plied; one of the broken ends made its way through the skin, and he died in three weeks. The bone is light, and is worm-eaten near the fracture, and there is only a little crumbling osseous deposit upon it. The same condition is seen in each of these two thigh-bones, one of which was taken from an aged subject in the dissecting-room, and the other bears all the marks of senility. I do not know the history in either case, but in both there are absence of new material, and evidence of too free removal of the old.

In the contrasting features, therefore, of liability to utter failure and demolition of the injured part on the one hand, and in the power of quick repair on the other, the bones resemble the soft parts; and I trust that the question for the solution of which I have asked your assistance has now been sufficiently answered. It is now an established fact that the repair of wounds and of fractures takes place in the old persons as quickly as in the middle-aged; and we ought to hear no more of the disqualification for reunion which has been attributed to old age. That this is no unimportant matter from a practical point of view, is sufficiently shown by the case mentioned to us by Mr. Hodson, of Bishop Stortford, in which a fracture of the thigh-bone in an old woman was allowed to go untreated, because the medical man thought that at that time of life union of a broken bone was not to be expected.

In conclusion, I have to thank the members who have been good enough to forward the cases from which the following notes have been taken; and I may remark that only by the collection of cases in this way these and many other questions can be answered. The investigation by this method, for which our Association affords such unprecedented opportunities, has the double advantage of bringing a heavy battery of information to bear upon any one point where information is required, and further of greatly benefiting those who communicate the information. There is no reading at all to compare with that of reading ourselves, our own experiences and our own thoughts upon them. These were the feelings which influenced me, when I ventured at the Cambridge meeting four years ago to suggest that some measure of the energies of the Association should be turned in this direction. I have never taken any part in the political movements which occupy the attention of some of the more active members; and thought that more service might be rendered to the Association, to its individual members, and to the science and practice of medicine, by organising a plan for the collection and utilisation of the vast streams of experience which are daily allowed to flow away into the great abyss of waste.

The following are notes of cases of wounds in elderly persons.

1. Woman, aged 85, strangulated hernia; wound healed in four days; torn open again by old lady's fingers, healed again soundly in three weeks; bed-sore on sacrum six days after operation (Mr. May, in *BRITISH MEDICAL JOURNAL*, May 31st). Woman, aged 75, hernia; healed in four days (Mr. March, *BRITISH MEDICAL JOURNAL*, May 31st).

2. Man, aged 91, large wound of scalp; periosteum stripped from bone; much bleeding; on eighth day himself again and going out (Mr. Molony, *BRITISH MEDICAL JOURNAL*, May 24th).

3. Woman, aged 86, hernia healed in ten days (Dr. Cousins, *BRITISH MEDICAL JOURNAL*, June 7th); never saw more satisfactory result.

4. Woman, aged 85, hernia; healed by first intention (Mr. Thomson, *BRITISH MEDICAL JOURNAL*, June 7th).

5. Woman, aged 79, hernia; healed by first intention (Mr. Thomson, *BRITISH MEDICAL JOURNAL*, June 7th).

6. Woman, aged 76, femoral hernia; bowel gangrenous; artificial anus; quite healed up in three weeks (Dr. Smith, of Newport, Essex).

7. Woman, aged 75, very feeble; femoral hernia; healed in three days.

8. Woman, aged 80, femoral hernia; healed in a week (a Member of the Association).

9. Woman, aged 78, mamma removed for soft cancer; severe hæmorrhage same night; immediate union (Mr. Hulke).

10. Male, aged 88, warty growth of lip, removed by V-shaped incision; healed as quickly and firmly as in young person.

11. Woman, aged 91, angry sore over middle of tibia from a blow; healed quickly and thoroughly under simple treatment (Mr. Hemming of Kimbolton).

12. Man, aged 93, scalp wound three inches long down to the bone, and contused wound on back of head from fall upon the grate when asleep. The former healed by first intention, the latter in a few days (Dr. Smith, of Newport, Essex).

Notes of cases of fracture in elderly persons:

1. Woman, aged 81, fractured thigh below middle, and dislocated shoulder; in six weeks could walk round table with help of stick; in five months walked four miles (Mr. Groom, of Wisbeach, 1884).

2. Woman, aged 80, compound fracture at ankle; healed and united in seven weeks (Mr. Groom).

3. Man, aged 80, fractured humerus; united in five weeks (Mr. Groom).

4. Man, aged 75, fractured femur; united in seven weeks (Mr. Hodson, of Bishop Stortford).

5. Man, aged 71, fractured tibia and fibula; walking on crutches in a month (Dr. Walford, of Hampstead).

6. Woman, aged 80, fractured radius; united in three weeks (Dr. Walford).

7. Woman, aged 74, fracture in hemiplegic and contracted leg; united in three weeks (Dr. Walford).

8. Man, aged 78, fracture of patella by muscular action; interval between edges, one inch; soon united apparently by bone; in a few months walked two miles without any instrumental or other aid, except a walking stick (Mr. Sutton, Garden Street).

9. Man, aged 80, fractured patella, fragments about three-quarters of an inch apart; very restless; united quickly, firmly; soon able to walk about.

10. Man, aged 83, fractured ulna by a blow, much bruising, no treatment for four days; united within a month (Mr. Bridger, of Cottenham).

11. Man, aged 92, fractured humerus and injured ribs; in bed three days; bony union in a month (Mr. Bridger, of Cottenham).

12. Woman, aged 74, fractured thigh; firm bony union in eight weeks (Mr. Fraser, of Leyland).

13. Woman, aged 82½, well marked Colles' fracture; firm union in twenty-five days (Mr. F. Harvey, Plymouth Hospital).

14. Woman, aged 72, fractured lower end of humerus; union in four weeks (Mr. Stephens, of Doddington).

15. Woman, aged 68, with paralysis agitans, carried from chair to bed, etc.; very helpless; limbs bent; tibia broken by foot being struck against ground, did well for a week, then became weaker and sank after two weeks; firm union.

