LECTURES

ON

HOSPITALISM: AND THE CAUSES OF DEATH AFTER OPERATIONS.

Delivered at University College Hospital, London.

By JOHN ERIC ERICHSEN, F.R.C.S.,

Holme Professor of Clinical Surgery in University College, and Senior Surgeon to University College Hospital.

LECTURE IV.—ON THE PREVENTION OF HOSPITALISM.

CONTENTS.—*Overcrowding.—Influence of, 1. Condition of Patient before Operation; 2. Skill of Operator; 3. Of Treatment after Operation.—Septic Disease bears no relation to mere size of Hospital.—Hospitals vary greatly in number of Operations and in amount of Mortality.—Evils in the present mode of Construction of Hospitals.—In Arrangements of Wards, Offices, Dead-House, Erysipelas-Ward.—Lincoln County Hospital.—Ventilation from Corridors.—Injurious Influence of Out-Patient Department.—Influence of Age of Hospitals.—Principal Hygienic Rules.—Conclusion.*

IN the last Lecture, I pointed out to you that, and in what way, overcrowding gave rise to septic disease; and I particularly endeavoured to impress upon you the very important fact, which I cannot too strongly urge upon your attention, that it is the nature, and not the number, of the cases in a ward that occasions that pestilential state of its atmosphere which develops pyæmia and other septic diseases. A ward may be "overcrowded" with those surgical injuries and diseases in which there is no breach of surface—such as simple fractures, chronically inflamed joints, strictures, etc.—without any more serious detriment to the health of its inmates than would result from inhabiting a room that is habitually too full of people; but the case is widely different when the inmates are the subjects of injuries or operations that occasion suppurating wounds. Then, and under such circumstances, even if the ward be not full, septic disease may be developed; and this will certainly happen, so far as our experience here will lead us to determine any sanitary point with certainty, if the number of suppurating wounds, the majority being severe ones, exceed one-half of the number of patients the ward is constructed to hold: and further, when once septic disease is so generated, it will spread by contact or infection of air.

Let me, then, advise you not to be sceptics about the influence of septic disease. How this "overcrowding" generates septic disease in the first instance—by local infection or by blood-poisoning—is a point on which men of science are divided. The discussion of this question would be altogether beyond the object of these lectures, and it need, consequently, not detain us. Its solution one way or the other in no way influences the fact with regard to the evil influence of overcrowding. We may, then, take it as proved, by the experience derived from this hospital, that under circumstances of injury or disease, and of a building such as we have to deal with here, an invasion of septic surgical disease may be foretold. We are able to determine with accuracy when it is imminent, and with certainty that it will occur according to the number and nature of the open wounds in a state of suppuration that are in a ward at a given time. To be forewarned in such cases is truly to be forearmed, as septic disease, and pyæmia more particularly, is the main cause of the present high rate of mortality after operations, more especially amputations. As the conditions under which it is developed can be determined with accuracy, we have only to guard against the development of these conditions in order to prevent the evolution of the septic cause of mortality, and thus, and in the same ratio, diminish that mortality.

Let us, however, examine this important question a little more in detail; for truly it is one on which I do not wish to dogmatise, but which I should like to present as clearly as possible to you. Now there can be no doubt of this, that, if the present rate of mortality after amputations in hospitals be not dependent on those influences to which patients are subjected after the operation has been performed, and which are included under the general term "hospitalism", they must arise from one of the three following conditions—viz., 1. The state of the patient's health before the operation; 2. The skill with which that operation is performed; or 3. The treatment—constitutional or local—

to which he is subjected after its performance. Let us briefly examine these.

