CHAPTER 3

STRUCTURE OF THE RURAL-HOSPITAL/HEALTH-CENTRE

A rural hospital which is intended to serve a given population should consist of a number of departments, chosen after a study of the prevailing conditions. The description which follows represents the sum total of departments which may go to make up a rural hospital; this does not, of course, mean that every hospital should contain all of them.

**Medicine**

The rural hospital should be in a position to receive medical cases. Leaving aside cases calling for the complicated equipment and specialist staffing to be found only in large institutions, there remain several classes of medical patients who should normally find a place in the rural hospital. First of all, there are the patients belonging to the most needy class in the rural community, i.e., agricultural labourers with no fixed residence. Any minor feverish condition, such as tonsillitis, seasonal influenza, or bronchitis, calls for a short stay in hospital with simple treatment. Secondly, in countries where the population is very scattered, there are hamlets and isolated farms at a considerable distance from the single medical practitioner in the nearest small market-town. It is practically impossible for treatment requiring a daily or twice-daily visit to be carried out in the home with any hope of regularity. It is of considerable help to the physician and to patients suffering from cardiac deficiencies, acute rheumatoid arthritis, or acute attacks developing in the course of endemic or chronic illnesses, if a number of hospital beds are available. Mott & Roemer 61 express this same view, in analysing the requirements of rural districts in the USA. Communications in rural areas are so slow that the country doctor may find it an advantage to have his more scattered patients admitted to hospital.

Lastly, the problem of convalescents in the town hospital may be partly solved by sending a number of patients to the rural hospitals. This measure should help to take care of fracture cases; the fracture, having
been reduced and splinted in a traumatology or orthopaedics centre, can be left to knit in a country institution which functions partly as a convalescent home. A number of rural hospitals situated close to towns could usefully be employed for this purpose.

Maternity Service

The rural maternity service calls for special examination, since the branch of public-health organization dealing with maternity represents the closest natural link between preventive and curative medicine.

Preparation for confinement normally takes the form of clinic visits during pregnancy, under a maternal- and child-welfare scheme. In the case of a complicated childbirth requiring surgical operation, whether foreseeable or not, the mother should be sent to an urban hospital equipped for major operations, anaesthesia, and resuscitation. Accordingly, the normal or subnormal confinement occupies an intermediate position between preventive examination and admission to hospital for urgent obstetrical operation. It is here that the crucial problem arises: should home confinements be encouraged, or should each village be provided with a few beds for maternity cases, as representing the primary aspect of the rural hospital structure? There are two opposing viewpoints, sometimes supported by arguments which admittedly have no common basis. Champions of the rural maternity-centre with beds emphasize the poorness of housing in rural areas and the risks such conditions entail. We have examined housing in the first chapter from the point of view of the hygienist. Such conditions would seem to argue in favour of confinement in a rural hospital, in hygienic and clean surroundings, where it is easy to guard mother and child against infection.9

Those in favour of home confinement cite the example of other countries where rural dwellings have nothing in common with the hut built of mud or palm-leaves. In the atmosphere of the Finnish rural home or of an up-to-date farm, normal childbirth—a physiological act with profound psychological repercussions—may take place under excellent conditions; and when the physician or midwife returns on the day after the delivery, they are glad to have preserved the intimate nature of this event which would have been lost in an institutional atmosphere, where the ties of affection cannot thrive. Those who advocate confinement in the home do not hesitate to stress the dangers of hospitalization and point to irrefutable examples of epidemics of neurotoxicosis among babies in nurseries and of outbreaks of nasopharyngeal influenza and abscess of the breast among mothers. It is also stressed that the scrupulous aseptic precautions
which are taken to reduce risks to newborn babies are ridiculous when it is realized that the infant will be plunged into a normal environment on returning to the home. One factor which has a considerable effect on the attitude of the community has to be borne in mind, namely, very young children in the home. In certain regions of high birth-rate, the mother has to look after two or three children between the ages of one and four years and, in some countries, she refuses to go to hospital to be confined unless she is allowed to bring her other children with her. It is almost impossible to provide hospital care for a mother accompanied by two or three children, and this creates complications which are probably unwarranted in relation to a normal, physiological act.

In such cases, the role of the public authorities will be to ensure:

(a) medical supervision of pregnancy;
(b) attendance of a midwife for the delivery;
(c) medical supervision of the mother for one to two weeks after delivery and of the infant during its first year at least; and
(d) domestic help before and after confinement.

This is the method which, according to advocates of home confinement, should be adopted in countries where rural housing is good.

In coming years, however, there will be an ever-increasing number of regions which, as a result of steadily improving conditions, will fall between the two types outlined above. A number of factors have to be taken into consideration in determining policy in this event:

(a) It is a fact recognized by nurses who have visited the less developed countries that the major puerperal infections are rare even when confinement takes place under the worst hygienic conditions.

(b) Simple equipment handled by intelligent personnel is all that is needed to carry out deliveries in the home under adequate conditions of safety.

(c) A system of home confinement, organized from the rural health-centre and operated by a competent staff with the assistance of local midwives, is less costly for the community than regular confinement in hospital.

Notwithstanding, a number of different cases may be singled out.

(1) In countries where rural housing is very poor and where the conditions of life in the village offer no hope of even a slight improvement within a short space of time, there is no option but to set up rural maternity-hospitals. Each hospital, however, should be so located as to serve at least 15,000 to 20,000 people, which would mean several hundred confinements per year, taking the normal birth-rate at 20 per 1,000. If judi-
ciously placed, the hospital will always be able to function as a centre for subnormal confinements even when the village has been cleaned up and the hovels of the countryside are disappearing. Such a maternity department, with a minimum of ten beds, will, of course, require the backing of a maternal- and child-welfare service. In the beginning, the capacity of the department should purposely be kept low, so that it will not be over-large when general conditions have improved. Two facts justify this view:

(a) It need not be expected that, as soon as the department is opened, all expectant mothers will agree to come there for confinement. We have already mentioned the cultural and psychological obstacles which are likely to stand in the way of immediate success for such a centre.

(b) By reason of the short rest-period after confinement in these countries, the turnover of beds is much more rapid than in town, where women in childbed remain in hospital for at least ten days after confinement. Where they remain only for an average of three days, ten beds can easily cope with from 800 to 1,000 confinements a year. These beds can be used to keep pregnant women under observation in cases where it is suspected that some complication may occur at the time of delivery.

(2) As modern ways penetrate, the country dwellers will convert and improve their housing, and it will gradually become better adapted to the requirements of home confinement. Even so, conditions will still be favourable for the work of the maternity department: it will carry out subnormal deliveries and admit women who so desire. It is, of course, understood that the standard rural maternity-department should on no account undertake complicated childbirth cases requiring major obstetrical operations.

If the unitary method is chosen, it will be possible to incorporate a maternity department, with a complement of 10-12 beds, in some of the health-centres. This might be done in the country and in suburban areas as well wherever housing conditions are poor. In areas where there are a number of obstacles to hospital confinement, the rural maternity-service should be principally a maternal- and child-welfare centre, on which teams of midwives, nurses, and domestic workers for carrying out deliveries in the home are based. Particularly interesting experiments of this type have been conducted with excellent results, in Egypt for example. The rural maternity services set up in the Ministry of Health hospitals and in social centres established by the Ministry of Social Affairs constitute a base for maternal- and child-welfare activities. The women are acquiring the habit of attending for examination at the preventive-medicine section.
They are given effective assistance at the time of confinement, which in the great majority of cases takes place at home with the aid of auxiliary midwives or midwives attached to the centre. Some time before the expected birth, the staff give advice on the arrangement of the room. They often manage to get the walls whitewashed, and boiled water and clean linen made ready. During the week following the confinement, a daily visit is made, and the midwife has to report on the condition of the mother and child. Most effective medical supervision of infants is carried out by the same staff. Lastly, the health-centre physician may carry out minor obstetrical operations himself, and cases requiring more complicated intervention are referred to the urban hospital.

A similar situation prevails in Indonesia, where village midwives, the "dockoen", are given elementary instruction in hygiene and carry out normal deliveries.

The system described above involves a relatively small financial outlay as it is limited to the construction of rural maternity services with a bed complement of not more than 0.2 or 0.3 per 1,000 of the population.

(3) In advanced countries, however, a definite health policy should be decided upon, in full knowledge of the facts, as obstacles to hospital care gradually disappear and financial resources permit. The tendency in favour of the hospital is notable in several advanced countries, such as Australia, the USA, New Zealand, and the Scandinavian countries; it calls for an expansion of the existing maternity-services, however, with an increase in capacity to 0.6 beds per 1,000. In other countries, such as the Netherlands, confinement at home is preferred and the results in terms of death- and morbidity-rates are no less good. Consequently, the advantages and drawbacks of these two trends should be carefully weighed. Once a community has laid aside its prejudices, only the practical aspect of the problem need be considered. In modern towns, the smallness of apartments, the difficulty of finding domestic help, and the laundry problem, are probably factors which militate in favour of hospital confinement. The case may be otherwise in the country; it may be considered that hospital confinement should be encouraged only where medical supervision is required, or for social cases, or for women living in rural slums. The suggestion that the number of maternity beds in rural hospitals should be maintained at 0.3 per 1,000 (see table VIII, page 69) is based on such a policy.

To sum up:

(1) In countries where rural housing is indifferent or bad, a network of rural maternity-hospitals should be developed, especially where the birth-rate is low and no religious or cultural obstacles keep mothers from
entering hospital. The rural maternity-hospital is then entirely justified and its capacity may be calculated from the birth-rate by assuming that 50% of pregnant women will attend hospital; this would be equivalent to a rate of 0.2-0.3 beds per 1,000, wherever financial resources would enable this to be attained.

Where the population is very prolific—several young children in every family, making it difficult for the mother to leave home—and the religious and moral situation is against women attending hospital, a confinement-in-the-home service is indispensable; it is a stage that cannot be avoided. In that case, the rural hospital may contain only a very small number of beds for maternity cases or may even dispense with that provision entirely.

(2) In countries where rural housing is adequate, but where there are obstacles due to custom, or religious or social ideas, confinement at home is always a good solution and has the advantage of not calling for too great a financial contribution from central governments and local authorities.

(3) In countries where a programme of comprehensive hospital installation is feasible, the demand for hospital confinement must be carefully ascertained. Maternity hospitals could be enlarged and multiplied as required, to enable the great majority of deliveries to take place in hospital. We feel, however, that such a policy should not constitute an end in itself and that in rural areas where housing conditions are good, home confinement of cases, normal in the medical and social sense, is still the method best calculated to safeguard the health and the emotional stability of the family.

It is clear that the criteria proposed are subject to constant change with the passage of time. The quality of rural housing, the fertility of the population, their beliefs and prejudices, are all elements which change with the social and economic development of a country. The method selected to provide rural maternity-hospitals should be capable of adaptation to successive stages of development, and these, incidentally, may follow one another more rapidly in some areas than in others. It is thus quite conceivable that, at a given time, one area may be equipped with a network of rural maternity-services providing for hospital confinement, while another would have provision mainly for home confinement. It is clear, of course, that a rural maternity-service should not retain any case requiring a major obstetrical operation. Such cases, representing between 1% and 3% of the total number of confinements, should be referred to an urban hospital. This is the percentage which obtains in most rural areas where no special conditions, such as serious rachitism or osteomalacia leading to pelvic deformities, prevail.
Paediatrics

The care of sick children also raises difficult and controversial problems. Paediatricians stress the very special nature of children's diseases and often advise that paediatric departments be set up in the bigger centres, in this way opposing decentralization. In the under-developed countries, however, infant mortality is very high and a rate of 200-300 per 1,000 is not uncommon. An objective analysis of the facts shows that the great majority of deaths take place in the home, without a physician having been called in. In many countries, the village midwives do not hesitate to exercise their alleged skill on sick children, with deplorable results. Again, obstacles similar to those raised against hospital confinement are encountered when it is proposed to send young children to the large town hospitals. Throughout the whole of the East, no woman will consent to be separated from her child or agree to its being sent to hospital unless she goes with it. The child's young brothers and sisters, however, must also accompany her, so that it is not infrequent to see three or four people requesting admission for one case of illness. This practice has certain advantages: in addition to relieving the nurses of part of their work, it provides an opportunity for education of the mothers, and mitigates the psychological problem of separation. Here, dormitories for mothers can help. In this sphere, as in the case of the maternity service, it is essential to adopt a method which, although perhaps far from ideal, has the merit at least of being practical. In countries with a high infant-mortality, a number of beds for children in the rural hospital will certainly help to save some who would otherwise be inexorably condemned to death by being kept at home without medical advice. What is more, a good many child deaths might be avoided through widespread health education.

The system could be rendered considerably more effective by extending maternal- and child-welfare services to cover medical supervision of children up to school age, by having the standard type of hospital take in cases of illness among children detected through the medico-social service, and by organizing treatment in the home for mild cases who need nothing more than good advice on hygiene and diet.

Surgery

The practice of surgery in rural hospitals raises difficult problems, and the numerous experiments conducted in this connexion should be carefully analysed. The health authorities in every country that possesses an extensive hospital network agree that rural hospitals should handle minor
surgical cases, leaving major surgical operations to the urban hospitals, but the basic difficulty consists in drawing a line between minor and major surgery. It is hardly necessary to emphasize the fact that a minor operation may reveal extremely serious lesions and, further, that minor surgery as well as major surgery ought to benefit from the constant advances in medical science. The Egyptian Ministry of Public Health has endeavoured to restrict surgical work in rural hospitals by prohibiting the practice of general anaesthesia. This, however, is no real solution because, as is well known, many minor surgical and specialized operations call for general anaesthesia of short duration, whereas a gastrectomy can be carried out under a local anaesthetic.

Moreover, restriction of surgical work in rural hospitals is not strictly justified in law. The degree of doctor of medicine authorizes its holder to practise all acts proper to the art of healing, and any government action contrary to this right would be deemed an abuse of power by the supreme judicature. In practice, the plea of emergency will always be put forward for any operation judged outside the stipulated limits.

Lastly, effective supervision of a network of rural hospitals cannot be hoped for, owing to their dispersion.

The sole means open to a government are to limit installations and surgical instruments and to refuse to pay for surgical interventions. If the rural hospital has only a small operating-theatre and a strictly limited set of instruments, the local physicians will be compelled to restrain their surgical ambitions. The best solution, however, still lies in giving local physicians ready access to urban hospitals and taking all possible steps to avoid making a distinction as regards quality and prestige between town and country doctors. In these circumstances, serious surgical cases will be sent without hesitation to the service with the requisite staff and equipment for proper treatment. We have already considered the possibility of creating an urgent emergency service for on-the-spot accident treatment, consisting of a mobile team of specialists from the town hospital, reinforced by doctors and nurses from the nearest institution. This is another illustration of the principle that the hospital system should be regarded, not as a number of successive stages through which a serious case has perforce to pass, but rather as a group of more or less specialized institutions, to any one of which the patient can be sent direct on the advice of the family doctor or of the out-patient department nearest his home, and on which teams of specialists can be based, ready to make their knowledge and skill available over a large area.

If it is feared that persuasion will not be enough to secure the transfer of surgical cases to the large urban hospitals, refusal to meet the hospital fees of any patient improperly retained in a rural institution may be contemplated.
To conclude, the rural hospital may have a surgical department. The size and equipment of this will depend upon the functions assigned to it and these are governed by general factors, such as distance from a large hospital, ease of communication, and quality of staff. Nevertheless, it must be acknowledged that "rural" surgery cannot claim to fulfil the same purpose as specialized and so-called major surgery. Accordingly, the technical equipment of a surgical department should be carefully planned, bearing in mind local possibilities.

Communicable Diseases

The problem of communicable diseases in hospitals has been greatly advanced since the predominance of infection by physical contact (hands and clothing) over air-borne infection was established. Discipline among the staff, the use of disinfectants, and the regular changing of overalls and gloves make it possible greatly to reduce the transmission of infection in hospitals. For this reason, there is an increasing tendency in western countries to place cases of communicable disease in a special section of the medical department and to lay greater stress on the discipline and training of the medical and nursing staff, rather than to keep to the method of special isolation hospitals or pavilions in the heart of the country. In tropical countries, the problem is complicated by the danger of big epidemics of smallpox, cholera, plague, or typhus, although preventive vaccination and the use of insecticides seem likely to reduce these risks considerably in the future. It must be recognized, too, that a separate department for communicable diseases is a costly item, since it is rarely full to capacity nor is full use made of its specialized staff. The only hope for the rural hospital—which, as we have seen, is costly owing to its low average rate of occupancy—to reduce its operating costs is by considerable flexibility in the use of sickrooms. It should, too, have a more general, all-round staff, less specialized than in the large hospital. For all these reasons, it is not desirable to have infectious cases in the rural hospital, nor is the creation of a special department for this purpose advised. Where a doubtful case is admitted, it is a simple matter to isolate the patient and to disinfect the room after his removal to the communicable-diseases department of an urban hospital centre.

These suggestions are only valid, however, where the area under consideration is not subject to epidemics of dangerous infectious diseases (scarlet fever, cerebrospinal meningitis, smallpox, plague, etc.). In such cases, we have to consider ways and means of providing some scores of additional beds within a few days and of increasing the capacity of the rural hospital on a large scale. The use of tents may be resorted to, but this is far from
being an ideal solution because of the possibility of storms and tornados, and also because of the risks attached to their disinfection once the epidemic is over. A more practical method is to prepare in advance cement or brick platforms in the hospital grounds or on a neighbouring piece of land. Such platforms, to measure about 6 m × 15 m (6½ × 16½ yards), may be constructed very simply with no dug-out foundations; water-cocks and drainage outlets should be provided, however. When a large-scale epidemic comes along, pavilions made of local materials (reeds, beaten earth, palms, or prefabricated panels) can be set up in a few hours and roofed over with corrugated iron or thatching; when the epidemic is on the wane, they can be burnt. Here we have a means, rudimentary, it is true, but inexpensive, of accommodating for a few weeks each year a sudden influx of patients who have to be isolated. Individual isolation is not essential in such instances since all the patients are "companions in contagion".

**Endemic Diseases**

In certain tropical or sub-tropical countries (Africa and western and eastern Asia) a large section of the population suffers from parasitic disorders, the treatment of which forms a special aspect of hospital care. Patients suffering from severe anaemia or intestinal disorders cannot attend for treatment at the out-patient clinic of the health-centre until their general state of health has been improved by a stay of from two to three weeks in hospital. As a preliminary to specific treatment, care consists purely of feeding-up the patient, giving him iron and vitamins, and allowing him to rest. Since these patients are able to move about during the day, sickrooms need be nothing more than simple dormitories, with an adjacent day-room serving also as a dining hall.

