AN ADDRESS

ON

THE EFFECT OF THE ANTISEPTIC TREATMENT
UPON THE GENERAL SALUBRITY OF
SURGICAL HOSPITALS.*Being the Address delivered in opening the Surgical Section of the British Medical Association in Edinburgh, August 4th, 1875.*

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GENTLEMEN,—I believe I can hardly more profitably occupy the time allotted to me for an address in opening this section, than by bringing before you some facts illustrative of the effect of antiseptic treatment, when strictly carried out, upon the general salubrity of surgical hospitals.

Six years ago, when writing on the very remarkable improvement which had been brought about by "enforcing strict attention to the antiseptic principle" in the wards of which I had charge in the Glasgow Royal Infirmary, "converting them from some of the most unhealthy in the kingdom into models of healthiness", I ventured to express myself thus. "Considering the circumstances of those wards, it seems hardly too much to expect that the same beneficent change which passed over them will take place in all surgical hospitals, when the principle shall be similarly recognised and acted on by the profession generally."* That prediction, I think I may say, is now in course of fulfilment.

I shall speak first of what has come to my knowledge with regard to some foreign hospitals, and I will begin with Copenhagen, where Professor Saxtorph long ago introduced antiseptic treatment; indeed, I believe he was the first to bring it into operation on the continent. The large hospital of which he had the charge used to be a very unhealthy one. Pyæmia was extremely frequent, even after very small operations, such as amputation of a finger. Pyæmia has vanished ever since the antiseptic treatment was introduced, hospital gangrene has almost entirely disappeared, and erysipelas is nearly unknown except as imported from the town. Professor Saxtorph writes to me as follows: "If you ask me what I have observed respecting the effects of antiseptic treatment, I may say that it has not modified, but completely changed my principles of pathology and my surgical practice." "The word *hospitalism*, which some years ago found its way from Edinburgh to the continent, no longer terrifies us; it no longer keeps us from performing operations in the infirmary, and you seldom meet with a case that could be called a case of hospital disease." After going into details regarding the various forms of hospital disease, he proceeds to describe the greatly increased success that now attends the treatment of some injuries. "As to accidental deep wounds, large lacerated wounds of the scalp, contused wounds with smashing of hand or foot, compound fractures or wounds of joints, I almost invariably have them heal without any bad symptoms, by means of antiseptic dressing and drainage-tubes. Any case of this sort will almost certainly recover if there is no complication of shock, or gangrene of the limb, or contusion of internal organs." He next speaks of the change which has taken place in the results of operations, such as amputations and excisions, and adds, "In short, I think I am right in saying that patients very seldom die from an operation. If they do die, it is not the operation that kills them, but the disease that existed previously to the performance of the operation." Lastly, he alludes as follows to abscesses connected with diseased bone. "What until the last few years proved the most difficult to deal with, are the abscesses which are connected with bone-disease. But now I think we may safely cut into them, if we only persevere in the antiseptic treatment for a sufficiently long time. By means of careful dressing, drainage-tubes, and the antiseptic spray whenever the dressing has to be changed, we get over those accidents of septicæmic poisoning which formerly almost invariably followed incision into these collections. But I am equally sure that, if I do not carry out the antiseptic treatment to its full extent, it is of no use whatever to apply carbolic acid to a wound, at least as regards the dangers that always accompany putrefaction."

I come now to what I witnessed in the course of my recent travel in Germany, and I shall speak only of those hospitals into which antiseptic treatment has been introduced. Of these, the first I saw was Munich. The large Allgemeines Krankenhaus there has been until

lately increasingly unhealthy; pyæmia was very frequent; and hospital gangrene, which made its appearance in the year 1872, had become annually a more and more frightful scourge, until last year it had reached the astounding proportion of 80 per cent. of all wounds that occurred in the hospital, whether accidental or inflicted by the surgeon. And not only was it thus extremely frequent, but was in a very severe form, produced frightful ravages, often caused death, and led to patients who recovered being retained an inordinately long time in the hospital. But, from the time when, at the beginning of the present year, efficient antiseptic treatment was brought into operation by Professor Nussbaum, they have not had one single case of hospital gangrene. At the time when I was at Munich, they were doubtful whether they had had one case of pyæmia; erysipelas, formerly very prevalent and severe, was rare, and, when it did occur, was in a very mild form; and I saw the convalescent wards—which previously had always been filled and overflowing—standing one after another empty, because the patients, no longer affected with hospital gangrene, recovered much more rapidly.*