1. Can the condition of the patient's health, his social status, his occupation, exercise any influence in determining the present high rate of mortality? Upon this point I need say but little, as I have no intention to compare town with country, hospital with private patients, but to compare the results of one hospital with another in the same town. Now I may take it for granted that the conditions of health are the same in the patients in all metropolitan hospitals; that there is no difference in health or in social status between the patients of a hospital in which the mortality amounts to 18 or 25 per cent. after all amputations, and those of one in which it reaches nearly 50; and yet these are the differences that are met with in different metropolitan hospitals. We find the same differences existing in the hospitals of Paris; and, on reference to Simpson's admitted statistics, it will be found that the hospitals of county towns differ also largely one from the other in the rate of operation-mortality. Without, therefore, comparing town and country patients, we find the utmost possible discrepancy in the results obtained from different institutions in the same town in which the conditions of the patients must necessarily be as nearly as possible similar in all that respects habits of life, occupation, and resulting constitution.

2. As to the second condition that may be supposed to lead to this different rate of mortality in different hospitals—namely, any difference of skill that may exist, it is not to be entertained for a moment. There are, doubtless, many capital operations in surgery—such as lithotomy, the ligature of arteries, herniotomy, etc.—in which it may be supposed that different operators possess varying degrees of skill which might influence the result; but in amputation, that simplest of all the great operations, there can be no difference in this respect: and, indeed, the results that are furnished by different hospitals bear no proportion whatever to the known skill and professional ability of the surgeons connected with them; and it is one of the greatest evils of the prevalence of septic disease in a hospital—call it hospitalism or not, as you please—that it neutralises the highest surgical skill, and renders abortive every care that can be bestowed upon the patient.

3. The third possible condition that may influence results of operations, independently of hospitalism, is treatment. Its influence on the results may possibly be somewhat greater, though on this important point we possess, as yet, no reliable evidence. It is a curious fact that the surgeons of the past generation seem to have been almost entirely ignorant of the existence of septic disease, and of its influence in modifying injuriously the results of surgical operations. There are, no doubt, scattered hints in the works, even of such philosophical surgeons as Brodie and the Bells, bearing upon this point, but septic disease was but little regarded, and its more prominent features scarcely recognised. In Cooper's last edition of his great *Surgical Dictionary* there is no mention whatever of pyæmia; nor is that disease described in the works of the best authorities of the day. Surgeons thirty-five years ago were chiefly concerned with methods of operating and modes of treatment, and they referred the varying conditions of success or failure to the practice that was adopted in these respects. We find long discussions and controversies upon the comparative advantages of the flap and circular methods of amputation, of immediate and delayed union; but no reference to those more general causes that are now known to override all these comparatively minor considerations of fashioning of flaps or mode of procuring union of wound. At this period, indeed, the secondary effects of pyæmia and septicæmia in the visceral abscesses and congestions produced were recognised; but the intermediate link of the blood-poisoning was but little, if at all, suspected. I can speak with some degree of experience upon this subject, for more than thirty years ago a paper of mine on so-called "Congestive Pneumonia" following surgical operations, injuries, and diseases, was published in the *Medico-Chirurgical Transactions*, and in that paper, as well as in another one on the "Cause of Death after Burns", I failed to recognise, and in the discussion that took place upon it no reference was made to, the blood-poisoning, which undoubtedly led to what we now know to be pyæmic and septicæmic conditions, but which were then looked upon as distinct constitutional diseases arising from some local irritation in an obscure and inexplicable manner. But, if we go from this past pathological era and come to more recent times, we shall still find that a great, and I cannot but think an undue, importance has been attached to peculiar methods of operation and to particular plans of treatment. Let me speak on this point solely from my own personal experience. The 307 amputation cases that have occurred in my wards have all, I believe without a single exception, been done by the flap operation. The patients have been subjected to various methods of treatment. In the early periods, up to twenty-five years ago, Liston—and I, acting afterwards on his precepts—generally treated amputation-wounds by leaving the flaps open with a piece of wet lint interposed, but otherwise

fully exposed to the air for from four to six hours until all oozing had ceased and the cut surfaces had become glazed. The flaps were then brought together, a strip of water-dressing laid along the edge of the wound, and an attempt made to procure union by adhesion. I afterwards employed different methods of treatment, generally bringing the flaps together immediately after the operation was completed, and dressing the stump in the operating theatre, sometimes washing the surface with a solution of chloride of zinc, with alcoholised water, or carbolic solutions. But, whatever method of treatment was adopted, the mortality was, as nearly as possible, the same, ranging, as I have stated in the first lecture, from 23 to 25 per cent.; in fact, it is quite certain that no influence whatever has been exercised in the result in my practice by any method of local treatment that has been adopted.