There is no reason, of course, why such patients should not enjoy regular hospital amenities; we merely wish to draw attention to the possibility of providing simplified buildings for them, of a capacity that can readily be calculated on the basis of the average length of stay (about 15 days) and the proportion of serious cases among the community served by the hospital.

**Tuberculosis and Mental Disorders**

There can be no question of keeping tuberculous or mental patients in a rural hospital that has normal contact with the remainder of the hospital system. At the most, an urgent case may be admitted for a few hours, but it is always preferable for such a patient to be taken directly from his home.
to a specialized institution. Only the rural hospital situated in a mountain valley, an oasis, or on an island may have a special room, to be set aside for the use of a patient in a disturbed state, or of a tuberculosis case during a period of crisis in the disease, at times when bad weather makes transportation difficult.

**Out-Patient Services**

The organization of out-patient services in rural hospitals is the item on which opinions are most divided. In the majority of western countries where country doctors are fairly numerous (one at least per 2,000 people), general care is given in private practice, and the traditional type of rural hospital does not have an out-patient department. The opposite is true, however, in most of the under-developed countries; country doctors are few and the rural hospital is the chief place used by the people for out-patient treatment and preventive examination.

With the passage of time, these two extremes will probably tend to meet. It may be that the body of private medical practitioners will modify their opposition to hospital clinics in the light of technical, social, and economic changes. Their attitude has already changed to tolerance in the case of the large urban institutions, but has hardened to a veto against the provision of general care by the rural hospitals. One hears it said on all sides that the era of the independent practitioner is at an end and that modern medicine demands frequent recourse to specialists and complicated equipment—or, in other words, needs teamwork. This opinion is endorsed by all those who are anxious that medical treatment in rural districts should not be outstripped in quality by that available in the towns. Country doctors in France expressly requested the Ministry of Public Health and Population, during the second National Congress of the "Association de Médecine Rurale" held at Angers on 14 and 15 June 1952, to organize out-patient clinics in the country hospitals for the special branches of medicine. Moreover, the rural masses in the western countries, who have long been excluded from sickness-insurance or social-security schemes, are gradually becoming covered to an ever-increasing extent. Purely private practice is thus declining from year to year in these countries, and special legislation may soon enable all country practitioners to have access to the rural hospitals, by giving them the chance of instituting out-patient consultations on the hospital premises, on more or less unrestricted terms according to the political structure of the country. In this way, what has been termed "group-practice offices" would be created, where each physician would have his own consulting-room, and would be able to seek the advice of specialists from the towns while giving his patients the benefit of the hospital's technical equipment.
It should be noted that in countries where medical services have been nationalized, the rural hospital always has an active out-patient department. This arrangement exists in countries where the government is socialist and it also appears in the plans of the National Health Service in Great Britain, where shortage of funds alone has prevented an increase in the number of health-centres. Be that as it may, in the under-developed countries, the out-patient services in the rural hospitals are the basic means whereby modern medical techniques are brought to the country villages. Some public-health men are afraid that this development in curative work may be detrimental to preventive action, but others have not failed to perceive that the cure of common diseases is the best means of attracting the rural population to the health-centre, and there they will be given some basic education and the benefit of the protection afforded by preventive-medicine techniques. The Association professionnelle internationale des Médecins laid down among its basic assumptions that two categories of medical needs should be held as strictly equal, namely, individual needs, coming under therapeutics, and collective needs, coming under preventive work. The survey of the organization of medical and social welfare in rural areas, instituted by this Association at the request of Professor J. Parisot, studied "the utilization of official agencies by family doctors in rural areas". The Preparatory Committee of the Intergovernmental Conference of Far-Eastern Countries on Rural Hygiene stated in its report that curative medicine should be regarded as an instrument for the spreading of hygiene, adding: "It is an old-established fact that, if a somewhat primitive population is to be prevailed upon to take advantage of preventive medicine, the first step is to win its confidence", and: "... a beginning is made with hospital building; polyclinics are established, the nursing staff is trained and the confidence of the public is won in this way. The doctor then finds that his hospital can be used to promote the work of public health".

In the USA, where every possible type of situation is represented, it has been suggested that

"in some remote and very sparsely settled regions, in which it is impractical to retain a physician in residence, the medical service center would be of minimum size... it might consist only of several rooms in which the physician could conduct clinics... A nurse might be employed who would reside in the quarters, [and] act as public health nurse... The centers would serve a dual function: (1) as offices for physicians and dentists... and (2) as local centers for the administration of public health services... Physicians having their offices in the rural health center could pay rent for their office space, or... offices could be provided without charge to the physician as an inducement to practise in the rural community. Laboratory and X-ray facilities could be handled on a fee basis... or could be paid for out of taxation".

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*69 "...l'utilisation, par les médecins de famille, dans les régions rurales, des organisations officielles."
A tendency is found in the USA \(^{61}\) to allow physicians and surgeons to have consulting rooms in the local hospital.

In Italy, Moretti \(^{60}\) suggested that the local hospital (ospedali comunali e di circolo) could "occasionally include a diagnostic centre for the use of doctors in the area".\(^{1}\)

In conclusion, pending an agreement among the majority of countries, it may be affirmed that, in the under-developed countries, one of the basic functions of the rural hospital is to conduct out-patient clinics, with distribution of medicaments. These clinics should cover general medicine and surgery and some of the commoner special branches, such as otorhinolaryngology and ophthalmology. The frequency of endemic diseases of a social nature and the importance of advice in the field of maternal and child welfare, however, give a marked medico-social character to hospital clinics in these countries. Curative and preventive medical work regularly overlap there to such an extent that the border-line between the two, which is always difficult to establish, disappears completely. This naturally leads us to regard the rural hospital as a means for spreading preventive medicine and the principles of health among the agricultural population, and so to an examination of efforts that have been made in this direction.

**Preventive Medicine**

The two ideas, that of using the hospital as a centre for preventive medical work and that of installing beds and conducting out-patient clinics in the health-centre, have existed side by side for over 20 years. Whatever the initial starting-point, the end-result is the same, namely, a building equipped to provide for all the health work of service to the community. We have had occasion to point out the error committed in the past of building hospitals without taking any action to bring down the incidence of disease by use of public-health techniques. Conversely, the local public cannot understand why a public-health institution should refuse to give them relief from their everyday ailments. Moreover, the prevention of most endemic diseases is a complex process which inevitably includes a curative phase. Can one combat bilharziasis, yaws, malaria, or venereal disease and at the same time fail to give treatment to carriers of disease or parasites? The fact that this question is still a slightly controversial one at the present time is due to the dual concept according to which the State, through its officials, is in charge of preventive medicine, while the full responsibility for curing disease is shared by the public hospital and private

\(^{1}\) "... potrebbe anche costituirsi in centro di diagnostica al servizio dei medici della zona."
medicine. Clearly, in western countries, the social-security system cannot dissociate itself from the prevention of disease, since it is bearing the cost of illness. In the under-developed countries the work to be done is so great and the qualified staff so limited that strict economy must be practised by the co-ordination of all available means.

In conclusion, therefore, we feel that the following measures should be adopted in respect of a rural zone in an under-developed country:

(1) in an area where no health work whatsoever has been undertaken, the most practical prescription is that of the hospital/health-centre;

(2) where a hospital exists, advantage should be taken of its premises and equipment to develop a public-health service;

(3) where a public-health centre exists, an out-patient service should be incorporated and hospital beds installed, provided the demographic characteristics warrant this.

With regard to the preventive activities that should be developed, it will suffice to reproduce the list given in the report of the technical discussions that took place at the Fifth World Health Assembly: 97

Maternal and child welfare
Communicable-disease control
Environmental sanitation
Housing control
Public-health nursing
Health education of the public
Keeping of statistical records
In-service training of personnel
Medical care (to an extent varying with the needs of the area).

It would not be unreasonable, as the report also states, to assign the following additional functions to the health-centre:

Laboratory examinations
Dental services
School health-services
Mental-hygiene consultations.

Special building arrangements are usual for the practice of most of these activities. A detailed analysis of the functions carried out cannot well be made without reference to the relevant equipment and lay-out of the premises. Maternal and child health, tuberculosis control, venereal-disease control, and school health-examinations, will be dealt with in detail, therefore, in the next chapter (see page 91). Occupational medicine, mental hygiene, and health education, on the other hand, are functions which
require no special arrangements; they can be carried out in an ordinary room. Hence, we can proceed to examine these straight away.

**Occupational Medicine**

Medical examination of newly-recruited workers and the systematic case-finding of social and occupational diseases are becoming of increasing importance in the world of labour. These activities have little connexion with the hospital system of the large town, where the larger factories have independent medical departments, or different trades have joint services. Similar arrangements can be found in rural areas where agriculture is practised on a large scale, in the growing and harvesting of coffee, tea, cotton, rubber, etc. Apart from such special cases, however, where medical services may be organized on the same lines as in the large industrial undertakings, the vast majority of rural workers are divided into two classes: those working in small groups on the land, and those practising a skilled trade in the villages, making or repairing agricultural implements, or working in minor industries such as brick-works, saw-mills, and charcoal-processing. In rural areas, especially in the under-developed countries, occupational diseases are rare and one is hardly likely to come across more than a few cases of poisoning caused by the new insecticides. All other diseases regarded as occupational, such as malaria among rice-planters and bilharziasis among peasants working on irrigated land, in actual fact affect families as a whole, since all take part in agricultural work. On the other hand, there is considerable exposure to risks and a high injury-rate in rural, semi-industrialized occupations.

The organization of an independent occupational-medicine service has to contend with the scattered nature of these small undertakings and the fact that the pathological pattern in the workers practically coincides with that in the population as a whole. Very close co-ordination between rural occupational medicine and the public-health service is therefore reasonable. The most practical method is to use the hospital/health-centre as a base for agricultural occupational medicine. Moreover, this is a function that does not require any special equipment. This method does not, of course, apply in the case of the large undertakings already mentioned, nor of those which draw a large contingent of workers for a few weeks at a time, say, for the sugar harvest, either in sugar-beet or sugar-cane growing countries. A special occupational-medicine service should be planned for these exceptional cases, which amount to the transplantation of urban industries into the heart of the country.

Where undertakings employ some tens of thousands of labourers, hospital services are organized to deal with accidents at work, occupational
diseases and, in most cases, even the common medical and surgical complaints. In this way they help to equip the rural areas in which they are operating with modern hospitals, some of which are excellent. Nevertheless, it is important to foster the closest possible co-ordination between the general hospital system and private schemes, so as to avoid duplication or mistakes such as those mentioned in the first chapter. It is desirable that company hospitals should be open to the families of the workers at least, and that any difficulty in admitting a patient who does not work directly for the undertaking, or who has been paid off, should be regulated by agreement with the government authorities.

Mental Health

It is very difficult to assess the extent of mental disorders in rural areas at the present time. It is a known fact that psychiatric hospitals receive only a small proportion of country patients (with the exception of cases of more or less transitory mental disorders due to pellagra) but these are nearly always cases of advanced psychosis; on the other hand, any traveller will find a number of backward and mentally deficient people who are looked after locally and are even for their own good put to simple agricultural tasks. It would appear from statistics that in tropical Africa the percentage of specific mental disorders is about one-tenth of that found among urban communities. Neuroses and cases of slight psychosis are certainly quite frequent, but working in the country probably keeps these patients in a better condition than if they were employed in a factory. Lastly, village teachers are well placed to detect mental backwardness in any of their pupils. The organizing of periodic mental-health consultations would therefore seem to be entirely justified and would most likely clarify the psychiatric position among countrydwellers. At the present moment, unfortunately, the number of psychiatrists and psychologists in the underdeveloped countries is so small that action of this kind cannot become general within a short space of time.

Health Education

Education of the public may be regarded as the first stage in organizing preventive medicine. Any community which can distinguish, among the common actions of daily life, those which are permissible, from the point of view of health, and those which should be avoided, has already gone a long way towards safeguarding its health. The concept of the hospital/health-centre would give many occasions for attracting the public; it would warrant the organization of lectures, discussion groups, exhibitions, and
personal contacts for the purpose of health education. In some rural areas, the success of the health system will depend largely on committees being set up, composed of local personalities, which have to be consulted periodically and kept informed of all action contemplated. Frank discussion in such committees will help to show how health education of the public should be approached. Health education should take place both inside and outside the hospital. As regards education of mothers, we would mention the scheme adopted in some British health-centres whereby future mothers are supplied with patterns of infants' garments, and given advice on the layette to be provided. Similarly, a library may be organized with a small reading-room and lending service. The latter is only possible, however, where the literature of the country concerned contains a sufficient number of periodicals and works which link up in one way or another with public health. Most activities of the rural-hospital/health-centre may be used for the health education of the public. In the home this is ensured by visiting nurses and midwives, in the school by the teacher, who accompanies the children during the routine school health-examinations, and lastly by the example of the work of the sanitary engineer.

In a small rural hospital, the responsibility for health education may rest with the head nurse; but the physician, visiting nurses, and social-service workers, as well as the sanitary engineer, naturally have their part, too. Rural-hospital/health-centres constitute a magnificent field for the sociologist and ethnologist to study social phenomena in their simple state, as well as the growing influence of urban and industrial institutions on country life. Such studies may also be helpful for health education.50

Old Persons and Hospices

The placing of old persons in institutions has been the custom for centuries in some western countries, especially in Belgium, France, Italy, and Switzerland. On the other hand, the Anglo-Saxon countries, which have not developed a system of rural hospices similar to that existing in Latin countries, are now facing a serious problem in dealing with the old and infirm.

For the under-developed countries, whose peoples have an expectation of life of less than 40 years, this is a question that has not so far arisen. These countries will not have to tackle it in the near future, but one cannot help thinking that in some 20 years' time preventive and curative medicine will have led to a change in the age-distribution of their populations, and that institutional care of a larger number of old persons will constitute a problem. Without wishing to dwell on this subject, which is as yet far from
topical, we would like to draw attention to the financial and administrative advantages derived in the Latin countries from having the hospice and the rural hospital in close proximity. Many small country hospitals would have been unable to carry on had they not had a parallel home for the aged; the total number of beds thus available justified the provision of the general services and made their operation economical.
CHAPTER 4

ARCHITECTURE AND EQUIPMENT OF THE STANDARD
RURAL-HOSPITAL/HEALTH-CENTRE

The functions to be discharged by the rural hospital may be determined for a particular area by examining the various circumstances that govern life there. With the number of inhabitants known, the relative importance of the different functions will enable the bed complement for each of the types of service deemed necessary to be fixed. This is the basis for the architectural plan which will culminate in an actual building, where the functions regarded as essential are expressed in areas and volumes. We must again emphasize the wide divergency in choice from one area to another, since the rural hospital is a protean concept. Nevertheless, analysis brings to light certain common factors, enabling us to outline a practical framework into which the plan may be fitted. A description follows of a standard hospital/health-centre which is capable of providing all the required services and at the same time is planned to achieve the maximum of economy. As we go along, it will be easy to see how some of the features may be cut out or, contrariwise, doubled or added to, where the community served is very large.

The rural hospital should not be a mere reproduction of the urban hospital; it has its own particular part to play, which is not to serve as a mere treatment-centre but to act as a public-health institution and school of health education as well. The success of the rural hospital will, in the main, depend on the manner in which its services are made available to the countrydweller. In the planning, on which success or failure of the rural health-programme will depend, the architect plays an important role.

General Conditions, Type of Architecture, Site, and Orientation

The rural hospital has to form an integral part of a community, and the type of building chosen should correspond to local building and maintenance facilities. Moreover, as in most cases its activities will be expanding,
the design of the rural hospital should be sufficiently flexible to allow of adaptation to meet new health needs. In many under-developed countries, the original nucleus may for some years consist of a diagnostic and public-health centre with a small maternity unit attached; medical and surgical departments will only be added afterwards. In other countries, the rural hospital at first may be run for in-patients only, and it will be out-patient and public-health clinics that are added gradually as time goes on. It rarely happens that a comprehensive hospital/health-centre can be built straight away with an optimum capacity and organization. To ensure the flexibility necessary to the rural hospital for development purposes, the architect should from the outset use a design capable of subsequent expansion to an extent that cannot always be foreseen. Lastly, one must not expect to find staff in rural areas able to handle mechanical equipment properly, or technicians for its repair and maintenance. For all these reasons, the rural hospital should be made up of simple buildings, with as little mechanization as possible, and should be capable of being added to subsequently or even modified inside. This all argues in favour of standardized buildings, of not more than two storeys, consisting of units so fitted together as to allow for future additions. In a small-capacity hospital, it would be unwise to provide for lifts, which are as costly to build as they are to maintain.

As regards the in-patient sections proper, the plan adopted should take into account the average rate of occupancy and the small number of the staff. In a large hospital with some hundreds of beds, it is usual to find separate sections for surgery, medicine, and individual specialities, each divided into wards of about 25 beds, assigned to men, women, and children respectively. In the case of the rural hospital, it is obviously impossible to apply the same idea, owing to the smaller capacity; in many cases, this will not exceed one or two wards of the traditional type. In many countries, segregation of the sexes is required by custom and this tends to reduce the flexibility of the hospital by making two strictly separate wards necessary. Consequently, it is no longer possible to divide these into sections devoted exclusively to surgery, medicine, and obstetrics. The most one can do is to set aside one end of a ward for surgery and the other end preferably for medical cases, the intervening portion to accommodate patients coming under one or other branch according to the predominating needs of the moment.

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*In this connexion "flexibility" means that an overcrowded ward may temporarily take over some rooms from a neighbouring ward which is not occupied to capacity. To make this definition clear, we might say that an hotel composed of identical rooms has maximum flexibility since guests can be taken in until the hotel is fully occupied; at the other extreme, a hospital whose departments are housed in different pavilions between which no exchange is possible has a minimum degree of flexibility only, since patients in one category may have to be refused although there are vacant beds in other pavilions. The idea of flexibility also applies to the out-patient department and technical services; some rooms could be employed for several purposes.*
One of the basic questions arising in a construction programme is to choose between communal wards with more than six beds and wards of smaller capacity. In the hospitals of western countries, the smaller-capacity ward has nearly always been adopted (six and its sub-multiples, three and one, or, mostly, four and its sub-multiples, two and one). Apart from the fact that this arrangement gives patients a feeling of privacy and comfort, smaller wards distributed among nursing-units allow for maximum flexibility by making each department less self-contained, and the strict segregation of men and women less rigid. It must be recognized, however, that nursing-units composed of small wards call for a larger staff, are more difficult to supervise, and are intended for an educated public, clean in habit and familiar with the use of sanitary installations.

