

Observations on the site and construction of hospitals / by Sir George Ballingall.

Contributors

Ballingall, George, 1780-1855.
Royal College of Surgeons of England

Publication/Creation

Edinburgh : Maclachlan and Stewart, 1851.

Persistent URL

<https://wellcomecollection.org/works/ah64x2kt>

Provider

Royal College of Surgeons

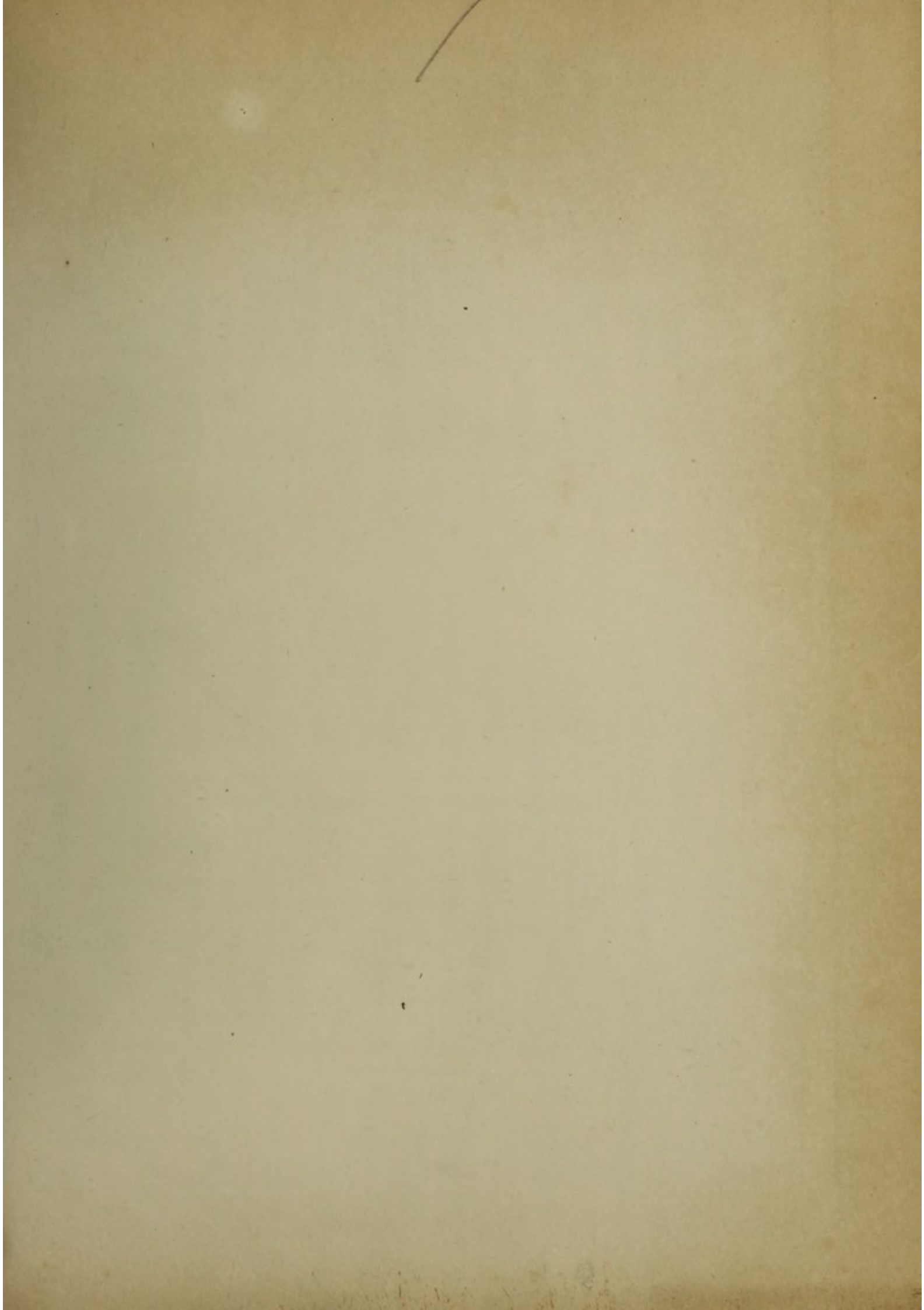
License and attribution

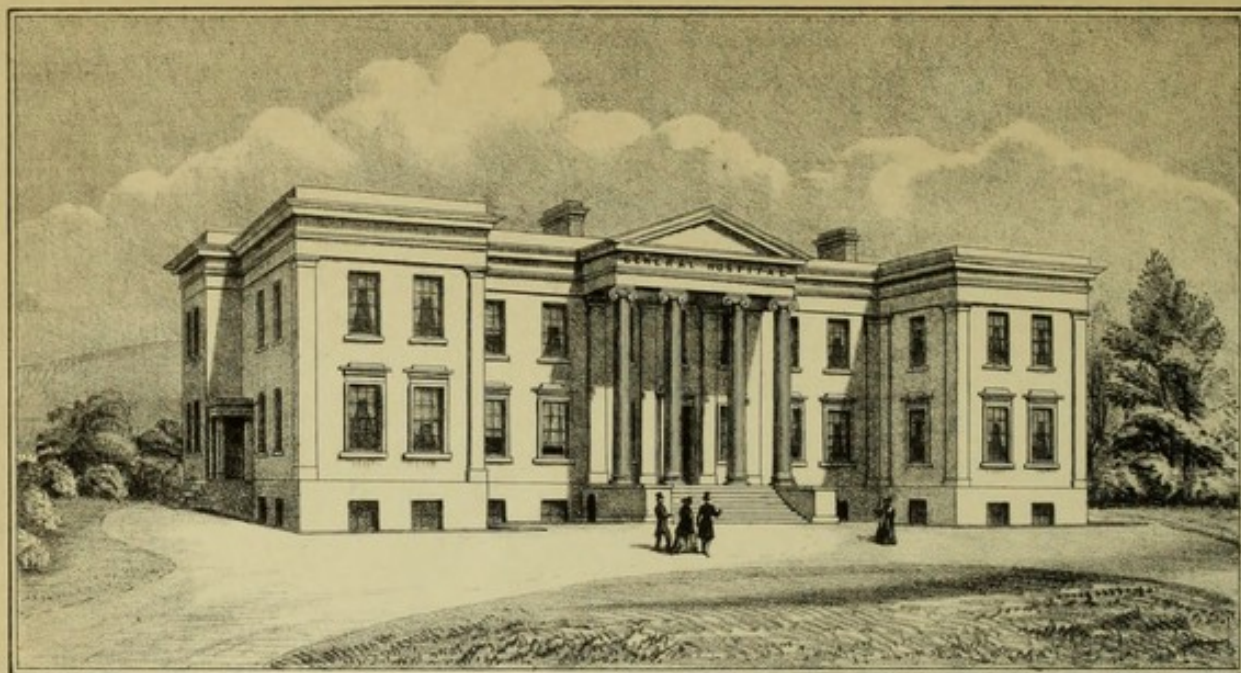
This material has been provided by This material has been provided by The Royal College of Surgeons of England. The original may be consulted at The Royal College of Surgeons of England. where the originals may be consulted. This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.



Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
<https://wellcomecollection.org>

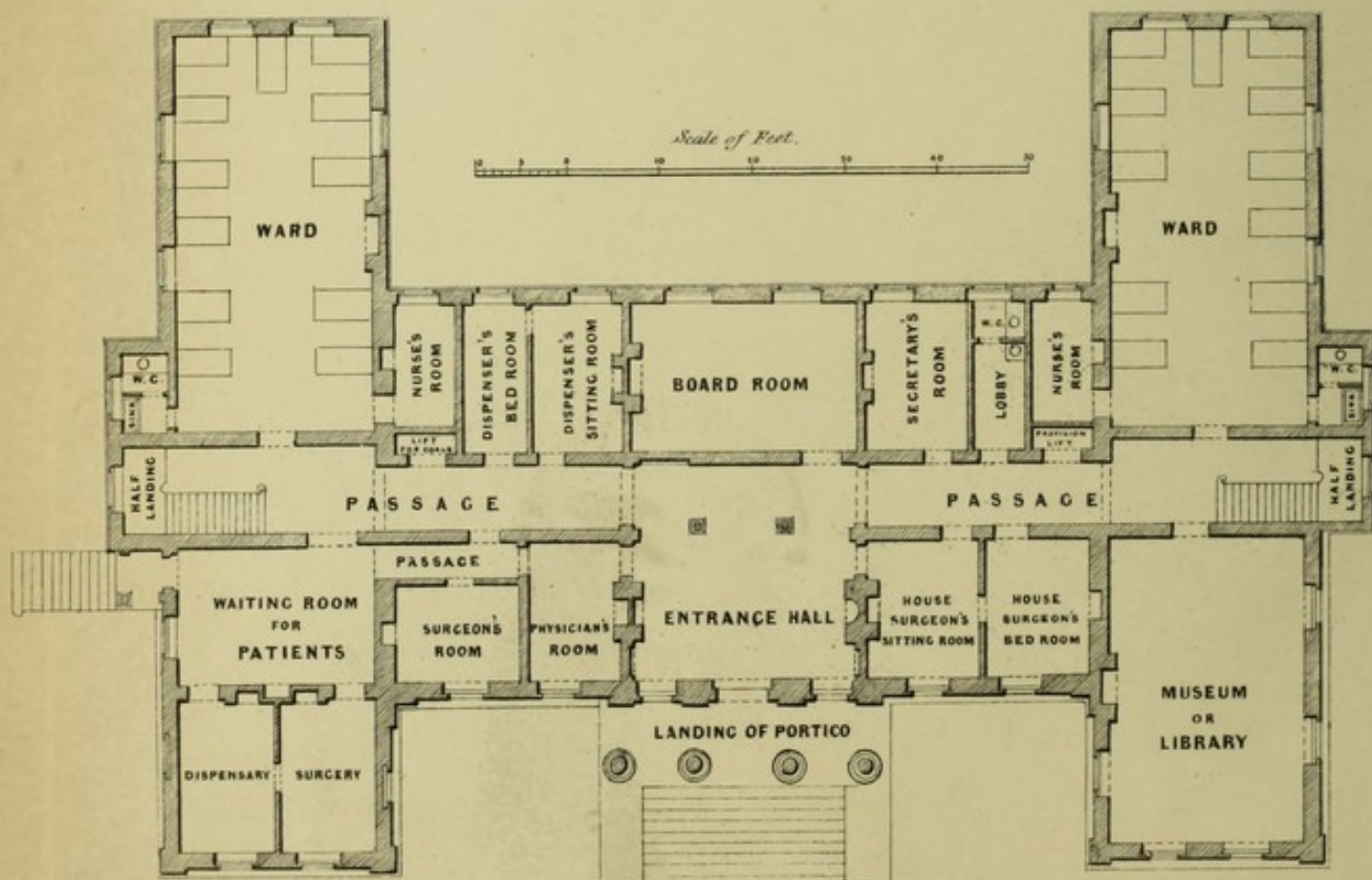




W. Forester Sculp. 1848.

CHELTEMHAM GENERAL HOSPITAL

Erected A.D. 1848.



GROUND PLAN.

OBSERVATIONS
ON
THE SITE AND CONSTRUCTION
OF
HOSPITALS.

BY
SIR GEORGE BALLINGALL, M.D., F.R.S.E.

SURGEON TO THE QUEEN, AND TO H. R. H. THE DUCHESS OF KENT;

REGIUS PROFESSOR OF MILITARY SURGERY IN THE UNIVERSITY OF EDINBURGH;

AND CONSULTING SURGEON TO THE ROYAL INFIRMARY.



EDINBURGH:
MACLACHLAN AND STEWART.

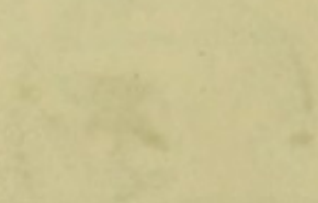
MDCCCLI.

OF THE

THE STATE AND COUNTY

HOSPITAL

NEW ORLEANS



LIBRARY

THOSE Gentlemen who have successively attended the Class of Military Surgery in this University have now, for a series of years, listened to my remarks on Military and Naval Hospitals with an attention creditable to themselves and very agreeable to me; and to them this ESSAY is inscribed, under the impression that I cannot fix their attention on any subject of greater importance than the Structure and Uses of Hospitals.

G. B.

EDINBURGH COLLEGE,
30th June 1851.

These Gentlemen who have generously attended the
of their property in the University have been
some, distant to my remarks in relation to the
with an attention to the objects of the
to me; and to them this I have been obliged to
that I cannot in this manner to any subject of
particular than the University and the
of the

NOTE.

THE history of the following pages is simply this. About two years ago, when resident at Taunton, in Somersetshire, I had an application from Dr Spencer Wells, to write the article "Hospital" for the Cyclopædia of Practical Surgery. This I readily undertook with the view of occupying my leisure hours, although I had not a single book to refer to, or any person of varied and extensive experience in the matter to consult. It is due, however, to the medical men of Taunton, where I was a frequent visitor at the Hospital, to say, that from them I derived every assistance and encouragement; and having completed my paper, a few copies were printed for circulation amongst my friends, to several of whom I am indebted for valuable comments on the subject.

It is indeed chiefly from finding a general concurrence in my sentiments on the part of some old and experienced medical officers in the public service, that I am induced to lay these observations before the Public in their present shape. My object is to solicit the attention of the Profession, more particularly of the younger members of it, to matters which are too much overlooked in the course of professional education, and to enable them to vindicate the influence and authority of professional opinion in a case in which the successful exertion of professional skill is so deeply involved.

I desire, in co-operation with others, to ascertain and establish, rather than to propound with authority, those principles which should regulate the construction of Hospitals; and in justification of this attempt to give a beginning to so important an inquiry, I may be permitted to state what have been my own opportunities of observation. I have now served personally in three-and-twenty different Hospitals, civil and military,

situated in different quarters of the world. Some of them possessing every advantage in point of locality, while defective in construction; others unexceptionable in point of construction, but *heedlessly* and *unnecessarily* placed in objectionable positions.

In addition to the numerous Hospitals with which I have had occasion to become acquainted in the earlier part of my life, in Europe, in Asia, and in Africa, those which I have more recently examined with a view to this publication, or to the improvement of my Lectures on Military and Naval Hospitals, are the Government establishments at Chatham, at Haslar, and at Plymouth; the Metropolitan Hospitals of London, Dublin, and Edinburgh; and the provincial Hospitals in Liverpool, Manchester, York, Birmingham, Oxford, Bath, Bristol, Exeter, Taunton, Barnstaple, Gloucester, Cheltenham, Shrewsbury, Bangor, and Denbigh. To the Surgeons, and more particularly to the House Surgeons, of these several Institutions, I beg to offer my grateful acknowledgments for the information which they have not only been prompt but eager to give me, relative to the dimensions of Wards and other particulars. Since my return to Edinburgh, I have had an opportunity of looking over most of the works in the list appended to this paper, but have found nothing to induce me to make any considerable change upon it. The only additions of any consequence are, a larger scale of the average dimensions of wards, drawn from a greater number of Hospitals, and a few additional remarks on Ventilation.

SITE AND CONSTRUCTION OF HOSPITALS.

THE word Hospital, in its more comprehensive sense, is made to include institutions for the support of aged and decayed people, or for the maintenance and education of youth, as well as those establishments appropriated to the treatment of accidents or disease. It is to the latter exclusively that I propose to restrict the following observations, and even with this limitation we shall find that Hospitals admit of numerous subdivisions. In military life we speak of general hospitals appropriated to the sick of a division or of a whole army, as contra-distinguished from garrison or regimental Hospitals—the latter adapted to the reception of the sick of a single regiment or battalion. In civil life again, general Hospitals are those appropriated to the reception of patients labouring under all forms of disease, as distinguished from fever, smallpox, lying-in, or surgical Hospitals. Of the latter, besides those adapted to the reception of accidents, and of cases for operation, we have again important subdivisions into Ophthalmic, and Lock, or Venereal Hospitals.

