co. (gasfitting); T. Clarke & Co., Ltd. (electric wiring); S. W. Francis & Co. (special doors in German silver for theatre); Carter & Co., Ltd. (faience tablets); James Hill & Co., Ltd. (door furniture); George Johnson (service lifts); W. Wadsworth and Sons (crane); Deane and Beal, Ltd. (heating apparatus); Ozonair, Ltd. (ventilating apparatus); T. Clarke & Co., Ltd. (electric bells); Relay Telephone Co. (telephones); Spencer Bonecourt, Ltd., and National Radiator Co., Ltd. (boilers); Whitfield Safe Co. (strong-room doors and safes); Deane and Beal, Ltd., and Parkinson Stove Co. (cooking apparatus); Manlove Alliott, Ltd. (sterilizers and incinerator); E. Hilburn (window blinds).

Nurses' Home, Astley-Ainslie Institution, Edinburgh

Sydney Mitchell and Wilson, Architects

This new building (page 656) will be three stories high and will accommodate forty-five nurses. The outer walls will be constructed of 16 in. hollow brick, rough-cast outside, and have exposed brick base. The upper story will be formed with mansard roof, covered with tiles.

Nurses' Home, Mearnskirk Sanatorium, Glasgow

This Home was designed in the Corporation Office of Public Works, Glasgow.

The site is situated about eight miles from the centre of Glasgow. The building is three stories high and accommodates 126 nurses. The walls are built of Edwards's fine cut brick, and the lintels and sills of windows, string-courses and plinths, are of reinforced concrete finished in "Atlas" White cement. Certain large wall panels are rough-cast and finished in "Atlas" White cement. The roofs are slated. The ground and first floor plans of block L of the nurses' home are illustrated on page 657.

The general contractors were Messrs. J. Rogerson and Sons, of Glasgow.

Tynemouth Infirmary Extensions

Cackett and Burns Dick, FF.R.I.B.A., Architects

These new extensions (pages 661 to 663) form the completion of the war memorial scheme, part of which, the war memorial monument, situated between the new extensions and the old infirmary, was unveiled by the Duke of Northumberland in 1923. The extensions consist of a new nurses' home, with temporary ward accommodation on the ground floor and a new laundry, kitchen, and boiler house. Alterations have also been made to the existing buildings forming an X-ray section, mortuary and post-mortem room. The buildings now erected form part of a general lay-out which was adopted by the committee, and will ultimately embrace new ward pavilions on modern lines east of the present extensions. This portion of the work will be carried out at some future date, as funds and circumstances permit. The buildings are of brick, with Portland stone dressings and with concrete stairs and floors.

The general contractors were Messrs. Thomas Lumsden, of Newcastle-upon-Tyne, and the sub-contractors were as follows: Limmer and Trinidad Asphalt Co. (asphalt); Thomas Blythe and Sons, of Birtley, Co. Durham (bricks); Leeds Fireclay Co. (glazed bricks); F. J. Barnes, Ltd. (Portland stone); Expanded Metal Co., Ltd. (reinforced concrete construction); Redpath, Brown & Co., Ltd. (steel work); Thos. Addison, North Shields (slates); Mellowes & Co., Ltd. (patent glazing and fittings); Wm. Scott and Son, Newcastle-upon-Tyne (plumbing and sanitary ware); Doulton & Co. (sanitary ware and fittings); Hollis Bros., Hull (flooring); Rowells, Ltd., Newcastle-upon-Tyne (Terrazzo flooring); Northern Electrical Co., North Shields (electric wiring); N. F. Ramsay & Co., Newcastle-upon-Tyne (special metal work and door furniture); Ediswan Electric Co., Newcastle-upon-Tyne (electric light fixtures); Pickerings, Ltd., Stockton (lifts); G. N. Haden and Son, Newcastle-upon-Tyne (heating apparatus); R. & A. Main, Falkirk (cooking equipment); D. and J. Tullis, Clydebank (laundry machinery).

Nurses' Home for Newcastle-upon-Tyne

Harrison and Ash, FF.R.I.B.A., Architects

The building (pages 664 to 666) has been erected for the Board of Guardians. It is situated in a prominent position in Westgate Road, and there is a fine open view from the building to the south. The subsoil is largely clay and stone. The building is constructed of sand-faced blocks and Portland stone, and roofed with Westmorland slates (peggies). The wall surfaces to the quadrangle are finished with white rough-cast. The floors throughout, also the staircases, are of reinforced concrete. The partitions dividing bedrooms, etc., are of "Bimol" patent blocks. An outstanding feature of the ground floor is the large recreation room, with a writing room at one end and a reading room at the other. The first, second, and third floors are devoted to bedroom, bathroom, and lavatory accommodation.

The sub-contractors were as follows: Messrs. Gibbs & Co., Loughborough (bricks); H. H. Martyn & Co., Cheltenham (carved stone work); Dorman, Long & Co., Ltd. (steel work); Building and Insulating Materials Co. ("Bimol" blocks); Dawber, Townsley & Co. (Westmorland slates).