I next proceeded to Leipzig, where Professor Thiersch is clinical teacher. He has three hundred beds under his own charge, of course seconded by able assistants. Professor Thiersch was the first to introduce antiseptic treatment on scientific principles into Germany. His results, as regards the general salubrity of the hospital, have been, on the whole, progressively more and more satisfactory, and in the present year he was able to state that he had only had one case of pyæmia in twelve months; and that, you will observe, in a service of three hundred beds. Hospital gangrene, also, had almost disappeared. There had been in 1871 a curious attack of that disease in two barrack wards, which seemed to be due to old hospital furniture piled up in an empty space under those apartments; but of late this also has vanished. Professor Thiersch has of late used, instead of carbolic acid, salicylic acid as an external dressing; but he still employs carbolic acid for the spray and lotion. Salicylic acid, as he uses it, certainly works very well; but that his increasingly satisfactory results are due to any special virtues of that agent, cannot be maintained.†

From Leipzig I passed to Halle, where I found Professor Volkmann carrying out antiseptic treatment just in the same way as we do here. He gave an antiseptic demonstration, to which he invited professors from various parts of Germany; and he certainly showed us a magnificent set of cases. It was, I confess, somewhat gratifying to me, that Professor Volkmann had obtained his results without any of his assistants having visited Edinburgh. Seeing the importance of the subject, he had worked in good earnest at the system, in accordance with what he had read of my writings. He told me he had only gradually got into the way of carrying out the system properly; but I had the satisfaction of seeing everything done exactly as we do here, and with results of the most brilliant kind. That hospital was previously an extremely unhealthy one. The wards are small and overcrowded; each one has a water-closet opening into it, and a large drain of the city runs under the wards. Indeed, the building is so confessedly bad, that it has been condemned to demolition. Pyæmia used to be exceedingly common there; but, since the introduction of

* Since the delivery of this address, I have received from Professor Nussbaum a pamphlet entitled *Die Chirurgische Klinik zu München im Jahr 1875. Ein Andenken für seine Schüler*. Published by Ferdinand Enke, Stuttgart. The subject of this work is the complete revolution brought about in the salubrity of the hospital by antiseptic treatment, and the means by which this result has been attained. One passage from the first chapter seems to me to demand reproduction here. After describing the previous frightful state of unhealthiness, he says: "Every thing that we had tried against the above-mentioned horrors had proved unsuccessful. The open treatment, the occlusion dressing, the continuous water-bath, irrigation with chlorine water or with carbolic acid solutions, salicylic acid in powder and in solution, the putting on of Lister's antiseptic materials—carbolic paste, etc.—all, all were unable to combat hospital gangrene and pyæmia. But when in the course of a single week, with great energy and industry, we applied to all our patients the newest antiseptic method, now in many respects improved by Lister, and did all operations according to his directions, we experienced one surprise after another. Everything went well; not a single other case of hospital gangrene occurred. Pyæmia and erysipelas were observed a few times at the very beginning; but only, as the result proved, because we did not yet possess the necessary practice in the carrying out of Lister's directions. We took pains, as you know, and learned from day to day more exactly how to comply with his instructions. Our results became better and better, the time of healing shorter, and pyæmia and erysipelas completely disappeared." (*Op. cit.*, page 6.)

† The true explanation of the improved results is given by Professor Thiersch himself in the following passage in a work which he has recently published on this subject—a statement characterised by the usual perfect candour of the distinguished writer: "Our results have constantly improved in proportion to the perfecting of the method and our own practice in carrying out its details. They are, indeed, not so good as those of Lister himself, or of Volkmann, etc." (see *Klinische Ergebnisse der Lister'schen Wundbehandlung*, etc., one of the *Klinische Vorträge* edited by Volkmann; Leipzig, 1875, page 645). To the same cause, I have little doubt, is to be attributed the fact that erysipelas was considerably less ("bedeutend geringer", *op. cit.*, p. 676) in the year 1874 than in the previous year. Professor Thiersch himself believes that erysipelas is not influenced by antiseptic treatment; but this view is entirely opposed to the experience of Saxtorph and Nussbaum already mentioned in the text, and to that of others to be alluded to in the sequel.