AN ADDRESS

ON

SOME EVIDENCES OF, AND INDICATIONS FOR, PROGRESS IN MEDICINE AND SURGERY.

Delivered at the Annual Meeting of the Yorkshire Branch.

By SAMUEL KNAGGS, M.R.C.S. Eng.,

President of the Branch, and Surgeon to the Huddersfield Infirmary.

I ADDRESS you to-day as a general practitioner, and the situation inspires the desire to give prominence to some of those topics which excite the interest, and have an important bearing upon the practice, of that large section of the profession to which I have the honour to belong. It is not proposed, therefore, to bring before you any special subject elucidated by exact statistical, physiological, pathological, and therapeutical data, but to invite you to follow me over a wider, though it may be a less scholar-like, range of thought and observation. The combined sciences of medicine and surgery are essentially progressive; vast strides are being made in every collateral department; and in no walk of science is there evinced greater earnestness of effort, and desire to develop truth. As the result, the advance during the last quarter of a century is so remarkable, as almost to transcend belief. Improved methods of observation, with instruments of constantly increasing precision and exactitude, have led to greater accuracy of thought and expression, and to a truer appreciation of scientific fact.

Improved chemistry has placed within our reach powers over disease which we never possessed before. We can now wave, as it were, an enchanter's wand over disease, arrest agonising pain in a few seconds, procure sleep for the sleepless without detriment, and perform the most formidable and painful operations upon the body without the slightest fraction of suffering or pain. And in the varied branches of the allied sciences we trace the same active spirit of progress, manifesting more and more perfect development, and ushering in discoveries of the highest value and interest to man.

Great and grand works have been done in the past, but the fields are infinite that have yet to be traversed; for, though knowledge has largely increased, there are some directions in which it seems scarcely to have penetrated at all. We have been accustomed to fix our attention so much upon the great things of the world, and so little upon

the small. When man stepped forth from Eden, the wild beasts of the forest became his obvious and most formidable enemies; and from that day to this he has brought to bear upon them his superior endowments and pertinacious resolution, thus reducing them to proportions comparatively harmless, and even, in some cases, blotting them out of existence altogether. But the destructive and invisible agencies which everywhere surround him, the small things of creation, the minute specks, the fungi, blights, mildews, rusts, moulds, and bacteria, although infinitely more ruinous to property and life, have for thousands of years gone steadily on their way, carrying on their errands of mercy and usefulness on the one hand, and scattering around pestilence, disease, and death on the other.

Man has been an unappreciative spectator of the operations of these unperceived atoms; he has witnessed, appalled, time after time, the withering scourge, be it famine, pestilence, ruin, death, and untold agony; but when did he trace the affliction to its source, unravel the mystery, and unmask the foe? This problem remained unsolved in any degree until this our own day; but now, at the close of the nineteenth century, we are face to face with a new era. The microscope, which deals with the infinitely little, has proved itself a keen detective, and has dragged to the light and identified atoms, whose direct object in life seems to be to engender and spread disease. By the aid of the microscope we can now trace these minute organisms, some rod-like, some spiral, some globular, some filamentous, and we call them micro-organisms or bacteria. These bacteria are vegetable parasites, and all vegetable parasites which affect the body may be classed as fungi.

The moulds and yeasts of the same class exert merely a local influence, but the bacteria are capable of exciting general and systemic disturbance. They are the smallest and the simplest of plants, single-celled, devoid of chlorophyll, and propagate, partly by fission and partly by spores, in endless profusion. The air is loaded with them; the soil contains them in immense abundance; the waters of the globe hold them in suspension; and their mission seems to be to remove the elements of disintegration and decay, and so to assist in the perpetual renewal and purification of the earth.

Many forms of bacteria are doubtless very harmless in their influence upon the human body, for it is certain that immense numbers must be daily inhaled and swallowed, and will be drawn through the lungs, and mucous and broken surfaces, and thus find their way into the fluids of the lymphatics and blood-vessels of the body. As this appears to be strictly compatible with the health of the individual, it necessitates the conclusion that these bacteria cannot thrive upon the human soil; they are overpowered, fed upon, cease to propagate, and produce no abiding injury. But there is such a thing as bacterial disease, which is set up when some of these bacteria, or bacterial spores, gain an entrance into the human body, and find a condition favourable to their development, and then proceed to grow and multiply.

They grow by attracting nutriment from the stores and structures around them, living upon albuminoids, carbo-hydrates, and some inorganic matters, and they produce marvellous transformations in these substances. Thus they set up putrid decomposition in albuminoid bodies, change sugar into lactic acid, lactic acid into butyric acid, alcohol into acetic acid, and sugar into a slimy gum. When bacteria, and these products of their active life, are drawn into the circulating fluids of the body, the particular or specific bacterial disease is produced, which kills the patient, unless the tissue-cells gain the upper hand in the struggle for life, and destroy and eliminate the bacteria. A few facts in connection with bacteria are useful to be remembered. They cannot live long in water which contains no nutriment; if so placed, they shrink up and die; pure oxygen kills them; boiling water and steam rapidly destroy them; and they shrivel at low temperatures. Certain substances kill them outright, and put an end to growth and fermentation, such as corrosive sublimate, bromine, iodine, chlorine, and carbolic acid, which all destroy the spores, as well as the bacilli themselves. Of these substances, the corrosive sublimate appears to be by far the most powerful, for a watery solution of one part in twenty thousand kills the spores of bacilli in ten minutes, and is therefore a very certain disinfectant.

The microscope shows considerable variety in the forms of bacteria, and proves, as we might expect, that they are composed of many distinct varieties or species. Thus the spirillum of splenic fever, the bacillus of consumption, the sarcina ventriculi, the bacillus anthracis, and many others, each presents its characteristic form, and is readily distinguishable from another. Nor does it appear that, even when submitted to cultivation under totally diverse conditions, they lose their definite form, although it is certain they may be so cultured as entirely to lose their pernicious and malignant qualities.

