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SOME INCIDENTS IN THE LIFE OF JOHN HUNTER, ANATOMIST AND SURGEON.*

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GENTLEMEN,—The duty has devolved upon me of delivering the opening lecture of the Medical Faculty of the University of Toronto. This is the beginning of the thirteenth session since the re-establishment of the Medical Faculty in the University, and during the dozen years which have elapsed marked progress has been made in improving the facilities for medical education in our University. As I became a member of the teaching staff the year after reorganization I can speak from personal experience of a little more than a decade. Further, it has been my duty for the past five years to act as Secretary of the Faculty, and in that capacity I have had special opportunities for observation. Further development and improvement is greatly needed in various departments, but I think we may congratulate ourselves that the standard of teaching, and the facilities afforded for thorough training in our laboratories and hospitals, as well as in the lecture theatre, are worthy of the Provincial University.

The conceptions which I had of university life were first formed as a student in the University of Edinburgh, and when I became connected with the University of Toronto I was wholly at a loss to understand the conditions which then existed. The Medical Faculty had just been reorganized, and many bitter opponents

*Opening lecture of the Medical Faculty of the University of Toronto, 1899-1900.

existed against the new order of things. Some there were outside the University walls, connected with other schools of medicine, who, fearing competition with this Faculty, questioned the right of the Medical Faculty of the University of Toronto to utilize the advantages offered in the University for instruction in certain branches of the medical curriculum.

This gave rise to a great deal of friction, and the questions were discussed at length in the public press and elsewhere. This discussion was perhaps not to be wondered at: it is simply another example of the "struggle for existence" which is constantly going on in all walks of life. There was, however, a peculiar relationship existing within the University itself between the Medical Faculty and their colleagues in Arts. The idea was prevalent with certain people that the Faculty of Medicine had no reason for its existence. They looked upon the Medical Faculty as an interloper, and would have terminated its existence by violent means had it been in their power to do so. It was this aspect of the situation which surprised me—a condition the exact opposite of that existing in the University of Edinburgh, where the Medical Faculty constituted the chief part of the University, where, in fact, the University is famous mainly as a school of medicine.

We may congratulate ourselves, however, on the fact that the University has survived all these trying ordeals, and has steadily grown in strength and favor. The outside schools now let us severely alone, and apparently there has been demonstrated the fact that there is room for all, and that the better policy is to avoid petty squabbles and to concentrate all possible energy on improvement within one's own border. We find, too, that the Medical Faculty of the University of Toronto is on the best possible terms with their colleagues in Arts. The Medical Faculty is, indeed, looked upon as a source of strength to the University, and, far from crippling that institution, it has helped it materially both financially and otherwise. Possibly the conditions obtaining in Edinburgh may one day be observed in Toronto and the Medical Faculty may develop into the most important department of the University, whilst in the distant future there may be repeated in Toronto what has recently occurred in Edinburgh, where the Medical Faculty have found it their privilege to come to the assistance of their weaker brethren in Arts.

Whilst the Medical Faculty has made progress during the period mentioned, we have to record during that time losses sustained by death. In the department of Surgery two professors have died—Dr. W. T. Aikins, Professor of Surgery and first Dean of the Faculty in 1897, and Dr. Laughlin McFarlane, Professor of Clinical Surgery in 1896; whilst in the department of Medicine two vacancies have occurred by death—Dr. H. H. Wright, Emeritus Professor of Medicine in 1898, and to-day we have to mourn the loss of Dr. J. E. Graham. Dr. Graham was present with us during our last session, and was actively engaged in the work of teaching.

By his death the University of Toronto has suffered a great loss. The reputation in which he was held as a physician has been demonstrated by the high eulogiums which have been pronounced upon his career in the medical press of Canada, Britain, and the United States. To-day we mourn his loss as a teacher in this University. We owe much to him for his work in that capacity. He was among the first to introduce the method of systematic instruction at the bedside, and his wonderful gift of imparting instruction as a clinical teacher will long be remembered by those pupils who had the good fortune to attend his clinical lectures. The patient and consistent manner in which he performed his work was itself worthy of imitation by those whom he sought to instruct. He had a remarkable faculty for grasping all the details which presented themselves whilst investigating obscure disease, and the systematic manner in which he considered these, and interpreted their significance, was itself a demonstration of incalculable value from an educational standpoint. Dr. Graham was beloved alike by his colleagues and his pupils. His uniform kindness and courtesy formed elements in his character which we shall long cherish in memory and should strive to emulate. His integrity, industry, and steadfastness of purpose will ever be an inspiration to those who had the privilege of being associated with him in his work in this University.

Let me now address a few words more directly to the students who are assembled here to-day for the purpose of beginning another session. You have come to this University for the purpose of preparing yourself for your life's work; you have deliberately chosen this school as an efficient means of equipping yourself for that work by the training you receive whilst here. We as teachers feel the responsibility of our position, and we hope that the confidence placed in us may be fully justified. The function of the teacher, we are told, is "to teach and propagate the best that is known and taught in the world," and whilst the true teacher should command the respect of his pupils, yet, after all, there is an element in the relationship between the teacher and his pupil which we are apt to overlook by simply viewing the position from the standpoint I have indicated. There is, I believe, great danger of sapping the independence of our students by our manner of teaching. The best teacher is the man who teaches his pupils to think for themselves, and educates them to become independent factors in the search after truth, capable of investigating and observing, and thus becoming intelligent students, true investigators, and men able to apply the reasoning faculty when conditions of difficulty present themselves. There is real danger lest a student should drink in all that is presented to him during his course, and accept all statements without question, and often without understanding them, as if it were sufficient merely "to know" and not equally essential also to "understand." No doubt the course is so congested at present that there is a tendency for the teacher to crowd in as much matter as

can possibly be accomplished during the allotted time. The student subjected to this treatment has little time for the assimilation of the material thus provided, and we fear too frequently there is not the intelligent grasp of the subject there ought to be. Surely the student, especially the medical student who will be thrown sooner or later upon his own resources to treat disease, should be trained to have his faculties always on the alert. Nothing should be passed by without careful scrutiny, and every effort should be made to thoroughly understand each item of instruction presented to him. Professor Chiene used to tell us that he thought we, as students, had too much "spoon-feeding," and that he feared such methods of instruction would fail to develop that strength of character and intellect which ought to result were we compelled to think out and to solve for ourselves the knotty problems which present themselves in the study of the science of medicine.

Far be it from me to undervalue the importance of inculcating that respect for authority which is an essential element in the character of the true student, and yet there is a slavish respect for so-called authority which is exceedingly harmful. There are, unfortunately, men in our profession who are very credulous, and who are too ready to accept statements as true without sufficient proof of their accuracy. There are those who are apt to teach as true the statements made by an author simply because they are contained in the page of a book duly bound and labelled as a text-book on this or that subject. It is a very old doctrine, but we have much need of appreciating its importance to-day—

"Prove all things, hold fast that which is good."

Even in the subject of Anatomy, where one would think there was little room for speculation, as the anatomist is supposed to deal with stubborn facts and no fictions, one occasionally finds erroneous views promulgated. I remember our worthy Emeritus Professor of Anatomy—Professor Richardson—at one time deploring the many erroneous statements which creep into anatomical literature. He likened a certain section of anatomists to a flock of sheep. "Let one man make a statement," said Professor Richardson, "and all these anatomists follow like sheep over a stile, and repeat the error an infinite number of times." That, perhaps, is a somewhat extreme statement, but it is characteristic of a man of wonderful independence of character who, as an excellent anatomist and a keen observer, possessed the qualities which constitute a keen critic.

The danger of accepting too hurriedly the dictum of a man who would pose as an authority, is greatly increased to-day because of the large number of individuals who wish to be considered authorities. The confusion is added to by the absurd desire on the part of many workers to rush into print and publish the result of labors, often before they have themselves been able to interpret the true significance of what appears to them to be a discovery, or

perhaps to convince themselves that they have really made a discovery at all. This desire to appear before the public is, however, not a recent development, but was apparently looked upon as something to be condemned by right-thinking people a century ago. One finds on record a story of Dr. John Barclay, who was a worthy rival of that great anatomist of the early part of this century — Monro tertius of Edinburgh. Sir Robert Christison was one of Barclay's pupils, and records of him that he was a wit as well as a man of science. "Gentlemen," said Dr. Barclay, "while carrying on your work in the dissecting-room, beware of making anatomical discoveries; and, above all, beware of rushing them into print. Our precursors have left us little to discover. You may fall in with a trifling supernumerary muscle or tendon, a slight deviation or extra branchlet of an artery, or perhaps a slight stray twig of a nerve—that will be all. But, beware! Publish the fact, and ten chances to one you will have it shown that you have been forestalled long ago. Anatomy may be likened to the harvest field. First come the reapers, who, entering upon untrodden ground, cut down great store of corn from all sides of them. These are the early anatomists of modern Europe, such as Vesalius, Fallopius, Malpighi and Harvey. Then come the gleaners, who gather up ears enough to make a few loaves of bread. Such were the anatomists of the last century—Valsalva, Contunnius, Haller, Vicq d'azyr, Camper, Hunter, and the two Munros. Last of all come the geese, who will contrive to pick up a few grains scattered here and there among the stubble, and waddle home in the evening, poor things, cackling with joy because of their success. Gentlemen," said Dr. Barclay, "we are the geese."

The difficulties of the student in medicine appear to be increased year by year in consequence of the ever-widening field of knowledge. To-day must be solved problems in chemistry and physics which were not thought of a few years ago, and the study of biology and physiology becomes more difficult because of the recent additions made to our knowledge of these subjects. It has now become impossible for the student to do more than master what may in truth be called the most elementary principles of these various sciences. And what we have said of these sciences apply also to such subjects as anatomy and pathology. The teacher has a difficult task to undertake when he proceeds to select from the vast storehouse of knowledge that which will prove most useful for the student who comes to him for instruction. In great measure the desirable end is attained if he be taught his chemistry and physics, for example, in such manner and in sufficient detail to ensure that he is able in future to investigate intelligently the problems which present themselves having a chemical or physical bearing; or again, if he be taught to understand the problems which present themselves in his course in physiology or biology in such manner that he will be able to apply physiological or biological methods practically in the treatment of disease. This

intelligent method of dealing with the various subjects of the medical curriculum is surely more to be commended than that of cramming facts and theories in an indiscriminate fashion into the mind, and making the student a mere machine to reproduce, like a phonograph, the statements of his teachers for examination purposes.

Let me quote from Sir Michael Foster, who, referring to the inter-dependence of the various sciences taught in the medical curriculum, spoke recently as follows: "Clinical knowledge," said he, "rests on a basis of pathology, pathology rests on anatomy and physiology, or more widely on biology; biology rests on chemistry and physics, and these in turn on mathematics. Each of the sciences are stretching out day by day not only wider but deeper, and a knowledge of each one of them is only possible through a knowledge of that which is its basis." The doctor's life, says Professor Foster, "is in one aspect of it a prolonged investigation; not a continuous inquiry into one homogeneous problem, but a repetition of attempts to solve the multitude of diverse problems presented to him day after day. His success, on this side of life at least, will depend on his power of right-thinking, and his power of clinical thinking is in part the outcome of his being trained to think in other things. He needs to be trained to think in physics and in chemistry in order that he may use these sciences aright when he attempts to study biological or physiological problems. He needs to be trained to think in physiology in order that he may think aright in pathology, and so, with his feet set in the right path, may in his future life be able, through the instincts, as it were, of a well-built mind, to recognize swiftly the value of the right views and the worthlessness of the wrong views, which from time to time will be offered to him, touching the nature and causes of disease. It is not the facts of physics, chemistry, etc., . . . but the right way of viewing these facts, the right way of thinking about them, which is the essential need." Thus we would have our medical students educated in the truest sense of the term, and thus we would hope to ensure that those who graduate from this University have cultivated that true scientific spirit which alone fits a man for the difficult task of dealing with disease in an intelligent and efficient manner.

The tendency for those of us who are students to imitate men whom we admire and respect, is very obvious, and it is therefore of the greatest importance that we should place our ideals high. If we are hero-worshippers, we should see to it that the object of our worship is worthy of our allegiance. The ideal is often found by the student in his teacher with whom he comes in contact day by day, and it is well that it should be so when that confidence is justly placed. It is possible, however, for us as students to take a broader view, and as we proceed with our studies we are compelled to judge of men and their work the world over; in fact, much inspiration of a stimulating character is not infrequently obtained

by studying not only the men of our own day but the masters who lived in other times. The University of Toronto has done well in endeavoring to stimulate interest in the history of medicine, and has recently instituted an examination in that subject for the M.D. degree. By this means students are encouraged to study the gradual development of the science of medicine, and by so doing it may be that, not infrequently, our ideal is found in a man who lived in the past centuries, and by the study of his life we may get an impetus which will serve to waken up latent talent in our own life and work.

Take, for example, the life of a man like John Hunter, characterized as "Man of Science and Surgeon," who lived 1728-1793. What an incentive to honest, conscientious work the study of such a life is! It is impossible, in the time at my disposal, to give but the briefest possible sketch of his life, but let me ask those students who hear me to study his character, and I can assure them that they will derive much benefit as well as pleasure therefrom. He was an indefatigable worker, and became famous not only as a surgeon but in other departments of science. Thus he has been described also as a great anatomist, a learned physiologist, and a profound pathologist. He was a Scotchman, who went to London early in his career, and he is one of the many Scotchmen who have become famous whilst residing in the great metropolis. His early developed scepticism, and his desire to sift the truth is apparent from a somewhat amusing anecdote narrated concerning him. One night, when he was about twelve years old, having gone to chat a little with some neighbors who lived in a cottage near his father's house, whilst he was sitting by the fire with two or three countrypeople, a most terrible apparition, with a face resembling the devil's, opened the door and looked in upon them. The company, which consisted of a woman and two men, believing it really to be what it represented, were petrified with fear and remained immovable, but John Hunter, who was, as he afterwards confessed, by no means certain that it was not the devil, snatched the tongs from the hearth, and, attacking the spectre, made it roar with pain and run out of the house.

When we consider the amount of work done, it is hardly credible that one man should have accomplished it in his lifetime, but here we have the key-note of his success in life. When we have talent combined with untiring industry, we have the stuff that makes the hero. It is well for those students who complain of long hours of work that they were not students under John Hunter. An incident is related of a student, a certain Mr. Thomas, who came to London and called on Mr. Hunter. "Well, young gentleman," said Hunter, "so you are come to London to be a surgeon. And how long do you intend to stay?" "One year," was the reply. "Then," said he, "I'll tell you what, that won't do. I've been here a great many years, and have worked hard too, and yet I don't know the principles of the art." After some further

conversation, Mr. Thomas was directed to call again in an hour, which he did, and accompanied Mr. Hunter to the hospital, when he said to him after business was over, "Come to me to-morrow morning, young gentleman, and I will put you further in the way of things; come early in the morning, as soon after four as you can." It was summer. Mr. Thomas kept the appointment, and found Hunter at that early hour busily engaged in dissecting beetles. Of his laborious life, Holmes writes that "his day began with sunrise in summer, and long before dawn at other seasons, after about four hours in bed; and then from four to five in the morning he used to dissect until eight o'clock breakfast. Then he saw his patients or pursued his researches till he had to go his rounds to the hospital or his office as Surgeon-General or his patients in the city, and after his frugal dinner at four o'clock and an hour's sleep, he resumed his labors till midnight brought his day to an end."

Hunter was first an anatomist; he was a keen and shrewd observer, and made many anatomical discoveries. His researches were far from being confined to human anatomy; he made also extensive additions to our knowledge of comparative anatomy. One of his biographers, Sir Richard Owen, says of him, that "from the title of his manuscripts it appears that Hunter possessed at the period of his decease, original records of the dissection of three hundred and fifteen different species of animals." In addition to these, Hunter's preparations testify that he had dissected a large number of animals, of which he left no written description. By adding these undescribed dissections to those of which we derive the evidence from the list of manuscripts, "there is proof that Hunter anatomised 500 different species of animals, exclusive of repeated dissections of different individuals of the same species, besides the dissection of plants to a considerable amount." Hunter believed in cultivating the faculty of observation in his students, and taught them to rely on their own powers of observation rather than accept the teachings of the authorities of the day. A certain Mr. Physick came to him as a student, and upon inquiry having been made as to what books he would require, Hunter led the way into the dissecting-room, and pointing to the several bodies said: "These are the books you will learn under my direction, the others are fit for very little." Some such sentiment ought to be expressed by the teacher of anatomy to-day, if it be used to enforce the importance of learning one's anatomy from the subject, and not from books. The enthusiasm with which Hunter pursued his researches was very remarkable; he was untiring in the energy he displayed in accomplishing his purpose, whatever that might be. A characteristic story is told of him that on one occasion, his money being exhausted, he went to his friend, Nicol, the bookseller, and thus introduced himself: "Pray, George, have you got any money in your pocket?" Nicol replied in the affirmative. "Have you got five guineas? because if you have, and will lend it to me, you shall

go halves." "Halves in what?" inquired his friend. "Why, halves in a magnificent tiger which is now dying in Castle Street." Nicol lent the money, and John Hunter got the tiger. The deliberate manner in which he planned to get possession of the skeleton of an individual, who was known as the "Irish Giant," also illustrates his determination to obtain whatever he thought of value to him in the pursuit of science.

The giant—O'Brian by name—learned during his life-time that Hunter's eye was upon him, and he therefore took precautionary measures, and ordered that on his death his body should be carefully guarded by relays of men until a leaden casket could be procured, in which the body was to be placed, and then carried out to sea and sunk. Hunter, however, was not to be baffled. On the giant's death Hunter's agent bought the watchers off. At first they agreed to a dereliction of duty for fifty pounds, but getting that so easily they demanded fifty more, and only ceased to extort when Hunter refused to budge a penny beyond 400 pounds! The skeleton of this giant may be seen in the Hunterian Museum.

Hard work was the all-absorbing passion of his life, and he never allowed anything to interfere with his work; he considered also that the greatest happiness could be obtained by patient, untiring industry. His advice to Jenner, in writing a letter of condolence to him because of a disappointment in love, indicates his belief in the efficacy of hard work in restoring happiness under such circumstances. "But," said Hunter, "let her go, never mind her; I shall employ you with hedgehogs, for I do not know how far I may trust mine."

John Hunter was a physiologist as well as an anatomist. He had a very extensive establishment at Earls' Court, where he kept a large number of animals which he used largely for experimental purposes, and for the purpose of studying their habits. He studied the development of the embryo from the egg, and made many important observations during his investigations.

Hunter's great aim in life was to study and to teach physiology as an experimental science, and as the only true basis of medicine and surgery. Let me mention one of his experiments to illustrate the completeness of his methods and show the manner in which he devised experiments and followed up his investigations. One of his biographers—Mather—writes as follows: "He was known to be humane and intent on conferring benefits on the human species as well as on science, therefore he was granted the privilege of making experiment on the deer in Richmond Park, and the result has proved the wisdom of allowing such liberty, for infinite blessing has been conferred upon humanity by the experiments. Hunter, in July of 1785, had a buck there caught and thrown, and tied one of its external carotids, which supplies the growing antler, and the soft covering called the velvet, in which the vessels convey the material of growth. He observed that the pulsations in the vessels of the velvet ceased, and that the antler which received its

blood supply therefrom, then half grown, became cold to the touch. Hunter debated with himself whether it would be shed in due time, or be retained longer than usual. To his surprise, on re-examining the antler a week or two later, when the wound was healed, it had regained its warmth, and was still increasing in size. Had, then, his operation in some way been defective? To determine this question the buck was killed and sent to Leicester Fields. On examination Hunter found that the external carotid had been duly tied, that the tied artery had been obliterated, but the circulation was carried on by vessels above and below the ligature, generally very small, but which, under the new conditions, had become enlarged, and by their anastomoses had supplied the blood supply to the growing part. Thus it was evident that under the 'stimulus of necessity,' to use a phrase of the experimenter, the small arterial channels are capable of rapid increase in dimensions to perform the offices of the larger ones." Thus was established in the middle of last century the important facts regarding the anastomotic circulation.

