did, pay their junior medical staff more than did those which were more attractive from a professional or geographical point of view.

There was little out-patient work in the former municipal hospitals. Hospital building has been sadly neglected, though in recent years the Government has placed considerably more money for capital development at the disposal of its agents, the various hospital boards. Out-patient work is increasing everywhere. The type of administration has tended to follow that of the former voluntary hospitals—that is, overall administrative control is passing from medical into lay hands. Before 1948 each municipal hospital had a prescribed district and a statutory duty to admit patients from their district in need of in-patient treatment: this at times caused difficulty, as patients from just outside their districts could be, and sometimes were, refused. Now hospitals can take patients from anywhere in the country; this has sometimes led to local patients having to be told that there is no room for them, particularly if the patient is elderly and likely to occupy a bed for a long time. The previous friendly rivalry between the voluntary and municipal hospitals has been replaced by grumbling from the regional board hospitals that the teaching hospitals get too large a slice of the cake.

The benefits which have resulted are that the former voluntary hospitals are no longer in the desperate need for money that some of them were, and there is no need for street collections and similar means of raising money. There is a better spread of consultants and a reduction of the pressure on central teaching hospitals for specialist advice. Mental hospitals are being brought into closer contact with other hospitals. The level of medical treatment and nursing care is being gradually raised. On the other hand, that close camaraderie between the staffs of hospitals which existed in the London County Council Hospital Service, and no doubt in others, and which was fostered by frequent and regular meetings at County Hall of medical superintendents and specialist groups and by clinical meetings at different hospitals in turn by the London County Medical Society, appears to be declining, and we have a number of individual hospitals without any special feeling of loyalty to their regional boards, and without any firm conviction that they are part of a service, and that there must be real co-operation with their neighbours.

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OBSERVATIONS ON HOSPITAL PLANNING

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In an earlier report (Abel and Lewin, 1959¹) a substantial increase in capital expenditure on hospital building was advocated, and it seems clear that there is now a general acceptance of the idea of more capital investment in hospitals, although views differ widely on the size of this investment. The Annual Report of the Ministry of Health for 1959² refers to the passing decade of "make do and mend" and to the future programme of "expansion." For 1961–2 £31m. are promised, but even the Guillebaud Report³ suggested £30m. a year to be the minimum required for replacement costs of hospitals, and that in terms of 1955 money value. Before the war £10m. a year were being spent on new hospitals and major extensions, which compares in value to the £31m. proposed for next year.

At the present rate of progress—and we have no particular reason to suppose that this will be maintained beyond the Government promise to reach a figure of £50m. by 1964–5—it will be 1968–9 before the target of £75m. suggested in the earlier paper is reached, and the National Health Service will have come of age. We still think this figure of £75m. a year a realistic one. To put the expenditure of a sum of £75m. a year on the hospital service into perspective we set out some of the main figures of capital expenditure in the public sector this year: Electricity Council, £285m.; Housing, £285m.; British Transport Commission, £200m. National Coal Board, £120m.; Education, £108m.; Roads, £92m.; Atomic Energy Authority, £42m.; Gas Council, £43m.; Air Corporations, £59m.; Post Office, £91m.; Water, £33m.; Sewerage, £42m.; and

Hospitals, £31m. It is clear that the hospital programme so far envisaged does not represent an expansion commensurate with the need.

So far the needs of hospitals have not come within the real range of public consciousness. Hospitals continue to receive letters of thanks for services rendered, but rarely one of bitter complaint at the quality of buildings in which patients are treated. The general public on the whole are unaware that most of their hospitals were built more than 70 years ago, that over one in five was built 100 years ago, and that although there are enough hospitals they are too old and often in the wrong places. The patients are satisfied if they continue to enjoy what has been described as "the best medicine in the world," but few of them appreciate the poor conditions of work under which the medical and nursing staff achieve this quality of care. Our concern is that we may be reaching a stage when the standard of service cannot be maintained with our present hospital buildings. Such a situation would immediately rouse the public conscience.

