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LORD LISTER

THE  
CANADIAN PRACTITIONER

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THE RIGHT HONORABLE LORD LISTER.

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NO man of the empire, no man in the world, has ever received a more cordial welcome from Canadians than Lord Lister. The members of the medical profession of this Dominion are especially enthusiastic over his visit to Canada. We recognize the fact that we have amongst us the greatest surgeon of this century—the greatest surgeon of all time. We all admire him for the great work he has done for the human race; we all love him for his kindly manner; we all respect him as a hero among men. Who can forget his face—full of dignity, full of strength, full of sweetness? Some think that a surgeon, who has handled the scalpel for many years, must become hardened and cold blooded. Lister is a noble, living evidence of the fact that such is not the case, that there is nothing in the practice of medicine and surgery that has any such effect on a good and broad-minded man. The whole world is paying homage to Lister for his greatness; and yet he, who has received the highest honors ever bestowed on any man of science, is one of the most modest and unpretentious men living.

## SHORT HISTORY OF LORD LISTER'S LIFE.

Lord Lister is a hale and hearty Englishman, seventy years of age. The portrait which appears in this issue is fairly good, but it doesn't show all of Lister. No picture can do that. Those who have had the pleasure and privilege of coming into close contact with him can well appreciate the force of this statement. He was born in Essex county, in 1827. As a youth he lived in a good atmosphere with his father, Joseph Jackson Lister, who was a Quaker, and at the same time a man endowed with a great love of science. He received the degree of B.A. from the University of London in 1847, and the degree of M.B. from the same university in 1852. During his student life he worked faithfully in the laboratories carrying out original investigations in physiology and pathology. He was also active in the hospital wards, and was one of the first house surgeons under the late Sir John Eric Erichsen.

After graduating he went to Edinburgh where he continued his researches in physiology and pathology, devoting most of his time to pathology. While in Edinburgh he became closely associated with the late Professor Syme. In a paper by Dr. Stewart, of Halifax, published in this issue, we learn something about the great importance of Lister's researches for several years in pathology. His results were published in the Transactions of the Royal Society for 1858. He was appointed Regius Professor of Surgery in the University of Glasgow in 1860, and did much of his earlier work in connection with antiseptic surgery in the Royal Infirmary of that city. His work in Glasgow and Edinburgh made him famous, and in the latter part of 1876 he was induced to go to London to take a position on the staff of King's College Hospital. He entered on his duties there with the distinct understanding that he was to have complete seclusion of his own wards, with a house surgeon, and nurses completely under his control.

At this important time in his career he encountered considerable opposition. Many of the surgeons of London endeavored to belittle his results so far as they were published. Many of those who criticized his methods had no clear conception of the principles underlying his system of treatment. The spray was unduly exalted to such an extent that its use was considered by many to be Listerism, while it was, in reality, only one, and that the least important feature of his treatment. At the same time many of the continental surgeons, especially those of Germany, understood Lister and his methods better than the majority of his conferees in Great Britain. Some prominent surgeons went so far as to state that he suppressed statis-

tics because "he had none that he would not be ashamed to produce." The following is an example of some of the unpleasant things insinuated: "The publication of isolated cases, however good, proves nothing, whereas the withholding of the whole suggests much." These were the words of Mr. Bryant, of London, and were endorsed by Mr. Savory (afterwards Sir William Savory) who quoted them with approbation in his address on surgery, British Medical Association, meeting at Cork in August, 1878.

While referring to such adverse criticisms, we will quote the following as an example of a very friendly opinion concerning Lister and his methods, from the address of Mr. John Wood, F.R.S., during the discussion of Sir William MacCormac's paper on antiseptic surgery before the South London Division of the Metropolitan Counties Branch of the British Medical Association, December, 1879: "While thus defining the limits of my agreement with my esteemed colleague, Professor Lister, I must take this opportunity of congratulating him sincerely upon the possession of those advantages which have made him so powerful an advocate of antiseptic surgery, and will give him so high a niche in the temple of fame; upon the professional position, which has given him the authority; upon the gifts of fortune which gave him the means; upon the gifts of nature, which gave him, in happy combination,

The patient thought, the steadfast will,  
Resolve and foresight, strength and skill,

which he has laid upon the altar of suffering humanity." \*

Lister continued to work with earnestness and zeal, and gradually, but surely, gained ground until he finally triumphed to such an extent that he practically overcame all opposition. His uniform kindness, and courtesy towards his opponents, did much to secure this happy condition of things. He was able to simplify his appliances in a few years, especially when, in 1885 or 1886, he decided to disregard the influence of atmospheric dust on open wounds, and discarded his spray apparatus. His improvements in these respects did much to popularize his methods in various parts of the world.

#### LORD LISTER IN PROFESSIONAL AND PRIVATE LIFE.

Lord Lister is one of our best specimens of the modern, cultured scientific surgeon. Since boyhood he has been diligently searching after truth, and helping others in the same direction. Thoughtful physicians and surgeons, obstetricians, general practitioners, and specialists in all civilized countries have learned something—generally much—from this great and good man. Never in the history of the

\*MacCormac, *Antiseptic Surgery*, page 77.

world has any one man taught so much, and done so much to ennoble our profession. He it was, or such as he, that went to Drumtochty, and performed the operation which saved the life of Tammas Mitchell's wife. It is rather pleasant to have a picture in one's mind of Lister and MacLure driving together through the flood, in Drumsheugh's dog cart, to see Annie Mitchell, "whose life was slowly ebbing away." It is easy to imagine how Lister would tear into fragments poor kindly MacLure's cheque, and how he would hold out his hand as the train was starting, and say: "give us another shake of your hand MacLure; I am proud to have met you; you are an honor to our profession. Mind the antiseptic dressings."

Many are the honors that have been literally heaped upon Lister at home and abroad. Great was the delight of the medical world when he was elevated to the Peerage on account of the great services he has rendered mankind by his practical researches, and his clinical work in aseptic and antiseptic surgery. Great was our regret when we understood he was to relinquish the name Lister—the name we had learned to love so well—and become Lord Kinnear. Great was our pleasure when we discovered our mistake, and found that we were not in any sense to lose our Lister, whom we now know as the Right Honorable, the Lord Lister. Many are the ovations he has received outside of Great Britain. One of the most memorable was that which he received at the great International Medical Congress in Berlin, August, 1890. There were seven thousand persons in the Circus Renz at the opening ceremony. When Professor Virchow, attended by a brilliant company of ministers, and other distinguished men, ascended the tribune, applause burst forth again and again as various celebrities came into view; but it was Lister who was met with the most prolonged applause. Again at the first general meeting, when he stood up to deliver his address on Antiseptic Surgery, he was greeted with applause so long continued that he had to wait some time before he could make himself heard.

#### LORD LISTER IN TORONTO.

Lord Lister's first appearance in public in Toronto was at the civic reception to the British Association for the Advancement of Science in the pavilion in the Horticultural Gardens, August 18. In reply to an address of welcome, delivered by His Worship, Mayor Shaw, he, as the retiring president of the association, spoke as follows:

Your Excellency, Mr. Mayor, My Lords, Ladies, and Gentlemen,—As almost the last act of my presidency of the British Asso-

ciation, it falls to my lot to say a few words on the present occasion. I have, in the first place, to thank your Excellency for your kind words of welcome on behalf of the entire Dominion, and I thank you, Mr. Mayor, for your exceedingly kind words in the same sense. Our visit to Canada hitherto has been one of surpassing interest. All of us must have been astonished at the evidence which greeted us on every hand of your wonderful progress in material and intellectual prosperity, but I may say, perhaps, without being invidious, that if I compare what things were when I visited Canada last, twenty-one years ago, with what they are now, there is nothing that has surprised me more than the change in this noble city—whether I consider the vast extent of the city, the greatness and nobleness of your buildings, your splendid installation of electric cars, or, not least, the exquisite taste of your new university buildings and the beauty of the scenery in which they are located. I think that the University of Toronto is to be congratulated on having such a magnificent site, which has been so beautifully cultivated. I cannot fail to say a few words as to the joy that this reception gives me, as an indication of the increasingly tight bonds that unite the Dominion of Canada with the Mother Country. The ringing cheers that greeted your allusions more than once to this subject were enough to do good to the hearts of every Briton. I need not say more than that wherever we have gone hitherto we have met with the most generous kindness, and we feel that we have indications that nowhere is that kindness greater than in this city of your own. On behalf of the British Association, therefore, we tender to Canada as a Dominion, and to the civic authorities of Toronto, our best thanks for all that they are doing for us.—*The Toronto Mail and Empire.*

#### BANQUET AT THE TORONTO CLUB.

On the evening of August 21, he was entertained at dinner in a quiet way at the Toronto Club, by members of the club and a few of their friends, who wished to do honor to Lord Lister. Only members of the medical profession were present. The number was necessarily small on account of the limited capacity of the club dining room, and the committee decided to make it private or semi-private, because its members did not wish to interfere in any way with the large banquet which had been tendered to Lord Lister, Lord Kelvin, Sir John Evans, and other members of the British Science Association. Dr. J. Algernon Temple presided, and, after the toast to Her Majesty had been duly honored, proposed, in graceful terms, the health of the distinguished guest.

Lord Lister, in response, thanked those present for thus honoring him ; and referred to the great advances which had been made in Canada in scientific medicine, and said the work which was being done would compare favorably with what he had seen in Great Britain. He was at first inclined to be surprised at this fact ; but, when he thought of the men he had met in the old land, he considered there was not after all any occasion for surprise. He then spoke of his pleasant relationships with many Canadians, including his old friend Dr. Thorburn, and his house surgeons, Dr. Malloch, of Hamilton, Dr. Grasett, of Toronto, and others. Short and appropriate speeches were also delivered by Dr. Thorburn, of Toronto; Dr. Henry Barnes, of Carlisle, Eng., retiring president of the British Medical Association ; Dr. Roddick, of Montreal, president of the British Medical Association ; Sir William Turner, of Edinburgh (a grand man—we in Toronto think) ; Dr. Reeve, of Toronto ; Dr. Sheard, of Toronto ; Dr. Minot, of Boston ; Dr. Osler, of Baltimore ; Dr. Geikie, of Toronto. This exceedingly pleasant gathering will be long remembered by those present, whose names will be found in the diagram which appears on page 631.

#### UNIVERSITY OF TORONTO.

At a special convocation of the University of Toronto honorary degrees were conferred on a number of distinguished men. After the degree of LL.D. had been conferred upon Lord Lister he spoke as follows :

I assure you that I feel nowadays that the praise given to me is far beyond deserts, and never has it been better shown than by, if I may so speak of it, the exaggerated remarks by the president of the University. There is no doubt it has been to me an unspeakable joy to be able to minister in some degree to the benefit of humanity, but I cannot consider myself worthy, as it were, to unloose the tie of the shoe of men like Lord Kelvin. Nevertheless, scientific investigation, such as I have been engaged in the greater part of my life, has to me always been an unmixed joy, and when, as it happens to have been in my case, it is given to me to see the results of that work for the good of humanity, I can heartily say that the joy has been increased a thousand fold. I agree most fully with what Lord Kelvin has said, that science such as a University ought to teach should not be confined to the abstract knowledge alone, but should extend to the practical observation and demonstration. I feel that I have nothing to add to what Lord Kelvin has said in admiration of the wonderful progress of your University. I



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Edinburgh

F. LEM. CRASSETT

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R. D. Rudolf	F. Warrington	H. A. Parsons	A. Baines
W. H. B. Aikens			A.A. Macdonald

have already, on former occasions, expressed my admiration of your buildings, and if I have one word more to add to what has been said by Lord Kelvin it is that it has given me very great satisfaction to learn that your University pitches the standard of medical degrees high, and that it refuses to acknowledge those which are not of thoroughly sound standard. I trust the day may come when, as it is now with Great Britain, so it may be with Canada, your degree will confer a license to practise over the whole of Canada, and the license to practise anywhere in Canada will be accepted by you. Nevertheless, I feel that under the present state of things that can probably not be the case. When I was young, a man who was educated in medicine in Scotland and held the best Scotch degree of M.D., was not allowed to practise on that qualification south of the Tweed. That certainly was a gross injustice, because the Scotch qualification ranked higher than many of the English did. That has long since been removed, and, I trust, will be in due time done away with here, but only when through the length and breadth of Canada all the medical schools shall have attained to the same high degree of proficiency as that of the University of Toronto.—*Toronto Globe.*

#### UNIVERSITY OF TRINITY COLLEGE.

At a special convocation of the University of Trinity College, August 24, the honorary degree of LL.D. was conferred on Lord Lister, after which he expressed his thanks for the honor done him. Referring to the remarks of previous speakers on the English character of Canada and its people, he thought, if he made a comparison at all, that he would rather say that this country was an improvement on British soil. Its inhabitants were a stalwart and hospitable race, and he was certain that the climate was a great deal better than that of the old country. He was pleased at the prosperity of the University, and especially pleased at that of the medical school. He had been over two of the hospitals, and he might say that he had received no greater pleasure during his visit here than in remarking the evidences of their efficiency. He asked to be excused if through ignorance he should seem to presume, but to a stranger it was a remarkable thing that there should be two great Universities in the same city. He could not see why the two great bodies should not be blended into one stronger body.

During the speech Lord Lister referred to the fact that he had had the opportunity of inspecting the Toronto General Hospital, and spoke in the highest terms of praise of its efficiency and excellence of management.—*Toronto Mail and Empire.*

## BANQUET IN THE HORTICULTURAL GARDENS.

At the banquet in the Horticultural Gardens, Toronto, to guests of the British Science Association, His Excellency, Lord Aberdeen, presiding, Lord Lister said: "Your Excellency, I have, in the first place, to thank you for the generous terms in which you have referred to my work, and this great company for the equally generous manner in which they have received your observations. I have also to express my deep sense of gratitude for the privilege of being a guest at this splendid banquet. But, turning from these considerations, I would express my very great satisfaction at beholding this splendid spectacle which is before me. In the first place, it seems to me that as the giving of a banquet to members of the British Association is not a common feature of the Association's meeting, this banquet must be taken as the cream of the generous hospitality which Toronto has afforded to us. In the second place, it is an indication of the great interest which Toronto takes in scientific progress; and in the third place, it is a most striking example—when we, for the most part English, Scotch, and Irish members of the British Association, are accorded this splendid reception by you—it is a glorious instance and illustration of the kindly feeling which Canada entertains towards the Mother Country. And lastly, I would refer to the very beautiful spectacle which the galleries present. At the Liverpool meeting we had many of the fair sex in the galleries, but we certainly had not such a galaxy as I see before me this evening. We must take this, too, as another indication of the sympathy which Toronto feels for science and for Britain."

## OTHER ECHOES FROM TORONTO.

Lord Lister was a busy man while in Toronto on account of his official connection with the British Science Association, but he found time to look around the city to some extent. Accompanied by Dr. Grasett he went through the Toronto General Hospital and the Hospital for Sick Children, and expressed himself as well pleased with what he saw in both of these institutions. A large number of physicians of Toronto and other parts of Ontario were presented to him, and all were charmed with his kindly manner and unvarying courtesy.

But the interest in Lord Lister was not confined to the members of the medical profession. Faith Fenton, of the Toronto *Mail and Empire*, who watched the proceedings of the meeting of the British Association, and made many comments thereon, wrote as follows:

“It is a pretty way they have of saying farewell ; gathering together for an hour, as they did yesterday afternoon, to utter the formal thanks and good-byes. And it was equally a courteous way, and an evidence of the fine English breeding of our guests, that the most famous among them was careful to be present.

“To the little upper room came Lord Kelvin, Lord Lister, Sir John Evans, Sir William Turner, Sir George Robertson, and all the men of magnificent minds, whose faces have grown so familiar to us during the past week. They were not too weary nor yet too impatient to say ‘Thank you’ and ‘Good-bye,’ and to say them graciously, and simply as a child.

“We listened and looked at each one of them in turn ; but our gaze lingered longest and last on the dearest old face of all, a face whose loveableness we shall always remember—that of Lord Lister.”

Speaking for Toronto, we have to say, with deep regret, that Lord Lister has gone. He left our city August 27, with a distinguished party, on a trip to the Georgian Bay, Algonquin Park, Ottawa, and Montreal. We may never see him here again, but many of us will hope to see him in the motherland. May God bless him and spare him for many years of health, happiness, and usefulness !

#### LORD LISTER IN MONTREAL.

Lord Lister’s reception in Montreal was quite as cordial and enthusiastic as in Toronto.

On Tuesday evening, August 30, the Montreal Medico-Chirurgical Society entertained him at dinner. The chair was taken by the President, Dr. G. W. Wilkins, who, after giving the toast of the Queen, proposed the health of the Governor-General. Lord Aberdeen, in responding, expressed the pleasure which it gave him to share in the compliment paid by the Society to Lord Lister, who had so well earned the honor conferred upon him by the Queen. Dr. Wilkins also gave the toast of Lord Lister, and presented to him an illuminated address signed by the officers in the name of the Society. The address was as follows :

MY LORD.—The members of the Montreal Medico-Chirurgical Society rejoice in the opportunity afforded them of congratulating your lordship on having been selected by the best Sovereign that ever graced a throne for the high distinction of the Peerage. No one in the medical profession was more worthy. Through a long period of years you have, through methods, well nigh perfect, sought after truth with an intelligence and discernment given to few, with a patience and assiduity, and, above all, with a truthfulness and

modesty that cannot but exert a salutary influence on all searchers for scientific truth, and with a success unsurpassed in the history of modern medicine. These purely scientific researches of your earlier years were the foundation on which at a later period you built the magnificent structure of antiseptis which placed you on the scroll of fame with Harvey, Hunter, Jenner, Simpson, and Pasteur. In advancing scientific and practical surgery you have advanced every branch of the healing art, and by investigations which have led you to the detection of the causes of disease you have brought us to a knowledge of the hindrances to the healing process. Henceforth, present and future generations may point to your lordship with pride as the man who has brought relief from suffering in every quarter of the globe. May your years be many, and may they be filled to repletion with the happiness which is born of having done nobly and well.