In many under-developed countries the lack of nursing staff and the ignorance of the public precludes the adoption of the smaller-ward system; communal wards of more than six beds will have to be retained. It remains to be seen how a type of building reconciling these two tendencies can be selected.

The site for the hospital has to be chosen with care. It must be safe from flood and avalanche and must not be overhung by any eminence; the subsoil must be both firm and permeable and not subject to landslips. As far as possible, care should be taken to avoid building-plots near important cross-roads, railway stations, or factories. These are a source of noise and smoke, and might also be the scene of social disturbance or of destruction in time of war. The aspect chosen should be such that the prevailing winds do not reach the building after crossing the town or village, for, apart from smoke and smells given off by small country workshops and farms, they may carry insects from manure-heaps, gutters, dumping-grounds for waste matter, or natural manure awaiting use. In rice-growing and market-gardening countries, preference should be given to rising ground or hillside where mosquitoes are less prevalent. Lastly, the site selected must be sufficiently extensive to allow for the construction of the institution and its annexes (accommodation for physicians and staff, garages, incinerator, water-tower, and mortuary) as well as for eventual additions. Generally speaking, an area of one hectare (2.47 acres) will suffice for a rural-hospital/health-centre.

After examining all suitable plots, taking into consideration communications facilities and water-supply and sewage-disposal possibilities, the site nearest to the village should be selected so that out-patient clinics and public-health services will be within easy reach of the public they are intended to serve. This is a recommendation we must press; it has often been neglected on the pretext of finding a quiet and airy location. The latter requirement may have seemed desirable at a time when the hospital con-
sisted only of in-patient services and there was general belief in air-borne infection, but it no longer holds today. The normal concept of the rural hospital is that it should be readily available to afford the whole population curative and preventive care; it must therefore be within reach of the people, and, where there is any doubt, it would be better to sacrifice a secondary requirement so that the site chosen will not be too far away.

In the case of a somewhat larger hospital, which is to be situated in an agglomeration already organized as a town and which will form the transition between the small village hospital and the urban hospital, the establishment of the centre may provide an opportunity for attempting rational integration in the town-planning scheme. It has been seen how, in countries with cramped villages built to no regular plan, the hospital/health-centre has to be set up on the outskirts, so as not to interfere with the inevitable subsequent changes in the village on more rational lines. In countries where the design of small towns is governed by a specific policy which may reasonably apply in the future, the site of the health-centre can easily be incorporated in the town-planning scheme, since radical changes in the latter will not be needed. Where the design is rectangular, the hospital/health-centre will find its natural place in one or more of the rectangles or squares marked out by the streets, far from areas containing slaughter-houses, small factories, repair shops, or rubbish dumps; preference should be given to a peripheral rectangle, opening on a garden belt and situated in the residential section. Where the plan of the town is that of streets radiating from a central point, there is generally a sector, lying between the angle of two of the streets, where the modest requirements in space for the development of health services (one hectare on an average) can be found at a reasonable distance from the agglomeration’s centre of gravity. Very often this design has an outer circular boulevard where the old walls once stood. The hospital might well be placed outside and at a tangent to this boulevard, while still remaining within the residential district.

Orientation has to be gone into thoroughly. Speaking very broadly, two main types may be considered. In temperate or cold countries, the tendency is to face the sun and avoid driving rains brought by the prevailing winds. By preference, therefore, the main axis will run from east to west so that the front of the building faces south. The wards will get the sun and the other departments will face north (fig. 5 A). In hot countries, the tendency is to avoid the sun and seek the breeze. Since the wind often comes from the northwest or southwest (trade winds), it would seem advisable to turn the frontage round to lie at a 45°-60° angle to the cardinal points of the compass, so as to take full advantage of every breath of air. This kind of orientation at an angle, however, does not keep out the setting sun, which shines in under the awnings in the late afternoon and heats the rooms facing west (fig. 5 B).
FIG. 5. HOSPITAL-UNITS IN TEMPERATE OR TROPICAL REGIONS

A. Traditional design for temperate regions, with projecting roof and main frontage facing south and parallel to west winds so as to avoid driving rain.

B. Design for tropical regions, with open-air verandah and permanent ventilation ensured by louvered windows; cross-section shows ventilation of rooms, raised basement, and roof, by means of the roof-opening turned to face the wind and the apertures in the verandah roofing.

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If there is indecision whether to choose orientation according to the sun or according to the direction of the prevailing winds, it is best to hold to the sun, since the course it follows is strictly fixed, whereas air currents are easily deflected by the use of slanting screens or louvered windows, inserted in the window frames. Any joiner can make louvered windows to give
protection from the sun's radiation and to catch and conduct the prevailing breezes into the interior of the building, by means of vertical divisions set at an angle slanting to the horizontal. Mostly, therefore, the axis of the building may run from east to west, as in temperate countries.

If the prevailing winds blow definitely from east to west, however, siting at an angle is essential, with special protection for wards facing west. In any case, it must be remembered that between the tropics the sun moves around the zenith, shining alternately on both sides of a building whatever its orientation. Protection against radiation is, in the final analysis, more a matter of constructional detail than of geographic orientation.

These climatic conditions are reflected in the general design of the building. In northern countries where the wind is to be feared, buildings generally have longitudinal internal walls, forming a central and more or less axial corridor. This is a traditional arrangement which avoids draught from the windows in the outer, longitudinal walls. Moreover, the windows receive the maximum amount of light, since they are flush with the walls. In tropical countries, on the contrary, the wind should be able to circulate freely, and wards should preferably be placed axially and be served by lateral

**FIG. 6. CONSTRUCTION-DETAIL OF BUILDING FOR TROPICAL REGIONS**

Thick walls of materials of low heat-conductivity, and small apertures protected from the sun by projecting roofing.

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corridors, running along the main frontages and covered by projecting roofs so as to reduce the light and prevent the sun’s rays from beating too long on the walls.

**FIG. 7. CONSTRUCTION-DETAIL OF BUILDING FOR EQUATORIAL REGIONS**

![Diagram of construction detail](image)

- **V** = Ventilation
- **S** = Sun
- Pivot door providing extensive shade from horizontal ("open") position
- After Neutra

No hard and fast rules can be laid down concerning the choice of constructional materials. In many countries, brick and cement are widely used, as a combination of the two is easy to mould and lends itself to standardized main elements. A number of essential parts can, in fact, be standardized and pre-fabricated; e.g., window- and door-frames, beams, hollow brickwork, and columns. The intervening wall-space can be constructed rapidly in brick, using panels pre-fabricated locally or employing well-planned, high-speed building techniques. In some tropical areas lying at a considerable distance from towns or ports, the cost of transporting cement becomes prohibitive. Yet timber cannot be used in most of these countries because of termites. It may be advantageous to order supporting materials in metal—generally much lighter than cement—for the standardized posts and beams, the intervening wall-space being filled in with local materials,
such as rough dried bricks or cob ("potopoto" in Africa). The advantage of this system is that it allows local labour, which is generally skilled enough, to aid in the construction of the building, once the framework has been assembled by a few specialized fitters.

A few simple facts have to be taken into account regarding the thickness and thermal capacity of wall materials. In desert zones, characterized by a considerable variation between day and night temperatures, the walls need to be very thick and buildings partly buried in the soil (where there is no danger of flooding); the materials chosen should have a high thermal capacity, i.e., should be slow to heat up or to lose heat. For the same reason, window openings should be narrow (fig. 6). In an equatorial zone, on the contrary, the nights are hardly less warm than the days; materials of low thermal capacity should therefore be used, and should be as thin as possible so that they rapidly lose through radiation the heat accumulated during the day. Window openings should be very wide; they may have glazed frames for use when the wind drops, provided the frames can be effectively protected against the direct rays of the sun. When the wind rises again, the windows can be opened and the louvers will admit the air (figs. 7 and 8).

**FIG. 8. HOSPITAL PAVILION FOR EQUATORIAL REGIONS**

\[ \text{Thin walls; projecting roofs; pile foundation; turfed slopes; roof, corridor, and room ventilation by means of louvered apertures} \]

After the "Bureau central d'Etudes pour les Equipements d'Outre-Mer".
The type of roof needs careful study. The flat roof has one considerable advantage: it enables an additional storey to be added later, without undue interference with the use of the ground floor. It can only be adopted, however, in countries where the rainfall is very slight since, as a rule, however much care is taken, it does not remain water-tight for more than 20 years and calls for meticulous repair. In countries with heavy seasonal rains or tornados, the traditional type of roof, which is durable and easy to maintain, is an excellent choice. Built as it should be, if offers better protection against heat than the flat roof, provided it has constant ventilation, so that the air blanket beneath the roof does not store up heat.  

Fig. 8 shows how wards should be encompassed with moving air so as to avoid the storing up of the sun's heat in the walls and roof. The breeze enters by the outer verandahs and splits up, part passing through the rooms and the remainder circulating beneath the roof where it meets other air currents drawn in through the lateral roof-opening turned to face the wind. In addition, the whole pavilion is built on piles, which ensures ventilation of the space below the flooring and keeps out insects and rodents, provided, of course, that the piles are suitably treated for the purpose.

Lastly, the grounds around the buildings should be given careful consideration. Bright surfaces reflecting the sun's rays obliquely upwards should be avoided, and grass should be planted below the hospital windows to absorb radiation during the day. A good way to reduce radiation to a minimum is to build on a mound, one to two metres in height (roughly 3'-6') and to lay out grass banks sloping gently outwards, which will take the sun's rays and turn them away from the building. Finally, shrub screens and trees for shade on the west side should not be overlooked; the latter can do much to insulate the buildings.

We have dwelt at length on the characteristics which buildings in warm countries should possess. The requirements for colder climates are better known: heat insulation of walls and ceilings, double windows, roofs to stand up to the weight of snow, internal piping to avoid freezing, and firmly secured and stormproof roofing.

**Nursing-Unit**

The nursing-unit is a grouping of accommodation for patients, with service-rooms and means of access, that enables a team of nurses to care for in-patients under the best conditions. So far as acute cases are concerned, there seems to be general agreement on an optimum capacity of 25-30 beds, not including cots and rest-beds. In western countries, the scheme most generally adopted provides for grouping in six-bed, three-bed,
and one-bed wards, or in four-bed, two-bed, and one-bed wards. In countries where lack of nursing staff imposes limitations, the lay-out may be modified by adopting a simpler arrangement, consisting of separate cubicles set up in a large ward and partly partitioned off. When properly executed, this type is less expensive to build and to run, and has the advantage of providing for subsequent conversion into a regular unit. All that is needed to convert this simplified type into a more elaborate nursing-unit, ensuring greater comfort to the patients, is to complete the cross-partitions and set up an internal longitudinal screen before each group of four beds. Nevertheless, every nursing-unit should include at least one complete two-bed ward and two isolation wards (fig. 9).

**FIG. 9. NURSING-UNIT OF 25 BEDS**

1. Baths and washbasins
2. Ward kitchen
3. Nurses’ workroom (two sections: soiled and clean instruments)
4. Dressings-room
5. Doctor’s office
6. Nurse’s station
7. Supervisor’s desk

\[ a = w.c. \]
\[ b = Cupboard \]

Research conducted in Switzerland, Sweden, France, the USA, and Great Britain has led to the laying-down of more or less definitive dimensions for the nursing-unit. The four-bed ward is roughly 5 m wide by 6 m long by 3-3.20 m high (16½' × 19½' × 10-10½'). The central corridor is 2½'-2½ m wide (roughly 7½'-8½') and most of the service-rooms—ward kitchen, nurses’ workroom, dressings-room, doctor’s office, and nurse’s station—are grouped at the entrance so that patients will be as near as possible to nurses during slack occupancy periods. Each service-room has a floor-space of 15 m² or 20 m² (about 18 or 20 square yards), according to
whether it is the same width as the wards or is on the other side of the dividing corridor cutting the two parts unevenly (fig. 10).

**FIG. 10. RURAL HOSPITAL OF NOT LESS THAN TWO NURSING-UNITS**

1. Baths and washbasins
2. Ward kitchen
3. Nurses' workroom (two sections: soiled and clean instruments)
4. Dressings-room
5. Doctor's office
6. Nurse's station
7. Supervisor's desk

Whatever arrangement is adopted, the total floor-space of the nursing-unit will be much the same. In the first type, the total width is given by 2 m × 5 m (for the rooms situated on either side of the corridor) plus 2½ m for the corridor, making 12½ m (13½ yards) in all, while the length is five times the standard 6 m per ward, which makes 30 m (33 yards). The area, 30 m × 12½ m = 375 m² (448½ square yards), gives a floor-space of 15 m² (about 18 square yards) per bed. In the second type, the width is reduced by 1 m at the expense of the two-bed wards and the service-rooms, but the length is increased by half the standard ward-length. The unit is thus 11½ m (12½ yards) wide by 33 m (36 yards) long, i.e., 379½ m² (459 square yards), giving a floor-space of 15.18 m² (18.2 square yards) per bed.²⁴

The distribution of wards and service-rooms may vary according to the total capacity of the hospital in order to provide the requisite flexibility.

(1) Where a hospital comprises one nursing-unit only of 25 beds, and strict segregation of the sexes is necessary (which is the case in most of the under-developed countries), the group of service-rooms may with advantage be placed in the centre of the unit, thus ensuring effective separation of the two sections while maintaining, in principle, a single operational unit,
served by one team of nurses. In the plan proposed (fig. 11), the group of service-rooms is placed between the two parts of the divided unit, reserved for men and women respectively, but the capacity is reduced by one bed, because two completely separate sanitary installations have to be provided and it is also advisable to have two rooms for dressings. Half a standard ward-length is sacrificed to this end but four two-bed wards remain which can serve as isolation rooms. In order to ensure complete separation between the circulation of patients and visitors, entrances are provided at both ends of the unit. The central section is used by the medical and nursing staff only and can be barred to patients and visitors alike by two doors (shown by dotted lines). Should a preliminary study show that the number of male in-patients is likely to be consistently higher than that of female in-patients over a number of years, the group of service-rooms may be moved to one end so as to leave, say, 16 beds on one side and 8 on the other, or any other ratio deemed advisable.

**FIG. 11. SINGLE-UNIT RURAL HOSPITAL**

1. w.c.  
2. Ward kitchen  
3. Nurses' workroom  
4. Dressings-room  
5. Doctor's office  
6. Nurse's station

(2) A hospital containing two 25-bed nursing-units has greater freedom of action; it may adopt one of the lay-outs shown in fig. 9 and 10, since one ward can be reserved for men and the other for women. In these examples, service-rooms have purposely been placed at one end to enable patients to fill the wards nearest the staff, leaving the more distant wards vacant in periods of low occupancy and thus making for greater ease of working. One external connecting corridor will be sufficient. This lay-out
applies to two independent units which must be serviced by two separate teams of nurses. An attempt can be made to reduce the length of the traffic lines and make the arrangement of the two nursing units more uniform by providing a single group of service-rooms. The arrangement shown (fig. 12) has considerable advantages when the two unit teams are unequal in number owing to shortage of nurses. In this way certain tasks common to both units may be entrusted to a single person. It will be noted that there is only one sterilizing-room for two dressings-rooms, a single doctor's office, and one ward kitchen for both units. Two units arranged in this way can cope satisfactorily with from 25 to 50 patients.
The suggested arrangement ensures strict segregation of the sexes, as patients have no occasion to enter the central section. Nevertheless, the maximum elasticity is ensured for medical and surgical services within each nursing-unit, since mutual "borrowing" can readily take place between the outer rows of four-bed wards. The corridor is lit by high windows, possibly placed over the corner cupboards, as well as by the glazed doors of the service-rooms.

**Wards**

Although the foregoing lay-outs comprise four-bed, two-bed, and one-bed wards, the six-three-one arrangement is equally worth considering; it has given excellent results in large-capacity hospitals. It makes for a

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**FIG. 13. FOUR-BED WARD, CLOSED**

1. Built-in locker  
2. Bedside cabinet  
3. Bed  
4. Chair  
5. Nurse's calling station  
6. Window curtain  
7. Wastepaper basket  
8. Lavatory  
9. Wallbracket light  
10. Bed light  
11. Corridor light  
12. Night light  
13. Overbed table  
14. Telephone  
15. Cubicle curtain and rod

*After standard plans drawn up by the US Public Health Service*
considerable decrease in length and this reduces the distance to be covered by the nurses. A six-bed ward, three beds deep, requires more width, however, and this involves a raising of the ceiling to ensure that the bed furthest away from the window receives enough light.

General agreement has been reached in most countries that preference should be given to the Rigs plan which specifies beds lying parallel to the main frontage of the hospital and receiving light on the side, rather than the old peripheral arrangement where the patient faces the window across the room. Fig. 13 and 14 show plans taken from the recommendations of the US Public Health Service (Elements of the General Hospital); they provide excellent lay-outs for a standard four-bed ward, either independent or as described above, i.e., semi-independent with incomplete partitioning. What is chiefly to be retained from these, however, are the general dimensions and the arrangement of beds, since many of the details, such as curtaining, individual lighting, telephones, etc., would not suit the conditions prevailing in under-developed countries.
Nor are modifications in the dimensions precluded; the plans submitted by Vogler & Hassenpflug \(^{88}\) (fig. 15) show various possible arrangements.

**FIG. 15. LAY-OUT OF FOUR-BED AND SIX-BED WARDS, WITH DIMENSIONS**

![Diagram of four-bed and six-bed wards with dimensions](image)

\(A = \text{Section} \quad B = \text{Plan} \quad 1 \text{ metre} = 3.281 \text{ ft.}
\)

*After Vogler & Hassenpflug \(^{88}\)*

In large hospitals, specialized nursing-units have to be provided for maternity cases, children, communicable-disease cases, and tuberculosis and mental patients. This is fully justified by the special care these types of patients receive and also by the regularity of attendance, which ensures that these departments always have a high average rate of occupancy. It is very
doubtful whether such arrangements can be recommended for the hospital in rural areas, bearing in mind its nature. Discussions which took place, for example, on the subject of the lay-out of maternity wards and, in particular, on the choice between separate nurseries for newborn infants or the method of “rooming-in”, led to the ingenious system used in the George Washington Hospital in Washington, D.C.: 49 which has been adopted by the Ministry of Health and Population in France. 24, 31 Such a scheme would not be applicable to rural hospitals. We have seen that in most cases mothers will not agree to being separated from their children, so that “rooming-in” automatically becomes necessary. Moreover, since serious cases have to be referred to the urban hospital, there is no need to provide even a small nursery for sick babies or babies born to a sick mother. In the rural hospital, the maternity ward does not call for any special features, the only difference being the cot beside the mother’s bed.

