No. 5

TRAVEL REPORTS

Visit of Charing Cross Delegation to American Hospitals

KING EDWARD'S HOSPITAL FUND FOR LONDON

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TRAVEL REPORT No. 3

VISIT OF CHARING CROSS DELEGATION TO AMERICAN HOSPITALS

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Purpose of visit	To study methods of hospital design and practice in America.
Hospitals and Institutions visited	See Foreword.
Date of visit	April 6th—May 13th, 1949.

TRAVEL REPORT No. 3

Visit of Charing Cross Delegation to American Hospitals

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Report of the Visit of a Delegation from Charing Cross Hospital to certain American Hospitals

FOREWORD

We, the undersigned delegates of Charing Cross Hospital, beg leave to submit our report upon a visit to a number of hospitals and other institutions in the Eastern States of America.

It is our pleasant duty to offer our warmest thanks to the Rockefeller Foundation of New York whose friendly hospitality, extended to us through Dr. R. R. Struthers and Dr. Wade W. Oliver, afforded us the opportunity to carry out our programme in the United States.

The institutions which we were able to visit in the brief time at our disposal were as follows :—

New York University Medical School.
New York Hospital and Cornell University Medical School.
Presbyterian Hospital and Columbia University Medical School.
Roosevelt Hospital N.Y.C.
Hospital Council of New York City.
N.Y.C. Public Works Administration—Hospital Section.
Sloane-Kettering Research Laboratories.
Lederle Co. Works.
Massachusetts General Hospital, Boston.
Harvard University Medical School.
Massachusetts Institute of Technology.
Yamins Research Laboratories, Beth Israel Hospital, Boston.
Hartford Hospital, Hartford, Conn.
Strong Memorial Hospital and Rochester (N.Y.) University Medical School.
Kodak Co. Works.
George Washington University Hospital and Medical School, Washington, D.C.
Georgetown University Hospital.
Federal Security Agency, U.S. Public Health Service.
National Institute of Health, Bethesda, Maryland.
Naval Medical Centre, Bethesda.
Johns Hopkins Hospital and Medical School, Baltimore.

It is pleasant for us to recall that in all these varied institutions we received the most generous treatment, the Deans, Superintendents and senior officials freely giving their time to show us round their buildings, to answer our many questions and to discuss problems of mutual interest. We should also like to thank the many architects who so generously supplied us with the plans and other details of their buildings. So many were our hosts that it is unfortunately not possible to mention them all by name.

At the desire of the Rockefeller Foundation, the delegation from Charing Cross Hospital consisted of the Dean of the Medical School, the Senior Surgeon representing clinical studies, the Professor of Anatomy representing pre-clinical studies and a partner of the firm of architects now working on the plans of the new Charing Cross Hospital. All the members of the delegation were also working members of the planning committees for the new buildings.

When, in the spring of 1947, the King's Fund supported the visit of a delegation from Charing Cross Hospital to some of the continental hospitals, the plans for rebuilding Charing Cross were embryonic and the main study was on general lay-out and departmental co-ordination. Since then the main plans of the new hospital have largely crystallised and in the present visit to America the chief studies were on American methods of hospital construction, of communications, of equipment, of administration and housing of staff, and of medical education in its bearing on hospital structure, the chief emphasis perhaps being on labour-saving equipment. Both here and in America the problems of the supply and cost of labour in hospitals are not dissimilar.

We hold the view that the management of health is a problem which should know no national boundaries and which must be a matter for international research and experiment. We have learnt from our experiences that a new hospital of any size becomes immediately a matter of international interest wherever it is built, and it is of first importance that it should be seen by as many people as possible so that they may learn from its mistakes as well as appraise its innovations. We feel that progress can only come by such active exploration, for methods of treatment continually change and the structure of the hospital must of necessity reflect its functions.

We are keenly appreciative of the broad-minded policy of the Fund which encourages men and women of this country to go out

and meet the nationals of other states in that personal interchange of views and information upon matters of mutual interest, which is the essential basis of peace and goodwill.

H. W. C. VINES,
Dean of Medical College.

NORMAN C. LAKE,
Senior Surgeon.

W. J. HAMILTON,
Professor of Anatomy.

W. A. GUTTRIDGE,
Architect.

October, 1949.

THE REPORT

PART I

THE ORGANISATION OF HOSPITALS

SECTION A.—GENERAL NOTES

1. THE BROAD PATTERN. In the United States the hospitals fall broadly into three groups, voluntary, municipal and proprietary, the last group including for present purposes the large and numerous institutions set up by the Veterans Administration.

2. The teaching of students centres in the voluntary hospitals, though some subsidiary use is made of the material in the municipal institutions, so that our study was most concerned with the voluntary group. These hospitals are usually owned and managed by a Board of Trustees or by a University.

3. The Voluntary hospitals are financed largely by donations, by charges made to patients, and by payments made by Federal State or Municipal Authorities in respect of patients for whom they are responsible. The last payments are usually at a rate equivalent to about half the full cost of the patients' hospitalisation and the patients are graded as " ward " or " charitable " patients. In the private patient group there are two categories, the " semi-private " patient who is charged approximately the cost incurred by the hospital and the " private " patient who is charged at a higher rate.

4. In New York City hospitalisation is free at income levels below $2,500 p.a.: through insurance schemes, governmental payments, etc., ward patients contribute $8–10 a day; semi-private patients pay about $14–20 per day, being the approximate cost of maintaining and servicing a bed: while private patients are charged $20–25 per day. In many hospitals there is in addition an extensive list of charges for every type of hospital service required by the patient above his board and lodging; these cover such items as the use of the operating theatre, the X-ray and other special departments including the laboratories, blood transfusion, etc., so that the total charges to the patient may soon run into a very considerable sum which may only be partly covered by his insurance. In one hospital there was a further charge of $4 per visit to the out-patient department. We felt it to be possible that in the middle income range there might be a large group of population to whom full and adequate medical care might be

economically difficult and who might, in times of financial stringency, take the risk of making no proper provision against illness.

5. HOSPITAL COSTS. The cost to the hospital of maintaining a bed is now nearing $20 a day and is still rising. Hospital income on the other hand is tending to sag or at least to rise less rapidly than costs and at one hospital we were told that in the past year there had been a loss of a quarter of a million dollars. The general trend seems to be that hospitals are approaching financial difficulties and this factor is playing some part in the structure and equipment of the newer institutions. There is as yet no general system of maintenance grants from governmental sources to the voluntary hospitals, but the federal government is empowered to contribute up to one-third of the capital cost of new hospitals. This sum passes to the board of management without any condition of control by the government in the administration of the hospital, but before the grant is made the federal government requires proof (1) that the community asking for the hospital can provide the remaining two-thirds of its cost ; (2) that it can maintain the hospital when built, and (3) that a hospital of the projected size is an essential need in the particular locality. The plans are also subject to scrutiny by the Public Health Service and are required to comply with their standards. These determine certain fundamental points, such as (*a*) nursing units shall not contain more than 35 beds : (*b*) the area per bed in multiple-bed wards shall be 80 feet super and in single rooms 100 feet super ; (*c*) no sickroom may have more than four beds, etc. There is therefore some central guidance exercised over the siting of hospitals in relation to community needs, and over the size and type of building to be erected. At the present time the chief concentration is upon the provision of small hospitals of 50–200 beds in the less populated areas rather than upon large institutions of 500–1,000 beds.

6. FUNCTIONAL GROUPING. The functional grouping of hospitals on a regional plan is being attempted in the larger cities and in New York City this problem has been entrusted to the Hospital Council of Greater New York. We had a most interesting talk with Dr. John Pastore, the executive director of the Council, who explained to us the Master Plan which the Council has formulated for the city, covering a population of 8,000,000. While it is not possible here to discuss the plan in detail, there are certain points of interest which might be mentioned.

(i) Small hospitals of under 200 beds are considered to be uneconomic.

(ii) Special hospitals of all types, including those for maternity or for infectious diseases, are undesirable ; specialties should be merged into the general hospitals so that every patient may have the benefit of full ancillary services.

(iii) General hospitals should have psychiatric and tuberculosis units not exceeding 50 beds for appropriate cases.

(iv) Convalescent beds should be in general hospitals, not in separate institutions.

(v) All hospitals should be good enough to provide adequate residency training for young doctors.

7. The functional grouping and change of use of hospitals is being carried out by voluntary agreement and with some success. The plan envisages three grades of hospital: (1) the central hospital of 750–1,000 beds providing for all types of medical service together with undergraduate training; (2) the regional hospital of 650–750 beds supplying all services except neuro-surgery, thoracic and plastic surgery and ophthalmology; and (3) the community hospital of 200–400 beds providing the basic services of general medicine and surgery, obstetrics and pædiatrics.

8 THE CHRONIC SICK. As in this country, the care of the chronic sick is a major problem, and there is at present the same danger that exists here, namely, that beds for acute cases may become sterilised by the admission of chronic cases for some acute phase of their condition. At Bellevue Hospital nearly 60 per cent. of the acute beds had become occupied by chronic cases. In a primarily acute hospital such a state of affairs leads also to wastage of nursing staff as the chronic sick are nursed by practical nurses and ward attendants rather than by fully qualified staff. In New York City it is proposed to build 1,000 beds for " acute " chronic sick, 2,000 beds for the usual type of case, and 1,000 beds for terminal cases; it is thought that this provision will meet the problem only in part.

9. PSYCHIATRIC REQUIREMENTS. Psychiatric treatment is another particular problem in New York City, where the incidence of mental instability seems very high. While it is estimated that the total bed requirement for the City is about 16 beds per 1,000 of population covering all general and special conditions, no less than eight of these beds are assigned to psychiatry.

SECTION B.—NURSING

10. SHORTAGE. Shortage of fully qualified nursing staff is nearly as acute in the United States as it is in this country and many expedients are being tried to overcome it. Midwives as we know them do not exist, nurses spending three months in the Maternity Department in the course of their routine training. Maternity hospitals have largely disappeared and as over 90 per cent. of all deliveries occur in hospital, domiciliary midwifery has also practically vanished. Hence there is not that major division of nursing personnel which exists here.