Hunter also investigated the conditions which presented themselves in disease, and he could lay claim to being an advanced pathologist. He investigated the phenomena which present themselves in inflammation, and wrote an extensive treatise on the subject He also worked upon the subject of mortification and the healing of wounds and a large number of other processes dealing with disease.

Hunter was forty years of age when he was appointed Surgeon to St. George's Hospital, and it was not until then that his work as a surgeon may be said to have commenced in earnest. Up to this period he had devoted the greater part of his time to the study of anatomy and to experiment upon animals. Now he began his work as a surgeon equipped in a manner like none other of his predecessors. Hunter raised surgery to the dignity of a true science. He had by his own efforts demonstrated the facts of anatomy, he had elucidated many difficult problems which present themselves both in health and disease, and in bringing this knowledge to bear upon his treatment of disease, he completely revolutionized surgical practice. His brother, Dr. Wm. Hunter, who was hardly less illustrious than himself, once said, "Were I to place a man of proper talents in the most direct road for becoming truly great in his profession, I would choose a good practical anatomist and put him into a large hospital, to attend the sick and dissect the dead." When forty-five years of age he gave his first lectures on Surgery. These lectures cost Hunter much labor. "Giving lectures was always particularly unpleasant to him; so that the desire of submitting his opinion to the world and learning their general estimation was scarcely sufficient to overcome his natural dislike to speaking in public. He never gave his first lecture of his course without taking thirty drops of laudanum to take off the effects of his uneasiness. He was so diffident of himself that he trusted nothing to memory, and

made his assistant draw up a short abstract of each lecture, which he read on the following evening as a recapitulation to connect the subject in the minds of the students."—(Home.)

The work he did in surgery was far ahead of his time. His operation for aneurism will become familiar to the student of surgery to-day. "In the treatment of wounds," said Hunter, "in order to facilitate the natural process of healing, little is to be done except removing impediments to the natural cure." In cancer, "unless the whole of the diseased part can be removed the operation will avail but little. . . . The first and great requisite for the restoration of the injured part is rest. . . . Varicose veins should be dissected out where this can be conveniently done." How close he was to the truth of Lister's teaching of the present day may be judged from the statement that "air will be injurious to man and animals by its containing specific particles of contagion." He wrote a work on military surgery, and in this practically laid the foundation of military surgery.

Whilst Hunter developed into a surgeon, "he never dropped one burden because he shouldered another; in spite of the lectures, the increase of his private practice, and his work at the hospital, "he was engaged in numerous dissections, observations and experiments. In the years 1772-1776 he contributed seven papers to the philosophical transactions of the Royal Society, five of them on Comparative Anatomy or Physiology, one in Pathology and only one of the seven concerned with treatment" (Paget). We find a description of him, too, in his old age spending hours over a piece of dissection.

Hunter was progressive. In his work he never stood still. To Astley Cooper, who asked with surprise whether he had not the year before stated an opinion on some point directly at variance with one he had just put forth, he replied, "Very likely I did; I hope I grow wiser every year;" and to the same purport he answered another of his pupils who asked him if he had not written so and so, "Never ask me what I have said, or what I have written; but if you will ask me what my present opinions are, I will tell you." Occasionally he would say to any of the pupils whom he saw taking notes, "You had better not write down that observation, for very likely I shall think differently next year." One cannot help wondering what sort of politician Hunter would have made! As a matter of fact Hunter had some strong opinions on politics. He is described by Gross as possessing strong feelings towards the Tory side, and he used to say that he "wished all rascals who were dissatisfied with their country would be good enough to leave it." In giving permission to a friend to send a third party to see his museum, he tells him that he may send any one he pleases except a democrat, for "I would rather," he adds, "see it in a blaze like the Bastile, than show it to a democrat, let his country be what is may."

The Government of his time showed little interest in the pur-

suit of science. After Hunter's death when an effort was made, to get the Government to purchase his museum, Mr. Pitt said, "What! buy preparations! Why I have not money enough to purchase gunpowder."

Hunter was an untiring investigator, and his faculty for observation was of rare quality. "If we try to find," says Sir James Paget, "in Hunter's character, the facts to which may be ascribed his great influence in the promotion of medicine and surgery, I think it may justly be assigned to the degree in which he introduced the exercise of the observant scientific mind into the study and practice of surgery." He was an extraordinary collector, and built up an extensive museum. The bulk of the preparations and dissections were made by his own hands. Upon this collection he spent some £70,000, in fact all his available funds went in this direction, so that at his death he left barely enough to pay his debts. The museum, which was a very extensive one, was purchased some six years after his death by the British Government, who paid £15,000 for it, and handed it over to the Royal College of Surgeons as custodians. The Hunterian Museum is well known to members of our profession the world over. It has been still further added to since Hunter's death by those who have been the curators through successive years, among the most noted of whom may be mentioned Sir R. Owen and Sir William Flower. The Hunterian Museum has no rival; there is nothing like it elsewhere to be found.

Hunter had written records made of most of his work, and some ten large volumes of manuscript which had been written, revised and corrected—the work of many years—were purchased with the museum by the nation, but some thirty years after Hunter's death the manuscript was burned by Sir Everard Home, the executor of the estate. There never was any satisfactory explanation of why these were destroyed, but Home alleged that it was by Hunter's desire, because he considered the writings too imperfect for the public eye.

Such then is a brief sketch of Hunter's life. His name has been honored by British surgeons. The first Hunterian oration was delivered in 1814, and since that time, at first annually, and latterly bi-annually, the Hunterian oration has been delivered by the President of the Royal College of Surgeons. It is wonderful how much there is of true value to be obtained by the study of such a life. The different Hunterian orators have succeeded in characterizing this remarkable man as an advanced thinker in various departments of science. He has been described as botanist, comparative anatomist, biologist, geologist, naturalist, physiologist, pathologist and surgeon. His work, however, all converged from these various outlying sciences towards the great central aim which he had in view, namely, to apply his knowledge in the practical work of his profession for the purpose of healing disease and thus benefiting humanity. It has been said of him that with

the exception of Hippocrates, the father of medicine, John Hunter is the grandest figure in his profession. Certain it is that he was a man of indomitable industry and of powerful intellect, who possessed an absolutely original method in his work, and as for Hunter's relation to the authorities of the day we may say that he acknowledged no authority, he was absolutely unfettered by authority, and thus his genius had free play. Whilst this was his attitude, he shrank from posing as an authority himself. He expressed himself as having a great distrust for rapid thinking and of work published in a hurry. "It is surprising to see," he says, "how a young man, if he catches an idea which has any novelty, will write away on it and tell you wonders." In fact, he published nothing himself except a few short notes until he was forty-three years of age.

Whilst Hunter led this laborious life, and thus accomplished so much, it is remarkable to note that he was greatly handicapped in his work by severe illness, from which he suffered for some years, and that he also suffered the misfortune of a defective early education. In fact, up to the age of seventeen he had no education. As far as school was concerned, he could neither read nor write. He was not idle, however, as he was studying nature at that early age. To quote his own words, he says: "When I was a boy I wanted to know about the clouds and the grasses, and why the leaves changed color in the autumn; I watched the ants, bees, birds, tadpoles, and cadis worms; I pestered people with questions about what nobody knew or cared anything about." I fear if Hunter had been blocked by the matriculation examination of the University of Toronto, his career as a scientist would have been prematurely cut off! A little later in life, when he was taunted with his ignorance of the classics, he remarked upon the circumstance thus: "Jesse Foot accuses me of not knowing the dead languages; but I could teach him that on the dead body which he never knew in any language, dead or living." Jesse Foot was a rival surgeon.

Let me conclude this account of Hunter by quoting what that beautiful writer, Sir James Paget, says regarding him. "The influence of such men," says Dr. Paget, "reaches far beyond the time and space of their conscious activity; their true thoughts live after them; their true thoughts not only endure and remain—in the continuity of mental life they really live; they pass on from one generation to another, and in the minds of each succeeding generation they are developed, they grow, they attain more nearly to perfection. Thus when we honor the memory of Hunter we honor not only that which is past, but that which is still present—a still abiding power of doing good. For Hunter's true thoughts still live in us, and they will live after us, and never cease to help and urge men onward in the pursuit of truth. In the world of mind he that is mortal may produce that which is immortal."

I have thus attempted to direct your attention to the study of the character of a great man who lived in last century. There are

two men of our own time who, like Hunter, claim our respect and reverence. Last year in London the leading men of our profession from all parts of the kingdom gathered together to do honor to a distinguished foreigner. I refer to Professor Virchow, of Berlin, who came to London last autumn for the purpose of delivering the Huxley lecture. By his work he may be said to have founded the modern science of pathology. He completely revolutionized our knowledge of disease by demonstrating the part played by the cell in the various morbid processes. He, like Hunter, abandoned the teachings of his time, and by original investigation, in his work in cellular pathology, laid the foundation of the science of pathology as it is understood to-day. His brilliant career has extended over half a century, and I suppose no man has done as much to advance the science of pathology as he. The marvellous insight of the man, his originality of method and keenness of observation claim our greatest admiration. Virchow himself in referring to Huxley, described him thus: "A young man who, besides collecting a rich treasure of positive knowledge, has practised dissection and the exercise of a critical judgment. . . . Freed from the formalism of schools, thrown upon the use of his own intellect, compelled to test each simple object as regards properties and history, he soon forgets the dogmas of prevailing system and becomes first a sceptic and then an investigator." Surely in Virchow's estimate of the qualities of that eminent biologist of our own country he fixed upon the very characteristics which were so strongly developed in his own—qualities which have made Virchow one of the outstanding figures of his day.

We have also in our own day one of the most distinguished surgeons who ever lived. I refer to Lord Lister. As Hunter was the ideal anatomist and Virchow the ideal pathologist, surely Lister is the ideal surgeon. He addressed an assembly in this very lecture theatre two years ago. His work is known and recognized by scientists the world over. It is unnecessary for me to say anything of his work here to-day. You as students will become familiar with the methods of Lister as you proceed with your studies in surgery. Let me quote again from Virchow who, as a German, thus spoke of Lord Lister recently. Speaking of his antiseptic methods he says that "by devising this treatment Lister has introduced the greatest and most beneficial reform that the practical branches of medical science have ever known. Every one is aware," says Virchow, "that Lord Lister, on the strength of his original reasoning, arrived at practical results which the new theory of fermentative and septic processes fully confirmed. Before any one had succeeded in demonstrating by exact methods the microbes which are active in various diseases, or in establishing the special functions that they perform, Lister had learnt a truly prophetic revelation, the means by which protection against the action of putrefactive organisms can be obtained. The opening up of further regions of clinical medicine to the knife of the surgeon

and a perfect revolution in the basis of therapeutics have been the consequence. Lord Lister is already and always will be amongst the greatest benefactors of the human race."

Let us do more than admire the qualities which enabled such men to accomplish so much. Let us imitate them in their untiring efforts to establish the truth. May the life and work of such men animate our own and stimulate us to higher aims.

ON THE SIGNIFICANCE OF BOVINE TUBERCULOSIS AND ITS ERADICATION AND PREVENTION IN CANADA.*

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IN determining the significance of bovine tuberculosis so as to arrive at adequate conclusions—adequate, that is, from all points of view—three main questions have to be asked and answered. These are:

1. Is tuberculosis in cattle a source of danger to other cattle so as to seriously affect their well-being, and to be a source of loss to their owners?

2. If infectious from animal to animal, is it infectious from animal to man, and thereby a grave source of danger to the human race?

3. If infectious from animal to man, what are the commonest modes of infection, and, as a sequel to this, how are we to diminish the danger?

If even the first of these only can be answered in the affirmative, then it becomes necessary to inquire how the disease can be arrested, and it is for our profession, as interesting itself in disease in general, to take a leading part in agitating for this arrest. If both the first and second, then are we not only indirectly but directly affected, and to allow tuberculosis in cattle to gain a headway without ourselves employing all the means in our power to arrest its progress, is little less than criminal.

To-day I propose briefly to consider in order, first, the significance of the disease, next its frequency in our country, and finally the steps necessary to stamp it out.

1. *Is tuberculosis in cattle a source of danger to other cattle?* To this the answer is an unqualified affirmative. We have abundant evidence here in Canada that the introduction of an infected bull, as again of infected cows, into a herd previously free from the disease, has been followed within a short time by symptoms of the disease in members of the old herd.

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*Being a paper read at the meeting of the Canadian Medical Association, Toronto, August 28th 1899.

The ravages which this disease creates among the cattle of civilized communities is something appalling. Here in Canada, as I shall proceed to point out, we are in a relatively very favorable condition, and most of us in our profession see very little of the disease and of its results. It is otherwise in the Old World; there the steady spread of this plague among the dairy herds is creating widespread alarm. That it is extending there is no doubt. The following table of slaughter-house statistics, which I take from an article by Professor Conn, gives some idea of the rate of this spread:

BAVARIA.

1877	1.62 per cent.
1888	2.7 "
1895	5 "

SAXONY.

1888	4.90 "
1890	15.7 "
1895	27.48 "

BERLIN.

1883	2.86 "
1885	2.10 "
1895	15.45 "

LEIPZIG.

1883	11.1 "
1889	14.9 "
1890	22 3 "
1891	26.7 "
1895	33.3 "

It may be objected that this increase is only apparent, that the veterinarians and the officials at the slaughter-houses have of late years learnt to recognize the disease with increasing accuracy, a single tuberculous gland being now often detected, whereas it was passed over in earlier years. It may also be objected that other factors have to be taken into account, namely, the experience of the inspectors, the attitude of the inspectors towards the disease—a desire to find little resulting in little being found, and *vice versa*; that, further, the age of the animals slaughtered affects the results (tuberculosis being a disease showing itself especially in older cattle).* But all through the period indicated by the above table great attention has been paid to the subject by veterinarians; their eyes have been opened to the existence of the disease, and to methods of gross anatomical diagnosis in the carcase. At Leipzig more especially, as Conn points out, the inspection has been most

* According to Roekl (I quote from a report of Dr. Bryce to the Provincial Board of Health, Toronto), from a consideration of some 51,000 animals slaughtered in German abbatoirs in 1888-89; according to the age of the animal the infection was found:

6 weeks old	0.6 per cent.
6 weeks to 1 year	0.6 "
1 to 3 years	11.4 "
3 to 6 years	33.1 "
Over 6 years	43.4 "

careful. It has been under the same management during the whole period, so that the results of successive years may more safely be compared with each other than in most cases, and Leipzig affords the strongest evidence of the increasing frequency of the disease.

This rise in percentage of tuberculous cattle seen in the slaughter-houses at Leipzig from 11.1 per cent. to 33.3 per cent. in seven years is veritably appalling, and no other explanation can be afforded than that the disease, in Germany at least, is spreading with terrible rapidity. So much indeed is this the case that competent authorities there are of opinion that in a few years there will be no breeding herds left unaffected. If, in place of the slaughter-house statistics, we take those afforded by the tuberculin test, the percentage of cases found in animals other than yearlings is yet higher than those afforded by the slaughter-houses. In Germany and Denmark veterinarians have come to the conclusion that the amount of tuberculosis is over 50 per cent. of all the animals in the land, many large farms being found without a single sound animal. In other words, about half the animals in northern and western Europe would seem to be afflicted with tuberculosis.

Corresponding statistics for Britain do not exist, nevertheless the conditions there, it would seem, are scarcely if at all more favorable. Thus in the County of Midlothian, abbatoir statistics show the existence of the disease in 22 per cent. of the animals slaughtered, in Yorkshire a percentage of 22.8, Durham 18.7, and in London 25 per cent. These, be it remembered, are slaughter-house results and not those derived from the tuberculin test. In fact, tuberculosis among the most valuable and most highly bred herds is so extensive that extreme precautions should be taken and stringent contracts made by the buyer as well as stringent regulations framed and carried out by the Government to insure that, however great the cost of the individual cow or bull imported, the animal be found perfectly sound and unaffected by the disease before it is permitted to enter the country.

Personally, though in this I speak in no official capacity, I am inclined to think that, taking into consideration the fact that if once an animal has been inoculated with tuberculin it may not give a second reaction until more than a month has elapsed, I would urge that all cattle imported for breeding purposes be kept in quarantine for six weeks at least, and only permitted to be delivered to owners in this country if at the end of that period they fail to react. Otherwise, by any other course, there is a distinct danger that the disease may be introduced into herds previously quite free from the disease.

Nor even in the Eastern and older populated States of America is the condition much more satisfactory. Certainly, in Massachusetts, where the most painstaking observations have been made, the disease has been found very common. In their report for 1895, the Cattle Commissioners of that State show that in several large herds the percentage of animals reacting to tuberculin was as high as

100 per cent. These are, it is true, extreme cases. Of 3,295 animals examined by inspectors and others in various parts of the State, 810, or about 24.58 per cent. reacted. Of neat cattle examined at the Stock Yards, about 6.21 per cent. were condemned, while in the district of Nantucket, selected because of its position as an island on the coast upon which there were comparatively few cattle, and these fairly well isolated, 6 of the 665 animals upon the island, or rather under 1 per cent. reacted to the test. This, while it shows considerable variation in the prevalence of the disease under varying conditions, shows also that it is far from infrequent, and that care must be taken with regard to importation of stock for breeding purposes, from the Eastern States as well as from across the sea.

What are the results of and what the dangers from this extraordinary prevalence of the disease elsewhere?

First and foremost, there is the effect upon the animal itself, upon its value as a milker, a breeder, and a meat-giver. While for some months a cow reacting to the tuberculin test may remain sleek and give abundant milk, sooner or later the disease progresses, she emaciates, dries up, becomes useless, and when killed is almost useless. What was once a valuable animal is finally a great loss to the farmer. I have met with cases of apparent healed or obsolescent tuberculosis in cattle, and it may be that such cases are not uncommon—in cattle, just as in man; but undoubtedly the danger is that the disease will extend.

In the second place, though this matter I shall not discuss at the present moment, there is the danger to the community in employing the milk and meat from such an animal. In any case where this disease is at all frequent, the loss to the farming community, and so to the country at large, is enormous.

Even in Scotland, which cannot be called a large country, or one in which cattle-raising and cattle-breeding is the staple occupation of the inhabitants, Professor Wright, in 1893, estimated that tuberculosis in cattle caused an annual loss of dairy stock of about £440,000, or $2,000,000, and this apart, I take it, from considerations of loss in milk and butter, and loss as breeding animals.

We may therefore conclude that, purely from the standpoint of the agriculturist, it is all-important that this disease be if possible eradicated.

II. *If infectious from animal to animal, is bovine tuberculosis infectious from animal to man?* The answer to this question is generally given as an unhesitating affirmative. I wish, however, to point out to you to-day that while we must accept the affirmative as the correct answer, and while it is the duty of the individual and of the State to act in full accordance with the belief that this is so, the amount of reliable evidence of direct transmission of tuberculosis from cattle to man is singularly slight. For let us consider the means at our disposal for determining this point. Could

we make a direct experiment the determination would be easy and straightforward; but this is just what we cannot do. To inoculate the human being with tuberculous material, or expose him to infection from a diseased cow, would be a criminal act; it would differ in no sense from attempted murder. We can, it is true, perform the opposite experiment, that of inoculating cattle with phthisical sputa or other tuberculous material from man. If we do this, as Theobald Smith has pointed out, we discover the remarkable fact that cattle are relatively insusceptible, or are but slightly susceptible to human tuberculosis. Whereas tubercle bacilli obtained from cattle introduced into other cattle induce a relatively virulent disease, those obtained from man either set up mild chronic disturbance tending to be localized or lead but to transient results, what tubercles are formed undergoing absorption and disappearance. Our own observations in Montreal fully confirm Theobald Smith's statement. That, because for cattle bovine tubercle bacilli are very virulent, therefore they are also very virulent for man, more than are the human bacilli, we know from comparative bacteriology to be an absolutely unsound deduction. This may be so, but it may not. We have fairly abundant evidence that passage of pathogenetic germs through a series of animals of one species, leads to those germs attaining their maximum virulence for that species—but not by any means necessarily for other species. Indeed at times the virulence for other species is distinctly lessened by such passage, and in connection with tuberculosis we have distinct evidence that the bacilli obtained from fowls suffering from tuberculosis differ even more widely in properties from those obtained from man than do the bovine tubercle bacilli. Despite some earlier observations to the contrary, it is now generally found that fowls may, with impunity, be fed with human phthisical sputa without becoming infected. Kruse has, it is true, obtained in a few cases tubercle bacilli of the avian type from the human body, indicating that man may be infected from birds. But we cannot legitimately and by analogy apply these observations to the case of bovine tuberculosis and man. We are forced, therefore, to fall back upon evidence of another type.