Of the antiseptic treatment, I can as yet say nothing positive; it has been tried in some cases in my wards, and with success, but not, as yet, in a sufficient number for me to come to any conclusion as to its utility in operation wounds; of its great advantage in chronic abscesses, I have seen enough to leave no doubt on my mind. Theoretically, "the antiseptic method" is perfect. It fulfils all the requirements that can be desired in the management of a wound. It may be equally good in practice, but, as I have already said, this is a point yet to be determined. The essential points in the local treatment of any wound being scrupulous attention to cleanliness, the absolute purity, so far as freedom from all decomposable organic matter is concerned, in everything that is brought into contact with it, be it air, or instruments, or dressings, or surgeon's fingers, and close personal supervision. In all these respects, the "antiseptic treatment" of Lister, and Callender's method of managing stumps, leave nothing to be desired; and, if I were to venture an opinion upon a subject which is still *sub judice*, I should say that it is in this that their great merit in practice consists. But we have, as yet, to learn the real value of antiseptic methods of treatment; and this can only be done by the observation of a very extended series of cases in which these plans of treatment have been employed, and comparing the results thus obtained with an equally extensive set of cases treated by other methods under as nearly as possible the same conditions in the same hospital. It would clearly lead to an incorrect conclusion, if we were to compare the mortality resulting from treatment by antiseptics and by other modes, at different seasons of the year, or in different years when epidemic influences might be present or absent, or in two hospitals, the mortality of which for years past has been so dissimilar, as is presented by those contained in Table B, as compared with University College with a mortality of 25 per cent., or St. Bartholomew's with one of 18 per cent. The only fair method of comparison is between the practice of one surgeon who uses the antiseptic method with that of another who does not, in the same institution and at the same time. This has never as yet been done, or, at least if done, the results have never been made public; and, until we are in possession of such comparative returns, we can attach no importance to the publication of isolated cases, or even of short and partial runs of success which have, as stated in Lecture I, occurred after almost every new method, and to many surgeons.

But if the high rate of mortality at present existing after amputations and many other operations, and dependent upon septic disease, and which differs so widely in different hospitals in London, is not due either to the condition of the patient before the operation, to the skill with which it is practised, or to the treatment that is adopted, to what are we to refer it? Why, necessarily to the last of the four conditions; namely, to the hygienic influences to which the patient is subjected after the operation. It is these influences that give rise to the septic diseases that are so fatal, pyæmia alone being the cause of death in more than one-third of the fatal cases; and, if this could be removed, we should be able to lessen our mortality proportionately. In other words, instead of having an average death-rate of about 37 per cent. after amputation, we should bring it down to 24 at most, if only the pyæmic cases could be saved; and considerably lower if the mortality from other septic disease, such as erysipelas, could be done away with.

The differences that exist in the rate of mortality from pyæmia after operations in different hospitals admit possibly of explanation in different ways. Simpson, as is well-known, endeavoured to prove that the mortality from septic disease in a hospital increases in the direct proportion of the size of the building. In this, I believe he was in error. It is quite possible that, if the conditions were equal in all hospitals, size might determine result, but the conditions are so unequal that no legitimate deduction as to mortality can be drawn merely from the consideration of the size of a hospital. If all hospitals were constructed in exactly the same way, if the number of severe injuries and operation-cases they contained was in exact proportion to the general number of their inmates, mere size of building, or, in other words, accumulation of numbers under one roof, would, in all pro-

bability, exercise a determinable influence upon the result. But, the construction of hospitals is so varied, and the proportion of severe operations and injuries varies so greatly in different institutions, being at least twice as great in proportion to the number of patients in some hospitals in London to what it is in others, that no safe deduction can be drawn from mere size of building or number of inmates. Thus, if we only take the four hospitals, the statistics of which appear in Table B, and University College Hospital, I find that the number of cases of amputation in the hospitals in proportion to the number of beds they contain is as nearly as possible as follows during the years mentioned in that table, viz.:-

