REQUIREMENTS OF A MILITARY HOSPITAL

BY
Major S. MACKENZIE, O.B.E., M.R.C.S., L.R.C.P., D.C.H.
Royal Army Medical Corps

[Continued from page 32, January issue]

PART II—IN-PATIENT DEPARTMENTS

WARD DESIGN

It is the present trend in hospital administration and staffing that a nursing unit should consist of about 25 to 30 beds, including a proportion of single rooms. The figure is a variable one in civil practice, depending on the nature of the ward concerned and types of case expected to be nursed there. A 25-bed unit, including three or four single rooms, is about the maximum desirable in a military hospital since there is available per nursing unit only one trained sister who has to supervise up to not more than about six untrained and semi-trained nursing assistants.

The design of wards has been discussed fairly exhaustively by various people in many countries and the types generally recognized are—

(a) The large pavilion type ward.
(b) The small ward.
(c) The large veranda type ward.

The Pavilion Type

(a) This is the type commonly found in military hospitals and in most “old-fashioned” civil hospitals. It consists of a long ward with the beds ranged down its sides, heads against the wall, feet towards the middle; the ward is lighted by long windows spaced between the beds, and cross-ventilation is simply and easily achieved. Ventilation is always ensured by the fact that the windows on the side of the ward protected from the prevailing weather can be opened without risk of exposure of the patients. Supervision of the ward is easy and simplicity of planning is another advantage.

(b) The disadvantages are that the patients face the light; it is not always easy to arrange ventilation to suit each patient’s needs; and some patients tend to feel lost in such a large group—a feeling of being in a “public institution” or “infirmary” tends to be engendered and is often resented by the patient.

The Small Ward

The small ward first became widely used in the late 1920’s in Scandinavia and later in the United States. The large pavilion type was practically
abandoned in any of their hospitals planned and built after 1930. The small ward trend has been followed in certain hospitals in this country; the tendency generally has been towards separate 4-bed wards. Examples of the small 4-bed ward layout may be seen in the Royal Masonic Hospital, London.

The reason that the tendency was chiefly towards a 4-bed unit was because this gave each patient his own corner position in the ward and also the shape and size of the room was convenient from the design and building aspect.

The principal advantages claimed for small wards were:

(a) They provided quiet and privacy for patients.
(b) They afforded opportunity for the segregation of patients within a ward.
(c) They limited the spread of cross infection.
(d) They facilitated periodic cleaning and redecoration.
(e) They afforded a small social unit for patients—that is to say, a patient would feel on more intimate terms with one, two, three or other small number of immediate neighbours: he did not get the feeling of being lost in a large number of anonymous personalities.

The disadvantages were:

(a) They increased the amount of supervision required so that more nurse time per patient was necessary. They also increased the amount of supervision of the nursing staff required for the sister in charge of the ward.
(b) They did not lend themselves so readily to adequate ventilation.
(c) They increased the cost of building and they complicated planning of wards and the hospital as a whole.

The Veranda Type

A compromise on these alternatives was developed in this country by the introduction in the early thirties by Elcock and Sutcliffe (1934) of the so-called "veranda" wards at the Hertford County Hospital. This type of ward is a version of what is known as the Rigs Ward in America and on the European Continent and which is named after the Rigs Hospital at Copenhagen, where it was apparently first used. It consists of a long ward divided into bays, each bay containing 2, 4 or 6 beds, according to the width of the ward.

In the original Rigs ward an open corridor giving on to the bays runs down the centre of the ward. In the veranda ward this corridor runs along one side of the ward and the other side wall consists of the windows, which may or may not give on to a balcony. The beds are lined lengthwise in the ward with the beds in each bay facing each other. The advantages and disadvantages of the veranda ward are similar in kind to those for the small wards, but vary somewhat in degree. A compromise is produced which retains almost the full advantages quoted above of the small ward and either entirely avoids or considerably reduces the disadvantages.

Examples of pavilion, Rigs and veranda types of wards are shown at Fig. 4.
The new Princess Victoria Ward at Q.A. Military Hospital, Millbank, is an example of C.