Pasteur and others have removed portions of diseased structure swarming with specific bacteria, and have proved conclusively, by introducing a minute quantity into the bodies of healthy animals, that they are able to produce with certainty the same disease as that from which they were derived. And, what is still more remarkable, they have demonstrated, by repeated experiment, that some of these virulent and poisonous bacilli are capable of being brought under cultivation, when they literally cease to be poisonous, and, if introduced into the bodies of healthy animals, are actually capable of exerting a prophylactic power, and protecting them against an invasion of the original disease. They cultivate these bacilli in animal broths, and other nutritious media, and find that, when they are exposed to atmospheric influence for a considerable period, they lose their noxious qualities, and may then be safely used for purposes of prophylaxis. It is a curious and most interesting fact, that bodies which have once withstood the action of a particular species of bacterium, and have successfully repelled the invasion, have their tissues left in a peculiarly insusceptible condition, which in many instances serves as a complete protection to the individual against any return of the disease. We do not know how this effect is produced, whether it results from some change in the chemical constitution of the tissues, or from other cause; yet the general and popular observation establishes the fact, that an attack of small-pox, whooping-cough, scarlet fever, and other infective diseases, all probably due to parasitic infection, usually secures the individual for life against a recurrence of the particular disease. We have a ready illustration in vaccination of the fact, that a body may be protected against a grave infective disease by the inoculation of a milder virus. The virus, passing through the system of the cow, is shorn of its intensity and virulence; and yet, in a large number of instances, it protects the human body as effectually as the inoculation, or even an attack, of small-pox itself. It seems by no means improbable that, as knowledge extends, many of these terrible zymotic diseases may not only be brought under more immediate and direct control, but that the system may even be made proof against them by some similarly harmless prophylactic measure.

We have strong reasons to believe that such diseases as fever, small-pox, scarlet fever, measles, cholera, glanders, consumption, erysipelas, diphtheria, pyæmia, and perhaps many others, originate in this kind of parasitic development. In these various diseases are found an immense variety of different micro-organisms, many of which doubtless have no causal relation to the particular disease. One might suppose that it would be comparatively easy to distinguish between them, and select the special germ which was the essential factor in producing the disease; but the difficulties which environ the inquiry are well nigh insuperable. To satisfy the point, the disease must be produced by the particular germ; but though tubercle has been produced by the tubercle-bacillus, and splenic fever by the spirillum, the same conclusive evidence has not yet been established with regard to many of these germs. Many of these diseases are not capable of being produced excepting in the human subject, and this constitutes a formidable difficulty; for you have to find, for the purposes of experiment, a creature capable of developing the disease, and one whose excessive vitality is not overpoweringly inimical to the bacterium.

Thus, we find it stated in Koch's sixth report, "specific bacteria occur in enteric fever and leprosy, but hitherto no one has succeeded in conveying them to animals." There is ample need to push inquiry to its utmost limits; for who shall tell how the knowledge of the laws of production, growth, and multiplication of these minute organisms may affect the vitality and well-being of the human race? It may be that we shall find in the refuse matter which we permit around us, the direct cause of the production of the deadly bacterium; and may we not hope that, as we can demonstrate the creature, we may also be able to ascertain the conditions of its existence, and ultimately obtain the means of limiting its powers, and controlling them in the direction in which they may be destructive to man? Here we need, as Goethe says, "more light." Nature cries aloud for help, as she cried in agony for thousands of years for the abrogation of pain, but obtained little or none, till experiment developed nitrous oxide, and from that stepping-stone was gradually led to ether and chloroform. And just when we approach the track of a vast and unexplored region, which seems to open before us some of the most glorious opportunities for influencing beneficially the future of the human race, the frivolity of fashionable sentimentalism, and the ridiculous folly of our legislators, combine to hamper, and even strive altogether to prevent, experimental inquiry.

In the sacred interests of humanity, may wisdom reign supreme; and show, whilst very properly frowning down and punishing all brutal and cruel indulgence, that the legitimate inquiries of science must not only have fair play, but even be fostered and encouraged

so that the light of truth and knowledge shall stream throughout the land!

What a mine of untold wealth lies before us for organised action to develop! Pearls and gems of priceless value are ready here for "Collective Investigation;" and, thanks to Professor Humphry and Dr. Mahomed, the machinery is ready to our hand. I look for incalculable benefit from the action of the Collective Investigation Association, which seeks to organise individual effort for collection of facts, to contrast and compare the observations obtained, and to combine, by cautious and patient reasoning, for the establishment of scientific truth, on the broad and enduring basis of ascertained fact. As medical practitioners, we need such help: for it is astonishing how great is the diversity of opinion on subjects continually coming before us, even, for example, in such simple and every-day matters as the uses and actions of diets and medicines. To hear what some medical men talk, and read what others write, about alcohol for instance, would place any unprofessional outsider on the horns of a dilemma. If he listen to one side, his philosophy will be that alcohol is an unmitigated evil, the introduction of Satanic influence, and leading, even when used in moderation, to mental and bodily decay. He will echo the sentiments of the worthy canon who recently expressed the wish "that every drop of alcohol was at the bottom of the sea, and every publican in heaven," and will direct us to such examples as that of Weston, who walks his fifty miles a day for a hundred successive days, on a diet perfectly free from alcohol, to show how needless it is for the purposes of health and hard laborious work. As he turns to the other side, he will find men, equally intelligent, pointing out that wine of the best quality was miraculously furnished by our Saviour for the marriage-feast, enjoined by him to be drunk as an emblem in the sacrament of the Lord's Supper, given by the Good Samaritan for the restoration of the injured wayfarer, and, as indicated by the wisest of men, "to be given to him that is ready to perish, and unto those that be of heavy heart." He is pointed to such examples as Sir Moses Montefiore, who, at the ripe old age of nearly 100 years, continues his daily custom of three glasses of sound old port; and also to a general experience of benefit sustained and observed. It is hardly to our credit as scientific observers that such divided opinion should prevail amongst us. It ought to be perfectly possible to define the exact power and use of such a body, and with as great certainty, as we can the powers and uses of nitro-glycerine or gunpowder. The fact that such substances are capable of deadly application, either by abuse or misdirection, is no argument whatever against their legitimate and proper use. Prejudiced we may well be in favour of earnest temperance; but we must restrain the impulse which runs away with our judgment, and strive to act well up to the old motto, "*Magna est veritas, et prevalebit.*"