* See the *Lancet*, January 8th, 1876.

antiseptic treatment, a change has taken place which I can best describe by a quotation from a paper by Professor Volkmann himself.

"I had hoped to have been able to publish before now the communication which I made on the antiseptic treatment and Lister's mode of dressing, on the occasion of the third Congress der deutschen Gesellschaft für Chirurgie; but as this has, unfortunately, not been the case, I may, perhaps, be allowed to mention here a few facts for the purpose of showing how greatly the danger of some forms of injury, which were formerly followed by a very high rate of mortality, is diminished by this procedure.

"Since the introduction of the antiseptic method into my *clinique*, now exactly two years ago (at the end of November 1872), no single patient suffering from a compound fracture, in which conservative treatment was attempted, has died. Amongst this number are included even those cases in which conservative treatment was only resorted to because the patients would not give their consent to amputation, and also those in which we at first underestimated the severity of the injury, and afterwards intermediate or secondary amputation had to be undertaken on account of hæmorrhage or gangrene. The number of compound fractures successfully treated without a single fatal result in our hospital, which is old and always overcrowded, and offers the most unhealthy hygienic conditions, amounts at present to thirty-one. Amongst these were as many as nineteen compound fractures of the leg, in several instances much comminuted, and often complicated with most severe bruising and laceration of soft parts. There were also two compound comminuted fractures of the patella, both of which recovered with movable joints. No case of pyæmia has occurred for a year and a half—i. e., since July 1873—although during this period alone about sixty major amputations have taken place." (See Professor Volkmann on Antiseptic Osteotomy, translation in the *Edinburgh Medical Journal*, March 1875.)

I also learn that hospital gangrene is now entirely unknown in that hospital. Erysipelas likewise is extremely rare; and, where it does appear, it is of a superficial and mild type: and Professor Volkmann told me that his experience of the effects of antiseptic treatment in diminishing the amount and severity of that disease was so striking, that he entirely differed from the opinion of Professor Thiersch on this matter.*

Amongst the cases brought before us in Professor Volkmann's demonstration was one of excision of the hip-joint, where putrid sinuses had existed before the operation. About a week had passed since the operative procedure, but there was no purulent discharge whatever; and no fluid even of a serous character could be pressed out from the small spot that alone remained unhealed, and the use of a drainage-tube had been already given up. In short, the case had followed the typical course we expect under antiseptic treatment when we operate with an unbroken skin. This is a kind of result I myself had never yet obtained, and it filled me with astonishment. I inquired how it had been arrived at, and I found it was as follows. Professor Volkmann several years ago strongly advocated the application to diseased soft parts of "the sharp spoon" which had been introduced into German surgery by Bruns of Tübingen for scraping carious bone. Thus, supposing a strumous abscess to be opened, instead of leaving the degenerated textures around to come away by a tedious process of suppuration, or to be removed by slow absorption, he scraped it all out at once with the sharp spoon, and thus greatly accelerated the recovery. Being thus accustomed to the use of this instrument, he applied it to clear out the pyogenic membrane of putrid abscesses and sinuses, and all granulations around the diseased bones after excision. For my part, I have always, after operating upon such a case, treated the cut surfaces with solution of chloride of zinc, and injected the sinuses with the same, in the faint hope of exterminating existing putrefaction; but I have practically never succeeded. The failure was always readily intelligible to me, on the ground that I could never get the antiseptic to penetrate all the recesses of the sinuses and the lymph or sloughs lying among the granulations. But here Professor Volkmann had cleared out the offending substances altogether, and then introduced an antiseptic lotion; and he told me, to my amazement, that it was the rule with him to attain results of the character I then witnessed. If my journey on the Continent had been one of unmixed labour, I should have thought that labour well rewarded by this circumstance in my visit to Halle. I have already put this plan in operation in my own practice since my return, and I hope to show you some of the results to-morrow, at a demonstration in the operating-theatre of the Royal Infirmary. Whether I can obtain such frequent success as Professor Volkmann, I do not know; but I have already succeeded in some cases.