The Volume of Work

Although we realize that the hospital care of the patient is only an episode in his total medical care, and that most of the illness in the country is treated by general practitioners, nevertheless the load upon the hospital service continues to increase, as revealed by the number of new out-patients attending for consultation and by the number of patients discharged from hospital wards. In the Oxford Regional Hospital Board

area, for example, the number of new out-patients in the last five years has increased by 16%. The number of in-patients treated in the hospitals last year was the highest ever, and yet at the end of the year the list of patients awaiting admission to hospital was larger. There is as yet no indication of a slackening in the demand for hospital treatment.

What is this work that the hospitals are called upon to perform? Our knowledge of morbidity statistics is very slight, but if hospitals continue to provide information to the Ministry of Health and General Register Office on every tenth patient there may be some interesting facts to be learned. The Report on the Hospital In-Patient Enquiry** for the year 1958, which has just been published, gives some preliminary tables for that year for England and Wales. The figures have been analysed in some detail in the Oxford Region, and it has been noted that the commonest causes of admission to hospital in the 0-5 age-group, as might be expected, are for the removal of tonsils and adenoids, and for congenital malformations. In the age-group 5-14 appendicitis comes second to "Ts and As." From 15 to 29 years head injuries are the commonest cause of admission of men to hospital, with appendicitis for women. In this age-group the second cause of admission for men is appendicitis and for women abortion. In the decades 30 to 70 hernia is the commonest cause of admission in men, followed by duodenal ulcer, carcinoma of the lung, and hyperplasia of the prostate. For women, disorders of menstruation and prolapse are the main causes of admission from the age of 30 to 70.

Trauma, as might be expected, is a less frequent cause of hospital admission in women, save in the higher age-groups when fracture of the lower limb is a relatively common cause. The conditions for which patients wait longer than six months for hospital admission are set out in this interim report, and it may well be that something might usefully be done to deal more promptly with some of the commoner conditions like strabismus, hernia, and prolapse. The usual cry is for more beds, but much might be achieved by a shorter duration of stay in hospital with earlier discharge to the care of the general practitioner.

Future Hospital Needs

This rising tide of work is still carried out in hospitals which are essentially the ex-municipal, ex-voluntary, and formerly E.M.S. hospitals. While most of these have been improved so far as out-patient and diagnostic facilities are concerned, and although much may have taken place in the way of modernization of E.M.S. wards, in many places the hospital service is split between more than one hospital. The medical, surgical, pathological, and out-patient facilities for a community may be located in several different hospitals, with all the attendant disadvantages to patients and staff. The structure of many existing hospitals makes further expenditure on them hardly worth while, and the hospitals are valuable probably only for the site which they occupy. In many instances the erection of one sizable hospital would lead to the abandonment of others.

Assuming that the hospital service will get an increasing share of the country's capital, we suggest some of the ways in which the hospitals should be developed and

the particular features which will need attention. It is the general hospitals which are dealt with in this paper, but we appreciate that the criticism of existing conditions applies equally to mental hospitals. They were designed in another age and built for a custodial purpose which they should serve to a lessening extent. There must be an integration of the mental and general hospital service by the joint use of medical staff and by providing psychiatric clinics and in-patient facilities in all new general hospitals.

Requirements of the Hospital

The general hospital for the future should be large enough to justify at least its own consultant staff in the main specialties and be able to support a pathology and radiology department. In our view a practical minimum size will be in the region of 200 beds. In larger centres there would also be at the general hospital psychiatric beds and geriatric beds, so that a total bed complement would most likely be 600-800 beds. Hospitals smaller than 200 beds are likely to be built only to serve special purposes or in special places—for example, general-practitioner maternity unit or a general hospital in a remote area of Wales. The implication is that many sizable communities will not be able to support a general hospital. Our suggestion for the provision of hospital services in such areas is the general-practitioner maternity unit and a diagnostic centre or peripheral out-patient department staffed by consultants from the general hospital which provides in-patient services for the area. We doubt whether "special" hospitals are likely to be built for the future save for mental deficiency and smallpox. Some hospital departments—thoracic surgery, cardiac surgery, neurology and neurosurgery, plastic surgery and radiotherapy—serve large catchment areas, some for a whole region. These departments, which should form part of a general hospital, will serve a regional need.