**Fig. 4.** Common Ward Types.
110

Requirements of a Military Hospital

The type that is to be preferred for a military hospital is not necessarily that best suited to civil hospitals. The young soldier is gregarious in most of his activities in barracks and as a rule tends to feel lonely if isolated. It is doubtful whether the advantage of privacy quoted above, which refers to civilian hospitals, applies in the case of young soldiers. Generally speaking, most soldiers find solitude wearisome and depressing and they will often prefer to be in a ward with twelve or more comrades, where they can "muck-in" with the others and enjoy conversation, play games, and make visits to each other's bedsides. The proportion who wish to be alone is small and these can be catered for in the single-bed wards, which have to be provided for patients requiring separate accommodation because they are severely ill, or noisy, or require observation quite apart from their fellows. On balance, therefore, the pavilion type of ward comprising about 20 beds with about 5 single-bed wards added is the type generally to be preferred for other rank wards. There is also a place for a certain number of veranda type wards, divided into 2-bed and 4-bed bays, for the T.B., V.D., E.N.T. and Eye wards, officers' wards and women's wards, to whose needs they are admirably suited.

Cret (1950) states that in designing the U.S. Naval Hospital, Beaufort (the latest American designed service hospital), the pavilion type wards were the outcome of the specific preference of the U.S. Navy Department.

Balconies and verandas must not be less than 9 feet wide, to permit easy turning of beds. They serve little purpose in the veranda type wards, but are valuable in pavilion wards where day rooms or solaria for each ward are not provided. Their usefulness in tropical climates in providing shade and in the prevention of solar heating of walls of the wards underneath should not be overlooked.

Ward Ancillaries.

The ward ancillaries required should comprise:

(a) Sluice room.
(b) Patients' lavatories comprising—
   (i) Lavatory basins.
   (ii) W.Cs. (urinals are out of date in wards and should only be provided in out-patients' departments, etc.)
(c) Bath and showers.
(d) Sister's duty room and lavatory.
(e) Ward servery.
(f) Medical Officer's consulting room and office.
(g) Treatment room with sterilization bay.
(h) Clean and dirty linen stores.
(j) Housemaids' store.
(k) Small ward store.

It is felt preferable to centralize the storage of such items as splints, bed rests, cradles, fracture boards, etc., in the hospital store, but it is essential that a small number of such items such as bed rests, splints, cradles, be held in the
ward and provision for these should be made in the small ward store. Certain wards require additional ancillary accommodation—e.g. in the V.D., families', skin, psychiatric units (q.v.). Dining and recreation accommodation will have to be provided in the officers' and families' wards (q.v.). Slight modifications to the standard ward plan may be needed to accommodate these.

The relative positioning of the sister's duty room, the servery and the sluice can give rise to much discussion, but, on balance, it is probably best that the sister's duty room be adjacent to the main ward itself. The sluice room and the patients' lavatories should also be adjacent to the ward, but the interposition of a small lobby is desirable.

A circulation diagram is at Fig. 5.

![Circulation Diagram](image)

**Fig. 5.—Ward Unit.**

**Staff lavatories**

Orderlies' lavatories should be provided on the basis of one per two or three wards. They need not be in the ward annexes at all, but placed at convenient points in the corridors between the wards whose staff they are intended to serve. One M.O.'s and one sister's lavatory per floor or wing should be sufficient, apart from those provided in the special departments, administrative wing, operating theatre suite, and so on.

**IN-PATIENT NURSING UNITS FOR SPECIAL DEPARTMENTS**

**Women and Children's Unit**

(a) The requirement for a women's and children's unit is best provided as—

(i) Women's medical and surgical wards—a number of 4-bed-bay veranda type wards as required, with a somewhat higher proportion of single rooms than is usual in ordinary wards.

(ii) Children's wards of the veranda type with a small isolation ward or cubicle providing for beds and cots.