In Berlin, Professor Bardeleben, with one hundred beds under his care at the Charité Hospital, has long introduced the antiseptic system. The hospital used to be a very unhealthy one. Pyæmia was so fre-

quent, that amputation in the lower limb was almost certain death to the patient; but, through antiseptic treatment, this has for a long time past been entirely changed. Professor Bardeleben informed me, at the time of the meeting of this Association in London, that pyæmia was practically abolished from the wards, without any other change than the introduction of antiseptic treatment; and I found that this same satisfactory condition of things continued at the time of my visit this year. Erysipelas was also rare, and of a mild type; and hospital gangrene very uncommon. At the same time, I feel bound to express my conviction that Professor Bardeleben would get still better results had he not been led, on the score of economy, to substitute for our antiseptic gauze unprepared gauze soaked with a watery solution of carbolic acid; for here, the carbolic acid being dissolved in a liquid, instead of being stored up in an insoluble medium, the antiseptic and its vehicle are both displaced together by the discharge which soaks into the dressing, and this involves great additional risk. In fact, Professor Bardeleben told me that for very special cases he still used our antiseptic gauze.

In the other great clinical hospital of Berlin, the renowned and veteran surgeon Von Langenbeck had not until the present year seen his way to adopting antiseptic treatment. He had professed admiration of various results he had heard of; but, as Professor Bardeleben said, it had been barren admiration. But it was a singular coincidence, and one very gratifying to me, that, when I called upon him, I found him preparing to perform his first operation according to strict antiseptic principles. The case was one of tumour of the upper end of the fibula; and, considering the possibility of the wound communicating with the knee-joint, he felt himself bound to use antiseptic treatment. This he did with perfect faithfulness, in spite of the serious inconvenience of a most unnecessarily wetting spray; and, when the operation was concluded, he did me the honour to ask me to put on the dressing.

At Magdeburg, I found a great hospital, containing, on the average, one hundred surgical patients. This hospital used to be noted for its unhealthiness; but I learned that, since the introduction of antiseptic treatment, an entire change had come over it in this respect. Pyæmia has almost entirely disappeared, hospital gangrene has gone, and erysipelas, when it occurs, is of a very mild type.*

At Bonn, also, I heard similar testimony. I learned from Professor von Busch, who introduced antiseptic treatment into the clinical hospital last year, that some previously unhealthy wards had since quite changed their character; and that in some fine airy wards, which were always very free from hospital disease, the mode of healing of the wounds was something altogether different from what it used to be.

So much, then, gentlemen, for my continental experience. And now I wish to say a few words as regards the Infirmary here, where I have now been at work for about six years. And, first, as to the conditions under which I am working. The wards, as some of you have seen, are small and overcrowded. These wards were never so severely tested as they have been since I came here. There used to be, in the old High School building, two reserved wards kept ready for the reception of erysipelas or other peculiar case; but, at the time when I was appointed, twenty beds were taken off from the clinical surgical department for the purpose of creating a new surgery; and, at the same time, the two reserved wards previously kept empty were filled with patients. That particular block of building has, therefore, been more severely tried than ever it was before. The number of beds is so limited that there is always great pressure upon them. When I came to Edinburgh from Glasgow, seeing the beds so close, I had several of them cleared out; but the result was, I found, that the same number of patients were admitted; and there always being a considerable proportion who could walk about during the day, they were put down on mattresses on the floor at night, so that the number of patients remained as before; and, as the wards continued perfectly healthy, I had the beds reintroduced. But, more than this, I have still the mattresses on the floor. If you were to go into these wards sometimes at night, you would be surprised to see how many "shake-downs" there are. We have, also, often two or three children in one bed; and altogether by these means, while I have fifty-five beds, I have lately had seventy-one patients. During the time I have been here, there has hardly been a day on which there have been as few patients as beds,

