A HOSPITAL WARD.

SOME DETAILS AND THEIR PRINCIPLES RECALLED.

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(FELLOW.)

I DO not propose to advance new theories, nor lay down fresh principles which should govern the details of hospital ward design and construction ; but rather to recall one or two fairly old principles which sometimes seem in danger of being forgotten, or at least not acted upon with the thoroughness which is necessary to give them entire fairplay. There is a danger too, that in flying to new ideas, we may forget the lessons of the older ones, and thereby court failures ; failures which are forthwith placed to the credit of the newer by those who judge by appearances only, or take short views of these matters.

There are several instances known, in the case of new wards constructed upon the latest principles, of failures which have been absent from the older and quite out-of-date buildings, and the reasons have been, in the cases with which I am personally acquainted, not far to seek. The old wards were known to be dangerously unclean, and special precautions were therefore taken to counteract this condition. The new wards were so very bright and clean, that anything but perfunctory cleaning was thought scarcely necessary. In the old wards, the windows were kept open, and the very walls, innocent of plaster, were porous enough to be an assistance to ventilation. In the new, it appeared that the provision of air inlets in the walls was thought to obviate the necessity of opening the windows.

Another example of this neglect of well-worn principles occurs to me, although it is not directly connected with a hospital ward. The drainage of a certain building was relaid upon modern principles with manholes at every branch and change of direction. The old drains were well flushed periodically, and thus kept fairly clean. The new drains were supposed to act for ever without such assistance. Five years after, when super-

intending some repairs, &c., at the building, I made a general examination of the system, and was compelled to use a crowbar to open up the covers of the manholes, which had never been opened since the drains were first laid. The building owner in this case had not realized that manholes were constructed for more easy access to, and inspection of, the new drains than was possible with the old.

One other example—and this was in connection with a ward. The whole of the inlet ventilators were expensively constructed with pipes glazed internally. On revisiting the hospital a year later, I found these flues black with dirt. No one ever thought of cleaning them.

Are not we apt at times to forget the principles upon which we design certain details? It is an accepted principle, for instance, that all angles, internal and external, should be well rounded. Yet not many years ago an architect drew the attention of a class of students to the hollowed skirting between the walls and floors of his wards; and went on to point out an arrangement he had devised for preventing the beds being pushed against the walls. This consisted of a square fillet nailed to the floor within half an inch of the skirting—*i.e.*, he had carefully done away with *one* internal square angle to the floor and added *two*.

I have heard, too, of air inlets constructed as I have described above, being closed at one end with a fixed grating, which effectually prevented any cleaning.

After all, the great principles to be kept in view in designing the details of a hospital ward are few and simple, and one of them—not the least important—is the avoidance of all sharp internal angles, deep-cut mouldings, and other not easily-cleaned lodgments for dust and dirt, those harbours of disease germs and sources of pollution to the air of the ward. It will be sufficient, in so short a paper as this, to deal mainly with this principle.

FLOORS.

It may be taken for granted that whatever difference of opinion there may be with respect to the walls, we shall all be agreed that the floor of a ward should be laid on a solid foundation, and that the surface should be as impervious as it is possible to make it. Also that it should be smooth and free from holes or crevices likely to retain dirt or dust. For this reason no one thinks nowadays of using plain jointed soft wood floors, because in addition to being absorbent, the material is bound in shrinking to form any number of crevices for the secretion of dirt and dust. Floor sweepings well wetted and impregnated with soap make a horrible compound.

Modern floors are of several kinds, which vary according to the fancy of the particular architect or the managers of the building. They comprise the following, viz. :—Hard wood block floors, hard wood tongued boards laid in narrow widths, asphalte, terrazzo, patent composition floors such as Eubocolith, Papyrolith, etc.

The hard wood floors are most frequently made of oak or teak. Hitherto I have myself adopted kiln-dried maple in very narrow widths. In addition to being an exceedingly hard and unwearable floor, its light colour shows up dust much more easily than dark woods, and this, to my mind, is an important detail. It would seem to be very desirable that dirt should always proclaim itself; but those who are immediately responsible for the cleanliness of the floors are, it is to be feared, not always of that opinion.

The most usual finishing to wood floors is beeswax and turpentine highly polished. I believe that if this is regularly wiped over with a cloth, and as regularly polished, it is a very good surface; though no doubt it is desirable to have the surface entirely cleaned off and renewed at intervals. The preparation called “Ronuk” is equally good.

Terrazzo floors are much advocated on account of their supposed impermeability. I do not think them quite so impermeable as they are supposed to be. After all, the main part of the material is cement, and it is well known that cement is fairly absorbent and marble chips are scarcely less so. Indeed the comparative impermeability of this floor is due to the high polish it receives when first laid, and that is very soon worn off. Perhaps it is best treated by being polished with beeswax as for wood floors. Even so, it is very hard to the feet, and the mottled colour too easily conceals dirt.