Liverpool Royal Infirmary: New Nurses' Home

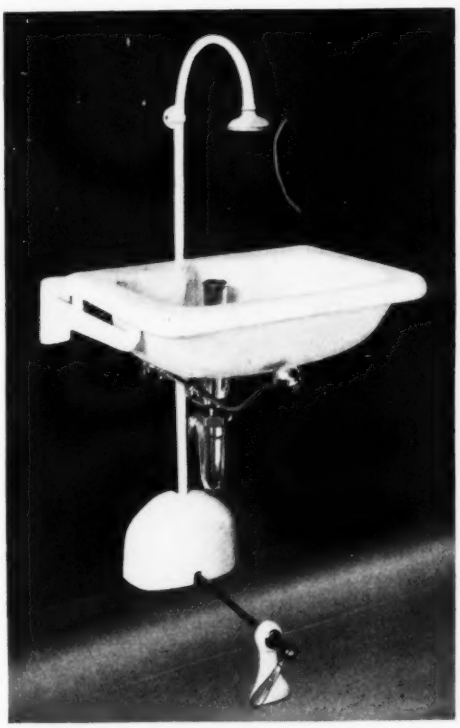
Edmund Kirby, F.R.I.B.A., and Sons, Architects

The site of this nurses' home (pages 667 and 668) is in Pembroke Place, Liverpool, and the foundations are of rock. At present only one wing, representing one-third of completed scheme, has been built. The exterior is of rustic brick, with red brick and Portland stone dressings. The interior is finished in accordance with latest labour-saving ideas, and there is no metal to polish in the whole building. The switch plates and kicking plates are of stainless steel, and the taps, etc., are covered with grey "Roanoid," by Rowan and Boden, Ltd., Royal Liver Building, Liverpool.

The general contractors were Messrs. Wm. Moss and Sons, Ltd., of Liverpool, who also executed the stonework and the plumbing and sanitary work, and the special woodwork and doors, and the fixed furniture, the sub-contractors being as follows: Thos. Faldo, Ltd., Manchester (asphalt and asphalt roofs); British Reinforced Concrete Engineering Co., Ltd., Manchester (reinforced concrete construction); McIntyre and Sons, Liverpool (steel work); J. H. Sankey and Son, Ltd. (Fosalsil blocks, fireproof partitions); Conway & Co., Manchester (wall tiles); Wm. Moss and Sons, Ltd., and Quiggin Bros., Ltd. (casements and casement fittings); Carron Co., Liverpool, and E. A. Clarke, Liverpool (stoves, grates and mantels); F. E. Pescod, Liverpool (sanitary ware and fittings); Acme Flooring Co., Ltd., London, and Magnesite Terrazzo and Mosaic Co., Liverpool (flooring); Korkoid and Ruboleum Tile Co., Glasgow (ruboleum floors and stair treads); R. F. Parry, Liverpool (electric wiring); J. Tanner and Son, Liverpool (fibrous or modelled plaster work); Quiggin Bros., Ltd., Liverpool (art metal work and door furniture); S. J. Edwards and Son, Birkenhead (gates, railings, hand-rails, balusters, etc.); Art Pavements and Decorations, Ltd. (mosaic decoration and marble work); Walpamur Co., Ltd. (wall papers and wall hangings); Express Lift Co., Ltd. (lifts); Dargue Griffiths & Co., Ltd. (heating and boilers); R. F. Parry (electric bells); Milner's Safe Co., Ltd., Liverpool (steel lockers); Rowan and Boden, Ltd., Liverpool ("Roanoid").

A New Surgeons' Lavatory

The surgeons' lavatory illustrated below is one of the newest designs of the many sanitary fittings supplied by Messrs. Davis, Bennett & Co., Westminster. The basin is of white glazed fireclay, and is fixed 3 in. clear of the wall, on porcelain enamelled cast-iron cantilever brackets. The hot and cold water is supplied through a patent blending valve of the firm's own design. This valve is operated by a toe-action lever, and very little effort is necessary to open or close it. The cold water valve, as usual, opens first, and the temperature rises as the lever is turned. The valves are enclosed in a white porcelain enamelled removable cover. The improved type of knee-action waste provided is easy to keep clean, and is simple in mechanism. The trumpet overflow fitting can be readily removed for cleansing. Various types of traps can be provided.



A NEW SURGEONS' LAVATORY.

Heating, and a few Notes about Ventilating and Cleaning Hospitals

By WILLIAM W. WOOD, A.R.I.B.A.

STANDING out before the mental vision of the hospital planner are three ever-present requisites—light, air, and cleanliness—and the greatest of these is cleanliness. The artificial generation and distribution of heat is normally associated with conditions at conflict with this desirability, and raises mental pictures of coal and coal-dust, cinders and ashes, volumes of black smoke and soot. The logical outcome of this view of the subject, therefore, is to consider first and foremost the various primary generating media available.