* Dr. Hagedorn, the chief surgeon, was absent at the time of my visit; but in a letter, which, through accidental circumstances, I did not receive till after this address was delivered, he describes in full detail the change that antiseptic treatment has effected. From this letter I must content myself with quoting two short passages. "I have now been for twelve years chief surgeon to the hospital, and I had to do battle on a large scale with pyæmia and septicæmia, till in May 1872 I introduced your antiseptic method." "Since that time we have constantly practised it with excellent results, which, in truth, have been constantly improving; for at first the procedure does not always succeed, and every man must pay for his schooling (muss Lehrgeld geben). Now I have arrived at the conviction that your procedure is unconditionally secure, and that in every failure the surgeon himself is to blame, and not the method."

* See note at the foot of last page.

although any of you can see those beds are not as distant from each other as they ought to be, according to modern notions of what is requisite for the salubrity of an hospital.

Then there is another important respect in which my wards have been more severely tried than before. There had previously always been an annual cleaning of the wards of our infirmary. Now, this involves considerable inconvenience. The patients had to be transported to another part of the hospital, and some cases were liable to be injured by this transport. Therefore, when the annual cleaning came about, I used to consider whether the patients would get more harm from the want of the cleaning of the wards, or from the transportation. I thought they were more likely to get harm from the transport; and this being year after year my conviction, it is now three years since any cleaning took place in these wards of mine. The year 1872 was the last in which it was practised, except in the case of one individual ward where a sore throat prevailed last summer, which seemed to be of the nature of scarlatina, and on that account the ward was emptied and purified. I have sometimes observed remarks made with regard to the results of treatment in my wards, to the effect that I work under superior hygienic conditions. It is, in truth, exactly the opposite. My wards, in these respects, are more severely tried, I believe, than those of any other surgeon in the kingdom.

Then it is said that greater cleanliness is involved in the antiseptic treatment. This, again, is an entire mistake. If we take cleanliness in any other sense than antiseptic cleanliness, my patients have the dirtiest wounds and sores in the world. I often keep on the dressings for a week at a time, during which the discharges accumulate and undergo chemical alteration, probably from oxidation and the action of the resin of the gauze upon them; and, when the wounds are exposed after such an interval, the altered blood with its various shades of colour conveys often both to the eye and to the nose an idea of anything rather than cleanliness. *Æsthetically* they are dirty, though surgically clean.

There is yet another way in which my wards have been unusually tried—namely that I now perform operations which, without antiseptic means, I should not have considered justifiable, some of them being of a character which used to involve especially the risk of pyæmia, such as cutting down on ununited fractures of the femur, and removal of the ends of the fragments.

Yet, in these circumstances, if I have had one case of pyæmia where I have operated myself, it is the only one I know of; and that was a spurious form of the disease. It occurred in a patient from whom I had removed the mamma, and, at the same time, cleared out all the axillary glands; and putrefaction took place in the axilla, in consequence, as we had reason to believe, of mismanagement of the spray. Of hospital gangrene we have not had one single case during these six years. As regards erysipelas, our experience has been various. As a rule, it is very rare in many wards. I have been two entire years without a single case of it; but, on the other hand, there was a time when it was frequent. This was during a concurrent epidemic of small-pox and erysipelas in Edinburgh two years ago. The erysipelas was of a very virulent type, and some patients in private practice in the city died of erysipelas affecting the puncture of revaccination. At this time, we had several cases of erysipelas admitted into my wards from the town, and several, also, took origin within the hospital. But the constitutional rather than the local cause of these cases was shown in several instances by the disease occurring not in or near the wound, but at some remote part, as in the head after an operation upon the penis. And it was somewhat remarkable that in no case did the disease as it originated in the hospital assume the malignant form which it sometimes exhibited in private practice.

Tætaus also appears to be rendered much less frequent by antiseptic treatment. Far be it from me to say that putrefaction is the only cause of it; we all know it is otherwise; but when I say that, in six years, with an average of sixty severe surgical cases, I have only had two cases of the disease, and those both of them in connection with septic wounds, I show strong grounds for believing that, if we exclude putrefaction, we exclude one—and the most common—exciting cause of tetanus.