Number of Beds Needed

The Hospital In-Patient Enquiry to which we have referred shows that some patients are waiting a long time for in-patient treatment. The waiting period for hernia, for instance, is such that every surgical ward in the country should perhaps have some beds available for the treatment of this condition alone. The duration of stay in hospital for hernia, however, varies considerably, for example, in the Oxford Region it is from 6 to 12 days. It may be, however, that only by allocating beds specifically for such common conditions, which cause much ill-health and loss of working efficiency to the country, can these problems be treated in sufficient numbers and avoid the losing battle with the more insistent claims of other acute or progressive illnesses.

If the cost of hospital beds is put at from £5,000 to £8,000 per bed, the number of beds to be provided is clearly going to be important. Surveys have been conducted in the past in an attempt to ascertain the bed need for the future so far as general hospitals are concerned, and recent estimates range from 2 to 3 beds per 1,000 of the population rather than the older suggestion of 4.5 or more. These surveys have been based on the use that has been made in the past of beds in perhaps inadequately staffed ancient buildings. The most recent study is of the Barrow and Furness area, where there are now 2.5 beds per 1,000 of the population. This particular survey has tried to estimate the extent to which the use of beds was justified. Forsyth

*The Hospital In-Patient Enquiry, which is organized on a national scale by the Ministry of Health and the General Register Office, consists of a 10% sample of patients admitted to all National Health Service hospitals (except mental and mental deficiency) in England and Wales.

and Logan,⁵ in their report on this survey, make the statement that on clinical grounds alone approximately one-quarter of the male and one-half of the female medical patients receiving treatment or investigation in hospital could have been dealt with either in the out-patient department or at home under the care of the general practitioner. The waiting period for beds in the Barrow and Furness area was surprisingly short and the waiting time for consultations was approximately one week.

The number of beds needed is not necessarily the same in all parts of the country. Local industry and even custom have their influence. The number needed may also depend on the adequate development of out-patient diagnostic services which may prevent unnecessary admissions. It will depend, too, on the centralization of modern, well-equipped, well-staffed hospitals in which a reduction in the average duration of stay may be achieved. The provision of adequate domiciliary services to support the general practitioner, thus perhaps avoiding admission to hospital on social grounds and allowing of early discharge to domiciliary convalescence, must also have its influence on bed numbers. If these conditions can be satisfied with new hospitals then the overall number of hospital beds required in the country may not require an increase. Indeed, the figure could well be less. The present number of acute beds in this country is 3.6 per 1,000 of the population. It might well be capable of reduction to 3 beds per 1,000.

Ward Design

A great deal of work on ward design has been done in this country by the Nuffield Provincial Hospitals Trust, who have erected in Northern Ireland and in Scotland experimental wards which are now the subject of intensive study. These are large wards—32 to 40 beds, which is a number greater than it has in the past been thought possible for one sister to supervise. They seem, however, to be working well in practice.

The wards are broken up into bays of four or six patients, and there is a generous proportion of single rooms. This grouping of patients allows of their distribution according to their medical or nursing needs. Wards have in the past been designed with rigid separation of the sexes, thus making it practically impossible to vary the bed allocation according to the demand by sexes. Nursing facilities in the new wards are so placed as to diminish the amount of walking. Attention has also been paid to cross-infection, and treatment rooms have been provided so that dressings may be undertaken in the controllable conditions of a special room rather than in the open conditions of the ward. An air-conditioned dressings room should be one essential of every surgical ward.

A design of this kind is reasonably flexible. The call for flexibility in ward design, a request which is made by all clinicians, can be brought about only in single-story construction, which limits the size of the hospital, or by the provision at the time of building, of a uniform grid of services available at every point, few of which would be in use at any one time. Such construction would be costly in the extreme, and unjustifiable without a certainty that change would be made in a short time.

It is questionable whether all the beds in the hospital need to be costly, and for the future it might be desirable to build hospitals with larger and more comprehensive out-patient departments, supplementing the beds for acute cases with recovery units of simple

construction on the hospital site—not in a convalescent home at some distant point on the coast, which inevitably means a division of medical care. The simple recovery units should cost much less than hospital beds for acute cases, and might possibly be of more or less standard design, making for economy in construction.