Another familiar illustration of divided medical opinion, even on the remedial agencies of disease, is the cold bath treatment of fever. If we suppose that the influence of the cold bath in fever is to check the febrile metabolism in the tissues of the patient, and so to largely prevent the accumulation of *débris* in the blood, we can readily believe that this antipyretic mode of treatment, commenced at an early period of the disease, should be found to produce excellent results, and to reduce the mortality of typhoid fever, as it is said to do, from 18 or 19 per cent. of all cases to as low as 10 or 11. The cold bath is a remedy of singular power in reducing a high pyrexia; it is prompt, pleasant, and effective. In the modified form of cool sponging, it has gained pretty general acceptance; but the bath itself, though lauded to the skies by some, is viewed with distrust and apprehension by others, and has not obtained that amount of general professional support which perhaps it ought to have secured. It may be that we defer too much to the preferences and prejudices of our patients, and are apt, in consequence, to discard remedies of the highest value because they run counter to personal, and perhaps even national, prejudice. If so, we abnegate our highest duties; for the public mind is imperfectly trained, and unfitted to weigh the evidence in most medical matters. It obtains its information generally from inferior and often very biassed sources, and is naturally disposed to place great reliance on its trusted medical advisers. If they be careful, clear, honest, and resolute, able to give sound grounds for their judgment and opinion, public confidence is assured, and they are largely trusted and believed in; but, if they be hesitating and uncertain, always doubting, and shifting their views after weathercock fashion, no wonder that we find the public speculating for itself, and defining the proprieties of its own treatment. The empire of fashion has been the degradation of medicine from the time of Hippocrates till now. Some eminent Sangrado of force and intellect expatiates brilliantly on the virtues and extraordinary properties of water, cold or hot; his theories bristle in every sentence, and their practical application in numerous paragraphs; and

forthwith a perfect stampede occurs, and the whole world is drenched and doctored with water, inside and out, *usque ad nauseam*. Another eminent personage ascertains that certain acute inflammatory affections attack exhausted and enfeebled habits of body, and finds good results from heroic doses of brandy. Immediately the idea becomes the fashion and the rage, and those who have previously struggled on with milk and water and weak broths are now convinced that the one thing needful is brandy *ad libitum*.

At one period of history every human bled must be bled; and woe to that man who had nothing the matter with him, if he passed a spring without his annual venesection; every little headache was an impending apoplexy, requiring the application of the remedy "*usque ad deliquium.*" Another swing of the pendulum, and we come to the time when nobody must be bled, for has it not been conclusively proved that all disease is the result of debility, and the abstraction of blood the most irrational of all procedures? In all these instances Fashion has dealt with remedies of singular power, grossly abusing them at one time, grossly neglecting them at another. Humanity pays the penalty; life is sacrificed to Moloch; and a national prejudice exacts its national tribute from the victims of its false philosophy. Venesection is a striking example of the truth of this contention; it is the remedy of all others certain to relieve effectually and promptly various physical conditions, but nevertheless it is set aside continually in deference to public prejudice. Occasionally, nature refuses to be trifled with, and a spontaneous hæmorrhage arises from some external surface, or in some internal organ, which speedily kills or cures the patient, and silently, but soundly, rebukes the cowardice and want of *amour propre* of the physician. This state of the "mind medical" deserves our earnest attention; it arises, often innocently enough, from a praiseworthy desire to preserve a fair and impartial mind, free from prejudice and bias, and to weigh adequately and justly arguments from all quarters which seem to establish scientific truth. Inasmuch, however, as it is the source of great weakness, it proves the desirability of establishing fixed standards upon which the mind can dwell; for, for refuge, rallying centres for fugitive thoughts, which shall be able to rest and stay the mind, and prevent the motion of the pendulum from swinging to such extremes. What we want to be established are accurate standards, that is, demonstrable truths, respecting which there can be no cavil, no more possibility of disagreement than we anticipate when we make the numerical statement that two and two make four. For centuries, the practitioners of medicine have been comparatively groping in the dark, but now they are working in the full blaze of nineteenth century light. When one sees, from day to day, how the knowledge of remedies, often obtained at hazard, can be made, by simple individual experience, to produce more and more perfect results, one can hardly despair of attaining to perfect accuracy in the adaptation of remedial force to the requirements of disease, when a legion of workers are to stand in the place of the few.

The question of most pregnant interest to the general practitioner is, What is the simplest and best mode of promoting the antiseptics of wounds? The enthusiasm and influence of Professor Lister have produced gigantic improvements in this department of surgery; and, though there may be some difference of opinion as to the superiority of his especial mode of practice, there can be none whatever as to the debt of gratitude that every surgeon owes to him for teaching the necessity, and for the efforts he has made to discover the best possible plan, of producing a perfect antiseptics of wounds.

The remarkable experience of such men as Keith and Lawson Tait in abdominal surgery entirely without the spray, who only have three, four, or five deaths out of a hundred consecutive abdominal sections for the removal of diseased ovaries, show conclusively that the spray is not the essential of success. Yet, nevertheless, when we consider Lister's remarkable papers, and though last, not least, his paper on "Fractures of the Patella," we feel that we are brought face to face with a plan which, at all events when fully applied, appears to carry with it a condition of great security. The demerit (if I may speak so irreverently) of this particular practice, appears to me to lie in the great amount of constant attention that is required to an infinite number of minute details, whilst any little slip, or flaw, or accident, may invalidate the whole. Momentary want of thought or care on the part of operator, assistant, nurse, or bystander, may defeat the end of an otherwise successfully planned and executed arrangement. Now, this is a matter of more consequence than at first sight appears; for, on reliance upon the security of your antiseptic arrangements, cases so treated are left often for days without dressing, during which they may go, as I have seen, considerably wrong, without developing the high temperature which often is supposed to be the required indica-

tion of the necessity for a fresh dressing. On this ground, I do not think it would produce such good results in general practice as would spring from daily dressings with more simple antiseptic precautions. We must remember that a great many factors have contributed to the improved treatment of wounds, and, consequently, to the decreased mortality after operations, quite independently of Listerism. The drainage of wounds was a great discovery; ligatures which produced the desired effect upon the vessels, and absorbed without acting the part of setons in the wound, were another; so placing all injured structures that the necessary dressings could be accomplished without the parts being moved, preserving, in this way, absolute quiescence during repair; the use of sutures composed of rapidly absorbent, and also of entirely non-absorbent, properties; and the exercise of greater care and gentleness in the handling of wounded structures, were all largely contributory to the more successful treatment of wounds.