(iii) Maternity wing comprising preparation room, lying-in ward, delivery room with separate sluice room and sterilization room; lavatories, bathrooms, etc.
Requirements of a Military Hospital

(iv) Infants' nursery with proper baths and an isolation cubicle, and a milk room in addition to the ward servery.

(v) The normal ward ancillaries plus a sitting room, dining room and sometimes an extra servery to serve them.

(b) The whole delivery suite and infants' nursery of the maternity unit should be air-conditioned in tropical climates.

(c) The planning of maternity and other women's ward accommodation in such a way that it is flexible is most desirable. The maternity section might be required to expand at some future date and the women's wards should be so laid out as to make any part or all of them suitable for this.

(d) The circulation diagram for a maternity unit is at Fig. 6.
S. Mackenzie

Officers' Unit

Sitting room, dining room and recreation room accommodation has to be provided in the ward ancillaries in addition to the normal scale. A number of small wards (4-8 beds) and a high proportion of single rooms should form the nursing unit.

E.N.T. Unit

Beyond a requirement to segregate clean from dirty cases, there are no special needs in these wards. The veranda type of ward should be preferred since it allows better segregation of the cases. The normal proportion of single rooms should be adequate.

Ophthalmic Unit

The considerations here are the same as for E.N.T. wards. Facilities for shading windows by use of venetian blinds are an extra requirement beyond what is needed for the ordinary wards. Otherwise the normal veranda type ward is suitable.

Skin Unit

There should be no need for the special provision of additional treatment rooms for the skin wards unless out-patients are to be dealt with in the in-patient wards or departments. Where this is not the intention in a particular hospital, nothing additional need be included except possibly an extra bathroom. As neither trained personnel nor equipment are yet generally authorized for provision of superficial X-ray therapy in military hospitals, no provision has to be made at present for accommodation for this purpose. When the time comes such provision is probably better made in the out-patient department.

S.U.S. (Detention) Unit

Soldiers under sentence or close arrest who are seriously ill should be nursed in the general wards—under guard if necessary. For cases of minor illness a small detention ward can be provided. This will require an annexe to accommodate a guardroom (for a maximum of about 1 N.C.Ö. and 10 O.Rs.), a servery, a treatment room and its own lavatories and bathroom. It is convenient to site it so that it can be very closely connected to some other nursing unit for proper supervision of the nursing, which may otherwise deteriorate in standard.

T.B. Unit

Beyond specifying that these wards need to be provided with a good proportion of single rooms, good access to one of the clinical side rooms and that the veranda type should be chosen, there is no special requirement for the ward itself. The sanitary annexe should be provided with a small destructor (gas or oil burning) and facilities for sterilization of crockery and sputum mugs are essential.
Requirements of a Military Hospital

Isolation Unit

Essential segregation is most economically provided by using veranda type wards with single-bed bays and single rooms. A small destructor is essential for destruction of infected waste; bed pan and crockery sterilization should be provided.

V.D. Unit

(a) The main requirement is for the avoidance of congestion in handling a large number of ambulant patients. Generally speaking, the number of bed patients in a V.D. department is small. A high proportion of its patients are only detained for in-patient treatment for a matter of twenty-four hours or so. It is convenient to deal with out-patients in the same unit to save staff, time, equipment and accommodation. This ward therefore should always be planned to be near to the general O.P. entrance so that V.D. out-patients may not only be dealt with in the V.D. unit and not in the general out-patients at all, but also would not need to go all through the hospital to get there.

(b) Accommodation required in addition to that provided in the standard ward ancillaries is therefore—

Waiting room.
Office.
Treatment room.
Departmental office for the Specialist in Venereology, to serve also as a private consulting room for special cases.
Dark ground room.

There is rarely any requirement for an irrigation room.

In addition to the normal ward accommodation there should be provided a small number of single rooms for officer patients or other-rank patients whose condition is serious or who for some other reason require separation.
Two separate W.Cs. and two separate baths should also be provided as part of the usual ancillaries.

A circulation diagram is at Fig. 7.