Comparison of Fuels

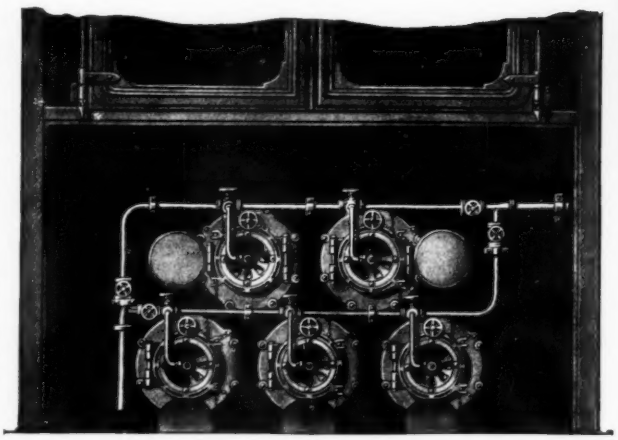
Coal is the most common fuel used for the generation of steam, and whilst cheaper in first cost than gas or oil it is obviously much dirtier in use. Perfect and regular stoking reduces smoke to a minimum, but the fallibility of the human factor looms so largely in this connection that the importance of the result is out of all proportion to the "if." Apart from dirt, coal needs a great deal of storage space to gain even the slightest independence, a tall, ugly, and costly chimney, and the constant attention of a stoker or stokers. The use of smoke-consuming firebars, with forced draught, is the only comparatively cleanly way of utilizing coal, or rather coal-dust.

Coke is not a suitable fuel for raising steam, owing to its slow-burning properties, but is the cleanest and most economical fuel to employ in a system of hot-water heating or hot-water supply services when a supply of steam is not available.

Anthracite is clean and its combustion almost complete, but in spite of its high calorific value its cost is greater than coal, and supplies are uncertain. In addition, it requires a more plentiful supply of air for proper combustion, sometimes necessitating the use of an induced draught-fan or a larger and/or higher chimney, but even then there is the risk of burning out the firebars. Its real value lies in small hot-water installations.

Oil is an excellent fuel, with a very high thermal content—in the neighbourhood of 20,000 British thermal units per pound—and, in view of the constant industrial disputes connected with the production of coal, it has undoubtedly a very great future. The objections to its use may be considered under three headings :

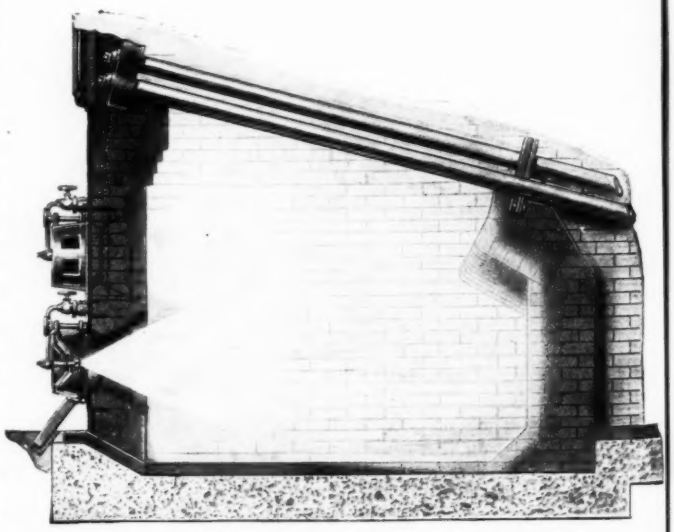
1. Instability of prices and uncertainty of supplies. Potential users are inclined to fear that if purely oil-fired boilers are installed they will be given an encouraging contract by the oil companies at the outset, but they doubt if this will be renewed on the same terms. Petrol consumers will probably sympathize with this point of view, but I am not at all sure that it is justified in fact. Thanks to the courtesy of Messrs. Babcock and Wilcox we are able to illustrate two typical furnaces, the one designed for burning oil only, and the other for burning oil or coal alternatively. The latter is, of course, more expensive in installation and less efficient when burning oil than the boiler designed solely for this purpose. A convertible boiler is naturally to be desired to obtain independence, but represents a difference in efficiency of something like 20 per cent., the non-convertible boiler reaching 87 per cent. efficiency with induced draught. The definite stabilization of oil prices and supplies is the apparent remedy for this unfortunate state of affairs. The above remarks are in the nature of generalizations, and are not intended to refer to the boilers illustrated, or those of any particular firm of manufacturers.



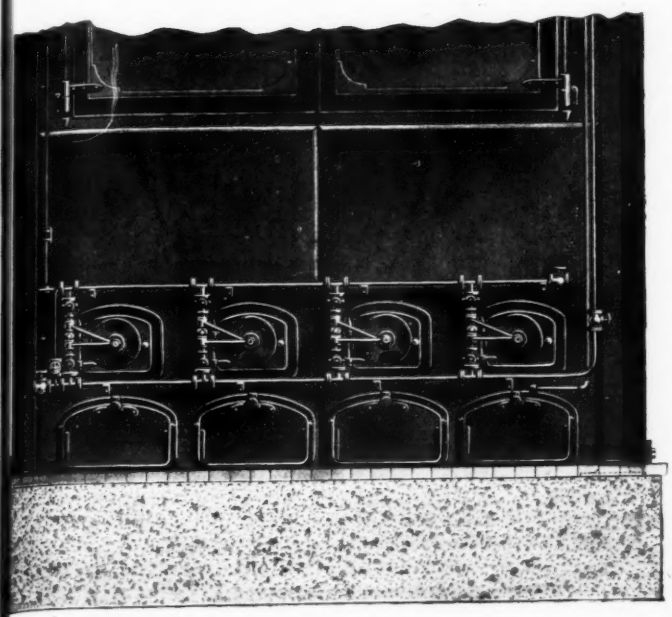
FRONT OF FURNACE, SHOWING DOUBLE ROW OF BURNERS.