Likewise, it is not desirable to have communicable-disease cases in the hospital; nearly always, a suspect can be isolated in a two-bed or one-bed ward, which is easy to disinfect after his removal. In the under-developed countries the rural hospital ward must be of the simplest type and should serve for all categories of in-patient. The possibility of erecting temporary pavilions, to be burned down once an epidemic is over, has already been mentioned (see page 82).

*Service-rooms*

The same simplification is necessary for the service-rooms. The smaller number of nurses and the comparative simplicity of the tasks they have to perform must always be borne in mind. Any complicated design with bays should be ruled out as being difficult to keep clean and to supervise.

In the large modern hospital, the work of each nurse is specialized within quite narrow limits and the tendency is to allocate a special office for each specific function attaching to the various departments in the unit. In the rural hospital, on the contrary, the nurse has to undertake a variety of duties and this combining of functions automatically leads to fewer service-rooms.

Only the essential should be retained. This consists of:

(a) Dressings-room where minor septic operations requiring extensive dressings can be carried out, without having to transport the patient to the operating theatre.

(b) Nurses’ workroom with sterilizing apparatus, medicine- and drug-store, table for preparing injections and sterile articles, and counter and sink for cleaning used instruments (syringes, needles, fingerstalls, gloves,
probes, minor-surgical instruments); it is used also for preparing biological specimens for dispatch to a local laboratory or a central hospital.

(c) Ward kitchen for the reception and distribution of food from the central kitchen and for preparation, where necessary, of special diets and babies’ bottles.

(d) Doctor’s office.

(e) Nurse’s office.

(f) Sanitary installations for patients. The need to disperse these installations so as to bring them within easy reach of patients has been recognized in the urban hospitals of western countries. Modern nursing-units contain up to eight w.c.’s., arranged in proximity to the wards so that in practice there is one sanitary installation for every four patients. This arrangement cannot be recommended for a hospital serving a community which is unaccustomed to such amenities. In many countries experience has shown that the sanitary installations in hospitals can be kept clean only if they are concentrated in one spot, and are easy to supervise and to sweep and sluice out. It would obviously be a mistake to install complicated modern sanitary systems, easy to put out of order, in rural hospitals. Sanitary installations should include a slop-sink for the emptying of bed-pans and urinals, and racks for the storage of these utensils. Such a system, which would be very much open to criticism in an up-to-date big hospital, would allow ambulant patients to help those confined to bed, thus lightening the work of the nurses.

(g) Built-in cupboards for clean linen, cleaning utensils, and fire extinguishers, as well as accessories which have to be kept at hand such as spittoons, bed-craddles, and hot-water bottles. Soiled linen should be taken straight to the washhouse to avoid unpleasant odours and the collection of flies and other insects. Owing to the low capacity of rural hospitals, there is no point in arranging a special room for soiled linen. It will suffice if wheeled metal stands are provided, with bags attached, into which used bedding is placed and which are then fastened and sent to the washhouse. Wall-cupboards should be sufficiently deep to take a stretcher and possibly the food-trolley. Stretchers may be unnecessary if beds are fitted with castors and a brake, enabling patients to be wheeled to the operating theatre and the X-ray department. Here again, however, it must not be forgotten that frequent movement is less necessary than in large urban hospitals, owing to the relative simplicity of cases admitted to the rural hospitals. On the other hand, movable beds need to be strong and floors must be even. Where outdoor movements or changes of level are involved, it will be better to use the standard type of stretcher; it is often the only possible way to negotiate stairs or outdoor passages.
Technical Services: Operating-Suite, Delivery-Room, Laboratory, Electro-Radiology Department, and Dispensary

The structure and position of these departments should be decided after taking into consideration the actual conditions in which they will have to function. These are the places in which the physician, often the only one, will do his work, helped by the head nurse; they will be used for every activity of the hospital and probably more for out-patient and public-health work than for in-patients; in short, they will satisfy the requirements for straightforward and simple work. Three indispensable elements will determine the position and size of the technical departments in a rural hospital: central position so as to cater for the main activities—in-patient and out-patient care and public-health work; composite grouping, to cut down constant traversing of corridors by the physician and the head nurse; and, lastly, segregation of patients and visitors from the traffic-lines. These various conditions can be met in a number of different ways; many designs for small modern hospitals satisfy the requirements (fig. 16 and 17). Generally speaking, a + or an H design is suitable. In a + design, the technical departments may be placed in one branch of the cross; in an H design, they form the link between the in-patient and the out-patient departments.

FIG. 16. HOSPITAL/HEALTH-CENTRE WITH 30 BEDS

1. Out-patient clinic and health-centre (administration)
2. Technical services
3. Nursing-unit
4. General services

a = Main entrance
b = Health-centre entrance
c = Emergency entrance
d = Service entrance
e = Laboratory and X-ray
f = Operating-room
g = Delivery-room
h = Sick-rooms
i = Isolation
j = Maternity service
k = General services

After standard plans drawn up by the US Public Health Service
Operating-suite and delivery-room

There are three types of activity which call for the use of surgical methods and which have certain arrangements in common in the matter of architecture and technical equipment. These are aseptic surgery, septic surgery, and child-delivery. The rooms in which these activities take place will all require special lighting, washbasins for careful cleansing of the hands, specialized furniture, washable and resistant wall-coverings, and ancillary rooms equipped for cleaning and sterilizing instruments. In applying these general principles to the rural hospital, some amplification is needed.

The most common of the activities is minor septic surgery. The out-patient department receives many patients suffering from abscesses, whitlows, ulcers, and the presence of foreign bodies; to these may be added reducible closed fractures calling for plaster splints. All such cases can be treated in the same room which may be called the septic-dressings and plaster-splints room. It is important that this room should connect with the out-patient department from which most of its patients will come.

Aseptic surgery will be much less common, since, theoretically, major surgery cases should be referred to the urban hospital. It will be limited
to a few operations such as removal of foreign bodies, varicoceles, and possibly simple hernias. The room reserved for this work may also be used by ear, nose, and throat specialists and ophthalmologists coming from town periodically for specialized operations (removal of tonsils and adenoids, and small eye-operations such as that for trichiasis).

Lastly, a room must be provided for normal deliveries, and complicated maternity cases not requiring major obstetrical intervention. The present tendency in western countries is to set up a completely independent maternity section, with its own delivery-room kept separate from the surgical suite, so as to avoid any risk of puerperal infection. Such an arrangement, however, is possible only where there are enough qualified nurses to service two separate suites in operation simultaneously. In addition, this lay-out calls for two sterilizing-rooms, two washrooms and two workrooms for the nurses. As puerperal infection is rare in the under-developed countries, the delivery-room and the operating-theatre may, we believe, be placed in the same suite.

In regions where home confinement is organized under the maternal- and child-welfare service, with complicated maternity cases diagnosed in pregnancy being sent to the urban hospital, the rural hospital will receive only those difficult cases that have not been recognized in advance, or have not been removed to town either because of transport difficulties or because a relatively minor operation, such as use of forceps, or version, or artificial delivery, would suffice. In such cases, the operations involved come within the field of surgery and can be carried out in the aseptic-room. Since the hospital has no beds specially earmarked for maternity cases, an independent delivery-room is not necessary, but wherever there is an average of eight to ten maternity-beds in constant occupation, a special room is essential where normal deliveries can take place in the best possible conditions.

As regards the siting of these rooms within the hospital, it is important to note that the delivery-room is reserved principally for women already admitted as in-patients, that the aseptic-room for specialized operations receives both in-patients and out-patients, and lastly, that the septic-dressings and plaster-splints room is intended chiefly for out-patients, as dressings-rooms are provided in the nursing-units for the use of in-patients.

The architecture and equipment of these rooms should be simple. An area of 25 m² (about 30 square yards) per room is sufficient, since the nature of the operations does not call for several assistants to be present, or for accessory equipment (such as anaesthetics trolley, stands, and tables) of the size and numbers required in operating-suites of large hospitals. The wall-covering should be carefully executed and should consist of unpolished earthenware tiles or other material not liable to deterioration. The colours commonly adopted are green or blue, to avoid dazzle. The flooring
should be a conductor of electricity (so as to avoid the danger of explosion caused by static charges) and should, of course, be washable and highly resistant, since certain places, especially those around the operating-table, are subject to considerable wear. In deciding on the kind of wall-covering, thought must always be given to its probable condition in ten years' time and care taken to avoid at all costs holes, crevices, or loose joints, where dust may collect and spread infection. Daylight lighting should be the invariable rule; the practice in some large modern hospitals of having darkrooms with permanent artificial lighting is not suitable for adoption here. This point need hardly be laboured, first in view of the unreliability of electricity supplies in country districts, making it necessary to use and clean rooms in daylight and, secondly, because of the germicidal power of the sun's rays. All surgical theatres should therefore have windows, or some other form of glass lighting. Care should be taken to avoid direct sunlight, however, and on that account direct roof-lighting is not recommendable. Some artificial lighting is, of course, essential. The most practical sort is a scialytic projector, fixed on the ceiling, which can be turned in any direction. If this method cannot be adopted in all three rooms because of the cost, the delivery-room and the septic-dressings and plaster-splints room should at least have a mobile projector on a stand as well as adequate general lighting.

In tropical countries, it is often necessary to counteract the effect of humid heat, which is tiring for surgeons and is the cause of accidents to patients under anaesthetic. Small mobile air-conditioning units exist which suffice to make the atmosphere less oppressive; it is therefore unnecessary to instal fixed machinery which is both expensive and complicated.

The obstetrical and surgical theatres should be provided with annexes. Here again, the lay-out generally adopted in the large hospitals may be simplified to suit the type of operations carried out and the fact that the nurses in the section are not so numerous or specialized.

*Washing- and sterilizing-room.* Even the simplest operating-suite cannot dispense with a room for sterilizing and preparing surgical instruments and injections for use in operations. A fairly spacious workroom should be provided for the nurse, in two sections separated by a part partition (fig. 18). The first section is used for the cleaning of soiled instruments and utensils, which the nurse subsequently puts in order and lays away in the autoclave. In the second, the sterilized instruments are set out in order and aseptic instruments and utensils prepared; here, the surgeon scrubs his hands with water from the sterilizer, and puts on clean gloves and, if necessary, a sterile gown, both of which are stored in this room. It is advantageous to have the autoclave and the water-sterilizer going through the central partition. This makes it possible to have a double-entrance autoclave and very
short piping, because of the fact that the sterilizer and the washbasins are close together. There are grounds for thinking that such piping is a possible breeding-place for algae and protozoa which seriously contaminate the water before it reaches the tap in the surgeon's washbasin. It is usual to have a hatch placed between the operating-theatre and the nurse's workroom, through which sterile surgical instruments may be passed during an operation. This arrangement, which is fully justified in large operating-departments, has no special advantage where there is only one nurse to assist the surgeon. Such a hatch can therefore be dispensed with in a rural hospital where the wall-space is needed for cupboards or shelving. Finally, a water-boiler should always be provided in addition to the autoclave, for the immediate sterilization of instruments required during an operation.

**FIG. 18. NURSE'S WORKROOM IN TECHNICAL SECTION**

A = Delivery-room  
B = Aseptic-operating-room  
C = Corridor  
a = Table and cupboard  
b = Hatch  
c = Sterilizer (boiler)  
d = Two-door autoclave and sterile-water container  
e = Surgical washbasins  
f = Cleaning-up sink

With the arrangement suggested, it is possible to reduce the number of rooms by laying-out a single room for processes which usually require three (cleaning of instruments, sterilizing, and surgeon's scrubbing-up and robing). The natural place for this workroom in a rural hospital with a maternity department is between the delivery-room and the aseptic-operating-theatre. In this case, the septic-room would not be directly served;
as it already has sinks for cleaning injuries and preparing plaster, the preliminary scrubbing of the instruments can be done there too. Nor is there any reason why these instruments, once clean, should not be taken a few yards further on to be sterilized. In hospitals where the delivery-room and aseptic-operating-theatre are combined, the workroom can be placed between this room and the septic-room.

**Rest-room.** A further annex to the operating-suite which is almost indispensable is a room with a few beds, a table, and a simple sanitary installation. This room may be placed opposite the operating-theatres, for use at any time for the following purposes:

(a) A short rest-period after a minor operation on an out-patient, especially a child whose tonsils have been removed.

(b) Preparation- and waiting-room for dressings and minor operations.

(c) Resuscitation and treatment for shock in serious casualties.

(d) Post-operative observation.

(e) Waiting-room for confinement cases admitted during the night.

(f) Care of newborn babies and resuscitation for apparently-dead children.

(g) Emergency admissions during the night.

A few stretcher-beds, a sink or washbasin, and a table would suffice as simple furnishing. This room serves the same purpose as the emergency-and reception-service in the large urban hospitals.

**Sanitary amenities.** A separate group of lavatories, washbasins, and showers should be available in the technical section not accessible to patients, for the use of the medical and nursing staff.

**Laboratory**

Installation of a complete laboratory can hardly be contemplated for a rural hospital owing to the lack of specialists and the cost of the equipment needed for complicated testing. However, some facilities for biological diagnosis are essential. A room of about 25 m² (30 square yards) will usually suffice for this purpose. It should be fitted with a counter, fixed alongside the window, and provided with a wide sink and drying-racks for glass-ware. There should be a central table for the reception of samples from the out-patient and in-patient departments. The electric centrifuge should be placed on a strong shelf. A refrigerator and an incubator are essential to preserve biological specimens and blood-cultures until their dispatch in insulated wrappings to the urban-centre laboratory.

The detailed equipment will obviously vary according to requirements. Where bilharziasis and intestinal parasitoses are prevalent, systematic
testing of stools and urine will settle the type of laboratory equipment; in other areas, malaria is the chief problem and the laboratory will be mainly responsible for blood testing. However, these differences in no way affect the architecture and basic equipment. The walls and flooring should have durable and washable coverings. The question of colour is debatable; white is the general choice, but in the USA black has sometimes been adopted, because it is less easily soiled, shows up glass more readily, and does not dazzle staff working with microscopes.

**Electro-radiology**

Every modern hospital should possess an X-ray apparatus, capable at least of being used for fluoroscopic examinations of the thorax and of fracture-reductions. Such an apparatus is essential in preventive medicine (detection of tuberculosis and routine examination of pregnant women) as well as for the classification of patients. The apparatus should preferably be capable of making radiographs, for which purpose it must have a generator and a tube able to take about 100 mA and 100 kV. Certain designs for rural hospitals make provision for a mobile radiography unit only. This is not considered a sound solution; an apparatus of this type cannot replace a fixed unit. The mobile unit is a useful accessory in large hospitals, for carrying out bedside examination of patients who cannot be moved (wet pleurisy or broncho-pneumonia in the communicable-diseases department), and for taking radiographs in the operating-theatre during orthopaedic operations or operations on the bile ducts. Hence, it is out of place in a small hospital where such patients are not retained. The rural hospital should therefore have a room for X-ray apparatus capable, if possible, of both vertical and horizontal examinations. The room should be big enough to allow for manoeuvring a stretcher and for taking tele-radiographs; it may also contain a bed and a small table for artificial pneumothorax refills. It should be located near the out-patient and public-health departments and should have sufficient space to deal with the routine examination of some 30 persons at a time; it should accordingly always have dressing-rooms at the entrance. At the same time, it should be in close communication with the remainder of the hospital, forming a natural link between the in-patient and the out-patient departments. The room should also have a darkroom attached for developing, as well as a small annex containing a lavatory and sink, for the preparation of barium meals for gastric and intestinal examinations. The developing-tanks should be kept at 18°C, either by an electric element, or by ice or a small refrigerator which can also be employed for storing unused film. It is self-evident that these two annexes will be unnecessary where there is fluoroscopic apparatus only. Attention should be paid to ventilation of the radiology-room, as it will be
used for routine examinations in the course of which some scores of patients
will be passing through in a short space of time. It would therefore be
advisable for the room to have a window, so as to admit fresh air and light
in the intervals between examinations.

Physiotherapy equipment is intended chiefly for out-patients, and espe-
cially for convalescents discharged from the hospital who return for periodic
diathermy and infra-red treatment. Such treatment cannot be given the
same priority, however, as the other activities of the hospital, and this
service may be regarded as optional. Where equipment is available, a room
of 25-30 m² (about 30-36 square yards), with provision for curtaining-off,
will suffice for three or four simultaneous treatments. This room should
be situated close to the radiology-room, since it is mostly the same nurse
who will work both units. Moreover, since the two types of appliance
require a special large-section cable, the electrical wiring system will be sim-
plicated if they are close together.

**Dispensary**

The dispensary of the rural hospital not only prepares medicaments for
in-patients, but also makes up prescriptions for out-patients. Furthermore,
it is in the dispensary that vaccines and other products used in the public-
health section are stored. The scene of these activities is a room for making
up prescriptions, containing a sink, balances, and a number of cupboards,
one of which should be reserved for poisons and narcotics and should be
kept locked. A store for supplies of cottonwool and dressings, and for
carboys of liquids (some inflammable, e.g., ether and alcohol) is necessary.
This store may be located in the basement or attached to the general services.
Where circumstances permit, it is desirable to have a qualified pharmacist,
who can also work in the laboratory. Although this is far from always
practicable in the under-developed countries, it is an advantage to have the
dispensary beside the laboratory. A refrigerator should be provided for
use in connexion with the work of both.

**Out-Patient Department**

The structure of the out-patient department varies widely according to
climatic and local conditions. In densely populated countries with highly-
habited villages, out-patient departments are often attended by large
numbers of patients. In Egypt, for example, 150-200 out-patients is the
normal daily figure for the rural hospitals set up in centres with a population
of 5,000-10,000 and surrounded by a thickly-populated rural area. Owing
to the almost complete absence of rain to the south of Cairo, it has been
possible to construct very airy out-patient services consisting of a waiting-
and registration-building situated between the buildings containing the examination-rooms and annexes. These premises are under cover but are not closed in, and are provided with wooden benches easy to sluice down with a hose. A similar arrangement is, as a rule, in force for the preventive-medicine services. In another form, the examination-rooms give onto a long, open corridor, forming a verandah. The whole is situated on a piece of ground which is used both as a waiting-room for the men and as a place for leaving donkeys and bicycles. Male and female patients are kept apart; the maternal- and child-welfare section is always separate. It is clear, however, that such an arrangement is suited to very special conditions, namely, a high rate of attendance by a dense population, and a hot, dry climate. In other countries, local conditions may be quite different in nature. In an average-sized rural area, the out-patient department would be attended by 20-30 patients, which represents three hours’ work per day at the rate of 8-10 examinations per hour. Except in an almost constantly dry climate, the out-patient department should be completely covered in. The premises needed are as follows:

(1) A spacious waiting-room with wooden or earthenware benches. The essential features are that it should be well-ventilated and easy to clean. The floor, tiled or cemented, should slope slightly towards an inset drain so that the room can be swilled out. It is useful to have the benches so arranged that the waiting-room can be used for health-education lectures. Propaganda and hygiene posters can be affixed to the walls, again in support of public-health work. In short, the unavoidable waiting-period should be turned to account for the instruction of the patients and their distraction from worry while awaiting medical examination.