Lord Lister replied in a short but sympathetic speech, thanking the society for the honor done him. He appreciated it as one of the highest which could be paid to him, coming as it did from members of his own profession.—*British Medical Journal*.

#### DR. RODDICK ON LORD LISTER.

Dr. Roddick, in his presidential address, referred to Lord Lister as follows :

But we are further honored by the presence among us to-day of the most illustrious surgeon of our generation, Lord Lister, who stands for the rise and zenith of modern surgery. It has been well and truly said that as long as surgery is scientifically discussed Lord Lister's name cannot fail to be mentioned. We have only to compare the surgery of the time before 1873 with the surgery as practised to-day to appreciate all that he has done for the science. Can it for a moment be questioned that Lord Lister has made operative proceedings possible which only twenty-five years ago would have been considered criminal? Undoubtedly, the most powerful agency in the development of surgery in this century has been the introduction of the antiseptic and aseptic methods of wound treatment, which he initiated. It is due to his efforts that surgical wards have been freed from pyæmia, and the mortality of lying-in hospitals reduced to the limits of normal parturition. For the past twenty years honors many and great have been showered upon him. Oxford, Cambridge, Edinburgh, Glasgow, Dublin, Toronto, and now McGill, have vied with one another in hastening to do him homage. Our Sovereign in conferring upon him the richly deserved distinction

which he bears with such gracious dignity only gives expression to the general feeling of his countrymen throughout the Empire and his admirers the world over. We are glad, I say, to have him with us to-day; his presence is an intellectual stimulus and an energizing force in our deliberations.—*British Medical Journal*.

LORD LISTER IN WINDSOR HALL.

After the President finished his address Lord Lister arose to propose a vote of thanks, and received another of those grand ovations which have become so common in his marvellous career. The whole vast audience arose, and cheered in true British fashion, at the same time waving their pocket handkerchiefs. The members of the fair sex showed, if possible, more excitement and enthusiasm than those of the sterner sex. Faith Fenton, of Toronto, evidently has many rivals in Montreal.

When he was allowed to speak he said he could testify from personal experience to the value of one of the health resorts to which Dr. Roddick had referred, having just returned from the Muskoka region. He had never seen a more lovely country, and he could not conceive of a more healthy district. One felt some doubts whether special health resorts were necessary for Canada, for the whole population struck him as being remarkably healthy as compared with that of the mother country. Dr. Roddick had also spoken of the medical schools and it was very pleasing to hear of the progress Canada was making in the character of her medical education. He had had some opportunity of seeing both the hospitals and educational institutions in Canada, and from what he had seen he could quite bear out all that Dr. Roddick had said.

There was another matter which helped to confirm him in this opinion. When he used to teach surgery long ago, a considerable number of his students were from Canada. These students from Canada studying in England and Scotland had become more and more rare, implying not that the young men of Canada undervalued a good education, or would not go far to get it, but that they had at home what they required. With regard to medical legislation, Dr. Roddick had touched upon a subject which seemed to Lord Lister one of extreme difficulty. Dr. Roddick had spoken of a central examining board. The great objection to such a central examining board was that the examinations must be conducted more or less by men who are ignorant of the courses of the individual students in the various schools. His own impression was that the system which prevailed in England would be a better one, namely, that there

should be a central body corresponding to the English General Medical Council which should appoint visitors to the various bodies entrusted with the power of giving licenses—and that these visitors should report to the General Council. If any of the institutions were found after warning to be distinctly behind what was required, the Medical Council would report to the Privy Council, and the Privy Council would deprive this recalcitrant body of the power of granting licenses, or at least suspend it. In his opinion, this would be a more simple manner of attaining the object, and at the same time would not interfere with what seemed to him a matter of vital importance, namely, that the students should be encouraged in their career and have justice done to them in their examinations by knowing that their teachers would take some share in those examinations. He felt that it would be ungracious not to express his thanks to Dr. Roddick for the exceedingly generous terms of the reference to himself in the presidential address, and for the equally generous response that the reference met with in this great Assembly. As there was no other speaker to follow him except the seconder of the resolution, who would be a Canadian, he wished to express the gratitude of the British Medical Association for the cordial welcome extended to them by the entire Dominion of Canada through His Excellency the Governor-General; from the Province of Quebec through the Lieutenant-Governor; and from the City of Montreal through the Mayor. It was no surprise to him, for he had just been attending the meeting of the British Association in Toronto, and this was merely a repetition of that magnificent hospitality. There was, however, one thing which was new and which had pleased him exceedingly. He had read of the loyalty of the French-Canadians to the British Crown, of their fellow-feeling with their fellow-subjects of British origin, but it had given him the greatest gratification to hear those sentiments from the lips of a French-Canadian, and expressed so nobly, and in such splendid language as that to which Sir Adolphe Chapleau had given utterance.—*Brit. Med. Journal.*

PROFESSOR CHARLES RICHEL AT LAVAL UNIVERSITY.

Professor Richet, delegate of the French Government and of the Faculty of Medicine of Paris, delivered an admirable address on "The Work of Pasteur," Tuesday evening, August 31st, in which he made the following allusion to the application of microbial theories to surgery:

There was a time when erysipelas, purulent infection, and hospital gangrene decimated those upon whom operations had been

performed, when puerperal infection claimed a terrible number of victims. It seems to us nowadays that the medical profession before 1868 were blindfolded, and that their blindness was almost criminal. These are now no more than historic memories. A sad history, doubtless, but one which we must look at coolly in order to understand what science can do for medicine. Left to their own resources, practitioners of medicine during long centuries could do nothing against erysipelas, against purulent infection, against puerperal infection, but, basing itself upon science, surgery has been able to triumph over these odious diseases and to relegate them to the past.

Let me here introduce a reminiscence. When, on the occasion of his jubilee, a great celebration was prepared for Pasteur in the Sorbonne, in the presence of the leading men of science of the world, there was a moment when all hearts were softened—the moment when the great surgeon who was the first to perceive how to apply to the practice of his art the theory of pathogenic parasites, when Lord Lister drew near to Pasteur and gave him a fraternal embrace. These two great benefactors of humanity, united in their common work, afforded a spectacle never to be forgotten, a striking reconciliation of medicine with science.—*British Medical Journal*.

#### LORD LISTER AND M'GILL UNIVERSITY.

After the honorary degree of LL.D. had been conferred on Lord Lister, he said he had to express his profound sense of gratitude to them for conferring upon him the degree in that the greatest University in the great Dominion of Canada. Before the meeting of the British Association, he, in common with many other members of the Association, was a partaker of their splendid hospitality and had the opportunity of inspecting their magnificent new University buildings, and their splendid equipment, which was due in no small measure to the Chancellor and other munificent donors and citizens of Montreal. He was astonished at the splendor of their new buildings and their equipments. He had seen their Laboratories; for example, the Physical Laboratory, the Mechanical Laboratory, and others, and they were second to none in the world. Having visited Canada twenty-one years ago, to see the immense change which had come over Montreal as a whole, and above all, their University, filled him with amazement and admiration. His words he knew ought to be very few, and he would only venture to add that it seemed to him to remain now for their teachers and their students to avail themselves to the full of their splendid opportunities, so that



practical instruction and research in the various departments of science might be carried on in a manner which their noble institution seemed fitted to ensure.—*British Medical Journal*.

#### LORD LISTER AND THE NURSES' HOME.

The foundation stone of the Nurses' Home to be erected in connection with the Montreal General Hospital was laid by Lord Lister, Sept. 2nd. After he had performed the function he spoke of the interest with which he had listened to the president's remarks concerning the intimate relations that had existed between the General Hospital and the Medical School. Some people, he said, imagined that a hospital should be simply for the curing of disease, and that the teaching element was of small importance. There could not be a greater mistake, not only because the teaching practically of medicine was of vital importance, but because in direct proportion to the eminence and efficiency of a hospital school was the efficiency of the hospital. Where a hospital existed unconnected with a medical school, the tendency too often was that the medical officers, unstimulated by public criticism were apt to lapse into a condition of careless indifference, in spite of their success and of the importance of their noble calling. Where a great medical school was associated with a hospital there was perpetually upon those working in it the eye of public criticism, and the stimulus of emulation. He had the pleasure on the previous day of going through the hospital. Some parts of the old portions, no doubt, had lower ceilings than would be thought suitable at the present day; but what was wanted was not so much a very lofty ceiling as ample space between the beds. There might be an atmosphere extending to the sky, but if the beds were put close together, there would be insalubrity. In those wards of the hospital which had the lowest ceilings, the arrangement of the beds was such that there had been ensured ample provision of cubic space for the patients. He had been told that, excellent as the hospital was and had shown itself in the treatment of disease, there was not satisfactory accommodation for the nursing staff. Undoubtedly, it was of the utmost importance that there should be such accommodation as that home would provide. He touched on the women who acted as nurses when he was a student, and said that an immense improvement had taken place since then, thanks to the noble example and teaching of Florence Nightingale, and to the efforts of many others. When going through the hospital he had been asked to take stock of the nurses. He did so hastily, and, as far as he could judge, they were a healthy, able,

amiable and loyal staff. He was sure that in their new home the nurses would have accommodation commensurate with their value. Addressing himself more particularly to the nurses, he spoke of the extreme gratification that he experienced last year when being shown over one of the largest hospitals in Liverpool, by the nurses presenting him with an address, stating that his humble endeavours had done much in the way of alleviating the work of nurses. He was pleased to think that he had been in any way instrumental in this direction. He had been informed that the nursing staff did not confine their operations to the hospital, but that there was a liberal arrangement made by the hospital authorities by which the nurses might be sent out in the town generally; and where the circumstances of the family were such that they could not pay the nurse properly, the funds were contributed by the hospital to aid in the payment of the nurses. That seemed to him a most noble idea, and he could not but think that if it could be extended, not only to all parts of the city, but to the remote outlying parts of the country, it would be a most valuable thing for Canada. Her Excellency Lady Aberdeen had this matter much at heart, and he was sure that if her idea of the Victorian Order of Nurses could be carried out, with due regard to the efficient training of the nurses, and also to the efficiency of their supervision, the matter would commend itself to all medical men.—*The Gazette, Montreal.*

#### LORD LISTER AT THE BANQUET.

At the banquet of the British Medical Association, Thursday September, 2nd, an address was presented from the Dalhousie University, of Halifax, Nova Scotia, in which the Faculty congratulated his Lordship on his elevation to the Peerage, and assured him of the high regard in which he was held by the medical profession, not only in Halifax, but throughout all Canada.

Lord Lister, in replying, said he found it impossible to express his feelings at this additional token of regard from the medical profession. He confessed to being absolutely astonished at the repeated kindnesses shown him by his Canadian friends. He found on the address the name of one of his old house surgeons, Dr. John Stewart, of Halifax, and referred to him as "a man whom I not only admire, but, I may truly say, reverence." (Dr. Stewart had expected to meet Lord Lister in Montreal, but had been prevented on account of the very serious illness of his brother.)

At this banquet Lord Lister gives his last, or one of his last addresses in a public assemblage in Montreal. Long will those present

remember it. In many of our minds there will ever remain a picture of Faith Fenton's most loveable face of a most loveable man, modest and sympathetic, so deeply touched by the address presented by his medical friends from the maritime provinces, so powerfully affected by the sight of the name of one whom he loved—now sorely afflicted—that words ceased to come readily, and speech soon failed entirely. Such was the somewhat abrupt termination of Lister's farewell address, which was listened to with the closest attention, and caused moisture in many eyes.

## LISTERISM.

WITHOUT discussing in detail the exact meaning of the word Listerism we will suppose that it includes the principles and practice of modern aseptic and anti-septic medicine in all its departments, although the term antiseptic surgery is probably the one most commonly used. Mr. Frederick Treves in his paper on "The Progress of Surgery" (*The Practitioner*) speaks as follows about Lister and his work :

"The great feature in Victorian surgery has, it is needless to say, been the introduction of the antiseptic method, and the great name which stands out above all others in the array of Victorian surgeons is the name of Lister.

"Lister created anew the ancient art of healing ; he made a reality of the hope which had for all time sustained the surgeon's endeavours ; he removed the impenetrable cloud which had stood for centuries between great principles and successful practice, and he rendered possible a treatment which had hitherto been but the vision of the dreamer. The nature of his discovery—like that of most great movements—was splendid in its simplicity and magnificent in its littleness. To the surgeon's craft it was but 'the one thing needful.' With it came the promise of a wondrous future ; without it was the hopelessness of an impotent past. It might well have been in Browning's mind when he wrote—

' Oh ! the little more and how much it is !  
And the little less and what worlds away ! ' "

In publishing certain selected and original articles on the subject we will cull first from Lister's own writings and give a portion of his presidential address delivered last year before the British Association for the Advancement of Science, at Liverpool. Next will come an address in surgery, dealing especially with Lister's earlier work in pathology, showing how it prepared the way for the acceptance of the Germ Theory. Next will be an abstract, or rather selected portions, of Mr. Watson Cheyne's paper on "Wound Treatment during the Victorian Era." Then will follow three original communications in Surgery, Obstetrics and Medicine.

## THE RELATIONS OF CLINICAL MEDICINE TO MODERN SCIENTIFIC DEVELOPMENT\*

BY SIR JOSEPH LISTER, BART., D.C.L., LL.D., F.R.S.

### PASTEUR'S RESEARCHES ON FERMENTATION.

My next illustration may be taken from the work of Pasteur on fermentation. The prevailing opinion regarding this class of phenomena when they first engaged his attention was that they were occasioned primarily by the oxygen of the air acting upon unstable animal or vegetable products, which, breaking up under its influence, communicated disturbance to other organic materials in their vicinity, and thus led to their decomposition. Cagniard-Latour had indeed shown several years before that yeast consists essentially of the cells of a microscopic fungus which grows as the sweetwort ferments; and he had attributed the breaking up of the sugar into alcohol and carbonic acid to the growth of the micro-organism. In Germany, Schwann, who independently discovered the yeast plant, had published very striking experiments in support of analogous ideas regarding the putrefaction of meat. Such views had also found other advocates, but they had become utterly discredited, largely through the great authority of Liebig, who bitterly opposed them.

Pasteur, having been appointed as a young man the Dean of the Faculty of Sciences in the University of Lille, a town where the products of alcoholic fermentation were staple articles of manufacture, determined to study that process thoroughly, and as a result he became firmly convinced of the correctness of Cagniard-Latours' views regarding it. In the case of other fermentations, however, nothing favorably comparable to the fermentation of yeast had till then been observed. This was now done by Pasteur for that fermentation in which sugar is resolved into lactic acid. This lactic fermentation was at that time brought about by adding some animal substance, such as fibrin, to a solution of sugar, together with chalk that should

\*Portion of Presidential Address delivered before the British Association for the Advancement of Science at Liverpool, 1896.

combine with the acid as it was formed. Pasteur saw, what had never before been noticed, that a fine grey deposit was formed, differing little in appearance from the decomposing fibrin, but steadily increasing as the fermentation proceeded. Struck by the analogy presented by the increasing deposit to the growth of yeast in sweet-wort, he examined it with the microscope, and found it to consist of minute particles of uniform size. Pasteur was not a biologist, but although these particles were of extreme minuteness in comparison with the constituents of the yeast plant, he felt convinced that they were of an analogous nature—the cells of a tiny microscopic fungus. This he regarded as the essential ferment, the fibrin or other so-called ferment serving, as he believed, merely the purpose of supplying to the growing plant certain chemical ingredients not contained in the sugar but essential to its nutrition. And the correctness of this view he confirmed in a very striking manner, by doing away with the fibrin or other animal material altogether, and substituting for it mineral salts containing the requisite chemical elements. A trace of the grey deposits being applied to a solution of sugar containing these salts in addition to the chalk, a brisker lactic fermentation ensued than could be procured in the ordinary way.

I have referred to this research in some detail because it illustrates Pasteur's acuteness as an observer and his ingenuity in experiment, as well as his almost intuitive perception of truth.

A series of other beautiful investigations followed, clearly proving that all true fermentations, including putrefaction, are caused by the growth of micro-organisms.

#### THE CONTROVERSY AS TO SPONTANEOUS GENERATION OF MICROBES.

It was natural that Pasteur should desire to know how the microbes, which he showed to be the essential causes of the various fermentations, took their origin. It was at that period a prevalent notion, even among many eminent naturalists, that such humble and minute beings originated *de novo* in decomposing organic substances; the doctrine of spontaneous generation, which had been chased successively from various positions which it once occupied among creatures visible to the naked eye, having taken its last refuge where the objects of study were of such minuteness that their habits and history were correspondingly difficult to trace. Here again Pasteur at once saw, as if by instinct, on which side the truth lay, and, perceiving its immense importance, he threw himself with ardour into its demonstration. I may describe briefly one class of experiments which he performed with this object. He charged a series of

narrow-necked glass flasks with a decoction of yeast, a liquid peculiarly liable to alteration on exposure to the air. Having boiled the liquid in each flask to kill any living germ it might contain, he sealed its neck with a blowpipe during ebullition, after which, the flask being allowed to cool, the steam within it condensed, leaving a vacuum above the liquid. If, then, the neck of the flask were broken in any locality, the air at that particular place would rush in to fill the vacuum, carrying with it any living microbes that might be floating in it. The neck of the flask having been again sealed, any germs so introduced would in due time manifest their presence by developing in the clear liquid. When any of such a series of flasks were opened and re-sealed in an inhabited room, or under the trees of a forest, multitudes of minute living forms made their appearance in them; but if this was done in a cellar long unused, where the suspended organisms, like other dust, might be expected to have all fallen to the ground, the decoction remained perfectly clear and unaltered. The oxygen and other gaseous constituents of the atmosphere were thus shown to be of themselves incapable of inducing any organic development in yeast water.

Such is a sample of the many well-devised experiments by which he carried to most minds the conviction that, as he expressed it, "*la génération spontanée est une chimère*," and that the humblest and minutest living organisms can only originate by parentage from beings like themselves.