2. Owing to its highly inflammable nature, if oil with a flashpoint below 150° F. is used, somewhat rigorous precautions have to be taken in storage and feeding to the boilers. The storage tank is usually underground, and must be adequately ventilated. Heavy oils are, however, more frequently employed, and these can be handled with comparative safety.

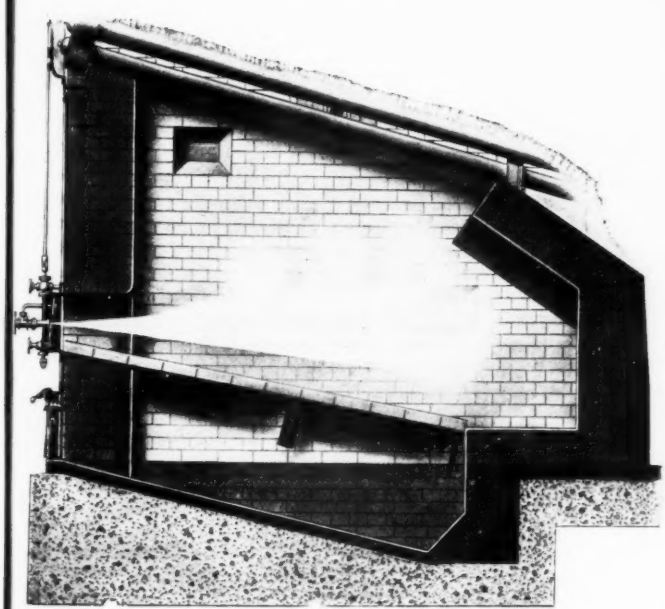
3. In the early days, burners were a constant source of trouble, but much has been done to improve their design. The oil can be atomized by any one of three ways—viz., by steam, air, or mechanically under pressure. The last named is the most efficient, but also the most costly in installation. Air is used chiefly in situations where water cannot be wasted, or when impurities are present.



SECTION THROUGH THE FURNACE OF A BOILER DESIGNED FOR BURNING OIL ONLY



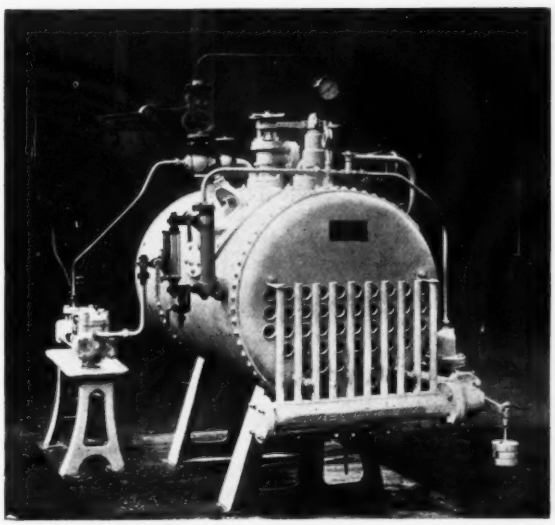
FRONT OF CONVERTIBLE FURNACE, SHOWING SINGLE ROW OF BURNERS



SECTION THROUGH THE FURNACE OF AN OIL-FIRED BOILER, DESIGNED FOR EASY CONVERSION TO THE BURNING OF COAL

The advantages of oil as a fuel for hospital work are chiefly cleanliness—there is comparatively no smoke, ash, soot, or any of the dirtiness contingent upon the use of coal—lower stoking costs, a smaller chimney, and no useful space occupied by supplies. The tank is, in fact, better some little distance away from the buildings.

Town gas possesses all the advantages of oil, plus the saving of cartage and storage, with none of the disadvantages, save the important one of cost. This is 200 per cent. to 250 per cent. greater than coal, and 150 per cent. to 200 per cent. greater than oil, but there is no reason why it should remain so. In certain parts of Lancashire a discount is given on gas consumed in central heating systems, making it possible to buy gas for this purpose at 1s. 2d per 1,000 cubic feet, as compared with 3s. 8d. in London A gas boiler was recently installed at the London Temperance Hospital by Messrs. Deane and Beal, Ltd., under the direction of the architect, Mr. Claude W. Ferrier, for the provision of steam for heating the operating theatre, sterilizing instruments, etc. The tubular boiler illustrated —the photograph was very kindly supplied by the makers, Messrs. Spencer-Bonecourt, Ltd.—is of a similar size, and similarly fitted up with controls to the one referred to. At the end of each tube is a gas-jet, and the tubes themselves are fitted with spirals, as an aid to the extraction of every B.T.U. from the gas, producing a very high degree of efficiency. These boilers are absolutely automatic, the gas-supply being controlled thermostatically and thermometrically, and a feed-water regulator controls the supply of steam to the feed pump. By these means there can be no waste of gas, no attendance of stokers whatever is required, and there is complete elimination of dirt. The