Hospital A, there was 1 amputation to every.....	13 beds.
Hospital B, " 1 "	17 "
Hospital C, " 1 "	10 "
Hospital D, " 1 "	35 "
University Coll. Hos., 1 "	6½ "

In point of fact, the largest hospital in London (St. Bartholomew's) is at the present time surgically the most healthy—its reports showing a smaller percentage of deaths from septic disease than that of any other institution. At University College Hospital, the number of operation-cases has always been very large in proportion to the size of the institution. We have 150 beds, of which about 75 are surgical. Now, I find by the Registrar's returns, that we have a yearly average of capital operations—i.e., of operations by which life is directly imperilled, as the major amputations, resections, operations for stone, hernia, the removal of large tumours, of organs, such as breast, testis, penis, and tongue—a total amounting to about 80, or more than one for each surgical bed; and this exclusive of all injuries that do not require operation. This is fully double what occurs in some other hospitals in London of the same size, and fully as many as occur in some that contain more than double the number of beds. Hence with us the proportionate number of severe cases in regard to the actual number of beds is very large, and yet the mortality from septic disease is, upon the whole, small.

In speaking so much of University College Hospital, I may possibly have laid myself open to something like a charge of egotism, for we naturally connect the hospital with the surgeon; but I must either refer to the results of the practice of that hospital, to which I have for nearly a quarter of a century been surgeon, and from which I necessarily derive all my experience of public surgical practice, or I must be silent.

It is not my intention on the present occasion to go into the general question of the construction and hygiene of hospitals; but there are a few points to which, as they bear on our present subject, I may direct your attention; for, indeed, I cannot but come to the conclusion that in the solution of this question is involved much that relates to the development of septic disease, and that increases immensely the evil results which are consequent upon over-crowding, or the simple aggregation of patients under one roof, by rendering the air impure before it enters the wards, and keeping, in fact, the whole hospital atmosphere in a state of pollution.

I cannot but think that there is something radically wrong in the conventional method of constructing ordinary hospitals. I am not at present speaking of those so-called "palatial" hospitals, founded by the munificence of the charitable and pious of a long past age, the revenues of which have augmented by the increased and ever growing value of property; by the bequests and donations of successive generations of benefactors, until they have rivalled the incomes of dukedoms; but I solely speak of that large class of hospitals (metropolitan and county) varying in size from 100 to 300 or 400 beds, which have no such princely revenues to fall back upon, but are supported from year to year by the "voluntary contributions" of the many charitable, pious, and often munificent, donors who live amongst us. These hospitals, having often but slender means at their disposal, or having been constructed with economy in outlay, have been built on a conventional plan, from which no architect has yet departed. They are simply big houses, with basements containing kitchens, lavatories, cellars, and the ordinary offices of a large establishment; with an operating theatre and dead-house more or less closely connected with the main building; with every floor filled with sick and injured people. On the ground-floor, accidents and operation-cases; on the first-floor, probably medical patients; above, chronic surgical cases—who can wonder at the development of pyæmia below and of erysipelas above? Who would live in an ordinary house thus filled? Who would expect to preserve his health if he ventured to inhabit it? How can the air be pure, and how can recovery be expected, or freedom from septic disease secured, under such circumstances? Civil hospitals, that were built during what may be termed the "pre-sanitary age"—i.e., until about a third of a century ago, were uniformly constructed on this big-house plan, being three or four storeys high. The evil of this mode of construction is very great. It leads to the upper storey, which ought to be the healthiest, being

usually the most infected with septic disease, and this notwithstanding its being more easily ventilated than those lower down.