The nursing service requires about 60,000 recruits annually and it is realised that if all are to be fully trained, the target is an impossible one. In the small number of hospitals which we visited, we found that 150 beds had been closed in one and 120 beds in another from lack of nursing staff.

11. NURSING GRADES. The grades of nursing staff which have been developed to meet the need are roughly these :—

(i) *Fully-trained Nurses.* These have a minimum of three years training for a diploma or the training may be prolonged to five years for a university degree. The former group is paid $200 per month ; most of the latter group go into administrative posts.

(ii) *Practical Nurses.* For these a minimum of one year's training is required by law. They are trained only in parts of the full curriculum and are paid $150 per month.

(iii) *Nursing Attendants.* These are given 3–6 weeks classroom training and learn the rest of their duties on the wards.

(iv) *Nursing Orderlies.*

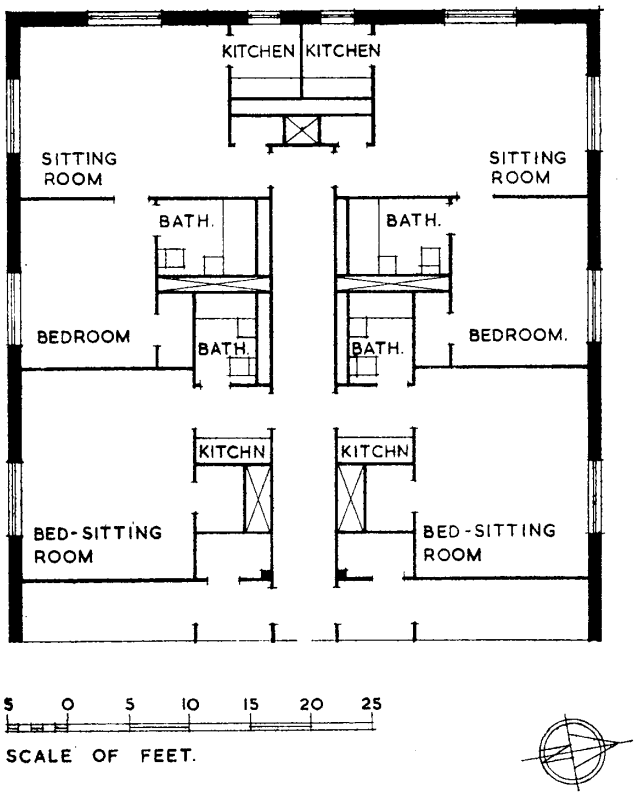
The present aim is to make up the required number of recruits by 20,000 fully-trained nurses and 40,000 practical nurses.

12. TRAINING. Much effort is made to ensure that the nurse does in fact tend the sick and does not spend a lot of her time being a secretary or a messenger. In addition to the nurses, a ward nursing-team may contain a dietitian, a floor secretary, a housekeeper, kitchen maids and cleaners. Methods of easy communication and of internal mechanical transport have been highly developed with the same end in view.

13. Some modification of training is being introduced because in a recent " job-analysis " it was shown that on the average a nurse in training does not return to the hospital in services rendered the equivalent of the cost of her training. The present idea is therefore to put the cost of a three-year period of theoretical training on to the universities after which she will have a year's practical training in the hospital. While the hospital may save a little money in this way, it may be asked whether the standard of so essentially practical a subject as nursing will be materially improved. Standards of training appear to vary very widely and it has been stated that two-thirds of the nurses trained for three years at small hospitals, often show a standard of competence only equivalent to a university-trained nurse of one year's standing.

14. NURSES' HOMES. Nurses may usually live " in " or " out " and for the former, hostel accommodation is provided. We saw a

new hostel for 500 student nurses, housed in single rooms. There was a tea-kitchen between every two floors and four baths and two showers for every twenty rooms. In addition to the large common sitting-rooms, there were several small lounges on the ground floor where nurses could have some privacy when entertaining their friends.



TYPICAL STAFF NURSES' ACCOMMODATION
THE PRESBYTERIAN HOSPITAL, NEW YORK CITY
(Voorhees, Walker, Foley and Smith, Architects)

Feeding was on the cafeteria system and in the basement there was a range of laundry rooms, containing electric washing machines, wring-driers, mangles and ironing boards, the nurses providing their own irons. Power was obtained for the machines by putting a coin in a slot. The rooms were furnished but nurses provided their own linen, cutlery and crockery; the hire of rooms was on the hotel system. In one hospital 50 per cent. of the nurses lived in and were charged $60 a month for complete maintenance.

15. In another case housing was also provided for the senior administrative and executive staff. A charge of $60 a month would provide a flatlet containing two large rooms, kitchenette, bathroom

and toilet furnished by the hospital. Prices descended to about $35 per month for one room with toilet accessories. In this building there were 184 apartments.

16. Economy of Trained Staff. The division of nurses into qualified and practical nurses is leading to an increase in the size of the nursing unit from 25 beds to 35 or 40 beds, though the maximum size of the sickroom remains at four beds. The general shortage of personnel for patient-care has also resulted in a much greater development of mechanical labour saving devices than is seen in this country for it is a tenet that any machine which is an efficient saver of man-power is worth while and will pay for itself in due time. We feel that this country is behind-hand in this matter because a high initial cost of installation too often acts as a deterrent before comparative maintenance costs are properly investigated.

Section C.—Medical Staff

17. In the voluntary hospitals the senior medical staff is unpaid except in the case of certain whole-time specialists such as pathologists, radiologists, etc. As the hospitals are so largely financed by the patients who use their rooms, it is to the advantage of the hospital to have a large number of local doctors on their staffs. It is also a general policy that as many general practitioners as possible should have some defined hospital contacts. In New York City about 60 per cent. of the doctors are on the staff of one hospital or another, a percentage which was thought to be too low; at one hospital we learnt that there were between four and five hundred doctors nominally on the staff. These massive staffs seem usually to be divided into grades. The "active staff" are those who are allowed the full use of all facilities in the hospital; in the teaching hospitals this group is usually headed by the medical professoriat of the associated University. Next comes the "attending staff" on a somewhat lower plane academically, and finally the "courtesy staff" who may bring private cases into the hospital but the treatment, especially surgery, is under the supervision of the active staff.

18. In the teaching hospitals the listed medical staff was even larger because it was swollen by including a large number of research and teaching posts in wide variety. In a non-teaching hospital of 810 beds serving a population of 300,000 people, there was a listed staff of 170 seniors and 67 interns, a considerable excess over the establishment for a similar hospital in this country. In the non-teaching hospitals the active staff seemed to be appointed by the Board of Management on the advice of some form of medical committee but the method of acceptance of the lower grades seemed to vary and to be less defined.

PART II

PLANNING, STRUCTURE AND EQUIPMENT

SECTION A.—GENERAL

19. PLANNING. While the vertical hospital of over ten floors rather dominates the picture among existing hospitals, there is recognition, gained by experience, that too much height leads to bottle-necks and administrative difficulties on the upper floors, and wherever the cost per foot of the site is not too great, the tendency is to reduce the height of the building. At the same time large institutions of 1,000 beds or over do not seem to be contemplated for future building and the accepted optimum seems to be a building of 10–12 floors and 800 beds.

20. As the finance of the voluntary hospital and the policy of encouraging doctor-hospital contacts on the broadest basis both centre around the admission of private and semi-private cases, the general plan of the hospital is similar to that of the European hospitals, the private patients occupying the upper floors. As they are housed in single or double rooms, usually each with a toilet and bath, the initial structural costs are high. Building costs of three hospitals opened within the last two years varied between $0.95 and $1.70 per foot cube or $10,000 to $15,000 per bed.

21. We were also able to discuss the blue-print plans of two hospitals of special types. One of these was a teaching hospital and medical school containing 650 beds to be built on four acres : its estimated cost was $22 million or about $34,000 per bed. The other was a federally-sponsored research hospital of 500 beds of an estimated cost of $35 million or $70,000 per bed and $2.00 per foot cube, a hospital of highly specialised function and structure which will be referred to later. The costs of these five hospitals demonstrate the wide range of capital expenditure per bed as specialisation of function increases.

22. The most recent hospitals show an almost standardised form of lay-out, typically :—

Basement. Kitchen ; laundry ; pharmacy ; central stores.
Ground Floor. Administration ; out-patient clinics ; staff-cafeterias ; X-ray department.
First Floor. Out-patient clinics ; medical wards.
Second Floor. Maternity.
Third Floor. Surgical operating suite ; central supply.
Fourth Floor. Surgical wards.
Fifth and Upper Floors. Semi-private patients with private patients on the top floors.

Sick-rooms were commonly placed on both sides of the central corridor and there was a complete disregard for natural cross-ventilation, even in those hospitals which did not have forced ventilation. Lavatories were generally sited on the internal wall without natural light or ventilation, a common practice in hotels and other buildings. These features result in a considerable saving of space and in compactness of planning.

23. CONSTRUCTION. No very new ideas in construction were seen, the conventional steel frame and hollow tile concrete floor being the common form. No special provision for pipe ducts was made in the basic construction of the buildings ; they were formed in breeze blocks or expanded metal and plaster, later in the construction programme. General points noted regarding construction and finishes were as follows :—

(i) *Walls and Partitions.* The most common facing material was brick, but stone slab facing is also employed. In some buildings the external walls were of solid brick while in others only the outer facings were brick and the inner skin was completed with cinder-blocks for reasons of economy : these blocks are used almost universally for internal partitions. Architects stated that they had no objections to their use as they were never known to affect plaster or other finishes adversely, as is so often the case with our breeze blocks. Terra-cotta partition blocks with a glazed finish were also extensively used ; owing to slight irregularities of shape a wide cement joint was necessary, a slight drawback in hospitals where porous dust-collecting surfaces are undesirable. A second drawback is that if the block gets badly damaged, it is more difficult to replace than a wall tile, especially if it is plastered on the reverse side. A few steel partitions were seen but these are not widely used in hospitals owing to their high cost.

(ii) *Ceilings.* Practically all ceilings in patient-areas are firred down from the structural soffit to form a false ceiling carrying the horizontal pipes and ventilation ducts. The use of acoustic ceiling tiles is almost universal and in some hospitals every room is so treated. When used as a false ceiling the tiles have the advantage of being easily removable to get at the pipes above. In one hospital a soft acoustic plaster had been used ; this has the disadvantage of not being easily removable if pipes run above it and it inevitably becomes dented by casual experiments to test its softness. The use of sound-absorbent ceilings throughout a hospital is very desirable and we were impressed by the quietness of the ward units as compared with the hospitals in this country.