Another idea which should be tried out is the establishment of intensive nursing-care units. Patients requiring 24-hour observation are admitted to such a unit, either one for the whole hospital or one for each of the medical and surgical divisions. Transfer from the intensive care unit to the general ward takes place when the need for continued observation and special nursing care diminishes, usually after 48 hours or more. The advocates of this nursing arrangement speak strongly in its favour, especially in circumstances where medical and nursing staff are limited. It is to be hoped that some hospitals may experiment with this type of nursing unit as well as the simple type of recovery unit mentioned above.

The present practice in this country of housing an infected patient in a side-room off the Florence Nightingale ward—the one in which most of the hospital medicine in this country is practised—has been patently demonstrated to be inadequate. The infected patient should be removed from the clean ward, and the hospital for the future will need on the same site a separate building containing a range of cubicles capable of being cross-ventilated and designed to minimize the possibility of cross-infection. It is desirable that this block should have its own theatre in which frankly septic cases can be dealt with without ever being admitted to clean hospital wards.

Operating Theatres

The number of theatres to be provided needs careful assessment to ensure the economic use of surgical beds.

However, their number needs to be sufficient, so that no one theatre is "overworked," a main factor in preventing hospital infection. An additional theatre, moreover, allows a regular programme of cleaning without disrupting the surgical services of the hospital. Theatres are best designed in groups rather than stacked one above the other. The recovery ward, at least for general surgery, has come to stay and its relation to the theatre must be close. For some specialties there may be a case for siting a theatre immediately adjacent to the ward, thus obviating the need for post-operative recovery beds. Air-conditioning is a *sine qua non*, and the system must provide for temperature control. With cross-infection so prevalent it is important that the clean area of a theatre should be clearly defined and that no one who is not suitably attired should enter it. Much thought is being given at the moment, and more is required, to the design of theatres so as to allow surgeons and nurses to walk into them with sterile clothes without being contaminated, and also an arrangement which involves the least amount of movement within a theatre.

Out-patient Departments

The steadily increasing number of hospital out-patients will, as suggested earlier, necessitate the construction of larger and more comprehensive out-patient departments, and the more investigation and treatment that can be carried out in the out-patient department the more satisfactory for the patient and the less costly for the hospital service. A few hospitals have beds associated with the out-patient department only. To these beds are admitted patients who have under-

gone surgical procedures which, after a few hours' observation, allow of discharge home to the care of the general practitioner. It seems clear from the studies of Forsyth and Logan⁵ that such beds might also be used by medical patients. Crombie and Cross⁶ estimated also that of a 10% sample of 5,400 medical patients in a Birmingham hospital in 1955 25% had no diagnostic or therapeutic requirement at the hospital level. This suggests that out-patient facilities, suitably extended so far as building, equipment, and staff are concerned, might well take a substantial load from the hospital in-patient service. It is important that the out-patient department, with its x-ray and pathological services, as a growing point of the hospital, should be located on the ground floor and that each department be so designed as to be capable of extension. If, for instance, the pathology department is located on the second floor of a monobloc, extension presents a problem.

Accident Departments

Death on the road has focused the public attention on accidents. Accidents on the roads, at work, and in the home have assumed major proportions, and the proper arrangements for their care should now be an essential part of the hospital services. More than one committee has now been set up to consider the problem of accident departments, and a number of reports can be expected in the near future. There is growing support for an accident service or department at designated hospitals which would deal with all the accidents for an area. Such a service would have a 24-hour medical and nursing staff, and in most instances would be part of a main general hospital and have available the ancillary services such as pathology and radiology. The casualty department, with which all medical men are at the moment familiar, admits a high percentage of "casuals" and a relatively small percentage of "casualties." Fry⁷ has shown that a large number of patients attending the casualty department of a London teaching hospital could more properly have been treated by general practitioners. Crombie⁸ has shown at Birmingham that a high proportion of patients attending casualty departments are "casual" patients.