Do the bacilli gained from the human and bovine species possess a morphological and cultural identity? They do not. The bovine grow more freely in the ordinary glycerinated media; they are, I find, of greater relative breadth, while again, as already indicated, pathogenetically they exhibit different degrees of virulence, and this when inoculated not only into cattle, but into guinea-pigs and the small animals of the laboratory. Koch, it is true, in his classical experiments held them to be identical, but later research has shown them to be so distinct as to make some observers consider them distinct species. But to classify them as distinct is to pass beyond what is right and reasonable. We are accumulating more and more facts to show that pathogenetic bacteria may undergo extensive modification according to the nature of their environment, and that within certain limits bacteria may show more or

less permanent variation of common properties as a result of variation in environment. And in this matter of tuberculosis we have the most important observations by Nocard and Roux that avian tubercle bacilli, which differ more widely from the human than do bovine, can be shown not to be a distinct species, but what may be termed *a race;*—

While under ordinary conditions, human tubercle bacilli inoculated into birds are destroyed, and lead to no organic changes, if a pure culture of such bacilli be placed in celloidin capsules, and those be then hermetically sealed and introduced into the abdominal cavities of birds, when thus protected from the body cells but fed by the body humors which diffuse through the celloidin, they will grow, and in the course of weeks assume all the characters and all the pathogenetic properties of the avian bacilli. We can only from this conclude that the races of the tubercle bacilli spring from a common stock, and have undergone material modifications according to their surroundings. So far, however, bacilli having all the morphological and cultural characteristics of the bovine "race," havenot been isolated from the human organism, nor do I know that, so far, by placing protected human bacilli in the abdominal cavity of the cow, these have assumed the bovine characters. It is in this last experiment, I believe, that the solution of the question is to be found. For if we can show that under favorable conditions the human bacillus can become highly pathogenetic for cattle, the converse would also seem to hold that there are conditions under which bovine tubercle bacilli can be pathogenetic for man.

Failing direct experimental and bacteriological evidence of the absolute identity of bovine and human tuberculosis, we are for an answer to this question driven back yet further, and this time to casuistic evidence. Have we any evidence or absolute proof that by natural means tuberculosis has been conveyed from cattle to man? We generally teach that we have such positive proof, and at first thought it would seem easy to collect case after case in which, for example, butchers, and those dealing with tuberculous animals, have become infected through wounds, and so on; or again, of children and other human beings fed upon the infected milk of tuberculous cattle developing tuberculosis. But when we come to examine into these cases, we must be struck by the lack of indisputable evidence afforded. To prove the case we must be able to absolutely exclude every other possible mode of infection, and with human tuberculosis so common a disease, such exclusion is a matter of extreme difficulty. It must be shown that the individual has not come into contact with any other human being actively suffering from the disease. In the case of butchers it has to be proven that they have dealt with tuberculous cattle, and no other infected animals: previous cases of human tuberculosis in the neighborhood have also to be excluded, for we know that in dwelling-houses the virus may linger for long in the dust and in hangings of rooms. Thus, to obtain an uncomplicated case is a matter of the greatest difficulty.

Upon broad principles, it is true, the frequency of tuberculosis among children and its increasing frequency during the period when they have a diet largely of cow's milk, would appear to be a strong argument in favor of believing that the milk of cows affords the most likely source of infection. Only in this last week's *British Medical Journal*, in an able paper by G. F. Still of the Great Ormond Street Hospital for Children, the matter is brought forward very clearly. He considers a series of 769 consecutive necropsies on children under twelve years of age; in these no less than 269, or more than one-third of the total number of cases, showed tuberculous lesions. We find of these 269 cases, 117 or no less than 43 per cent. occurred at the milk-drinking period of life, namely during the first two years of life, and 56.5 per cent. occurred in the first three years. Undoubtedly the main incidence of tuberculosis in the young corresponds more or less exactly with the period in which milk forms, or should form, the chief article of diet, and as Still quotes from a report on tuberculosis, presented to the Council of the British Medical Association, "the mortality from tuberculosis in early childhood is not decreasing as it is at other ages in the United Kingdom, and the opinion that this great prevalency of the disease in childhood is due to infection through the alimentary canal by milk from tuberculous cows, appears to be well founded."

But now let us analyse Dr. Still's very careful studies upon the sequence of infection. To determine such sequence is a difficult matter, because tuberculosis in children so rapidly tends to become generalized, and it is difficult to make out which are the oldest and which the more recent lesions. But a study of the lymphatic glands affords material aid; thus, large cheesy or caseous masses in a mesenteric gland with scattered tubercles in the peribronchial glands indicates that the intestinal lesion is the older, and conversely, if the peribronchial glands be the more affected, infection has been more probably through the respiratory tract. Tubercular adenitis of the larynx and tubercular ear disease would also appear to be mainly due to infection through the air rather than the food. Thus of the 269 cases above referred to the channels of infection were as follows:

Respiratory:			
Lung	105	138	153 = 57.2 per cent.
Probably Lung	33		
Ear	9	15	
Probably Ear	6		
Alimentary:			
Intestine	53	63 = 23.4 per cent.	
Probably Intestine	10		
Other Cases:			
Bones or Joints	5		
Fauces	2		
Uncertain	46		
	269		

It thus follows that respiratory rather than alimentary infection is the commoner in children in about the ratio of 57.2 to 23.4. While this is the case it must also be admitted that the proportion of cases of alimentary infection is relatively high, so high as to make it very probable that the staple food of children, namely, milk, does play a part in the spread of the disease.

When now we come to examine the individual cases there are some which it is very difficult to explain unless we assume that infection has been through the milk. But while admitting this we have to confess that with scarce an exception the evidence afforded is not absolutely exclusive of possibility of infection by other means.

Demme records a case of four infants in the Children's Hospital at Berne, issue of sound parents, without any tuberculous ancestry, who died of intestinal and mesenteric tuberculosis as the result of feeding on the unsterilized milks of tuberculous cows. These were the cases in which he was able to exclude the possibility of other causes for the disease and was satisfied that the milk alone was to blame.

The Cattle Commissioners of Massachusetts give reference to a case of an infant, son of a college mate of one of their body, a comparatively strong healthy child of twenty-one months, who, visiting a relation for a week, drank unsterilized milk of a cow which was soon after condemned and killed in a state of generalized tuberculosis; this child died three months later with mesenteric tuberculosis. Only distant relations had died of this disease and the child had seen but one of these and that for short intervals. A second child of the same family brought up on sterilized milk remained in robust health; the parents were free from the disease Even in a case like this, convincing as it seems, more information is required with regard to the nurse and servants of the household, the possible existence of any case of tuberculosis in the house of the relation visited, and so on.

Ernst quotes similar cases. Olliver's well-known case, quoted in the *Semaine Medicale* of February 25th, 1892, is also not quite perfect. The case was that of a girl of apparently healthy parentage and previous surroundings, who died of meningeal tuberculosis. She was educated at a boarding school where thirteen pupils had been ill with, and then had died of, tuberculosis within a few months. The milk supplied to the school was from cows kept on the premises; these animals upon examination were found to have tubercular disease of the udders and to suffer from general tuberculosis. Here, for example, it might be urged that under school conditions one girl might easily convey the disease to the other. The swiftness, however, with which the disease affected simultaneously a large number of individuals, is on the whole, in favor of regarding the disease as having been brought about through the milk. Thus the evidence, while not absolutely convincing, is strongly in favor of the view that tuberculosis can be conveyed

through the milk of animals extensively diseased, and this being the case, we cannot sit with hands folded and regard the extension of bovine tuberculosis with indifference, but must make such regulations as will diminish the possibility of such infection.

3. *What are the more frequent modes of Infection?* Naturally apart from actual contact with the diseased animals and their products, the commonest modes of infection are by the animal products used as food, namely, the meat, milk and milk products. There are but a few words that I wish to say in this connection. The infectiousness of meat may be rapidly dismissed. Sims Woodhead and the British Royal Commission have shown that while the ordinary cooking of meat is sufficient to destroy tubercle bacilli, and while thus in English-speaking countries the danger of infection from this source is reduced to a minimum, it nevertheless may happen that the portion of a large joint in the centre may not be subjected to a temperature sufficient to kill the bacilli. At the same time the report from the same Royal Commission shows clearly that even in fairly well advanced cases of tuberculosis the bacilli are present but in small quantities in the meat itself; in fact, muscle is one of the last tissues to become the seat of the tubercular process. They show that the great danger is not from the existence of tubercles within the meat but of contamination of the surface in the process of dressing, by the knives and hands of the operators becoming smeared with material from other regions which are the seat of extensive disease.

When such susceptible animals as guinea-pigs, fed directly with the expressed juice of raw meat, do not thereby become infected, it is, to say the least, little likely that cooked or even partially cooked meat can set up infection in man. Where the disease is so far advanced that the meat may become dangerous to humanity there is little likelihood of such meat being exposed for sale or employed as a food.

With milk, the problem presents several difficulties. Accepting it as a fact that this can convey infection, the conditions under which it does so are, I think, not generally recognized. Thus the British Royal Commission lays it down that only when the udder is diseased does the milk become infectious, and would suggest that the withdrawal from the dairies of cows having any disease whatever of the udder, would form some approach to security against the serious danger incurred to man by the use of tuberculous milk; "but it would not be an adequate security." The report further states, "if the expert finds tubercle bacilli in the milk, the cow has dangerous tuberculosis of the udder; if he does not find them, he may apply a further test by inoculating some susceptible animals with the milk and thereby learning the nature of the udder disease. By this test he will rarely be misled."

In this conclusion the British Commission strongly supported Nocard's opinion upon this subject. But this view that the tubercle

bacilli only pass into the milk when there is disease of the udder, I feel convinced is founded upon imperfect knowledge. This conviction is based upon the results of observations conducted by Dr. C. F. Martin and myself for the Dominion Government during the course of last year.*

On ten cows placed at our disposal by the Minister of Agriculture necropsies were made, and we could not find a trace of a single tubercular focus in any one of the udders, and that notwithstanding very careful study and examination. Any part that upon section looked to us the least suspicious, was subjected to examination under the microscope. Yet in the milk of two of these cows we detected bacilli in fair numbers, in four others on certain occasions we saw forms which we were compelled to describe as undoubted bacilli, and what is more, two of the guinea-pigs inoculated with milk from the cow which showed the greatest number of bacilli, undoubtedly succumbed to tuberculosis. It is true that the majority of the animals inoculated with this same milk remained perfectly free from the disease, *i.e.*, of twenty-nine guinea-pigs and twenty-six rabbits inoculated intraperitoneally with varying quantities only two guinea-pigs succumbed, while again a calf, fed solely with the milk from this cow, remained in perfect health although fed for five months. Had only this cow shown no sign of tuberculous disease of the udder we might have thought that our failure to recognize it was due to insufficient examination, but the same absence of udder disease was seen in the case of the other cows which afforded the bacilli.

Since publishing our report Rabinovitch and Kempner have contributed to the Congress of Tuberculosis at Berlin a paper in which, by inoculation into guinea-pigs, they came to a similar conclusion. Taking fifteen cows which had reacted to tuberculin, receiving the milk direct into sterilized glasses and inoculating guinea-pigs with a mixture of the precipitate and creamy layer after centrifugalization, they obtained the following results:

From ten of the animals (66.6 per cent.) they obtained a positive result, but of those animals only one showed clinically definite tuberculosis of the udder, and one other showed udder tuberculosis under the microscope. Of the remaining eight cases three were found at necropsy to present advanced generalized tuberculosis without tuberculosis of the udder, one showed slight tuberculosis, and the remaining four only presented either dubious or absent clinical signs of the disease. They thus come to the conclusion that tubercle bacilli can pass into the milk even in the early stage of tuberculosis in which there is no recognizable disease of the udder as also in cases in which the disease can only be detected by the tuberculin reaction.

It has been objected in results of this nature that the bacilli in these cases are not truly tubercle bacilli, but are contaminations of

* Report of the Minister of Agriculture of the Dominion for the year 1898. Ottawa, 1899.

a relatively non-pathogenetic form. Thus, as has been pointed out recently, there may be present in milk a bacillus which microscopically is undistinguishable from the true tubercle bacillus, and which, when inoculated into guinea-pigs, produces a disease and frequently death with symptoms very similar to those of true tuberculosis. But to animals other than guinea-pigs, this bacillus is not harmful, and probably it has no effect on man. Only by fuller experimentation is it possible to distinguish between these two forms of organism, and it is urged that, recognizing the presence of this false bacillus in milk and butter, experiments such as those above described are open to serious question. Indeed, some go so far as to claim that nearly all the fatal results obtained from inoculating butter into guinea-pigs, have been due to this false bacillus and not to the true one.

Such a bacillus has been isolated from ordinary Timothy grass, and undoubtedly resembles very closely the tubercle bacillus, but herein comes the difficulty in accepting this explanation for our experiments and those of Rabinovitch. In our case the udders were carefully washed with creolin before milking, and whereas the milk was first passed through a sterilized funnel into sterilized bottles which we brought immediately to the laboratory, later the milk was received direct from the cleansed udder into the sterilized bottles. There was here practically no chance for contamination of the milk, unless indeed it be held that this false tubercle bacillus is a normal inhabitant of the larger milk ducts. Rabinovitch and Kempner took similar precautions. It is also interesting to note, in the second place, that we found a relationship between the number of bacilli present in the milk and the extent of the tuberculous process in the animals. The two animals in whose milk we found the bacilli most extensively present were those showing most extensive disease of the lungs. Such a relationship would be impossible were we dealing with contamination. Thus I can only fall back upon the belief, that just as I have recently shown that the gland cells of the liver and of the kidney take up and discharge the colon bacilli, so the cells of the actively working milk gland in cattle have a similar power; and just as I find that the colon bacilli tend to be attenuated in their passage, so would I ascribe the somewhat altered appearance of these tubercle bacilli in milk of animals not suffering from udder tuberculosis to direct action upon them in the process of excretion, and would recognize that their lowered infective powers are due to the same result. At the present moment at the Experimental Station at Outremont, Dr. Higgins and I are putting this view to the test.

For myself, therefore, I cannot but come to the somewhat unsatisfactory conclusion, that whereas, in the first place, the milk of animals not suffering from udder tuberculosis may contain bacilli, nevertheless such milk is not of high infective power, and that, therefore, the frequency with which the bacteriologist may by *inoculation* into the very susceptible guinea-pig find the milk to

be infectious, it is not absolute indication of its danger when employed as a food for man. Only when there is recognizable udder tuberculosis and active tubercle bacilli are discharged into the milk in enormous numbers in consequence of ulcerative changes occurring in the tubercles, is there real danger. For practical purposes, therefore, I agree with Nocard, that as regards the milk-supply local tuberculosis of the udder is what has to be most especially guarded against, and this, not because the evidence at our disposal affords absolute proof of the transmission of tuberculosis from cattle to man, but because the trend of the evidence is all in that direction.

ON THE EXTENT OF TUBERCULOSIS IN CANADIAN CATTLE.

So far as I can see there is no large tract of country in the North Temperate Zone in which cattle are so free from tuberculosis as are our Canadian cattle, unless it be the Western States. During 1898 the testing of cattle was encouraged to the utmost possible degree by the Government, and as is natural, the applications for inspection came more especially from those districts in one or other part of the Dominion where they had reason to fear the existence of the disease. In these "suspect" districts and "suspect" herds over ten thousand head of cattle were inoculated, and of these only 5 per cent. reacted. Further, of ninety thousand cattle inspected at Montreal during 1894 on the eve of debarkation, at a time when, in consequence of the active measures taken by the British Government against importation of Canadian cattle on account of suspected pleuro-pneumonia—a disease which I may add is absolutely non-existent here—at a period, that is, when great care was being taken not to export animals showing any infectious disease, only eighty animals were rejected by the inspectors, and of these eighty two were recognized as suffering from tuberculosis and even in them this was local. I do not mention these last figures as giving an absolute indication of the incidence of tuberculosis in Canadian cattle, but this I do say, that no other civilised country could now-a-days ship ninety thousand cattle under like conditions and have only two of the number rejected for clinically recognisable tuberculosis.

Similarly that same year the lungs of 2,504 animals were examined in the abbatoirs of Montreal, St. John, N.B., and Halifax, N.S., and among these there were only fourteen cases of tuberculosis or a percentage of 0.6. There is, I say, no other country which can show such low figures. One reason for this is that for now some years great care has been exercised in insuring that animals imported for breeding purposes are absolutely healthy. Another is that the keeping of animals within town limits, cooped up in dairies, is almost unknown, and yet another reason is that our animals in general have abundant pasturage and roam over wide areas; during the greater part of the year they live in most healthful conditions.

Were any other indication needed with regard to the rarity of tuberculosis in our cattle, it is to be found in the following fact. For purposes of investigation of the Experimental Farm at Outremont, in order that Dr. Higgins and I could compare the infectiousness of milk from animals with advanced disease of the udder, as compared with that from diseased animals not showing such udder trouble, it is absolutely necessary that we should obtain one or two cows showing udder disease. This most important portion of our investigations is at a standstill, merely because we cannot obtain such animals. We have only heard of one small collection of cases, which we could not utilize, as a matter of principle, because the owner, hearing that they were necessary to us, immediately demanded a ridiculous price. But Dr. McEachran, the Chief Inspector, with the authority of the Minister, has sent detailed orders to all the inspectors over a large area of country, asking them to look out for and report any such advanced cases. That was some months ago, and still we are waiting to obtain these cattle.

Prevention of Tuberculosis

The rareness of tuberculosis among our cattle makes it possible to hope for a complete eradication of the disease. In the Old World, where the disease is so common, such eradication appears chimerical —not only so, but is absolutely impracticable; and there to begin a crusade of extermination and to slaughter every animal giving the tuberculin reaction would ruin the farmers—and would also ruin the Governments. To slaughter only animals showing clinical symptoms would be but a sop in the pan; it would certainly not extinguish the danger of contagion and the slow spread of the disease. To restrict the movements of animals reacting to tuberculin would mean placing the whole country under the ban, and would absolutely paralyse the cattle industry; while again, to compensate the farmers for the condemned animals would be found the cause of great dissatisfaction. The disease is so lingering and the eventual emaciation so marked that it is very difficult to arrive at any conclusion as to what was the original value of the animal. The most that can be done there is to introduce what is known as Bang's system, namely, that of separating the healthy from the diseased animals in separate byres, keeping them apart, and gradually, as the diseased animals die off, replacing them in the sound herd by animals which do not react, and also by adding to this sound herd the calves born to the diseased stock, it having been found that such calves, removed immediately from their mothers, show almost without exception no sign and no tendency towards the disease.

Now, on the other hand, returning to Canada, the disease is so rare that Dr. McEachran calculates that probably throughout the Dominion but 10,000 animals show clinical symptoms, and this is probably an excessive estimate. Were there 10,000, and were these to be slaughtered, even at full value compensation would not exceed $250,000. Those reacting to tuberculin would be, of course, more

numerous, but of these 70 per cent. at least, if not a much higher percentage, could be fed and slaughtered for beef under supervision, while in the case of highly bred cattle reacting to tuberculin, in which no clinical symptoms are discoverable, they could be kept in isolated buildings and treated and bred from under Bang's system.

I cannot but cordially endorse Professor McEachran's opinion that by the expenditure of an amount of money, trifling in itself, as compared with the enormous benefits that would accrue both to the live stock industry and to the people of Canada, the disease could be practically eradicated in the course of three or four years.