This has happened here repeatedly with regard to erysipelas. The upper floor in the main building of our hospital is occupied by the female surgical beds. The cases are much less severe than those in the male accident wards on the ground-floor; the wounds are slighter; operations less frequent and far less severe. But yet erysipelas occurs to a greater extent amongst the patients on this floor than amongst those on the ground floor. From July 1870 to July 1873, there were thirty cases of erysipelas in these wards, against twenty-four in the lower wards. But during the whole of this time, I had not one single case of pyæmia amongst my female patients in the upper ward. The fact appears to be, that the air, as it ascends in the hospital, becomes impregnated more and more with septic matters; and that, erysipelas being infectious, the contagion of that disease is at once carried by the upward current of air to the higher storeys, however well ventilated these wards may be; and no doubt the good ventilation in these higher wards tends to lessen the septic disease that would otherwise be more frequent in them.

But not only is the general mode of construction of most hospitals, whether town or provincial, faulty, but the internal arrangements are usually such as not only tend to predispose to those septic diseases that are due directly to contamination of air beyond a certain point of impurity, and also to render it extremely difficult in all cases, and in some impossible, to expel or eradicate such disease when once it has got a foothold in the building. A hospital may thus become contaminated by septic disease—be pyæmia-stricken, in fact, beyond the possibility of purification. This is what has happened at the Lincoln County Hospital, which the governors have most nobly decided on demolishing and reconstructing at a vast cost. In the case of this hospital, to which I have no hesitation in alluding, as its condition has been made public in the local papers, in the medical journals, and, at the meeting at which its reconstruction was decided upon, my name was mentioned in reference to a modified scheme, there have been repeated outbreaks of pyæmia for many years past; and at last the surgeons had been compelled to desist from operating in it, and even to advise patients to be treated at their own homes, rather than encounter the perils of the hospital. Mr. Brook, one of the surgeons, said at the meeting alluded to: "Of late years, the interior of the hospital has, at one time or another, been entirely renewed; but still the disease (pyæmia) kept breaking out; and it was the opinion of all great authorities that it lurked in the very fabric, and that nothing but demolition would remove it." (*Lincoln Gazette*, January 10th, 1874.) Mr. Lowe, another of the surgeons, spoke in the same strain, and has told me that, although the hospital had become thus pyæmia-stricken, he had never met with a case of that disease out of the hospital in the town itself.

I am acquainted with other instances of hospital infection nearly, if not quite, as serious as this; but, as they have not yet been brought before the public, I refrain from mentioning them. But surely no stronger or more conclusive evidence is needed of the tenacious and ineradicable nature of this pyæmic infection, when once it has taken firm hold of a hospital, than that which is furnished by the example just given. What name so appropriate as "hospitalism" for a condition of things such as here described? The town free from infection; the hospital saturated by it, so as to induce its own surgeons to recommend their patients not to enter it, to compel them to refrain from operating, and after every attempt that science and humanity could suggest; every hygienic means employed in vain in the fruitless attempt to eradicate the pestilence from "the very fabric" itself; to compel the governors, as a last resource, to decide on the demolition of the building and its complete reconstruction at a great expense as the only remedy. The truth is that, when once a hospital has become incurably pyæmia-stricken, it is as impossible to disinfect it by any known hygienic means, as it would be to "disinfect" a crumbling wall of the ants that have taken possession of it, or an old cheese of the maggots which have been generated in it. There is, in these extreme cases, only one remedy left—that remedy which the governors and staff of the Lincoln County Hospital have so generously, so disinterestedly, so nobly, resolved on—viz., the demolition of the infected fabric, and the destruction of its materials, for that last clause must not be forgotten. In fact, just as the cattle-plague has to be "stamped out" by the pole-axe, so has the infection of a pyæmic hospital to be destroyed by the pick.