(iii) *Floors.* Floor finishes were almost exclusively in asphalte tile except in lavatories, kitchens, etc. This standardisation of

the type of flooring was so striking that all the architects we met were asked the reasons ; all gave the same answer—that the cost was much below that of rubber or linoleum. In a " samples exhibition " at the Institute of Architects in New York only one or two firms offered alternatives to the asphalte tile, which is obtainable in a variety of colours ; a " grease-proof " tile is also obtainable. In kitchens the usual floor finish was quarry tiles laid with a wide joint in cement with carborundum or bitumen. This not only gave a pleasant appearance but reduced the slipperiness of the tiles. In lavatories, utility and sterilising rooms mosaic tiles were most commonly used. These were also seen in operating theatres, though here terrazzo was more usual.

(iv) *Roofs.* These are often finished with rolls of bitumen felt laid in three layers and given a final coat of hot bitumen ; on top of this there is an insulating cover of peanut gravel or thermal tiles. Where roofs are to be used as terraces they are often finished with quarry tiles.

(v) *Windows.* The double hung sash-window is surprisingly popular and it was seen both in metal and wood. One hospital, only completed a year ago, had these windows throughout irrespective of the use of the rooms. Purpose-made metal casement windows were only seen in two hospitals ; in one of these the metal was aluminium and had given good service for ten years.

(vi) *Doors.* Metal trim is used universally for internal doors, almost always without any architrave to cover the joint between metal and plaster. Doors themselves are invariably flush without spyholes. Metal doors are sometimes used.

(vii) *Staircases.* These are used merely as fire-escapes and are consequently finished very cheaply. They are always of metal construction and they generally have only a cement finish to treads and landings ; their walls are often left unplastered. Usually they are placed internally on plan without natural light or ventilation.

24. Reducing Building Costs. In all building the cost of labour is by far the greatest expense and where funds are short, various devices are used to minimise costs. Radiators are used almost universally in place of ceiling panel-heating as they are much cheaper to install. In laboratories and rooms outside the patient-area, walls are often finished in spray-painted breeze blocks instead of plaster while the service pipes in laboratories are usually not enclosed, the services for the upper room being carried across the ceiling of the room below. Though the effect is unsightly and the pipes catch the dust, it is claimed that the efficiency of the laboratory is not diminished,

that installation costs are lower and that there is free access for maintenance purposes. Complaints of dirt falling from the pipes, which do not appear to be kept clean, are however made by laboratory workers, more especially bacteriologists.

25. Another factor which makes a large difference to the total cube of the building is the height of the sickrooms. By our standards these were generally low averaging about nine feet in the clear. In one new hospital there was only 8 feet 2 inches in the clear and in another, not yet built, it was planned to have the rooms 9 feet in the clear with ceiling panel heating, so that allowing for the height of the bed, the patient might well be uncomfortably warm. In a " mock-up " of a trial ward for the same hospital we also noted the persistence of the very large window covering the greater part of the south side of the sickroom ; above it was a concrete " eye-brow " designed to cut off part of the light and it was estimated that the total cost of these projections in the whole building would be about that of an additional floor and a half. We do not feel that in acute hospitals patients like too much light or that it benefits them and, with the length of stay in hospital diminishing, unduly large windows may be a costly mistake.

26. LENGTH OF STAY AND PLANNING. The length of the patients' stay in hospital is itself a matter of structural significance. In surgery and obstetrics early ambulation is the popular treatment in America at the present time, the patient getting up within 24–48 hours after a major operation or childbirth, six to seven days being the average stay in hospital in the latter case. This method of treatment requires a larger provision of toilets and bathrooms and even in the most recent hospitals the superintendents were anxiously seeking additional space for these facilities. The need for ample lavatory accommodation is further increased by the mixing of sexes in the nursing units, a common practice which is facilitated by the small sick rooms. We could not help feeling that with the present high costs of hospitalisation the patient would be likely to co-operate willingly in his early ambulation, but that if charges were lower or absent, maternity patients in particular might seek a longer period of rest. Admittedly early ambulation increases the turn-over of beds materially but it is very difficult to judge of its real benefit to the patient and to be certain that it is a permanent and not a temporary phase in treatment.

27. AMENITIES FOR LONG STAY CASES. By contrast, when the stay in hospital is unduly long to meet the needs of research, every attempt is made to make that stay as attractive as possible. At the proposed Research Hospital of the National Institute of Health where long term study of such conditions as cardiovascular disease, neuropsychiatry and cancer will be carried out, the hospital will

contain a cinema, shops, a beauty parlour, a bank, a post office, a barber's shop, a chapel and an auditorium to seat five hundred. The sick room will be wired for three choices of radio and conduited for television, together with two-way nurse-patient telephones. One certainly admires this directness of purpose to attain a desired end.

28. FLEXIBILITY. "Flexibility" of building is something easy to talk about and very difficult to attain; usually it looms large in the blue print stage and then gradually disappears from conversation. In the "blue-print" hospitals we met this idea. In one case flexibility was to be attained by standardisation of fenestration and types of service; by refraining from allocating any ward space to specific case-types except maternity and psychiatry, and by having 50–60 per cent. of single rooms in the nursing unit. Every patient would be first admitted to a single room and then as he improves he would be moved successively to a two-bed and a four-bed room. It was stated that a further degree of flexibility would be obtained by doubling the beds in the single rooms when necessity arose; in this event, however, the area per patient would be well below our standards.

29. In the other hospital flexibility of a minor degree was to be obtained by separating two-bed rooms with removable metal partitions so that a four-bed room could be easily made. The use of two-bed sickrooms was common in spite of their obvious psychological disadvantages. The building of standard services into every space between standard windows, as is done at the Kantonsspital, Zurich, was not contemplated though it is in fact the only way in which real flexibility can be attained.

30. SERVICE SUPPLY. In view of the shortage of nursing and domestic staff, domestic equipment and methods of service supply have been highly developed in America, and we could well follow their example. The use of the pneumatic tube system for the transmission of records, messages, small pieces of equipment or specimens, is usual and in one new hospital where it had been omitted on the ground of high initial cost, its absence was loudly regretted. Central vacuum cleaning with "plug-in" tubes on the floors was used in several hospitals; we were told that bacteria had been shown to be driven through the fabric dust-bag of the individual type of machine. Paging is almost universally by vocal means, bells, buzzers, and lights having disappeared. In some hospitals there is two-way communication between the patient and the nurses station. Service lifts are freely used and in one hospital there was a continuous-bucket lift which automatically delivered goods from the pharmacy and from central supply to the required floors. In four new hospitals passenger lifts were provided in the varying proportions of 1 : 50, 1 : 80, 1 : 80 and 1 : 100 beds: in the plans issued by the U.S. Public Health Department the standard ratio appears to be one elevator to fifty beds.

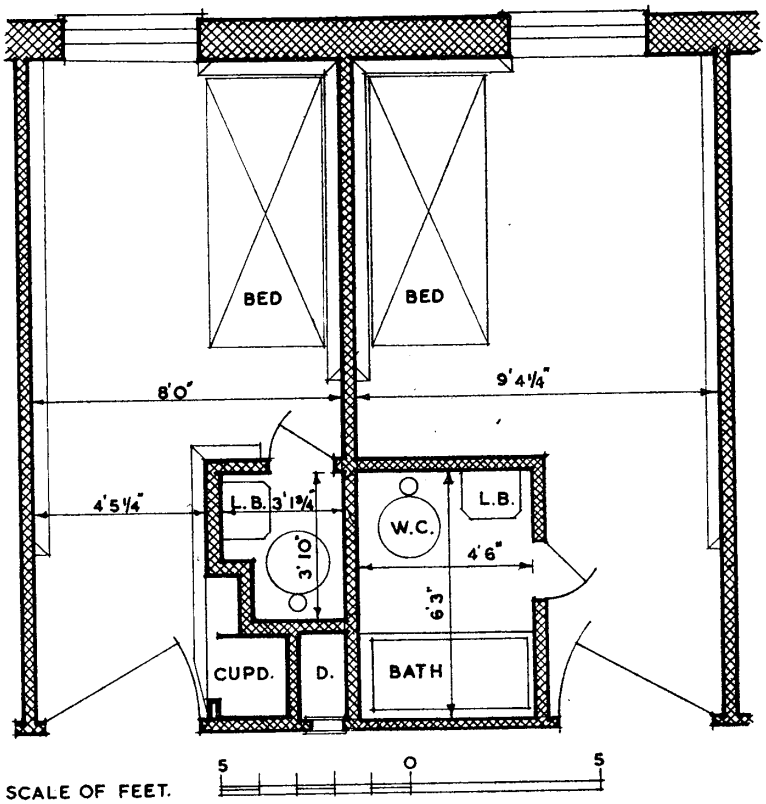
31. CENTRAL SUPPLY. " Central Supply " is now a usual hospital service and consists of the central sterilisation plant housed in a large room generally on one of the upper floors. In this department sterile solutions for injection are made up and dressing sets, theatre packs, gloves, syringes, etc., are sterilised and distributed. Metal drums are now almost wholly replaced by packs for theatre use, each pack containing the necessary linen, gowns, swabs, etc., for one operation. Gloves are washed, dried and powdered, in one case by an automatic " tumbler " machine, and then are autoclaved either for ten minutes at 25 lbs. or for fifteen minutes at 15 lbs. : we did not see free steam used for this purpose. Usually there was only one supply department of this type but in one hospital the maternity floor had an additional one for itself. We felt that this was an essential department in a modern hospital.

32. OXYGEN SYSTEMS. Oxygen is used more generously in America than in this country and the handling of the large cylinders required is considered to be wasteful of time and manpower. One hospital made its own oxygen ; at another oxygen was supplied commercially in tanks on a trolley. The tank was connected up to the piping system outside the hospital buildings and was renewed every two days. In another hospital it was planned actually to put in piping owing to the trouble of handling cylinders. There was much variation in the degree to which piped oxygen was distributed : the largest distribution was to 45 per cent. of the total beds and the least was limited to the cots for premature infants. Generally oxygen and suction were piped to two or three single rooms in each ward unit, to theatres, treatment rooms and recovery rooms where these were present.