(2) Separate sanitary facilities for men and women. The women’s section should have a large sink and table for mothers to change children’s napkins. The seatless w.c. is the usual choice, as being easy to clean and having the running-water tap indispensable in Moslem countries.

(3) Administrative staff to register out-patients, look after administrative formalities, and direct movement of patients. The cubicle where the responsible official works should be at the entrance and should also overlook the whole of the examination-room, for supervision purposes.

(4) Medical-examination rooms according to the number of physicians. In small centres, one physician will be responsible for the regular work but specialists may come on certain days for examination of eye, ear, nose, and throat cases. These medical-examination rooms may be treated as physicians’ consulting-rooms if the latter are allowed to receive private patients there. It is this incorporation of consulting-rooms in a public building, allowing doctors the use of its diagnostic and therapeutic facilities, which constitutes “group-practice offices”. It should also be remembered that
minor surgical operations are practised in the dressings- and plaster-splint-room in the technical section described above. It is worth considering dressing-cubicles between the waiting-room and the medical-examination rooms. They may be of doubtful utility in some hot countries where patients wear few clothes, but they are almost indispensable in the colder countries. In any case, dressing-cubicles are usually much appreciated by the women. It would be advisable, therefore, to provide for very simple cubicles, partly partitioned-off, with a door leading into the consulting-room and a curtain, if nothing more, on the waiting-room side. The partitions should be 2.20 m to 2.40 m in height (about 7'-8') and should be off the ground, so as to facilitate ventilation and cleaning.

(5) A room for the nurse, containing scales, sink, and slop-sink, together with the necessary shelves for medicaments and dressings for use during consultations; to be used also for preparing injections and instruments at the physician’s request. A boiler for sterilizing is placed here. The natural position for the room will be close to the medical-examination room, or, if there are two, between them.

(6) An office for the head nurse.

(7) An office for the nurse and social worker, to hold the records and necessary administrative documentation.

(8) A room for the distribution of medicaments. In many underdeveloped countries, there are no private dispensaries in rural areas so that patients have to be provided with the medicines prescribed. Accordingly, at the end of the consultant line there should be a distribution hatch. The distribution process is better not done direct from the rural hospital dispensary; it is preferable to provide a small room where the individual prescriptions made up daily by the dispensary are deposited and this room should have the distribution hatch. Such an arrangement avoids interference with the work of the hospital dispensary and prevents theft or clandestine distribution of toxic or narcotic drugs.

(9) A dental department, serviced regularly by a dentist from town. Some patients will go to the dental department of their own accord but most will be sent by the public-health sections, in particular the departments dealing with maternal and child welfare and school health.

Preventive-Medicine Service

The concept of hospital/health-centre requires that preventive as well as curative services should be housed in the same building. The advantage of such a combination from the point of view of building-construction and equipment is that it permits a number of basic elements—the waiting-room
and the technical and administrative services—to be used jointly. The architectural design will depend upon the centre’s schedule of work. In the small rural hospital serving a relatively small and scattered population, the low attendance-rate warrants a time-table allowing some parts of the centre to be employed for several different purposes. For instance, the rooms used in the morning to give medical care may serve for public-health purposes at other times of the day. On the other hand, in a rural hospital serving a large and dense population, the high attendance-rate will call for the two sections, preventive and curative, to be almost completely separated, the principle of liaison between the two through the technical and administrative services being nevertheless retained.

For the sake of clarity, an average type of preventive-medicine service will be described below.

*Maternal and child welfare*

It is most important that this section should be kept distinct from the rest of the hospital, as it is attended exclusively by pregnant women, mothers, and young children; it can have very little in common, therefore, with the rest of the institution.

The child-welfare service or baby clinic consists, in principle, of the following:

1. Waiting-space (this may be one end of the large main room); a nurse stationed in the entrance hall (which should be separate), responsible for picking out communicable-disease suspects. Such children should be placed in a small nearby cubicle, to await examination.

2. A room for undressing, weighing, and measuring, which should have a sink and slop-sink.

3. A medical-examination room into which mothers and children are ushered in turn.

4. An office for the nurse, containing the card-indexing system.

5. A dressing-room.

6. An exit hall, where possibly milk and medicine may be distributed.

A happy way to deal with children’s clothing is to issue mothers with small wire baskets to be carried along with them to each department. This system prevents theft or substitution of clothing and avoids the risk of contamination. The section as a whole may be designed for traffic entering at one end and either going out at the other or returning to the starting-point (fig. 19), according to whether two different rooms are set apart for undressing and dressing, or whether the same facilities are used for both.
It is important to bear in mind the danger of contagion and the need for providing sanitary- and cleaning-facilities in all parts of this section. The undressing- and dressing-room can be dispensed with only where financial considerations dictate an extremely simplified design, save for countries where the children are in the habit of wearing practically no clothes.

**FIG. 19. MATERNAL- AND CHILD-WELFARE SECTION**

A = Through traffic  
1. Waiting-room  
2. Undressing of Infants  
\( a = \text{Reception-control and isolation} \)  
\( b = \text{Records} \)

B = Circular traffic  
3. Medical-examination room  
4. Dressing-room  
\( c = \text{w.c.'s and washbasins} \)  
\( d = \text{Milk- and medicaments-distribution} \)

The maternal-welfare service or prenatal clinic is intended for the periodic examination of pregnant women. The premises described above may be used for this purpose. The room used for undressing the babies may serve for the women, provided it can be curtained-off, and examinations can take place in the medical-examination room. A sanitary installation is also needed, however, for taking samples of urine for analysis. The gynaecological and obstetrical examination is usually supplemented by an X-ray examination, carried out at a later stage, in the technical department.
Tuberculosis control

The essential requirements for tuberculosis control are as follows:
(1) waiting-room, for which the general waiting-room will serve;
(2) medical examination;
(3) X-ray examination;
(4) treatment by artificial pneumothorax. This requires a bed and a stand, which may be provided, as planned, in the radiology-room, because of the check which has to be made before and after insufflation. It is by no means mandatory that they should be placed there; this minor operation can be done in the dressings-room or the medical-examination room.

It has frequently been recommended that the medical consulting-room and the radiology-room in tuberculosis clinics should be placed in close proximity, so as to avoid patients having to undress twice. The experience of lung specialists is, in fact, in favour of the prior medical examination of all patients, followed by X-ray examination at a second visit, so as to avoid the need for adapting the eyes to repeated changes of light. It is therefore not essential for the medical-examination room to be next door to the radiology-room. Where this is the case, pneumothorax insufflation should be carried out in the radiology-room. Obviously, where a preliminary survey suggests that the tuberculosis clinic will be particularly active, it will be necessary to provide a special room for pneumothorax cases.

Venereal-disease control

Requirements for the organization of venereal-disease control are fairly simple: a waiting-room, a consulting-room, and an injections-room, together with a secretary’s office and suitable card-index. In a small rural-hospital/health-centre, where everything should be done to simplify arrangements by employing the same rooms for different purposes, it is advisable to hold venereal-disease clinics when the rooms described above can be used, i.e., the common waiting-room, the medical-examination room, and the dressings-room for injections.

School medical examinations

Wherever agreement can be reached with the departments responsible for the health of children of school age, it is reasonable to suggest that the centre take over this work. As a matter of fact, it can be carried out in the simplest manner. The waiting-room may be used for reception of the children, and they can undress and be measured and weighed there. They can then proceed to the adjoining consulting-room, unless the doctor prefers a table placed in the waiting-room for his work. Preventive dental
care for children of school age is extremely important; dental examination for this purpose may be arranged on the same day as the school medical examination.

Other departments

The rooms described above can be used in a small centre for occupational medicine and mental-health clinics, as well as health education. In drawing up plans for the rural hospital, however, all its future activities should be kept in mind. Two rooms are generally required for the mental-health clinic, one for interviewing and analysis, and a second for sensory and psychological tests. In small hospitals, this work could be done in the medical examination-room or in the maternal- and child-welfare section, for example. Larger centres should include at least one special room for the purpose. As regards health education, the waiting-room may be used for lectures and the showing of lantern-slides or films, and for discussion groups; it may also serve as a permanent health exhibition. The room should have a wall built-in for use as a screen, together with display counters and wall pictures showing the most common health risks and how to avoid them.

General Services

The system which we have just analysed requires general services (see fig. 20, showing a plan for a rural-hospital/health-centre of two nursing-units). In tropical regions, units 35 and 36 (of the fig. 10 type) can be replaced by units with a verandah on the lines of fig. 5 B. Where the prevailing winds make it necessary, the plan should be turned clockwise through an angle of 20°-60°, so as to ensure cross-ventilation. The main features of the general services may be classified as follows:

Administration

The general management of the rural hospital is entrusted to the physician-in-charge, but the demands of day-to-day running should be left in the hands of a competent administrator, such as an assistant-director/bursar. He should be in charge of the accounts section and the admission and discharge sections and of all administrative records relating to staff, kitchen, linen, and purchases. The building plan has therefore to include:

1. an office for the assistant-director/bursar;
2. an accounts and records office, with tables and filing cabinets (30-50 m² or about 36-60 square yards);
3. an office with desk in the entrance hall of the premises, for registering admissions, discharges, out-patients, and public-health examinees,
and for directing visitors; the office will therefore have to have filing cabinets for administrative purposes to a number in direct proportion to the size of the population; thus, in populous areas provision will have to be made to deal with files mounting rapidly into the tens of thousands;

(4) large, lockable cupboards for medical records, i.e., in-patients’ files, radiographs, records of biological tests, and out-patients’ medical cards.

Kitchen and annexes

For a small hospital with 20-30 beds, the kitchen will be simple and of fairly modest capacity. In the rural areas of under-developed countries, the type of cooker to be used will be determined by the fuel available. It may be wood- or coal-burning, and additional small oil or portable-gas stoves may be supplied. Annexes should comprise:

(1) scullery for dish-washing, with drying racks and cupboards;
(2) pantry for preparing vegetables and cutting up meat; and
(3) dark store-room, with little ventilation, and with racks for vegetables and fruit and a small cold-chamber for meat, milk, and eggs.

A small, specially equipped room may be warranted for preparing special diets and babies’ bottles.

Laundry and linen room

Two rooms are necessary: one for washing and drying, and the other for ironing, mending, and storing linen.

Heating and electric-power supply

The problem of heating and electricity-supply may be dealt with in various ways. In many tropical countries, there is no need for central heating; all the heating equipment that is required will be for providing steam and hot water for the laundry, the kitchen, and the in-patients’ department. As a rule, the sterilization of instruments is done in the operating-suite but disinfection of bedding and of in-patients’ effects requires an oven, which should be next to the laundry and the heating plant. The type of electricity installation will depend on local conditions. Where a good electricity grid system exists, a transformer and control-panel will suffice, but it is advisable to provide an emergency plant, capable of supplying the current required for lighting the technical section, the wards, and the corridors, as well as for working the X-ray apparatus. Where there is no grid, it is essential to have a generator with a capacity sufficient
to cover all the hospital’s needs. It is interesting to note, by way of information, that the US Public Health Service recommends an average power of 0.40 kw per bed, the range of consumption for a group of hospitals in the USA having been calculated at 0.20-1.00 kw per bed.

Water supply

The water supply is of the utmost importance. As a rule, country villages have no drinking-water supply laid on, and it is through the use of surface water that endemic typhus and epidemics of cholera are spread. A hospital would be inconceivable without pure drinking-water, and it
Key to figure 20

1. Waiting-hall

Administration

2. Reception-control and Information
3. Accounts and administrative office
4. Assistant-administrative-director's office
5. Records

a = Seating
b = Screen
c = Undressing room
d = Darkroom
e = W.C.

Maternal and child welfare

6. Reception-control and isolation
7. Changing-room for infants
8. Medical examinations

Public health

9. Sanitary inspector's office
10. Social-worker's office
11. Mental health
12. Tuberculosis
13. Physiotherapy

Medical care

14-15. Doctors' offices
16. Sterilizing
17. Medical or nurse's office
18. Dentist
19. Waiting- and rest-room
20. Matron's office
21. Administrative office
22-23. Lavatories
24. Medicaments-distribution (may be enlarged or reduced in accordance with number of doctors' offices)

Technical services

25. X-ray
26. Doctors' office and cloakroom
27. Lavatories
28. Laboratory
29. Dispensary
30. Delivery-room
31. Sterilizing
32. Aseptic-operating-room
33. Rest-room
34. Dressings- and minor septic-operations room

Nursing-units

35. Unit for women
36. Unit for men

General services

37. Public showers
38. Washhouse
39. Heating plant
40. Central kitchen
41. Water-tank
42. Stores
43. Garage
44. Mortuary
would be hardly logical to allow the villagers to continue using impure water while the hospital alone had clean supplies. The inevitable conclusion is that the hospital must install a potable water-supply system, adequate not only for its own needs but also for those of the village in which it is located. This problem is closely linked with that of showers and clothes-washing amenities; in many countries, the hospital's facilities for these purposes are made available to the public.

Disposal of waste matter

A hospital is a particularly dangerous source of waste-matter and -liquids. Effluents may contain typhoid- and tubercle-bacilli, as well as the eggs of intestinal and urinary parasites, which may be a serious cause of pollution to the neighbouring fields if left untreated by standard biological methods. An exhaustive study of the prevailing conditions should therefore be made by a sanitary engineer, who will be concerned not with the hospital alone but with the community as a whole. This technician and his team of workers may undertake the improvement of the rural area's sanitation, starting from the hospital, by recommending the gradual construction of suitable latrines and sewers. He can advise the population on the use of water, on how to treat manure heaps and make compost, and on the lighting and ventilation of houses and ways of preventing damp. Hence, it is essential that he should have an office in the hospital/health-centre, as well as a place for storing the equipment used in his work.

Accommodation for staff

Accommodation for the staff should be planned with a view to providing an acceptable standard of comfort and making a lengthy stay in the rural area as pleasant as possible. Generally speaking, the centre's medical officer and nursing staff will be lodged in the hospital. Although this arrangement facilitates night-duty and supervision by the nurses, the view may be taken that efforts be made to provide them with quarters more or less independent of the hospital, so that they can get away from the working atmosphere once duty hours are over. It is essential, however, that they should be provided with accommodation, laundry, lighting, and heating, free of charge.

Garage and stores

An ambulance is an indispensable accessory, as it enables the rural hospital to keep in contact not only with the villages in its area but with the town hospital as well. The whole concept of the regionalization plan rests on contact between the different branches of the hospital system.
Experience of rural hospitals which have now been in operation for several years indicates that one ambulance is not enough, because of maintenance requirements and the need to give the driver leave. An additional ambulance should therefore be provided for any group of six hospitals within a reasonable distance of one another, so that seven ambulances are available per group, the extra vehicle replacing the other six in rotation for one day per week, when these are taken off the road for maintenance purposes.

A rural hospital should possess a repair workshop, and reserves of equipment and pharmaceutical products. It would seem logical to place these near the garage, as it is the ambulance that brings essential products and utensils from town and also because alcohol, ether, and other inflammable products can be kept on the same premises as the petrol reserve, thus taking advantage of general fire-fighting measures.

_Mortuary_

The mortuary should be kept separate and should, if possible, have an exit concealed from patients by trees. It should include a room for laying-out corpses (in a small hospital, this can also be used for autopsies, which in fact are very rare on account of religious objections) and a room where the first part of the funeral ceremonies can take place. Mohammedan funeral rites require two rooms for the washing of corpses—one for men and the other for women. As a rule, burial takes place shortly after death, but a hospital may be obliged to keep a corpse for some days for purposes of forensic examination, and this justifies the provision of two compartments, at the least, for the storing of bodies.

_Technical Equipment_

Without attempting to enter into details of no general interest, some suggestions as to the technical equipment of the rural hospital would seem to be in order. This equipment will depend largely upon local possibilities for manufacture and importation. It is desirable for scientific equipment, such as X-ray and laboratory apparatus and medical and surgical instruments, to be standardized, or at the least to be restricted to a small number of models, so that it can be repaired or replaced without delay. Repair of equipment cannot be undertaken at the rural hospital level. Stores of equipment and maintenance workshops will therefore be found at the regional or national level in countries with a high degree of administrative and technical centralization. The advantages of adopting standardized equipment will be readily appreciated, since it enables spare parts to be
obtained and facilitates the work of the specialists, who are invariably still too few in number. In under-developed countries which do not make hospital equipment, there are many advantages in having a small number of models and brands for heavy and expensive equipment, such as X-ray, sterilizing, and endoscopic apparatus, and microscopes, so as to encourage firms from which they are imported to organize periodic checking, maintenance, and repair services. Strong, simple equipment should be chosen for the rural hospital. Operating-tables should be of a common type with no complicated machinery such as pumps or motors. Apparatus for sterilizing should consist mainly of oil-burning autoclaves or water-boilers. It is important for the wiring of the X-ray apparatus to be fully protected so as to avoid accident to inexperienced staff. Preference should be given to self-adjusting apparatus with a device for protecting the tube so that wrong handling or errors in operating the time-switch will not lead to abnormal wear or sudden destruction of the tubes. All electric circuits should be "tropicalized" even in temperate climates, as should the electrical equipment for diagnosis and therapy, in order to avoid accidents due to humidity. The increased cost of such apparatus is amply offset by the saving effected through the absence of technical faulting. Equipment for the general services calls for the same qualities of strength and simplicity. The choice of boiler, cookers, and laundry machines will depend on the type of fuel used. National products should be utilized as far as possible, so as to minimize the effect of some restriction of, or sudden stoppage in, the importation of basic materials. In some cases, equipment capable of using several types of fuel, such as fuel-oil, coal, and wood, may be selected. The use of electricity as the chief source of power needs careful consideration, because it makes the institutions concerned dependent on the general grid. A careful study of local conditions is required in deciding how water supplies and sewage-disposal facilities are to be installed. A hospital is a heavy consumer of water. One has to reckon on a daily amount of not less than 100 litres (22 Imperial gallons) per patient. This figure has to be increased where the hospital plant is intended to supply the village with water of tested quality. The water-supply unit should be driven by electricity or fuel-oil, with a hand pump kept always in reserve. The construction of a water-tower is obviously indispensable, and in estimating its capacity account should be taken of the reserve necessary in the event of fire.