BOILER FITTED WITH AUTOMATIC PRESSURE GAS REGULATOR.

boiler can, if it is desired to conserve space, be placed on the roof, and by the use of an induced draught-fan 95 per cent. efficiency can be obtained without the necessity of a chimney-shaft. This article, however, must not develop into a dissertation on gas-fired boilers; those interested in the subject are referred to an excellent pamphlet published by the British Commercial Gas Association, vol. xiii, No. 135, price 6d. post free.

Electricity can only be considered for localized heat, but it is extraordinarily useful to have power plugs in handy positions for electric fires. These are particularly good in the spring and early autumn, on odd cold days when the central-heating system is not in operation.

Heat-distributing Media

Air was used by the Romans, and is used in plenum, hot-blast, and similar systems to-day, but is not applicable to hospital work, except in storage basements, old-fashioned hospitals, and other situations where supplies of natural air are not plentiful. In this connection it will be discussed under the heading of ventilating.

Steam is used extensively in hospitals, both directly and indirectly. Under the former heading come cooking, sterilizing of instruments, and laundry work-power (an engine having steam as its motive power is frequently used to drive the laundry shafting), boiling, and drying. As a direct-heating agent its use is normally limited to the operating theatre. Its indirect use is, however, the one that

chiefly concerns us. A pump-accelerated low-pressure gravity hot-water system will do wonders, but the loss of heat consequent upon travelling over very long distances is uneconomical. In large, and especially wide-spreading hospitals and sanatoria, it is better to install calorifiers, two in each convenient block (this will be determined by the planning), one for the heating system, and the other for the hot-water supply services (baths, etc.) of the block in question. Each calorifier is fed by high-pressure steam from the central boiler-house, and transmits heat to the water in, and passing through, the cylinder. The calorifiers are supplied with condensers, and, when advisable on the grounds of economy of water, economizers, which return the condensed water to the feed-pump in the boiler-house. It is not always sound policy to install economizers, as the capital expenditure on them and on the return piping may not be commensurate with the water saved. Each individual case must be considered on its merits.

Water is the ideal heat-distributing medium, whether gravity or pump-accelerated (but not high-pressure), whether receiving its heat direct from the boiler or from a steam calorifier, whether the heat is disseminated by means of pipes and radiators, or on the panel system. The chief reasons for this are :

1. The low surface-temperature, resulting in the absence of the burnt, dry atmosphere contingent upon the use of steam.

2. The temperature can be regulated to a nicety in any and every part of the building by means of the radiator or panel coil valves.

3. Fewer leakages, no "water-hammer," reduction in, and possible total elimination of, trenches.

4. The greater resultant cleanliness due to less upcast of particles of dust, which disfigure walls and ceilings over radiators, unless the surfaces are continually brushed or washed.

In small hospitals, or in cases where there is an insufficient supply of steam, the water is best heated by coke-fired boilers, centrally situated, the heated water circulating by means of gravitation or, better still, on a gravity system designed for, and supplemented by, a centrifugal pump. This last system ensures small pipes throughout, less waste heat from the otherwise large mains, and a consequent economy in fuel, with the expenditure of a negligible amount of electric current to drive the pump.

As already mentioned, it is usually possible, and advisable, to work from steam calorifiers rather than direct from hot-water boilers, and to these cases the remarks in the last paragraph are equally applicable.

Heat-distributing Systems

Systems, or methods of heat-distribution, are too many to bear enumeration here, and only those generally accepted as the best need be discussed. These are, briefly :

1. Two-pipe main systems—rise or drop—designed for slow circulation by gravity (in case the pump breaks down), normally accelerated by a centrifugal pump.

2. The panel system, designed, basically, in a similar manner.

Let us consider them in the order given :

1a. The two-pipe main rising system, in essence consists of a main flow or flows taken from the top of the boiler or calorifier, and, rising slightly as it goes, made to circumnavigate the building. To odd points out of the path of the main, branches are run, and from these, as from the main at all suitable points, risers are taken off. As these pass up the building, they feed radiators on each floor, some actually from the risers, others from horizontal branches. It might be worth mentioning at this point that no flow or return pipes are truly horizontal—they must all either rise or fall. The riser ends at the topmost radiator, and from this radiator—in the case of each riser—a return commences, picking up the returns from the other radiators at each floor, until the lowermost point is reached, where it enters the main return to the boiler. It will be seen that by this system no water after leaving the boiler is used more than once for radiation purposes, except in its passage through the pipes, and the result means a lower temperature difference, smaller pipes, and a much more even surface-temperature at all radiators than can be achieved on a one-pipe system.

The Two-pipe System.