Leaving out of account the hygienic importance of such eradication, "45 per cent. of the population of Canada is engaged in rural pursuits; the railways depend upon agriculture for one-fourth of the freight they carry, and the canals one-third. As regards the shipping industry, more than half of the total exports are agricultural products, the value of which for 1897 amounted, according to the Year Book, to the sum of $44,533,592. . . Surely no reasonable expenditure," to quote Dr. McEachran, "can be withheld to eradicate a disease that interferes with the development of an industry of such importance to the country's prosperity." And when, in addition to this, we regard also possible danger to the health of humanity, surely it is our duty, as medical men, to support strongly any attempt on the part of the Government to bring about the prevention of this disease in cattle.

I am most anxious that it be understood that I speak as a private individual, but at the same time as one who has for the last two years continually studied the subject in its various aspects. If it seems overbold and too large a project to introduce this attempt to eradicate the disease simultaneously over the whole Dominion, *at least, it seems to me, that the endeavor might be started in well-defined areas, Prince Edward Island, for example, Cape Breton, or Nova Scotia.* And if what I have stated be correct—and our observations in Montreal entirely confirm those of Professor Theobald Smith—if cattle show but a transient and slight, and not an ulcerous and infective disturbance when inoculated with what are truly enormous numbers of tubercle bacilli obtained from man; if cattle thus are relatively insusceptible to the human disease; then the disease may be either eradicated or kept absolutely in check even although tuberculosis continue to prevail among the inhabitants of the districts mentioned, without adequate endeavors to arrest its spread among them.

A corps of inspectors might be empowered to make a complete and perfect visitation, to kill off and compensate for all animals showing clinical evidence of the disease; to isolate or buy at full value, and place on Government reserves all animals reacting to tuberculin, according to the condition of their owners and their capacity or incapacity to undertake this work for themselves; to disinfect all byres in which infected animals have been discovered; to prevent

temporarily the entrance of animals into the areas visited after undergoing tuberculin test, and thereby to demonstrate whether these areas can be rendered absolutely exempt from bovine tuberculosis.

I believe that this can be done, and done at a cost relatively so small as to be incommensurate with the accruing benefit. *For if we in Canada can establish herds absolutely free from the disease, this means that in a very few years Canada will become the great centre for the breeding of high-class cattle, and European countries will have to come to us to re-establish their herds.* They cannot do it at home. We only, and only we, are in a position to make a fruitful endeavor to get rid of the disease in the course of three or four years. Possibly this statement is too sweeping, for there is a similar relative freedom from tuberculosis in the Western States, and by strict quarantine and rigorous inspection and regulations preventive of the entrance of untested animals, certain of those States might free themselves from this disease at a relatively small cost. But none of the States has the same favorable geographical position for testing the matter as we possess in our large islands and peninsulas—Prince Edward Island, Cape Breton and Nova Scotia. The absence of natural boundaries must necessitate extreme care in the individual States as at any time the disease might reassert itself. In any case it is for Canada to make the endeavor.

AN INQUIRY INTO THE ETIOLOGY OF CHRONIC BRIGHT'S DISEASE.*

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THE subject of chronic Bright's disease is one of ever-recurring interest. It is at once the bug-bear of the clinician and the despair of the pathologist.

The few remarks which I have the honor to present in this connection to this Association are based on a somewhat extensive study, made largely from the standpoint of the pathologist and experimentalist. Owing to the limited time at my disposal now, I can only hope to indicate to you, in the merest outline, the facts which I have gathered, and the conclusions I have based upon them, referring any who may care to enter into the subject in more detail to the original contribution which appeared in the *Montreal Medical Journal* for March, 1899. Since that paper appeared, however, a few new facts have been elucidated, and my original ideas have been modified.

My interest in the matter was kindled by the now well-known researches of Prof. Adami, of McGill University, on cirrhosis of

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the liver, in which he demonstrated in cirrhotic livers, and later in normal ones, the presence of a minute micro-organism which tended to take a diplococcus form, and which he was inclined to regard as of etiological moment in the production of fibroid changes in this organ.

It struck me that a similar cause might be at work in the case of fibrosis of the kidney, and to the elucidation of this point I have been for some months, and still am, devoting myself. At present I am only able to advance a theory, but a theory which is supported by all the facts that I have been able to collect, and negatived by none. The complete mathematical proof may come later. Still the investigation is, I think, novel, and most suggestive.

With regard to acute nephritis, upon which there have been multitudinous studies of late years, we have probably attained something like the truth—the whole series of "infections," and mineral or other toxins being the etiological factors concerned, in the vast majority, if not in all the cases. The origin, however, of the chronic forms, and their relationship or otherwise to the acute stage, may be said to be largely unknown.

The clinical symptoms, the character of the urine, give us merely the roughest sort of information, and every pathologist knows how difficult it is to predict the actual condition of the kidneys from the clinical examination in any given case. Indeed, the confusion of the whole subject may be inferred from the numerous attempts at a rational classification of the various forms of kidney inflammation which have been proposed, all of which differ more or less in important particulars.

This, I am inclined to think, is the result of too limited a view, and the failure to realize the different factors in the problem. To have any degree of comprehension of the disease, clinical studies, histological examination, bacteriology and experimental work must be laid under contribution.

In the case of true acute nephritis, the trend of the investigation of the past fifteen years points strongly to the unity of the process as a result of various microbic infections.

When we come to consider the production of chronic nephritis the task becomes more difficult. It is usual to teach that the acute cases may become chronic, and that the cirrhotic kidney is an end-stage of the chronic parenchymatous nephritis, or is due to arterial disease, or again, to certain poisons, as alcohol, gout and lead. (The "primäre Schrumpfniere" of the Vienna School.) This does not, however, explain all the cases; cases of contracted kidney occur where there was no history of any acute attack, and ran an insidious course. And again, cirrhotic kidneys may occur in children, where there could be no question of arterio-sclerosis, or chronic intoxications from mineral substances.

Further, the cirrhotic kidney has been known to result from infective diseases, as pneumonia (diplococcus) and influenza. The

etiological elements in this form then seem to be very various, and the course apparently without any fixed rule.

While it is generally admitted that acute nephritis is, in the immense majority of cases, due to some infective agent, as yet, I believe, no one has ventured to say that chronic Bright's disease is due to the direct action of bacteria.

With a view of gaining further information and ascertaining whether bacteria were present or not in the various forms of Bright's disease, I have availed myself of the pathological material of the Royal Victoria Hospital from about 325 autopsies, and also the clinical notes of all the cases of nephritis in the wards for the past four years.

In approaching this investigation, I have thought that more valuable information would be attained by examining sections of kidneys which presented evidence of nephritis microscopically, in addition to those which were taken from cases which were recognized clinically. For by this means one gets a wider view of the subject, inasmuch as the study embraces all grades of the disease from the incipient forms up to the most advanced stages. Particularly valuable is the study of the early stages, since it is only thus that a true appreciation of the process can be formed.

Sections were made from 105 kidneys presenting the various forms of nephritis. All cases in which there was cystitis or any evidence of an "ascending" infection, or local tuberculosis, were excluded as unnecessarily complicating the subject.

Some of the material in early years was hardened in Müller's fluid, so that many kidneys presented evidence of *post-mortem* growth of bacteria; these were excluded in drawing conclusions. The material, however, which was hardened in Formol-Müller was satisfactory. All cases in which there was clearly a terminal infection, as shown by plugs of bacteria in the capillaries, were also excluded.

The method of staining was as follows:

Celloidin sections, cut as thin as possible, were placed in carbol-thionin for from twelve to twenty-four hours in the incubator. The formula of the stain was:

Solution of carbolic acid	(1:40), 100 cc.
Thionin	1 gramme.
Filtered as used.	

The sections were then decolorized in weak acetic acid, dehydrated in aniline oil, washed in xylol and mounted in balsam.

Those sections in which pus cocci, or micro-organisms positive to Gram, were suspected, were also prepared by the Gram-Weigert method. The results were very satisfactory. The sections were examined by 1-18th Reichert oil-immersion lens and No. 4 eye-piece.

Confining my remarks to chronic cases, there were the following results:

Chronic parenchymatous	8	cases.
Chronic diffuse	11	"
Chronic glomerulitis	1	"
Chronic interstitial	10	"
Arterio-sclerotic and senile	13	"
Amyloid fatty kidney	2	"

In the eight examples of chronic parenchymatous nephritis, four showed minute diplococci with a delicate halo mostly between the lobules in the cortical area. Of these, one case, which was associated with atrophic cirrhosis of the liver, showed a few well-marked minute diplococci with a halo. In two, one an alcoholic kidney, bacilli of doubtful nature were seen. Two others gave negative results.

The chronic glomerulitis case showed a slight acute interstitial inflammation as well, and a few rare diplococci were seen. The primary disease was septic peritonitis.

The amyloid fatty kidneys showed no germs.

Still more interesting and suggestive were the results found in the chronic diffuse, chronic interstitial, and the arterio-sclerotic type of the disease.

In the chronic diffuse nephritis, bacteria were found in all eleven cases. In two there were rather large diplococci, which might be the diplococcus lanceolatus, as a lobar pneumonia was present. In five, small diplococci; in four, short stumpy bacilli were seen with polar staining closely resembling the B. Coli. These were situated in the areas of round-celled infiltration, beneath the basement membranes of the tubules, and in one case within the lining cells of the secreting tubules.

One case, in which the small diplococcus form was seen, was associated with atrophic cirrhosis of the liver.

There were ten cases of chronic interstitial nephritis. In all were found the minute diplococci with a halo, mainly in the areas of round-celled infiltration, some few within the Bowman's capsules, and in one case within the cells of the tubular epithelium.

Figs. I. and II., Plate I., show very well the diplococci in the small-celled infiltration. In the thirteen arterio-sclerotic and senile forms, three gave negative results, but the specimens were very poor; nine showed small diplococci with a halo, chiefly in the areas of round-celled infiltration, and also in one case in a glomerular capillary; in another, within a Bowman's capsule; and in a third within the lumen of a secreting tubule.

In two of the cases besides there were noted bacilli of varying forms. These were diplo-bacilli of small size, very short bacilli with rounded ends, a slender form with polar staining, and others large and curved conforming well to the usual appearance of the B. Coli.

To sum up, in the 45 cases of chronic nephritis of all forms, minute diplococci, as a rule with a distinct halo, were seen in 29, and bacilli having the ordinary appearance of B. Coli in 4 more.

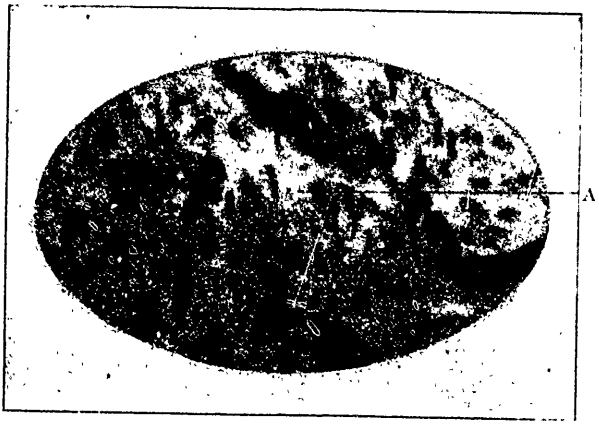


PLATE I., FIG. I.

Reichert oil-immersion 1-18th. Without eyepiece.

Kidney. Area of round celled infiltration showing minute diplococci at A.

Patient, a male, aged 27 ; clinically a chronic nephritis of one year's standing ; there was a history of repeated exposure to wet and cold. The kidneys were of the large white variety passing into the contracted stage, microscopically a chronic diffuse nephritis.

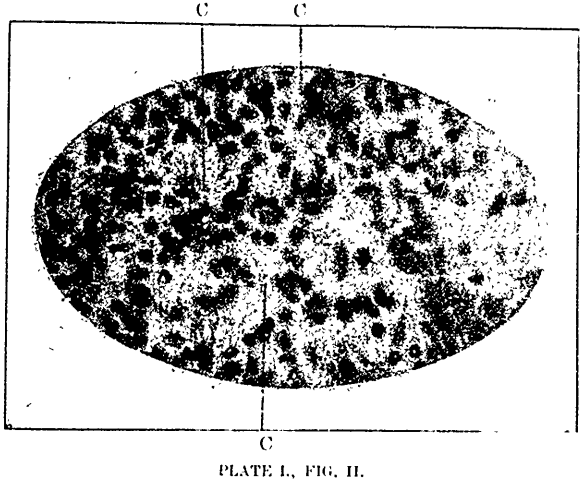


PLATE I., FIG. II.

Kidney. Area of round-celled infiltration showing a diplococcus at C.

Patient, a female, aged 21 ; clinically a chronic nephritis of eight months' standing ; onset insidious. Kidneys were extremely contracted ; microscopically extreme interstitial nephritis.

In only 6 were no bacteria seen, but this might easily be due to poor sections or errors in technique, for it is difficult in a large series of sections to get perfectly even results.

These diplococcus forms were very minute, and might easily be overlooked with an ordinary 1-12th immersion. Sometimes it could be made out that they were really very short, fine bacilli with polar staining, the intervening substances being almost colorless. They were generally in the areas of interstitial round-celled infiltration. Rarely I have seen them within the Bowman's capsules, and within the secreting cells of the contorted tubules; on one occasion within a lumen. The halo was probably not a true capsule, but due to the effects of refraction.

As to the nature of these diplococcus forms, it may be said that they are identical in appearance and size with the diplococci which Adami has found recently in the liver, associated with progressive portal cirrhosis, and which he has proved to be a variant of the colon bacillus. His very important investigations appeared in the *Montreal Medical Journal* in July, 1898, the *British Medical Journal* for October, 1898, and the *Lancet* of August 13th, 1898. He found diplococcus forms in all livers which stained a brownish hue and were probably dead forms, while in atrophic cirrhosis of the liver they were increased in number and stained well. He has, I think, established the fact that these forms are really a modified colon bacillus, and that the liver in health is constantly excreting them, thus constituting a chief barrier of defence against bacterial infection from the gastro-intestinal tract.

With a view to discover if the colon bacillus is to be found in the urine of nephritis cases, I have examined the urine in one case of acute hemorrhagic nephritis, and in one of chronic interstitial. The method employed was to sterilize the meatus and glands penis, then to allow the patient to pass several ounces of urine and collect the residue in sterilized flasks. These were then sealed and placed in the incubator for 48 hours. In the first case I obtained the colon bacillus, but it died out rapidly, and I was not able to study it very closely.

In the second case, the chronic interstitial, various forms were found, as seen in Fig. I., Plate II. These were stout bacilli, either straight or curved with rounded ends, some with polar staining; they all resembled the ordinary colon forms. Besides these there were small ovate bacteria, and shorter, more delicate bacilli with polar staining. There were also short chains composed of very short bacilli with rather blunt ends showing polar staining. All were negative to Gram. A broth transfer was made, and after 48 hours all the usual forms of the B. Coli were seen with the addition of minute diplococci with a halo. These, owing to the crescentic form of the stained portions, resembled gonococci. Small diplococci with halos were seen, exactly resembling those seen in the sections, also a similar diplococcus, but larger.

When transferred to agar for 48 hours, a thick tallowy growth was produced, and microscopically the germs were short oval bacteria, very small, with the 1-12th oil immersion exactly like cocci; also numerous minute diplococcus forms. No bacilli were seen. (*Vide* Fig. II., Plate II.) This was transferred to a bouillon made from kidney reacting, 1.5 per cent. acid to phenolthalein; this showed minute diplococci with halos, diplobacilli, a slender bacillus with polar staining, and besides these, the ordinary typical colon. (Fig. I., Plate III.)

Cultures from the coccus and diplococcus forms were made on broth, milk, potato, glucose, agar and litmus agar. They showed that in all respects the organism reacted like the B. Coli, with the exception that indol was not produced. Unlike Dr. Adami's diplococcus, this one produced a very heavy growth on agar.

When grown with sterilized bile on agar, the cocci and diplococci seen were even smaller than those produced on plain agar.

With regard to the presence of B. Coli or other germs in the urine of chronic nephritis, information is lacking, and my investigations on this point are still going on, being hampered at present for want of enough clinical material. Still, in the cases I have examined I have found the colon bacillus, although as is well known, it is also present in other conditions, notably cystitis, nephrolithiasis and pyelonephritis suppurativa.

The presence of the colon bacillus so generally in the kidneys, which I have studied, receives additional importance from the fact that in this study I have been careful to exclude all cases in which there were cystitis, suppurative pyelonephritis, and tubercular abscesses—conditions in which there is apt to be an "ascending" infection with the colon bacillus. We must then conclude that the infection is a "descending" one by way of the blood stream. That the presence of the colon bacillus is to be explained as a terminal infection or a *post-mortem* overgrowth, I do not believe, for it is easy to eliminate cases of this kind as I did very freely, for the differences are quite distinctive. In *ante-mortem* terminal infections, the germs are largely in the capillaries, often forming large plugs, and consist of large fat bacilli, short bacilli, or sometimes diplococci, but always much larger and staining more deeply than the diplococcus forms I describe. Further, there is no evidence of inflammatory reaction about these large bacteria, while in the case of diplococcus, they are enclosed by an inflammatory round-celled infiltration. Neither is it a *post-mortem* growth, for in this case, the germs are in the superficial cortical layers, and are always much larger and different in appearance and staining powers. Such germs can be seen with an ordinary No. 7 objective, while the diplococcus requires the 1-12th oil immersion at least, or better the 1-18th. Then again, the diplococci are always very few in number, perhaps only five or six in a section.

That the process in chronic nephritis with productive inflammation is due to an embolic infection is strongly supported by the

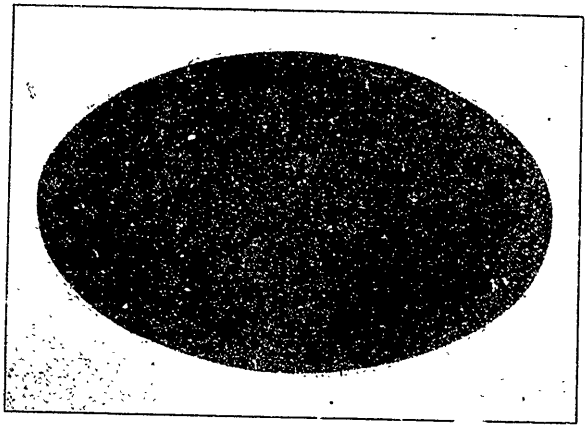


PLATE II., FIG. I.

Original growth of B. Coli from the urine of a patient with advanced chronic interstitial nephritis. Shows colon bacilli of the ordinary type, bacilli with polar staining, cocci and diplococci: also chains of minute bacilli with polar staining. Taken from a flask in which the urine had been allowed to stand three days at 37 C.

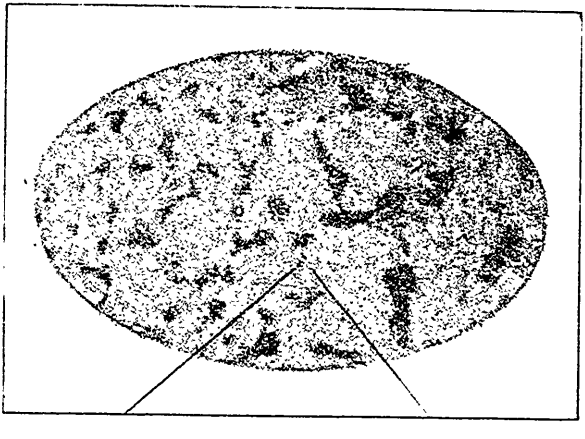


PLATE II., FIG. II.

The same organism as last transferred to 1.5 per cent. acid agar for 48 hours. Now single cocci and diplococci.

histological features in the sections I have studied. The lesions in the chronic forms are identical with those in the acute interstitial as to their anatomical distribution.