Psychiatric Unit

(a) It is desirable that the pavilion type of ward be adopted for reasons of ease of supervision. The special accommodation required different from or in addition to that normally provided consists of—

One or two silent rooms (can be ordinary single rooms).
One or two special protected rooms with, if possible, lavatory accommodation separate from the rest of the ward.

The remainder of the beds can be accommodated in a single open ward with the normal standard ward ancillaries.

In addition to the doors, lights, windows, etc., all baths, lavatories and washbasins must be provided with special fittings, suitable for the protection of mental patients.

(b) It is essential that particular attention is paid to ventilation of the protected rooms. The protected rooms must have no projections; fixed windows must be provided, out of reach of the patient. An observation window must be fitted to the wall or door, and must render all parts of the room visible.

(c) There is no need for a psychiatric testing room or any other special accommodation for the unit. Out-patients can easily be dealt with in the ordinary out-patients' department, and here again no special requirement has to be met.

Therapeutic and Diagnostic Departments

Physiotherapy Department

(a) The physiotherapy department provides two forms of treatment:

(i) Rehabilitation exercises.
(ii) Electro-therapy and massage.

(b) For the first requirement there is needed a small “gymnasium” where such articles as wall bars, static bicycles, ropes, pulleys and sandbags, etc., can be used by the patients under the supervision of the physiotherapist.

(c) An electro-therapy and massage section requires cubicles where patients can undergo treatment by short wave diathermy, Faradism, U.V.L., infra-red rays, etc., and have massage and manipulative exercises. A Faraday cage will have to be provided for the cubicles used for short wave diathermy, although this can be avoided by using wave lengths of 6 m. or less (as is now done in the standard Army set), except where interference with radar may be caused.

(d) It is desirable to have dressing cubicles in the gymnasium. Toilets for staff and patients are necessary and the physiotherapists require a staff room and store. There should be no need for a consulting room within the department for
Requirements of a Military Hospital

the specialist in physical medicine in addition to the usual M.O.'s room, except
with the major hospitals of a Command where such a Command Specialist is
borne on the establishment.

(e) The whole department may require to be air-conditioned in tropical
climates.

(f) A circulation diagram is at Fig. 8.

X-Ray Department

(a) Requirements for the X-ray department are that it should be so situated
as to be readily accessible both to out-patients and in-patients and to the operating theatres. The Recommendations of the British X-ray and Radium Protection

Committee—Second Revised Report (1948)—should be closely studied. The following room sizes of the accommodation required for a major hospital would meet their requirements:

(i) X-ray screening room—floor area of 25×18 ft. (=450 f.s.) and with a W.C. adjoining.

(ii) General radiography rooms—
    one for chests, sinus and trunk work;
    one for extremities.
    (Dimensions for chest, etc., room should not be less than 17×15 ft.
    (=255 f.s.) and the extremities room can be somewhat smaller.)

(iii) Dark room, about 100 f.s. in area
    and having access, if possible, to both the screening and the radiography rooms; if not, to the radiography room.

(iv) Radiologist's office.

(v) Clerk and record office.

(vi) Radiographer's room and radiography materials store.

(vii) Waiting rooms—preferably divisible for O.Rs. and officers.
    (These rooms are essential since out-patients as well as in-patients
    are dealt with.)

(viii) Dressing cubicles: Four cubicles each 6×4 ft. are necessary where male and female patients are to be dealt with in the one department, and should be provided both for the screening and radiography rooms.
(b) Layout of the department, the provision of means of protection from radiation, the location of wiring and power points and provision of supports of adequate strength for the weight of certain equipment all require considerable detailed planning, and these requirements must be given to the architect before he attempts to begin planning the location and layout of the department.

(c) The department requires air conditioning in tropical climates.

(d) A circulation diagram is at Fig. 9.

**Operating Theatre Suite**

(a) Requirement generally is for one or more clean operating theatres, one “septic” theatre and one plaster room (plaster room can be combined with “septic” theatre in a small hospital). Separate changing rooms and sanitary accommodation must be provided for surgeons, sisters and orderlies. A north or east aspect is most desirable for the operating and anaesthetizing rooms. 400 f.s. is the minimum size acceptable for a main theatre.