From the manner in which most hospitals are built—on the model, in fact, of a large dwelling-house—all the wards open upon corridors or lobbies which communicate with the general staircase of the building, and, through the medium of these, with its basement-floor, with the entrance-hall, the out-patient department, and frequently by continuous passages with the dead-house. The only air-supply that the wards receive at night, or when the windows are shut, is in the

majority of cases, that which is thus drawn from these corridors, and which, from various causes, is already in a state of impurity, and will thus more readily become contaminated up to the septic point by overcrowding of the wards.

Now let us consider briefly how these causes of pollution of the air may be remedied.

The three main causes of the impurity of the air of hospital corridors and staircases appear to be: 1. Effluvia from the kitchens, cellars, and washing-places, on the basement-floor. The odours arising from these various sources of impurity, the smell of cooking, of washing, etc., are often perceptible in a very marked degree in hospitals. This evil might easily be remedied by removing all these offices into an outbuilding, as is now generally done in all well constructed modern houses. The basement-floor might then be converted to useful purposes for the inmates. Reading and recreation rooms might be established in it for the use of residents or patients.

2. The second great cause of impurity in the internal air of many hospitals, is the out-patient department being under the general roof of the hospital. This I cannot but consider to be a great evil, and a most fertile source of disease amongst the inmates. The fact is, that there is too much done in hospitals at the present day. They have not been constructed originally for the amount of work that is thrown upon them. Thirty years ago, the out-patient department was insignificant in comparison to what it now is. Dispensaries then did the work that hospitals now undertake in this respect. Not only are there the usual general medical and surgical out-patients, but very commonly new out-patient arrangements are made for those affected by a variety of special diseases. Not only has the augmentation in the number of out-patients become so great as to be a source of demoralisation to the public at large, of loss and injustice to the great mass of general practitioners, of wasteful expenditure and of great embarrassment to hospitals—but the accumulation of these crowds of diseased, often of infectious, people in the entrance-halls and "out-patient and casualty" rooms of hospitals, has become a source of serious unhealthiness to the inmates of these institutions. The out-patient room is commonly situated near one of the entrances into a hospital; and who that has gone into that apartment, when crowded with patients, many afflicted alike with dirt and disease, has not been conscious of a heavy and noisome odour tainting the air at its very entry into the hospital, and rendering it, at the very doors of the building, unfitted for contact with the wounded within its walls?

I give no opinion here on this question of indiscriminate out-patient relief. Whether an evil or a necessity, it exists. But it should not be suffered to exist under the same roof that covers those who have recently sustained serious injuries or been subjected to grave operations. For this, at all events, there can be no necessity; and we shall in vain attempt to purify the air of our hospitals, and to render it free from septic influences within, when we allow it to be polluted, if not infected, at its very entry into the building. Let the out-patient department be removed from the hospital to a detached and altogether separate building, and we shall at all events remove one source, and a great one, of atmospheric impurity.

3. A third grave cause of the impurity of the general air distinguished from the ward air of hospitals, is often the proximity of the dead-house and *post mortem* room to the main building, with which it, in most instances, is connected by means of a corridor. To this I need do little more than allude; for it must be obvious that it is hopeless to endeavour to prevent the continuance, the occasional severe outbreak, or the spread, of septic disease in the wards, when the air that supplies them from within the building is from time to time contaminated by the diffusion through it of emanations arising from the *post mortem* examination of those who have already perished from their influence. The dead-house, like the out-patient department should be entirely separated from the hospital, and should have no covered communication with the main building. So also the porters whose duties are connected with it, and the officers whose business it is to make the necropsies, should on no account be permitted to handle the patients or to examine or dress the wounds of any surgical patient.