The early history of Hospitals is, in many respects, imperfect. The Field, or, as they are sometimes termed, the Flying Hospitals of armies, are believed to have originated in a very rude beginning, in the appointment of certain followers whose duty it was to pick up those wounded in battle, and to convey them to the rear; for which purpose they were mounted on horseback, and amongst other parts of their equipment, had two stirrups on the left side of the saddle, the more readily to enable them to take up the wounded behind them. It would thus appear, from the first traces which we have of these establishments, that they were adapted chiefly or exclusively to surgical purposes.

Of civil Hospitals we have no authentic accounts till after the Christian era. One of the first which we find mentioned in history is that founded at Rome in the fourth century by Fabiola, a benevolent Roman lady; but which there is reason to believe was a refuge for the poor and infirm, as well as for the sick. Some of the earliest of the Hospitals in this country appear to have been appropriated to patients labouring under particular forms of disease, as the lazar houses of Scotland, of which an interesting account has recently been given by Dr Simpson, the learned Professor of Midwifery in the University of Edinburgh.

The first general Hospital erected in England was that founded at Canterbury in 1070, by Lanfranc, who was archbishop of that see, and who is supposed to have founded it upon the model of some of those previously existing in Italy, his native country. It

was, like modern institutions of the same kind, fitted up so that one part of it was appropriated to the reception of sick men, and the other of sick women. Subsequent to this, some of the older metropolitan Hospitals were established by royal munificence, or by wealthy individuals; and the funds being frequently left in the shape of landed property, have progressively risen in value, so as to afford very ample endowments. Amongst the earlier of our provincial Hospitals were the Radcliffe Infirmary at Oxford, founded by the distinguished physician whose name it bears, and the Infirmary at Bristol, which is said to have been originally fitted up under the suggestions of the philanthropic Howard. The former, although it has necessarily fallen behind in the progress of improvement, is less defective than I had been led to suppose from a controversy of which it was the subject; and the latter has been entirely rebuilt.

Hospitals of various descriptions are now greatly multiplied in all civilized countries. They are looked upon as the most indispensable of all charities; and of late years provincial or district Hospitals have been established in most of the counties of Great Britain and Ireland. These are generally the result of voluntary contributions, highly creditable to the parties concerned; and indeed the benevolent intention of such institutions has never been questioned; but it is remarkable, that even so late as the end of the last century we find Pouteau, the distinguished surgeon of the Hotel Dieu at Lyons, exclaiming—"Are hospitals then more pernicious than useful to society?" This exclamation gives additional importance to all that may be said on the site, the construction, and ventilation of such buildings, for it is only by the due regulation of these that any satisfactory answer can be given to such a question; and it is to these points that I propose to direct attention in the following remarks.

The *Site* of an Hospital must sometimes be regulated by accidental circumstances, over which medical opinion can have but little control. This is particularly the case in large cities, where the adoption of the best site is often impracticable, from the high value of the ground, the impossibility of obtaining a proper access, or other causes dependent on the interests, or it may be on the humour of individuals. In contemplating the erection of provincial or county Hospitals, where there is more choice of site, in the suburbs or fields adjoining a town, we should endeavour to find a dry, elevated situation, remote from marshes, swamps, or stagnant waters, with a favourable exposure; sheltered, if possible, from such prevalent winds as are known to be in themselves unfavourable to health, or the vehicles of noxious effluvia; and, above all, such a position as admits of a sufficient slope for perfect drainage.

With a view to this last point, the character of the soil itself, and particularly of the subsoil, is a matter of grave importance. When this is gravelly or porous, it forms a natural drain, admitting of the rapid subsidence of water from the surface, where its lodgement, in cold climates, is fraught with perpetual damp, and in warm climates with very noxious emanations. There are several instances on record of the evils arising from the injudicious position of Hospitals; and, with reference more particularly to warm climates, there are some valuable observations on the necessity of attention to this subject in a letter on the health of the troops in the West Indies, addressed to the Secretary at War by the late Sir Andrew Halliday.

In the *Construction* of Hospitals, I would deprecate all superfluous ornament, or complicated and elaborate design ; not only as a waste of money in the first instance, but as becoming, in the progress of time, a positive obstacle to improvement. A site may become deteriorated by the accumulation of buildings—perhaps offensive manufactories around it. The house itself becomes faulty, standing in need of constant and expensive repairs ; but we cannot bring our minds to throw down a building which has become interesting from its history, venerable for its antiquity, and of which the ornamental front is perhaps the only remaining monument of an age gone by.

Upon the splendid designs for Hospitals figured by Iberti and others, it is unnecessary to enlarge. They could not be executed without an amount of funds not easily obtained, and are upon a scale of magnitude of which it will be seen that I do not approve. Of the style of the Russian Hospitals, I can only speak from report. The Russians are the only great nation in Europe of whose institutions I have not happened to see more or less ; but when we read the descriptions of the Hospitals at Moscow and St Petersburg, as given by Dr Granville, and the late Sir George Lefevre, who speaks of their “ external appearance as splendid in the extreme, resembling more the palaces of princes than the abodes of the sick,” I can only say that all this is superfluous. Those who have the disbursement of money for hospital purposes, whether they may be the servants of Government, the trustees of benevolent individuals, or the responsible guardians of voluntary contributions, would do well to consider whether, by a more judicious disposal of their funds, the purposes of the charity might not be extended ; and whether the occupants of the hospital would not be materially benefitted by having more space within and less ornament without—a better atmosphere and a less showy exterior.

It would be considered a very extravagant proposition were I to suggest that all Hospitals should be made of a temporary character, built, like some of the London houses, to last only for a given number of years ; but I have little doubt that such a measure would be favourable to the interests of the sick. Old buildings have sometimes become unfavourable to health from causes which it is not easy to define or to specify ; and there are facts upon record which will bear me out in the assertion, that Hospitals have not unfrequently been found more successful in the earlier than in the later periods of their history. In support of this opinion, I may refer to the rate of mortality in the Hotel Dieu at Paris, perhaps the oldest Hospital in modern Europe, as contrasted with that in more recent buildings ; and I would state, upon the authority of Professor Simpson, the following remarkable circumstance, mentioned to him by the late Mr Liston, that for some time after the opening of University College Hospital, the rate of mortality after amputation did not, he believed, exceed one in twenty.

There is a measure, however, short of the rebuilding of an Hospital, much less formidable in appearance, and which, were it more maturely considered, would probably be more frequently resorted to. The annual whitewashing of the walls, which is looked to as a principal means of promoting the salubrity of the building, becomes ultimately insufficient. The plaster becomes cracked, broken, patched, discoloured, or otherwise injured. The whitewashing has been repeated for a series of years ; the new, perhaps,

laid on without sufficient attention to the removal of the old ; and thus, as it has been somewhat facetiously said, " white dirt is heaped over black dirt." In all such cases the old plaster should be picked off the walls : the partitions, if necessary, removed or altered, and the whole plastered anew. Where the prevailing defect of old buildings does not exist, and where sufficient elevation has originally been given to the wards, it is in our power, by such a measure, to renovate the Hospital, and to introduce into it, at a moderate expense, all the more valuable characteristics of a modern building.

In support of the opinion that buildings less imposing in appearance, and less expensive in their nature, would not be less conducive to the successful treatment of the sick, I would refer to the temporary barrack hospitals, erected in many of our country towns during the last war. These consisted of a few feet of stone or brick-work as a basement, the rest of the structure being of wood. In a comparison of more than twenty Hospitals, civil and military, in which I have served nearly half a century in different quarters of the world, I have found none more favourable to the treatment of disease, or to the convalescence of the patients, than the simple and unpretending structures to which I refer.

A substantial coat of wooden planking externally covered over with pitch, and the interior finished with lath and plaster, renders such buildings sufficiently comfortable, even for the winter months ; while buildings of a still slighter description may suffice for the summer season, or for more temperate climates. Such structures are peculiarly adapted to occasional emergencies, whether arising from the incidents of warfare or the presence of prevalent epidemics. An eligible site may in most cases be found for them ; and I consider them not less economical, and much more propitious to the health of the inmates, than such old, ill-ventilated, and faulty houses as are occasionally provided for them. Of the temporary War-Hospitals, a good example is to be seen in the Barrack Hospital at Greenlaw, near Edinburgh, of which I have a plan and elevation in the Museum of the Class of Military Surgery. This has recently been converted into a military prison ; and I was much struck, on visiting the building a few weeks ago, with the perfect state in which the exterior remains after a lapse of some forty years. Numerous wooden sheds, erected several years ago during the prevalence of fever in Ireland, are still to be seen at Dublin, the best of which are those connected with the Cork Street Fever Hospital. But it is to buildings of a more permanent character that the following remarks more particularly apply ; and it is of great importance that the profession and the public should know that Hospitals are not necessarily, nor *advantageously*, made of an expensive character. With a view to economy, the walls of an Hospital cannot be made too plain *without* ; and, with a view to the health of the inmates, they cannot be made too plain *within*.