Pasteur pointed out the enormous importance of these humble organisms in the economy of nature. It is by their agency that the dead bodies of plants and animals are resolved into simpler compounds fitted for assimilation by new living forms. Without their aid they would be, as Pasteur expresses it, *encombré de cadavres*. They are essential, not only to our well-being, but to our very existence. Similar microbes must have discharged the same necessary function of removing refuse and providing food for successive generations of plants and animals during the past periods of the world's history; and it is interesting to think that organisms as simple as can well be conceived to have existed when life first appeared upon our globe have, in all probability, propagated the same lowly but most useful offspring during the ages of geological time.

#### THE INFLUENCE OF PASTEUR'S RESEARCHES ON SURGERY.

Pasteur's labours on fermentation have had a very important influence upon surgery. I have been often asked to speak on my share in this matter before a public audience; but I have hitherto

refused to do so, partly because the details are so entirely technical, but chiefly because I have felt an invincible repugnance to what might seem to savour of self-advertisement. The latter objection now no longer exists, since advancing years have indicated that it is right for me to leave to younger men the practice of my dearly loved profession. And it will perhaps be expected that, if I can make myself intelligible, I should say something upon the subject on the present occasion.

Nothing was formerly more striking in surgical experience than the difference in the behaviour of injuries according to whether the skin was implicated or not. Thus if the bones of the leg were broken and the skin remained intact, the surgeon applied the necessary apparatus without any other anxiety than that of maintaining a good position of the fragments, although the internal injury to bones and soft parts might be very severe. If, on the other hand, a wound of the skin was present communicating with the broken bones, although the damage might be in other respects comparatively slight, the compound fracture, as it was termed, was one of the most dangerous accidents that could happen. Mr. Syme, who was, I believe, the safest surgeon of his time, once told me that he was inclined to think that it would be, on the whole, better if all compound fractures of the leg were subjected to amputation, without any attempt to save the limb. What was the cause of this astonishing difference? It was clearly in some way due to the exposure of the injured parts to the external world. One obvious effect of such exposure was indicated by the odour of the discharge, which showed that the blood in the wound had undergone putrefactive change by which the bland nutrient liquid had been converted into highly irritating and poisonous substances. I have seen a man with compound fracture of the leg die within two days of the accident, as plainly poisoned by the products of putrefaction as if he had taken a fatal dose of some potent toxic drug.

An external wound of the soft parts might be healed in one of two ways. If its surfaces were clean cut, and could be brought into accurate apposition it might unite rapidly and painlessly "by the first intention." This, however, was exceptional. Too often the surgeon's efforts to obtain primary union were frustrated; the wound inflamed, and the retentive stitches had to be removed, allowing it to gape; and then, as if it had been left open from the first, healing had to be effected in the other way which it is necessary for me briefly to describe. An exposed raw surface became covered in the first instance with a layer of clotted blood, or certain



of its constituents, which invariably putrefied; and the irritation of the sensitive tissues by the putrid products appeared to me to account sufficiently for the inflammation which always occurred in and around an open wound during the three or four days which elapsed before what were termed "granulations" had been produced. These constituted a coarsely granular coating of very imperfect or embryonic structure, destitute of sensory nerves and prone to throw off matter or pus, rather than absorb, as freshly divided tissues do, the products of putrefactions. The granulations thus formed a beautiful living plaster, which protected the sensitive parts beneath from irritation, and the system generally from poisoning and consequent febrile disturbance. The granulations had other useful properties, of which I may mention their tendency to shrink as they grew, thus gradually reducing the dimensions of the sore. Meanwhile, another cause of diminution was in operation. The cells of the epidermis or scarf-skin of the cutaneous margins were perpetually producing a crop of young cells of similar nature, which gradually spread over the granulations till they covered them entirely and a complete cicatrix or scar was the result. Such was the other mode of healing, that by granulation and cicatrization; a process which, when it proceeded unchecked to its completion, commanded our profound admiration. It was, however, essentially tedious compared with primary union, while, as we have seen, it was always preceded by more or less inflammation and fever, sometimes very serious in their effects. It was also liable to unforeseen interruptions. The sore might become larger instead of smaller, cicatrization giving place to ulceration in one of its various forms, or even to the frightful destruction of tissue which, from the circumstance that it was most frequently met with in hospitals, was termed hospital gangrene. Other serious and often fatal complications might arise, which the surgeon could only regard as untoward accidents, and over which he had no efficient control.

It will be readily understood from the above description that the inflammation which so often frustrated the surgeon's endeavours after primary union was in my opinion essentially due to decomposition of blood within the wound.

#### THE ANTISEPTIC SYSTEM OF SURGERY.

These and many other considerations had long impressed me with the greatness of the evils of putrefaction in surgery. I had done my best to mitigate it by scrupulous ordinary cleanliness and the use of various deodorant lotions. But to prevent it altogether

appeared hopeless while we believed with Liebig that its primary cause was the atmospheric oxygen which, in accordance with the researches of Graham, could not fail to be perpetually diffused through the porous dressings which were used to absorb the blood discharges from the wound. But when Pasteur had shown that putrefaction was a fermentation caused by the growth of microbes, and that these could not arise *de novo* in the decomposable substance, the problem assumed a more hopeful aspect. If the wound could be treated with some substance which, without doing too serious mischief to the human tissues, would kill the microbes already contained in it, and prevent the future access of others in the living state, putrefaction might be prevented, however freely the air with its oxygen might enter. I had heard of carbolic acid as having a remarkable deodorizing effect upon sewerage, and having obtained from my colleague, Dr. Anderson, Professor of Chemistry in the University of Glasgow, a sample which he had of this product, then little more than a chemical curiosity in Scotland, I determined to try it in compound fractures. Applying it undiluted to the wound, with an arrangement for its frequent renewal, I had the joy of seeing these formidable injuries follow the same safe and tranquil course as simple fractures, in which the skin remains unbroken.

At the same time we had the intense interest of observing in open wounds what had previously been hidden from human view, the manner in which the subcutaneous injuries are repaired. Of special interest was the process by which portions of tissues killed by the violence of the accident were disposed of, as contrasted with what had till then been invariably witnessed. Dead parts had been always seen to be gradually separated from the living by an inflammatory process and thrown off as sloughs. But when protected by the antiseptic dressing from becoming putrid and therefore irritating, a structure deprived of its life caused no disturbance in its vicinity, and, on the contrary, being of a nutritious nature, it served as pabulum for the growing elements of the neighbouring living structures, and these became in due time entirely substituted for it. Even dead bone was seen to be thus replaced by living osseous tissue.

This suggested the idea of using threads of dead animal tissue for tying blood vessels ; and this was realized by means of catgut, which is made from the intestines of the sheep. If deprived of living microbes, and otherwise properly prepared, catgut answers the purpose completely, the knot holding securely, while the ligature around the vessel becomes gradually absorbed and replaced by a ring of living tissue. The threads, instead of being left long as before

could now be cut short, and the tedious process of separation of the ligature, with its attendant serious danger of bleeding, was avoided.

Undiluted carbolic acid is a powerful caustic, and, although it might be employed in compound fracture where some loss of tissue was of little moment in comparison with the tremendous danger to be averted, it was altogether unsuitable for wounds made by the surgeon. It soon appeared, however, that the acid would answer the purpose aimed at, though used in diluted forms devoid of caustic action, and therefore applicable to operative surgery. According to our then existing knowledge, two essential points had to be aimed at—to conduct the operation so that on its completion the wound should contain no living microbes, and to apply a dressing capable of preventing the access of other living organisms till the time should have arrived for changing it.

Carbolic acid lent itself well to both these objects. Our experience with this agent brought out what was, I believe, a new principle in pharmacology—namely, that the energy of action of any substance upon the human tissues depends not only upon the proportion in which it is contained in the material used as a vehicle for its administration, but also upon the degree of tenacity with which it is held by its solvent. Water dissolves carbolic acid sparingly and holds it extremely lightly, leaving it free to act energetically on other things for which it has greater affinity, while various organic substances absorb it greedily and hold it tenaciously. Hence its watery solution seemed admirably suited for a detergent lotion to be used during the operation for destroying any microbes that might fall upon the wound, and for purifying the surrounding skin and also the surgeon's hands and instruments. For the last named purpose it had the further advantage that it did not act on steel.

For an external dressing the watery solution was not adapted, as it soon lost the acid it contained, and was irritating while it lasted. For this purpose some organic substances were found, to answer well. Large proportions of the acid could be blended with them in so bland a form as to be unirritating; and such mixtures, while perpetually giving off enough of the volatile salt to prevent organic development in the discharges that flowed past them, served as a reliable store of the antiseptic for days together.

#### ATMOSPHERIC DUST.

The appliances which I first used for carrying out the antiseptic principle were both rude and needlessly complicated. The years that have since passed have witnessed great improvements in

both respects. Of the various materials which have been employed by myself and others and their modes of application I need say nothing, except to express my belief, as a matter of long experience, that carbolic acid, by virtue of its powerful affinity for the epidermis and oily matters associated with it, and also its great penetrating power, is still the best agent at our disposal for purifying the skin around the wound. But I must say a few words regarding a most important simplification of our procedure. Pasteur, as we have seen, had shown that the air of every inhabited room teems with microbes; and for a long time I employed various more or less elaborate precautions against the living atmospheric dust, not doubting that, as all wounds except the few which healed completely by the first intention underwent putrefactive fermentation, the blood must be a peculiarly favorable soil for the growth of putrefactive microbes. But I afterwards learned that such was by no means the case. I had performed many experiments in confirmation of Pasteur's germ theory—not, indeed, in order to satisfy myself of its truth, but in the hope of convincing others. I had observed that uncontaminated milk, which would remain unaltered for an indefinite time, if protected from dust, was made to teem with microbes of different kinds by a very brief exposure to the atmosphere, and that the same effect was produced by the addition of a drop of ordinary water. But when I came to experiment with blood drawn with antiseptic precautions into sterilized vessels, I saw to my surprise that it might remain free from microbes in spite of similar access of air or treatment with water. I even found that if very putrid blood was largely diluted with sterilized water, so as to diffuse its microbes widely and wash them of their acrid products, a drop of such dilution added to pure blood might leave it unchanged for days at the temperature of the body, although a trace of the septic liquid undiluted caused intense putrefaction within twenty-four hours. Hence I was led to conclude that it was the grosser forms of septic mischief, rather than microbes in the attenuated condition in which they existed in the atmosphere, that we had to dread in surgical practice. And at the London Medical Congress in 1881, I hinted, when describing the experiments I have alluded to, that it might turn out possible to disregard altogether the atmospheric dust. But greatly as I should have rejoiced at such a simplification of our procedure, if justifiable, I did not then venture to test it in practice. I knew that with the safeguards which we then employed I could ensure the safety of my patients, and I did not dare to imperil it by relaxing them. There is one golden<sup>x</sup> rule for all experiments upon

our fellow men. Let the thing tried be that which, according to our best judgment, is the most likely to promote the welfare of the patient. In other words, Do as you would be done by. Nine years later, however, at the Berlin Congress in 1890, I was able to bring forward what was, I believe, absolute demonstration of the harmlessness of the atmospheric dust in surgical operations. This conclusion has been justified by subsequent experience; the irritation of the wound by antiseptic irrigation and washing may, therefore, now be avoided, and Nature left quite undisturbed to carry out her best methods of repair, while the surgeon may conduct his operations as simply as in former days, provided always that, deeply impressed with the tremendous importance of his object, and inspiring the same conviction in all his assistants, he vigilantly maintains from first to last, with a care that, once learnt, becomes instinctive, but for the want of which nothing else can compensate, the use of the simple means which will suffice to exclude from the wound the coarser forms of septic impurity.

#### THE EFFECT OF THE ANTISEPTIC SYSTEM ON HOSPITAL STATISTICS.

Even our earlier and ruder methods of carrying out the antiseptic principle soon produced a wonderful change in my surgical wards in the Glasgow Royal Infirmary, which, from being some of the most unhealthy in the kingdom, became, as I believe I may say without exaggeration, the healthiest in the world; while other wards, separated from mine only by a passage a few feet broad, where former modes of treatment were for a while continued, retained their former insalubrity. This result, I need hardly remark, was not in any degree due to special skill on my part, but simply to the strenuous endeavour to carry out strictly what seemed to me a principle of supreme importance.

Equally striking changes were afterwards witnessed in other institutions. Of these I may give one example. In the great Allgemeines Krankenhaus of Munich, hospital gangrene became more and more rife from year to year, till at length the frightful condition was reached that 80 per cent. of all wounds became affected by it. It is only just to the memory of Professor von Nussbaum, then the head of that establishment, to say that he had done his utmost to check this frightful scourge; and that the evil was not caused by anything peculiar in his management was shown by the fact that in a private hospital under his care there was no unusual unhealthiness. The larger institution seemed to have become hopelessly infected

and the city authorities were contemplating its demolition and reconstruction. Under these circumstances, Professor von Nussbaum despatched his chief assistant, Dr. Lindpaintner, to Edinburgh, where I at that time occupied the chair of clinical surgery, to learn the details of the antiseptic system as we then practised it. He remained until he had entirely mastered them, and after his return all the cases were on a certain day dressed on our plan. From that day forward not a single case of hospital gangrene occurred in the Krankenhaus. The fearful disease pyæmia disappeared, and erysipelas soon followed its example.

#### THE EXTENSION OF THE FIELD OF SURGERY.

But it was by no means only in removing the unhealthiness of hospitals that the antiseptic system showed its benefits. Inflammation being suppressed, with attendant fever, pain, and wasting discharge, the sufferings of the patient were, of course, immensely lessened; rapid primary union being now the rule, convalescence was correspondingly curtailed; while as regards safety and the essential nature of the mode of repair, it became a matter of indifference whether the wound had clean cut surfaces which could be closely approximated or whether the injury inflicted had been such as to cause destruction of tissue. And operations which had been regarded from time immemorial as unjustifiable were adopted with complete safety.

It pleases me to think that there is an ever-increasing number of practitioners throughout the world to whom this will not appear the language of exaggeration. There are cases in which, from the situation of the part concerned or other unusual circumstances, it is impossible to carry out the antiseptic system completely. These, however, are quite exceptional; and even in them much has been done to mitigate the evil which cannot be altogether avoided.

I ask your indulgence if I have seemed to dwell too long upon matters in which I have been personally concerned.—*British Medical Journal*, Sept. 19, 1896.

## ADDRESS IN SURGERY.\*

BY JOHN STEWART, M.B. EDIN.  
HALIFAX, N.S.

IN considering this era of many books when in our own territory the intellectual atmosphere is really obscured by the perpetual precipitation of what we are pleased so call literary matter, one is struck by the fact that the man who has done the most important work of the era, the man whose work is the inspiration of a large part of this surgical literature, has never written a book. The published writings of Sir Joseph Lister exist only in scattered papers in the pages of various medical and scientific journals. They might all be collected in one small octavo volume. But I will venture to say that octavo volume would contain more of the marrow of surgery than many bulky treatises. It would indeed, I believe, be found to throw a clearer light on the great problems of medical science in general, than any single volume that can be named.

The enormous practical importance of the work Lister has done in establishing antiseptic surgery has, I cannot help thinking, overshadowed to some extent the equally great importance of his earlier work on pathology. Equal importance, I say advisedly, for the pathological principles acquired in his earlier work prepared the way for the acceptance of the germ theory and gave it a rational basis to work on. A practice founded on isolated data, a purely empirical practice with no definite homogeneous pathological groundwork, must be unsatisfactory, unmanageable, even at times dangerous. One cannot have a better example of this than the history of venesection.

It is my purpose in this short paper to draw attention to some of the cardinal points in the teaching of Lister. And first I shall speak of his work on the essential nature of inflammation, as I consider it gives the key-note of all his teaching. It would be impossible to overestimate the importance of these researches. They occupied him for several years, and the results are published in the Trans-

\*Delivered at the twenty-ninth annual meeting of the Canadian Medical Association held in Montreal, August 27, 1896.

actions of the Royal Society for 1858. They may be called the Principia of Surgical Pathology. This work removed many erroneous impressions as to the nature of the inflammatory process; it proved the correctness of many of the surmises arrived at by the marvellous genius of John Hunter, but replaced his definition of inflammation by an entirely different one, and gave us a new idea of the subject. And some of the most interesting facts in physiology and pathology were for the first time discovered and demonstrated.

At the time when he began his work the question of the nature of inflammation was in a most unsettled condition. All sorts of theories were held about it, and there was little but theory. But the subject was being eagerly investigated. Many influences, a consideration of which may not detain us now, had combined to awaken a spirit of research into vital phenomena, and experimental pathology and microscopic analysis were being brought to bear on what may truly be called this burning question. The web of the frog's foot and the membranous wing of the bat were, on account of their transparency, the favorite subjects of study.

It was well known that the application of an irritant to the web of the frog's foot resulted in changes of the calibre of the blood vessels and the abnormal accumulation in them of blood corpuscles. Lister set himself to discover whether these phenomena were related to each other as cause and effect. The Astley Cooper prize had just been awarded to Wharton Jones for an essay in which he contended that the stagnation of the blood was due to a contraction of the arteries. It occurred to Lister that if a mild irritant were employed one might get "the alteration in the blood vessels without the concomitant alteration in the blood," and he experimented with warm water. As a result of his experiments he arrived at the conclusion that "the arteries regulate by their contractility the amount of blood transmitted in a given time through the capillaries, but neither full dilatation, extreme constriction, nor any intermediate state is capable *per se* of producing accumulation of corpuscles in the latter." His next step was by a series of most ingenious experiments, which it is impossible to describe in the limits of this paper, to establish the fact that inflammation "may be brought about in two totally distinct ways, viz., either by the direct operation of a noxious agent upon the tissues or indirectly through the medium of the nervous system."

Then, from study of the phenomena observed in the affected tissue he arrived at an explanation of the essential changes underlying these phenomena. As this was the earliest exposition of the modern doctrine of inflammation we may consider it in some detail.