Asphalte is, no doubt, the most impervious of floor materials, but it is of a dark, uneven, and bad colour, and is therefore seldom used.

My experience of patent composition floors has not hitherto been so fortunate as to enable me to commend them highly. They have some undoubted virtues, and the material is more impervious, and less subject to the action of acids than any I know. Unless very carefully laid, they appear to be liable to swell and crack. The material can be coloured, and when polished the surface is generally excellent.

SKIRTINGS.

The skirting (if it can be so called) to the floors should be rounded so as to form a good hollow. The most usual radius is from $2\frac{1}{2}$ in. to 3 in. Latterly I have used $1\frac{1}{4}$ in. only, which is quite sufficient for its purpose,

and can be carried round projections more easily than is possible with the larger radius. All that appears to be necessary is to have such an angle as will permit of the whole surface being easily and rapidly cleaned, and prevent stagnation of air. It is best formed of the same material as the floor. Hollowed glazed bricks have been used, but there are too many joints, and the edges of the bricks are not generally even.

WALL SURFACES.

There are practically two opposite principles which govern the material of which the wall surfaces should be composed, and these are derived from different views on that much-vexed subject, ventilation. It would be rather trenching upon this subject, which is large enough for separate treatment, to attempt to discuss here whether the walls should be porous or not.

It is safe, however, to assert that at the present time, for hospital wards at least, impervious walls are mostly in vogue. If we adopt this principle, the next important consideration is that the surface of the internal faces should be easily cleaned and kept clear and free from dust. In some modern treatment of walls we have, I think, somewhat overlooked this principle, although at first sight it appears to have been carefully studied. I refer to the growing practice of lining the ward walls with tiles. The use of tiles has no doubt given us a more impervious and even surface over a large area, but it is discounted by the numerous joints which no care nor skill in the fixing can make perfectly smooth. The ideal finish would no doubt be an unbroken and polished surface such as obtains on tiles, affording no ledges for the lodgment of dust; but this has been fairly well achieved by the use of enamel paint upon hard trowelled cement surfaces.

It is scarcely possible to obtain a more generally smooth surface than trowelled cement—Keene's or Sirapite, and other hard cements. These can be brought to a polished surface. It is, however, difficult, if not impossible, to obtain a really even colour, and painting is therefore necessary. Although enamel paint can be used with decorative effect, pictures would still be required to enliven the walls, and the ordinary framed picture is a veritable dust trap. Therein tiled surfaces have the advantage of painted walls, as they can be decorated with permanent pictures painted on the surface. It would of course be too costly to renew pictures every time the walls required to be repainted.

It would be possible to cover permanent wall paintings with glass let in flush with the wall surface; and I am not sure that this has not been done.

CEILINGS.

There can be no question that ceilings should be non-porous, and they are best painted.

WINDOWS.

As to the best form of window for a hospital ward, there does not appear to be any general agreement. The most usual is the ordinary sash window with a hopper above opening into the ward, with spandril sides to prevent down draught. Its form and construction involve the many angles, crevices and hidden voids which in other parts of the ward we strive so much to avoid. Casement windows with solid frames at least are not open to this objection, though no doubt their advantages in other directions may be questioned.

At Willesden Parish Infirmary I have used casement windows brought down to within 12 inches of the floor, and with hoppers next the ceiling. The casements open inwards, and thus form a protection for the bed. It is also possible by opening the windows to their fullest extent to flood the wards with air much more effectually than is possible with sashes.

At Charing Cross Hospital, I am adopting a form somewhat similar to what I believe is known as the "Middlesex" window, (owing to the alleged fact that it was first used at that hospital). There are five sashes of equal size in the height of the window, all of which (excepting the lowest) are hung on centres and controlled by one rod and lever. (In the "Middlesex" window the sashes are hung on the bottom rail.) The sashes close one upon another, and there are therefore no transoms. The lowest sash is separately hung on the bottom rail. It is obvious that a window so constructed can be opened to a much larger extent than is possible with the ordinary sash window. I should add that all except the controlling lever of the opening apparatus is fixed on the *outside* of the window.

If it is possible to fix the glass quite flush with the inner surface of the sashes, a great advance will be made.

DOORS.

Nothing much can be said with respect to doors in a ward. They should be made wide enough to allow of the passage of a bed. It is desirable that the upper panels should be glazed with clear glass, and that for a reason to which I shall refer later on.

The whole question of the material for joinery might be considered here. Hard wood throughout is generally adopted, where the question of

cost is not vital, hard wood oiled or French polished. Its comparative freedom from material shrinkage, and its harder or less absorbent surface, are great advantages. Nevertheless, I think that soft wood covered with enamel paint is not much, if at all, inferior.

I am hoping in time to obtain what may be called solid joinery, *i.e.*, built up without panels with the inevitable sharp internal angles which can only be kept clean at the cost of great labour. Of course, it is possible to have solid or flush panels, but shrinkage soon shows up the joints, which then become dust traps impossible to clean.