It is questionable whether the hospital service should continue to carry this load. If the hospital is to continue to deal with "casuals"—that is to say, if hospitals are to have an "open door" policy—then the staffing of the casualty departments as opposed to accident departments might best be undertaken by experienced general practitioners. They could provide continuity of service in a field which at the moment is ever changing.

A corollary of the separation of casualty and accident departments is that there will be fewer but better accident departments. Not every hospital will treat accidents, and although this proposal may be distasteful to some hospitals it is a development that will have to come in some of our large cities. The principle of a central accident service at a main general hospital integrated with smaller peripheral units has already been outlined in the Report of the British Orthopaedic Association.⁹ Where time is a factor it is better used getting the patients to the right hospital rather than to the nearest hospital.

Central Sterilization and Supply Department

The Central Sterilization and Supply Department which has been developed for some years in the Services is now being more widely adopted. It furnishes all parts of the hospital with pre-packed sterile goods, and

no sterilization takes place on the wards. While there is an increased outlay on instruments there are compensatory savings on autoclaves. The C.S.S.D. may be located near to the operating theatre, with the possibility that it can also deal with operating-theatre instruments. The staffing of these departments does not make demands on the nursing staff but eases the task of both doctor and nurse on the wards, in out-patient departments, and in operating-theatres. The introduction of disposable items of equipment promises to lessen the labour problems even further. As many pathologists have pointed out, the practice of "sterilizing" items on wards is as archaic as the hospital buildings.

Operational Research

Most of the operational research that has been conducted in this country so far has been done by voluntary bodies like the Nuffield Provincial Hospitals Trust or university departments. The Nuffield Trust has done first-class work in its studies of the function and design of hospitals, of sterilizing procedures in hospital, of the accident service (shortly to be published), of the radiological service (now the subject of study), and on hospital case load in the Barrow and Furness group of hospitals. In prospect is the study of the mental hospital service by P.E.P., financed by the Trust. A vast number of studies remain to be carried out, and what is needed is a central intelligence body stimulating—and more important, financing—boards of governors, regional hospital boards, and university departments to find answers to the many questions still outstanding, all of which will have an implication in hospital building. It may be questioned why regional hospital boards have not set up departments to investigate their own workings over the past 12 years. A good case can be made out to show that this kind of investigatory activity is best left to outside independent bodies, who have no axe to grind, who can finance such investigations adequately, and who only seek to improve the efficiency of the service in the interests of all who work in it and receive service from it. There is good reason to believe that the Ministry of Health is going to take on some of these operational research functions, supplementing the work done by private bodies.

One of the most important tasks of all is to examine a new hospital or department after a reasonable period in use and take a profit from the lessons to be learned. This kind of examination may involve prolonged and patient study and a ready admission of mistakes in planning, which no one likes to make. Action along these lines will give boards of governors, regional hospital boards, and the Ministry of Health an increasing amount of knowledge at present lacking in this country. Coupled with this research into success and failure of design is needed some advisory machinery to bring the lessons to be learned before those interested in planning. This should lead to the establishment of a Central Intelligence Service which would make the latest information on design available to anyone concerned in planning.

Another problem is the degree to which it may be possible to accept some basic designs and so cut down the time taken to bring a hospital project from conception to fruition. The delays are not only with the clinicians, the planners, and the Ministry—they are also with the architects and building contractors. There is a good deal to be learned from the Americans, whose working drawings on the agreed plan take eight months

as opposed to two years in this country. The American counterpart of the Ministry of Health has assisted sponsoring bodies in America to build 4,000 hospitals under the Hill Burton Programme.* This assistance has been not only in the provision of money but in the provision of information in the form of guide material which has given the outlines of requirements and suggested layouts for all departments of hospitals of all sizes up to 600 beds. There is a need for information of this kind and in this form in this country now.

Staffing

In thinking ahead to the time when the new hospitals are provided, to what extent are our staffing problems linked to the need for new hospitals and what particular problems confront us?