A strong inference may be drawn from the following experiment. A frog was placed in a jar of water strongly charged with carbonic acid. When the limbs had ceased to act it was withdrawn. It was found though the heart was still beating, the blood-vessels were loaded with stagnating blood. After a time the frog regained consciousness and resolution occurred in the vessels. We may infer that the carbonic acid, poisoning the web as well as the brain, paralyzes for a time the functional activity of both, and that the return of circulation like the recovery of cerebral functions, depends on the restoration of the dormant faculties of the affected tissues. The same conclusions are present in cases of galvanic shock.

Then the condition of the blood corpuscles in the inflamed part is suggestive. In healthy frog's blood the corpuscles have no tendency to adhere; in the inflamed web they adhere to each other and to the wall of the vessel as they do in shed blood. If the blood, then, passing through the vessels of an inflamed part behaves as it does when let out of the body and in contact with dead matter, the inference is, that the tissues of this part are more like dead matter than living—that their vitality is at a low ebb. A consideration also of the nature of the agents acting as irritants would lead to the same conclusions. All of these irritants, chemical, thermal, mechanical, electrical, are such, that if supplied sufficiently strongly, or for a long enough time, they will kill the tissues.

But direct evidence on the question was obtained from an unexpected quarter. While examining a frog's web, in which he had induced inflammation by a grain of mustard, Lister observed, to his astonishment, that, in addition to the usual appearances of inflammation in the irritated part, the pigment cells in this area had a totally different appearance from what they had elsewhere. This observation opened up a new path for investigation and led to most important results. It had long been known that changes occurred in the colour of the frog similar to, though not so marked as, those of the chameleon. It was also known that the pigment was situated in certain cells of the skin, and German investigators had concluded that the changes in shade from light to dark were caused by contractile changes in the protoplasm of these chromatophorous cells. But Lister showed that the change was not due to a change of shape in the cell but to variations in the distribution of the pigment. He showed that the cells were branching cells, the process of which subdivided and anastomosed so as to form a reticular meshwork in the skin. When the skin of the frog is pale the pigment granules are aggregated in a small black mass around

the nucleus, the branches of the cell being seen with difficulty. Where the skin is dark, the pigment granules are scattered throughout the protoplasm, being more closely packed in the smaller branches, until finally they come in contact and give the appearance of fine dark lines. And there are intermediate conditions corresponding to the hue of the frog. If the frog is exposed to light, it becomes pale, if secluded from the light, it becomes dark. How is the change brought about? Is it a direct action of sunlight on the skin, or is it reflex, through the eye? Lister decided this in a simple way, he blindfolded the frog, made a little hood or jacket for it, leaving only an opening for air, and now found that, whether exposed to light or not, the dark color was permanent. This proved that the movement, or, at least the concentration of pigment, was a reflex change through the eye and similar to the contraction of the pupil. Before this experiment, there was no evidence that any function but that of muscular contraction was under the influence of the nervous system. Further experiment showed that the spinal cord held the same relation to the concentration of the pigment granules as to the contractility of the arterial musculature. Division of the sciatic nerve, or of the spinal cord was followed, in one case, by relaxation of the arteries; in the other, by diffusion of the pigment granules and the corresponding darkening of the skin. But in time, contractility and concentration returned. Transverse segments could be removed from the spinal cord with the same result. After a longer or shorter time, there was a restoration of the suspended function. But when the whole spinal cord had been cut away the nervous control of these functions was lost and permanent relaxation and diffusion resulted.

And the direct action of the irritant on the pigment cells was shown to be distinctly of the nature of a paralysis or arrest of function. In the inflamed spot on the frog's web, the pigment is in an immovable condition. If a frog of medium color has been the subject of experiment, and if we place it in a white basin and expose it to light it soon becomes pale, but the irritated spot remains dark. If, on the other hand, we cover it in a jar and exclude it from light it becomes dark, but the irritated spot appears pale by contrast. Power of concentration, as well as power of diffusion is lost.

The same results were obtained when the experiment was varied by acting on a portion of the web entirely removed from the foot so that the influence of the nervous and circulatory systems were eliminated. This is absolute evidence that this particular form of tissue loses its power of action when an irritant has acted sufficiently

long upon it. It has not been destroyed; after a time its power returns. If the irritant has been too powerful or continued for too long a time, the tissue may lose its properties permanently : it may die.

Similar results were also obtained in a series of most interesting experiments upon ciliated cells.

And so, from the behaviour of the blood in an irritated, that is, an inflamed part, from a consideration of the nature of irritants, and of the behaviour of the tissues when irritated, "we are drawn to the inevitable inference that the occurrence of inflammatory congestion in a part, indicates an enfeebled state of the tissues bordering more or less closely on death, and if continued leads to death."

These experiments showed that the phenomena of inflammation could be induced in tissues entirely cut off from the influence of the nervous or circulatory system. This is proof that the tissues possessed life in themselves. Again when the irritation was removed, inflammation passed off, therefore the tissues possessed inherent powers of recovery. This idea of inherent vitality of the cell, the self preserving power of the tissues, is a favorite one in Lister's teaching. One of his earliest contributions to surgical literature is a note of a case in which, on account of secondary hæmorrhage, a tourniquet had been applied to the arm so as completely to stop the circulation in it, and had so remained for thirty hours before he was called in to amputate. The arm was of course swollen, cold, and discolored, but encouraged by the results of the observations he was then carrying out on this subject of the vitality of the tissues, he decided to tie the brachial and give the arm a chance, and with complete success.

And blood is a tissue in which the phenomena of depressed function and renewed vigor may be seen, and which has an inherent power of resisting noxious agents. And this not only in its fluid state. Coagulation does not necessarily imply death of the blood. Lister showed in a series of most remarkable experiments that blood in its normal condition has no tendency to coagulate. In most text-books of physiology Brucke's theory of coagulation is adopted, namely, that coagulation is prevented by the peculiar action of the blood vessels. But we cannot prevent a tendency unless the tendency be there to prevent. The vascular parieties exert no special action on the blood, they simply continue to live and to hold their normal relations to the blood. We have as much right to say that the blood exerts a peculiar influence on the walls of the blood vessels to prevent their degenerating. What is it that induces coagulation?

Contact with dead, or rather with non-living solid matter. Now take the case of a wounded vein. There is, of necessity, a clot in the wound. But this clot does not extend, the blood flowing over it does not coagulate upon it, the blood-clot does not induce coagulation, therefore it is the living tissue. Later on, when antiseptic surgery enabled him to study the whole subject under new conditions, Lister was able to prove the truth of theories he had been led to form as to the behaviour of the blood-clot in a wound. I find in some text-books references to Schede's method of utilizing blood-clot in wounds and, if I mistake not, I have read of Halstead's blood-clot, but I do not find that blood-clot behaves differently in Hamburg or Baltimore from what it did in the Royal Infirmary of Edinburgh a quarter of a century ago, when one of Lister's favourite demonstrations was the vascularisation of blood-clot and epithelial growth upon it. Some of you will remember Hunter's famous case in which he believed organization had taken place in a blood-clot in the tunica vaginalis.

These principles explained healing by first intention. The tissues, irritated by the passage of the knife, present the early stages of inflammation, dilatation of vessels, stasis of blood, effusion of liquor sanguinis and corpuscles which glue the sides of the wound together and in which organization at once sets in. In such a wound, it may be that none of the cardinal signs of inflammation show themselves. And the germ theory explained the too frequent failure of this method of union. The initial cause of irritation had passed away, but septic germs had gained access to the wound and led to a persistent irritation, directly, by their poisonous action on the tissues; indirectly causing reflex irritation through the nervous system.

In the same way granulation tissue was shown to have no tendency to suppurate unless irritated. The bearing of this upon the treatment of ulcer is evident. Remove the irritation and the tendency to suppuration ceases. When granulations are covered over by epithelium, their structure is not changed, but external agencies are excluded and no more pus is formed. Also, when two granulating surfaces are brought together they cease to form pus. Each protects the other from irritation. Then, too, when antiseptic surgery began, it was shown that some antiseptic agent was necessary to purify the skin, the hands, the instruments, Lister showed that the less the antiseptic, with its unavoidable irritation, acted on the wound, the better. Twenty-five years ago, when the most extravagant ideas were abroad as to antiseptic treatment, when wounds

were being pickled in antiseptics, the abscess cavities were being over distended with carbolic acid, these were Lister's words : "The "injured tissues do not need to be stimulated or treated with any "mysterious 'specific' ; ALL THAT THEY NEED IS TO BE LET "ALONE. Nature will then take care of them ; those which are "weakened will recover and those which have been deprived of "vitality by the injury, will serve as pabulum for their living neighbours." This is the watch-word of Lister's whole system of treatment. Remove the obstacle to healing ; relieve irritation ; assist Nature. The most potent and frequent hindrance to the healing process was septic infection, and naturally engrossed the largest amount of attention, but this principle underlies Lister's work in all directions.

In the quotation just given, we have the first indication of a new principle: "pabulum for their living neighbours." That which struck Lister most in the study of granulation tissue under the new conditions of antiseptic surgery was its power of absorbing dead tissue as sloughs and necrosed bone. It was generally supposed that matter had to be in a state of solution before it could be absorbed. Lister showed this was not necessary. He pointed out that the granulations ate the dead bone, "nibbling" was the word he used in describing the process. And this observation led to the successful reintroduction of animal ligature. Many of these observations, for example, the specific action of living tissues, the germicidal action of the blood, and even of the white corpuscles, and this "nibbling" of dead substances by the cells of granulation tissue, were forerunners of the modern doctrine of phagocytosis. Lister laid stress on the fact that a granulating surface was a non-absorbing surface, and that a wound was safer from infection when once covered by granulations, and spoke of the granulating surface as a "living plaster," or protective. Metchnikoff's theory explains this by assuming that the amœboid cells of the granulating surface are capable of coping with the micro-organisms which find their way to it.

We can see that the trend of Lister's thought was much influenced by the teaching of John Hunter. To one of these lines of thought I will now refer, and that is the influence of the nervous system in pathological processes, what Hunter spoke of as "sympathy." We have just seen the importance which Lister attached to the action of the nervous system in inflammation. While he proved that inflammation might occur independently of the central nervous system, he held that in ordinary circumstances it played

a very important part in the process, and he believed with Hunter, that in such events as pneumonia, following upon chill, or the sudden congestion occurring in the kidneys after the passing of a bougie into the bladder, we had proofs of inflammation brought about reflexly through the nervous system.

Hunter pointed to the good effects of bleeding from the temples in iritis, and similar things as an example of this sympathy, or what he sometimes called "textural contiguity." He also pointed to the general contraction of the arteries occurring in venesection. And Lister observed that the reduction of pressure in the veins resulting from the action of gravity, as in an elevated arm, led to reflex contraction of the arteries and local anæmia, and long before Esmarch described his bloodless method, Lister had turned this observation to advantage, and by simply elevating the limb and then applying a tourniquet, secured absolute anæmia, in the part to be operated upon.

Early in the history of antiseptic surgery, Lister, in treating of suppuration, considered it due to two causes, that is, that the abnormal stimulus of the tissues which led to suppuration might be excited through the action of the nervous system, or the direct action of stimulating salts, and sub-divided the latter into putrefactive stimulation from bacterial products and the irritative action of antiseptics themselves. This was before Ogston's work, and when the science of bacteriology was in its infancy. It would appear now that the aphorism of Weigert must hold, and that without micro-organisms we can have no suppuration. But the question has two sides, there is the soil and the seed, and the deterioration of tissue which makes it a fit soil for the growth of germs may be brought about by altered nervous action. But if this doctrine of suppuration is pushed further, and all inflammation, as some pathologists would have us believe, is micro-organismal, if this is the orthodox faith I cheerfully confess myself a heretic, for I cannot understand why the products of bacterial life should have a monopoly of inflammatory power.

One of Lister's favorite instances of this action of the nervous system was the practice of counter-irritation, whether by blisters or in acupuncture, or in the use of the actual cautery. It has been said in the light of modern pathology counter-irritation is an exploded theory and an obsolete practice. I should be sorry to think so. Counter-irritation, like venesection, may have been unwisely used, but the fact remains that it is one of our most powerful and trustworthy methods of treatment.

As much as twenty years ago it was Lister's practice, in early cases of gelatinous degeneration of the knee-joint, with perhaps effusion, to make free incisions through the infiltrated tissues into the joint, and this was in a certain proportion of cases followed by very satisfactory results. We know now that this disease was tuberculous, an infective inflammation. I believe the explanation of these cures to be that partly as a result of the relief of tension, partly as a consequence of the counter-irritation caused by the open wounds, reflex nutritional changes were set up which improved the vitality of the tissues and enabled them to cope with the tubercle bacilli.

Gentlemen, I have perhaps tried to cover too much ground in the time at my disposal. But there are two or three things suggested by this survey of Lister's doctrines to which I would like to draw attention. First, we see the supreme importance of a thorough training in the branches of knowledge on which scientific surgery is based. It was his training in chemistry and physics, and his remarkable, we may almost say unrivalled, skill in microscopic technique which enabled Lister to carry out these researches.

Again, I wish to point out that Lister's teaching is to a very great extent clinical and practical. There is not one of the principles which we have been considering which is not capable of demonstration at the bed-side, or, at least, for which strong inferences may not be drawn from the facts of our daily work.

Lastly, I must refer to the spirit in which Lister works. On the one hand, devotion to the good of his fellowmen, the best interests of the patients committed to his care; on the other, a reverent attitude towards the Eternal Power who manifests Himself in these mysteries of life. It appears to me that in his habits of observation, his methods of study, and, fortunately for humanity, in the general result of his work, we have a fine illustration of the thought of an ancient Eastern poet who has said :

“ Devoutly look, and naught but wonders shall pass by thee,  
 Devoutly read, and then all books shall edify thee,  
 Devoutly speak, and men devoutly listen to thee,  
 Devoutly act, and then the strength of God acts through thee.”

—*Montreal Medical Journal*, September, 1896.

## WOUND TREATMENT DURING THE VICTORIAN ERA.

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THE advance of surgery during the Victorian era is one of the most striking facts of this age, and it is interesting to contrast the state of matters at the beginning of the Queen's reign with that at the present time. Let us compare the contents of a text-book on surgery published during the third decade with those of a text-book at the present time. Take, for example, Liston's "Elements of Surgery" or Lizars's "System of Practical Surgery." We find that they deal with inflammation and various inflammatory affections at considerable length, and with tumours, the treatment of ulcers, and various septic diseases. Hardly anything is said about the method of dressing wounds, certainly no prominent place is assigned to that subject. When we come to regional surgery we are struck by the entire absence of any reference to many diseases now known and included in the department of surgery, and to a variety of operations which are now of every-day occurrence. In speaking of the surgery of the abdomen, hernia is referred to at great length, ascites and ovarian disease are mentioned, and operations for ovarian or other abdominal tumours are condemned. There is no mention at all of intestinal surgery, while as to exploratory operations Liston says, in referring to attempts that had been made to remove abdominal tumors, that the majority of the patients who were dissected to see what part was affected perished within forty-eight hours, and that the repetition of any such incisions and gropings would be unpardonable. The surgical affections of the kidneys, gall bladder, and other abdominal organs were not so much as mentioned. Of the surgery of the bones and joints, which forms so large a part of our present operative work, there is the same cursory notice, for any attempt to operate on these parts was generally followed by very serious and often fatal consequences. The main part of the surgical text-books of that day is taken up in the description of amputations, in short notices



of one or two excisions, which are generally looked on as unsatisfactory operations, in elaborate descriptions of fractures and dislocations, ligature of arteries, hernia, and genito-urinary diseases, more especially stone. In fact, the operative surgery of that period consisted solely in procedures which could be done quickly and which were essential for the life of the patient. Operations of convenience, which form so large a part of surgical practice at the present day—that is to say, operations with the view of remedying deformities, removing unsightly swellings or scars, making a patient more comfortable or relieving him of a source of pain—were hardly ever mentioned, and certainly were very rarely practised.

If, on the other hand, we look at a surgical text-book of the present time we find details as to many operative measures in all parts of the body which were not referred to at all previously, and operations which, if thought of at all at the beginning of this era, were looked on as unwarrantable, are now commonly recommended. For example, we find that large portions of the text-books of the present day are occupied by discussions on abdominal surgery, including many and ingenious procedures affecting practically all the organs in the abdomen. We find, for example, that there is now a large field for renal surgery. One has only to read Professor Mayo Robson's lectures on the surgery of the gall bladder in the recent numbers of the *Lancet* to see what a variety of procedures have been devised for the relief of gall stones, and with what remarkable success these various procedures can be carried out. Exploratory operations also form an important point in the diagnosis of abdominal diseases, and where a patient is suffering, and where, from the general facts of the case, there seems a reasonable probability that the cause of his suffering is remediable by operation, one does not hesitate to open the abdomen with the view of ascertaining the nature and seat of the suffering, and of remedying it if possible. Nor is surgery any longer limited to operations which can be rapidly performed, and which are necessary to save life. All sorts of operations are now performed with the view of making the patient more comfortable, or even of making him more beautiful; patients, in fact, are becoming discontented with any deviation from the normal, and themselves seek the surgeon's aid in remedying the defect. Numerous operations are performed on bones and joints which formerly were considered to be quite unjustifiable, deformities are remedied, fractures are wired or pegged if they will not come into proper position with apparatus, healthy joints are opened, and so on.

In spite of the active surgery of the present day, the mortality

after operations has almost entirely disappeared, more especially in the case of those performed for purposes of exploration and convenience. In my own practice the mortality in major operations does not exceed 2 to 3 per cent., and this is practically entirely made up of cases admitted almost moribund, such as advanced intestinal obstruction, and operated on *in extremis* with the faint hope that life may be saved. At the beginning of this era the mortality after operations which were done, even where a patient was not *in extremis*, was from 25 per cent. to 40 per cent., or even more, and the surgical ward of a hospital was one of the most depressing and nauseating sights; depressing because the patients were almost all ill, suffering pain from their festering wounds, and in a state of fever, while many were moribund from septic diseases; and nauseating from the stench from the putrefying wounds and dressings which poisoned the air. At the present day to go into a surgical ward is a pleasure. The patients are happy and cheerful, and it is very rarely that one is found who presents any signs of fever or illness; they are free from pain with rare exceptions, and the air is as pure and free from odour as the air in the gardens and parks outside.