33. WARD UNITS. The ward unit varied from 40 to 58 beds split into two equal nursing units. These might be arranged, for instance, as 3x1 : 1x2 : and 6x4 : bed rooms and would be nursed by a head nurse, an assistant head nurse, ten staff nurses, two nursing attendants, a floor clerk and one or more male or female orderlies. The maximum of four beds in a sickroom arises indirectly through the semi-private patients who are usually those insured under the Blue Cross or similar schemes. These bodies stipulate that their beneficiaries shall not be in rooms containing more than four beds and in all recent hospitals this figure is not exceeded because it was considered best to plan the non-paying accommodation on the same principle so as to retain sufficient flexibility of the nursing units. In one of the older hospitals we saw large wards of the Rigg's type taking sixteen beds. One error that requires correction in these small sickrooms of four beds or less is that the usual high centre light produces too much glare and some other form of lighting should be developed.

[*For plan of Ward Unit, Hartford Hospital, Connecticut, see inside back cover.*]

34. SINGLE ROOMS. The single rooms for private patients have as a rule each its own sanitary annexe opening directly out of the bedroom and placed on the internal wall saving much space. A spray fitting was attached to the W.C., the bedpan being emptied and cleaned there. In one hospital, beds in single rooms were placed



STRONG MEMORIAL HOSPITAL, ROCHESTER, N.Y.
PLAN OF PRIVATE PATIENTS' ROOMS SHOWING MINIMUM SIZES OF TOILET ACCOMMODATION
(Kaelber and Waasdorp, Architects)

parallel with the partition walls and for patients not requiring care in bed, divan beds were used. American beds are now being built seven feet long owing to the increase in the average height of the population. In the same hospital the chairs, window frames and the venetian blinds of the rooms were of aluminium.

35. FOOD SUPPLY. In many cases the unit of fifty beds or more was served from a single ward kitchen and in one or two hospitals we were told of complaints about cold food, clearly because the service of so large a number from one kitchen was too slow. The general

practice was for the food to come from the kitchens in electrically heated wagons to the ward kitchen where it was broken down into servings and distributed on unheated tray-trolleys. The patient could exercise no choice as to quantity and no selection was offered. One new hospital had started by offering an alternative menu but lack of personnel terminated the experiment. The practice, formulated by us, of bedside service from the bulk trolley created interest and was thought to be the better plan as it helps to maintain the patient's individuality. There is often a " dietitian " to each ward unit or floor who, in some cases, was entirely responsible with her staff for the service of food, the nursing staff taking no part in it.

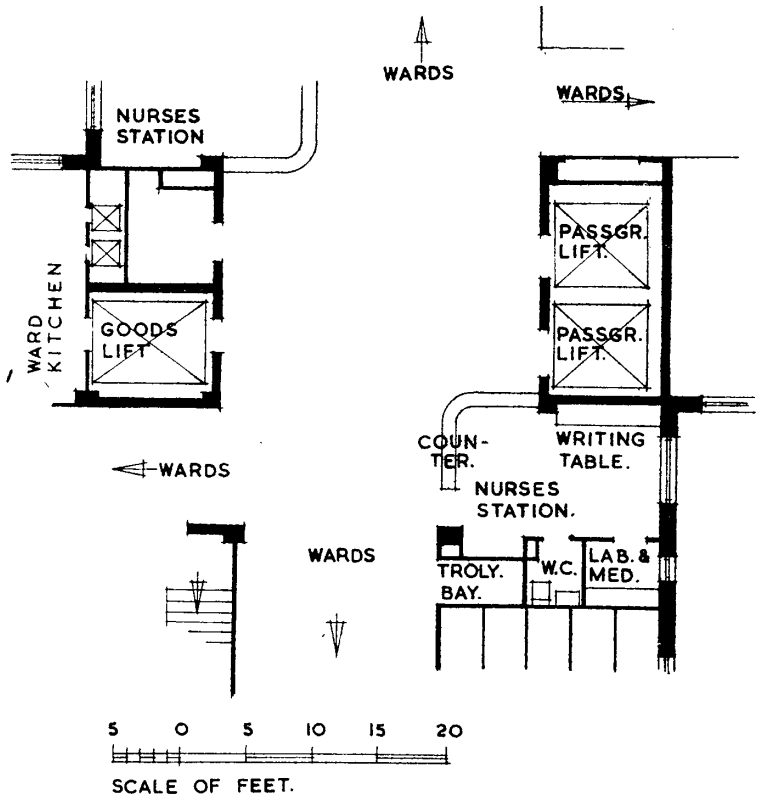
36. GARBAGE DISPOSAL. Garbage disposal from the ward kitchens was a point of special inquiry. It is a common practice for ward units to carry two chutes, one for dirty linen and one for dry trash but we saw no chutes used for wet food wastes. These are usually put into bins, collected by a porter and removed by lift. The two " blue-print " hospitals suggested two new methods. In one the garbage was to be put into strong paper bags and dropped into an opening in the flue of a gas-fired combustion chamber : the bags would be burnt, probably at night, and it was assumed that the heat and gases would sterilise the flue. In the other hospital there was to be a garbage-grinder in each ward kitchen. These machines triturate the garbage into a soupy consistency and it is then flushed down the drain to the sewer. We saw a large machine in operation for a hospital kitchen : it was supervised by one man who constantly searched the garbage for cutlery, tins, etc., and it was not a popular occupation. In many States the existing building codes forbid the use of garbage grinders. In this country at any rate, it would seem that apart from manual labour, there is no adequate method of removing these wastes from the ward kitchens.

37. DISH WASHING. Dish-washing machines of suitable size were very widely used in the ward kitchens, for in most cases the washing-up was done on the wards and not centrally. They were usually built in as an integral part of the stainless steel draining board to the sink. While expensive to install, with proper servicing they should last some twenty years ; they save labour, are easy to work and deliver the china clean and practically dry and, with some patterns, reasonably sterile. This is done by using two temperature levels, washing at 140° F. and the final rinse at 180° F. or higher if required. We think such a fitting is highly desirable not only because it saves labour but because the utensils used by any sick person should be sterilised after use.

38. The china used on the wards was thick and heavy, perhaps to minimise breakages. We did not see any use being made of plastic or stainless steel utensils. Other useful devices in the ward kitchens

were automatic egg-boilers set with a timing switch, toastmaking machines and a variety of refrigerators including space for deep-frozen foods.

39. In discussing the ward food service with the Public Health Authority, we found that there was a strong advocacy of the principle that washing up should be done in a room and by a staff separate from the place and personnel concerned with the preparation and service of food. Unless there are frequent occasions when washing up and service are concurrent, it is a little difficult to see the reason for this suggestion.



NURSES' STATION

GEORGE WASHINGTON UNIVERSITY HOSPITAL, WASHINGTON, D.C.

(Faulkner, Kingsbury and Stenhouse, Architects)

40. NURSES' DUTY STATIONS. Nurses' stations were a usual feature of the ward layout. They generally consisted of an open counter at the front where the duty nurse was stationed with a considerable recessed area behind used for charting by the nurses

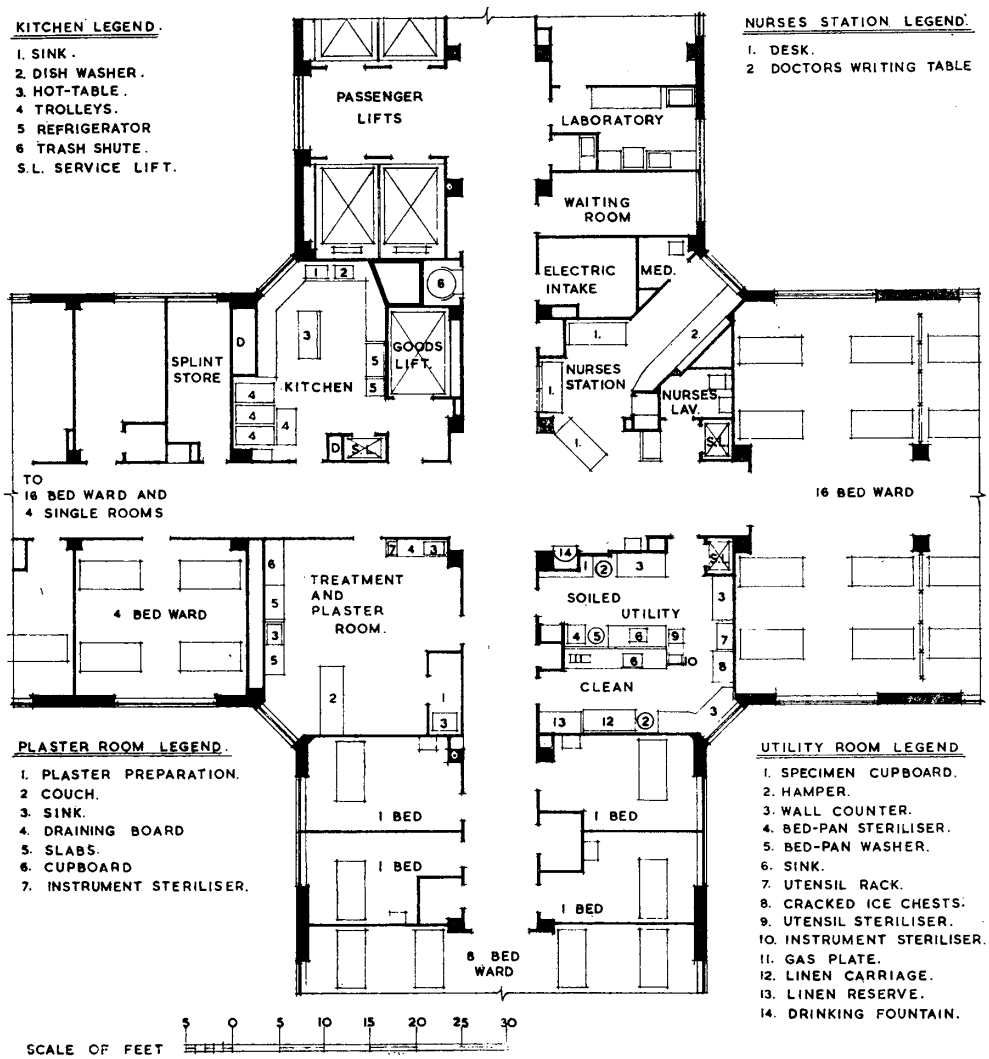
and for note-writing by interns and students. The medicine cupboard was usually in this area and the paging loud-speaker. The patients' notes were also kept here either in a rack or a trolley. At one teaching hospital the ward laboratory was placed next to the nurses' station and combined the functions of a students' laboratory and writing room : it was fitted with X-ray viewing boxes and the patients' notes rack was of a revolving pattern common to the laboratory and the nurses' station.