In the great majority of the acute interstitial and acute mixed varieties, the areas of round-celled infiltration are to be found around the glomeruli, or around the afferent vessels and interlobular arterioles exactly as would be expected in an embolic infection. The same holds good for the chronic cases. In the arterio-sclerotic type, that the infiltration and proliferation is mostly confined to vascular districts needs only to be mentioned. In the early stages of the chronic diffuse nephritis one sees the inflammatory exudation in the same way about the afferent blood vessels, associated with connective tissue hyperplasia. The cells of the Bowman's capsules proliferate, causing atrophy and hyaline degeneration of the glomerular tuft, or we get small fibrous patches about the vessels between the contorted tubules.

In both acute and chronic forms the vessels of the affected areas often show marked congestion. Later on, in the chronic interstitial type (contracted kidney), the fibrous tissue overgrowth is so generalized that this relationship to the blood vessels can no longer be made out. In my series the process could be accurately followed out.

What is the starting point then of this colon bacillus invasion? The most obvious is the intestine. We have ample evidence that intestinal disorders can cause acute nephritis. It occurs in gastro-enteritis, and in cholera Asiatica, for instance.

Ebstein (*Deut. med. Woch.*, June 15th, 1897) discusses acute nephritis as a complication of chronic gastro-enteritis. In a case he records in a woman aged 27, there was a history of diarrhea for nine months previously, pain in the epigastrium and anorexia for six. The nephritis came on most acutely, and was fatal in a few days from eclampsia, coma and collapse. At the autopsy acute nephritis was found, a tapeworm in the intestine, acute follicular ulcerative enteritis and enlargement of the mesenteric glands. The spleen was normal. Influenza and all other infections as a cause were excluded, and Ebstein concluded that the condition was due to an intoxication from the intestine.

Dupeu ("Acute Nephritis in Children," *Jour. de Méd.*, July 10th, 1897), states that acute nephritis may be a result of ordinary gastro-intestinal intoxication, particularly when there is dilatation of the stomach. It has been observed in children as young as eleven to sixteen months fed by the bottle, and in whom vomiting and diarrhea were prominent symptoms. In these cases it may last two to four weeks, and present all the usual features of Bright's disease.

With a view to determine the relationship, if any, of various gastro-intestinal disorders to nephritis, I have examined carefully the clinical records of the Royal Victoria Hospital for the past four years, having access to these through the courtesy of Prof. Jas.

Stewart. In making the estimate I have been careful not to accept as an etiological factor the nausea, vomiting and diarrhea, which so often usher in or complicate an uremic attack, but I have endeavored to find out if there was any history of such disorders existing for lengthened periods which might reasonably be regarded as of etiological moment.

There were seventy-one cases of nephritis of various forms divided according to the reports as follows:

Acute parenchymatous nephritis	10
Sub-acute parenchymatous	15
Chronic parenchymatous	17
Chronic interstitial	29

The etiological factors were:

Chronic alcoholism	15 times
Dyspepsia (gastro-enteritis, nausea, vomiting, etc.)	15 times
Infectious diseases (influenza, acute rheumatism, diphtheria, typhoid)	11 times
Exposures to wet and cold, or to extremes of temperature	5 times
Appendicitis	Once
Puerperal eclampsia	Twice
Gastralgia	Once
Acute gonorrhea	Once
Chronic gonorrhea	Once
Insidious (no definite cause)	22 times

Thus it will be seen that of the seventy-one cases studied, twenty-nine were subsequent to gastro-enteric disturbances, assuming as one fairly may that such would be present in the chronic alcoholics. This is a percentage of 40.84 per cent. of all cases. Excluding the acute cases due to the various infective fevers in which the etiology is quite established, the proportion becomes 50 per cent. In 30.98 per cent. the onset was insidious, and no cause could be assigned.

These facts go far to show that there is a definite relationship between nephritis and disorders of the alimentary tract, for when we consider that there were in the records no special investigations made to establish such relationship, but merely the ordinary routine investigation, the above figures become invested with even greater importance. Further, there were very few of these gastro-intestinal disorders acute in character, but in most there was a history of such symptoms extending over periods of months or years.

Clinical evidence then strongly supports the view that chronic Bright's disease, and indeed acute, may be a result of some long-standing gastro-intestinal disorder, 50 per cent. of cases giving this history, 30 per cent. of cases are insidious in onset, all the usual causes being absent; such might be called "cryptogenetic forms." Can these be due to an infection from the intestine? It is very probable, but the clinician must further elucidate this point by a more careful study of the history.

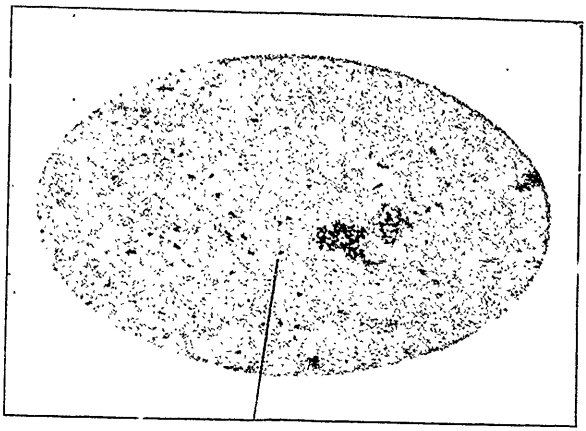


PLATE III., FIG. I.

Same as last on kidney bouillon 1.5 per cent. acid. Ordinary colon forms and minute diplococci.
NOTE.—The diplococci in the sections and in the slides from the cultures when viewed by transmitted electric light were seen to be really minute short bacilli with polar staining.

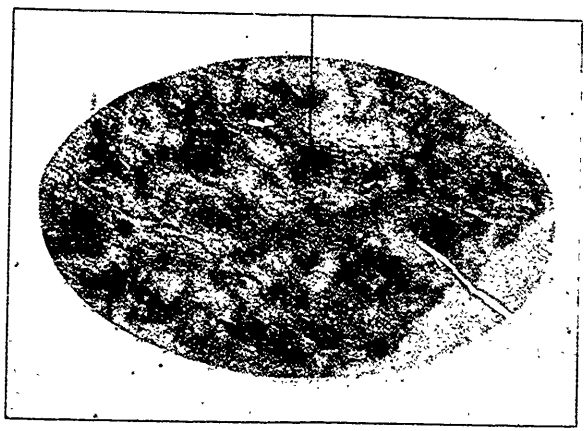


PLATE III., FIG. II.

Acute parenchymatous nephritis in acute lobar pneumonia.
Figure shows part of a glomerulus with numerous diplococci of pneumonia in a capillary.

We have distinct evidence that bacteria can pass into the general system even in health. In the case of livers and kidneys of normal rabbits removed antiseptically, and prepared with all due care, careful search reveals bacteria, particularly these diplococcus forms as I have verified over and over again. In the case of the kidney, however, these germs are very scanty. Further, on removal of a small bit of mesentery in the case of two healthy rabbits, prepared with all antiseptic precautions, and stained, crowds of bacteria could be seen massed in the lymphatic channels. If a lesion of the intestine exists the same holds good.

It is almost impossible to get perfectly normal kidneys in a *post-mortem* room, but I have examined a few for diplococci in which microscopically the tissue showed no abnormality. In ten such sections, seven showed no germs; three showed rather rare diplococci similar to those in the nephritis cases, but on further examination I found that in one case there had been a hernia operation, and there was an acute local enteritis; in the second there had been a gastrotomy performed, and there was local peritonitis; and in the third a spina bifida had been removed. Thus in two there could have been infection from the intestinal tract.

Further, in a healthy rabbit, killed suddenly, cultures were taken from the liver and kidney, and staphylococci and colon bacilli were demonstrated. In this case the organs, including the intestines, appeared quite healthy, but there was a very slight degree of diarrhea.

It is generally taught that the bacillus coli from the healthy intestine is non-pathogenic. To produce nephritis, then, something more is needed than the mere passing into the general circulation of the bacillus coli.

The experiments of Macaigne, Klecki, and Sanarelli prove that if the intestine is injured the virulence of the bacillus coli is increased.

Anything then which causes a loss of the lining epithelium of the intestine with increased virulence of the germ, provides the starting point for a systemic infection. That this often happens is beyond doubt. The occurrence of pneumonias due to colon infection is well recognized in strangulated hernia, and in septic peritonitis due to the same germ, the bacillus coli has been found in all the organs of the body including the kidneys.

The usual line of infection is through the mesenteric glands and liver, which thus constitute the first barrier of defence, either through the portal blood or by the bile ducts or both; further, it may take place through the abdominal lymphatics.

Should the condition mentioned exist so that we get a relatively virulent germ introduced into the liver, then we get local results on the liver leading to parenchymatous degeneration, perhaps cirrhosis, and even to invasion of the systemic circulation. This invasion of the blood stream would, *a priori*, be more likely to take place the more severe the lesion from which the liver was suffering.

To determine whether there is any connection between hepatic disorders, as, for instance, cirrhosis of the liver, and the various forms of nephritis, I have consulted the *post-mortem* records of the General Hospital from 1883 to 1898, to which I have had access through the courtesy of Dr. Wyatt Johnston. In addition I have made use of the Royal Victoria records from 1895 to 1898. In the aggregate there were 1,547 autopsies.

Atrophic cirrhosis of the liver, or atrophic cirrhosis with fatty infiltration, occurred twenty-four times. Associated with these:

Acute parenchymatous nephritis was found	Twice
Chronic parenchymatous nephritis	Twice
Chronic diffuse nephritis	Once
Chronic interstitial nephritis	15 times
No special abnormality to gross appearance	4 times

This was a total percentage of 83.30, or chronic nephritis only in 75 per cent. Conversely, the proportion of chronic interstitial nephritis in all diseases other than cirrhosis of the liver, was 242 cases or 15.64 per cent.

In three cases of hypertrophic cirrhosis, acute parenchymatous nephritis was present in one; chronic interstitial in one, and no change in one. These figures speak for themselves.

Further, it has been mentioned by several observers that fibrosis of the pancreas often goes with cirrhosis of the liver, facts pointing to a common cause. In the five Royal Victoria Hospital cases, this condition was present in every case. Of course, the same infection that would attack the one would be likely to affect the other, the excreting ducts opening so close together. I have also frequently observed that there is a similar relationship between the kidneys and the pancreas in a large proportion of cases.

But while in the case of the liver and pancreas, the infection could be through the ducts or lymphatics, in the case of the kidneys, of course, it must be through the circulatory system. Moreover, it needs only to be mentioned that the toxins which are supposed to bring about nephritis act in a similar way upon the liver. This is seen in the case of chronic alcoholism, and it is far from uncommon to find in the infective diseases such as tuberculosis and typhoid, at one and the same time, an acute infiltration in the portal sheaths and in the interstitial substance of the kidney. I would, then, regard the disease as an attempt on the part of the kidneys to eliminate the bacteria which reach them.

This view is supported by the experimental work of Wyssokowitsch, Pernice, Scagliosi, Cavazzani and others.

Through the kindness of Professor Adami, I have studied the kidneys in the case of rabbits inoculated intravenously with pure growths of B. Coli, which he employed in his studies on cirrhosis of the liver. These animals were inoculated in the auricular vein, and then killed at regular intervals.

Rabbit A., killed fifteen minutes after intravenous inoculation with pure growth of typical B. Coli.

Microscopically, there were relatively few bacilli found, which were confined to the vessels of the cortical region and the neighborhood of the glomeruli. They appeared as fair-sized bacilli.

Rabbit B., killed thirty minutes after.

The bacteria were found in great numbers in the capsule and as large embolic masses in the arteriæ rectæ of the pyramidal portion. The glomerular tufts contained relatively few. Many could be seen in the perivascular lymph-spaces between the contorted tubules and between the collecting tubules in the medulla. These had the typical appearance. Bacteria could be seen in the endothelial cells of the capillaries, within the secreting cells of the cortical tubules, and in the lumina. When enclosed in the cells they were, as a rule, smaller, often appearing as slender bacilli with polar staining, and sometimes as a diplococcus form with a distinct halo. In the cells they stained badly, and seemed to be in a state of absorption. (Fig. II., Plate IV.)

Rabbit C., killed one hour after.

Bacilli were much fewer in number, being mainly confined to the interlobular and straight vessels, but also being seen as shadows in the parenchymatous cells of the convoluted tubules.

Rabbit D., killed four hours after.

The bacteria were seen largely in the interstitial substance between the convoluted tubules; many were within the excreting cells showing as faint diplococci or short bacilli with polar staining. Some were also seen beneath the basement membranes of the tubules, and within the lumina.

The glomerular capillaries contained very few. The diplococcus form was noted to be much smaller than the usual colon type. Cultures from the urine were sterile.

Rabbit E., killed twenty-four hours after.

Marked parenchymatous degeneration of the secreting cells; very few bacteria could be seen, mostly in shadows beneath the basement membrane of the contorted tubules.

These simple facts are in accordance with the observations of Chiari, Adami and others. After the intravenous inoculation of an animal, bacteria are found in all organs, principally the liver, kidneys, spleen and bone-marrow, but after a short time, chiefly in the liver. It is important to note that the endothelial cells of the capillaries and the secreting cells of the convoluted tubules in the kidney, have the power of ingesting bacteria, rendering them for a time, at least, inert. The same thing has been shown by Adami in the liver, when within fifteen minutes after inoculation, he observed bacteria within the endothelium, and in two hours within the liver cells themselves. I have seen the same ingestion of germs by the secreting cells of the contorted tubules of the kidney in the case of acute nephritis in lobar pneumonia, and in septicemia. The tendency of the bacillus to assume a diplococcus form is noteworthy.

Thus the liver and kidney parenchyma are shown to play an important part in the resistance of the organism against bacterial

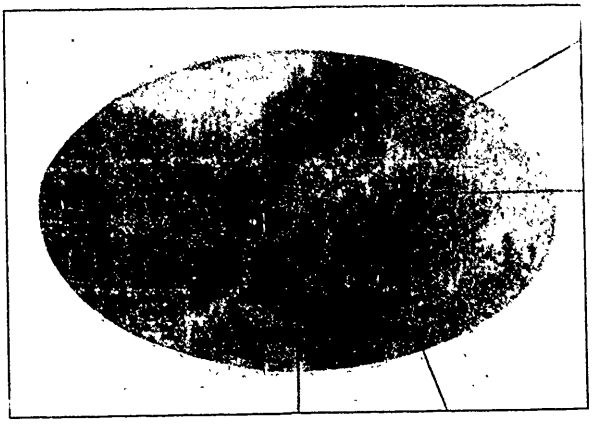


PLATE IV., FIG. I.

Acute parenchymatous nephritis in acute lobar pneumonia.

Diplococci of pneumonia in the lumen of a contorted tubule. Under the microscope, however, the diplococci could be seen as shadows within the secreting cells.

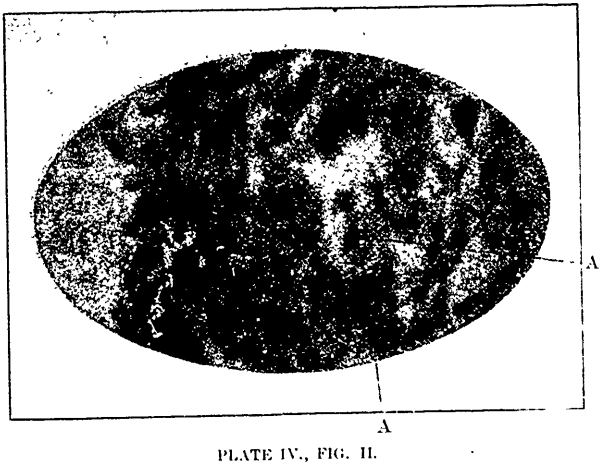


PLATE IV., FIG. II.

Kidney showing secreting tubules from an experimental rabbit half an hour after inoculation with pure growth of B. Coli.

The bacilli are seen as diplococcus-like forms within the secreting cell shown at A.

[NOTE.—For these photographs I am greatly indebted to Dr. David Patrick, who has admirably succeeded in a difficult task.—A.G.N.]

invasion. This resisting power on the part of the parenchyma, however, may be diminished in many ways, particularly by chemical and bacterial toxins, thus permitting the more rapid passage of germs through the organs.

In the light of the present study we get an entirely new conception of the process at work in the case of Bright's disease. All cases, acute and chronic, are brought into the category of "infections." The nature of the infecting germ varies; in the acute forms it is usually the specific germ causing the primary disease, although in some cases it is the colon bacillus. In the chronic cases, in the great majority, it is the colon which is the infective agent, but there is some evidence to favor the view that a few germs like the bacillus Pfeifferi and the diplococcus lanceolatus are capable of producing fibrosis. Two processes are at work, parenchymatous degeneration and productive inflammation. Parenchymatous degeneration alone is not to be regarded as a true nephritis, but is the result of chemical and bacterial toxins, bringing about injury to the secreting epithelium. Whether inflammatory infiltration occurs in addition or not depends on several factors:

1st, the number and size of the infecting germs.

2nd, the degree of virulence.

3rd, their specific qualities.

If the germs are few in number and of small size, they may pass through the glomerular capillaries, and merely produce degeneration and necrosis without further change. If they be sufficiently numerous to block the vessels or get into the capillary endothelium, then we get local inflammatory reaction with acute leucocytic infiltration.

A germ of low virulence brings about a low grade of inflammation, but if of high virulence, and in sufficient numbers, extreme degeneration is brought about, and interstitial abscess formation. The inherent quality of the germ is of importance. Thus some germs nearly always bring about suppurative inflammation, while others are more apt to bring about a reparative fibrous hyperplasia. This has been shown recently by Von Wunscheim, in a study of pyelonephritis. When the infection was due to streptococci, or staphylococci suppuration resulted, but when it was due to the B. Coli, he saw distinct evidences of connective tissue production. However, these differences probably have something to do with the virulence and abundance of the bacteria concerned.

In the chronic cases where fibrous hyperplasia is beginning to make its appearance, just as in the leucocytic infiltration of the acute cases, we see the fibrous change beginning about the afferent and interlobular vessels associated with vascular dilatation, followed later by compression and degeneration of the glomeruli, atrophy of the tubules, and the formation of casts. Interstitial proliferation then is the key-note of the process. This proliferation is the more readily brought about since there is present a germ which tends to produce fibrous hyperplasia; present, too, in very

small numbers in an infective process probably extending over years. And further, the progressive nature of the lesion is due to continuous action of a germ which has been shown to be present in all stages I consequently cannot believe as Holst does, that a toxin can go on acting so as to bring about a fibrous hyperplasia, long after the original infection has disappeared. That an infective agent, like the B. Coli, for instance, can be shown to be the *corpus delicti*, in all the stages of Bright's, explains the anatomical distribution of the lesions, the pathological process, and the etiological momenta, in a way that none of the usual theories have been able to do. We must, I think, assume that before the germs can act there must be a lowering of the vitality of the epithelium through toxins or otherwise.

My conclusions are :

1. That bacteria are constantly passing from the intestine into the liver, and thence into the general blood-stream, even in a normal animal.

2. The different forms of Bright's disease are to be regarded as various stages in the same general process, there being a unity pervading the whole pathological picture.

3. All forms of nephritis are due in the immense majority of cases to infective agents; the acute, to the usual specific germs of the primary disease, and the chronic, as a general rule, to the bacillus coli, though other germs may sometimes be concerned.

4. Acute interstitial inflammation and subsequent connective tissue hyperplasia are the key-note of the process; this is, however, preceded by parenchymatous degeneration.

5. The point of invasion by the B. Coli is the gastro-intestinal tract; for other germs it may be various.

6. The liver and mesenteric glands are the first barriers of defence; and the endothelial cells of the capillaries and secreting tubules of the kidney have the power of ingesting bacteria, this being an attempt at inhibition and elimination.

THE GREAT LAKES AS A HEALTH RESORT.*

BY E. HERBERT ADAMS, M.D., TORONTO.

THE object of this paper is to attract the attention of the medical profession of Canada to the natural advantages of climate possessed by the Great Lakes and their lakeside resorts as compared with the oceanic climate and that of the seaside resorts.