Medical

Everyone is aware of the difficulties in securing junior resident staff in the hospital service, particularly in casualty departments. In the Oxford Region over the past two years 47% of the registrars and 54% of the casualty officers qualified outside the United Kingdom. It is not suggested that the hospital service should cease to be a training-ground for doctors from the Commonwealth—far from it. Indeed, without them resident medical staffing in some of our hospitals would break down altogether. This shortage of junior personnel, which is the subject of an inquiry by a working party, is not, of course, unconnected with the difficulty of securing entry to general practice. The applicant for a practice who appears to have climbed part of the way up the hospital consultant ladder seems, unfortunately, to be regarded as being less fitted for general practice. A fresh approach between general practitioners and consultants on this problem is urgently needed.

There are shortages of consultants in some of the specialist fields, notably psychiatry, anaesthetics, and radiology, though the number of applicants for consultant posts in general medicine and general surgery is still very high. The publication by the Ministry of Health of the numbers of doctors in the various specialties, with the dates of birth, has made it clear that prospects in some fields of medicine will be brighter than in others for some years to come. Prospects of success, however, and inclination do not necessarily run well together; even so, many young men have changed their direction in the hospital field. We cannot hope, nor should we try, to provide a 24-hour resident medical staff for all our hospitals. Some centralization of services as outlined in this paper may well lead not only to a more efficient service but to a lessened demand for junior staff.

Few of our hospitals possess adequate accommodation for medical staff—that which exists is as old as the hospital or has been converted from premises devised originally for other purposes. Still fewer hospitals have quarters for married doctors. To attract and keep suitable junior resident staff, adequate accommodation for single and married doctors will be essential.

Nursing

The ever-increasing demand for more nurses may overlook the considerable increase that has already taken

place. In the 10 years 1949–58 the number of nurses of all grades employed in hospitals increased by 31%, from 139,526 to 183,105.

The amount of work, and, more important, its intensity and complexity, have increased as well. There is, however, little to suggest that the nursing services can expect to attract a further sizably increased percentage of girls leaving school. It follows that if the nursing service is to cope with the demands made on it then much of the solution must come from the harnessing of our present resources. The *student nurse* should be encouraged to complete her training: of 20,000 student nurses recruited in one year recently no fewer than 8,700 failed to complete their training. A broad interest of work in a number of departments in a main hospital, better working conditions in new hospitals, and the provision of good nursing accommodation, probably in the form of flatlets away from the hospital, may all prove helpful. Most important, however, will be to realize that a nurse's time is going to be increasingly valuable and should be spent on nursing. To this extent new hospitals which can improve hospital intercommunication, provide central supplies, and improve ward design will help us to use our nursing services to the best advantage.

The *assistant nurse* has played an ever-increasing part in the nursing service, and, indeed, many hospitals could not continue without them. The proposals of the General Nursing Council to allow student-nurse training to be undertaken only in hospital groups of a least 300 beds and to raise the standard of education are designed in part to provide fewer general training schools and therefore more and better opportunities for the training of the assistant nurse. We shall certainly need both, and the new proposals for nurse-training should be examined with all these points in mind.

In addition, there is the growing army of *part-time nurses* of all grades, and this could be encouraged. In 1958 there were 41,176 part-time nurses of all grades. This will not necessarily mean a falling off in the standard of nursing care. A married woman, the demands of whose children have lessened, may well make an excellent nurse, devoting a continuity of care which in the hospital service generally is unusual, except perhaps in the case of ward sisters. This return after marriage to an earlier professional activity is now being actively advocated for the teaching profession, and we would do well to explore its possibilities in nursing to the full.

The whole problem of staffing in new hospitals may well require a fresh review. These comments on medical and nursing services have their counterpart in the ancillary services, including almoners, physiotherapists, and radiographers. It is clear that the fuller integration of the service and better working conditions would ease the not dissimilar problems in these branches of hospital work.