Effluents should be treated with particular care if they are to be discharged into a river or culverts. They can cause the spread of infections or epidemics through the use of water obtained near the hospital for irrigation. Waste water from the nursing units and the laboratory has to be closely watched, as it may contain a considerable concentration of microbes and parasite eggs.
The rooms in the hospital should be well ventilated and well lighted in order to reduce septicity. It must not be forgotten that, for the sake of economy, certain rooms intended for medical examinations in the preventive-medicine and out-patient departments are planned to serve a number of purposes at different times of day. For example, the examination-room for tuberculosis cases may be used for examining newly recruited employees or for mental-health work; the X-ray room caters for all types of patients, and the waiting-room is common to all branches. If it is considered necessary, in countries where little sunlight is received during part of the year, germicidal lamps may be installed wherever the risk of infection is greatest. These lamps, which provide largely monochromatic ultra-violet rays, have proved extremely useful in departments attended by children by considerably reducing cross-infections. The all-important rule in installing them is to ensure that no-one is exposed to direct radiation from the element, and that no metallic object with a polished, reflecting surface comes into the direct field of the rays. Hospital furnishings should be simple and, above all, easy to maintain and repair with local means. Metal beds are the natural choice as these are easy to clean and disinfect. Painted rather than processed-enamel beds may be preferred, as they can be repainted locally. Accessory furniture, such as tables, chairs, benches, and cupboards, may be in wood; this is easily made and repaired by the village joiner. Finally, for utensils such as bedpans, urinals, spittoons, washbasins, and cutlery, stainless steel has undeniable advantages as it is resistant and not liable to deterioration.

Conclusions

The distinctive features which a rural-hospital/health-centre should contain have been described above; their relative importance, however, may vary to suit the population served and the local conditions. In some areas, the hospital will consist only of a maternity ward and some rest-beds. Elsewhere, there will be no distinct maternity section, the hospital being attended mainly by men. The relative importance of the curative and preventive departments may vary according to the particular case and to the structure of the health service itself. If a network of public-health centres already exists, the rural hospital will meet the needs of curative medicine alone, and there will be no premises reserved for preventive medicine. Lastly, a gradual evolution may take place. In a region where women are reluctant to attend hospital, this attitude may be modified within a few years and a radical change may intervene in the relative proportions of the various groups of out-patients and in-patients. Accordingly, the design of the hospital should allow for subsequent alterations and additions. In many cases, a one-floor design is likely to be selected, since
additions and alterations can be made without bringing the whole centre to a standstill. On the other hand, the pavilion type, which precludes flexibility, will generally be discarded in favour of integrated, communicating sections. This was the principle which predominated in the competition organized in 1946 by the Modern Hospital Publishing Company. In other cases, advantage may be taken of sloping land to design a building of two storeys on different levels, like the steps of a staircase. Fig. 21 is an example of how a rural institution may develop. The first stage is that of a small hospital comprising a male ward and an out-patient department; in the second stage, a maternity ward is added; in the third stage, it is decided to enlarge the hospital by adding a third ward, for women, together with a maternal- and child-welfare centre; the fourth stage finds the hospital/health-centre complete, after the requisite expansion of the out-patient department and the switching-round of the administrative and preventive-medicine departments so as to bring the latter into communication with
the technical section. An internal gallery going round the courtyard facili-
tates the movement of visitors. The general services are not shown; un-
less they are located in the basement in the first stage, they have to be set up some distance away so as not to hamper subsequent development of the plan. Obviously, an institution with a different background would follow an entirely different scheme of development, involving, for example, two ward units on different floors, obtained by constructing another storey to the buildings, with expanded technical services added at ground level. All this emphasizes the difficulty of drawing up standard plans, and the need for the architect to retain his creative role. The present chapter merely suggests some standard features and designs for movement and liaison among the different departments, with the aim of aiding in the preparation of specific programmes and projects. We have paid particular attention to the study of hospitals intended for the rural areas of under-developed countries, where a heavy public-health programme has to be carried through on limited budgets and with inadequate staff. This is why we have had to make a strict choice from among the many admirable plans evolved in western countries. Requirements held to be essential in the USA and Europe will seem to have been repeatedly ignored. This is because it has been necessary to propose an economical scheme which does not call for a large staff. For this reason, and because resistance to infection varies from one country to another, the maternity ward, for example, has not been separated from the women's nursing-unit, as experience shows that this is not always necessary. In the same way, provision for isolation at the entrance to the baby clinic, although recommended, cannot be regarded as indispensable. Finally, we feel that we have emphasized the difficulty of drawing up standard plans sufficiently for the reader to regard the accompanying designs merely as a convenient way of illustrating the text. They should on no account be taken as plans in the accepted sense of the term; they are open to different arrangement for specific projects, according to the programme and the local conditions.
CHAPTER 5

STAFF

The aim of a well-designed hospital building is essentially to ensure the comfort of the patients and to create conditions under which the work of doctors and nurses can be carried on most effectively. Generally speaking, however, the quality of the treatment depends more on the staff than on the premises. Let us examine in turn the known facts regarding the problem of staffing the rural hospital.

Medical Staff

The unequal distribution of physicians among town and country was considered in the first chapter, together with various temporary means certain governments had in mind for encouraging doctors to settle in the country. Measures likely to accentuate the differentiation between town and country must nevertheless be avoided. From this angle, any system of short-term compulsory service by young doctors, or the establishment of a corps of auxiliary doctors or health officers, involves certain drawbacks which need not be gone into here. Any structure likely to lead to rural areas having medical attention of an inferior quality, provided by young trainees or partly-qualified physicians, should be avoided.

Consequently, the medical and health system in rural areas should be in the hands of fully qualified physicians. The whole problem lies in attracting these latter, despite the limited interest of a career largely to be spent in the country. Many writers think, and rightly so, that in districts where the medical density is lowest, the hospital/health-centre is a sound method of retaining conscientious and able practitioners because of the considerable possibilities it affords them for practical aid and moral support.

"The modern hospital will attract and help to hold physicians in rural areas... Hospitals alone, however, will not hold physicians in rural areas. There must be a sound economic base for both hospital and physician." 34 "The establishment of hospitals in rural districts enables those districts to keep the necessary medical staff." 5

For an understanding of the problem in all its ramifications, however, three cases should be considered:

(1) In an area where there are few medical facilities and the number of physicians is distinctly lower than the number of health-centres, the best
way out is to develop communications. A single doctor may then hold regular clinics in a number of health-centres, the preliminary work being done by the resident nursing staff in each centre. Taking a network of three or four institutions, set 20-25 km (about 12-15 miles) apart (comprising preventive-medicine and out-patient departments with a few beds for social cases, and serviced by a team consisting of a head nurse, some visiting nurses, and an assistant health-worker), a doctor can, if he has a car and communications are fairly good, spend a day in each centre, setting aside several hours for out-patient clinics. Under this system, the doctor's role is mainly that of a health inspector, but he would not be debarred from treating a few private patients and this would increase his interest in this type of post. Local hospitalization would be reserved for the simplest social cases; the more common practice would be to remove patients to the town where the doctor will generally reside. The small, simple hospital/health-centre of this concept really acts as an out-station for the local hospital in the nearest town.

(2) In an area where the medical density is higher, a doctor may be permanently attached to each village that has a hospital/health-centre. In this case the institution takes on added importance and may have a capacity of 20-30 beds if the demographic, economic, and social conditions make this feasible. The physician would find the hospital an excellent working instrument, and he would be in charge of all branches of medical assistance. As an added inducement, it would be desirable to authorize him to receive paying clients in the out-patient section, in addition to his private practice at home, and to retain a few one- or two-bed wards for his personal patients, with the proviso that the public-health side of his work and indigent patients should not be neglected. The system as a whole would be under the control of the regional or district health-authority.

(3) In a third case, which applies to more advanced countries, medical density and economic conditions would permit of the provision of a hospital/health-centre for every zone containing from 20,000 to 30,000 inhabitants and several practising physicians. This is more or less what is found in western countries. The hospital should be open to all local practitioners. In addition, the volume of public-health and preventive work would warrant the appointment of a whole-time medical-officer/health-inspector. He would be in charge of the administrative and technical management of the centre, and the unitary would gradually give place to the twofold concept, under which public-health and prevention work is entrusted to a medical officer of the health ministry and curative work to the medical practitioners.

In these circumstances relations between the practitioners and the hospital/health-centre may be governed by varying sets of rules, but, in
order to increase the efficiency of the system and ensure maximum output, efforts should be made to allow them full access to the centre so that, besides providing medical care for the indigent, the technical hospital facilities and private wards will be available for their private patients. In this way a more comprehensive hospital, corresponding in its curative section to the "group-practice" system already mentioned, would be imperceptibly realized.

In the last two cases, the hospital/health-centre would receive periodic visits from town specialists, in accordance with the general regionalization programme, for the purpose of giving advice, in agreement with the local practitioners, on ear, nose, and throat complaints, ophthalmology, or any other ordinary speciality. To be sure of retaining doctors in rural districts for long periods, a variant of the Mexican \(^70\) and the Russian \(^80\) systems might be contemplated, whereby scholarship holders from country districts are offered free medical training on undertaking to practise in rural districts for at least 10 years. This would have the advantage of providing practitioners whose childhood has been passed in the country and who have formed associations and habits which are likely to retain them in country districts over a long period. A useful complement to this system would be refresher courses with payment of compensation. These practitioners might even be given the chance to work for a specialized qualification. Under this liberal system a considerable number of country doctors could be trained, who would be fully integrated into the life of their area and for whom the hospital/health-centres, with their modern equipment for diagnosis and treatment, would provide material aid.

**Nursing Staff**

Nurses have an essential part to play in the rural system of medical assistance. In the simplest type of health-centre, they mostly work alone and have to develop that spirit of initiative which makes them of decisive importance. In treating patients in their homes, assisting at confinements, and summoning the doctor for urgent cases, they bear a heavy responsibility which calls for sound professional and ethical training. Accordingly, any government that wants to improve rural medical assistance as a whole should make every effort to train nurses suitable for country work. In the smallest centres, the senior nurse has many varied duties to perform, covering every aspect of health work. She can acquire the necessary experience only after a thorough course of instruction and training periods spent in all sections of the more specialized centres.

In the simpler centres (the first two described in the preceding section, pages 133-134), the single type of work calls for not more than one senior
nurse. In the bigger centres (case 3, see page 134), the twofold nature of
the work may warrant two senior nurses, one each for the preventive and
the curative sides. The total number of nurses may vary widely, but the
following may be suggested as a general example:

(1) For the smaller centres (cases 1 and 2):

1 qualified senior nurse

2 nurses for the out-patient department (treatment and preventive
medicine), one qualified and the other an auxiliary

1 nurse for the X-ray room and the laboratory

4 nurses for each nursing-unit of 25 beds, comprising 1 qualified
and 3 auxiliary nurses, working to the following timetable:

7 a.m.-3 p.m. 2 nurses (In the afternoons, nurses from
3 p.m.-11 p.m. 1 nurse the out-patient department may
11 p.m.-7 a.m. 1 nurse help.)

1 visiting nurse to 5,000 of a population; she may be an auxiliary
assistant midwives, under the charge of the qualified nurses, to a
number depending on the volume of work.

(2) For the larger centres (case 3), the number of nurses has to be increased
in proportion to the volume of work; the following may be suggested:

2 senior qualified nurses

2 nurses for the out-patient department, 1 qualified

2 nurses for public-health work, 1 qualified in puericulture

1 nurse for the laboratory

1 nurse for the X-ray room

4 nurses for each nursing-unit of 25 beds, comprising

1 qualified and 3 auxiliaries

1 visiting nurse to 5,000 of a population; she may be an auxiliary

1 or 2 qualified midwives and a variable number of assistant midwives

In most countries, it is impossible to find qualified nurses to fill all
hospital posts and auxiliaries have to be employed. In the big teaching
hospitals, student nurses are a considerable help; they look after patients
during training periods as part of their 3- or 4-year course of study. In
smaller hospitals, and even more so in rural hospitals, however, this source
of help is not available and it is necessary to resort to an auxiliary corps
that has been given a rapid course of training in elementary nursing tech-
niques. Many of these auxiliaries will have been recruited locally as atten-
dants and will have received a year’s training in a vocational school. In

Except where this work is performed by special technicians

Assuming an average occupancy of 50%
many cases the system could be rendered more flexible by organizing exchanges. Qualified nurses might be obliged to spend a training period in a rural hospital as a final stage of their study, and the best of the auxiliaries in the rural hospitals might be given the chance of a scholarship to enable them to become fully qualified. They have very varied duties to perform (as has been described elsewhere), including hospital care, out-patient clinics, public-health department, domiciliary care, and work in technical sections. It will be for the senior nurse and the physician to decide, in accordance with the ability shown, whether a nurse should specialize in one particular branch or whether she should gain successive experience in every type of work done in the hospital/health-centre.

Technical Staff

The work carried out by the centre requires technicians qualified in hygiene and environmental sanitation. In the big centres there should be a sanitary engineer to deal with problems of water supply, sewage disposal, and control of insect vectors and epidemics. He should have one or more assistants to look after disinsectization- and disinfection-equipment. His main duties will lie outside the hospital/health-centre, but he should take part in health education of the public by giving lectures and organizing discussion groups, and by the personal example of his work.

Under this heading, we may also include radiology and laboratory technicians, and pharmacists, whom some countries use in place of nurses for these specialized functions. This is a good method, provided such staff are well trained and competent. If it is to be adopted, technical schools would have to be organized to give the necessary training.

Administrative Staff

An assistant-director/bursar, and accounting- and general-services staff make up the necessary administrative personnel.

In many under-developed countries, there is no body of senior staff specialized in hospital administration, as that branch has not developed to the same extent as in western countries. For this reason, the administrative control of hospitals is entrusted to the physicians-in-charge. When the business of running the hospital becomes more complicated, as it is bound to do as soon as a regionalized hospital-structure is set up, the physician-in-charge is overwhelmed by routine work for which he has neither the administrative nor the legal experience needed. Hence, the time comes
when the medical director requires the help of an assistant-director/bursar to take over the daily routine work, under his general and technical direction. The work as a whole is co-ordinated and supervised by the regional or sub-divisional health authority whose functions have been analysed in the second chapter (see page 37).

This assistant director has an administrative and secretarial staff for dealing with admission and discharge of patients, hospital budget, general supplies from national and regional authorities, and local purchase of perishable foodstuffs. The size of the administrative department will naturally vary according to the functions discharged by the hospital/health-centre. This department also controls the service personnel responsible for building maintenance, kitchen-work, laundry-work, heating and electricity plant, and ambulances.

It is worth drawing attention to the standards recommended by the US Public Health Service. The work entitled *The Modern Small Hospital and Community Health Center* also includes a table of the staff needed for a standard 40- to 60-bed hospital. The number of staff envisaged generally exceeds the number of beds, so that there would seem little point in reproducing the findings here since the conditions on which they were based are very different from those prevailing in small hospitals in the underdeveloped countries; there, the lack of staff has frequently prevented not only the development of a hospital system but also the opening of newly completed institutions. These sources can readily be consulted by the reader, if so desired.
CHAPTER 6

FROM THEORY TO PRACTICE

It has been repeatedly stressed that rural hospitals must be integrated as fully as possible in the general hospital system. They must not be regarded as isolated institutions, intended only for providing medical services to rural communities; that would entail a twofold system, the well-equipped part being reserved for towndwellers and the second, scattered and poorly equipped, serving rural areas. All the hospital facilities should operate as an integrated, well-adjusted whole, the object of which is to provide the population with the best-possible medical care.

Indeed, the concept of the rural hospital carries a certain element of risk. Decentralization of hospitals leads to the setting-up of small institutions with limited diagnostic and therapeutic facilities; staff recruitment will always be a source of difficulty arising from the cultural and economic causes already analysed. Where communications are good and distances fairly short, no patient will refuse to be brought to town unless some opposing force is at work. The possibility of local hospitalization, however, will certainly check removals to the town hospital, where it is clearly more difficult to maintain the ties of affection and culture. Moreover, too much reliance should not be placed on the country doctor to overcome these difficulties, as the ties he forms with the rural community will urge him to keep his patients at home.

Nevertheless, the rural hospital is an essential element in evolving a health programme, and has proved to be the most rational means for improving the physical and moral condition of country dwellers. It is the instrument of any comprehensive health policy and one of the essential stages in any scheme for raising the economic status of rural areas. A public-health campaign should accompany its establishment. Indeed, there have been cases where it was decided to carry out experimental case-finding of social diseases in areas with no facilities for curative treatment; mobile teams have been sent out and the inhabitants medically examined for the purposes of a health survey, in order to determine the percentage of tuberculous, venereal-disease, and endemic-disease cases. In the course of these surveys, various diseases have come to light: heart disorders, diabetes, and nutritional or deficiency diseases. The population, attracted by the novelty of this work and sometimes even encouraged by the local authorities,
expects concrete results from the medical team and the examination centre. If no supporting curative service has been organized for treatment of the cases discovered, a feeling of disappointment among the patients and the population as a whole is bound to follow. In the face of a concrete problem of this nature, the necessity for close co-ordination between public-health surveys and curative medicine becomes clear. Moreover, it is obvious that many cases can be treated only in specialized centres, which are sometimes at quite a distance from the villages surveyed. It is therefore necessary to build up a graded and co-ordinated system step by step, in accordance with a broad general programme, of which the rural hospitals form an essential part—a part which has to be closely linked with the system as a whole.

From the practical point of view, general hygiene methods (vaccination, sanitation, and control of insects and parasites), techniques for early diagnosis (tuberculosis and venereal-disease control), maternal and child welfare, and organized curative care, may be considered only as different aspects of a general all-round policy, and their focal point, as regards health campaigns, is the hospital/health-centre. Winslow has said, moreover, that "preventive medicine must depend in a large measure on out-patient services for the ambulant case".

Having established these premises, the requisite conditions for ensuring that rural hospitals form a closely integrated part of the general system may now be considered.