The subject will, of course, only be treated in a general tentative way, for it would take a volume to describe the immensity and majesty of the Great Lakes with their thousands of waterside wonders, their tens of thousands of islands, and their hundreds of

*Read before the Canadian Medical Association, Toronto, August 30th, 1899.

thousands of pleasant peninsulas and beautiful bays and beaches. When some years ago attempting to describe the attractions of Toronto as a fashionable watering-place and summer resort, it took a volume for me to do it, and if every physician practising at a Canadian lakeside resort—and almost every other physician, in Ontario at least, in this land of majestic water stretches, is practising at or near a lakeside resort—I say, if every other physician would go and do likewise about his nearest summer and health resort, the volume of summer and health resort literature so produced would wake the sleeping world as to the climatic and scenic advantages of this glorious summer land of ours; and the volume of visitors would fill the exchequer of the country, and incidentally that of the physician.

These great fresh-water inland seas are the natural playground and sanitarium for the people of this great continent of North America. It is to the lakes and rivers and islands of Ontario and Quebec that a large portion of the millions of our heat-stricken cousins across the border are to look for health, pleasure and pastime during the hottest summer months.

In the Southern States they are especially beginning to appreciate this fact, and the cream of the wealth and fashion of the South are already beginning to become regular visitors here, although we ourselves are doing little or nothing to study and extol our climatic and other advantages or make it easy for them to come. In such localities where we are doing a little in this way, the tourist traffic is increasing by leaps and bounds.

The South is interested, and it only needs information, proper hotel accommodation and a little judicious use of printer's ink to produce marvellous results in this direction.

Every physician who will write up his favorite resort will find American medical journals anxious to publish his paper. The notice of the title of this paper was scarcely in print before a Southern medical journalist wrote me requesting the paper for publication, and saying that the subject was specially interesting to them. Our own citizens are not awake to the advantages of our climatic and health resorts, and they must be educated by the physician and climatologist.

A patient, whose nervous and physical system was somewhat weakened from overwork and business worry, recently came to my office and wanted to know whether I would advise him to take an ocean trip for his health. He said he had just time to spare to cross the Atlantic and back before urgent business would again demand his attention. On questioning him as to whether he was a good sailor he said that he was occasionally seasick on an ocean voyage, but that he thought the sea air and change would do him good.

On asking him if he had ever taken a trip on any of our Great Lakes, his answer was "No," with the exception of day-trips by boat to Niagara, Grimsby or local resorts. My advice to him was to take

the Mackinaw trip, or some such trip on one of the Great Lakes, and my reasons for this advice were the following: It will cost you far less; you are not likely to be seasick; the scenery will be more varied; you will get more ozone from the breezes wafted from the shores of the immense pine forests of the north, over these great fresh-water seas than you will in any other way. Besides, you have made a comfortable living out of this country, and it is high time you knew something of the natural advantages, climatic and otherwise, of the land you live in. He took my advice, and he says he never was built up so much in so short a time, nor ever had a more pleasant time.

There is uninterrupted navigation for upwards of 2,000 miles on the Great Lakes and the St. Lawrence, and until we know our own country we can find abundant opportunity for a change of air and scene on our own waterways. It is to be hoped that, with the deepening of our canals and an enlargement of our lake passenger fleet, there will be a deepening of our interest in the health and pleasure trips of our Great Lakes, and an enlargement of our ideas as to the possibilities for the development of our health and pleasure resorts for American and European tourist travel. With the exception of the influence of the climate of very high altitudes, such as are to be found at Banff, Kamloops, and other points in our Canadian Rockies, and of the climate of the great salt water seas, which we have at its best in the Land of Evangeline on the east, and in the west on the sun-kissed shores of the Pacific—with these exceptions we have in the Great Lakes region during navigation season every variety of climate of a healthful and attractive type which is to be found in the world of to-day.

The great test of climate is, after all, as to whether it promotes nutrition, and is it free from all contaminating influences productive of ill-health and disease. Climate acts mainly through its general influence on the physiological functions. Change of air, change of scene, change of diet and of occupation and of daily routine are very important. Life on shipboard affords considerable advantages, providing you are able to be on deck most of the time, and there is sufficient variety in the surroundings and the scenery to prevent *ennui*. These conditions are found at their best in the ever-varying scenery of the Great Lakes and rivers of Canada

The temperature of this Great Lakes region is most equable and enjoyable. There are less daily variations than there are in California, Colorado, Florida and the seaside resorts of the Atlantic. The whole of this region, from the middle of May to the middle of September, is included between the same isotherms as the greater portion of France. The humidity is equal to that of many of the mountain sanitaria as far as dryness is concerned, while the mean daily humidity is less than that of Florida, Georgia, England, France and Italy. Ozone is abundant in the atmosphere and especially on our northern lakes, and no purer air can be found in the world.

Let us know where this Great Lakes region is before we go any farther, for if the latitude of our country were better known to ourselves and to Europeans, many false impressions regarding our climate would fade as quickly as the snows of winter in the midst of our Great Lakes, and these Great Lakes are never frozen over, even in the severest winter.

Were we, for purposes of illustration, to move Merry England, Bonnie Scotland and Ireland's Emerald Isle due west to the centre of this Canadian domain, Land's End (50.4 N.), the most southerly point of England, would be north of Nipigon, and John o' Groat's House (58.38 N.), in the north of Scotland, would be in about the same latitude as Port Nelson, half-way up the shores of Hudson Bay; Liverpool (53.25 N.) would be considerably north of Fort Albany (52.5 N.) at the mouth of the Albany River on James Bay; while the Lakes of Killarney (52.3 N.) and the blarney stone would be lost in the wilderness somewhere between Moose River and the Albany River whose waters flow into James Bay. Magna Charta was signed north of the Great Divide, and, in fact, the entire British Isles lie north of the Great Divide that separates the waters which flow into James Bay from those which flow south to the Great Lakes. While Windsor, Ontario (42.21 N.), is south of the Pyrenees Mountains (42.40 N.) in the north of Spain, Windsor, England (51.30 N.), is in the latitude of the south shore of James Bay. Lakes Ontario and Erie are in the latitude of the North Mediterranean Sea, Toronto (43.39 N.) being slightly south of Nice (43.42 N.), and considerably south of Venice, and the famous Pass of Roncesvalles (43.02 N.) is in nearly the same latitude as Niagara (43.12 N.), and Port Dalhousie (43.12 N.), Queenston Heights and Lundy's Lane. The Adriatic Sea is north of Lake Erie, and the battle of Balaclava was fought in exactly the same latitude as where the dusky Huron braves fought many a bloody fight with their savage Algonquin foes on the Saugeen River (44.30 N.). Paris, France, is north of the myriad islands of Lakes Temiscamingue and Temigamingue. Lake Como is north of the Muskoka Lakes, and Venice (45.25 N.) north of the Gravenhurst Sanitarium, while Rome, Italy (41.54 N.), is in the same latitude as Chicago (41.56 N.), and St. Petersburg is considerably north of Fort Churchill on Hudson Bay. Lake Windermere, England, is far north of Abittibi and many hundreds of miles north of Windermere, Muskoka.

The Great Lakes region is the land of clear skies and bright sunshine. A report made by Mr. R. F. Stupart, of the Meteorological Department here, shows that there are few, if any, places in England having a larger annual percentage than 36 per cent. of the bright sunshine throughout the year, and there are many as low as 25 per cent.; while in the region of the Great Lakes most of the places have an average of 40 per cent., while many reach 46; that of Toronto being 44, and during the summer months the average approaches 60 per cent. In England in but few places during the summer months does the normal excel 45 per cent. At

German stations the August average maximum per cent. is 50, and in a few cases reaches 52, though in the south somewhat higher averages are obtained—Vienna 54, Zurich 57, Trieste 66, Rome 75.

Around the shores of these lakes is one of the most delightful climates in the world as well as one of its best natural gardens. Here are grown in abundance fruit of the highest qualities, from the hardy apple to the delicate peach and tender fig. There are several million apple trees and a couple of million of grape vines, and over half a million each of plum, peach, pear and cherry trees.

A patient of mine suffering from pulmonary trouble, who has sought relief by mountain air and ocean trip, states that he finds the salt air of the ocean irritable to the bronchial mucous membrane, and considers that he obtains the greatest benefit by trips on our Great Lakes, and for several years past he has thus spent the most of his life during navigation season. He thinks the great pine forests of the north waft healing breezes over the lakes, which are soothing, instead of irritating, like salt breezes, to the delicate bronchial membrane. He has never had a cold on the Great Lakes.

There is no region on earth exceeding in healthfulness that of the Great Lakes. If you take, say, ten of the largest cities on the Great Lakes, and compare the death rate with that of, say, ten cities of similar size on the Atlantic coast, or ten on the Pacific coast, or ten in the interior, or with, say, ten European cities of the same size, you will find the death rate of the cities of the Great Lakes to be less than the death rates of the cities selected from the other districts chosen.

CRANIECTOMY FOR MICROCEPHALIC IDIOCY.*

BY W. J. WILSON, M.D., TORONTO.

SINCE Fuller, of Montreal, in 1878 trephined an idiot's skull with the object of improving his mental condition, and Lannelongue, of Paris, did linear craniectomy on microcephalic idiots with the same object, craniectomy has been undertaken a number of times and with varying success. The subject has been debated from several standpoints, some holding, as Lannelongue, that the premature ossification of the skull is the cause of the microcephalus and deficient brain development, and therefore the operation is rational. Others, as Laplace, justify it on the theory that the imperfectly formed brain improves in function and takes a greater amount of nourishment after the operation.

W. W. Kean says no good can possibly come from operation on an idiot with skull of average size, in extreme microcephalus or

*Read at the Canadian Medical Association meeting, Toronto, 1899.

in a patient over seven years of age, and concludes that in some few cases of moderate microcephalus craniectomy is justifiable, that slight improvement will follow in a small number of cases but in the majority there will be no change. He places the mortality at from 15 to 20 per cent.

Dana holds that craniectomy is justifiable in a selected class of cases. He believes that the clinical reports show improvement too often for the facts to be ignored. He thinks the operation is indicated in simple lack of development rather than where extensive lesions exist.

Jacobi gives forty-one operations on thirty-three cases with fourteen deaths, and of the nineteen recoveries there was slight improvement in eight and considerable improvement in two.

Dr. Carl Beck concludes that craniectomy is a justifiable operation and apt to be successful in microcephalus with idiocy. The success of the operation depends on the kind of microcephalus and the degree of idiocy. Acquired and late forms give a better prognosis than the congenital forms. The dangers of the operation are not very great. The operation ought to be quite extensive and the bone incision large enough to permit of dilatation. The patient must be given a thorough pedagogic training afterwards. Single cases ought to be followed up for years and reported on from time to time.

Dr. Graeme Hammond reports eleven cases without marked improvement in a single instance.

Treeves quotes Cunningham's demonstrations, which show that congenital microcephalus is due to some error of development, and that the microcephalic brain resembles the brain of the ape. He sums up the pathology as injury during the intra-uterine life or early infancy; infantile cerebral hemiplegia; mental defects without marked physical signs; sensory defects, such as deafmutism, hemianopsia, etc., with no marked motor or mental signs; porencephaly, meningo-encephalitis, hemorrhages, or cysts. These cases all have more or less atrophy with brain sclerosis. Treeves thinks the arrest of development may be temporary, and if during this period of arrest, ossification of sutures and fontanelles takes place, further development will be retarded. In this case linear craniectomy is indicated. He concludes the operation is not likely to be useful in congenital cases. It may be of benefit to remove blood clots or cysts from the surface of the brain and in epileptic cases.

There are so many conditions which, in microcephalus with idiocy, may be present either as a cause or simply in association—conditions which during life it may be impossible to diagnose—that the question whether we should operate in any given case becomes a matter for very serious consideration. There can be no doubt that premature ossification does take place, that fontanelles may be closed and the sutures ossified at birth, but whether this is a cause of the microcephaly, as was thought to be the case by Lannelongue,

or a result of arrest of brain development is still a debatable question. When gross cerebral lesions, such as extensive sclerosis, exist, the chances for improvement cannot be good.

Operations on the skull for microcephalic idiocy will not take a permanent place in our treatment until a large number of cases have been observed, and we are able to have judged better just what conditions may or may not be improved by operation. It is with this object in view that the following case is presented:

Henry R., aged five years. Family history good. No idiocy, deformities or insanity in the family of either parent. No history of tuberculosis or syphilis. One sister died from laryngeal diphtheria. Has two healthy brothers. There is a difference in the age between Henry and the next elder child of fourteen years. During these fourteen years there were no miscarriages. One since. Parents both healthy and strong; grandparents on both sides lived between seventy and eighty years. Other members of the family have average-size square heads. Mother had no frights and no thoughts of trouble in the child during gestation. At birth baby weighed seven pounds, was plump and fat, but his head was very small. His mother noticed there were no openings in his head.

Dr. Webster, who saw the child when six months old, says at that time there was no trace of fontanelles. He was a small feeder. Was nursed on breast for fifteen months but did not thrive well. At sixteen months he weighed fifteen pounds, was apparently healthy, but did not grow like other children. He was three years old before he could stand alone. His ankles were weak and turned in. Sight and hearing normal so far as known. In walking he bent forward almost to a right angle. He was restless and cried a great deal, was a bad sleeper, waking frequently during the night. When four years old began taking thyroid tablets. He began with one five-grain tablet per day, and by the end of nine months was taking four tablets or twenty grains of P. D. & Co.'s thyroid extract per day.

During this time his legs improved very much in strength and became straighter at the ankles, but body remained bent over in walking. Five months ago he was admitted under my care at the Western Hospital. At this time he could only say one word—mamma—and this he used for every person. He would not play with his toys, was very restless, and rubbed his head a great deal. He was then five years old, and it was noticed he was cutting his lower central incisor teeth. His first dentition began at the fifth month. His disposition was affectionate, but at times he became vicious towards other children. The cranial measurements, after hair was removed, were: Circumference at tip of ears, 14¼ inches; over vertex from meatus to meatus, 9¼ inches; diagonally over frontal bone from meatus to meatus, 8¾ inches; diagonally over occiput from meatus to meatus, 9 inches. Early in April an incision was made on one side of the sagittal suture and about one inch from it. At the first incision a piece of bone one by two inches was

removed. This was followed by very little shock, and in about three weeks a similar incision was made on the other side of the head. These two incisions were extended to about four inches by one inch on either side of the sagittal suture, and at periods of two or three weeks apart, making in all four operations.

The skull was first opened with a trephine, and the opening then extended by the aid of punch forceps. The periosteum was pushed to one side, but not removed, and the dura mater was not opened. There was some bulging of the dura at each operation. The skull was not thick, but so dense it took a very hard pressure of the forceps to cut it through. There was not much hemorrhage, but it was remarked there was an increased amount at each operation. The bone lifted easily from the dura except during the last operation which was on the posterior part of right incision, and here it was attached more firmly. No other conditions were noted. Shock was very slight after operation, and next morning he wanted to sit up in bed as usual. Some improvement was made from the first. He became easier to manage, and played more with his toys. He has learned a great many words and short sentences, and is learning more daily. His disposition is milder, he sleeps all night through, and has quit, for the most part, movements of his hands, which before operation were very marked. While he does not always stand erect or walk without some bend forward, his gait is vastly improved and he stands erect most of the time. He has had no special training since operation other than by his mother, so that training does not account for his improvement. Henry has always been quite musical and picks up tunes readily. He did this before operation.

When he came into hospital his circulation was bad, his hands cold, blue and damp. This was attributed to the use of the thyroid, and after it was discontinued his circulation improved.

The conditions in this case which decided for operation were (1) early ossification of sutures and fontanelles and early dentition; (2) absence in so far as could be discovered of gross brain lesion.

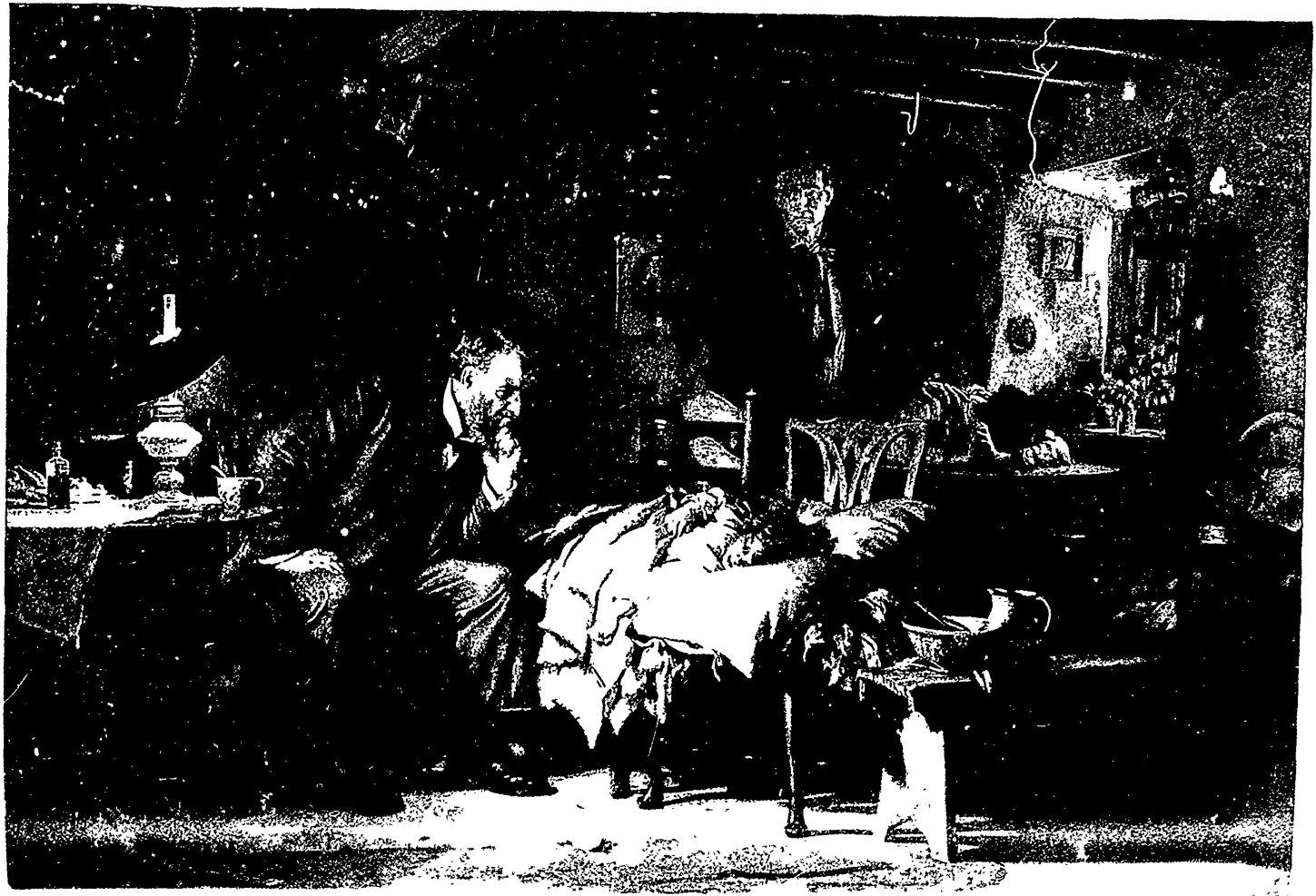
WE congratulate heartily Dr. Jas. M. MacCallum on his election to a seat in Toronto University Senate, to fill the vacancy caused by the death of Dr. J. E. Graham.

WE extend our cordial congratulations to Dr. P. H. Bryce, Secretary of the Provincial Board of Health of Ontario, on his election to the presidency of the American Public Health Association.

DRS. N. A. POWELL and Luke Teskey returned ten days ago from their annual deer hunt. Their stories (!!!) are dead funny.

From the Painting by Heywood Hardy

"DUTY."



THE "DOCTOR."