41. There seemed to be some tendency for the open nurses' station to become a general information bureau at which one passed the time of day : in some hospitals this was prevented to some extent by having a floor secretary for each ward unit : in another hospital the nurses' station was fully enclosed by a projecting " shop-window " becoming in fact a duty room. Apart from this question of a barrier there is little functional difference between an open nurses' station and a closed duty room.

42. Lavatory and cloakroom accommodation for nurses is usually combined in the nurses' station : occasionally there is a teaching room for nurses on the ward floor. In distinction from the common continental practice nurses do not eat or sleep on their ward units. In the Research Hospital at the National Institute of Health it is proposed to build a lounge or rest room for nurses on each floor.

43. SLUICE ROOMS. A change of practice seems to be in progress in the use of the utility or sluice room. Formerly this had a " dirty " side where bed pans, etc., were washed and cleaned mechanically, and a " clean " side where equipment was stored when clean. The present tendency is to build separate recesses with forced ventilation for cleaning bedpans and when cleaned they are kept in a compartment at the bottom of the patient's bed-locker : it is the practice only to sterilise bedpans between patients, if at all. Having got rid of the bedpans, the utility room is used for washing such things as mackintosh sheets and chiefly for sterilising. It is often not physically divided into a clean and a dirty side : it is commonly used for making up trolleys for dressings, etc., and the treatment room frequently opens off it.

44. TREATMENT ROOMS. Treatment rooms are generally provided on the ward unit and are used for small operations, dressings, etc. : they may be fitted with an operating table and supplied with suction and oxygen. While nurses still make up dressing trolleys and sterilise syringes in the utility room or tray room, the conception for the future is that all such materials required on the wards will come from central supply and the ward nurse will cease to be responsible for them. At present everything seems to be autoclaved rather than boiled and the utility room usually contains a small autoclave.

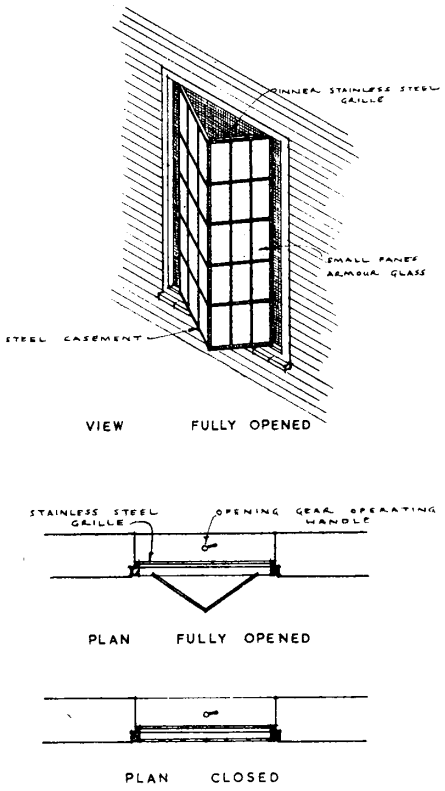


KITCHEN, UTILITY ROOM, NURSES' STATION AND PLASTER ROOM FOR 52-BED UNIT

GEORGE ROBERT WHITE MEMORIAL BUILDING
MASSACHUSETTS GENERAL HOSPITAL, BOSTON

(Coolidge, Shepley, Bullfinch and Abbott, Architects)

45. Special fittings of note in an acute psychiatric ward were windows of limited movement made of Herculite unbreakable glass and covered internally with a fine-mesh screen of stainless steel wire.



PSYCHIATRIC WARD WINDOW

The necessity of preventing the admission of ordinary glass in any form to the ward was impressed upon us. Each room was fitted with a special alarm for the use of nurses if they were in difficulties.

46. OPERATING THEATRES. Operating theatre suites were generally sited on the floor below the surgical wards, usually the second or third in contrast to the common position on the top floor in this country. They were invariably arranged horizontally along a corridor or in a cul-de-sac. In some hospitals both major and minor theatres were provided but we were told in one place that the minor theatres were not used because of an inferiority complex about them on the part of the staff.

47. The ratio of operating theatres to total beds showed wide variation in different hospitals. In the older ones the established

ratio of one theatre per hundred beds usually prevailed but in the new ones this figure was clearly regarded as being too low. In four new hospitals the ratio theatres/beds was 1 : 63, 1 : 60, 1 : 40.5 and 1 : 29. In the type plans issued by the Public Health Department the ratio seems to be 1 : 50.

48. The operating theatres did not show any very important new features ; mostly they were air conditioned with high humidification. There is great concern, fathered largely by the insurance companies, over the danger of explosion through static discharges, so that many expensive precautions have to be taken such as special graphite-containing floor finishes, special non-sparking mercury switches and high humidification. In one hospital the floor had been made so conductive that it tended to attract any electric leakage in the area of the theatre. No regard is paid to the use of daylight and windows may not even be put in where access to natural lighting is possible. The fixed scyalitic lamp over the table is giving place to one which is movable on rails so that a smaller theatre is possible : in two new hospitals the area of the theatres was less than 300 feet super. All movable equipment is on wheels and stainless steel is the metal of choice.

49. Observation of operative procedures by students was, in the best examples, provided for by sealing the top of the theatre with sloping glass panels round which the students sat so that they were nearly over the table. A two-way microphone gave contact between student and surgeon and in one place low-power binoculars were provided. By contrast, open galleries placed too low down were also seen in quite new hospitals. Television was not generally installed as a routine means of observation.

50. Instruments were kept in the operating suite and were not handled by central supply. In two hospitals there was a mechanical instrument washer much like a small dishwasher ; it was said not to harm the instruments and to be efficient. Calgonite was used in the machine, a commercial preparation used in ordinary dishwashers for loosening precipitated or dried protein matter. Other useful fittings were :—

(i) Scrub-up sinks in stainless steel which took up much less room than the porcelain pattern.

(ii) A stainless-steel bin in the theatre to receive swabs, linen, etc., which had not been used and required re-sterilisation without re-laundering.

(iii) A cystoscopy table with the X-ray unit built on to a steel column carried on the table-frame to give a constant focus. The apparatus had a local transformer with the H.T. mains carried in the ceiling.

51. Anæsthetic rooms were few; sometimes there was a moderate sized room where a number of patients could be anæsthetised or alternatively, after pre-medication in the ward, the patient was put straight on the table where induction was carried out.

52. RECOVERY ROOMS. Recovery rooms are coming into use as a necessary part of the operating suite, though one of the newest hospitals had none. American surgeons operate rather more slowly than the English and a high percentage of cases are given some form of intravenous solution postoperatively, matters which make the provision of recovery rooms rather essential. In one hospital the recovery room held about fifteen cases and was staffed by three fully-trained nurses from 7 a.m. to 4 p.m.: no patient had as yet been kept in it overnight. The room was supplied with multiple points for piped oxygen and suction, and a sluice room and a utility room opened off it. All operation cases were held in it until they had completely come round from the anæsthetic. In another hospital there was a six-bed recovery room and in a third a four-bed room: the last was too small and its equipment was inadequate.

[*For plan of Johns Hopkins Hospital Operating Suite, see inside back cover.*]

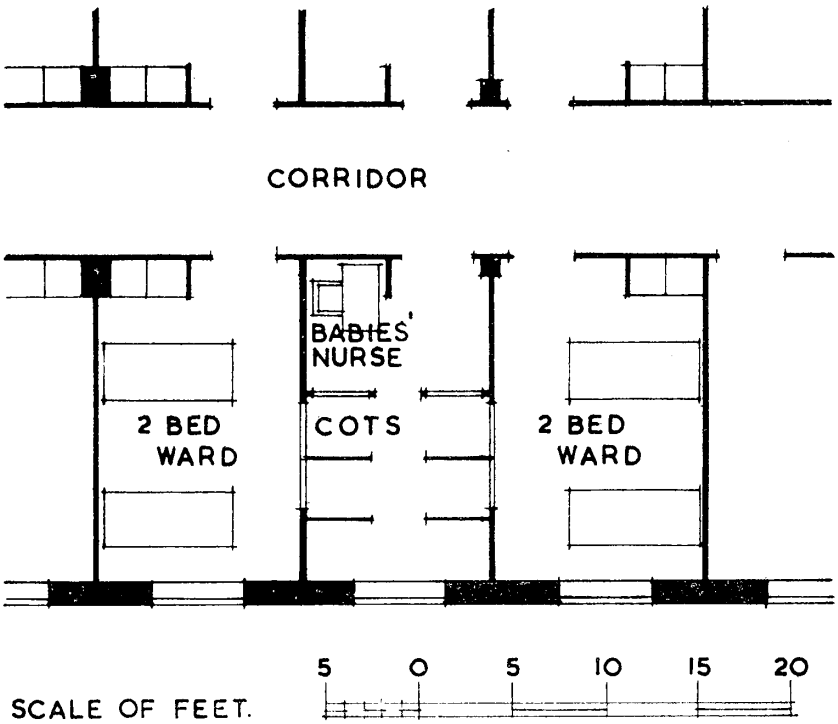
SECTION B.—MATERNITY

53. DELIVERY UNITS. Delivery units, like the operating theatres, were usually arranged horizontally on one floor: generally there were four or five delivery rooms, one being fitted for sections, fed by from seven to sixteen first stage rooms. Special rooms for suspect cases were sometimes provided. The lying-in period is generally short (5–7 days) and the babies are usually separated from their mothers into small nurseries; these may hold four, six or eight cribs disposed around a central chart- and treatment-room. The babies may have a separate nursing staff from their mothers, and it is the practice to sponge and oil the babies rather than to bathe them totally. Formula rooms on the usual plan of a clean and dirty side may either be sited near the main kitchen or on the maternity block, the latter being the slightly commoner practice. For suspect babies small isolation nurseries are provided.