What is it that has led to this wonderful change? How is it that the range of operative surgery has expanded to such an enormous degree? How is it that operations which were not thought of before, or if thought of were only looked on as chimeras, are now so successfully carried out? How is it that the patients remain free from fever and pain, and that the mortality has been reduced to such a marked extent?

If we consider the matter we see that the reasons why many of the operations of the present day were not formerly performed are threefold; firstly, they were too prolonged and painful for the patient to bear; secondly, many of them were too dangerous; and thirdly, in the case of many the surgeon at that time did not possess the necessary knowledge to enable him to decide what was the real root of the evil, and how it might best be remedied.

At that time pain was a very important element in considering the question of operation, and one of the great qualifications of a surgeon was rapidity and dexterity in operating; the greatest—at any rate, the best known and most highly reputed—surgeon was, in many cases, the man who could perform an operation in the fewest number of seconds, and not necessarily the man who had the best judgment or knowledge. Clearly an operation which would take from half an hour to two hours, or even longer in its performance,

such as extensive excision of tuberculous glands in the neck, excision of intestine with subsequent suture, prolonged operations on bones, and so forth, could not be thought of; the patient would hardly have been alive by the time the operation was concluded.

Many of these operations also were too dangerous. Suppuration practically always occurred in the wounds; it is true that healing by first intention occasionally took place to some extent, but hardly ever completely throughout the whole area of the wound. Ferguson, in 1842, writing on union by first intention, says: "It may be satisfactory for the young practitioner to know that when surgeons talk of union by first intention having occurred throughout the wound, such little troublesome points often remained" (referring especially to the points where the ligatures passed out) "which the most consummate skill will not cause to heal until nature seems inclined, and this will not be until the open part has gone through the process of suppuration and reached that of healthy granulation, when the sore will heal, as it were, spontaneously." Pyæmia, septicæmia, erysipelas, tetanus, and hospital gangrene were common sequelæ of wounds, and where veins, bones, serous cavities, joints, or the abdominal cavity, were involved in the operative procedures the occurrence of these septic diseases was so frequent, indeed almost constant, that after a few attempts operations of that kind were usually given up.

Again, want of knowledge prevented the employment of many surgical procedures in vogue at the present day; want of knowledge, for example, of the whole subject of tuberculosis led to the adoption of methods of treatment of tuberculous diseases which are only employed at the present time for a comparatively short period of the case, if at all; and our knowledge of the nature and mode of distribution and anatomy of these tuberculous affections enables us to check them by operative measures in a way which could not be done till this knowledge had been acquired. Similarly in the case of malignant disease. The strides which have of recent years been made in our knowledge of the mode of spread and extent of malignant disease as the result of the use of the microscope enable us to attack affections of this kind in a much more thorough manner than was formerly thought necessary, and with results of the most satisfactory character.

These three obstacles to the progress of operative surgery have been removed during the Victorian era by the discovery of anæsthesia, by the introduction of asepsis, and by the remarkable progress which has been made in surgical pathology.

It is interesting for the moment to consider which of these three

has exercised the most important influence on the rapid development of surgery. In the first place, however, it may be pointed out that they have all been necessary; that without all three, surgery could not be in its present position. Without anæsthesia we should still be unable to undertake extensive, severe, and prolonged operations, however safe as regards their ultimate result (supposing the patient to survive the shock), or however much we knew them to be necessary from our pathological knowledge. Without asepsis, the possibility of prolonging the operation would not help us at all; on the contrary, it would only lead to greater disasters, because the wound would be more certainly soiled; nor could the knowledge acquired from the study of surgical pathology be applied with safety. And again, without our knowledge of surgical pathology—although, no doubt, many advances could have been made, for example, with regard to operations for deformities—the present advances could not have been attained, because we should not have known what to do. Taking the two examples which we have already mentioned, tuberculosis and cancer, without the knowledge gained by surgical pathology, our results and our procedures would be practically as inefficient as ever they were.

Although these three great advances are essential one to the other, the greatest of them and the most essential is the discovery of asepsis. If we look at the surgical text-books up to the period of the introduction of asepsis, we do not find any very marked advances in surgical procedures during the twenty years which elapsed after the discovery of anæsthetics. We still find, for example, in the case of the abdomen that there is no mention of renal surgery, of gall-bladder surgery, or of intestinal surgery, though it is true that, by the time asepsis had been begun, abdominal surgery was beginning to make considerable progress, chiefly through the efforts of Spencer Wells, and especially in the direction of the removal of ovarian tumours. We still find that operations on varicose veins, for example, are just as dangerous and just as much decried as they were before. Thus Gross in his text-book of surgery considers only two methods justifiable in treating varix—namely, subcutaneous ligature and the caustic tissue—and he speaks of the great dangers of such operations. We find similarly that little or no progress had been made in bone or joint surgery. It is true that in speaking of exostoses Gross says that they may be removed by operation, and he says also that operation may yield satisfactory results, but he adds: "as it is, there will, in any event, be more or less suppuration retarding the progress of the case, and the patient may congratulate

himself if he escapes erysipelas and other serious consequences." In the treatment of spinal abscess, again, we find that but little advance had been made up till the introduction of asepsis. Abernethy's valvular method still remained the best, although Gross says that it is not of the slightest use as a curative agent, and that the operation is always in a very short time followed by hectic fever, and by more or less rapid failure of the health and strength, no matter how carefully it may have been performed.

We may therefore take it that of the three advances that have been made anæsthesia is the least important, and, although necessary for present-day surgery, has had the least effect in bringing it to its present position. The essential discovery which is at the foundation of all recent work is that of asepsis, with which the name of Lister must be solely and for ever associated.

The tendency as regards wound treatment in England at the beginning of the Victorian era was in the direction of simplification of the dressings. At that time it was the universal practice to apply silk or hempen ligatures to the large vessels in the wound. These ligatures were not cut short, but were allowed to hang out of the wound, and as few as possible were employed; the smaller vessels which did not actually spout were left to close by the natural process of hæmostasis, aided by pressure and cold. The result was that complete healing by first intention could never occur, as has been already mentioned in the quotation from Fergusson's surgery, for these ligatures had to come away by a process of suppuration and ulceration, and wherever the thread passed out of the wound a suppurating sinus formed and remained till the ligature had separated. Surgeons differed to a great extent as to whether attempts to produce primary union were advisable or not. Probably most surgeons at that time objected to it because where a wound was stitched up with the view of getting primary union, decomposing discharges were very apt to accumulate in the deeper parts and lead to inflammation and suppuration and, not uncommonly, to very serious general infection. The habit of many surgeons was, in the case of an amputation wound, to place a little charpie between the edges of the wound till the surface had become glazed with lymph; the edges of the wound were then brought together either with stitches or plaster, the ligature threads which hung out forming a certain amount of drainage for the wound. Others gave up any attempt to obtain healing by first intention, and continued the stuffing of the wound till granulation had been completely established, and then some allowed the granulating surfaces to come together, with the result that a considerable amount of adhesion took place.

It was in the early part of 1867 that Lister published his first paper on antiseptic treatment, with special reference to compound fractures, and in it he laid down the principles which are now universally recognized as being those which must guide us in the treatment of wounds. He pointed out that it was not the air *per se*, nor the temperature of the air, nor the nature of the injury that led to the calamities which followed wounds, but it was the living particles which were present in the air and on surrounding objects—bacteria, in fact, which, falling into wounds and setting up decomposition of the discharges, and also gaining access to the body, were the root of all the troubles. He showed that the aim of the surgeon during the operation and the object of his dressings afterwards must be to prevent the entrance of living micro-organisms into the wound. The substance which he used for this purpose was carbolic acid, and it is a remarkable fact that, in spite of the numerous investigations that have since been made, and of the numerous antiseptic substances which have since been introduced, carbolic acid still retains its place as the most important of all. This first paper of Lister's was followed by others, in which the system was elaborated, and the first methods of dressing improved, and the further history of the subject has been one of constant advance in the methods of application of the principles, but without any deviation from the essential principles themselves. The principle of wound treatment first enunciated by Lister remains the same at the present day; subsequent investigations have only shown its accuracy, and, although it has been amplified in many directions, it remains and must always remain untouched. Along with the introduction of asepsis Lister also improved the treatment of wounds in a variety of ways. He pointed out the value of proper drainage, the best methods of bringing the edges of the wound together, and he taught us to cut ligatures short, and introduced absorbable ligatures. Thus the silk threads hanging out of wounds were got rid of, and the risk of secondary hæmorrhage was practically abolished.

To follow the further history of the development of the Listerian method would take too long. Coming to the present time we find that two chief plans are employed which differ slightly in procedure, though not at all in principle. The principle underlying both is the exclusion of micro-organisms in the most effectual manner possible, and with the least irritation of the wounded surface. According to the Listerian plan the destruction of the organisms is carried out by means of chemical substances or antiseptics, and their entrance into wounds after the operation is prevented by the use of dressings con-

taining antiseptics, while every care is taken to avoid, as far as possible, the contact of irritating antiseptic solutions with the wound. In the other plan, while, more especially for the disinfection of the skin, antiseptics must be used, the disinfection of the instruments, etc., is carried out by boiling, no antiseptics come in contact with the wounds, and the dressing applied is sterilized by heat, contains no antiseptic material, and merely acts as a filter. The latter plan, which is very difficult to carry out successfully, and in which the smallest error is irremediable, is founded on an exaggerated idea of the amount of irritation of the wound caused by antiseptics. In the antiseptic method the contact of irritating antiseptics such as carbolic acid with the wound is, of course, avoided, and the weak sublimate solution used for the sponges, etc., does not cause any harm, while errors in the asepsis are not nearly so likely to occur, and can be readily remedied. The boiling of the instruments is, no doubt, a valuable point ; but otherwise I have no hesitation in saying that the method, by the use of antiseptics, is the simplest, the most universally applicable, and the one which is most likely to yield satisfactory results in the hands of the greatest number of surgeons.

We may finish this short sketch of the history of wound treatment during the Victorian era by the description of an operation as carried out at the present time on the Listerian principle, with the results that are obtained. The elaborate preparations for an operation nowadays and the care bestowed on the treatment of the wound contrast very markedly with former times. Formerly before an operation every effort was made to get the patient into as good a state of health as possible, but no other precautions were taken, and as soon as the operation was over the surgeon's work was looked upon as practically ended. The dressing of the wound was a very secondary consideration, and was usually left to a nurse to carry out. Nowadays the preparations for an operation and the dressing of the wound are looked on as of the greatest importance, and as requiring the skilled attention of the surgeon in charge of the case.

The aim of the operator is to exclude micro-organisms from the wounds, and, as they are present everywhere in nature, a great deal of care must be taken in order to attain this object. They are more especially present on the skin, both of the patient and of the operator, on the instruments and materials which may come into contact with the wound, and in the air. The aerial organisms, being dry, are usually the spores of bacilli, and fortunately of saprophytic bacilli, so that it is but rarely that organisms possessing pathogenic and infective properties fall into a wound from the air. The chief

organisms which are at work in the production of the various septic diseases are constantly present on the skin, and therefore a very essential point in the treatment is the disinfection of the skin. It has recently been found that this is an extremely difficult thing to carry out completely. The organisms inhabit the old epithelium, they are constantly present about the hairs, and they seem to penetrate for a certain distance into the hair follicles and sebaceous glands. They are naturally most numerous in parts where the skin is moist—for example, in the axilla; and, what is a point of very great importance as regards the operator, they are present under and about the nails. In order to ensure asepsis of the wound it is necessary to pay great attention to the disinfection of the skin. This is carried out in the first instance by soaking the skin with substances such as ether or turpentine—which will dissolve the fat—by scrubbing away the old epithelium with nail brushes, by shaving the region to be operated upon so as to get rid of the hairs, and by thoroughly soaking the skin with strong antiseptic solutions, the most efficacious being a solution of 1 in 20 carbolic acid containing one grain of corrosive sublimate to the ounce. The skin is thoroughly cleaned in this manner, and the carbolic acid solution is allowed to soak into it for some time before an operation. In order to secure disinfection of the surgeon's hands equal care must be taken, and special attention must be paid to the removal of the dirt under the nails and of the old epithelium around the nails. The instruments must be thoroughly disinfected, either by boiling for ten minutes at least, or by prolonged immersion in 1 to 20 carbolic acid solution. The ligatures and stitches must be carefully disinfected in a similar manner. Great attention should be paid to the sponges, which must be soaked in 1 to 20 carbolic acid for several days before use; and in order to prevent accidental infection of the wounds from the blankets, etc., in the neighborhood, the whole area of the operation is surrounded by towels which have been rendered aseptic and which are wet with carbolic acid or sublimate solutions. During the progress of the operation every care is taken not to allow anything that has not been disinfected to come into contact with the wound. Ligatures are now cut short, and frequently, with the view of obliterating the cavity of the deeper part of the wound, deep sutures are inserted; all bleeding points are stopped, union by first intention is aimed at, and with this view numerous stitches are carefully applied so as to bring the edges of the wound into accurate apposition.

Nor is the fight against the micro-organisms ended with the operation. Care must be taken that after the operation the wound is



protected from the entrance of micro-organisms till it has healed. Antiseptic dressings are applied in large quantity and extent, and the part is placed thoroughly at rest and left undisturbed till healing is complete.

Where the operation has been carried out in the manner described, healing by first intention practically always occurs. After the operation, and as soon as the actual pain of the incision has passed away, the patient suffers no more pain ; there is no elevation of temperature or fever, no loss of appetite ; and, where the operation has not been so severe as to cause shock to any marked degree, the patient in a day or two is as well as he was before the operation. There is no swelling of the edges of the wound, no redness of the skin, and when the dressing is removed at the end of the eighth or tenth day, union is found to have occurred along the whole line of incision, the part is absolutely free from pain and tenderness—in fact, the patient is well.—*Abstracted from The Practitioner Jubilee number.*

## IMPROVEMENTS IN CERTAIN SURGICAL PROCEDURES DUE TO LISTERISM.

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WE propose to consider some of the newer operations which have been made possible and safe by the application of Listerian principles. The most striking developments of recent surgery have concerned the abdomen, the chest, the brain, and the spine.

Injuries of the liver are now treated by operation, and the treatment of abscesses and cysts of that organ are much more successful than before Listerian methods were introduced. A number of operations are now performed for the relief of gall stones. Professor Mayo Robson, in a recent paper in the *Lancet*, proposes to treat catarrhal cholecystitis or chronic catarrh of the gall-bladder as we do catarrh of the urinary bladder—first by medical and general remedies, and, those failing, to secure physiological rest by means of drainage. He performs cholecystotomy and inserts a drainage tube, and after the third day syringes warm water gently through this tube so as to wash out the ducts, and after a fortnight or more the tube is left out and the wound allowed to close. For empyema of the gall-bladder or suppurative cholecystitis, cholecystostomy is advisable. After exposing the gall-bladder, it will be wise to aspirate before opening it, in order to avoid soiling the tissues with pus. For acute phlegmonous cholecystitis, incision and drainage as above. However, should gangrene of the gall-bladder be present Professor Robson thinks that the gall-bladder should be removed, just as we would remove a gangrenous vermiform appendix.

In cases of permanent obstruction of the common bile duct, incurable biliary fistula and jaundice due to occlusion of the common duct, cholecystenterostomy which was first done in 1882 by Winiwaster, is now considered to be the proper procedure as it is attended by most satisfactory results. 3

If we next consider some of the operations which are now performed upon the kidney, we will see what remarkable advance has been made. It was only in 1880 that Morris performed his first nephro-lithotomy, an operation which is now undertaken not only to relieve the pain and the hæmaturia, but for the purpose of saving the kidney from any further deterioration. If, however, calculous pyelitis, or calculous hydronephrosis or pyonephrosis be already present, then nephrotomy with drainage should be performed; and if the kidney is so far destroyed as to exclude the possibility of saving it, then nephrectomy should be done as a means of saving the patient's life. Nephrectomy is also performed in cases of tuberculous pyelitis or pyo-nephrosis which have been previously explored and drained by nephrotomy, but in which a sinus and discharge persists. It is also done in certain cases of malignant disease. These fall into two groups—the sarcomata which occur in children before ten, and the carcinomata which occur usually in patients past middle age.

In either case, an operation should only be performed in an early stage, while the growth is still internal to the capsule, and while the health and strength are good. For the condition of hydro-nephrosis, the present opinion seems to be that nephrotomy should first be done, and after a month's drainage, if there is not a considerable diminution of the amount escaping, and where the fluid thus coming away contains but a small amount of urine, and where there is evidence that the other kidney is competent, the cyst and remaining kidney tissue should be removed. For moveable kidney the operation of nephrorrhaphy was first done in 1881 by Hahn of Berlin, but has since been frequently performed with very considerable success.

One of the most recent advances in the surgery of the stomach is the treatment of perforating ulcers. The writer has seen seven successful cases of suturing for this condition.

Further, the operative treatment of fibrous strictures of the pylorus, gastrotomy for the removal of foreign bodies, and gastro-enterostomy have all proved to be measures of very great value. In the same way various operations upon the intestines have been devised and successfully carried out during recent years. Portions of intestine are now excised for injury, gangrene, stricture or malignant disease, and the operation of colotomy is now associated with very little risk. To these operations we must add the removal of the diseased vermiform appendix, the closure of perforating ulcers of the bowel and the successful treatment of intestinal obstruction. In connec-

tion with the latter, it is interesting to note a report by Mr. Bernard Pitts in the *Lancet* of June 12th, of seven consecutive cases of intussusception in infants treated by abdominal section with six recoveries.

The successful treatment by operation of the desperate condition due to the early rupture of the cyst in ectopic gestation, is a development of recent years and has been the means of saving many lives.