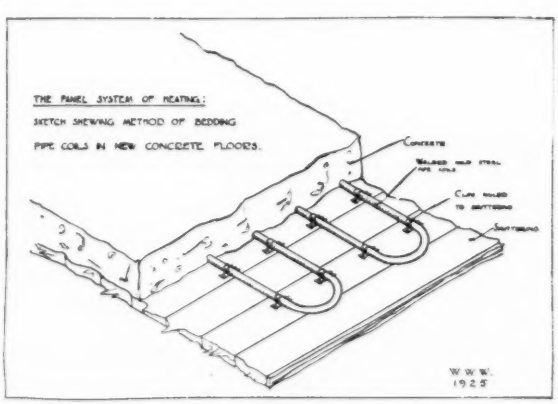
1b. The two-pipe main drop system is used in situations where it is more convenient to have the main flow in the roof or at ceiling level on the top floor. From this main, flow or feed pipes are taken down the building, serving the radiators on each floor as they go, the connection preferably being made at the top. This saves the use of air-valves on the radiators, as all air will rise to the highest point of the system and escape up the vent pipe. The flow ends at the top of the lowest radiator. From the first or highest radiator supplied, a return drop commences, eventually entering the ring main return below the return connection of the lowest radiator. As the horizontal flow and return connections would have to fall in opposite directions, it will be seen how difficult it would be to serve radiators any distance out of the path of the drop. The connections, even so, would have to be both at the bottom, or top and bottom, opposite ends, if there was no objection to the flow-pipe rising alongside the last section of the radiator. At best it is an ugly arrangement, and one of the limitations of this system.

Radiators, movable and easy to clean, are, of course, specially made for hospital work.

The Panel System.

2a. The panel system is deemed to be superior to all other methods of warming a hospital. The word "warming" is used advisedly, it being one of the chief claims of the patentees that the air is not heated, and consequently avoids the certain amount of stuffiness that is inevitably produced with even low-pressure hot-water heating by means of radiators, or perhaps a more accurate term would be "convectors"—but owing to the large areas of heated surface, warmth is imparted to the occupants of a room by means of direct radiation. In other words, panel heating from the ceiling, the mode of application in hospitals, may almost be regarded as artificial sunshine—without the light rays ! The large surface permits of a very low surface-temperature, and at the same time all parts of the room or ward are warmed simultaneously. The principle of circulation is, as already indicated, the same as for a system of radiators, and the temperature of panels can be similarly controlled by valves.

The panels consist of small-diameter pipes, welded together in sufficient numbers to provide the required number of B.T.U.'s. In hospital work especially, the ceiling is the best place in which to have the panels. The coils are most advantageously embedded in the concrete, as shown in the accompanying sketch, and if this is done, mild-steel



pipes are used. The coils, after welding, are secured to the upper side of the shuttering by means of clips and nails, and the concrete is poured in. After setting and removal of the struts, the shuttering is torn down, leaving the ends of the nails projecting through the concrete. These are knocked up into the concrete, or clipped off. Concrete floors laid *in situ* are the simplest to treat, but any form of patent flooring possessing concrete beams can be modified to suit. The beam is simply made the width of the required panel, and the reinforcement revised and redistributed accordingly. In cases, however, where it is necessary to put the coils up after the floors are in position, amalgam pipes are used, being lighter in weight and easier to fix.

The panels are plastered over in the same way as the rest of the ceiling, the only thing being that the plaster is somewhat thicker than usual. An important feature in this connection is the introduction of a layer of canvas in the finishing coat.

Relative costs vary, of course, with the nature of the building, but the panel system does not appreciably exceed the cost of an ordinary radiator system. Offset against this is a great saving in fuel consumption due to the comparatively low temperature of the circulating water (90° to 130° F.), and the relatively small amount of heat absorbed by the air.

Cold water may with advantage be circulated in hot weather. This was done at Bush House, Aldwych, during portions of the past summer.

It seems unnecessary to dwell on the obvious advantages of the panel system in the cause of cleanliness; the elimination of dirt-harbouring, leaky radiators; upcast of dust on to walls and ceilings, and all the attendant troubles of a radiator system.

The panel system is at present being installed in the University College Hospital extension by Messrs. Richard Crittall & Co., Ltd., under the supervision of Professor A. H. Barker, B.Sc., Wh.Sc., the consulting engineer, the architects being the late Mr. Paul Waterhouse, PP.R.I.B.A., and Messrs. Hornblower and Thorpe; and at Bolingbroke Hospital, where the architects are Messrs. Young and Hall.

There are so many different governing factors in each individual hospital that an architect is called upon to design, that to generalize, ever a dangerous procedure, is well-nigh an impossibility, and to summarize is in this instance also to generalize. Given ideal conditions in every respect, the fuel, I think, should be oil or town gas, the heat-distributing media steam to the calorifiers, and thence water on the panel system.

Ventilating

Natural ventilation, if efficient, is undoubtedly the best, but circumstances do arise which call for special treatment. Storage basements, corridors, waiting-halls for out-patients, operating theatres, portions of old hospitals, and hospitals in confined situations, are sometimes difficult to ventilate satisfactorily without recourse to mechanical means, and a brief description of the means may not be out of place.