There is one other source of infection, or rather of maintenance of infection, in a hospital that is closely allied in its influence to the dead-house; I mean the "erysipelas ward." That, also, should never be allowed within the walls and under the roof of the main building, but should be detached and non-communicating. The contagion of erysipelas is undoubted. I gave you, in the last lecture, a striking illustration of it. What but infection, then, can be expected from placing patients so diseased on the same floor, in the same stream of air-communication with others, rendered, by open wounds, peculiarly susceptible to its infection? If the "erysipelas ward" were removed out of the hospital, and had no communication with the main building,

its use would be greatly restricted; as now situated, it too often feeds itself.

We know as yet but little that is positive as to the influence of the duration of use, or, in other words, the age, of a hospital in producing a tendency to the generation of septic diseases within it. It is a question extremely difficult to answer, how far the mere age of a building tends to its unhealthiness—whether that building be a modern hospital or a mediæval Italian palazzo. There are so many circumstances in every building, independently of its mere age, that must modify its sanitary condition—such as the material of which it is constructed—stone, brick, or modern lath and plaster—its site, and the attention that has been bestowed upon its drainage and other hygienic conditions—that we cannot, I think, go much further than this in the answer, viz., that age and neglect will certainly render any building unhealthy.

There is one remarkable circumstance connected with age of hospital, and it is this, that new buildings added on to old hospitals often become more unhealthy than the original building. This happened at one of the Paris hospitals (I believe it was the Neckar), and has been observed in this country also.

But to return again to that on which I base all my remarks in these lectures, viz., the experience I have derived during the twenty-five years that I have been surgeon to University College Hospital, I can say this, that—notwithstanding the immensely improved sanitary arrangements that have, during that time, been introduced and adopted by the increasing vigilance and devoted attention of the hospital committee—the sanitary state of the hospital has just been maintained at the same state that it was a quarter of a century ago. Our amputation-mortality is exactly the same now as it was then, viz., about 25 per cent. The effect of greatly improved hygienic arrangements has been to prevent the hospital from becoming more unhealthy; they have not succeeded in increasing its salubrity. They appear just to have been able to counteract the ill effects that would otherwise have arisen from the impregnation of the building with the accumulated septic emanations of a continuous influx of sick and wounded.

There are various other points in connection with hospital hygiene to which I need do little more than direct your attention, as they are matters of general rather than of special sanitary arrangements; they are matters, in fact, of common sense with common experience. Though generally known, they are often neglected; but attention to which will undoubtedly greatly influence the development, the prevalence, and the persistence of septic disease in a hospital. They consist mainly in the following points. 1. The rendering of all surfaces as little absorbent as possible, by parianising the walls and painting the floors: by these means also they become smooth, and less likely to harbour organic dust. 2. The employment of dry rubbing of, instead of washing, the floors. 3. The frequent purification of the bedding. 4. The removal of all unnecessary furniture, such as bed-curtains, carpets, etc., that can impede ventilation or harbour infection. 5. The removal of the patients' clothes, especially those of cloth and woollen materials, from the wards, and storing them away in an out-building. 6. To compel the nurses to wear dresses that can easily be, and that frequently are, washed. 7. It would doubtless be advantageous to furnish the patients with suits that admit of being cleaned and washed—flannel in winter, cotton in summer. 8. There should always be an abundant supply of carbolised water in the wards for washing purposes. 9. No personal communication through porters, dressers, or house-surgeons; between the dissecting room or dead-house, and the wards. 10. The isolation of patients suffering from fetid ulcerations, especially of a cancerous character. 11. The separation of patients with suppurating wounds from one another by the interposition of unwounded patients. 12. Care not to allow more than one-half of the patients in any given ward to have suppurating wounds, even if these wounds be trivial; nor more, if possible, than one-third if severe. 13. Instantly to isolate all cases of septic disease. 14. To see that there is a current of air admitted into and passing through the ward from the outside of the building by night as well as by day. 15. To close every surgical ward once a year for a month, during which time it should be disinfected and whitewashed. 16. And above all, and under all circumstances, to avoid over-crowding.