The operation of castration or vasectomy has been recently introduced by Dr. J. W. White for senile hypertrophy of the prostate. He says it should be done when the residual urine reaches 12 ounces, and does not diminish under catheterism, owing to the danger of backward pressure on the kidneys increasing atony of the bladder and cystitis. He does not advise it in fairly young patients where there is no impairment of sexual power—but thinks prostatectomy should be done here. In older patients where the sexual power is absent or much enfeebled, or where there is marked renal disease he recommends vasectomy or castration. The operation promises to be a good one in suitable cases, but a sufficient time has not yet elapsed to speak with confidence regarding it.

A new operation has been devised by Kraské for removing a carcinomatous rectum; he excises a portion of the sacrum thus exposing freely the rectum and making its removal a much easier matter than by the older operation.

In connection with the surgery of the chest, the most notable advance has been made in the treatment of the hitherto incurable condition of empyema. The introduction of Estlander's operation of thoracoplasty has rendered this condition curable, and much success has attended the treatment of cavities of the lung.

The surgery of the brain has made rapid strides within recent years owing to antiseptic methods. The operation of trephining for injury, hæmorrhage or abscess is now much more successful owing to the greater accuracy of localization. In 1884 Mr. Godlee successfully removed a tumor from the brain, thus opening up a new field in cerebral surgery.

Excision of a small portion of cortex for epilepsy so as to include the centres which originate the attack as indicated by the muscles first showing convulsive movements, is an operation which has recently been done, but sufficient time has not yet elapsed nor have enough cases been operated upon to form any conclusion as to its utility.

Removal of the gasserian ganglion for trigeminal neuralgia

was first undertaken by William Rose, of King's College Hospital, London, in 1890. This formidable operation is justified by the fact that, as a rule, neuralgia returns within a period of nine months to two years, after neurectomy of the trunks and branches of the fifth nerve by any other operative procedure. Mr. Rose reaches the ganglion by trephining at the base of the skull from without, and his method is called an extra-cranial one.

Horsley, Hartley and Krause get at the ganglion and nerve-trunks within the middle fossa, by going through the side of the skull, their method being intra-cranial. Hartley and Krause's methods are practically the same, and they differ from Horsley's in the following important details: The dura mater is not opened but raised from the middle fossa with the brain. Instead of dividing the sensory root behind the ganglion, the second and third divisions are found in front of this body and resected, and part of the ganglion removed if desired. Cases have not been watched for a sufficiently long time to say if these operations will produce complete cures.

For cases of chronic otitis media, where a discharge has continued for years, where there is perforation of the drum associated with granulations in the tympanic cavity and carious ossicles, the operation of gouging into the mastoid antrum, and from this into the middle ear and scraping out all granulations and diseased ossicles, is now done. It is quite justifiable when one considers the complications which may occur at any time in chronic otitis media, viz., acute inflammation of mastoid cells and mastoid abscess, abscess in the cerebrum or cerebellum, septic thrombosis of lateral sinus, and pyæmia and meningitis.

If septic thrombosis of the lateral sinus has occurred, then the operation suggested by Horsley should be carried out. This consists in ligaturing the internal jugular vein in the neck, so as to obviate the passage of septic material from the sinus along the jugular vein and into the general circulation. Having ligatured the internal jugular vein in the neck opposite the hyoid bone, the wall of the sinus is incised and the septic thrombus thoroughly scraped away. The wound is then plugged firmly with iodoform gauze. This operation has now been done a number of times with complete success.

One might also mention the improvements in plastic surgery and in skin grafting, since antiseptic methods have been in vogue, but sufficient has been said to show the great debt of gratitude that we owe to Lord Lister for his wonderful discoveries which have so completely revolutionized surgery.

## LISTERISM AND OBSTETRICS.

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SEMMELWEISS, FORDYCE BARKER, and LISTER are three men, whose names, in my mind, are inseparably connected with the great advances in midwifery during the last fifty years. Semmelweiss made a great discovery which the world did not properly appreciate during his lifetime. Barker made many improvements in the art of midwifery which obstetricians recognized, but during his later years hugged a mistaken theory, as to the nature of puerperal fever, long after it had been exploded. Lister made the greatest discovery of this century, which, fortunately, the world fully appreciates.

Semmelweiss, in 1847, clearly and positively enunciated the view that puerperal fever was caused by the introduction of putrescent substances deposited in or about the genital tract of the parturient woman. He thought that such noxious substances were in reality decomposed animal matter; and also considered it possible that such offending material might be developed in the body of the patient (auto-genetic). These views were adopted by a limited number, and from the year 1848 antiseptics have been used to a greater or lesser extent.

Fordyce Barker commenced the use of antiseptics, including antiseptic vaginal douches, about the year 1854. In addition to the use of antiseptics he practised the strictest cleanliness, and in his teaching urged the importance of the same. He was one of the most impressive teachers I have ever met, and, personally, I have to thank him for many of the vague instincts in the right direction which aided me materially in my earlier years of obstetric work, although I had not for some time any intelligent conception of the principles of Listerism.

Lister, for years before he discovered the relationship between microbes and bad results in wounds, recognized the evil of putrefac-

tion in surgery, and endeavored to counteract it by cleanliness and the use of deodorant lotions. Up to this time he had advanced as far as Semmelweiss and Barker, but no further. Fortunately, however, he did not stop here ; but went on with his good work, and applied his knowledge of Pasteurism to surgery. His grand discovery stimulated surgeons, and—what I am more interested in now—obstetricians in all parts of the world, and caused them to make special efforts to avoid septicæmia.

Some have thought that as Semmelweiss and Barker had advanced so far in the direction of aseptic and antiseptic midwifery, their followers would soon, by a process of evolution, have acquired our modern ideas. Strict cleanliness, with or without the use of antiseptic agents, is so simple, and at the same time so effective, that the world must soon have learned to appreciate its virtues, and act accordingly. I will not offer a decided opinion upon this aspect of the question ; but I may call attention to the fact that others, before the time of Pasteur and Lister, had appreciated the value of cleanliness, and even of antiseptics, but were not able to sufficiently impress their friends with the importance of their views and methods. In illustration of the fact I will refer to the work of a remarkable surgeon who lived in the first half of this century. I have to give prominence to surgery, because it is from surgeons that we have learned our most valuable lessons concerning the science and art of obstetrics.

Dr. Benjamin W. Dudley was one of the greatest surgeons of this continent. After graduating in Pennsylvania University in 1804, he spent four years in London and Paris, where he studied under such men as Sir Astley Cooper, Abernethy, Baron, and Larry. After returning to his native country in 1808, he practised in Lexington, Kentucky, with signal success. Dr. Bedford Brown, in his memorial address, delivered in 1892, before the Southern Surgical and Gynæcological Association, tells us that his methods in preparing his patients for operation, and practising asepsis and antiseptics in the most minute details, were remarkably like those now employed. I will quote from Dr. Brown as follows : " While in these times bacteriology was a science unknown, and sepsis and antiseptics were things unheard of, Dudley understood the principles of asepsis, and he knew that all dirt and filth contained the seeds of disease, and to place his patient beyond the pale of disease was to preserve him in an absolute state of cleanliness." Before operating, his patients were always thoroughly cleansed by means of soap and hot water. All instruments and other articles which came in con-

tact with the patients were washed in hot water. All sorts of wounds and injuries were treated by copious applications of hot water, such applications being continued sometimes for hours. The operator and assistants were expected to make themselves thoroughly clean by the free use of hot water and soap. In all cases the hot water had previously been boiled for a considerable length of time. Unfavorable results, Dr. Brown says, such as suppurative fever, erysipelas, and gangrene, were unknown in his practice. He performed the operation of lateral lithotomy two hundred and twenty-five times with the loss of only three cases, and was equally successful in various other branches of surgery.

The methods of Dudley were excellent, and very similar to those of many of our best surgeons at the present time, but they were soon forgotten even in his own city. Is it possible that modern aseptic and antiseptic methods will be forgotten in a hundred years from now! There is, probably, a general consensus of opinion that they will always be remembered, because the great work of Lister has placed the art of surgery on a thoroughly scientific basis. We all hope and believe that surgery in the future will continue to advance, and that the world will never go back to the dark ages of pre-Listerism.

Listerism has completely revolutionized our views and our methods in obstetrics. The idea that puerperal fever is a specific disease, like scarlet fever, is replaced by the opinion that it is a preventable disease produced by microbes which come from without. Auto-genetic puerperal fever, as it was formerly understood, is not now recognized. Our former theories as to varied forms of inflammation occurring during the puerperal period are changed and simplified, because we have accepted Lister's views as to the causes of surgical diseases.

About the year 1872 obstetricians commenced to use Listerian methods, especially in large maternity hospitals. The new ideas and the new methods spread rapidly from hospital to hospital in Germany, France, Great Britain, America and other countries. Rigid antiseptic methods were adopted, with marvellous changes in the mortality rates. Those horrible epidemics of that fearful scourge, puerperal septicæmia, with its almost countless victims, were rapidly being repressed. The carefully prepared reports, and minute descriptions of the various methods employed, were circulated over the whole civilized world, and incalculable good was derived therefrom. Mortality rates of 5 to 10 per cent., or even more, were speedily reduced to about one-half of 1 per cent.



in all our well-ordered maternity hospitals, both in the old and the new world.

The wonderful reduction in mortality rates does not, however, tell the whole story. It tells us that many thousands of lives have been saved during the last twenty-five years through the application of Listerian methods; but it does not tell us how many other thousands have been relieved from the ill effects of septicæmia, which kills not, but cripples sadly. It is very unsatisfactory in this connection to find that the general results in private practice have not kept pace with those in lying-in hospitals. The annual reports of the Registrar-General of Great Britain show that the death rates from childbirth have not appreciably diminished in England and Wales. In the United States and Canada the mortality from puerperal septicæmia has probably diminished during the last twenty years, but it is still very high.

It is interesting to consider the work of some of the early enthusiastic admirers of antisepticism. Many of them understood only in part Lister's views concerning inflammation as it occurs in injured tissues. As Stewart has told us "wounds were being pickled in antiseptics, and abscess cavities were being overdistended with carbolic acid." Many obstetricians went to almost absurd extremes in their desires to out-Lister Lister. One eminent obstetrician and gynecologist of New York insisted that vaginal injections should be employed every four hours after labor had commenced, and every eight hours after it was concluded. In addition, in six or eight hours, suppositories of cocoa butter, containing three to five grains of iodoform, should be placed under the os uteri every two or three hours for at least ten days. This meant that after a normal labor the bruised, and perhaps lacerated vagina was to be invaded from eleven to fifteen times every twenty-four hours for at least ten days. Fortunately such meddlesome methods did not become popular, although excessive douching was carried out for years in certain quarters. Most of us now are inclined to imitate Lister, so far as we understand him, and simply try to prevent the ingress of pathogenic organisms, and at the same time allow Nature to do her admirable work in her own inimitable way.

Some endeavored conscientiously to employ all Lister's earlier methods with his rather cumbersome apparatus. We find that in the British Lying-in Hospital his manner of cleaning the wards was imitated; also, a long-spouted kettle containing a solution of carbolic acid was placed in the centre of each ward. This was kept heated so as to produce a continuous spray which was especially directed

towards the vulva during labor. It was thought that this prevented the entrance of germs into the uterus when the vagina was dilated by the passage of the child. The other details of Listerism were faithfully carried out, and the results were remarkably good. Such methods of using the spray during labor were, however, very troublesome, and decidedly objectionable, especially in private practice, and were not generally employed. The discovery that the spray was useless was a great boon to midwifery.

I have not the space in this number to say much as to the great progress of obstetrical surgery, which has been made possible through Listerism. Much that has already been said with reference to general surgery, by Lister, Stewart, Cheyne, and Bruce, will apply to obstetrics. Modern antiseptic surgery has taught us much about the nature of pelvic inflammations. Many of the difficulties and obscurities in connection with ectopic gestation have been removed, and we now fully realize the vast importance of tubal pregnancy. Operative procedures in cases of ectopic pregnancy have saved many valuable lives.

The increased frequency of, and favorable results attained in operations for ruptured uterus, in Cæsarian section, Porro's operation, and symphysiotomy are well known. For a time some thought that Porro's operation was going to replace Cæsarian section, and the good results following the former seemed, for a time, to justify such opinions; but careful work on the part of skilled operators has wonderfully improved the methods and results in Cæsarian section. One of the most pleasing features connected with modern obstetric surgery is the fact that the horribly revolting operation—craniotomy, or more correctly embryotomy, on a living child (for some time a sad blot on the escutcheon of one of the most brilliant obstetrical schools in the world) has practically become obsolete.

The simplicity of Lister's discovery, and its application to the surgical art may be to some extent misleading. The simplicity is perhaps more apparent than real. In the minds of many the simplicity gives way to obscurity. For instance, a worthy and zealous practitioner told me a few days ago he had "tried those antiseptic remedies and found them useless." He had used carbolic acid, 1-40 and 1-20; he had tried the bichloride, 1-1000, and 1-500; but he got a large amount of pus. What answer is one to make to such a practitioner? I scarcely know, but I would like to advise a course of study of two years in order that he might learn Listerism—with all its simplicity. I have seen many careful and conscientious obstetricians who use soap and water—carbolic acid, bichloride, and

iodoform, and yet do not practise Listerism ; and, with them, the most unfortunate feature is that they think they do. Have any of us reached perfection in our methods? Not, so far as I know, if we may judge from our results. Let us all then cultivate one of Lister's most admirable qualities—humility, and copy him so far as we can, in every way, and make earnest efforts, by careful study, patient investigation, and intelligent observation to improve our methods and attain better results in our treatment of parturient women.

## THE INFLUENCE OF LISTERISM ON MODERN MEDICINE.

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TO form any fair conception of the influence of the work and teachings of Lister upon the science and art of medicine it would be necessary in the first place to examine the views accepted concerning the nature of various diseases before his time and to compare them with those accepted to-day; and in the second place to give credit where it is due to the work of the other great men who shared with him the labor and ought to wear with him the laurels. The one great advance of modern medicine has been the recognition of the germ origin of many of the most prevalent and fatal diseases and the application in some instances of our knowledge of the life history of these micro-organisms to the cure of the conditions they induce. Darwin paved the way by his masterly demonstration of the struggle for existence of contending forms of life, and made easy the conception that many of the ills which afflict the human organism might be due to the struggle of lower forms of animal and vegetable life to live and flourish at the expense of the cells and tissues of the human body. The improvements in the microscope made it possible to study these minuter organisms.

Although vague descriptions of bacteria appear as early as the seventeenth century the first great advance was the proof, some sixty years ago, that yeast fermentation was due to a living organism. The final refutation of the doctrine of spontaneous generation, and the demonstrations that all living cells, whether bacteria, yeast, moulds, or brain cells are derived from similar pre-existing living organisms are of comparatively recent date. As early as 1836 it was shown that boiling would destroy germs capable of developing in animal and vegetable infusions, and that such infusions would remain sterile even though exposed freely to air if the access of fresh germs was prevented. As early as 1837 the spores which were afterwards proved by Pasteur to be the specific cause of the silk

worm disease were described by Bassi, and twelve years later Davaine described organisms in the blood of cattle afflicted with splenic fever, and it was suggested that they might be the cause of the disease. Indeed, by 1857 the way was already paved for antiseptic surgery, and it only awaited the genius of Lister to recognize the relation of micro-organisms with septic processes, and to apply the means already hinted at for the prevention of the development of these organisms. Vanderbroek even went so far in this direction as to demonstrate that such fluids as urine, grape juice, and blood, could be kept from decomposing by receiving them into receptacles thoroughly sterilized by heat, and preventing the access of air not sterilized by filtration through cotton-wool or otherwise.

In 1862 Pasteur proved the impossibility of putrefaction occurring in organic liquids without the access of micro-organisms, and demonstrated the distinction between aërobic and anaërobic organisms.

Lister made his first experiments on the antiseptic treatment of wounds in 1865, and two years later insisted that wounds would heal without suppuration if micro-organisms were excluded. Year after year he labored on, gradually improving his methods, until finally he perfected the antiseptic treatment of wounds. The splendid practical results which followed the application of his methods, of course, gave a tremendous stimulus to investigations into the relations of micro-organisms to disease, and as a result, a flood of light was thrown upon the nature of many diseases. Old theories and beliefs disappeared forever, and scientific certainty succeeded blind groping in dark places. Text-books of medicine had to be re-written, and even to-day the industrious student can hardly keep pace with the progress of bacteriological research. To form some conception of the progress of our knowledge of infectious diseases during the last twenty years it is only necessary to compare the text-book of that time with that of to-day. The writer has reviewed the text-book he read when a student, viz., "Bristowe's Practice of Medicine," dated 1879. The dependence of the infectious diseases upon micro-organisms is only hinted at. A specific virus is spoken of, but the nature of the virus is not specified. However, speaking of the etiology of infectious diseases generally, a shrewd guess is given as to their origin in the following passage: "But here we have poisons or irritants which do multiply in the system, it may be a billionfold, every unit of whose product is as efficient in imparting disease as was the unit from which it sprung. These facts seem quite incompatible with any other view of the nature of these

causes, than that they are actual living things." "Some evidence to the effect that the contagia consist in marvellously minute particles of living matter or protoplasm, has been adduced."

The study of the anatomical condition of diseased organs certainly threw but little light upon the best means to treat diseased conditions, and such valuable knowledge as was possessed of specific remedies was almost purely empirical. Indeed the physician's art often antedated its scientific basis. Even to-day but moderate progress has been made in the internal treatment of disease by means of drugs, and scientific therapeutics is still in its infancy. With the knowledge that many such diseased conditions are due to the struggle for existence of contending forms of life, has come a mighty effort to keep the enemy at a safe distance, or, if it succeed in coming to close quarters, to place the cells and tissues of the human organism under such conditions that the contest will have a successful issue.