Details of Equipment.

First of all, if it is necessary to go to the expense of a system of ductwork, the provision and equipping of a plant-room, then a saving should be effected on the cost of the hot-water heating installation by heating with warmed air the parts artificially ventilated.

A galvanized sheet-iron trunk, or a brickwork or concrete shaft parged inside with cement, is taken from the nearest available source of tolerably clean air supply, and is connected to the ventilating chamber, usually situated adjacent to the boiler-room. A multi-blade fan, driven by an electric motor or small steam-engine, is fixed in the ventilating-plant room. Interposed between the outside air inlet as just described and the suction side of the fan are an air washer and tempering coil. Inside the washer is a spray chamber, and the air, coming into contact with the finely atomized water, is saturated, causing the heavier particles of dirt to fall into the collecting tank, and the smaller to be deposited on the shaped baffle-plates, whence they are washed into the tank also. The tempering coils (or the pre-heater) are placed on the inlet side of the sprays, and the after-heater between the outlet of the washer and the suction eye of the fan.

The Batteries.

The first battery warms the incoming air sufficiently to ensure complete saturation, so that when further heated by the main or after-heater, it will be of the correct degree of humidity for human respiration. The discharge side of the fan is connected to the main distributing ducts, from which risers are taken, and the warmed air is discharged through white-enamelled register faces fixed about 7 ft. 6 in. above each floor-level. In the summer the heating batteries are closed down, and consequently the washed air is delightfully cool and refreshing.

Ozone Generator.

An ozone generator may be advantageously connected to the suction side of the fan, the pure ozone being mixed with the main volume of fresh air in the fan casing, to proportions of one part of ozone to two million parts of air, by volume. The effect is to give the air a peculiarly pleasing tang, and to destroy a certain proportion of possibly dangerous bacteria.

Vacuum Cleaning

The following extracts are taken from a paper read by B. H. Shaw, M.D., before the autumn meeting of the Northern and Midland Division of the Medico-Psychological Association of Great Britain and Ireland on October 26, 1922, and published in the "Journal of Mental Science" for January, 1923:

". . . investigation shows that the use of damp sawdust and tea-leaves while sweeping a large polished floor area is very ineffective as regards reduction of the microbic content of the air in the ward; that the constant use of rubbers in polishing is a danger, as after their use the air content of organisms is doubled; and, finally, that the adoption of vacuum cleaning is very desirable. As a result of using the vacuum cleaner, the atmosphere in the ward was actually purer as far as its microbic content was concerned—sixty-nine organisms being deposited on the Petri dish fifteen minutes after as against eighty three hours later, when the air was still." The paper goes on to advocate strongly the installation of a central system of vacuum extraction in mental hospitals, and lack of space alone prevents its reproduction here *in extenso*. There seems no reason whatever why this excellent recommendation has not been more widely adopted, except the one of capital expenditure; and should this be seriously considered where the hygienic conditions of a hospital are concerned?

The Turbine Principle.

There are various ways of creating the necessary vacuum. One that is frequently adopted for hospital work is on the turbine principle. The machine consists of a series of centrifugal fan wheels mounted on a common shaft, and so arranged that the air is drawn from wheel to wheel, through diffusing chambers, until such degree of suction is reached as will produce the required velocity. Fairly large pipes are used, with long sweep bends; hose connections, with flaps automatically held closed by the suction when the plant is in use but not the point in question, are provided at all convenient sweeping points on each floor. A good situation permits of the extended use of a 50 ft. length of hose in every direction. The dust and débris pass through a filter, the heavier dirt being precipitated into a removable bin, and the lighter being collected into an inverted bag. The air, with a negligible quantity of the very finest dust, is then exhausted into the open.

Correspondence

Hollow Floors and Roofs

London Building Acts (Amendment) Act, 1905: First Schedule.

To the Editor of THE ARCHITECTS' JOURNAL.

SIR,—I have to inform you that the Council, on June 23, 1925, passed the following resolution :—