This, as regards the exterior, has reference not merely to the character of the masonry, but to the absence, as far as possible, of all superfluous wings or extensive projections of any kind from the body of the building. Such projections necessarily imply the existence of corners or recesses, which become reservoirs of stagnant air ; and in deciding upon the exterior form of an Hospital, the great problem to be solved seems to be this—to give the external atmosphere free access to as many points of the building as possible ; leaving no part of it to be supplied with stagnant, borrowed, or

vitiating air. Upon this principle the old form of Hospital buildings, occupying four sides of a quadrangular court, is very objectionable, and becomes more so when the building consists of a series or succession of such courts. It is obvious that the air occupying the interior of these courts must be, more or less, stagnant, and that all the transepts, or ranges of building dividing them from each other, must have this stagnant air on both sides.

Of such forms of building examples are not wanting in our own country; but there are still more remarkable ones to be seen upon the Continent, as in the "Krankenhaus," or great civil Hospital at Vienna, which consists of a numerous series of such courts, and also in the old part of the Hotel Dieu at Lyons, noted in former days as one of the most deadly *habitats* of Hospital gangrene. Of more modern buildings, constructed in this quadrangular form, the Hospital "St Jean" at Brussels presents an example, as I think, peculiarly unfortunate, because in all other respects it is one of the best constructed Hospitals which I have ever seen. The evil here alluded to, from building round a quadrangular court, is in some measure obviated where one side of the quadrangle is left open, or simply enclosed with a railing; and it may be still further obviated, when the building is on a large scale, by having it subdivided into several separate pavilions.

When an Hospital is on a small scale, so as not to imply the necessity of more apartments than may be contained within the area of a common two-floored dwelling-house, there is no necessity for any deviation from the rectangular form usually adopted in such buildings; and it should be an established principle, that the kitchen, laboratory, and all the necessary appurtenances, should be on the ground floor, not only as a matter of convenience, but with the view of leaving the whole of the upper floor for the accommodation of the patients. One of the best examples of an Hospital of this description, without projecting wings, is to be seen in the new Hospital at York, which was in the progress of erection when I visited it, at the suggestion of Dr Neil Arnot, some twelve or fourteen months ago. I am not aware whether the plan of ventilation proposed for that building has been carried out, but I have had the pleasure of reading a paper by Dr Arnot, written with the special object of being submitted to the Governors of the County Hospital at York.

In adverting to the exterior form, or ground plan, of larger Hospitals, one very commonly adopted is that of a body with wings projecting from either extremity, somewhat in the form of an extended letter H. To this there seems to be no reasonable objection. It answers in a great measure the important desideratum of giving the air free access to the building. It is a form to be observed in some of the best Hospitals in this country, and was successfully adopted in several of the military or barrack Hospitals erected during the war. Of this form of Hospital I have selected for publication, from numerous others in my possession, a sketch of the General Hospital at Cheltenham, and this for two reasons. First, because it is one of the neatest, most commodious and compact little Hospitals with which I am acquainted; and, secondly, because I consider it a good example of how much may be done in the way of Hospital building with a very moderate fund. The whole has, it appears, been erected for a sum of L.7695, including an extensive system of drainage, and the front wall and gates of

the large enclosure around it. This building I consider highly creditable to the architect, Mr Humphris. If there is any defect, it is in the ventilation of the laundry and wash-house; but this does not bear upon the health of the patients, and is capable of being easily remedied.

Hospitals on this plan may be made to accommodate from one hundred to three hundred patients; and when more than this is required, it will be best done, wherever space will admit, by extending the building horizontally, thus—**HH**, giving it an additional body and wing, which will go a great way to double the accommodation. This would be an eligible plan in the case of large Hospitals connected with schools of medicine, where the Medical and Surgical Departments should be kept distinct, and where it may be proper to set apart a portion of the Hospital for clinical instruction. Where the wings of an hospital, in the form of the letter **H**, are prolonged backwards and forwards, so as to be equal in length to the body of the house, we come to have two equilateral quadrangles, each enclosed on three sides by building, and it is not desirable that the wings should in any case be prolonged to this extent.

The wings are sometimes of necessity extended only in one direction, **L** as in the extensive addition now making to the Infirmary at Manchester; and wherever they are extended far in this way, it leads to a less perfect ventilation, in consequence of the partial stagnation of the atmosphere between the wings. There is another form, or outline of a building, which it is right to submit for further consideration, and of which an example is to be seen in the Workhouse at Taunton, in Somersetshire. This is constructed somewhat in the form of the letter **Y**; the cooking-house is placed in the centre, and the radiating or diverging wings contain the wards occupied by the paupers. This, like all the other Unions which I have happened to visit, is very defective in the width of the wards and elevation of the ceilings; but it is the general design of the building to which I would call attention, although I am not aware that this form has hitherto been adopted in any Hospital.

Wherever a great extent of Hospital accommodation is required for the public service, there can be no better model than that of the great Naval Hospital at Plymouth, the most splendid establishment for sick and hurt in the British dominions; capable, so far as I recollect, of accommodating 1600 patients. Although not quite so extensive as the kindred establishment at Haslar, it has the advantage of being built in separate structures, each of them as it were constituting a separate Hospital. From a well finished sketch of this building in my possession, drawn by Dr Macdonald of the Navy, and for which I am indebted to Dr Rae, it appears that there are in all ten of these separate buildings, exclusive of the chapel, placed round a large quadrangular area, and connected only by a corridor or verandah, running round the interior of the quadrangle. This gives ample room for the circulation of air between the buildings, prevents the stagnation of air within the quadrangle, and gives great facilities for the classification of diseases. It facilitates also the successive vacation of the wards, and white-washing of the different parts of the Hospital, as very properly enjoined by the Naval Regulations.

In large Hospitals some of the necessary appendages, the cooking-house, washing-house, dead-house, &c. are often placed exterior to the body of the building, and perhaps advantageously so; but I consider a sunk or half sunk storey, which may be occupied

partly in this way, partly with store-rooms, cellarage, &c., to be a most desirable and most beneficial provision in the construction of all Hospitals. In some cases a greater extent of underbuilding may be necessary to raise the wards to the level of the contiguous ground, as in the case of large Hospitals occupying an extensive area, and a portion of that area projecting over a rapidly sloping bank. I cannot consider any building to enjoy that perfect ventilation required in hospitals, where the floors of the wards are not upon such an elevation as to admit of a complete circulation or passage of air through the building from one side to the other.

Looking to the amount of cellarage, store-room, and other accommodations required in a large Hospital, and to the probability of vaults being in demand by the merchants of a large city, I believe that the raising of the wards, or habitable part of the building, upon a series of arches, would go far to pay its own expenses; and as I am of opinion that no patient should lie below the level of the ground adjoining an Hospital, either on the one side or the other, it seems inexpedient in any case to make an expensive excavation, with the view of bringing down the building to a lower level. Of the superior health enjoyed by the inhabitants of upper floors of buildings, innumerable examples might be pointed out, particularly in the writings of Sir John Pringle, of the late Dr Fergusson of Windsor, and in the Report of the distinguished physicians sent to the assistance of the sick in Walcheren in 1809. As regards Hospitals more particularly, striking illustrations of the superiority of upper floors are given by Sir James Clark with reference to the clinical wards in the Hospital at Padua; and in my "Outlines of Military Surgery," as applicable to the spacious and well-constructed Hospital at Sourabaya, in the remote island of Java.