Conclusion

Our object in this paper has been to draw attention to the inadequacy of the present financial arrangements to rebuild our hospitals and to suggest that, quite apart from the need to replace antiquated and uneconomic buildings and to provide accommodation in keeping with the present standards of living, there are other cogent arguments to advance in support of a more rapid hospital-building programme. There is no evidence at present to suggest that the demand for hospital services is falling. Indeed, it has increased, and it is difficult

*Under the Hill Burton Programme the Federal Government has made "matching contributions" to assist in the building of new hospitals. These contributions vary from one-third to two-thirds of the total cost of the hospital. The local sponsoring body may be public or private, but the hospital must be non-profit-making and provide a community service.

to see how much more can be done with our existing resources without a falling off in our standards of care. The rise of hospital infection, with its morbidity and mortality, is a grim warning of what may be in store unless the public conscience is roused to demand more new hospitals sooner. It is also suggested that the more efficient use of our personnel in modern hospitals—the replacement, for example, of two outworn hospitals for one fully equipped one—may make a significant contribution to the problems of medical, nursing, and ancillary staffing.

In addition, some observations are made on what seem to be important points to consider when designing new hospitals. They are not intended to be exhaustive but to serve as items for discussion. The need to marshal such knowledge as we have of hospital needs and hospital building is stressed, and through a central intelligence service this information should be immediately available to anyone called to help in hospital development.

Finally, we would stress again that in the space available we have concerned ourselves solely with general hospitals. The problems of mental hospitals, for example, and other special hospitals are no less insistent; nor have we explored the role of the local authority or the part which it is hoped the general practitioners will play within the hospital service. Discussion on hospital

building reflects vividly the overlap of the three arms of the National Health Service and the need for the fullest co-operation and integration. Indeed, at peripheral level the hospital provides the only possible meeting-ground for all the professional elements of the service. Is it too much to hope that in the construction of new hospitals this will be recognized and definite meeting-rooms made available in which the medical and other workers in the National Health Service can come together to deal with the problems which affect them all?

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ARCHITECTURAL PROBLEMS OF NEW HOSPITALS

BY

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It has been said that it was lucky that our economic difficulties prevented us from building any hospitals in the decade immediately following the war, because our ideas of what a hospital should be like have changed so radically in this period. They have indeed changed, but of course they are still changing, and it is by no means certain that the rate of change has slowed down very much. However, we have now to build a substantial number of new hospitals to replace many which are hopelessly out of date and uneconomic, and we therefore have to take decisions now which will establish the pattern of hospital building in the next few years. The ability to meet changing need must be a first consideration in design.

Buildings have a considerable life. Even lightly constructed modern buildings will last, so far as structural soundness is concerned, for 50 to 100 years. Over such a period we must expect many changes in use. It has sometimes been argued that we ought to try to put up hospitals in a very temporary form, designed to last only a short period. However desirable this may be, it is not possible; building structures have to be designed to stand up against certain maximum stresses imposed by the British climate, including rare events such as gales of 100 miles an hour. If they are strong enough to stand up with certainty for one year they will be strong enough to last for 50 years. Buildings are expensive and we cannot afford to plan on the basis of a very short life for our hospitals. We must therefore try to design hospitals which, although structurally long-lived, are flexible enough to remain efficient under changing use.

There is more than one way of approaching the problem. One approach, which was strongly urged a few years ago, is to use buildings which are, in large measure, demountable. These buildings, it was hoped, would be composed of unit parts which could be taken apart and reassembled easily whenever necessary. Amongst other attractions this idea appeared to absolve hospital planners from the need to think very carefully about function; it presupposed that the building could always be rearranged to fit any type of use. Unfortunately, demountable building is not really practical. Complex modern buildings, like hospitals and laboratories, are an assembly of services—heating, lighting, ventilation, and drainage—they do not consist merely of walls and floors. To change the use of a building therefore involves not merely unscrewing and reassembling wall panels, but also changing the position of sinks, wash-basins, lights, power points, etc.

Attempts have been made to provide for freedom for rearrangement of services, but this means installing a tremendous network of service lines with take-off points in all possible positions. In any given arrangement of the building, only a very small proportion of the service lines are in actual use, and therefore buildings with this degree of flexibility are prohibitive in cost. Again, it has been found that demountable walls, with numerous channels and ducts for services, make effective soundproofing impossible and present difficult problems in hygiene and control of infection. There is little likelihood that we shall solve the problem of soundproofing demountable walls, as the soundproofing properties of