(b) The following will also be required:

| Instrument sterilizing room(s) | Stock room, linen workroom and instrument room |
| Instrument wash-up and sluice(s) | Duty room |
| Surgeon’s scrub-up(s) | Trolley bay |
| Anaesthetic room(s) | Dirty linen bay |

Instrument sterilizing and surgeon’s wash-up can be centralized or divided into two set-ups, one to serve the clean theatres and one to serve the septic theatre and plaster room. An anaesthetizing room should be provided for each of the clean theatres (or one anaesthetizing room should be accessible to either), and an anaesthetizing room should be also provided accessible to both the septic theatre and the plaster room.
(c) The operating theatres should be provided with air conditioning in sub-tropical and tropical climates.

(d) A circulation diagram is at Fig. 10.

Central Sterile Supply Department

This department maintains the supply of sterile sets for the performance of minor surgical and medical procedures in the wards and departments. It has to be run usually by the operating theatre staff and therefore it is desirable that it be included as part of, or adjacent to, the operating theatre suite. The accommodation has to provide for the reception of used apparatus from the wards and departments, its cleaning, packing and sterilization, and its issue on demand to wards and departments. It can also contain the theatre autoclaves. It can function adequately in one room of good size, or can be split up into four separate rooms—receiving, packing, sterilizing and issue rooms.

Pathological Department

(a) The Laboratory.—In cases where no provision has to be made for a central command pathological laboratory and the accommodation is to be confined to that necessary for the hospital itself, this consists of—

Main laboratory
Pathologist’s laboratory both with north aspect.
Wash-up.
Autoclave room.
Media preparation room.

FIG. 10.—OPERATING THEATRE SUITE.
The wash-up should be adjacent to the laboratories, the autoclave room opening off it. The media room should not open directly off either of these, or off any main corridor.

Office and store.
Laboratory staff room and cloakroom (only in large hospitals).
Animal room and fodder store (which may often be provided in a separate building outside).
Waiting room, with patients’ lavatory comprising—
one urinal, one W.C., one commode (specimen commode).

(b) Clinical Side Rooms.—In addition to the laboratory there should be provided some clinical side rooms for medical officers and nursing officers to carry

1. Waiting.
2. W.C. (including Specimen Commode).
3. Office.
4. Main Laboratory.
5. Pathologist’s Main Laboratory.
6. Wash-up.
7. Autoclave Room.
8. Media Room.
9. Store.
10. Staff Room.

Fig. 11.—Pathological Laboratories.

out investigations such as blood counts, blood films, erythrocyte sedimentation rates, etc. One per floor is a sound basis.

(c) The Mortuary.—Outside the hospital itself, but adjacent to it, provision has to be made for a post-mortem department, comprising—

Mortuary and post-mortem room.
Viewing room (which can be used as a chapel if required).
Changing room.
Coffin store.

A refrigerated body store should be provided in the mortuary.

(d) The Blood Bank.—This would normally only comprise one or more refrigerators in the main laboratory.

(e) A circulation diagram of the laboratories is at Fig. 11.

Dental Department

This department is dealt with in the section devoted to out-patients.

[To be continued]
Requirements of a Military Hospital

S. Mackenzie

_J R Army Med Corps_ 1952 98: 107-119
doi: 10.1136/jramc-98-02-03

Updated information and services can be found at:
[http://jramc.bmj.com/content/98/2/107.citation](http://jramc.bmj.com/content/98/2/107.citation)

**Email alerting service**
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

**Notes**

To request permissions go to:
[http://group.bmj.com/group/rights-licensing/permissions](http://group.bmj.com/group/rights-licensing/permissions)

To order reprints go to:
[http://journals.bmj.com/cgi/reprintform](http://journals.bmj.com/cgi/reprintform)

To subscribe to BMJ go to:
[http://group.bmj.com/subscribe/](http://group.bmj.com/subscribe/)