Although it would thus appear that the upper floors of a building are most conducive to health, it does not follow that the floors of an Hospital are to be multiplied without reference to other considerations. Besides the general objections to the accumulation and concentration of sick in large buildings, by which disease is aggravated and contagion extended, it is obvious that the additional labour thrown upon the servants in conveying food or medicine, and in administering to the wants of the patients on the upper floors, becomes a serious inconvenience; while the patients themselves, impaired in strength or crippled in their limbs, are in a great measure rendered prisoners in the upper wards, debarred from an easy access to the airing grounds, and from the advantageous use of them when they become convalescent.

Two, or at most three floors, exclusive of the sunk storey, should be considered the maximum in this respect; and in Surgical Hospitals more particularly, it is desirable to restrict the building to the first-mentioned limit, from the pain and injury entailed upon patients with shattered limbs, in conveying them up numerous flights of steps. The only thing like an excuse for elevating Hospital buildings beyond the prescribed limits, is the impossibility of extending them horizontally, from the restricted space often allotted to them in large cities. But this is precisely the situation in which large accumulations of sick become particularly objectionable; and here it is always a most important consideration, whether Hospitals should not be multiplied in number, rather than increased in size. The three thousand sick heaped together in one corner of Vienna would, with great advantage to all parties, furnish a sufficient hospital population for

some half dozen establishments in different quarters of the city. A similar remark will apply to the Salpêtrière, the Saint Louis, and others of the Parisian Hospitals; and, perhaps, in a lesser degree to some of those in the English metropolis.

In laying out the wards of an Hospital, the principal considerations are the shape and dimensions of the apartment with reference to the number of individuals which it is to contain. I have no means at this moment of stating correctly the dimensions of some of the large wards which I have seen in tropical countries, and on the Continent of Europe; but it may be observed that $37\frac{3}{4}$ yards, or about 113 feet, is stated by Dr Otto to be the length of some of the wards in the Royal Hospital at Copenhagen; and I believe that I have seen them considerably larger than this. The largest with which I am acquainted in this country, are the accident ward in Guy's, the long wards in St Thomas's, and some of the wards in the general Hospital at Birmingham. The smallest which I recollect to have seen are in a Military Hospital at Dresden.

Wards of an inordinate size are unfavourable to the advantageous classification of patients, whether with reference to their diseases, their habits, or other circumstances; and in cold climates are not easily and equably heated. Smaller wards, while they offer facilities in these respects, afford also an advantage in enabling us to concentrate, or to subdivide the patients of the several medical officers, and to have them more completely under observation. A ward, wholly occupied by the patients of one physician or surgeon, becomes exclusively his charge; the servants employed in it are responsible only to one master, and he alone becomes answerable for the regularity, order, and cleanliness with which it is kept. In this respect the wards of an Hospital sometimes present to a practised eye contrasts of a very striking description.

This subdivision, however, may easily be carried to an inconvenient extent, particularly as regards the number of servants necessary to meet the wants of the patients, and to ensure a due attention to cleanliness. The corners of a room are the parts of it which naturally require most time and attention in cleaning; and if a long ward is subdivided into two by a partition run across, it is obvious that we at once give the servants eight corners to clean instead of four. With reference to small sized wards, to which some gentlemen are partial, it may be observed, that the more numerous the partitions by which a building is subdivided into separate apartments, the less will be the quantity of air which that building contains. This seems a very demonstrable proposition; and with reference to the space occupied by such partitions, it is deserving of consideration whether in some cases partial partitions, rising only to the height of from four to six feet, might not be advantageously introduced, as in the new Fever Hospital in London.

In the case of two long wards occupying the wing of a building, and running parallel to each other without an intermediate passage, they might be advantageously separated by such a partial partition; and this would seem particularly applicable to the construction of Military Hospitals, where the men are accustomed to sleep in great numbers in the same barrack-room, and where there is no need of any provision for a separation of the sexes. This would give to such wards all the advantages of what are sometimes termed *single* Hospitals, where the breadth of the wards occupies the whole breadth of the building, and where consequently there is a free access of light and of air on

either side. The size of wards is, after all, perhaps as much an economical as a professional question. I have already observed that large wards are not easily heated in cold climates; while, on the other hand, small wards imply the necessity of additional fires, and, I may add, of additional servants. Upon a full consideration of this subject, I am inclined to think that, in the larger scale of Hospitals, wards fifty or sixty feet long, containing from sixteen to twenty beds, are the most eligible.

The common quadrangular form of wards, admitting of a range of beds along either side, and a central passage between them, is in all respects convenient; and the space allotted to each bed has generally been estimated at six feet square. Looking, then, in the first instance, to the length of the ward with reference to this regulation, it will be seen that a room fifty feet long will hold sixteen beds, eight on either side, allowing six feet four inches to each. On an average of one hundred and thirty-four wards, in forty of the principal Hospitals in this country, including government, metropolitan, and provincial hospitals, the average length, in round numbers, is forty-seven feet. The longest being one hundred and thirty-six, and the shortest fourteen feet.

The breadth of wards is a matter of more easy and definite calculation, as in this case we have only to determine the breadth of the central passage, and this in no case ought to be less than eight feet; nor do I see the necessity of its extending, in any case, beyond twelve feet. The wards in several Hospitals with which I am acquainted exceed this; but unfortunately it happens that in almost every one of these the height of the ceiling is too limited. I do not desire to see the horizontal space in any case diminished; but I have no hesitation in saying that a couple of feet taken from the breadth, and added to the height of these wards, would improve their salubrity, inasmuch as respired and heated air does not tend to radiate horizontally, but to ascend perpendicularly. Taking off then six feet from either side, as equivalent to the length of the bedsteads, or twelve feet in all; and allowing from eight to twelve feet for a central passage, we have from twenty to twenty-four feet as the breadth of the ward. The dimensions of the wards in the several Hospitals just referred to give an average breadth of somewhat more than twenty-one feet. The widest being thirty-four, and the narrowest, where a double range of beds is admitted, sixteen feet.

With reference to the height of wards, I concur entirely in the sentiments of the late Dr Jackson, when he observes that "height of roof is a property of great importance in a house appropriated to the reception of the sick; for the air being contaminated by the breathings of a crowd of people in confined space, disease is generated, and mortality is multiplied to an extraordinary extent. It was often proved in the history of the late war, that more human life was destroyed by accumulating sick men in low and ill-ventilated apartments, than by leaving them exposed in severe and inclement weather at the side of a hedge or common dike." An insufficient elevation of the roof is the leading defect in the older Hospitals, and in too many of the modern ones. I have found hospitals, in other respects well proportioned, extremely deficient in this respect; the wards I have measured give an average height of twelve feet, and the extremes vary not less than from seven to nineteen feet.

In such cases as the former, where there is only an elevation of seven feet, a patient can scarcely rise from the horizontal to the erect posture, without running his head into

a vitiated atmosphere; without inhaling a portion of the air which has just escaped from the lungs of his neighbour. The case of the "Grotto del Cane" is here reversed—the noxious atmosphere being above and not below. Nothing can shew more forcibly the loose, vague, and capricious views which have hitherto prevailed in the construction of Hospitals than the statement just given as to the dimensions of wards. Taking fifty feet by twenty-four, as eligible for the length and breadth of a ward, I would specify from fourteen to sixteen feet as its proper height.

This leads me to a most important point in estimating the capacity of wards, and regulating the number of beds to be placed in them, which should always be done by a calculation of the cubic contents of the room, as originally suggested, I believe, by Tenon in his valuable work on the Parisian Hospitals. Taking in each case select wards in the several Hospitals of which I have ascertained the dimensions, I find that the Government General Hospitals, naval and military, give an average of nine hundred and eighty-four cubic feet of space for each patient; the metropolitan Hospitals, those of London, Dublin, and Edinburgh, nine hundred and forty-seven cubic feet; and the provincial Hospitals, nine hundred and forty-four cubic feet. The largest in any case being fourteen hundred and ninety-six, and the smallest five hundred and forty-six.