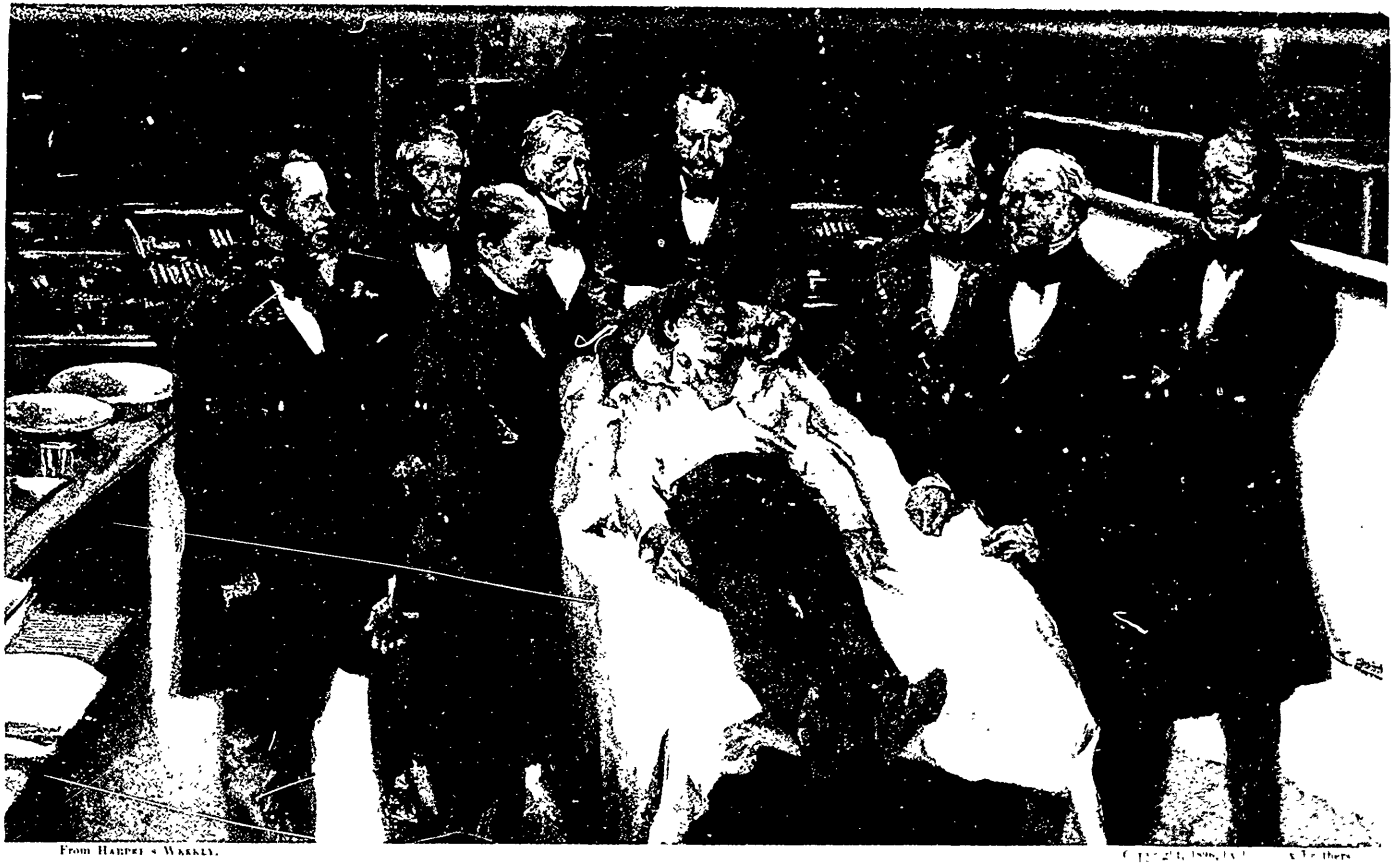
A CHARITY PATIENT

A DYING DECLARATION

From Rembrandt's Famous Painting

"AN ANATOMICAL LECTURE."

AN ACCIDENT.



THE FIRST PUBLIC DEMONSTRATION OF SURGICAL ANESTHESIA AT THE MASSACHUSETTS GENERAL HOSPITAL, BOSTON, OCTOBER 16th, 1846.

ANDRE BROUILLET. SERUM-THERAPY FOR CROUP AT TROUSSEAU HOSPITAL, PARIS

The Canadian Journal of Medicine and Surgery

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Editorials.

MOSQUITOES AND MALARIA.

BACTERIOLOGISTS are devoting a good deal of attention to the study of malaria, particularly in tropical countries, and a good deal of evidence has been collected in different parts of the world, to prove that certain definite families of mosquitoes perpetuate this disease in certain localities. Authorities are, however, not agreed as to the method by which the malaria parasites are introduced into successive generations of mosquitoes. The German Malaria Commission,

reporting September 14th, 1899, from Grosseto, Tuscany, say that each year's mosquitoes must get their supply of malarial parasites from the blood of human beings who had been previously infected. These infected persons form a bridge from one year's fever season to another, and, if they were isolated, the fever would die out in any given district. It is impossible to isolate them, but the Commission are of opinion, that suitable treatment with quinine during the eight or nine "safe" months, would render them incapable of infecting mosquitoes, and through the mosquitoes their neighbors. In this connection it has been shown that a localized outbreak of malaria, for example, in a country inn, has more than once dated from the arrival of a malarious person. According to this theory, the malarial parasite passes from the blood of the infected person to a mosquito, and is introduced into the bodies of other persons by the insect's bites. All kinds of mosquitoes are not considered equally capable of transferring malaria. At Grosseto, the German Commision found the anopheles and culex pipiens in malarious houses, and supposed that both these varieties were responsible for the malarial infection of the inmates. In this opinion they differ from Ross and Grassi, who credited malarial infection to the grey mosquito (anopheles) alone. The fact that mosquitoes are present at Grosseto during the "safe" portion of the year, as well as during June, July, August and September, when malarial fevers prevail, is explained by the assertion that the malarial parasite requires a certain degree of warmth for its development. The sudden outbreak of malaria occurs about twenty-one days after the temperature has reached 80.6° F. The parasite takes eight or ten days to develop in the mosquito, and the disease has an incubation period of ten days after inoculation, so that three weeks after the temperature has reached the right height, the disease becomes apparent. That heat has a direct effect on the development of the malarial parasite in the mosquito is shown by the fact that the sickle-shaped pigment bodies found in the poison glands of these insects only make their appearance there during hot weather.

Other suggestions have been offered to explain the presence of the malarial parasite in mosquitoes. Mosquitoes eat each other's excrements, and may become infected in this manner. The grubs might become infected through eating the dead bodies of the mother mosquitoes. Mosquitoes might also transmit the parasite to the eggs of the female mosquito as spores. Grassi has observed spores in mosquito eggs (anopheles), and again, it has been found

that in Italy fertilized female mosquitoes may live through the winter, perhaps in this way preventing the dying-out of the parasites.

The German Commission favor the view, that the malaria-infected human being, if properly cured by the exhibition of quinine, will be incapable of infecting the mosquito, and the malaria infection will die out in any given locality. According to the opposite theory, even if all infected persons residing in a certain locality were cured during the "safe" months, the malaria parasite which had been transmitted to the eggs of the female mosquito, would reappear in her descendants as intermediary hosts, and be introduced by them into man, and possibly other mammals, as principal hosts.

Whichever view may be the correct one, it is evident that, if ponds and marshes where mosquitoes are in the habit of depositing their eggs, are drained, mosquitoes will disappear and the malarial parasite with them. Hence the value of the well-attested fact, that localities in Europe and America, which once enjoyed "a bad pre-eminence" for malaria, after drying up of the soil had been secured, have become quite free from manifestations of this disease. In India, the problem of draining large swamps will be more difficult than in America. The grey mosquitoes (anopheles) can live at an altitude of 7,000 feet, which is precisely the limit to which malaria reaches in that country. The reason why fevers appear in the hill country of India in the autumn is that, owing to heavy rains, swamps form in which mosquitoes multiply unchecked, because they have not to struggle against their natural enemies, the [illegible] and the frogs. In such cases, if neither public nor private authority will provide for the drainage of the swamps, it would be advisable to try the American plan of pouring a small quantity of kerosene over the surface of the swamp water, in order to prevent the development of the mosquitoes.

There is good evidence from many lands to show the protective value of the mosquito-net. Thus Dr. Ian Macdonald, physician to an English company in Spain, mentions that in a fishing colony of a hundred persons, all of whom were suffering from fever, the people said they were bitten furiously at night by a large mosquito. Their "patron" alone slept under curtains and had not had fever. Adult specimens of mosquitoes sent from their huts were A. claviger and A. bifurcatus. Thus the protective agency of the mosquito-net and the causative agency of the anopheles were

very distinctly brought out. While useful in shielding healthy people from malaria, the mosquito-net is indispensable in the cases of infected persons, since the mosquitoes may obtain in their blood fresh supplies of the infectious parasites. J. J. C.

THE TORONTO ORTHOPEDIC HOSPITAL.

THE first annual meeting of the Toronto Orthopedic Hospital was held on the evening of Tuesday, November 7th, on which occasion a reception was given by the trustees and the ladies' committee. In response to the invitations issued, about 150 persons, including many of the medical profession, availed themselves of the opportunity to inspect the various departments of the hospital. The wards, orthopedic gymnasium and the mechanical departments attracted many visitors, each presenting its own special feature of interest.

The visitors appeared to take much interest in a practical exhibition of orthopedic gymnastics given by a class of patients. The work here is not intended to show any fancy series of movements, but is designed to accomplish a special purpose in each case. It was a matter of great surprise not only to the laity, but to some members of the medical profession, to witness the amount of force that could be employed in order to rectify certain deformities.

Although not the usual hours for the work, the mechanics were asked to return to the shops in order that the actual work of the making of the appliances, special boots, etc., could be seen by the friends who were interested in this department. All the work required for making orthopedic appliances is done in the shops. The raw material in the way of steel and leather is brought in, and everything, even to the electroplating, is done here.

The annual report of the hospital which had been previously distributed to the visitors, was taken as read. Some remarks were made by four of the trustees, Rev. Dr. Potts, His Honor Judge MacDougall, Rev. Frank Ryan and Rev. John Gillespie. Briefly presented, the substance of their statements was to the effect that the hospital had been open about fifteen months, having at the commencement accommodation for twelve patients, while, at the present, twenty-six beds are provided, twenty-five of which are occupied at the present time. During this first fifteen months 172 patients were admitted to the wards for treatment. At first only one build-

ing was occupied, but recently a second one and part of a third have been leased by the trustees.

One feature of the work done is a matter of great interest to the medical profession, and is worthy of special commendation by this journal. The tendency toward "hospital abuse," which has attracted the attention of medical men so largely in the great centres, and of which we have several times written in no uncertain manner, has been clearly recognized by both trustees and staff, and, regardless of its possible effect in limiting the number of patients applying for treatment, those interested have determined that while the poor shall have at their disposal every advantage of the hospital, a consistent effort will be made to limit its charitable work strictly to those who are unable to pay for hospital maintenance and medical care.

The history of the first year's work of the Toronto Orthopedic Hospital, as evinced at this first annual meeting, and as set forth in the annual report, certainly justifies us in joining the trustees in predicting for it a large field of usefulness and rapidly growing patronage.

W. A. Y.

THE ROLE OF RATS IN PLAGUE.

In his introductory lecture at the London School of Tropical Medicine, Dr. Manson devoted a good deal of time to show that plague is a rat-borne disease. He elaborated the fact that the rat is attacked by plague before that disease appears in epidemic form among men, and contended that the infection spread from rat to rat and from rat to man, so that, except in sporadic form, plague could not exist in any place where rats had been exterminated. With him the prevention of plague in a town would begin with the destruction of the local rats before they had been attacked with the disease. As he says: "When rats are tumbling about the floors drunk with plague, it is too late for general prophylaxis, and the remedy would then be Hafkine's injections." Dr. Manson explains that if an infected rat dies, it is eaten by other rats, or the fleas infesting it would transfer themselves to other rats and with them plague bacilli. This explanation offers a reasonable theory of the infectiousness of plague among rats, but leaves a hiatus as to the communication of the disease from rat to man. It may be, however, that Dr. Manson considerately allowed his hearers to fill in the etiological chain for themselves. Needless to say, in famine

times rats are eaten by men, and if plague-stricken, may transfer that disease to their hosts; but it is strange that the rat, which flees the companionship of man, should, when dying of plague, communicate his fleas to the superior vertebrate. And yet so it seems to be.

Ogata, a Japanese scientist, was the first to observe the role played by fleas in the propagation of plague. He discovered in the bodies of fleas the bacillus of plague, and concluded that the disease could be inoculated by the bites of these insects. A fact noted by Simond is very interesting. A great number of cases of plague were observed in persons who had been in contact with rats and mice; but, on the other hand, these contacts were harmless when the rats had been dead twenty-four hours. Now, it is well known that fleas rapidly leave the bodies of animals after death, which explains their harmlessness in the cases observed. Simond crushed fleas caught on rats or dogs sick with the plague, injected the resulting liquid into mice, which duly succumbed to plague after an interval of from three to thirteen days. Healthy rats bitten by suspected fleas died five days after being bitten, with all the characteristic symptoms of plague. Side by side with these positive proofs, Simond gives negative ones also; but, nevertheless, is inclined to admit this method of propagating the plague, which is doubted by Nuttal.

It must also be observed that the flea of the rat (typhopsylla musculi) is a distinct genus from the flea of man (pulex irritans), and that it has not yet been proved that it bites its human host. The ants, which devour rats dead from the plague and which do not catch it (Hafkine, 1897), may also be a source of danger, not so much by their bites as by infecting water and food upon which they are often found in great numbers. In view of these facts, a rat-catching campaign may be seriously considered by the sanitary authorities of European and American cities. In the opinion of the foreign physicians, who have been sent to study the plague at Oporto, the sanitary cordon in operation around that city is illusory, since it has not prevented the spread of the disease to a village about twelve miles out, and dangerous because the increase of poverty will intensify the spread of the plague. The large amount of money required to keep up a cordon of soldiers would be more usefully employed at Oporto in organizing depots for disinfection, in procuring the destruction of insanitary houses, and in making provision against overcrowding and poverty. It is now thought that the plague will continue at Oporto for

months, perhaps for years, without increasing in intensity. It will be almost impossible to prevent the contamination of other European cities with the plague, because in many of them there are thousands of people who suffer from direst poverty and live in the filthiest surroundings.

In the cleanest of cities, inhabited by people who practise personal and domestic cleanliness, who avoid overcrowding and shun infection, the spread of plague from man to man may be controlled; but if a plague-stricken rat should escape into the sewers of a European city he would certainly infect the other rats and the inhabitants as well. J. J. C.

TORONTO UNIVERSITY SENATE ELECTION.

OWING to the death some time ago of Dr. J. E. Graham, a vacancy was created in the Toronto University Senate, and necessity arose for electing another medical representative. This vacancy was filled recently by the election of Dr. James M. MacCallum, who defeated his opponent by a majority of ten. Those "in the inner ring" made every possible effort to have the election result the other way, but were snowed under. To quote the words of the closing sentence of an editorial that appeared in the October (1898) issue of the *Canadian Practitioner*, which dealt with the Toronto University Senate elections which had just then taken place, "We sincerely hope that in the near future, peace and harmony will exist in a faculty which should show no divisions in connection with the general policy which should prevail among the governors of our Provincial University." The question is, have the actions and sentiments of the writer of the editorial referred to coincided? W. A. Y.

REMOTE RESULTS OF A RESECTION OF THE URETHRA.

ON the 5th of August, 1891, the writer of this article was present at the Necker Hospital, Paris, when Professor Guyon performed a radical operation on a small boy who was suffering from impermeable stricture of the urethra. The accident which caused the stricture had resulted in 1888 from the lad falling astride the back of a bench. From August, 1888, to January, 1891, he had been operated on four times, one external urethrotomy and three internal urethrotomies. Recontraction of the stricture ensued after each of these operations. The surgical procedure adopted by Pro-

fessor Guyon consisted in a complete resection of the strictured portion of the urethra, the severed ends of which were subsequently drawn together by sutures, followed by suturing of the overlying tissues in successive layers up to the surface. The writer was unable to follow the subsequent history of this interesting case, but is indebted for it to an article by Dr. Nogues, which was published in the *Annales des Maladies des Organes Genito-Urinaires*, 1899, No. 2, p. 167. It appears from the narrative that the perineal wound united by first intention, and that a No. 24 French sound could be passed through the urethra. In December, 1898, the patient was seen again by Professor Guyon. The stricture had reappeared; but, owing to the complete restoration of the urethra by the operation performed in 1891, the stricture proved to be very yielding, and after dilatation had been practised a few times, the urethra became quite permeable. J. J. C.

OUR ILLUSTRATED CHRISTMAS NUMBER.

ONCE more we wish our readers one and all a Merry Christmas. We fain would wear a sprig of holly on our own account, but it might not prove becoming to the complexion of a medical publication, intended exclusively for those who look at things through a microscope. So we just present our compliments at this gala season by introducing a few half-tones, reproductions of subjects of allied interest to all students of medicine. They include the well-known pictures, "The Doctor," "A Charity Patient," "The First Public Demonstration of Anæsthesia at the Massachusetts General Hospital, Boston, October 16th, 1846," "An Accident," "Duty," "An Anatomical Lecture," "André Brouillet—Serum-Therapy for Croup at Trousseau Hospital, Paris," and "A Dying Declaration." Probably this is the second time only that any attempt in the way of embellishment at Christmas time has been made by any medical journal in Canada, the first being in 1898 when this journal gave a number of half-tones illustrative of beauty spots in and around Toronto. This departure was so favorably received and so heartily commended that we again venture upon carrying out the idea which we have made our own. W. A. Y.

EDITORIAL NOTES.

An Acknowledgment.—We take the greatest of pleasure in acknowledging the kindness and courtesy extended to us by the

Arlington Chemical Co., of Yonkers, N.Y., in loaning us the half-tone plates which appear in and so embellish this number of the JOURNAL. We venture to say that never at any time has the management of any medical journal on this continent been able to give its readers such a wealth of valuable material as is contained in the present issue of THE CANADIAN JOURNAL OF MEDICINE AND SURGERY.

An Early Symptom of Actinomycosis.—Inability to open the mouth, without apparent cause, was considered an infallible proof of actinomycosis by Poncet. Recently, Besnier presented to the Society of Dermatology, of Lyons, a patient, who felt a great difficulty in opening his mouth. An examination of his mouth revealed nothing abnormal; but in five or six months the skin broke down, and pus, containing the characteristic yellow grains, issued from the abscess.

Le Bulletin Medical de Quebec.—We have received and examined with interest a first copy of this new medical monthly, which is published in the French language at "the ancient capital." The original articles are good, and the selections are numerous and well chosen. It is published by the Medical Society of Quebec, with the collaboration of the Medical Faculty of Laval University. Under such able management it will easily maintain a high position among its readers, and will also serve to reunite the graduates of Laval University to their *Alma Mater*. We wish our confreres of *Le Bulletin Medical de Quebec* every success in their enterprise.

Substitution, the Bete Noir of Drug Manufacturers.—We can conceive of nothing so mean and so contemptible on the part of the retail druggist as the substitution by him, with the one object of making a larger profit, of one particular preparation for another, in the dispensing of physicians' prescriptions. Is there anything, we ask, which could be more fatal to any business than the adoption of such methods—methods unworthy of any firm? There is no question about the fact that in many cases the failure on the part of the physician to procure results in the treatment of many diseases is due to tactics of this kind. We are led to make these remarks on account of having noticed that just the other day Judge Kohlsaat, of the United States Circuit Court for the northern District of Illinois, perpetually enjoined a druggist in Chicago from ever again substituting any spurious or inferior preparation for "Fairchild's Essence of Pepsine," when the latter was expressly called for in physicians' prescriptions. We most

heartily congratulate the firm, who secured so deserved a success, on the result of their suit, and trust that it will have a wholesome effect in the future and act as a warning to others who might, in order to illegally increase their share of this world's goods, act similarly.