54. The trolley-cabinet type of bassinette was in common use, each infant having a complete toilet outfit and linen, etc., to itself. In one hospital each infant's clothing, etc., was separately laundered and returned to its bassinette without going into any common pool. On some of the delivery units bedrooms were provided for the internes.

55. PREMATURE INFANTS. Premature infants were kept in incubator cots, the Armstrong pattern being most commonly used;

the premature nurseries were air-conditioned and supplied with piped oxygen but were not specially heated. The pædiatrician was usually in charge of the infants. In one hospital with 450–500 deliveries per month, eleven incubator cots were provided for normal cases with an additional one in the isolation unit.



GEORGE WASHINGTON UNIVERSITY HOSPITAL, WASHINGTON, D.C.

SEMI-PRIVATE WARDS IN MATERNITY DEPT.

(Faulkner, Kingsbury and Stenhouse, Architects)

56. A fairly common piece of apparatus on the maternity units was the Baby Resuscitator—the Kreiselman Model Heidbrink Resuscitator built by the Ohio Manufacturing Company at a cost of $700: it was a rather complex machine but was said to be satisfactory.

Section C.—Casualty Departments

57. The Roosevelt Hospital. Casualty departments in the voluntary hospitals were generally small and not of great interest; this was due to the practice that, unless a hospital maintained an ambulance, accident and other emergency cases were taken by the police to the municipal hospitals. However, at the Roosevelt Hospital, New York, there was a fairly large emergency intake and a

new casualty department was just completed. Through the courtesy of the Director, Dr. Maddison Brown, we were able to see it before it was officially opened.

58. The hospital has about 9,200 emergency calls annually and 37,000 casualty attendances for immediate treatment. It maintains two ambulances in a basement garage and at the request of the police it is ready to send out emergency medical teams to assist at severe fires, collisions or other catastrophes. Ambulances unload in the open and cases are carried in through an ordinary door ; immediately inside this is the control room which receives police calls and sets the emergency organisation in motion. This is based on standing orders allotting report stations to all members of the resident and nursing staff.

59. RECEPTION UNIT. The casualty reception unit is a straight length of corridor leading to the main hospital. That half of the unit nearest the main entrance is concerned with treatment, and the inner half nearest the hospital with recovery and observation. In the treatment area there were six treatment rooms, each about 14 feet by 8 feet, furnished with an instrument cabinet, a wall staple by which the trolley with the patient could be strapped to the wall, and provided with suction. There was a minor operating theatre separated from a plaster room by a sterilising and washing-up room. The plaster room was wired for the use of a portable X-ray plant.

60. RECOVERY ROOMS. There were ten single rooms for recovery or observation and two rooms for alcoholic cases ; these were fitted with a central drain and standpipe so that the whole room could be hosed down. There was a spyhole in the doors of these rooms and the windows were guarded by a fine-mesh screen of stainless steel wire. The ancilliary rooms were a small kitchen, a doctor's office, a utility room and a sanitary annexe with bath, w.c., and wash basin. The total area of the unit was about 11,500 feet super.

61. In other voluntary hospitals there were generally a few beds in the casualty department of the recovery type, no patient staying there for more than 24 hours. In only one hospital were the main wards closed for admission at night, patients staying in casualty until the morning.

SECTION D.—OUT-PATIENT DEPARTMENTS

62. Out-patient departments tended also to be small and rather lacking in the comfort and attractiveness seen in the Swiss and Swedish hospitals. In one new hospital the department was on the first floor and approached by stairs ; the patients waited on wooden benches in this case but elsewhere we saw upholstered tip-seats of the cinema type. In the plans of another hospital the consulting rooms

were about 14 feet by 12 feet with no dressing cubicles and the patients' waiting space was an artificially lit recess off the main corridor fitted with wooden benches. Small clinic rooms seem to be favoured, one or two students examining the patients by themselves or with an intern. In some cases the consultant staff seemed to play very little part in the out-patient service and one felt that this class of patient was not much encouraged. On the other hand at one new hospital there was a building containing offices and consulting rooms for ninety members of the hospital staff. It was privately owned and suites were rented to the doctors who charged the patients for consultation. Out-patient canteens were exceptionally provided and the appointments system seemed to be in general use.

63. At one hospital all in-patients and out-patients were given a routine examination consisting of a miniature chest film, Wassermann reaction, a simple blood count and a urine analysis. A number of unsuspected chest lesions had been discovered.

64. So far as we could gather domiciliary consultant service from the hospitals was not developed except occasionally in pædiatrics. The X-ray and laboratory services did not appear to be made available to practitioners outside the hospital staff.

Section E.—Miscellaneous

65. Medical Records. Record-keeping in the hospitals did not show us anything significantly new. The unit-system of numbering was used in some cases but punch-card systems and microfilm recording were not met with. In one hospital it was proposed to hold the records centrally for twenty-seven years in metal cabinets and the X-ray films for ten years. We did not find that in the new hospitals specific areas for central records had been designed.

66. While in Rochester, N.Y., we visited the Kodak works and had a conversation about microfilm records and it is clear that the microfilming of documents and reading them back presents no technical difficulties ; a great deal of storage space and some labour can be saved by this means. The microfilming of X-ray films is less easy, the problem being to obtain a minimal loss of definition in the processing. In New York we visited Recordak Co., a subsidiary of Kodak's, and the results of microfilming X-rays shown to us seemed fairly good but unfortunately the originals were not at hand for comparison. It is hoped to pursue the matter further in this country.

67. Laboratories. The clinical laboratory service in the different hospitals varied in form ; in some places the laboratories were centralised while in others they were diffused throughout the

floors in close relation to the wards. In the teaching hospitals the clinical laboratories of the hospital are under the charge of the Professor of Pathology; in practice the work is largely done by technicians assisted by post-graduate pathological trainees and supervised by two or three qualified pathologists. In addition there are often ward laboratories for student nurses; these seemed in most cases to be adequately equipped and to be in use.

68. The autopsy equipment did not present any strikingly new features. Low temperature storage of cadavers seems to be inclining to the use of cold rooms rather than of the more usual enclosed racks; preservation of organs by deep freezing is also used instead of formolisation.

69. KITCHENS. Main kitchens were invariably found to be on the lowest floor of the hospital, though in some cases a fall in the ground levels allowed the kitchen to have some natural light and direct access from the street on at least one side. Kitchens were usually laid out on much the same principles as our own, but there is generally a larger proportion of refrigerator space including deep-freeze stores and ice-cream makers. Some hospitals made their own flake-ice which was distributed to the ward refrigerators. In all cases the main kitchen prepared both the patients' meals and food for the staff cafeterias. The area of main kitchens, including all stores and service spaces, was found to be roughly between six and seven feet super per person served.

70. The New York City Hospitals Department is planning an interesting feature in their new hospitals. This is the substitution of several kitchens, distributed throughout the ward floors, in place of a large main kitchen. They are each to serve 100–150 patients and in the New York City Hospital, Queens, for instance, are sited in the centre of the ward units on every other floor. This development naturally means the provision of a separate kitchen for the staff cafeterias. A small pantry is still provided for every nursing unit for the preparation of beverages, etc., between main meals.

71. MISCELLANEOUS POINTS. A few small points which have not been mentioned, are these :—

(i) *Doors.* The general width was 48 inches for sick rooms and the flap-extension was not much seen. Door furniture was often of the push-pull type without a door-latch. We saw a mechanical stop acting in two positions, full open and ajar.

(ii) *Wall Coverings.* A plasticised fabric—"Fabron"—was stated to be durable, easily cleaned and gave a pleasant appearance. Another plastic—"Kalistron"—was opaquely translucent but has not been sufficiently tried out: it is claimed to be fireproof and tough with a consistency not unlike washleather.

(iii) *Name-boards.* Staff name-boards often had a switch to each name which when depressed gave a local light indicator and another in the central telephone room. The local light could be "shimmered" from the control room to attract attention if necessary.

(iv) *Stainless Steel.* This was widely used and is without question the best material for fittings in kitchens, utility rooms, operating theatres, laboratories, etc. One kitchen we saw even had a stainless steel ceiling.

72. MISTAKES IN PLANNING. In the course of our tour a number of mistakes in planning were pointed out to us by hospital superintendents, nurses and other staff. The main points of this kind were :—

(i) Omission of the pneumatic tube conveyor.

(ii) Insufficient air conditioning.

(iii) Bad siting of an emergency entrance too remote from the main theatres and administrative offices.

(iv) Absence of adequate supplies of piped oxygen and suction.

(v) Lack of direct patient/nurse intercommunication.

(vi) Lack of adequate cupboard space in theatre units.

(vii) Lack of an interview room for relatives, etc., and of storage room on ward units.

(viii) Lifts too scattered.

(ix) Linen and rubbish chutes too closely placed and causing confusion. The best site for the linen chute is the linen room.

73. A PROJECTED RESEARCH HOSPITAL. A note may be made about the Research Hospital of 500 beds to be built at the National Institute of Health as it involves some quite new ideas. The new concept is to bring the research laboratories, floor by floor, into immediate contact with the wards in a planned proportion of two units of laboratory space to one of ward space. The unit module is 12 feet by 20 feet and the hospital will contain 1,000 modules for laboratories and 500 modules for wards and ancilliaries. This object is attained by widening the building in the patient-area to 80 feet and having two parallel internal corridors each of eight feet width. To the south side of one corridor lie the wards, and on the north side of the other are the laboratories ; between the two are the ancillary rooms of the wards, lit wholly by artificial light and air conditioned. Somewhat curiously the building is to be in reinforced concrete to save money : the patient area is to be floored with asphalte tile and the walls are to be covered with "Kalistron."