Adverting then to the dimensions formerly specified, a ward fifty feet long, twenty feet (the minimum) in breadth, and sixteen feet in height: these sums, multiplied into each other, will give us sixteen thousand cubic feet as the capacity of the room; and this divided by sixteen as the number of beds, gives one thousand cubic feet of space for each patient. This I consider a very fair allowance in this climate for General Hospitals, or for wards occupied with many bed-ridden patients. Where patients are convalescent, or labouring under slight ailments, an allowance of eight hundred cubic feet for each person may be considered sufficient; observing always, that when there are any fractional parts above the specified quantity, such fractional parts should be allowed for the portion of air displaced by the bedsteads, tables, forms, &c. From a recent paper by Dr Kinnis, Deputy Inspector of Hospitals to the Queen's troops at Bombay, which will be found in the Edinburgh Medical and Surgical Journal for April 1851, it appears, that in seven Hospitals occupied by regiments or detachments of Her Majesty's troops in that Presidency, of which the dimensions of the wards are given, the average space allotted to each patient is about eleven hundred and twenty cubic feet.

The form and capacity of wards being determined, I would, in adverting to their interior arrangements, recur to the principle with which I set out—that the walls of an Hospital cannot be made too plain. All ornamental projections, elaborate cornices, recesses, shelving, or wall-presses, I consider objectionable, the latter being often made receptacles for offensive refuse, and being obstacles to the perfect cleaning of the wards, preparatory to the periodical white-washing or size-painting which all Hospitals should undergo. Where wards are appropriated to the reception of ophthalmic cases, it is expedient to have some of them coloured green, as at Vienna, Brussels, and elsewhere, or painted of a light bluish colour, as in the Hospital at Heidelberg. Where accommodation is required for the clothes of bedridden patients, this should be provided for in a general store-room, or in wooden presses in the adjoining lobby, as is

to be seen in the Hospitals at Wurtzburg and Frankfort. All fixed presses, or accommodations of this kind within the wards, what are called "conveniences," I look upon as the bane of Hospitals; and this remark I would extend to those numerous bed-closets, or apartments for single patients, which are to be found in some Hospitals. A sufficient retirement or seclusion, for the purposes of decency, may in general be very easily and satisfactorily obtained, by a well-constructed moveable screen; and when closets exist, they should be specially and exclusively reserved for those patients to whose individual complaints they are peculiarly adapted. They are, however, frequently sought after as a matter of favour; and the surgeon is thus subjected to undue solicitation; to which, if he yields, he is exposed to a charge of favouritism, and if he resists, to a charge of harshness or incivility. The less he is enabled to favour individuals, or to burden the servants, and impede the general ventilation of the Hospital by such accommodations, the better.

In many of the more recent Hospitals a great improvement has been introduced, by skirting or lining the walls with wood to a height of some four or five feet from the floor. This enables us effectually to clean and wash, with soap and water, as often as it may be deemed necessary, that part of the wall which is most likely to be soiled or dirtied by slovenly or inattentive patients, whilst at the same time it obviates those unseemly breaches in the plaster which are not unfrequently made by carelessly dashing up the bedsteads against the wall. This last accident, even where the high skirting is not introduced, may be prevented by having the common skirting board made thicker and more projecting than usual, and frequent washing may be facilitated by the use of the Parian cement, with which some of the walls in the Middlesex Hospital have been finished. Where the wooden lining is introduced, great attention must be paid to have it made of well-seasoned or dessicated wood, the planks closely joined, and applied flat or imbedded in the plaster; otherwise space is left behind for the lodgement of bugs or vermin.

In large general Hospitals, and particularly in Surgical Hospitals, the position and construction of the operating theatre is a most important consideration. This is frequently and very properly placed on the upper floor, with a view to its having the advantage of a skylight in addition to a side light. In Hospitals frequented by a great number of pupils, and where the theatre serves also as the lecture room, it is necessary to have it upon an enlarged scale, and where it cannot be conveniently introduced into the body of the house, it may be constructed in a building projecting laterally from it, and communicating directly with the staircase, as may be seen in the present Surgical Hospital, formerly the High School, attached to the Royal Infirmary at Edinburgh. Here the floor of the theatre is on a level with the landing place at the top of the first flight of steps, midway between the two floors of which the Hospital consists, so that patients, on being brought to or removed from the operation room, have only to pass over a single flight of steps. This theatre, more particularly with reference to the abundance of light and the elevation of the benches, is in all respects an admirable one; and were the position of this building equal to its construction, it might be referred to as an example of all that is desirable in a Surgical Hospital, particularly as regards the shape, size, height, flooring, and ventilation of the wards.

In Hospitals where much operating is anticipated, and where many patients are admitted with shattered limbs, involving amputations, I have often thought that their sufferings might be very materially lessened by having a cot, or bedstead to be moved upwards and downwards through a shaft, communicating with the theatre itself or with an adjoining room; in the same way as provision is made in some large Hospitals for raising the food of the patients to the several floors of the building. This improvement, I was glad to observe, was about to be introduced into St Mary's Hospital at Paddington, when I had the pleasure of visiting it last year; and I was somewhat surprised to see this contrivance in operation in the Southern, or what is called "Jenny Lind's" Hospital at Liverpool, for the purpose of raising dead bodies from the dead-house to the dissecting room; while St Mary's is the first instance, so far as I know, where such an accommodation has been given to the living.

The position and construction of the baths and water-closets about an Hospital, I consider it unnecessary to enlarge upon. These may for the most part be left to the ingenuity of the architect, with this single remark, that they should, if possible, for the better accommodation of the patients, be placed upon each floor; that the water-closets should be made more ample and better lighted than they often are, and that they should be judiciously placed with reference to prevailing winds, and as contiguous as possible to the principal drains. Of the numerous plans which have been devised for working the water-closets, I have seen none better than that introduced, amongst many other recent improvements, into the Middlesex Hospital, where the window, or ventilator of the closet, is shut and opened, and at the same time the pan washed out by the simple act of the patient's sitting down and rising up, which he cannot omit.

Besides the accommodation of the patients, which I have hitherto been considering, there are other interests to be provided for in the plan of a large Hospital—the board-room, consulting-room, apartments for the house surgeon, resident pupils, and nurses. Where there is a Dispensary attached to the Hospital, or where numerous out-patients are to be seen, it is necessary also to provide accommodation for this purpose. It is, however, very desirable that out-patients should, if possible, in all cases, be treated in dispensaries apart from the Hospital. The reception of such patients naturally occasions noise and filth about an Hospital, and also tends to facilitate the introduction of spirits or other articles injurious to the health of the patients. Here I would particularly refer to the present state of the Bristol Infirmary where the out-patients are admitted by a separate door, and so far as I recollect from a separate street, and where each of the physicians and surgeons has a comfortable apartment, furnished with a handsome writing table, and every convenience for examining his out-patients, and transacting his hospital business; indicative, I trust, of a due estimate of the services of professional men, and an enlightened policy on the part of the managers. Looking to the enormous amount of gratuitous labour which is executed in the Hospitals of Great Britain, the physicians and surgeons have an undeniable claim upon the governors, and upon the public, for every comfort and accommodation in the discharge of this part of their duty—a claim not always admitted in the liberal spirit which it ought to be.

There is another class of gentlemen connected with Hospitals, whose duties are of a very important nature, and whose continuous residence within these buildings render

such duties extremely dangerous to their health—I allude to the house surgeons and resident pupils. This is one of the most hazardous services in which a young man can engage; and I believe that the public is little aware of the risks which these young men run in the pursuit of professional knowledge. In an experience of the last thirty years, I scarcely know of one of them whose health has not suffered more or less permanently; while many—too many! have fallen victims to typhoid fevers and dissection wounds; and this in an Hospital, which is, in many respects, one of the best regulated and efficient in the kingdom.

We have now to consider the *Ventilation* of Hospitals, and I shall not be thought to over-estimate the importance of this point, when we reflect upon the opinions expressed by such men as Pringle, Jackson, John Bell, Pouteau, and others. “Amongst the principal causes of sickness and death in an army,” says Sir John Pringle, “are the Hospitals themselves, on account of the bad air and other inconveniences attending them;” while Pouteau was, as we have formerly seen, induced to question the utility of Hospitals *in toto*, in consequence of the sufferings of himself and his patients from the “*mauvais air qu’on respirent dans les grands hôpitaux.*”

Ventilation implies a constant renewal of the foul and frequently respired atmosphere, and the introduction of a fresh supply of air, without exposing the inmates of an apartment to violent and irregular draughts or currents. It is to this “constant renewal of the air” that we find Professor Brugmans, in 1799, attributing the remarkable exemption of the patients at Leyden from Hospital gangrene, or other adventitious disease, notwithstanding the bad position of the Hospital of that city, and the admission of four thousand wounded men.