One objection that has been urged against my treatment is the inordinate length of time patients remain in hospital. No doubt it is so in some cases; but, as a rule, these are instances in which we expect to cure otherwise incurable cases, such as spinal abscess. But, on the other hand, on comparing Mr. Syme's case-books with my own, during two periods of three years, the unexpected result has lately been arrived at that, in proportion to my number of beds, I have had a larger number of operations than Mr. Syme; showing that, while some patients, kept alive by antiseptic treatment, have remained long in the hospital, this was more than counterbalanced by the rapid cure of others.

I trust, gentlemen, that the facts which I have now had the honour

to bring before you will be considered pretty strong proof of the value of strict antiseptic treatment in promoting the general salubrity of surgical hospitals.

FURTHER OBSERVATIONS ON HARE-LIP AND CLEFT PALATE.

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IN THE BRITISH MEDICAL JOURNAL of March 28th and April 4th, 1874, I ventured to write on these topics, under the impression that, in regard to both, I had something new, and therefore original to state. On hare-lip I trod on ground which to many might seem so trifling and so exhausted that I could scarcely expect attention to what I stated, excepting from those who might have special interest in such cases; or who might, like myself, have devoted more than forty years of careful study to matters in surgery and abnormal development, which, in the estimation of many, have been considered of minor importance.

Within these two years, my experience on such malformations and their treatment has been considerably increased; and, at the risk of being considered prolix, I venture to give the results of that experience in the hope of making additions to our knowledge in this department of professional study.

At this date in surgery, it is not easy to imagine how any novelty in regard to hare-lip could be announced. In the paper above alluded to, I described a practice in the operation which I thought likely to be advantageous in certain examples. In some cases of single fissure, I had learnt from experience that failure of the usual operation was induced by the projection of the intermaxillary bone on that side, and I had long been in the habit of removing such projection previously to bringing the edges of the gap into approximation. This removal was readily accomplished, in the majority of cases, by the scalpel or scissors. Preferring, as I do, to perform the operation in the early months of infancy, the tissues are then so soft that they can be readily cut by these instruments. At an older date, the cutting forceps was sometimes applied to divide the narrow part of the intermaxillary bone where connected with the vomer. For many years in early life, a scalpel can readily be passed between the intermaxillary bones in the mesial line; and it was my custom in many instances to so use the blade as to effect the separation. But even here, in the course of time, I learnt to apply conservative surgery; and, instead of taking away bone, tooth, and mucous membrane, I so managed by cutting and raising the mucous membrane that I could cut away tooth and bone, and leave the membrane as a soft cushion and a more complete covering to the side not interfered with. The object here was to keep a natural surface of mucous membrane, instead of exposing a considerable portion of raw surface. Within these two years, I have frequently acted on these views, and have every reason to be well satisfied with the results. In some instances, I have been content with gouging out the tooth only; but in others, where the prominence has been of considerable bulk, I have clipped away the whole bone, leaving, however, the whole mucous membrane, and probably most of the periosteum. By such a plan, I feel confident that union of the gap in the lip has been rendered more certain. An objection, and seemingly important one, to this plan is, that it costs the milk incisor, and possibly the permanent one. I have long been convinced, however, from experience, that these teeth are rarely of much value. Occasionally, some good teeth are met with in the intermaxillary bone, but so rarely, that their preservation is of small consequence as compared to the result of a well designed and perfect operation. Whilst advocating the sacrifice of teeth, or even of an intermaxillary bone in single hare-lip, where the bone happens to project, I feel equal confidence in recommending free work with the two intermaxillaries when they happen to be very prominent in double hare-lip. In many instances of double hare-lip, as in single, the alveoli are not involved in the fissure; but usually there is the complication of cleft-palate, and the intermaxillary bones are left so isolated, being attached by a slender neck to the vomer, that in subsequent years their value is questionable, even when preserved in a satisfactory operation for the double gap. It does in some instances, even after years have passed, fill up a gap that might otherwise be in front of the mouth; but it has often appeared to me that it would have been better away, so as in due time to permit the closer approximation of the lateral portions of the jaws. Where, however, the intermaxillary bones do not project, so as to endanger the success of an operation on