There are some Canadian doors now made of which the principle of construction could, no doubt, be applied so as to successfully overcome this difficulty. They are made up of quite small sections of wood very closely fitted together, and sheathed with hard wood beautifully dove-tailed to the whole, pressed and almost welded together by hydraulic pressure. At present they are made to imitate the ordinary panelled door; but one is being made for me now (as an experiment) of *solid* soft wood, sheathed all round in oak.

FURNITURE.

It is in the furniture and fittings of wards (for which the Architects are not generally responsible) that there is a general falling away from the principles of construction we are considering; although I am bound to add that some very notable improvements have been made of late years in the construction of chairs, tables and bedside lockers. The last-mentioned especially call for consideration, if only because they are less under observation and control than the furniture which stands out in the open. The tops are now usually of glass or marmorite, and if it were only possible to get rid of the closed cupboards, it would not be difficult to design them so that every part could be readily and easily cleaned.

The mention of cupboards reminds me that these fittings are generally objectionable, and should be as far as possible banished from the ward. One at least is, of course, necessary for holding surgical and medical appliances, lint, medicines, &c., but it should not, as is frequently the case, be placed or built against the wall. It should stand out in the centre of the ward, and should be constructed of hard wood, framed and glazed all round and on top, and fitted with glass shelves. I am not certain that such a fitting commends itself to all Nurses. Some time since a Nurse complained to me that it cost her much labour and trouble to put away anything in these fittings, because, in effect, anything in the nature of disorder, or want of absolute cleanliness, could not be concealed even

from her own sense of order, not to speak of the Doctor on his rounds. I am sure that you will agree with me that therein lies the great virtue of this form of construction.

Fixed or heavy tables and chairs are to be avoided. It is possible to make a light table rigid.

STOVES.

A great number of the smaller paragraphs in the Building Press referring to hospitals, new and old, are inserted by makers of particular ward stoves which have been used in the building. There is no reason to doubt that they are excellent stoves for many purposes; but as they are built of iron plates and gills and plentifully adorned with mouldings, &c., they would appear to be entirely unsuitable to a hospital ward.

One or other of the forms of stoves which are built up with plain fire brick and bricks, or tiles, is far preferable. There is a greater amount of heat given out by radiation, and far less by conduction, and there are fewer lodgments for dust and dirt. Some of these brick and tile stoves are honeycombed with ventilating flues for heating air, which is conveyed by long horizontal flues from the outside. They would not appear to be open to objection, provided they are so constructed as to be kept clean easily.

HEATING AND VENTILATION.

It is not the purpose of this paper to deal with such large and controversial subjects as heating and ventilation, or to enter into any discussion upon the relative merits of natural or mechanical ventilation.

It is only necessary to remind you that, whatever pipes or fittings are used, they should be so placed and constructed as to be readily cleaned. If possible, too, all controlling valves and pipes should be kept out of the ward.

Flues of any sort, whether in the floors or walls, should also be so constructed, with movable gratings and covers, as to allow of easy access for cleaning and disinfection.

LAVATORY BASINS.

Until quite recently, a fixed lavatory basin was, I think, regarded as quite inadmissible in the ward itself, but the inconvenience of hand basins, and the great improvement in the construction of fixed lavatories, have combined to overcome the objection to the latter. Of course, they are for the use only of the medical staff and the surgeons. The first hospital in which I saw them was one which has claims to being considered of the most modern design and construction: it is not yet quite finished. The

basins were, however, of an ordinary pattern, and fixed close against the wall, but I regret to add that underneath, the supply, waste, overflow and anti-syphon pipes (all on the surface of the wall) formed a perfect tangle of pipes.

Whilst mentioning these fittings, I should like to refer to the deceptive character of so many sinks and basins in the market, which are designed especially for hospital purposes. They are beautifully designed to avoid anything in the nature of dirt crevices or mouldings *on the surfaces* in sight, and so far only as they can be obvious to the casual observer. Underneath they are rough, angular, and full of pockets which are never likely to be cleaned from the day they are fixed. Much improvement is being effected by a few manufacturers to meet the persistent demands of those who value cleanness in the unseen parts as in those seen.

One other detail I have to refer to, and that is the necessity of what I may call "publicity" in every part of a ward and its adjuncts. It would seem desirable that in a general way both patients and nurses should always be under observation, or at least liable to be observed at nearly all times by the superior officers. If that appears to be objectionably stringent, I may add that it is not at all necessarily so.

I need scarcely say that I exclude the bath rooms and ward conveniences, but certainly the duty room and ward kitchen and separate day rooms should always be more or less open.

When patients know that they cannot escape even casual observation, they are more likely to behave themselves correctly, and the nurses themselves do their duty none the worse for the lack of opportunities of concealment.

It is better too that nurses should be continuously employed when on duty for shorter hours, than that the weariness of long hours should lead them to lounge or neglect their duties when occasion offers.

(For discussion on this paper, see page 384).