The object of the Listerian method is to prevent the bacterial and septic influence upon the wound, and it professes to act upon and destroy all germs and spores that by any possibility can find an entrance. It is doubtful whether this effect is even generally achieved, for a spore often takes a good deal of killing; for example, it takes twenty-four hours for a five per cent. solution of carbolic acid to kill the spores of the bacillus anthracis, and a three per cent. solution will not kill them in the same time; and Koch tells us that a five per cent. solution of chloride of zinc has no effect upon them, even when they have lain in it for a month. If the spores which enter the wound through the water or atmosphere be not killed by the spray-process, it explains why, in a certain number of these cases, suppuration is observed, and also is an argument in favour of a more frequent cleansing or irrigation of the wound. I have used both plans extensively in hospital and in private practice, namely, the spray-plan, and the strict cleanliness plan, and have generally found in cases I have dressed myself that the wound daily cleansed was the soonest healed. It has often occurred to me as a singular circumstance that well boiled water, which is easily obtained, and in which certainly the bacilli, and probably the spores, are destroyed, should not always be used for the dressing and irrigation of wounds. The addition to it of small quantities of iodine or carbolic acid would make it theoretically a very suitable wash for surgical purposes. The protection of the wound until the next dressing is sufficiently and simply arranged for by covering it with a strip of protective, and encasing it in a covering of salicylic silk or other similar dressing.

In operations involving penetration of joints and other important cavities, where efficient drainage and irrigation cannot be ensured, in osteotomies, and in the treatment of certain cases of compound fracture where similar difficulties exist, there seems special advantage in the adoption of a strict Listerism.

But it is evident, from the remarkable statistics of Mr. Callender, of St. Bartholomew's Hospital, and others, that results can be obtained quite as good in general surgery by other and simpler plans, as any that have ever been published under the strictest Listerian methods. A very favourable witness thus describes a case which he saw recently at King's College Hospital under the care of Professor Lister. "I saw one patient who had a temperature of 103°; his wound had suppurated, and when I saw him there was still suppuration, not very healthy-looking, and his temperature had not fallen to normal, some weeks after the operation for fracture of the patella." Thus even Lister's practice does not appear to produce absolute security, even under its most studied and careful application. I hope it will not be thought from these remarks that I speak in any degree slightly of Professor Lister, or of his great work; nothing can be further from my intention. It is comparatively easy for men like him, surrounded by enthusiastic pupils who worship every word he utters, or for others with abundance of skilled assistance to aid them, to carry out accurately all the details of Listerian treatment; but for a method to become of universal acceptance amongst the populations of the world, requires simplicity to recommend it, and that it should not be overweighted with too much detail. We may use a complicated machinery for rare and uncommon purposes, or under the influence of a strong enthusiasm, but effective treatment that is simple will certainly, in the long run, be preferred by the common sense and necessities of mankind. Sir Joseph Lister himself seems to be approaching the subject from a somewhat similar point of view; for, in a very interesting and able speech made before the Woolwich Military Medical Society, we find him acknowledging that the spray-system could not be carried out in military surgery. He says: "I do not desire that the spray should be used in military practice. I believe that essentially the same results can be got without it." And we find him experimenting with iodoform, and the most powerful known antiseptic, namely, corrosive sublimate, which had been previously extensively used at Dresden, in

order to provide a more prompt and certain parasiticide, for the effectual destruction of bacterial spores. Lister, it is evident, does not consider that he has reached finality; nor does it seem that it is the particular method for which he cares to fight, but the principle involved, which is, the necessity of ensuring the destruction of all bacterial germs, and preventing their decomposing and septic influence in wounds.

Here, I think, we shall be all agreed with him: and if by his researches he can develop the best and simplest plan of achieving this result, instead of the most complicated, he will confer an inestimable service upon his fellow surgeons, and make the whole world his debtor. Remembering how Professor Lister has thrown his whole soul into this work, how completely he has earned for himself the title of the Apostle of Antisepsis, it would seem most befitting that he should be the one to place the top stone on his work, and obtain an undisputed and never fading crown.

I will now pass to a brief consideration of some of the opprobria of medicine and surgery; and, inasmuch as we, as general practitioners, bear the brunt of the opprobrium, it seems legitimate, when we have the opportunity, that we should discuss the matter somewhat from our own point of view.

Starting, in the first instance, with cancer, I would remark that no disease requires to be more resolutely dealt with from its first obtaining a standpoint within the body. Our great opportunity lies in our first dealing with cancer. Entire destruction of the part itself, and of every affected structure, adjacent or distant, at the earliest possible moment, offers the best and apparently the only method of eradicating the disease. It may be that in the unfathomed mysteries of the future, some guardian spirit may discern and reveal the way to shrivel up a cancer in the mass, or arrest the formation in the germ; but, with present knowledge, if we are to meet it successfully in its local habitation, there must be no delay, no half-heartedness.