The development of bacteriology is the great stride onward of modern medicine, and it owed its mightiest impulse to the work of perhaps the two greatest men of the century, Lister, who is to-day Canada's honored guest, and the great Frenchman who so lately passed away—Louis Pasteur. If, of the former it may be truly said that "scientific surgery begins with Lister," then we may none the less justly designate Pasteur "the father of scientific medicine." From his work the whole system of serum therapeutics has developed. Others have done splendid service, but these two names stand out above the rest. The practical results have been greater in surgery than in medicine, but in the latter we are only upon the threshold of its possibilities, and the results, preventive and curative, that we have attained in such diseases as small-pox, rabies, tetanus, diphtheria, plague, cholera and malaria will surely be extended to many other diseases. Every year is adding to our knowledge, and the Lister of the twentieth century will wield mighty weapons in his struggle with disease and death. Already the microscope and culture-tube are of inestimable value in the diagnosis, among other diseases, of tuberculosis, diphtheria, anthrax, pneumonia, cholera, septicæmia, typhoid fever, malaria, dysentery, bubonic plague, epidemic meningitis, leprosy, tetanus, influenza, and probably yellow fever. The study of immunity, antitoxins, etc., promises important results, and one of the things best worth living for in the coming twentieth century will be to see, and perchance to share in, the triumphs of the most beneficent of the sciences—that one which has to do with the alleviation of suffering and the prevention and cure of disease.

## THE BRITISH MEDICAL ASSOCIATION.

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AT the meeting of the British Medical Association, held in Nottingham, in 1892, Sir William Hingston said, he "trusted that at no very distant date the British Medical Association would see their way to paying Canada a visit. They would there find a heterogeneous population—French, English, Scotch, and Irish—but amongst them all an intense love of British institutions, and a very deep attachment to Her Most Gracious Majesty Queen Victoria; and if the Association would do them the honor suggested, he could assure for the members a most cordial and hearty welcome. Again, last year Drs. Roddick, Armstrong, and Adami, of Montreal, and Drs. Cameron, Peters, Macallum, and Doolittle, of Toronto, speaking on behalf of Canada, invited the Society to hold the 1897 meeting in Montreal. The Council accepted the invitation without a dissentient voice, and nominated Dr. Roddick as President elect. This decision pleased the profession of Canada, and its members in various parts of the Dominion have given Dr. Roddick and the members of the local committee valuable assistance in making the preliminary arrangements for the recent meeting.

The British Medical Association is now sixty-five years old. Its growth in earlier years was slow, but during the last thirty years it has grown with marvellous rapidity. Dr. White, the President at the Nottingham meeting, held five years ago, gave some interesting facts connected with the history of the Association. He stated that he was secretary at a former meeting held in Nottingham in 1857, when there were between 80 and 90 in attendance. The Association was then twenty-five years old and numbered 2,065, while at that time (1892) it numbered over 14,000. In its earlier days it was called the Provincial Medical and Surgical Association, but in 1855 it was felt that the influence of the Association should no longer be confined to provincial limits, and after careful consideration the title was changed, and it became the British Medical Association. In the following year the meeting was held in Edinburgh, under the presidency of Professor Allison. In 1862 the annual meeting was held in London, and in 1867 the first meeting was held in Dublin.

During the meeting of 1857, in Nottingham, all the sessions were held in one small room known as the assembly room. During the Dublin meeting, in 1867, it was found that the work had increased to such an extent that it was necessary to divide into sections. From year to year since that time the sections have increased in number, and in the amount and importance of their work. There were eleven sections this year.

Dr. Roddick, in his presidential address, gave some interesting facts in connection with the growth of the Association, and especially its branches. In 1837, five years after it was organized, there were three branches, namely, the East Anglian, the Bath and Bristol, and the Lancashire and Cheshire. In 1878 there were thirty, one of which was in Jamaica—the first colonial branch formed. There are now sixty-five branches, with a total membership of nearly 17,000. Of the branches, twenty-seven are Indian and Colonial. The first Canadian branch was formed in Halifax in 1887. Branches were formed in British Columbia, Manitoba, Toronto and Montreal in 1891, and in Ottawa and Quebec in 1897. There are, therefore, seven Canadian branches.

#### THE MEETING IN MONTREAL.

To say that the Montreal meeting was a grand success is simply giving expression to a well known fact in very plain and simple words. One feels, however, that numerous accentuated superlatives are absolutely necessary in giving anything like a correct description of this great gathering. We will not attempt to use such, but will simply say that the success of the meeting has in all respects exceeded the most sanguine expectations of all physicians interested, both in Great Britain and Canada. To whom is all this success due? To his Excellency the Governor-General of Canada; to the Lieutenant-Governor of Quebec; to the Mayor, and Council, and citizens of Montreal; to the officers of the Association; to the president and members of the local committee; to the officers of sections; to the profession of Great Britain (including the lion of the day—Lord Lister), who came “across the water” to take part in the proceedings; to the profession of Canada. We who are Canadians, but not of Montreal, must give the chief credit to the profession of that great city.

Montreal is noted for her generous hospitality, which has so frequently been shown in the past; but this time she far exceeded any and all of her former efforts. Her physicians united in a continuous and untiring effort to keep the enormous machinery of the meeting



in good running order, and to royally entertain their guests, both British and Canadian. Their work in the former direction was perfect and complete, their hospitality was more than ordinary mortals could accept in its entirety.

A meeting of the Association outside of Great Britain is, of course, a remarkable event, and the success of the Montreal meeting is likely to have a marked effect on the future history of this great medical organization. *The London Lancet* speaks as follows :

“ It seems to us that with this meeting at Montreal, memorable as it will be in many ways, the British Medical Association enters upon a new career. Those of its members who are attending it from England will realize that in Greater Britain the medical profession is animated by the same spirit as at home ; that with the common participation of membership of the same body there must be equally the common desire towards the same ends, the furtherance of the art and science of medicine for the sake of humanity, the promotion of fellowship between those who pursue the same calling. More than this, it may be hoped that, as the Association expands, its sphere of work will widen, too, and that some of those objects rehearsed by Dr. Roddick as originally propounded by its founders will be extended to all the Empire. The subject matter of the president's address suggests, indeed, one line of useful work, which might well be undertaken, namely, the collation of records as to the climatic and physical conditions of the various countries in which the branches of the Association exist, and the collective investigation of disease on a more ample scale than was originally contemplated by those earnest and enthusiastic advocates of this line of inquiry, the late Sir George Humphrey and the late Dr. Mahomed. The Association has long ceased to be “ provincial,” it is now more than insular, and with its world-wide expansion must come the growth of new ideas, the emancipation from the fetters of narrow policies and the working together of the medical profession of the British Empire to attain all that is most worthy in the promotion of professional aims and to maintain a high standard of professional honor.”

#### OPENING CEREMONIES.

The opening ceremonies connected with the meeting were very impressive and exceedingly interesting. A service was conducted in Christ's Church Cathedral at 12 o'clock, during which a sermon was preached by the Right Rev. Dr. Dumoulin, Lord Bishop of Niagara, from the text “ How God anointed Jesus of Nazareth with the Holy Ghost and with power : who went about doing good,

and healing all that were oppressed of the devil ; for God was with him " Acts 10th chapter and 38th verse. In the early part of his discourse he referred to the notable gathering in London this year in connection with the Jubilee celebration, which was one of the most remarkable events in the history of the British empire. He spoke at length and in a kindly way of the medical profession, saying that its work was comparable only to that of the Church.

It is needless to say that this discourse, delivered by one of the most powerful pulpit orators on this continent, was listened to with wrapt attention.

#### FORMAL OPENING OF THE MEETING.

The meeting was formally opened in the afternoon, when a large assembly was gathered together in the Windsor Hall. The president of the council, Dr. Robert Saundby, of Birmingham, occupied the chair. Dr. Saundby first explained the circumstances under which the meeting was adjourned from London, and introduced amid great applause the new president, Dr. T. G. Roddick, who took the chair, and at once called upon the Mayor to extend a welcome to the association in the name of the city of Montreal. His Worship said it seemed very proper that the British Medical Association should hold in the metropolitan city of the Dominion the first meeting that it held outside of the British Isles, and it also seemed quite in keeping that it should be held in a British colony under a colonial president, for it showed that the association belonged not only to Great Britain, but to Greater Britain.

#### SIR J. A. CHAPLEAU.

The president then called upon Sir J. A. Chapleau, the Lieutenant-Governor of Quebec, who said he would not attempt to make an elaborate address of welcome, but he might be allowed to say that they were in a province where was appreciated the mission that the association had undertaken in coming amongst us. The visit was made under the most auspicious conditions—it was made in this year of Her Majesty's Jubilee, which was a good omen for those closer and stronger bonds that must unite Great Britain our *mere patrie*, the mother country, and this great colony of Canada, which was one portion, and would be one great portion of that Greater Britain to which the Mayor had referred. It had been said in England by the authorized representative of Canada, that Canada was a nation, and that liberty was its nationality. Yes—we were free—we owed it to the generosity of our beloved Queen—we owed it to the generosity of the British Parliament—but we owed it still more to

the liberality of the British people themselves. We were in accord with them in this province—our national preferences were free, and our loyalty was free, and that loyalty was as sound, was as solid and everlasting as truth was truth, and heart was heart in man.

#### THE GOVERNOR-GENERAL.

The president then called upon His Excellency, Lord Aberdeen, to extend a welcome to the visitors on behalf of the Dominion—His Excellency said—This being the third speech on the present occasion, he trusted the visitors would believe and realize that they were indeed thrice welcome. After making some humorous references to the magnificent distances in the great Dominion of Canada, he said that the visit of the Association appealed to the feelings, as well as the practical and prudential instincts, of the Canadian people. It also appealed to their public spirit and patriotism. We, as British subjects, welcome our brothers, and our kith and kin.

#### INTRODUCTION OF DELEGATES.

This was an interesting ceremony, in which Professor Adami, one of the local secretaries, introduced to the President and to the Governor-General the delegates from France, the United States, and other countries.

#### INVITATION FROM WINNIPEG.

Dr. O'Donnell said that before leaving Winnipeg he was commissioned by the Premier of Manitoba to invite the association to hold their next year's meeting, or some meeting in the near future, in the city of Winnipeg. He was aware that as this was the first meeting held outside of the United Kingdom the request coming as it did from a very young city might seem a little presumptuous; he desired to say, however, that although thirty years ago Winnipeg was only an outpost of civilization, yet it was now a prosperous and flourishing city, containing something like 50,000 inhabitants, situated precisely in the centre of the British North American continent.

Dr. Saundby, on behalf of the association, thanked Dr. O'Donnell for the invitation, and said the council in London would be very glad to take the matter into consideration.

#### THE PRESIDENT'S ADDRESS.

The able, popular, and genial president was received with long continued applause—the members of the association in both Great Britain and Canada appreciate very highly the magnificent work

which Dr. Roddick has done during the last year in the interest of this great meeting. As an instance of his zeal, we may recall the fact that in January he paid a special visit to Great Britain to assist the council in making preliminary arrangements, and also to induce as many as possible of the leaders of the profession to attend the Montreal meeting, and take a prominent part in it. In addition, he has visited many parts of the Dominion to consult with the officers of the various branches, and with leading men in other centres. He has also worked assiduously and continuously with the local committee in Montreal. It is only fair, therefore, to say that a large measure of the great success which has attended the meeting, is due to the personal efforts of the president.

In his address he referred to the loyalty of the Canadians, and to Sir Wilfrid Laurier's visit to England. He then spoke of the scientific achievements of Professor Richet and Lord Lister.

After a graceful reference to Dr. Henry Barnes (we desire to say that Dr. Henry Barnes is in no way related to Dr. Robert Barnes nor his son, Dr. Fancourt Barnes, of London, but is a prominent surgeon living in Carlisle, who was president of the association last year), and Dr. Saundby, the president, and other members of the council, he went on to say that the address in medicine at this meeting would be delivered by one whose reputation is now world-wide—by our Osler—whose professional education was in great part received in this city, and who, I am happy to say, is still a Canadian. How he has been able to escape the Alien Law is a puzzle to many, but he has really only been borrowed for a time—he is merely passing through the United States in bond.

He then referred to the history of the association, which was organized in 1832 by Sir Charles Hastings, of Worcester, and a few of his friends, and went on to show the rapidity of its growth in Great Britain and also its progress during later years in Canada.

He then spoke of climatic conditions in Canada, and the intellectual progress of its people, referring especially to the subjects of medical education and medical legislation, and concluded by expressing the wish that the visitors would enjoy their visit to Canada.

After a cordial vote of thanks, moved by Lord Lister, and seconded by Sir James Grant, the opening proceedings were terminated.

## BRITISH MEDICINE IN GREATER BRITAIN.\*

BY WILLIAM OSLER, M.D., F.R.C.P.,

Professor of Medicine, Johns Hopkins University, Baltimore.

TO trace successfully the evolution of any one of the learned professions would require the hand of a master—of one who, like Darwin, combined the capacity for patient observation with philosophic vision. In the case of medicine the difficulties are enormously increased by the extraordinary development which belongs to the history of the present century. The rate of progress has been too rapid for us to appreciate, and we stand bewildered and, as it were, in a state of intellectual giddiness, when we attempt to obtain a broad, comprehensive view of the subject. In a safer “middle flight” I propose to dwell on certain of the factors which have moulded the profession in English-speaking lands beyond the narrow seas—of British medicine in Greater Britain. Even for this lesser task (though my affiliations are wide and my sympathies deep) I recognize the limitations of my fitness, and am not unaware that in my ignorance I shall overlook much which might have rendered less sketchy a sketch necessarily imperfect.

Evolution advances by such slow and imperceptible degrees that to those who are part of it the finger of time scarcely seems to move. Even the great epochs are seldom apparent to the participators. During the last century neither the colonists nor the mother country appreciated the thrilling interest of the long-fought duel for the possession of this continent. The acts and scenes of the drama, to them detached, isolated and independent, now glide like dissolving views into each other, and in the vitascope of history we can see the true sequence of events. That we can meet here to-day, Britons on British soil, in a French province, is one of the far-off results of that struggle. This was but a prelude to the other great event of the eighteenth century: the revolt of the colonies and the founding of

\* The Address in Medicine at the British Medical Association, Montreal, Aug 31st, 1897.

a second great English-speaking nation—in the words of Bishop Berkeley's prophecy, "Time's noblest offspring."

Surely a unique spectacle that a century later descendants of the actors of these two great dramas should meet in an English city in New France! Here, the American may forget Yorktown in Louisburg, the Englishman Bunker Hill in Quebec, and the Frenchman both Louisburg and Quebec in Chateauguay; while we Canadians, English and French, in a forgiving spirit, overlooking your unseemly quarrels, are only too happy to welcome you to our country—this land on which and for which you have so often fought.

Once, and only once, before in the history of the world could such a gathering as this have taken place. Divided though the Greeks were, a Hellenic sentiment of extraordinary strength united them in certain assemblies and festivals. No great flight of imagination is required to picture a notable representation of our profession in the fifth century B.C. meeting in such a colonial town as Agrigentum, under the presidency of Empedocles. Delegates from the mother cities, brilliant predecessors of Hippocrates of the stamp of Damocedes and Herodicus, delegates from the sister colonies of Syracuse and other Sicilian towns, from neighboring Italy, from far distant Massilia, and from still more distant Panticapæum and Istria. And in such an assemblage there would have been men capable of discussing problems of life and mind more brilliantly than in many subsequent periods, in proportion as the pre-Hippocratic philosophers in things medical had thought more deeply than many of those who came after them.

We English are the modern Greeks, and we alone have colonized as they did, as free peoples. There have been other great colonial empires, Phœnician, Roman, Spanish, Dutch and French, but in civil liberty and intellectual freedom Magna Græcia and Greater Britain stand alone. The parallel so often drawn between them is of particular interest with reference to the similarity between the Greek settlements in Sicily and the English plantations on the Atlantic coast. Indeed, Freeman says: "I can never think of America without something suggesting Sicily, or of Sicily without something suggesting America." I wish to use the parallel only to emphasize two points, one of difference and one of resemblance. The Greek colonist took Greece with him. Hellas had no geographical bounds, "Massilia and Olbia were cities of Hellas in as full sense as Athens or Sparta." While the emigrant Britons changed their sky, not their character, in crossing the great sea; yet the home-stayers had never the same feeling toward the plantations as the Greeks had towards the colonial cities

of Magna Græcia. If, as has been shrewdly surmised, Professor Seely was Herodotus reincarnate, how grieved the spirit of the father of history must have been to say of Englishmen, "nor have we even now ceased to think of ourselves as simply a race inhabiting an island off the northern coast of the continent of Europe." The assumption of gracious superiority which, unless carefully cloaked, smacks just a little of our national arrogance, is apt to jar on sensitive colonial nerves. With the expansion of the Empire, and the supplanting of a national by an imperial spirit this will become impossible. That this sentiment never prevailed in Hellas, as it did later in the Roman Empire, was due largely to the fact that in literature, in science and in art, the colonial cities of Greece early overshadowed the mother cities. It may be because the settlements of Greater Britain were things of slower growth that it took several generations and several bitter trials to teach a lesson the Greeks never had to learn.

The Greek spirit was the leaven of the old world, the workings of which no nationality could resist; thrice it saved western civilization, for it had the magic power of leading captivity captive and making even captive conquerors the missionaries of her culture. What modern medicine owes to it will appear later. "The love of science, the love of art, the love of freedom—vitaly correlated to each other, and brought into organic union," were the essential attributes of the Greek genius (Butcher). While we cannot claim for the Anglo-Saxon race all of these distinctions it has in a high degree that one which in practical life is the most valuable, and which has been the most precious gift of the race to the world—the love of freedom,

"Of freedom in her regal seat  
Of England."

It would carry me too far afield to discuss the differences between the native Briton and his children scattered so widely up and down the Earth. In Canada, South Africa, Australia, and New Zealand, types of the Anglo-Saxon race are developing which will differ as much from each other, and from the English, as the American does to-day from the original stock; but amid these differences can everywhere be seen those race-qualities which have made us what we are—"courage, national integrity, steady good sense, and energy in work." At a future meeting of the association, perhaps in Australia, a professional Sir Charles Dilke with a firm grasp of the subject may deal with the medical problems of Greater Britain in a manner worthy of the address in medicine. My task, as I mentioned at the outset, is much less ambitious.