Communications

Communications are of paramount importance, since any region with convenient means of access that is served by frequent transport services can be provided with a network of urban and rural health-institutions in accordance with a regionalization scheme. Areas, on the other hand, where poor communications tend to cut off some country districts have little hope of other than isolated institutions, where the quality of the medical treatment cannot be fully satisfactory. Between these two extremes, however, all types of intermediate situation may be found; hence the solutions to be adopted will vary and will be governed by a number of factors.

Where communications are good and the ambulance-time between towns is under two hours (which means that the most remote villages will lie at about one hour’s distance from the nearest urban hospital), rural hospitals should be mainly centres for diagnosis, out-patient treatment, and preventive medicine; they should have a minimum number of beds only, to be determined by the attitude, density, and size of the population. The beds will be reserved chiefly for social cases (homeless agricultural workers),
common ailments affecting the local population, and confinements, where the conditions analysed at length above warrant this. In areas where communications between different districts are slow, difficult, or liable to complete interruption during part of the year, rural hospitals have to be planned on similar, but proportionate, lines to those of local urban hospitals. Beds will be reserved mainly for emergency cases, patients who cannot be moved, and serious cases difficult to treat at home.

The course adopted in intermediate situations will depend on various factors. It will always be difficult to forecast the exact ratio of medical, surgical, and obstetrical cases the rural hospital will have to admit. Accordingly, it will have to be as adaptable as possible, with that quality of flexibility so constantly stressed in investigating possible standard designs for buildings.

Financial, Social, and Economic Conditions

Financial, social, and economic conditions have a decisive influence in developing and deciding the type of hospital system. Transport facilities are also closely linked to these, since the attitude of a rural community to medical care and hospital treatment largely depends upon the volume of cultural and economic exchanges between town and country. An improvement in the rural economy is reflected in better housing and increased family budgets which, once a certain level has been passed, are able to bear some contribution to the cost of the hospital programme and part of the cost of medical care. Indeed, we must not lose sight of the fact that the financing of a comprehensive health programme is a very heavy burden and a country's national budget can hardly bear the full cost in respect of a rural area totally lacking in resources. A State's expenditure under its budget is, after all, merely a redistribution of the total resources derived from the country as a whole. Where an area is too poor to contribute to the general budget and no national hospitals plan has been established, members of parliament representing the richer areas in some countries have been known to hesitate to adopt a finance bill that allocated considerable sums to the poorer districts. These under-privileged parts have thus been kept in a state of stagnation from which they could emerge only when a comprehensive plan of economic development was approved at the national level. Hence, throughout the preliminary period, the health system must operate free of charge, the national budget bearing the full financial cost, as is done in most of the under-developed countries.

Once this stage is passed, the rural areas can begin to contribute actively to the general resources of the State and to receive in exchange steadily increasing benefits, among which medical and hospital facilities represent
one aspect. The moment the vicious circle is broken, the economic and health side of the development of these areas may be steadily improved through mutual contributions. The culminating point in this type of evolution is reached when a local community is able to contribute to the general resources of the State, receiving subsidies for its equipment to an approximately equivalent amount. The population is then able to pay for the operation of the hospital system, either by individual contribution, or through a sickness-insurance or social-security scheme, or by general taxation.

Participation of Local Authorities

The participation of local authorities is accordingly the final goal of any rational plan for economic and health development, and an effort is necessary to bring together local personalities, political and otherwise, and to arouse their interest in the plan as it relates to the particular area. In briefly discussing, in chapter 2, how the administrative structure of the central and external services of the health ministries should be adapted to the regionalization plan, we referred to advisory hospital boards, composed of personalities representing the communities affected by the development of the hospital system.

These boards may advantageously draw attention to local needs and wants, as well as to possible criticisms of the health plan. Without having any power of decision, which might tend to paralyse government action, the boards may help the regional health directors and ministries to a clear appreciation of the problems peculiar to individual regions. As soon as local communities (rural and urban municipalities, administrative subdivisions, and areas) are authorized to levy local taxes, the proceeds of which are to be used for part financing of health projects within the general plan, their role takes on added importance. It is, of course, inevitable that this will lead to complications in the administrative machinery and in the execution of projects; there will be an undeniable gain, however, in flexibility and effectiveness. The efficiency of a hospital system and the interest taken by the community is greater where the population is able to express its views on how local and general taxes are spent. In under-developed countries, it is often difficult in country villages to form a board capable of managing and developing the local hospital, but the formation of discussion groups, able to express views on suitable action and the policy to be followed in the hospital's health programme, may be possible. It is often useful to allow the people to express their opinions, since this provides an opportunity of explaining to them the technical and financial reasons for the action contemplated.
Finally, the technical and, above all, the financial participation of the local authorities has the advantage of ensuring a certain stability in carrying out a large-scale plan for the provision of health facilities. In countries where authority is completely centralized at the national level, a mere change in political orientation often results in projects being modified, or even abandoned, without sufficient attention being paid to local needs or to promises made in the past. On the other hand, when the local authorities have entered into financial engagements to cover part of the installation and running costs and can get a hearing from the central authority, it becomes much more difficult for the latter to upset a solidly established plan. The general plan, whose implementation comprises a series of successive phases, then becomes more permanent and more independent of any political changes which may occur at the ministerial level.

**National and Regional Hospital Investment-Funds**

*Hospital-development programme*

Nevertheless, possible difficulties arising from too much power in the hands of local boards should not be overlooked. Many western countries have inherited a form of local hospital-management which makes co-ordinated action and implementation of a national and regional programme very difficult. The fact that each hospital has an independent budget, and that each locality is obliged to bear part of the cost of equipping, modernizing, or building its own hospital, acts as a continual brake on planned development by the government and the national hospital-board. In under-developed countries where such a system has never existed, it seems preferable to plan for a national hospitals-fund and regional funds to be derived from all possible sources (government subsidies, community contributions through local taxes, contributions from social-security funds, and donations from philanthropic associations and private persons). The national fund, administered by the health ministry with the advice of the national hospital-board, composed of representatives of other ministries, the teaching profession, and professional and technical associations, would be used for the financing of projects of national interest (research centres and specialized institutes) on the one hand, and for allocation among regional funds according to the special needs of each hospital region, on the other. Finally, financing of each project would be assured by co-ordinated distribution of the funds available within each region, after consultation with the regional hospital-board, and taking account of the wishes expressed by local communities, all under the supervision of the regional health-director and the ministry.
Operating Budget

Any attempt to summarize the various methods of meeting hospital costs brings to light a surprising diversity among existing provisions. It is soon found, however, that the different ways of approaching the problem are the result of the legislative, economic, and social situation in the individual countries.

Complete State assumption of all running costs

The State may meet the full expenditure for public hospitals out of its general budget derived from taxation. Where the risks of interruption to work and invalidity are covered by a sickness-insurance scheme, the scheme may in certain cases contribute towards the hospital system through an annual contribution paid into the budget of the responsible ministry. Public hospitals, however, may also admit paying patients or patients coming under special regulations; in this case, each hospital institution would show in its accounts receipts derived from private patients and, for example, from certain payments under industrial-accident insurance schemes, as well as the running costs. The latter vary widely, depending on whether supplies and salaries are paid locally or out of the general State, provincial, or municipal budget, according to the status of the employees. The difference between receipts and expenditure is periodically adjusted, after inspection, by the responsible ministry. Every year, the hospital management prepares a draft budget for the following year, to enable the State to calculate its general budget. This financial system may be applied either to single hospitals or, in the case of rural hospitals, to hospital groups having a total of 1,000 beds, as is done in Great Britain.

Assumption of costs under sickness-insurance or social-security systems

Some countries have developed social-security systems under which hospital institutions belong to the system, and persons coming under it are treated free of charge. In this case, the aged, or persons who by reason of their social status do not come under sickness insurance, may utilize these hospitals only by meeting the cost personally, except where they are registered for free medical assistance, and an agreement covering this has been concluded between the State and the social-security system.

Independent hospital budgets

In some western countries, the municipal administration of hospitals has led to every hospital having a completely independent budget. Since the hospital is a public utility undertaking, it should not, in principle, be
profit-making; in fact, income should exactly equal expenditure. As the Anglo-Saxons so aptly express it, they are "non-profit and self-supporting" institutions. In this case, the hospital assumes all costs, paying for staff, supplies, and maintenance of premises and equipment, as well as the interest on any loans it may have contracted. To obtain the income to balance expenditure, it has to establish a daily rate, that is, a daily fixed charge which the patient has to pay in one way or another. This daily charge is calculated by dividing the total expenditure by the annual number of patient-days, that is to say, by the product obtained by multiplying the annual number of patients admitted by the average length of stay in days. Patients may defray the cost of their stay, calculated by multiplying the daily charge by the number of days in hospital, in a variety of ways:

1. they may be registered for free medical assistance and have all costs of hospitalization met out of government funds;

2. they may contribute to a hospital-insurance, a sickness-insurance, or a comprehensive social-security scheme; costs of hospitalization may then be covered wholly or in part and, in each case, for a period varying according to the arrangements in force in the different countries;

3. they may be required to pay the full cost personally, where they are not covered by any general provision.

Private voluntary hospitals

In some countries, old traditions have persisted, and have led to the development of hospitals financed by private initiative (gifts, legacies, contributions from charity, charitable and philanthropic societies, the Red Cross, the Red Crescent, etc.). The steadily rising cost of medical care, however, has made it necessary in most cases to obtain aid from the State or from sickness-insurance schemes, so that most of these institutions nowadays depend largely on public sources of financing. The usual practice is for these hospitals to conclude agreements with the State and with the sickness-insurance fund covering the treatment of indigent and insured persons respectively. These agreements normally stipulate a fixed daily charge, taking account of the various sources of income, whether public or private.

Privately-owned hospitals

This category of hospital is cited because, in countries where private medical practice is the general rule, the cost of treatment in such institutions is refunded by sickness-insurance or social-security schemes at the rate generally charged in the local public hospital. Patients themselves have to pay for the extras obtainable under the commercial side. Indigent persons entitled to free medical assistance are not, as a rule, admitted to such hospitals.
These differing possibilities in no way represent a state of affairs which reflects the economic or social development of the countries where they are found. Countries in south-east Asia originally possessed colonial hospitals, financed by the parent State and to some extent by local taxation; nowadays their funds are derived from the State (Ceylon) or the Provinces (India). In general, the countries of western Asia have adopted the State-financing system, in common with the USSR, the Scandinavian countries, and Great Britain, although the existence of social-security systems in the two last-named complicates the matter. Until now, the Latin countries of Europe have preferred to retain the budgetary autonomy of each hospital, and as a consequence have adopted the daily-rate system. In Turkey, a growing number of hospitals are administered under the social-security system, although it covers only a small portion of the population. In South America, hospital institutions generally derive their funds from the State. In the USA, the majority of hospitals have retained their private character and consequently their income comes from a number of different sources.

Thus, hospital systems throughout the world seem to follow one or other of two main tendencies.

(1) State responsibility: Under this principle the health system, in both basic aspects, preventive and curative, is financed out of the general budget. Assuming that the various dangers already cited have been avoided and a hospital-construction plan drawn up that takes in rural areas hitherto not covered, the general budget makes it possible to carry out the health programme under the most favourable conditions.

It must, however, be emphasized that this programme represents a very considerable financial effort, and where a country wishes to follow this course it is essential for the central government, in adopting the plan to be carried out, to make adequate funds available to the responsible ministry. These funds may represent a substantial proportion of the general budget. The parliament and government must be brought to a realization of the need for sustained effort over a long period of time and for assured financial backing. Lacking this, the hospital programme will fail to attain its full magnitude, and experience has repeatedly shown that rural installations are the first to suffer from a reduction of credits.

Lastly, such a system implies that the public should be aware that part of the taxes it pays comes back to it in the form of the health services placed at its disposal. As a matter of policy, therefore, the people should be made aware of the fact that the hospital system to which it is traditionally attached would benefit directly from nationalization. One advantage of the system is that it provides a financial backing relatively independent of fluctuations in industry and commerce—although unfortunately affected by reaction to
the international situation—whereas the arrangements described below are more closely tied to the wages of the socially insured in industry and commerce, and to general economic prosperity.

(2) Social-security participation in the health system: The following arguments are put forward by those who advocate social-security participation in the financing of the health system.

The introduction of a contributory scheme in any area where this is warranted by the social and economic level has proved to be the best means of ensuring the rapid development of a comprehensive health system. It is a well-known fact that a community will take an interest in a service intended for its benefit only where it has a part in the administration and financing. The introduction of a contributory scheme for public-health and medical care enables the primitive stage of State tutelage of a patriarchal and authoritarian type (or what is considered to be such by local communities) to pass to a system of shared effort calling for the active co-operation of the population. This evolution may take place gradually, and at the same time the private interests of professional groups, such as doctors, midwives, and private nurses, can well be fully respected.

Broadly speaking, three stages are discernible:

(a) Hospital insurance, covering the costs in whole or in part of hospitalization or out-patient services. The public pay contributions to a fund which may be private, State-controlled, or nationalized. A sum fixed by agreement goes back into the hospital system from the fund, according to the number of out-patient consultations and days of hospitalization. As a rule, maternity insurance is organized at this stage.

(b) Sickness insurance, applying to all medical and nursing care, as well as to the supply of medicaments, and covering the expenses incurred by insured persons in whole or in part, on account of illness or maternity, whether under hospital or private treatment.

(c) Social security, extending the original principle of sickness insurance to apply to most aspects of social life by adding to the earlier scheme supplementary provisions for unemployment compensation, invalid-and old-age-pensions, family allowances, and death grants.

These three basic stages may follow one another, step by step, in keeping with the economic development of the country concerned. This system invariably has a telling effect on the general health of the population; their attention is drawn to health problems, and recourse to medical advice from the doctor or the hospital is made easy. The result is therefore a growing demand for treatment and greater activity among the hospital services.
In under-developed countries where treatment has always been provided free of charge, the sickness-insurance or social-security scheme must from the outset cover all expenses, with the aid of government subsidy; no fees whatever should be charged for hospital medical attention. There is the possibility, however, that arrangements of this sort will lead to abuse, to be found, in particular, in out-patient departments. This is the reason why, in certain western countries, the patient is requested to pay a small charge, equal to 10% or 20% of the cost of medical attention, which represents a modest but useful contribution to the hospital running costs.

Contributions from funds may be paid either to the health ministry, which would be responsible for financing the system as a whole (national hospital funds), or to individual hospitals. The first is the only possible arrangement in under-developed countries where the hospitals do not all have independent and balancing budgets. The second may be used wherever hospital budgets are independent, with receipts and expenditure balancing. Both can exist side by side, moreover, as may be observed in India, Israel, and Turkey. In these countries a dual hospital organization is taking shape, one part intended for the socially insured and the other for the medical assistance of the indigent, the former being financed out of social-security funds and the latter by the State. It is very difficult to choose between the two; every country must be left free to adopt the system that best corresponds to its economic status and the will of its people. The world presents a variety of examples and solutions; it is impossible to forecast the final outcome. All that can be said here is that the social-security idea made remarkable progress between 1925 and 1940, whereas, in the past ten years, a nationalized hospital structure seems to have gained in favour in Great Britain, the Scandinavian countries, South America, and Asia.

**Deciding Factors in Hospital Planning**

We have tried to show how a hospital programme that embraces a policy of development in rural areas is dependent on a series of factors, and that it should be applied in specific cases only after careful consideration. For many years to come, the world will continue to harbour many different philosophies, cultures, and systems; hence, hospital programmes, which reflect so closely the essential features of the style of life, will have to be carefully adapted to the diverse conditions prevailing in individual regions. It is to be feared, however, that by laying so much stress on the diversity of possible solutions, the reader may become confused about the problem as a whole. Fortunately, the different aspects can be grouped together in such a way as to make it possible to trace in broad outline the main types of organization, and this is done below. It should be stressed that, in the
writer's opinion, any action in the field of detection and early diagnosis must have the backing of curative services to take charge of cases of illness brought to light by systematic surveys.

**Primitive regions in tropical zones**

The characteristics of primitive regions in tropical zones are a rudimentary type of agriculture, a certain percentage of nomads among the population—i.e., people who migrate periodically in search of pasture or new land—a very low population density, and an almost complete lack of organized medical services. Stability and evolution among social groups are jeopardized by periodic epidemics and nutritional disorders.

Health action has to be aimed chiefly at the eradication of pestilential diseases by means of mass vaccination, disinsectization, and general hygiene measures. In the early stages this programme can be carried out by mobile teams, based on health-centres in the former colonial towns. These can cover both the preventive work already described and curative action as well, by organizing out-patient clinics for the treatment of simple complaints common to most of the people, as, for instance, ulcers, fractures, hernia, variocele, elephantiasis, eye affections, and parasitoses. Accordingly, the mobile unit could consist of several dispensary vans with surgical equipment, beds for setting up under canvas, a radiography apparatus, and a small laboratory; it could be stationed for several weeks, or even months, in each area. The vans could be used for touring the area to organize periodic preventive and curative surveys and to bring back patients to the temporary centre for operation or further observation.

Exploratory work of this kind would make it possible to determine the most suitable site for the permanent centre, which should be built in the simplest possible fashion, its work being supported by clinics held in the villages. The essential features of this system were laid down at the First Pan-African Health Conference, held in 1932, where the inadvisability of separating preventive and curative medicine was emphasized, as far as concerns personnel coming into direct contact with the masses of the people. Curative medicine offers the health officer the best of chances to give tangible proof of his desire to help the people. As far as possible, use should be made of local personnel.

**Under-developed regions with a dense agricultural population**

These regions are characterized by more or less large population groups who live by working the land, whose civilization may sometimes be advanced, but whose economic situation is precarious. This is the case in many under-developed countries where the political and social structure has not yet been able to assure the population of an income large enough to break
the vicious circle of poverty and disease, in spite of the fact that these countries may once have been the site of ancient, highly-advanced civilizations. These are the countries where epidemic and endemic diseases combine to preserve a very low social level and a chronic shortage of financial resources. The 19th-century idea of erecting hospitals before undertaking any other action must be abandoned, and priority given to a series of general health measures, with a view to removing the threat of epidemics and reducing the incidence of endemic diseases.\(^r\) Even at this point, however, curative services should be organized in order to justify in the eyes of the population the action undertaken in the field of public health. This is the stage of the hospital/health-centre, which has a dual function to discharge—preventive and curative. Under this system, out-patient clinics furnish the opportunity for organizing routine examinations and developing the public-health programme as a whole, while at the same time ensuring prompt attention and treatment for cases of illness diagnosed in the early stages. Simple out-stations in the villages, staffed by local personnel, provide a first-aid service for isolated communities.