By attention to simple hygienic rules such as these, much may be done to lessen the mortality from septic surgical diseases in hospitals; to mitigate the violence of their outbreaks; to limit the range of their destructiveness when they do occur; and, above all, to prevent the risk of ineradicable and persistent contamination of the building by septic poison, a condition which experience has shown to be incurable, and only to be met by the destruction of the infected building.

And now, gentlemen, I have done for the present with this subject, the most important, probably, that is at the present moment before the

profession. It is alike important to the surgeon and to the public. To the public who use the hospitals, there can be no subject of deeper or more vital moment than that those hospitals should be in the highest state of sanitary efficiency. To the surgeon, the importance of the prevention of septic disease in hospitals cannot be overestimated. As matters now stand, the most consummate skill and the most devoted attention are often alike rendered unavailing by the influence of septic diseases generated within the hospitals themselves by the operation of causes entirely beyond the surgeon's control—diseases which neutralise the best directed efforts of his art, and which, in no small degree, increase the pressure of that heavy responsibility and deep anxiety which, even under the most favourable circumstances, attend its exercise.

LETTSONIAN LECTURES ON SYPHILIS AS A CAUSE OF DISEASE OF THE NERVOUS SYSTEM.

Delivered before the Medical Society of London.

By W. H. BROADBENT, M.D., F.R.C.P.,
Physician and Lecturer on Medicine at St. Mary's Hospital.

LECTURE III.

GENTLEMEN,—I have still to bring before you the affections which result from the effects of syphilitic disease upon the brain, its membranes, and blood-vessels. So numerous are these, and so important, that I could well occupy, in even a brief account of them, more than the number of hours allotted to the entire series of lectures; and they are so varied and protean, that I might be excused if I took refuge in a merely symptomatic classification of them. But, even were I to bring them before you under the heads of paralytic and convulsive affections, and affections of sensation or of the intelligence, I should find myself in a difficulty of another kind. In many of the cases, there are both convulsions, paralysis, and mental derangement, and these could only be assigned to one or other ground in an arbitrary manner. Moreover, any of these symptoms may arise in one case from one cause; in another, from some lesion entirely different both in seat and character; and one classification would fail altogether to aid either in prognosis or treatment. A real diagnosis implies the identification of the part which has suffered injury, and a recognition of the morbid process which has inflicted it. We can form a rational estimate of the chances of recovery, and direct intelligent efforts for its attainment, only when a distinct and definite idea has been formed respecting the disease we have to treat, and it is only when this has been done that we can profit by our mistakes. Let us have error rather than confusion.

I must here again briefly enumerate the morbid changes which syphilis induces in the brain. You will remember that the characteristic is a tendency to the exudation of a particular kind of plastic material, which may be diffused in the membrane at the base of the brain, or over the hemispheres, or may take the form of a distinct tumour, which will frequently have a great resemblance externally to malignant growths. The "habit of locality" of the tumours, as well as of the diffused exudation, is to affect the surface, although gummata or syphilomata may be found in the substance of the brain, usually, however, in the more vascular parts, the grey matter of the corpora striata or thalami.

In the diffuse form, we may have the membranes adherent to each other, and to the convolutions, by means of the firm plastic material described in my first lecture; and, as a result, the vessels of the pia mater are occluded, the supply of blood to the peripheral grey matter is diminished, and this undergoes atrophic change of some kind, or small indurations may invade the nervous structures from the membranes. Disease of the surface grey matter of the hemispheres may give rise to convulsions or paralysis, or the most varied intellectual or moral disturbances, according to the particular set of convolutions affected, and the nature and rate of progress and stage of the morbid process. This it is—the tendency to affect the membranes, and the varying intensity of the inflammation—which makes syphilitic affections of the brain so multiform.

The order in which I propose to consider these affections is as follows:—First, the slighter changes, presumably in the membranes or