PART III

MEDICAL EDUCATION

SECTION A.—UNDERGRADUATE SCHOOLS

74. We visited the following medical schools at which, through the courtesy of the Deans, we were able to have conversations on medical education :—

Harvard University.
Johns Hopkins University.
New York University.
Columbia University.
Cornell University.
George Washington University.
Rochester (N.Y.) University.

75. MANAGEMENT. Up to the present time it has been the general practice in many cases that the medical school and the teaching hospital should have separate boards of management. Experience has proved that this arrangement creates difficulties and there is now a tendency to the formation of joint boards. This is of interest in view of the arrangements determined by the National Health Service Act.

76. There was a general feeling that the Dean of a School should be a part-time officer in contact with teaching and research rather than a whole-time administrator. But owing to the pressure of administrative work in these days the ideal was difficult to follow and for that reason it was not easy to fill the post in some schools, as no one sought it.

77. FINANCIAL DIFFICULTIES. Owing to rising costs, especially of labour, many of the schools are moving towards financial difficulties. There is no system of grants from public funds apart from the financing of research projects and at one school with an annual budget of about one million dollars, roughly one-third is met from student's fees, one half from the University payments and the remainder from donations, endowments, etc. There is therefore a general tendency to renovate buildings as little and as economically as possible and to raise students' fees ; in a number of schools these are being increased from $600 to $800 for tuition only. At one school we were told that the cost of graduating a student through the four-year medical course was at the

rate of $2,000 per annum, and that the fees pay roughly a quarter of the total cost.

78. SELECTION OF STUDENTS. The pressure of students seeking admission to the medical schools does not seem to be much less than in this country and there is some political pressure being put on the schools to enlarge their numbers. Columbia and New York Universities have some 3,000 applicants each for 100–125 places annually: after 600–700 applications have been received for the 75 available places, Johns Hopkins Medical School ceases to send out further application forms; at George Washington University there are about 2,400 applications for eighty places.

79. The method of selection of students is fairly standardised. The rather detailed entry forms are examined by the selection committee and a short list for interview is compiled, considerable attention being paid to the reports on the student's ability from his teachers at his school or college. Interviews are usually carried out by individual members of the selection committee and not by the committee sitting as a body, and finally the selected list is voted on. In one school an "aptitude" test was used which really consisted of a general knowledge paper with mathematics and a foreign language and was in no sense a psychological test; tests of the last kind do not seem to be used. The selection board is usually formed of six or eight members of the medical faculty, usually the younger rather than the older members, presided over by the Assistant Dean or the Sub-Dean.

80. Students enter medicine on the average two or three years later than in this country; most medical schools insist on a B.A. degree in the basic sciences as a condition for consideration for admission. The average admission of women in most schools is about eight to ten per cent. of the entry and they are admitted without enthusiasm.

81. THE CURRICULUM. The educational programme appears to start at six years old with three years in the primary school, followed successively by five years at grammar school, four years at high school, three or four years at college and finally four years at the medical school. Medical education begins properly with anatomy and physiology, the two subjects occupying the first medical year of some thirty-four weeks teaching length; the first half-year is devoted almost wholly to anatomy and histology and the second half-year to physiology and biochemistry. In the second year pathology and its branches are studied in the first half year continuing in lesser degree into the second half when pharmacology and a course of introductory medicine are added. The last two years are concerned with clinical subjects, much time being spent in lecture-demonstrations, inter-departmental conferences, etc.

82. LACK OF TEACHING MATERIAL. The administrative structure of the voluntary hospitals with their high percentage of private and semi-private cases was apt to interfere with student training in the clinical period. In one new University hospital there was no pædiatric department and there were insufficient "ward" patients to satisfy the student need in the period of clinical clerkship: the students either had to watch the interns deal with the private patients or go to the municipal hospital.

83. DEGREES. We were struck by the fact that the University degree in medicine did not carry a licence to practise, this being acquired by the State Board Examination or the Examination of the National Examining Board, whose standards did not appear to be unduly searching. Hence the University teaching rather tends to centre on the licensing examinations and the granting of the M.D. degree—there is no M.B. degree—is apt to become something of a formality with a pass rate of over ninety per cent. We also noted that the final examinations of the universities were wholly internal and that a great deal more importance was paid to written papers than to oral and clinical tests. Under such conditions there is likely to be a very wide variation of standard between the M.D. degrees of different universities and we did not feel that these systems of teaching and examinations were in advance of our own.

84. TEACHING STAFF. While the staffs of the pre-clinical departments were not unduly large, in the clinical subjects including some of the specialties, their size was very considerable, though it seemed likely that not by any means all were active teachers. At one school the Dean informed us that the teacher/student ratio was 1 : 20 and that he would prefer it to be 1 : 10 or less. Teaching to small student groups was more favoured than lecturing to large classes.

85. The clinical professoriat was very large and contained a number of grades suggesting that the term "professor" has a somewhat lower academic significance than in this country and implies more nearly a senior teacher. Generally the clinical departments were headed by one or more full-time Professors who do not accept private fees and may be paid $20,000 to $25,000 a year, the hospital paying 75 per cent. of the salary and the school 25 per cent. Then there is a number of part-time teachers who may accept private fees and for whom consulting rooms may be provided in the hospital to keep them always on the premises. These are either paid nominal salaries and take full private fees, or are paid half salaries and accept half-fees. Rates of pay in the non-clinical subjects are lower than in the clinical, a senior teacher receiving $12,000—$15,000 per annum against the $20,000—$25,000 of his clinical colleague of comparable status. This discrepancy in payment leads to some difficulty of

recruitment for non-clinical posts, though the position is not so acute as it is in this country.

86. INTERNS. When a medical student graduates at a university he becomes a doctor of medicine but has as yet had no clinical experience of our "house-officer" type. It is customary for him next to hold one or more internships in succession. Such posts are not guaranteed to him at his own hospital but as there are far more of these posts available throughout the country than there are men to fill them, there is no difficulty in obtaining one. Hospitals are approved for internship training by the Medical Education Council of the American Medical Association and in 1948 there were 9,118 internships available but only 5,543 men graduating to fill them. Even the teaching hospitals had nearly 10 per cent. of their posts unfilled. According to our ideas the American hospitals are lavish with their intern appointments. In a teaching hospital of 400 beds there were 65 interns and in a non-teaching hospital of 800 beds there were 67.

87. BUILDINGS AND EQUIPMENT. The medical school buildings which we saw were mostly old and there is much that requires rebuilding when the financial position permits. The blueprint for the new New York University Hospital and Medical School did not show anything very remarkable except the grouping of the lecture rooms in a separate low building in front of the main entrance to the school buildings. There was a separate refectory and kitchen for the school. A small hostel was planned but as the larger percentage of students live in New York City with their families, the demand for hostel accommodation is not pressing. No recreational facilities were provided.

88. The space allocated to the more academic departments varies considerably. Figures were given to us relating to four universities in different parts of America and the overall space per student, covering the departments of Anatomy, Physiology, Biochemistry, Pharmacology, Bacteriology and Pathology, varied from 607 feet super to 274 feet. Averaging them out, the total areas per department were as follows :—

	Av. sq. ft.	*Av. sq. ft. per student*
Anatomy ..	25,500 ..	80
Physiology ..	26,000 ..	81
Biochemistry ..	21,000 ..	65
Pharmacology	12,700 ..	40
Bacteriology ..	18,500 ..	57
Pathology ..	14,300 ..	112

89. LECTURE ROOMS. No strikingly new features were seen in lecture rooms or class laboratories. In the latter, as in hospital

laboratories, the service pipes were usually not enclosed and in the newer parts the walls were of spray-painted unplastered breeze blocks. Large and well-equipped machine shops with expert technical staffs were seen on several occasions and were used chiefly for making special research apparatus rather than for running repairs. Class equipment, so far as we could see, was not notably in advance of our own. The best amphitheatre which we saw was actually in a new non-teaching hospital where it was used for clinical staff conferences, etc. It seated about two hundred and was fitted with tip-up upholstered seats and with a full range of projection: the ceiling was finished in acoustic tile.

90. MUSEUMS. Medical museums appear to be falling out of favour to some extent as important elements in teaching. In pathology the tendency is to use fresh material for teaching, preserved by deep freezing, and then to throw it away. Such museums as we saw were overcrowded with material and seemed to be used more as places of storage than of study. By contrast the large public museums were magnificently set out and were much used by student classes.

91. LIBRARIES. Most school libraries were designed on the general plan of a control desk and card-index, a book-stack area and a study area; usually a large number of journals were taken and these were sometimes kept in a separate journals' room. In the plans of one new school two types of study room for the library were designed; one was a small room with a door containing a table and seats for four or six students, and the other was an open bay holding three lighted reading desks for individual students, one behind the other. More commonly the study area held several large tables seating ten or twelve students. In one school of about 450 students and interns the daily average use of the library was by 80 students and 50 interns or about a third of the total. In another hospital there was a special library for interns open from 2 p.m. to 6 p.m. In addition to the general library, departmental libraries of advanced books and journals sited in the departments were the rule.

92. FEEDING OF STUDENTS. The feeding of students was invariably in cash cafeterias, often run by the hospital as part of the general arrangement for the hospital staff. We lunched in several of these cafeterias and their standards were high, allowing for the inevitable difficulties of cafeteria service. The meals were cheap, there was considerable variety to meet different tastes and purses and the food was good and served attractively. The general plan was a large central room to seat one or two hundred at small tables and in immediate contact with the service counter: a number of smaller rooms opened off the main one and these were used by various grades of staff.

93. HOSTELS. The best students' hostel we saw was Bard Hall at Columbia University Medical School. There was a total capacity of 344 students, seven floors being for men and three for women; on the eleventh floor there were quarters for married students. There was a fairly wide choice of accommodation according to cost: rates ran from $407 for single rooms to $290 per student for double rooms for the academic year of thirty-nine weeks. For married students living in flatlets of two more or less furnished rooms, charges were about $400 for each person. All meals were bought for cash and in addition each student paid about $10 for athletics. The hostel provided a swimming pool and four squash courts in the basement.