A very experienced surgeon told me, not long ago, "that he did not see any good in operating for cancers, for they all came back again." This is not exactly what needs to be, but I am sure it represents pretty closely what often occurs. When we take cancer in its common seat in the breast, and remove the whole gland, keeping far away from adherent skin, and cleaning out thoroughly all the cellular tissue, lymphatics, and little glands well up into the axilla, in a great majority of instances we shall prevent the return of cancer in that situation. This has been my experience in the few grave cases in which such a procedure was rendered necessary; and even when cancer, after a prolonged interval, developed in internal organs, the axilla and cicatrix remained perfectly free from disease. But why should this course not be adopted more generally, when well defined true cancer is found embedded in the breast? It would certainly add to the dangers of the operation; but in a much greater number of cases we should achieve our object, which is to prevent the recurrence of the disease.

I very much agree with the remarks of Mr. Mitchell Banks upon this subject, which are so graphic, and so much to the point, that I venture to reproduce them. "In the surgery-books of 200 years ago," he says, "the true method of removing a cancerous breast will be found; the breast was laid hold of with great pincers, and having been cut clean off, the surface was rubbed with a red hot iron. Against a proceeding so shocking to the age modern taste revolted; and so for many years surgeons have been removing a little elliptical bit of skin including the nipple, and dissecting out the mamma. Then the remaining skin, all infiltrated with cancer-germs, has been carefully laid down again, and neatly stitched together, so that it should heal up quickly. Very few people died of the operation—very few indeed. Unfortunately, they all died at a little later period, for want of a little more of it. My contention is for a return to the old plan of sweeping everything away, and leaving a great hole if you like; the operation will no longer be the bit of surgical tailoring that it has been, and many more will die from it; but many more will also be spared to lead useful lives, and escape the horrors of a return tenfold worse than the original mischief." Mr. Banks's plan, in all cases of mammary cancer, is to make a wide circuit around the disease, and at the same time to clean out the axilla. He has carried out the practice in 41 cases, of which 6 have died; 11 recurred, of which 3 were known to be incomplete operations, and in 18 the disease did not return. It may be that the true line of action lies somewhat intermediate between the course generally pursued and that advised by Mr. Banks; and I would suggest that in all such cases the patient should be allowed to have a voice, for he may well desire to encounter a somewhat greater immediate risk, for the sake of obtaining greater security against the recurrence of the cancer. The same principle will guide

us in our operations for cancer in general; never to rest satisfied with half measures when the true character of the disease is beyond doubt, but to meet it in the earliest stage with the most resolute and complete removal.

In this connection, I will mention a simple method which I have found useful for removing cancerous masses; it is only intended for temporary relief, but it gives very little pain and produces much subsequent comfort. It consists in the application of a thin strip of India-rubber around the base of the growth. This thin rubber band having been stretched three or four times around the base, but not so tightly as to cut through, the ends are tied with silk when at full tension as closely as possible to the tumour, and gradual progressive contraction takes place. Where this has been done, considerable sloughing of the cancerous mass has taken place below the site of the ligature, so that a much greater amount of the disease was removed than was included within it. It checks hæmorrhage, relieves pain, adds greatly to the comfort, and somewhat to the life, of the sufferer. Such is the constricting power of the rubber, that in one case where the enclosed mass was larger than a big lemon, and had penetrated by deep seated ulceration hopelessly beyond the reach of any surgical measure, the whole included mass was cut through in five days, with several layers of cartilage, which were as cleanly divided as though they had been cut with a knife. The patient, a strong middle aged man, was blanched with loss of blood when this mass was first ligatured, for at each daily dressing nearly a couple of ounces of blood was lost before I saw the case. The mass was tied without the aid of an anæsthetic, and immediately afterwards a subcutaneous injection of morphia was given. In three minutes sleep commenced, and continued for seven hours, at the expiration of which time he awoke free from pain, and remained for eight weeks in great comfort, and entirely without bleeding. The parts were daily cleansed, and then dressed with a thick covering of equal parts of powdered conium and tannic acid. The growth then began to grow rapidly, and bleed freely, and the process was repeated with precisely the same results; but deeper seated growths afterwards developed, which could not be attacked, and the person died, five months after the application of the first ligature and two months after the second. The masses removed on each occasion were fully as large as my clenched fist. The strangulation of hæmorrhoids is also, I think, more pleasantly and quickly effected with this ligature than by ordinary thick silk. It is a little more difficult to manipulate, and is most readily applied behind a strong tenaculum, which has transfixed the base of the pile. The powerful continuing contraction renders the division of the skin unnecessary, if the pain of the first few hours be well relieved by morphia; and there is much less soreness and discomfort afterwards, and less liability of the absorption of putrescent liquids. Encircling naevoid masses with a similar temporary ligature at the base allows their being dissected out with very little loss of blood.

Another class of the opprobria comprises vesical tumours, and chronic prostatic and bladder diseases, which occasion horrible agony, and have been accustomed to go on hopelessly from bad to worse, in spite of the old stock methods of careful catheterism, vesical anodynes, and irrigation of the bladder. One has been tempted occasionally to open into the bladder by operation, as for lithotomy, in order to give rest to the organ, and some respite from suffering. The procedure was, however, more of a temporary than permanent benefit, always serious, and, in some cases, not admissible. Sir Henry Thompson proposes, in these cases, to make a small vertical incision in the perineal raphe, above the anus, into the membranous part of the urethra, sufficient to admit the finger to pass through to the neck of the bladder; and then to insert a large soft tube just within the bladder, retaining the tube for the channel for as long as may be desirable. The suggestion is so simple and easy of execution, that one wonders it has not been thought of before. It supplies a key to the relief of many of these intractable affections, and appears in many cases to enable the interior of the bladder to be readily explored, and to offer facilities for the removal of growths by direct operative interference.