The subject of Ventilation, as applicable to Hospitals, and other public buildings, as well as to ships, is very fully considered in Doctor Reid’s valuable work on ventilation; and the leading principle upon which all our plans for this purpose may be successfully conducted is the simple fact, that air heated by respiration, or otherwise, naturally rises to the tops of the wards; while that which is cooler and heavier occupies the lower part. Hence judicious openings at the top and bottom of a ward will provide for the exit of the upper stratum of air, with an influx from below to supply its place; and its progress may be expedited in two ways, either by *propulsion* or *exhaustion*. The latter is generally adopted as being the more economical, the more manageable, and perhaps the more effectual. If the above principle be correct, it is obvious that, to insure a progressive and complete change in the whole atmosphere of a ward, the apertures for the admission of fresh air cannot be made too low in the room, nor those for the escape of the heated air too high.

I know of no way in which the former object can be better attained than by the construction of a series of channels, or air tubes, under the flooring, which communicate directly with the external atmosphere, and deliver the air into the wards at the lowest possible level, through grated apertures, or perforated brass plates in the floors. I have already spoken of the propriety of making the skirting board more projecting than usual, for the purpose of keeping the beds off the wall; and it is an easy matter, by providing a groove or channel within this board, to form an air tube running round the whole ward, charging itself constantly with fresh air by means of apertures

through the wall, and delivering this air internally by another series of apertures covered over with wire gauze, or perforated zinc: these interior apertures, to be placed intermediately with reference to the external ones, and so arranged as to open under the bedsteads, rather than between them. By this means we prevent a draught upon the legs of patients stepping out of bed, while at the same time we provide for the renewal of the air under the bedsteads themselves, where it is most disposed to become stagnant.

Where wards run along either side of an intermediate passage or lobby, the air occupying such passage may be made, to some extent, subservient to the ventilation of the adjoining wards, provided always that this air is kept in a pure and salubrious state, by a free and uninterrupted communication with the external atmosphere. This may be effected in various ways, either by ventilators above and below the passage windows, or by the method detailed in my Introductory Lectures published in 1830, and for which I am indebted to the late Dr Hennen. He proposes that all the passages of an Hospital should be converted into spacious reservoirs, or air trunks, communicating directly with the external atmosphere, which may be effected by the very simple contrivance of having at either end of the passage a window reaching from the floor to the ceiling, so constructed as not to shut close at either top or bottom, but to have an aperture, or slit, open at all times, and screened with a slip of sheet iron, so as to prevent the access of rain or snow. In fine weather, these passage windows may be open to any extent, so as to give the most unlimited access to the external air; and in extreme cold weather the temperature may be raised by stoves or fire-places in the lobbies. In this way we may have at all times and at all seasons a constant supply of air existing within the building itself, let the storm rage how it may without. Apertures are then to be made through the partitions on a level with the floor, and communicating with the air tube running round the interior of the wards; a portion of the air from the lobby will thus be introduced, circulated along with the air of the ward, the ventilation of the passages themselves will be ensured, and the whole air within the building successively changed.

The provision for the admission of cool and unrespired air into the wards by means of a ventilating tube or channel surrounding the ward, is merely a modification, and I think an advantageous one, of the plan of ventilating Hospitals by means of perforations directly through the walls, as recommended by Dr Donald Monro in 1762; and it may be observed, that the admission of air at numerous points round the ward, as well as by the apertures in the floor, will ensure the most perfect renovation of the air. Indeed, the more numerous these points, the more certainly will this object be attained; at the same time, any inconvenience or danger from the operation of strong or partial draughts will be avoided, while the *diffusion* of the fresh and unrespired air, the most difficult problem in all modes of ventilation, will be promoted.

The air channel encompassing the room may be made a lodgement for hot air, or hot water pipes, in those cases in which it may be thought advisable to warm apartments in this way. One of the first Hospitals in which heated air was employed was that at Derby, where I saw it in operation more than thirty years ago, but it has not come into general use. I believe that wards of the moderate size which I have recommended,

are quite capable of being sufficiently heated by open fires, and I am not singular in the opinion, that this is the most eligible mode of doing so. In a letter from Doctor Drummond of the Melville Hospital at Chatham, which I have not seen for several years, he observes, "You may recollect that we have certain wards warmed by a current of heated air. I do not feel quite sure as to the advantage derived from them, and *the men do not like them*. The air never feels so pure, and the wards are never so *sweet* as those heated by the common fire." This, it will be observed, is an opinion offered by a very intelligent and experienced surgeon of the navy, without its being elicited by any question of mine, or any knowledge of my sentiments. I heard a very strong opinion to the same effect expressed a few days ago by one of the intelligent attendants of the Edinburgh Lunatic Asylum; who, in reply to questions put to him by Dr Skae in my presence, stated distinctly and unhesitatingly, that he considered those dormitories the freshest and sweetest which were heated in the common way by open fire places.

I have heard many individuals express a feeling of something unnatural, something more easily recognised than described, in the atmosphere of a room warmed by heated air. This naturally becomes more remarkable in proportion as the temperature is raised, and is, I think, very perceptible in the Consumptive Hospital at Brompton. Although a cure or alleviation of particular complaints may be promoted by keeping patients in an artificial temperature this practice is not expedient in general Hospitals, and is especially questionable amongst that class of patients who are under the necessity of resorting to such institutions. As a general rule, cures will be found most satisfactory, and most permanent, when effected under the least deviation from those circumstances to which the patient must of necessity return.

It will be seen from what has been said, that the supply of fresh air should not be left entirely dependent on the natural openings of a ward, its doors and windows; and when the latter are a chief source of supply, it is of importance that they should not be placed too high, as is sometimes the case. In the Middlesex Hospital is to be seen an ingenious device, the invention of one of the patients of the house, by which "each window is divided into three parts, turning downwards and inwards by means of a horizontal handle working upon a semicircular plate and upright iron rod, so that from half an inch to six inches of the three divisions of each window can be opened occasionally."

The operation and efficiency of all the several sources of supply depend upon the facilities for the escape or *abstraction* of heated air above, and this is provided for in various ways. In some instances the employment of Frier's ventilators, or of some panes of the ventilating glass in the upper sashes of the windows, have been successfully employed; but one of the most simple and efficient contrivances is the formation of apertures in the ceiling of the room communicating with the flue of the chimney, or with a heated air-shaft or ventilating funnel for the whole building. This is an appendage which I am inclined to consider indispensable in all large Hospitals, with a view to its operation at those periods of the year when the air is naturally stagnant, or when fires are not required in the wards.

A very simple process of ventilation has been successfully carried out, upon the re-

commendation of Dr Arnot, in some of the work-houses and dwellings of the poor, by merely removing a brick or two from the front of the chimney, immediately under the ceiling, so as to make an aperture into the flue ; and it appears to me to speak volumes in favour of this plan when I say that I saw it in operation last year, in the houses of several of the most eminent professional men in London. This will operate more powerfully in proportion as the flue is more heated, the exit of the warm air not being checked or impeded by its coming in contact with a body of colder air ; and it will be observed, that all the proposed means, both for the entrance of the fresh air and the escape of the heated air, may be employed at the same time, the process of ventilation going on more or less vigorously from natural causes in constant operation.

A prevalent error in the present day is a disposition to lean too much upon artificial modes of ventilation, while the natural course of the air in buildings numerously inhabited is sometimes overlooked, neglected, or counteracted. This seems to apply particularly to the plan of bringing in fresh air from above, immediately under the ceiling, and abstracting or pumping out the vitiated air below—a plan which appears to me erroneous in principle, inasmuch as the air being brought down and inspired by the patient, will again be thrown out or expired at an elevated temperature. This gives it a tendency to rise, but being opposed by the volume of air in the room, it will stagnate in what Dr Reid has called the “Zone of Respiration,” about the patient’s mouth and nostrils, or perhaps to some extent rise above them ; in the latter case, so soon as it loses its adventitious heat, it will again be borne downwards, passing a second time over the patient’s respiratory organs.