SECTION B.— POSTGRADUATE TRAINING

94. SPECIALISATION. Postgraduate studies are divided into the training of young men to be specialists and the provision of refresher courses for established practitioners. Specialist training requires a further five years' study after graduation and the desire to specialise is even greater among young doctors than in this country. This is partly based on the greater financial prospects of specialisation but the men are also actively encouraged to specialise by their schools. At one medical school the Dean expressed a low opinion of general practice even implying that it should come to an end. As in this country, the result is that the general practitioner service is suffering and rural areas are under-doctored. In the United States there is an average of one doctor per 720 of population; in the towns the average is one doctor per 450 of population. Another cause of the decrease in general practitioners is stated to be the overspecialisation of internships. When a graduate starts to specialise, his field of education becomes at once entirely limited to his chosen specialty: in such a subject as surgery it was our impression that he was directed by his chief to perform operations of far greater difficulty and responsibility at a much earlier stage of his training than would be the case for his equal in this country.

95. HIGHER DEGREES. The higher degrees which in this country are accepted as indicating certain standards of proficiency in advanced training, are fewer and less well defined in America. The American College of Surgeons is now taking some steps to improve the standards of its examinations and in some universities the degree of Master of Medical Science is given by examination.

SECTION C.— RESEARCH

96. FUNDS. Just as specialisation is the height of attainment in clinical medicine, so research is the zenith of the academic side. In general, American medical schools are so far more obviously

" research-minded " than we are in this country, that one wonders if research is not becoming something of a fetish. Research attracts funds to the schools with almost unfailing certainty, funds which can be derived from Federal sources, from private donations or from public subscription and which are forthcoming for almost any reasonable project. On the other side of the account it is, of course, extremely difficult to assess what sort of return this monetary investment yields.

97. APPARATUS. We were duly impressed by the large amount and expensive nature of much of the equipment seen in research laboratories. Physical methods of analysis and examination are much in vogue, involving a great deal of highly complex electrical apparatus ; machines of which there may be one or two in this country are often in fairly wide use and free supply in America. While this is doubtless an effect of our dollar shortage, we could not help wondering whether this rigid policy of exclusion was wholly wise in the long-term view, and we formed the conclusion that America is considerably ahead of us in the construction and use of much research apparatus.

98. LABORATORIES. In contrast with the apparatus, the actual laboratories were not structurally very interesting, for the saving of money on structure—no doubt to put into equipment—does not produce beautiful rooms. In one research institution the laboratory module was 24 feet by 20 feet ; when, as had been done, this module was divided to form two rooms, they were too small for convenience because the projecting service pipes compelled the benches to be set out from the walls six or nine inches all round. As the space on either side of the door is apt to be a " dead " area for bench work in a small laboratory, the sink was often placed on one side and the fume cupboard on the other ; but as a fire in the fume cupboard might prevent escape from the room, many laboratories were built with intercommunicating doors as well as doors to the corridor. We did not see the development of unit benches in plastic or similar materials, wood still being most often used. Bench services were usually carried as a range of exposed pipes with feed points, along the back of the bench rather high up.

99. We were unfortunately unable to arrange to see the laboratories of the Bell Telephone Co. which are very highly spoken of, but there were some good research laboratories in the chemical department of the Kodak Co. Here we saw stainless steel used for bench tops and for sinks : it did not seem to cause undue breakage of glass ware and stood up to the chemical reagents very well. The benches were fitted with enamelled steel cupboards and drawers, fittings which we saw in several other places ; some benches had continuous strip lighting under the reagent shelves. Pipes were

hidden in stainless steel casings below the reagent shelves or, in the case of wall benches, in a 4″ by 4″ stainless steel duct. In several laboratories the false ceiling consisted of enamelled steel sheets pierced with one-eighth inch holes at about three-quarter centres. These formed the air-extraction grille as well as having a good sound-absorbent effect owing to the air-space above. The fume-cupboards were of the sash-type and again in steel, some being of two tiers with the lower chamber at floor level; controls for the services were brought to the front of the cupboard. The floors were of acid-resistant tiles and the internal partitions were of hollow terra-cotta blocks with one face glazed and sometimes laid on the side, the cavities being used for air-extraction.

100. For more specialised work the virus laboratories of the National Institute of Health and the tuberculosis laboratory at the Lederle Co.'s works were outstanding. Both were air conditioned with a small positive pressure; the work of handling cultures, etc., was carried out in low glass hoods with manual access. The air from these was extracted continuously and passed through an incinerator chamber before expulsion to the outer air. The incoming air was passed through a glass wool filter and irradiated by ultraviolet light. Bench service controls were brought to a panel on the bench front and there was a device for dealing with wastes so that the outside of the container was not soiled.

101. We gained the impression that while university research laboratories expended their funds chiefly on apparatus over a considerable range, commercial research paid more attention to fittings and general equipment, the apparatus being good but more limited to the lines upon which specific research was being conducted.

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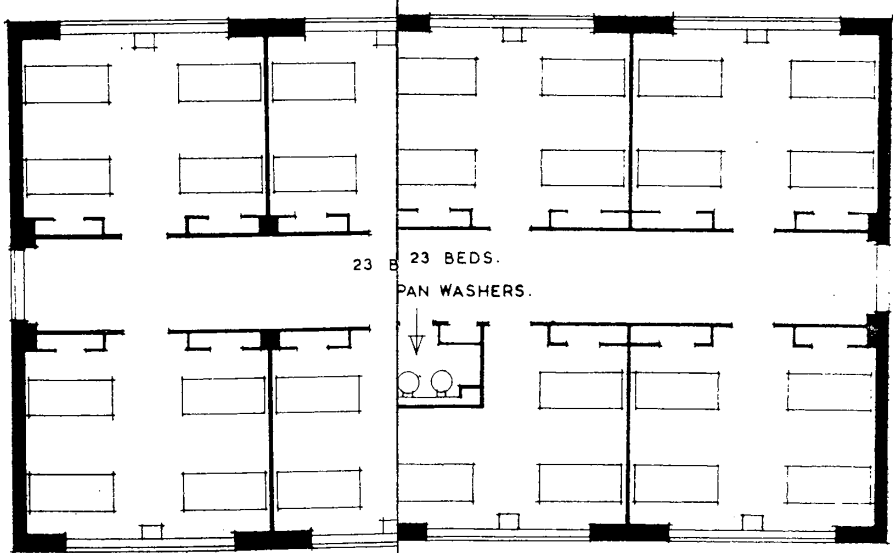

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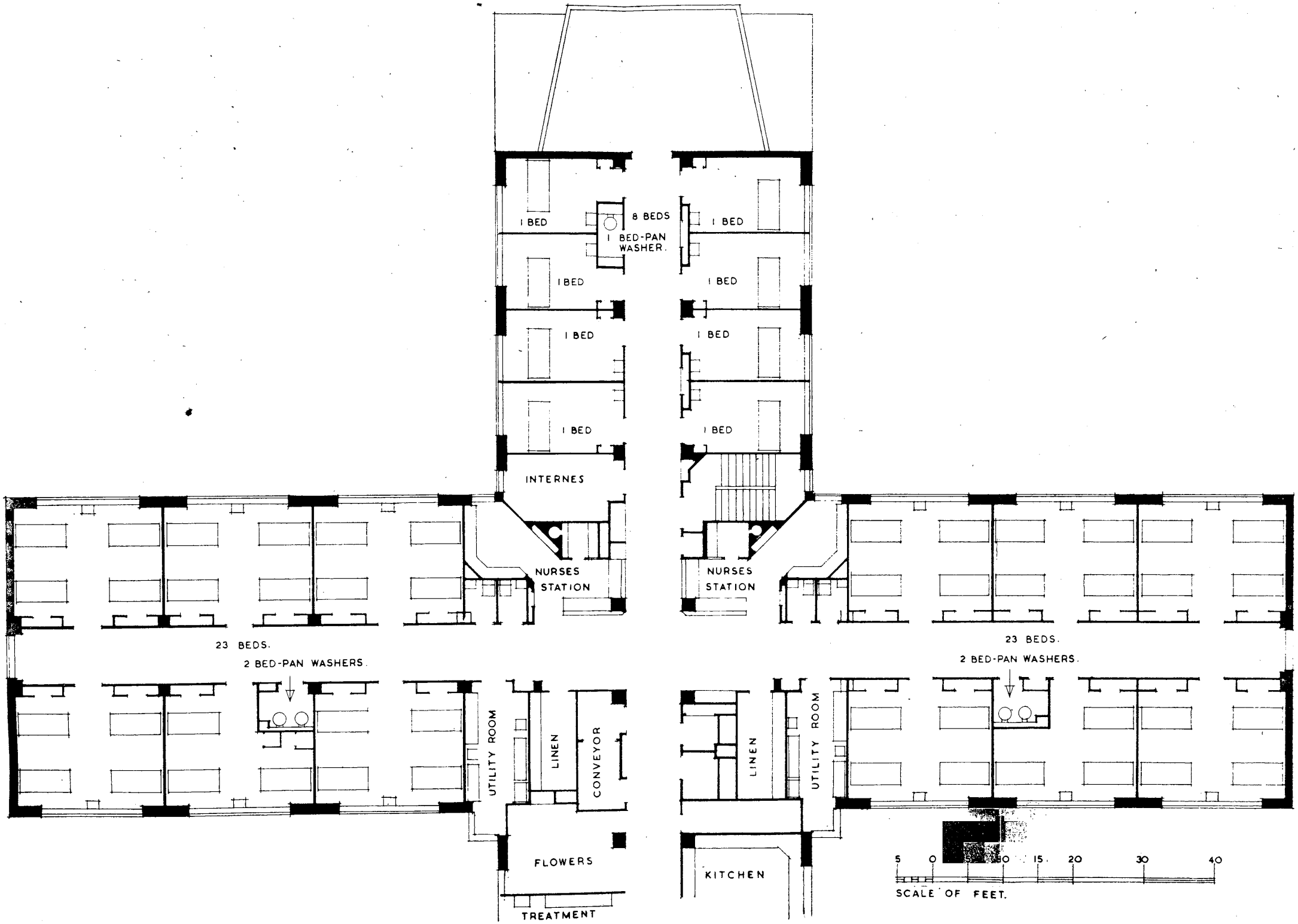

HARTFORD HOSPITAL, CONNECTICUT

DIAGRAM OF WARD UNITS SHOWING DISTRIBUTION OF BED-PAN WASHERS

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