The restless activity of medical thought may be said to have left no part or organ of the body unconsidered. Even the brain, and the nerves themselves, are being brought daily more and more within the range of direct surgical interference. If a nerve be accidentally divided, we unite the ends together with fine catgut, and look with tolerable confidence to the junction becoming permanent, and to a complete restoration of the nerve-functions. If bone be beaten into the brain, we trephine, and go fearlessly in search of all the splinters and depressed fragments; and, though considerable quantities of brain-substance will sometimes be broken up, yet a satisfactory recovery often results, with little evidence of impairment even of the intellectual functions of the brain. Seeing, therefore, these evidences of great reparative power in nervous sub-

stance, we regard the bold suggestion of Ferrier, that it may become a reasonable expedient to cut down upon some portion of the brain-structure, and remove a disease which is destroying the life of an individual, though as a startling, yet as not by any means an unwarrantable, proposition. Our knowledge at present is not yet sufficiently definite; but, when we consider how strictly localised are the functions of different portions of the brain-structure, it does not seem unreasonable to suppose that patient study and research may enable us more clearly to unravel the hidden mysteries of the brain, and to distinguish diseases of its structure that are susceptible of removal even by operative procedures.

The treatment of neuralgia by nerve-stretching is another valuable contribution to our power of removing the opprobria. All who, like myself, have been compelled to inject morphia in enormous doses, for months together, to relieve the excruciating horrors of a neuralgia, will not, I imagine, hesitate to cut down upon the nerve, and give it any amount of stretching that may be desirable. From the published records, there can be little doubt that this mode of treatment will be found very efficacious, and that it will soon become the rule in most obstinate cases of the disease. Like everything else, the process must be carefully studied, for there is a Scylla and Charybdis to be passed. If we do not pull hard enough, we shall irritate, and make the neuralgia worse; if we be too violent, we may perhaps destroy the function of the nerve permanently. Experience will, doubtless, eventually develop some sure and ready method for graduating the force applied. At present, according to Mr. Marshall, this appears to be best left to the direct manipulation of the operator. He says: "Surgeons should educate their feeling of resistance, so as to be able, safely and adequately, to stretch a nerve; adequately, in order to cure; safely, so as not to injure the patient. If you grasp the nerve with your hand, and feel the resistance it offers, you can judge, after a few experiments with a dead nerve, how much force is necessary to produce the adequate stretching. The nerve sensibly yields to your traction; you feel an internal creeping movement in the particles of the nerve—of the sheath, no doubt; you feel a certain attrition and vibration going on, and you must educate yourself to that, and you will be safe." I would remark upon this, however, that inasmuch as success must thus depend upon the fine appreciation of touch, which varies much in different individuals, and even in the same person at different periods, it would be better if it could be arranged otherwise. Mechanical invention can surely devise some simple method of applying the required degree of force, in a steady and measured manner. The admirable "Bradshaw" lecture of this year is a very original and valuable contribution to this question of nerve-stretching; but it is yet in its infancy, and there will be many points, and possibly this is one, that may invite reconsideration.

Keeping one's eye fixed on the opprobria, and turning to the great cavity of the chest, we notice a very important point in practice which has been recently established, namely, the treatment by free incision of some of those severe suppurating effusions in the thoracic cavity which are going on from bad to worse under the simple treatment of ordinary paracentesis. By the free incision, a better outlet is established, drainage is more effective, the necessary cleansing can be more readily accomplished; and, though the measure may seem severe, nothing but good results, and the prospects of recovery are greatly enhanced. This, amongst other useful plans, has been ably set forth in the excellent essay hailing from Huddersfield, which very deservedly obtained the Fothergillian medal. I allude to the work on intrathoracic effusions by Mr. Norman Porritt, which reflects infinite credit upon his research and industry, and is well worthy the perusal of every practical surgeon.

Recently, an important suggestion has been made, that gangrene and sloughing abscesses of the lungs should be treated in a similar manner: an opening made freely in the chest-wall, the portion of diseased lung cut into and explored, and the contents, instead of being discharged by the mouth, liberated by the fistulous opening in the thorax; and the suggestion appears to offer a chance of escape from this formidable calamity.

I turn to tubercle, but not with despair, for have we not recently found the tubercle-bacillus? In the second volume of scientific reports recently issued by the Imperial Board of Health in Germany, is a paper by Dr. Koch, in which he says that the bacilli of tubercle are found with the greatest certainty at those spots where the tubercular process has just begun, or is rapidly progressing. There are but few to be seen except where the disintegrating process is taking place very quickly. Dr. Koch confidently asserts that the bacilli are the cause, and not the consequence, of the degenerative change.

With respect to the process by which a latent tubercular centre is capable of giving rise to an active general infection, he believes that it

is due to the agency of the wandering cells (leucocytes), which bear the bacilli about in the tissues, and may leave them in any spot whatsoever, being themselves brought to a standstill by their constantly increasing burden. In no single instance of tuberculosis did he find the bacilli absent; the smaller and younger the nodules, the more profuse were the bacilli contained within them, being especially numerous towards the centre. The bacilli appear to be fewer as caseation advances. A somewhat similar testimony comes from the pathologist of the Brompton Consumption Hospital.

The pathology of the past revealed only part of the truth. It told us that the blood in phthisis had a tendency to form and exude cells, which grew, but did not develop into tissue; which died, and caseated, and in this state irritated the lymphatic system generally, and the pulmonary lymphatics in particular. We knew from the time of Laennec that tubercle could be artificially produced in animals by the insertion of tubercular and septic matters beneath the skin. We were able also to distinguish milary tubercles, white granulations, yellow granulations, caseous masses, catarrhal pneumonia, red hepatization, fibrosis, chalky masses, fibrinous nodules, and vesicular emphysema. But we knew how utterly unavailing was all this knowledge to arrest the progress of the malady, and establish the cure. The idea that tubercle originates in any sense from vegetation, belongs to a new and advanced philosophy, and opens up a wide region for speculation and experiment. The fairest and loveliest flowers that ever bloomed on earth are cut off annually, in their thousands and tens of thousands, by this fell and dread disease, in the very pride and zenith of their youth. Very touching is their mute appeal. The stoutest heart amongst us may well quail and tremble, as it sees all that is brightest and most beautiful in life garnered thus early into the silent tomb. All ardently desire to see the veil lifted; the origin of the evil exposed in its naked simplicity; and the angel of death arrested in his ruthless and destroying march. This may not be in our day, but yet there is hope. Very magnificent indeed will be the reward of that man who shall succeed in solving this intricate problem, and removing tubercle from the catalogue of the opprobria.