I have seen this mode of ventilation employed, and I believe successfully, in the solitary cells of prisons ; but this I hold to be altogether a different question from ventilating a Barrack-room or the wards of an Hospital. Such cells have often no communication with the external atmosphere, and the only apertures are a small close-fitting door, and one small-sized window of a few inches square, both perhaps opening into an adjoining passage or lobby. Here artificial ventilation in some shape or other is quite indispensable to the very existence of the occupant, but the case is different in the wards of a spacious Hospital. We are informed by the late Dr Fergusson, who was intimately conversant with the malaria or marsh poison, that “it evidently possessed an uncommon and singular attraction for the earth’s surface ;” and it is possible that, in the event of an Hospital being inevitably placed in a malarious situation, it might be advantageous to bring in the air to the wards from an elevated stratum, as was attempted in ventilating the ships on the Niger expedition.

I set aside for the present any calculation as to the comparative weight of the different constituents of the atmosphere, and any chance of the heavier gases being separated and deposited in the lower part of a room, because I believe that this never takes place to any injurious extent where a due circulation is kept up, as it ought to be, in the wards of an Hospital. I have, however, but a limited experience, and perhaps an imperfect knowledge, of the mode of ventilation to which I have just referred. The only large building where I have seen it in operation is the spacious Lunatic Asylum at Denbigh in Wales, but I was not sensible of that establishment being better ventilated than fifty Hospitals to which I could refer ; in some of which the admission of air is solely dependent on

the usual openings of the doors and windows. Under these circumstances, it is with great diffidence that I speak of this *reverse* process of ventilation; but I speak with more confidence when I say, that as regards Hospitals I believe it to be altogether uncalled for. All our adventitious plans for ventilation should be *supplemental* or *auxiliary* to the natural course of the air, and should be rendered, as far as possible, independent of any apparatus which is liable to get out of order, or upon anything which patients or servants have it in their power to neglect.

In addition to the subjects upon which I have now given my views—the Site, Construction, and Ventilation of Hospitals—there are many other points of great importance in regard to the interior economy of these establishments; such as the financial and purveying departments, the dieting of patients, the rates of mortality, and other statistical information, upon which it does not come within my present purpose to enlarge. But I cannot omit this opportunity of adverting to the vast amount of valuable information which has of late years emanated from our Hospitals, through the medium of the Professional Journals. Something, however, is still wanting to turn these institutions to full account as schools of professional instruction; and I see no reason to change the sentiments which I expressed upon this subject many years ago, in a Clinical Lecture which was delivered to the students of surgery in the Royal Infirmary here, in February 1828, and subsequently printed for their use. With reference to a short abstract or return of the cases which had been under my care during the course, prepared by the late Dr Bruce, who was then my apprentice, I observed,—“Such returns as this (and they may easily be made to embrace other important particulars) enable us at once to see the results of our practice; and to those who witness it, and who study it with an earnest desire to improve upon it, form documents of more importance than volumes of idle, uninteresting, or partial detail. I am far from undervaluing the importance of individual cases, particularly when recorded in the candid and unaffected language of a Pott or a Hey; but a large proportion of the cases with which we are usually furnished, exhibit only the bright side of the picture, and if taken alone, become unsafe guides for regulating our future practice.

“It is not, I apprehend, in the occasional detail of an isolated case that the improvement of our profession is to be sought, but in the calm contemplation of general results upon an extended scale; tracing, if possible, the causes of our failure and success with a hand equally impartial; giving to adventitious circumstances all the weight to which they may be fairly entitled, and shewing no overweening partiality to measures which are purely our own. Give us a statement of the number and description of patients admitted with any given accident or disease; give us a statement of the results, and let us know what is the general mode of treatment adopted, and we shall then be in a situation to compare the success of one Hospital with that of another; and to judge how much of this success may be due to the superiority of accommodation, or advantageous circumstances in which the patients are placed, and how much may be fairly attributed to the superior attention, skill, or dexterity of the medical attendants. However mortifying the confession may be to our professional pride, I fear that more will be found to belong to the former, and less to the latter, than many of us probably suspect; and I say this, certainly not with any view of countenancing or

encouraging negligence or inattention to operations or remedial measures, but from a conviction that, in the present advanced state of surgical science, and the rapidity with which every improvement is disseminated, Hospitals will be found to differ less widely in the practice of their medical attendants, than in extraneous circumstances, over which these attendants have no control.

“ My opinions upon this subject have not been taken up hastily ; I speak from more than twenty years’ habitual attention to every thing connected with the situation, the construction, and internal arrangements of Hospitals which can possibly affect the health of their inmates—an attention for which I take to myself no sort of credit, because it is rendered compulsory by the wise regulations of the service in which I passed my earlier years. My views in regard to Hospital establishments, and the national advantages to which they may be turned, are, I fear, only capable of being fully realized by national interference. In this country these institutions have almost exclusively been supported—and most honourably so—by private benevolence. But were the Government to lend its aid by contributing to every Hospital of a given magnitude, particularly those connected with large Schools of Medicine, so as to entitle it to take a share in the management, and to call upon the medical officers for accurate returns and reports at stated periods, we should more speedily come to the knowledge of all that is beneficial to the patients, instructive to the profession, or advantageous to the community ; and, as a professional man, I may be permitted to think that, in such an undertaking as this, the public money would be well bestowed.”

WORKS ON HOSPITALS.

CLAVAREAU, *Mémoire sur les Hôpitaux*. COUSTIN, *Modèles des états des Hôpitaux Militaires*. DUCHENEY, *Projet d’une Nouvelle Organization des Hôpitaux*. IBERTI, *Observations générales sur les Hôpitaux*. DULAURENS, *Essai sur les Hôpitaux*. Plans des Hôpitaux et Hospices civils de Paris. Rapport sur l’Hotel Dieu. RECALDE (l’Abbé de), *Abregé Historique des Hôpitaux*. *Règlements pour la Construction et Reparation dans les Hôpitaux de Paris*. TENON, *Sur les Hôpitaux de Paris*

A Pattern of a well-constructed and well-governed Hospital (the Hospital of Invalids, near Paris), translated from the French, and published in London 1695. AIKIN, *Thoughts on Hospitals*. ARNOTT on the Establishment and Uses of Hospitals, *London Medical Gazette*, October 1841. BLIZARD, SIR WILLIAM, *Suggestions for the Improvement of Hospitals*. CARTER on the Hospitals of France, Italy, Switzerland, and the Netherlands. CLARK, SIR JAMES, *Medical Notes on Climate, Diseases, Hospitals, and Medical Schools*. CROSS, *Sketches of the Medical Schools of Paris*. SIMPSON, *Notice of Leprosy and Leper Hospitals in Scotland and England*, *Edinburgh Medical and Surgical Journal*, 1841, and subsequent volumes. *History and Charter of the Royal Infirmary of*

Edinburgh. History of the Derby Infirmary. History of the Newcastle Infirmary. History of St Thomas's Hospital. History and Statutes of many of the Provincial Infirmarys of Great Britain and Ireland. Proceedings of a Special Court, Middlesex Hospital, January 1st, 1849.

MILITARY HOSPITALS.

BALLINGALL, Outlines of Military Surgery. Introductory Lecture, Northern Journal of Medicine, June 1846. BROCKLESBY on Military Hospitals. FAULKNER, SIR A. B. on Hospitals for Officers. FERGUSON, History of the Marsh Poison, Transactions of the Royal Society of Edinburgh. Recollections of a Professional Life, and other Works. HENDERSON on Yellow Fever, and a Plan for Military Hospitals. HENNEN, Military Surgery. JACKSON, Formation, Discipline, and Economy of Armies, and other works. KINNIS, Military Medical Statistics of the Bombay Presidency, Edinburgh Medical and Surgical Journal, April 1851. MONRO, Health of Soldiers. PRINGLE, Diseases of the Army. ROLLO, Account of the Royal Artillery Hospital at Woolwich. WILLIAMS, Hints on the Ventilation of Army Hospitals and Barrack-Rooms. Instructions for the Royal Naval Hospitals at Haslar and Plymouth. Collection of Papers printed for the use of the Officers of the Royal Engineers.

ERRATUM.—Page 6, line 31, *for* 1600, *read* 1200.

FINIS.