Could some one with full knowledge patiently analyze the char-

acteristics of British medicine he would find certain national traits sufficiently distinct for recognition. Three centuries cannot accomplish very much (and that period has only just passed since the revival of medicine in England), but the local conditions of isolation, which have been singularly favorable to the development of special peculiarities in the national character have not been without effect in the medical profession. I cannot do more than touch upon a few features, which will be useful as indicating the sources of influence upon Great Britain in the past, and which may perhaps be suggestive as to lines of progress in the future.

Above the fire-place in Sir Henry Acland's study are three pannelled portraits of Linacre, Sydenham, and Harvey; the scroll upon them reads *Litteræ, Praxis, Scientia*. To this great triumvirate—as to the fountain heads, we may trace the streams of inspiration which have made British medicine what it is to-day.

Linacre, the type of the literary physician, must ever hold a unique place in the annals of our profession. To him was due in great measure the revival of Greek thought in the 16th century in England, and in the last Harveian oration Dr. Payne has pointed out his importance as a forerunner of Harvey. He made Greek methods available; through him the art of Hippocrates and the science of Galen became once more the subject of careful, first-hand study. Linacre, as Dr. Payne remarks, "was possessed from his youth till his death by the enthusiasm of learning. He was an idealist devoted to objects which the world thought of little use." Painstaking, accurate, critical, hypercritical perhaps, he remains to-day the chief literary representative of British medicine. Neither in Britain nor in Greater Britain have we maintained the place in the world of letters created for us by Linacre's noble start. It is true that in no generation since has the profession lacked a man who might stand unabashed in the temple at Delos; but judged by the fruits of learning scholars of his type have been more common in France and Germany. Nor is it to our credit that so little provision is made for the encouragement of these studies. For years the reputation of Great Britain in this matter was sustained almost alone by the great Dee-side scholar, the surgeon of Banchory, Francis Adams—the interpreter of Hippocrates to English students. In this century he and Greenhill have well maintained the traditions of Linacre. Their work, and that of a few of our contemporaries, among whom Ogle must be specially mentioned, has kept us in touch with the ancients. But by the neglect of the study of the humanities, which has been far too general, the profession loses a very precious quality.



While in critical scholarship and in accurate historical studies British medicine must take a second place, the influence of Linacre exerted through the Royal College of Physicians and the old Universities has given to the humanities an important part in education, so that they have moulded a larger section of the profession than in any other country. A physician may possess the science of Harvey and the art of Sydenham, and yet there may be lacking in him those finer qualities of heart and head which count for so much in life. Pasture is not everything, and that indefinable, though well understood, something which we know as breeding, is not always an accompaniment of great professional skill. Medicine is seen at its best in men whose faculties have had the highest and most harmonious culture. The Lathams, the Watsons, the Pagets, the Jenners, and the Gairdners have influenced the profession less by their special work than by exemplifying those graces of life and refinements of heart which make up character. And the men of this stamp in Greater Britain have left the most enduring mark—Beaumont, Bovell, and Hodder in Toronto; Holmes, Campbell, and Howard in this city; the Warrens, the Jacksons, the Bigelows, the Bowditches, and the Shattucks in Boston; Bard, Hossack, Francis, Clark, and Flint of New York; Morgan, Shippen, Redman, Rush, Coxe, the elder Wood, the elder Pepper, and the elder Mitchell of Philadelphia—Brahmins all, in the language of the greatest Brahmin among them, Oliver Wendell Holmes—these, and men like unto them, have been the leaven which has raised our profession above the dead level of a business.

The *litteræ humaniores*, represented by Linacre, revived Greek methods; but the Faculty during the sixteenth and at the beginning of the seventeenth centuries was in a slough of ignorance and self-conceit, and not to be aroused even by Moses and the prophets in the form of Hippocrates and the fathers of medicine. In the pictures referred to, Sydenham is placed between Linacre and Harvey; but science preceded practice, and Harvey's great Lumleian lectures were delivered before Sydenham was born. Linacre has been well called, by Payne, Harvey's intellectual grandfather. "The discovery of the circulation of the blood was the climax of that movement which began a century and a half before with the revival of Greek medical classics, and especially of Galen." (Payne.) Harvey returned to Greek methods and became the founder of modern experimental physiology and the great glory of British scientific medicine. The demonstration of the circulation of the blood remains in every detail a model research. I shall not repeat the oft-told tale of Harvey's great and enduring influence, but I must refer to one

feature which, until lately, has been also a special characteristic of his direct successors in Great Britain. Harvey was a practitioner and a hospital physician. There are gossiping statements by Aubrey to the effect that "he fell mightily in his practice" after the publication of the *De motu cordis*, and that his "therapeutic way" was not admired; but to these his practical success is the best answer. It is remarkable that a large proportion of all the physiological work of Great Britain has been done by men who have become successful hospital physicians or surgeons. I was much impressed by a conversation with Professor Ludwig in 1884. Speaking of the state of English physiology, he lamented the lapse of a favorite English pupil from science to practice; but, he added, "while sorry for him, I am glad for the profession in England." He held that the clinical physicians of that country had received a very positive impress from the work of their early years in physiology and the natural sciences. I was surprised at the list of names which he cited; among them I remember Bowman, Paget, Savory, and Lister. Ludwig attributed this feature in part to the independent character of the schools in England, to the absence of the university element so important in medical life in Germany, but, above all, to the practical character of the English mind, the better men preferring an active life in practice to a secluded laboratory career.

Thucydides it was who said of the Greeks that they possessed "the power of thinking before they acted, and of acting, too." The same is true in a high degree of the English race. To know just what has to be done, then to do it, comprises the whole philosophy of practical life. Sydenham—*Angliæ lumen*, as he has been well called, is the model practical physician of modern times. Linacre led Harvey back to Galen, Sydenham to Hippocrates. The one took Greek science, the other not so much Greek medicine as Greek methods, particularly intellectual fearlessness, and a certain knack of looking at things. Sydenham broke with authority and went to nature. It is an extraordinary fact that he could have been so emancipated from dogmas and theories of all sorts. He laid down the fundamental proposition, and acted upon it, that "all diseases should be described as objects of natural history." To do him justice we must remember, as Dr. John Brown says, "in the midst of what a mass of errors and prejudices, of theories actively mischievous, he was placed, at a time when the mania of hypothesis was at its height, and when the practical part of his art was overrun and stultified by vile and silly nostrums." Sydenham led us back to Hippocrates, I would that we could be led oftener to Sydenham!

How necessary to bear in mind what he says about the method of the study of medicine. In writing, therefore, such a natural history of diseases, every merely philosophical hypothesis should be set aside, and the manifest and natural phenomena, however minute; should be noted with the utmost exactness. The usefulness of this procedure cannot be easily overrated, as compared with the subtle inquiries and trifling notions of modern writers, for can there be a shorter, or indeed any other way of coming at the morbid causes, or discovering the curative indications than by a certain perception of the peculiar symptoms? By these steps and helps it was that the father of physic, the great Hippocrates, came to excel, his theory being no more than an exact description or view of nature. He found that nature alone often terminates diseases, and works a cure with a few simple medicines, and often enough with no medicines at all. Well, indeed, has a recent writer remarked: "Sydenham is unlike every previous teacher of the principles and practice of medicine in the modern world." Sydenham, not Linacre or Harvey, is the model British physician in whom were concentrated all those practical instincts upon which we lay such stress in the Anglo-Saxon character.

The Greek faculty which we possess of thinking and acting has enabled us, in spite of many disadvantages, to take the lion's share in the great practical advances in medicine. Three among the greatest scientific movements of the century have come from Germany and France. Bichât, Lænnec and Louis laid the foundation of modern clinical medicine; Virchow and his pupils of scientific pathology; while Pasteur and Koch have revolutionized the study of the causes of disease; and yet, the modern history of the art of medicine could almost be written in its fullness from the records of the Anglo-Saxon race. We can claim almost every practical advance of the very first rank—vaccination, anæsthesia, preventive medicine and antiseptic surgery, the "captain jewels in the carcanet" of the profession, beside which can be placed no others of equal lustre.

One other lesson of Sydenham's life needs careful conning. The English Hippocrates, as I said, broke with authority. His motto was :

"Thou nature art my goddess; to thy law  
My services are bound."

Undue reverence for authority as such, a serene satisfaction with the *status quo* and a fatuous objection to change have often retarded the progress of medicine. In every generation, in every country,

there have been, and ever will be, *laudatores temporis acti*, in the bad sense of that phrase, not a few of them men in high places, who have lent the weight of a complacent conservatism to bolster up an ineffectual attempt to stay the progress of new ideas. Every innovator from Harvey to Lister has been made to feel its force. The recently issued life of Thomas Wakley is a running commentary on this spirit, against the pricks of which he kicked so hard and so effectually. But there are signs of a great change. The old universities and the colleges, once the chief offenders, have been emancipated, and remain no longer, as Gibbon found them, steeped in port and prejudice. The value of authority *per se* has lessened enormously, and we of Greater Britain have perhaps suffered as the pendulum has swung to the other extreme. Practice loves authority, as announced in "the general and perpetual voice of men." Science must ever hold with Epicharmus that a judicious distrust and wise scepticism are the sinews of the understanding. And yet the very foundations of belief in almost everything relative to our art rest upon authority. The practitioner cannot always be the judge; the responsibility must often rest with the teachers and investigators, who can only learn in the lessons of history the terrible significance of the word. The fetters of a thousand years in the treatment of fever were shattered by Sydenham, shattered only to be riveted anew. How hard was the battle in this century against the entrenched and stubborn foe! Listen to the eloquent pleadings of Stokes, pleading as did Sydenham, against authority, and against the bleedings, the purgings and sweatings of fifty years ago. "Though his hair be gray and his authority high, he is but a child in knowledge and his reputation an error. On a level with a child, so far as correct appreciation of the great truths of medicine is concerned, he is very different in other respects, his powers of doing mischief are greater; he is far more dangerous. Oh, that men would stoop to learn, or at least cease to destroy." The potency of human authority among the powers that be, was never better drawn than by the judicious Hooker in his section on this subject. "And this not only with 'the simpler sort,' but the learned and wiser we are, the more such arguments in some cases prevail with us. The reason why the simpler sort are moved with authority is the conscience of their own ignorance; whereby it cometh to pass that having learned men in admiration, they rather feared to dislike them than know wherefore they should allow and follow their judgments. Contrariwise with them that are skilful authority is much more strong and forcible; because they only are able to discern how just cause there is why to

some men's authority so much should be attributed. For which cause the name of Hippocrates (no doubt) were more effectual to persuade even such men as Galen himself than to move a silly empiric."\*

Sydenham was called "a man of many doubts" and therein lay the secret of his great strength.

Turning now to the main question of the development of this British medicine in Greater Britain, I must at once acknowledge the impossibility of doing justice to it. I can only indicate a few points of importance and I must confine my remarks chiefly to the American part of Greater Britain. We may recognize three distinct periods corresponding to three distinct waves of influence, the first from the early immigration to about 1820, the second from about 1820 to 1860, and the third from about 1860 to the present time.

The colonial settlements were contemporaneous with the revival of medicine in England. Fellow-students of Harvey at Cambridge might have sailed in the *Mayflower* and the *Arbella*. The more carefully planned expeditions usually enlisted the services of a well trained physician, and the early records, particularly of the New England colonies, contain many interesting references to these college-bred men. Giles Firman, who settled in Boston in 1632, a Cambridge-man seems to have been the first to give instruction in medicine in the new world. The parsons of that day had often a smattering of physic, and illustrated what Cotton Mather called an "angelical conjunction." He says: "Even since the days of Luke, the Evangelist, skill in *physick* has been frequently professed and practised by Persons whose more declared Business was the study of Divinity." Firman himself, finding physic 'but a meane helpe,' took orders. These English physicians in the New England colonies were scholarly, able men. Roger Chillingworth, in Hawthorne's *Scarlet Letter*, has depicted them in a sketch of his own life: "Made up of earnest, studious, thoughtful, quiet years, bestowed faithfully for the increase of knowledge, faithfully, too, for the advancement of human welfare, men, thoughtful for others, caring little for themselves, kind just, true, and of constant if not warm affections,"—a singularly truthful picture of the old colonial physician.

Until the establishment of medical schools, University of Pennsylvania, 1763; King's College (afterwards Columbia) 1767; Harvard, 1782, the supply of physicians for the colonies came from Great Britain, supplemented by men trained under the old apprentice system, and of colonists who went to Edinburgh, Leyden and London

\**Ecclesiastical Polity*. Book ii., vii. 2.

for their medical education. This latter group had a most powerful effect in moulding professional life in the pre-revolutionary period. They were men who had enjoyed not alone the instruction but often the intimate friendship of the great English and European physicians. Morgan, Rush, Shippen, Bard, Wistar, Hossack and others had received an education comprising all that was best in the period, and had acquired the added culture which only comes from travel and wide acquaintance with the world. Morgan, the founder of the medical school of the University of Pennsylvania, was away seven years, and before returning had taken his seat as a corresponding member of the French Academy of Surgery, besides having been elected a Fellow of the Royal Society. The war of Independence interrupted temporarily the stream of students, but not the friendship which existed between Cullen and Fothergill and their old pupils in America. The correspondence of these two warm friends of the colonies testifies to the strong professional intimacy which existed at the time between the leaders of the profession in the old and new worlds.

But neither Boerhaave, Cullen nor Fothergill stamped colonial medicine as did the great Scotchman, John Hunter. Long, weary centuries separated Harvey from Galen; not a century elapsed from the death of the great physiologist to the advent of the man in whose phenomenal personality may be seen all the distinctive traits of modern medicine, and the range of whose mighty intellect has had few if any, equals since Aristotle. Hunter's influence on the profession of this continent, so deep and enduring, was exerted in three ways. In the first place, his career as an army surgeon, and his writings on subjects of special interest to military men, carried his work and ways into innumerable campaigns in the long French wars and in the war of Independence. Hunter's works were reprinted in America as early as 1791 and 1793. In the second place, Hunter had a number of most distinguished students from the colonies, among whom were two who became teachers of wide reputation. William Shippen, the first Professor of Anatomy in the University of Pennsylvania, lived with Hunter on terms of the greatest intimacy. He brought back his methods of teaching and some measure of his spirit. With the exception of Hewson and Home, Hunter had no more distinguished pupil than Philip Syng Physick, who was his house surgeon at St. George's Hospital, and his devoted friend. For more than a generation Physick had no surgical compeer in America, and enjoyed a reputation equalled by no one save Rush. He taught Hunterian methods in the largest medical school in the country, and the

work of his nephew (Dorsey) on Surgery is very largely Hunter modified by Physick. But in a third and much more potent way the great master influenced the profession of this continent. Hunter was a naturalist to whom pathological processes were only a small part of a stupendous whole, governed by law, but which could never be understood until the facts had been accumulated, tabulated and systematized. By his example, by his prodigious industry and by his suggestive experiments he led men again into the old paths of Aristotle, Galien, and Harvey. He made all thinking physicians naturalists, and he lent a dignity to the study of organic life, and re-established a close union between medicine and the natural sciences. Both in Britain and Greater Britain he laid the foundation of the great collections and museums, particularly those connected with the medical schools. The Wistar-Horner and the Warren museums originated with men who had been greatly influenced by Hunter. He was, moreover, the intellectual father of that interesting group of men on this side of the Atlantic who, while practising as physicians, devoted much time and labor to the study of natural history. In the latter part of the last century and during the first thirty years of this, the successful practitioner was very often a naturalist. I wish that time permitted me to do justice to the long list of men who have been devoted naturalists and who have made contributions of great value. Benjamin Smith Barton, David Hossack, Jacob Bigelow, Richard Harlan, John D. Goodman, Samuel George Morton, John Collins Warren, Samuel L. Mitchell, J. Aiken Meigs, and many others, have left the records of their industry in their valuable works and in the transactions of the various societies and academies. In Canada, many of our best naturalists have been physicians, and collections in this city testify to the industry of Holmes and McCullough.

I was regretting the *humanities* a few minutes ago, and now I have to mourn the almost complete severance of medicine from the old natural history. To a man the most delightful recollections of whose student life are the Saturdays spent with a preceptor who had a Hunterian appetite for specimens—anything from a trilobite to an acarus—to such a one across the present brilliant outlook comes the shadow of the thought that the conditions of progress will make impossible again such careers as those of William Kitchen Parker and William Carmichael McIntosh.

Until about 1820 the English profession of this continent knew little else than British medicine. After this date in the United States the ties of professional union with the old country became

relaxed, owing in great part to the increase in the number of home schools, and in part to the development of American literature. To 1820 one hundred and fourteen native medical books of all kinds had been issued from the press, and one hundred and thirty-one reprints and translations, the former English, the latter, few in number, and almost exclusively French (Billings).

Turning for a few minutes to the condition of the profession in Canada during this period, I regret that I cannot speak of the many interesting questions relating to the French colonies. With the earliest settlers physicians had come, and among the Jesuits, in their devoted missions, there are records of *donnés* (laymen attached to the service), who were members of the profession. One of these, René Goupil, suffered martyrdom at the hands of the Iroquois.\*

Between the fall of Quebec in 1759 and 1820, the English population had increased by the settlement of Upper Canada, chiefly by United Empire loyalists from the United States, and after the war of 1812 by settlers from the old country. The physicians in the sparsely settled districts were either young men who sought their fortunes in the new colony, or were army surgeons who had remained after the revolutionary war or the war of 1812. The military element gave for some years a very distinctive stamp to the profession. These surgeons were men of energy and ability, who had seen much service, and were accustomed to order, discipline, and regulations. Sabine, in his "History of the Loyalists," refers to the Tory proclivities of the doctors, but says that they were not so much disturbed as the lawyers and clergymen. Still, a good many of them left their homes for conscience sake, and Canniff, in his "History of the Profession in Upper Canada," gives a list of those known to have been among the United Empire Loyalists.

\*Parkman. Jesuits in North America.

(To be continued.)