Passing to abdominal surgery one is tempted to say a word, but on a purely ethical aspect. The brilliant gains in abdominal surgery have been largely due to the impetus given by a few eminent specialists, and must challenge and win universal admiration. But I think we can hardly approve when they tell us (I quote the words) that "no surgeon engaged in constant attendance on the promiscuous cases admitted to a general hospital should perform such an operation as ovariectomy." Such remarks come with a bad grace from gentlemen whose practice must be essentially most promiscuous, for their almost daily work will consist in removing colloid and malignant tumours, suppurating cysts, decomposing hydatids, pyosalpinges, and bodies and organs in various stages of putrescence, and oftentimes in patients actually septicæmic, or suffering from peritonitis and other complications; and yet they are able, by proper expedients, to protect their patients from being injured by this alarming promiscuity. Absolute and perfect cleanliness is the specific expedient required—cleanliness of hands, fingers, nails, sponges, instruments, clothing; cleanliness of water, air, and all surroundings; cleanliness within the abdomen after the growth or disease has been removed, as shown in the complete removal of every trace of extravasated blood, or other fluid, which it may have been impossible to prevent reaching the cavity; and a general nicety and cleanliness in the adaptation of all wounded parts, both inside and outside the abdomen. Cleanliness is the sheet-anchor which protects the specialist against evil resulting from his promiscuous practice, and the hospital surgeon must take it for his defence in the same thorough and exhaustive way, if he desire to excel in the department of abdominal surgery.

I venture to express the hope, when another edition of the excellent work which contains this observation is published, that this paragraph will be expunged. Two considerations convince me that such contention is mischievous to the best outcomes of surgery. The forethought, care, and knowledge, which are so strikingly rewarded by success in abdominal surgery, are quite within the range of work of every good operating surgeon, if he will only be at the pains and trouble to attain them. And, secondly, these very qualifications are so much enhanced by the practice of abdominal surgery, that a corresponding improvement in the all round practice of the surgeon is sure to result. Though he may not succeed in obtaining as high an average of success as a Spencer Wells, Keith, or Lawson Tait, yet the general product of his work will be better, and society at large the gainer. He cannot get good results unless he work upon the best possible plan, be very painstaking, careful as to minute points and every procedure; and thus he will insensibly form habits of the highest value in relation to every department of surgical practice. On this ground, therefore, the

operating surgeon of the general hospital who is willing and able to give his best time, and thought, and personal attention, should not allow abdominal surgery to be wrested from him by any artificial rules for the restriction of practice, and there is no valid reason why he should not achieve as good success as the most distinguished specialist.

To the specialist I would say in all frankness, perfect your art; show if you can cent. per cent. of recovery; still let your motto ever be "Excelsior." It is a great, and, maybe, a very noble ambition. Record your experience very faithfully; detail every minute point upon which you know your distinguished success depends, so that you may guide others with less experience, and prevent their being taken in pitfalls, from which, perhaps, you have barely yourself escaped; but never attempt to reflect on others, either inferentially or otherwise, who, striving to do their best, have not as yet managed to attain to your own high average of success. Thus you will earn a rich respect, and deserve to become *facile princeps* in your own department.

In bringing this too discursive paper to a close, I do not claim to have advanced anything original or new, but have drawn largely from the ideas, observations, and discoveries of others. My aim has been to depict in homely and simple guise, the optimist views on a variety of subjects, of an ordinary general practitioner. As in nature, so here, there are different aspects to every view; one mind prefers the sunshine, another the shade; one loves to roam along the valley stream, another selects the mountain top. Human life is the prospect that surrounds us, with its wondrous mechanism working continually on its life spring without cessation, with the most marvellous accuracy, and perfect adaptation of means to ends. The contemplation of the processes involved in what we know as life and death; the genesis, growth, reparation, secretion, excretion, propagation, and decay; all point to the Master hand that guides, controls, and renews the whole. It is sometimes our high privilege to scan the works of Providence as illustrated in the phenomena of life; to unfold and explain the beautiful design, the perfect mechanism, the chemical mysteries, the physiological harmonies, and the pathological subtleties which constitute the mountain top scenes which are open to the view of the capable and aspiring medical mountaineer. But I have rather preferred the valley as more suited to my years and inexperience, and have laid before you the thoughts and speculations as they arose in my mind on the scattered and disconnected objects which presented themselves in the nooks and bye-ways amongst which I wandered.

If the pictures are true that I have drawn, and the remarks and inferences just, I shall trust to your consideration and kindness to make allowance for the imperfections of the work.

A CASE OF EXTREME OUTWARD ROTATION OF THE LOWER EXTREMITIES, THE HEELS POINTING DIRECTLY FORWARDS, WITH DEFECTIVE DEVELOPMENT OF BOTH KNEE-JOINTS: COMPLETE DEVELOPMENT OF CONTROL OF THE LIMBS.

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A. T., a female, born August 7th, 1877, a healthy, well nourished child, no rickets, was brought to me on February 14th, 1878, for congenital deformity of both lower extremities. She had also a right biceps cubiti that could not be extended properly; the elbow stopped at 145°. The left biceps was slightly shortened too. There was no nail on either thumb (the paternal grandfather and father had none).

The lower limbs were so everted at the hips, that the heels looked directly forwards (see Fig. 1, taken from a photograph). But the child could rotate them in with help, and bend the thighs to the belly. There was no dislocation of the hips. In the right limb, at the knee, the tibia was rotated outwards, the inner tuberosity rested on the external condyle, and the patella lay on that prominence. A dimple in the skin at the inner margin of the patella marked a fibrous band attaching it to the femur. The tibia and patella could be restored to the natural position. There was no perceptible deformity of the articular ends of the tibia and femur. Flexion of the knee was natural, but the joint could be extended beyond the straight line until the toes touched the belly. There was a general looseness