That the Council, in pursuance of the powers vested in it by the First Schedule (Part III) to the London Building Acts (Amendment) Act, 1905, do approve as fire-resisting, in the case of hollow floors and hollow roofs, asbestos, burnt clay, cement mortar, or cement, concrete and steel, subject to the following conditions : (i) That all materials shall be to the satisfaction of the district surveyor, and the whole of the work shall be executed to his satisfaction; (ii) that if any blocks are of clay they shall be thoroughly burnt, free from lime and cracks and other defects; (iii) that all concrete which is less than 2 in. thick at any part, and all concrete for hollow brick floors, shall be fine concrete mixed in the proportion of at least one volume of Portland cement to three volumes of aggregate, composed of clean silicious sand and broken flint of all such sizes as will pass through a mesh three-eighths of an inch square measured in the clear; (iv) that when such aggregate is not "fully graded," i.e. when such aggregate is not so varied in size that all voids can be filled with cement paste, then the proportions shall be not less than one volume of Portland cement to two volumes of aggregate; (v) that, in the case of hollow block floors, the ends of the blocks shall be solidly jointed with cement mortar in the proportions of one volume of Portland cement to two volumes of clean sharp sand; (vi) that the concrete above the void shall be mixed in the same proportions as in the solid portions of the floor; (vii) that apart from any requirements in respect of imposed loads and working stresses : (1) The least diameter of the main tensile reinforcement shall be not less than one-quarter of an inch; (2) the least diameter of shear reinforcement (if any) shall be not less than three-sixteenths of an inch; and (3) both ends of all reinforcement shall be properly hooked to the satisfaction of the district surveyor; (viii) that when burnt clay tiles are not used as a part of the covering of the reinforcement, then the thickness of fine concrete (exclusive of any other material) covering the main tensile reinforcement shall be not less than three-quarters of an inch thick, and not less than the diameter of such main tensile reinforcement; (ix) that when burnt clay tiles are used as a part of the covering of the reinforcement, then the thickness of fine concrete covering the main tensile reinforcement shall be not less than one-half of an inch, and not less than the diameter of such main tensile reinforcement, and the thickness of the tile shall be not less than one-half of an inch; (x) that the sides and undersides of steel beams and girders shall be protected from the action of fire by fine concrete at least 2 in. thick, rodded and rammed, or 1½ in. thick trowelled round suitable mesh reinforcement, and that in all cases the concrete shall be bedded solidly against the steel, and there shall be no intervening cavity; (xi) that fillets, strips, and blocks of wood or other combustible materials shall not be embedded in the thickness of the fine concrete necessary: (1) To transmit stresses; (2) to provide protection to any steelwork or reinforcement; or (3) to comply with any of these conditions; (xii) that when the material above the void is effectively arched or haunched the thickness of the material at the crown shall be not less than 2 in.; (xiii) that when the material above the void is not effectively arched or haunched the thickness of the material above the void shall be not less than : (1) 2 in. in cases in which the width of the void is not more than 4 in.; (2) 2·5 in. in cases in which the width of the void is not more than 5 in.; (3) 3 in. in cases in which the width of the void is 6 in. and over; (xiv) that the thickness of the soffit of the voids (exclusive of any plaster) shall be not less than three-quarters of an inch; (xv) that the thickness of the material above the void added to the thickness of the soffit (exclusive of any plaster) shall be not less than 3 in.; (xvi) that the dimensions specified in the foregoing conditions shall refer only to questions of fire-resistance and resistance to impact during fires apart from any requirements in respect of imposed loads and working stresses under normal conditions of use.

Provided that this approval shall not in any way derogate from any of the powers of the Council, and shall not in any way affect the requirements of : (1) The London County Council (General Powers) Act, 1908, with respect to cubical extent of buildings; (2) the London County Council (General Powers) Act, 1909, with respect to the enclosure or encasing of pillars or girders with brickwork, terra-cotta, stone, tiles, or other incombustible materials; and (3) the regulations made under the provisions of section 23 of the London County Council (General Powers) Act, 1909, with respect to the construction of buildings wholly or partly of reinforced concrete.

G. TOPHAM FORREST, Superintending Architect.

Registration and Chief Assistants

To the Editor of THE ARCHITECTS' JOURNAL.

SIR,—What is the position of chief assistants of, say, between thirty-five and forty years of age, who, through love of their work and a desire to be industrious, have not pretended to practise on their own account, but who have, through this source, become highly competent architects, with knowledge and experience undoubtedly superior to those of many Licentiates, and even some Fellows ?

These cases have been placed before the R.I.B.A., which body, through their secretary, reply by sending leaflets of examinations, without comments on the advice sought.

Surely there are many highly qualified assistants in this position, who, at such age, feel that they are not being fairly treated when asked to sit down and wade through the almost unnecessary curriculum demanded by the R.I.B.A.

It need hardly be pointed out that these assistants have in many cases been the instruments whereby many other architects have become Fellows.

Why could not the R.I.B.A. have formed a class for these men, who, when they wish to practise, could style themselves "Chartered Architects" ? EQUITY.

Architectural Teaching

To the Editor of THE ARCHITECTS' JOURNAL.

SIR,—No subject has interested the architectural profession more within recent years than its educational policy, which interest is in itself a proof that this same policy requires adjustment in accordance with the complex interests involved.

The "school system" of training seems firmly established for better or worse. Admittedly it obviates many of the student's difficulties by guiding him to his goal. The crucial question is, Does it tend to produce better architects than those trained under the old articles system, or does it just serve as an organized cram institution for winning the student his credentials ? Certainly every architectural teacher holds, or should hold, high academic qualifications. Surely, then, one might say there is no question as to their capability of administering the knowledge which the school courses stipulate. There is none, provided architectural teachers leave themselves open-minded enough to agree that good architecture is not solely the style of architecture which they prefer. The architectural teacher must be fair and just to architecture as a whole, and not be wedded to one particular phase of it. He must guard against the tendency of students to become his disciples in style rather than good prospective architects.

ANGELO.

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