At this stage, no financial contribution can be asked of the community, and the hospital/health-centre will be run by a whole-time medical and nursing staff with all-round experience; operating, building, and equipment expenses will be assumed in full by the government.

This state of affairs should be regarded as temporary since the State must take steps concurrently with its health activities to improve communications and gradually raise the economic level of the country, especially as regards nutrition and housing.\(^{29}\) Furthermore, urban centres should possess well-equipped hospitals with sufficient capacity to admit any country patient whose condition requires his removal to an appropriate institution. The rural hospitals should be in a position to apply to specialized institutions in cases of tuberculous, mental, or other diseases, detected in the course of consultations or routine examinations. The hospital/health-centre described in the second chapter would correspond to this type of organization; provision should include a very limited number of private wards reserved exclusively for isolation cases.

*Regions in course of economic development, already partly industrialized and having a substantial per capita income*

As soon as some portion of the population has a not-inconsiderable average income, the field of medical practice is able to extend. To avoid duplication of effort and to ensure harmonious operation of the health

\(^r\) The reader is referred to the work of the Netherlands Indies Public Health Service in this field.\(^{44}\)
services, the rural hospital should be accessible to all physicians and should include a private section for paying patients. Where a government adopts this method, a contributory system can be established in the form of a hospital-insurance or, better still, a sickness- and maternity-insurance scheme. The clientele of the hospital would then fall into two categories: indigent persons treated free of charge, and paying patients treated in private practice, together with the socially insured whose expenses are met out of the sickness-insurance fund. The type of hospital described in the previous paragraph would be quite suitable for this purpose, provided the number of private or two-bed wards is slightly increased.

**Advanced rural areas with high economic and social living-standards**

Here, the rural hospital takes on its most highly-developed form, and the preventive section may come under a whole-time public-health officer. The State or a social-security system covers the great majority of the population and assumes responsibility for indigent persons and cases of hardship. This period will be characterized by the expansion of the financial and administrative structure studied in the previous section. The rural hospital has become an integral part of the general system, and the functions it discharges are precisely those assigned to it under the regionalization concept.

It is clear that in the last three stages, the relative importance of the different sections of the rural hospital would largely depend upon geographic, demographic, cultural, and health requirements, the various aspects of which were studied in earlier chapters; we must repeat that any one country may perfectly well contain several regions where the rural-hospital facilities differ widely. It is important to avoid rigidity in schemes as well as exaggerated standardization.

Provided this condition is fulfilled, the definition given by Mackintosh may well apply to the rural hospital:

"The appropriate field of study of a hospital is not sickness in the narrow sense but life in the broad sense. Sickness is an incident—grave, troublesome, or restful—in the life of a person, but to the hospital and its staff sickness is a challenge, a focus of enquiry from which prevention should radiate as well as the cure of the individual."

A health system such as we have described may well correspond to the prediction of Neutra:

"We can foresee a time when our technical civilization ... will actually keep its promise and serve not only the strictly urban variety of mankind ... People, who populate vast stretches of the earth, will then no longer feel themselves to be second-rate citizens."
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INDEX

Acute diseases, distribution of general hospitals in USA, 57
Administrative services in rural-hospital/health-centre, 122-123
Administrative staff for rural-hospital/health-centre, 137-138
Administrative structure of public health, relation to hospital regionalization, 54-55, 142-143
Africa, medical staff, proportion to population, 23
paramedical and auxiliary staff, 25
Agrarian innovations influencing rural life, 28-29, 31-33
Air ambulances, 70
Air-conditioning, see Mobile air-conditioning units
Ambulance needs for rural-hospital/health-centre, 126-127
Architecture of rural-hospital/health-centre, 91-131
Area required for rural-hospital/health-centre, 93
Asia, hospital systems, 146
medical staff, proportion to population, 23
Assistant director/bursar, functions, 122, 137-138
Association de Médecine Rurale, second national congress, 83
Association professionnelle internationale des Médecins, 49, 84
Australia, medical staff, proportion to population, 23
Autonomous hospitals for isolated communities, 37-38
Auxiliary staff, see Paramedical and auxiliary staff
Ayurveda in Asia, 26

Bed/population ratio, calculation methods, 65-70
definition, 55-56
in regional hospital-centre, 42-44
in various countries, 56, 59
Bibliography, 153-156
Blood transfusion, regionalization, 48

Brazilian Census Department definitions of rural and urban districts, 12
Budget for rural hospitals, 144-148

Canada, hospitalization-rates, 60
Centralization of hospital systems, 34, 143
Child-welfare services, see Maternal- and child-welfare services
Children, hospitalization difficulties, 17, 79
specialized nursing units for, 106-107
China, villages, lay-out, 22
Chronic diseases, affecting hospital occupancy, 60-61
Climate, factor in design of rural-hospital/health-centre, 94-99
Climatology of rural areas, 27-28
Communicable diseases, provision for, 81-82, 106-107
Communications, rural, and health, 12-14, 28, 38, 57, 73, 134, 140-141, 150
influence on hospital regionalization, 41, 93-94, 140-141
Convalescents, hospitalization needs, 73-74
Costs, see Financial factors
Customs, and rural health, 16-18

Death grants, 147
Delivery-room, siting, design, and equipment, 110-112
Denmark, hospital occupancy, duration, 60
Dental department in rural-hospital/health-centre, 118, 121-122
Design for rural hospital/health-centre, choice, 92-93
Dietary taboos, 17
Dispensary, siting, functions, and equipment, 116, 118
Domiciliary care schemes, 20-21

Economic and demographic aspects of rural environment, 11-12, 31-33, 141-142
Economic factors in establishing rural-hospital systems, 141-142, 150
Egypt, hospital occupancy, 58
infant mortality, 19
maternity services, 20, 27, 76-77
out-patient services, 116-117
villages, lay-out, 22
Electrical apparatus, protection, 128
Electricity-supply for rural-hospital/health-centre, 123-124
Electro-radiology rooms, design and equipment, 115-116
Endemic diseases, prevention and treatment, 82, 85-86
Epidemics, rural-health problem, 19, 81-82, 149
Equatorial regions, see Tropics
Europe, central, villages, lay-out, 22
Europe, medical staff, proportion to population, 23
European Conference on Rural Hygiene, 12, 48-49
Expansion, factor in hospital siting and design, 93, 129-131

Family allowances, 147
Farm, definition, 12
Financial factors in establishing rural-hospital system, 10, 71, 141-143
See also Budget for rural hospitals; Hospital investment-funds
Fire-fighting precautions, 127, 128
Flexibility in design of rural-hospital/health-centre, 92, 93, 130
Four-stage development of rural-hospital/health-centre, 130-131
Fourth International Hospital Congress, 46
France, bed/population ratios, 58-59
domiciliary care schemes, 21
hospitalization, duration and costs, 58
medical staff, proportion to population, 23
survey of population served by hospitals, 61-65
Fuel, types recommended, 128
Furniture, types recommended, 128, 129
Garage for rural-hospital/health-centre, 126-127
Geriatrics affecting hospital occupancy, 60-61, 89-90
Germicidal lamps, 129
Great Britain, bed/population ratio, 56, 59
domiciliary care schemes, 21
hospital systems, 146

Great Britain (continued)
medical staff, proportion to population, 24
nurses, proportion to population, 26
Group-practice offices, 83, 117, 135

Health aspects of rural environment, 12-14
Health education, function of rural-hospital/health-centre, 88-89, 117, 122
Heating of rural-hospital/health-centre, 123-124
Hospices for old persons, 89-90
Hospital equipment, climate affecting, 28
needed for rural-hospital/health-centre, 91-131
preventive and therapeutic, economy of combining, 51
purchase co-operatives, 48
quality and availability affecting hospital occupancy, 58, 68
restriction, for governmental control of services, 80
standardization, 127-128
storing, 126-127
Hospital insurance, 147, 151
Hospital investment-funds, national and regional, 143
See also Budget for rural hospitals; Financial factors in establishing rural-hospital systems
Housing, affecting hospitalization needs, 31, 58, 75-76, 77-78, 150
Hungary, domiciliary care for tuberculosis, 21

Independent hospital budgets, 144-145
India, domiciliary care for tuberculosis, 21
infant mortality, 19
medical staff, proportion to population, 24
paramedical and auxiliary staff, disadvantages, 25
preventive and curative medicine, development, 53
villages, lay-out, 22
Indices of operations of hospitals, 65-70
Indonesia, midwives, 27, 77
preventive and curative medicine, development, 53
Industry, influencing rural life, 29-31, 87
Infant mortality, 19
Injuries, occupational, and rural-hospital organization, 47, 87
Insects, avoidance in hospital siting and construction, 93, 99
Intergovernmental Conference of Far-Eastern Countries on Rural Hygiene, 49, 50, 84
International Statistics Institute, definition of rural district, 12
Investment-funds, see Hospital investment-funds
Isochrone, definition, 13
illustration, 45, 46
Isolation wards, 100, 107, 150

Japan, medical staff, proportion to population, 23

Kitchen in rural-hospital/health-centre, 103, 108, 123, 128

Laboratory, design and equipment, 114-115
Laboratory technicians, 48, 137
Latin America, medical staff, proportion to population, 23
Laundry and linen, in rural-hospital/health-centre, 108, 123, 128
Lawns, use around rural-hospital/health-centre, 98, 99
League of Nations Health Organisation, recommendations on rural-hospital systems, 48, 49
Lifts, unsuitability for small hospitals, 92
Lighting, hospital, 104, 112, 129
See also Electricity-supply
Linen in rural-hospital/health-centre, see Laundry and linen
Local authorities, participation in health programmes, 142-143
Local hospital, average bed/population ratios, 69
definition, 44

Maternal- and child-welfare services, 74-78, 79, 89, 119-120
Maternity services, affecting hospital attendance, 59
bed/population ratio, 67, 70-71, 77
equipment, 115
nursing units, design, 106-107
problems of custom and religion, 17, 75, 78
required in rural-hospital/health-centre, 74-78

Medical education influencing hospital distribution, 41
Medical research, influencing hospital distribution, 41
Medical staff for rural areas, lack, 23-25, 133-134
system for provision, 133-135
Medicine, general, department required in rural-hospital/health-centre, 73-74
Mental disorders, admission of patients to rural hospital, 82-83,
clinic, 122
hospital occupancy, 60
specialized nursing-units for, 106-107
survey in rural areas, need of, 88
in under-developed countries, 150
Metropolitan district, definition, 12
Midwives, in under-developed countries, 26-27
See also Nursing staff; Paramedical and auxiliary staff
Mobile air-conditioning units, 112
Mobile clinics, 36, 149
Mobile health-units, 70, 149
Mobile radiography unit, 115
Mobile surgical team, 80
Modern Hospital Publishing Company, design competition, 130
Mortuary, 127
Moslem customs, and health, 17

Nationalized hospital systems, 34, 55, 59, 84, 148
New York, Master Plan of Greater, 56
New Zealand, domiciliary care for tuberculous, 21
medical staff, proportion to population, 23
Non-profit hospitals, 144-145
North America, medical staff, proportion to population, 23
Nursing staff, duties in rural hospital/health-centre, 107-108, 112, 118, 135-137
lack in under-developed countries, 26
Nursing-unit, form and equipment, for rural-hospital/health-centre, 99-108
See also Wards
Nurse’s workroom in rural-hospital/health-centre, 112-114, 118

Occupancy of hospitals, duration, 59-61
calculation methods, 65-70
factor in design, 92
Occupational medicine, facilities needed in rural areas, 87-88, 122
Old persons, care of, 60-61, 89-90
pensions, 147
Operating-suite, sitting, design, and equipment, 110-114, 128
Operating-tables, type recommended, 128
Orientation of rural-hospital/health-centre, 94-97
Osteomalacia affecting maternity-service needs, 78
Out-patient services, design and equipment, 116-118
patients’ contributions, desirability of, 134, 148
required in rural-hospital/health-centre, 83-85

Paediatrics department required in rural-hospital/health-centre, 79
Pan-African Health Conference, 50, 149
Pandemics, rural-health problem, 19
Paramedical and auxiliary staff, 25-27, 136-137
Pathology, rural, 18-19
Pavilion-type building for rural-hospital/health-centre, 82, 98, 107, 130
Paying patients, as incentive to rural medical staff, 134, 150
Pensions, invalid and old-age, 147
Pharmacist, duties in rural-hospital/health-centre, 116, 137
Physiotherapy room, sitting and equipment, 116
Political factors influencing rural life, 28, 33-34
Prefabrication of parts for rural-hospital/health-centre, 97-98
Prevention-and-cure concept, 35, 49, 84-85, 139-140, 149
Preventive medicine, integration in rural-hospital system, 48-54, 85-87, 118-122, 139-140
Primitive tropical regions, problems, 149
Private organization of hospitals, 34, 38, 145-146
Psychiatric hospitals, occupancy, 60
See also Mental disorders
Psychology, rural, 16-18
Public-health programmes and rural medical services, 54-55, 139-140
Purchase co-operatives for hospitals, 48
Rachitism affecting maternity - service needs, 78
Radiation, control in design of rural-hospital/health-centre, 95-97, 98, 99
Radiology-room, see Electro-radiology rooms
Radiology technician, duties, 137
Records, in rural-hospital/health-centre, 122-123
Regional hospital-centre (RHC), average bed/population ratios, 69
definition, 42-44
statistical calculation of population served, 61-65
Regionalization concept for rural hospitals, 37-48
Religion, and rural health, 16-18, 127
Repair of hospital equipment, 127-128
Rest-room, functions and equipment, 114
Roof, design, for rural-hospital/health-centre, 97, 99
“Rooming-in” for maternity wards, 107
Rural areas, general description, 11-36
Rural environment, definition, 11-14
Rural hospital, average bed/population ratios, 69
definition, 9
in developed areas, 151
distribution recommended, 45-48
organization, recent trends, 34-36
scope and functions, 70-72, 91, 139
statistical calculation of population served, 61-65
Rural-hospital/health-centre, architecture and equipment, 91-131
costs, 10
definition, 9-10
departmental structure, 73-90
functions, 37, 86-87, 140
Rural non-farm, definition, 12
Rural settlement, types, 14-16
Sanitary engineer, role, 89, 126
Sanitary installations, type, for patients, 102, 108, 117, 120
for staff, 114
Sanitation, affecting rural health, 21-23
factor in hospital siting, 93
Scandinavia, hospital systems, 146
Scholarships for rural medical students, 135
School medical examinations, 121-122
Seasonal factors and health planning, 27-28
Segregation of sexes, factor in hospital design, 92, 93, 101-102, 104, 117, 127
Septic-dressings and plaster-splints room, 110, 111
Service-rooms, design and equipment, 107-108
Sickness insurance, 147, 151
Site for rural-hospital/health-centre, choice, 93-94
Social-security schemes, influence on hospital organization, 41, 142, 144, 147-148, 151
Sociology and rural-hospital/health-centre, 89
South America, hospital system, 146
Specialists, proportion to population, 23, 40, 42
Specialization, medical, influencing hospital regionalization, 38, 39, 40-41
Staff, accommodation, 126
Staff for rural-hospital/health-centre, 133-138
Standard organization of hospital services, 38-39
Standardization of hospital equipment, 127-128
Standards proposed for rural hospital, 55-70
State responsibility for hospital system, 144, 146-147, 151
See also Nationalized hospital systems
Statistical calculation of population served by a hospital, 61-65
Sterilization facilities for equipment, 107, 110, 111, 112-114, 118, 123, 128
Sub-divisional hospital-centre (SHC), average bed/population ratios, 69
definition, 44
statistical calculation of population served, 61-65
Surgery, design and equipment of rooms for, 110-112
type required in rural-hospital/health-centre, 79-81
Sweden, bed/population ratio, 56
hospital occupancy, duration, 60

Technical services, planning and equipment, 109-116
Technical staff for rural-hospital/health-centre, 48, 137
Telephotography, 48

Temporary emergency hospitalization measures, 81-82, 107
Tents, value in temporary hospitalization, 81-82
Thailand, midwives, 27
Theory of the rural hospital, 37-72
Ting-Hsien experiment, 20
Town-planning, and hospital siting, 94
Transport, definition, 14
See also Communications
Tropics, air-conditioning requirements in operating-theatres, 112
electrical installations, protection, 128
rural-health problems, 18-19, 81-82, 149
structure of rural-hospital/health-centre, 94-99, 122
Tuberculosis, admission of cases to rural hospital, 82-83
control, 121
domiciliary care schemes, 21
equipment for detection, 115, 121
specialized nursing-units for, 106-107
under-developed countries, 150
Turkey, hospital system, 146
medical staff, proportion to population, 24
villages, lay-out, 22

Under-developed countries, epidemics, 150
health-planning, 10, 18, 148, 150
local authorities, participation in, 142-143
hospital equipment, type, 128
maternity, 19-20, 75-76
nursing staff, lack, 26-27, 93
old persons, 89-90
out-patient services, 83, 150
paediatrics, 79
preventive and curative medicine, roles, 49-50, 52-54, 86-87, 150
psychological, religious and cultural prejudices, 16-17
rural-hospital/health-centre, choice of design, 92, 131
social-security schemes, 147-148
Unemployment compensation, 147
Union of South Africa, medical staff, proportion to population, 23
Union of Soviet Socialist Republics, hospital systems, 146
medical staff, proportion to population, 23
Union of Soviet Socialist Republics
(continued)
paramedical and auxiliary staff, 25
rural medical centres, structure, 51
United States of America, bed/population
ratios, 56, 57
domiciliary care schemes, 20-21
health-centres, development patterns, 51
hospital occupancy, 59-60
hospital system, 146
medical staff, proportion to population, 24
rural hospitals, distribution, 46
United States of America Bureau of the
Census, definitions of urban and rural environments, 11-12
Urban environment, definition, 11-12
Utensils, hospital, types recommended, 129
Venereal-disease control, 121
Village, types, 14-16, 22-23
Voluntary hospitals, see Private organization of hospitals
Wall materials for rural-hospital/health-centre, 97-98, 111-112, 115
Wards, equipment, 104-107
orientation, 96-97
size and planning, 93, 99-104
Washing- and sterilizing-room for surgery, design and equipment, 112-114
Waste matter disposal, 93, 126, 128
Water-supply for rural-hospital/health-centre, 93, 124-126, 128
Windows, design, for rural-hospital/health-centre, 98
World Health Organization, Fifth World Health Assembly, 52, 86