Exemplary Lay Advertising.—It is a well-known fact that the usual daily press advertising done by a very large percentage of medicine manufacturers is worse than outrageous, stamping the concern as being fake, pure and simple. One such advertisement, however, we came across the other day and cannot help alluding to it. It said: "The test of all proprietary remedies is this—what does your doctor say? We believe the physician is the best judge of what is what in regard to medicine, and our aim is to make —— —— Emulsion a useful remedy in the hands of physicians." We feel that if such methods were pursued as in this case, and some amount of judgment resorted to, there would be far less feeling on the part of physicians against concerns of the kind, and latterly more money come into the coffers of the manufacturers themselves.

Increase in Typhoid Fever in Ontario during August, 1899.—We notice by the monthly statistical report of the Provincial Board of Health, that typhoid fever in Ontario shows a high death rate during the month of August of this year, as compared with the same month of the previous year. In August, 1898, the mortality from typhoid fever was 34 or 0.2 per 1,000 per annum; in August, 1899, it was 55 or 0.3 per 1,000 per annum. This increased mortality indicates that frequent outbreaks of typhoid fever have been caused by an impure condition of the water supplies, and this is probably due to the drought during July and August, which caused a reduction in the level of the ground water and a more concentrated condition of impurity in the well water. In Toronto, during the month of August, 1898, the mortality from typhoid fever was 4, during August, 1899, it was 3. It would seem then that the drought, which produces low ground water and concentrated impurity in a country well, does not operate similarly in a water supply drawn from a large body of water. In fact, when the sewage and surface impurities of Toronto are not washed into Lake Ontario by frequent showers, the city water supply is purer than during a wet season, as in spring or autumn. Country people, to escape from typhoid fever, should improve their wells; city people, for a similar reason, should not discharge civic sewage into their water supplies.

The Physician's Library.

BOOK REVIEWS.

The International Text-Book of Surgery. By American and British authors. Edited by J. COLLINS WARREN, M.D., LL.D., Professor of Surgery in Harvard Medical School; Surgeon to the Massachusetts General Hospital; and PEARCE GOULD, M.S., F.R.C.S., Surgeon to Middlesex Hospital; Lecturer on Practical Surgery and Teacher of Operatic Surgery, Middlesex Hospital Medical School; Member of the Court of Examiners of the Royal College of Surgeons, England. Vol. I., General and Operative Surgery, with 458 illustrations in the text and nine full-page plates in colors. Philadelphia: W. B. Saunders, 925 Walnut Street. 1899. Price, $5.00 net per volume. Canadian Agents, G. A. Carveth & Co., Toronto, Ont.

Among the contributors to Vol. I. of this most complete system of surgery appear the names of such men as Charles McBurney, J. Bland Sutton, Maurice H. Richardson, Frank Hartley, Harold C. Ernst, C. H. Golding Bird, J. G. A. Burns, J. Chalmers Da Costa, John B. Hamilton, W. Watson Cheyne, and last, but not least, Irving H. Cameron, of Toronto, who contributes a very able section on Surgical Tuberculosis.

It was with a considerable feeling of modesty that the authors of this new book on surgery launched upon their work. They felt that there were many books on the subject already in the hands of the profession, but at the same time considered that a text-book of surgery was needed which would be entirely "untrammelled by many of the conditions of the past and at the same time present with due discrimination the results of modern progress." It will take the reader but a very short time to decide as to the great success which has attended their labors, the work as a whole being one which presents the most modern views on surgery in all its phases, and which ought to be in the hands of all who wish a volume suitable for work in every respect modern and up-to-date. The authors have recognized the fact that so wide is the field of surgery and so great its development that it is simply out of the question for one man to attempt to write anything like a text-book of surgery, so for that reason they sought and found the aid of a staff of men whose experience is wide and whose statements cannot be gainsaid, some of whose names we have already given. Since handing in his contribution to the work, one of the staff has already passed away and "crossed that bourne whence no traveller returns"—the late John B. Hamilton.

In treating of surgical tuberculosis, Mr. I. H. Cameron states that all periods of life are subject to tuberculosis, but that the surgical aspect shows itself largely in childhood, the strumous glands and bone and joint affections occurring most frequently in this period. The bacillus tuberculosis may pass from the mother to the fetus *in utero*, giving rise to a peculiar susceptibility by the tissues of the body to the tuberculous irritant, thus affecting a favorable nidus for the development of the germ. The writer states that the route by which the tubercle germ most frequently enters the system is the respiratory passage, the most likely vehicle of the contagion being dust, infected with dried sputum. The author lays stress upon the maximum amount of sunlight and pure air as being most important in the general treatment of the disease. Amongst the drugs which are most serviceable, are iron, manganese, quinine, strychnine, iodine, chlorine and phosphorus, with their potash, soda and lime salts, creasote and guaiacol, cod-liver oil and ichthyol, protonuclein and methylene blue; but Mr. Cameron adds "any or all of these in the absence of the trinity, free air, free sunshine and free nutrition, are broken reeds indeed."

The author deals with his subject under several headings, and takes up separately (1) tuberculosis of skin and mucous membrane, (2) tuberculous lymphadenitis, (3) tuberculosis of the serous membranes, (4) tuberculosis of tendons, tendon sheaths and muscles, (5) tuberculosis of muscles and fascie, (6) of the genito-urinary organs, (7) of the prostate, vesiculæ seminales, testis, epididymis and vas deferens, (8) of the bladder, (9) of the kidney.

The publishers are to be congratulated upon the array of material presented in Vol. I. of this text-book, and we bespeak a very large sale indeed for the work. W. A. Y.

The Nervous System and Its Constituent Neurones. By LEWELLYS F. BARKER, M.B. (Tor.), Associate Professor of Anatomy in the Johns Hopkins University, and Assistant Resident Pathologist to the Johns Hopkins Hospital. 676 illustrations, two colored plates. New York: D. Appleton & Co.

"Barker's Nervous System," for which some have been looking for some time, has come to hand. Our personal acquaintance with and esteem for the author creates in us a desire to write a review worthy of the work, but we fear that anything that may be said will fall far short of the merits of the book. To say that it is probably the most comprehensive *résumé* and criticism of the work done on the nervous system ever published in the English language, is, we feel certain, not putting it a whit too strong.

Naturally, in a work of the kind, there is a great deal of purely technical information, but this is put in such a clear style as to be not only instructive but interesting to the average reader.

The author's description of the "neurone," and what is meant by the term, is concise, and readily grasped. In Chapter V. he is critical of Schäfer for having used the term "neuron," as limited to the axis cylinder process only, thus leading to a great deal of confusion.

Sections II. and III., covering Chapters VII. to XIV., take up the external and the internal morphology of the neurones, and is naturally technical and scientific. Section V., including Chapters XIX. to XXV., deals with "the neurone as the unit." The book is worth having for these chapters alone, and a perusal of them will prove to any reader not only instructive but entertaining.

In Section VI., covering Chapters XXVI. to LXVIII., "The Grouping and Chaining together of the Neurones" is considered in a most lucid manner. It is taken up in such a way as to be easily mastered by the general practitioner.

The book covers so much ground that it is impossible, in the space at our disposal, to go minutely into a review and criticism of detail, even if we were competent. We can, however, confidently recommend it as a useful addition to one's library, and any one desirous of keeping abreast of the recent literature on the nervous system will certainly feel it necessary to "read, mark, learn, and inwardly digest" its contents.

To those who have known Lew. Barker as a boy, as a fellow-student, as a fellow-graduate, and as a teacher, it is natural that we should turn to this—the result of many months of arduous labor—with peculiar feelings of pride and of admiration. For the author we have always entertained the highest esteem, and for this—his work—have nothing but praise. F. N. G. S.

A Practical Treatise on Materia Medica and Therapeutics. By ROBERTS BARTHOLOW, M.A., M.D., LL.D., Professor emeritus of Materia Medica, General Therapeutics and Hygiene in the Jefferson Medical College of Philadelphia; formerly Professor of Materia Medica and Therapeutics and of the Practice of Medicine in the Medical College of Ohio; Fellow of the College of Physicians of Philadelphia; Member of the American Philosophical Society, etc., etc., etc. Tenth edition, revised and enlarged. New York: D. Appleton & Co. 1899. Canadian Agents: Geo. Morang Co., Ltd., Toronto.

It is just about three years since the last or ninth edition of this work was published, and in that short space of time such extensive changes have taken

place in the subject of Materia Medica and Therapeutics, not to speak of the large demand for Dr. Bartholow's work from the profession all over the world, that still another edition of the book became necessary. The tenth is a larger book than any preceding one, and consists of over 800 pages. The author has dealt at some length with some of the newer remedies, and has written a special article on the writing of prescriptions. The author states that, as the next decennial revision of the United States Pharmacopeia is so near at hand (1900). it will not be long before authoritative action as to all the newer remedies will be taken, thus terminating the state of uncertainty at present existing. The author divides this edition of his work into two parts, the first dealing with the modes in which medicines are introduced into the organism, and the second with the action and uses of remedial agents. Under the section on Evacuants and Catharties, a most interesting chapter is that treating of Enemata. The author states that Enemata act either by reflex irritation or by absorption. The quantity, as well as the temperature, of the fluid injected must be taken into consideration when it is proposed to empty the bowels by merely reflex irritation. On the other hand, when it is the intention to procure the absorption of the medicated fluid, the quantity injected must be relatively small, and its temperature be that of the rectum. In order to secure absorption, it is necessary also to regard the laws of diffusion. As the secretions of the rectum are alkaline, it is obvious that acidulated solutions will diffuse into the rectal veins with the greatest facility. The utmost gentleness is requisite in administering rectal injections, especially if a large amount of fluid is to be introduced. If not, injury to the mucous membrane may result, or even rupture of the intestine if the coats are softened by disease. Sudden and forcible distention of the bowel may produce dangerous cardiac syncope in susceptible subjects. Experiments on the cadaver have demonstrated that, although the large intestine may be filled with water, no fluid can be made to pass the ileo-cecal valve. We notice that the author has not excluded proprietary medicines from his work. We consider such to be wise, as a treatise on Materia Medica would be wanting in thoroughness and completeness if it did not refer to the most recent remedies whether included in the Pharmacopeia or not. W. A. Y.

A Text-Book of the Practice of Medicine. By JAS. M. ANDERS, M.D., Ph.D., LL.D., Professor of the Practice of Medicine and of Clinical Medicine in the Medico-Chirurgical College, Philadelphia; Attending Physician to the Medico Chirurgical and Samaritan Hospitals, Philadelphia, etc., etc. Illustrated. Third edition, revised. Philadelphia: W. B. Saunders, 925 Walnut Street. 1899. Price in cloth, $5.50; in sheep or half morocco, $6.50. Canadian Agents: G. A. Carveth & Co., Toronto.

It is but a year since the last edition of this work was issued. The second edition was very similar to the first and had very few additions indeed. This edition, however, is entirely re-written and revised. The section on Infectious Diseases has had particular attention paid to it, so great has been the advance in this department of medicine. There have been a large number of new subjects included in this edition of Dr. Anders' work, and among them we notice, in reading the book, periodic paralysis, ether-pneumonia, splenic anemia and meralgia paresthetica. There has also been added in the section on Nervous Diseases a chapter dealing with the subject of localization.

In dealing with ether-pneumonia, the author states that the aggregate number of cases from all sources gives a percentage of 0.07. Among the principal causes are: (1) Season, over 80 per cent. occurring during the winter and spring months. (2) Catching cold, or exposure during protracted operations. (3) Some morbid state of the respiratory mucosa at the time of anesthesia. (4) Dried secretions or incrustations of foreign matter that are loosened by the ether and drawn downward into the lungs. (5) Abdominal operations give the highest percentage of cases of ether-pneumonia, due doubtless to the protracted etherization. The clinical features compare aptly with those of secondary pneumonia, the diagnosis resting particularly on the typical physical signs. The author lays stress upon the great importance of a physical examination of the

thorax upon the sudden accession of fever, particularly if associated with thoracic pain, however slight, following an operation.

Meralgia Paresthetica, otherwise known as Bernhardt's Disturbance of Sensation, is a disease characterized by paresthesia and disturbance of sensation on the outer side of the thigh, in the region supplied by the external cutaneous femoral nerve. Of the disease there are two varieties: first, the paresthesial, where there may be burning, tingling or stabbing pains severe enough to disable the patient or only a feeling of cold or numbness; second, the sensory disturbances, varying from slight hyperesthesia to total anesthesia. The diagnosis is easy, prognosis doubtful and very little to be done in the way of treatment.

The book is one of considerable value, and in its third edition presents to the profession a complete work on medicine.

A Text-Book of Materia Medica, Therapeutics and Pharmacology. By G. F. Butler, Ph-G., M-D., Professor of Materia Medica in the College of Physicians Surgeons, Medical Department of the University of Illinois; Professor of General Medicine and Diseases of the Digestive System, Chicago Clinical School, etc., etc. Third edition. Thoroughly revised. Philadelphia: W. B. Saunders, 925 Walnut Street. 1899.

The fact that a third edition of Dr. Butler's work has been called for since the first edition appeared in September, 1896, would naturally indicate that it has been found useful, particularly by the student of medicine. We should be inclined to think that as a ready work of reference it would also find a place on the desk of the busy practitioner. The arrangement of the drugs in groups, according to their therapeutic affinities, should make the study of any subdivision of the subject in hand less perplexing to the beginner, and will doubtless enable a practitioner to compare the composition of the various preparations with ease and despatch. The author, in addition to copious and timely selections from the best authorities, gives the personal observations of a skilled therapeutist in short, telling sentences, and by the frequent use of italics, enables the reader to seize on the salient points of the drug or preparation he wishes to study. A distinction is made between the toxic effects and the mere untoward results of drugs, which is rational in theory and will be useful in practical medicine. The article on Hematics, including animal extracts (organotherapy), will be found very readable. Under the heading of Alteratives, the Section on Arsenic contains some novel references to the uses of this drug, which will very much add to the interest of the reader. The remarks on the uses of colchicum are also very instructive. Owing to the really marvellous cures obtained through the use of anti-diphtheritic serum in diphtheria and of anti-streptococcic serum in septicemia, much interest naturally attaches to the perusal of the article on serum-therapy. The last chapter, devoted to prescriptions, contains detailed instructions on the art, not too widely diffused, of writing prescriptions in good Latin. Several useful hints to physicians on the business aspects of prescriptions are also given. In addition to a full general index, a clinical index is added, which, needless to say, is useful and time-saving. The typography and general appearance of the work reflects credit on the publisher. J. J. C.

Clinical Lectures on Mental Diseases. By T. S. Clouston. Fifth edition. London: J. & A. Churchill. 1898.

The changes and additions are so numerous in the present edition that it might almost be said to be an entirely new work on the subject, were it not that the author's inimitable charm in treating the matter is at once recognized by those who have followed his earlier work: a felicity of style which bids fair to make the present edition as popular a work for reference or general reading as the preceding editions have been on both sides of the Atlantic. Twenty elaborate plates, many colored, form an interesting feature, and add greatly to the value of the volume.

As the title of the book indicates, these are clinical studies. The author has very wisely refrained from entering deeply into pathological discussions upon a

subject which is yet in its infancy, and for which the technique of practical pathology, as it is at present practised, has been able to do very little. Judging by the example set by this eminent authority, the present tendency in psychiatry is towards simplification. No tendency can be hailed with greater eagerness, especially when observed in a clinical branch of medicine, where, until very recently, the practice of investigating every incidental symptom with the dignity of an independent mind-lesion had bred a state of chaos that could scarcely be more ridiculous on the one hand, or more hopeless on the other.

"I trust," the author remarks prefatorily—"I trust we teachers will be enabled now, more than ever, to present to our students, in addition to the details of our subject, the relationship of the disturbed mental functions of the brain to general medicine and surgery, and to prevent our department from sinking into a specialty in the bad sense. Mind and brain dominate all else in the organism, and their diseases, if properly studied, can never be narrowing."

E. H. S.

Encyclopedia Medica. Under the general editorship of CHALMERS WATSON, M.B., M.R.C.P.E. Vol. I., Abdomen to Bone. Edinburgh: William Green & Co. 1899. Pp. 579. $5.00.

This is the first volume of the most recent of the encyclopedias, of which the closing years of this century have been so prolific. The design of this work is very comprehensive, the aim being to do for medical science what the Encyclopedia Britannica has done for general literature. The articles are arranged alphabetically, and when completed the work is to consist of twelve volumes.

In this first volume the articles are well written though condensed. Many of them are by well-known contributors, such as Sir William Gowers on Epilepsy, Lander Brunten on Angina Pectoris, Byron Bramwell on Aphasia, Dudley Burton on Anesthetics, T. Colcott Fox on Acne, A. R. Simpson on Abortion, etc.

In the alphabetical arrangement the names of the diseases, not of the organs affected, are regarded, so that the diseases of an organ are not dealt with in a consecutive series of articles. This necessitates the purchase of the whole work to enable one to consult all the articles in any given department, as, *e.g.*, disease of the lungs.

In encyclopedic works the articles are often hastily written and are not the best work of the contributors, who are apt to feel that their individuality is lost in the multiplicity of authorship. This, no doubt, accounts for much that is disappointing in such works. In this volume, however, the articles generally have escaped that injurious influence. It is much to be regretted that English and American publishers have not adopted the German plan by which a single volume, or even a part of a volume can be obtained without purchasing the whole work. Such a plan encourages special work in the profession by furnishing the literature of any subject at a minimum of cost. In such a plan also the contributors would feel that the success of their individual parts would depend on their intrinsic merit rather than on the reputation of the work as a whole. It remains in a great measure with the profession itself to effect such a change in the methods of publication. Failure to obtain subscribers to these many-volumed works would soon compel the publishers to sell individual volumes, or even parts of them.

This first volume of the "Encyclopedia Medica" is well printed and presents an appearance creditable to the publisher.

A. M'P.

A Text-Book of Diseases of the Nose and Throat. By D. BRADEN KYLE, M.D., Clinical Professor of Laryngology and Rhinology, Jefferson Medical College. With 175 illustrations, 25 of them in colors. Philadelphia: W. B. Saunders, 925 Walnut Street. 1899. Toronto: Carveth & Co.

The publisher has every reason to be proud of this excellent addition to the long series of good books which have issued from his press. Dr. Kyle, like other modest authors, introduces his work by excusing some features of it. His readers, however, will be apt to consider these very features strong points, for

every chapter is practically complete in itself. While evidently thoroughly conversant with all the literature of his subject, the author does not hesitate to advance his own opinions, side by side with those generally accepted.

The increased attention being paid in rhinological practice to diseases of the accessory sinuses is mirrored in the very complete and satisfactory chapter on this subject. That peculiar disease, membranous rhinitis, he divides into three classes, croupous, fibrinoplastic and diphtheritic. The croupous form he ascribes to the streptococcus pyogenes, associated sometimes with the attenuated form of diphtheria bacillus, yet he does not think it necessary to isolate the patient. In treatment of atrophic rhinitis he makes no mention of the aceto-tartrate of alum, a drug which has proved most satisfactory in our hands.

Taken altogether this is one of the most satisfactory books which has yet appeared on diseases of the nose and throat.

Introduction to the Outlines of the Principles of Differential Diagnosis, with Clinical Memoranda. By FRED. J. SMITH, M.A., M.D. (Oxon.) F.R.C.P. (Lond.), Physician (with care of out-patients) and Senior Pathologist to the London Hospital. London: Macmillan & Co. (Limited). New York: The Macmillan Co. 1899. Price, 7s. 6d.

The writer claims for his book nothing particularly new, but a rearrangement "of the old, old phenomena of disease in such a manner as to show more clearly their fundamental meaning and relationship." He has drawn his inferences and deductions by utilizing the data of physiology and the facts of pathological anatomy. The work is not large, but at the same time is replete with facts which are of practical value to the practitioner of medicine. It is next to impossible for a physician to carry with him the necessary fund of information to enable him to always make correct diagnosis. A work such as Dr. Smith's "Differential Diagnosis" is just the thing for this purpose, and we feel sure that it will meet with a large sale, not only in the Mother Country, but in the Colonies as well.

The Physician's Visiting List (Lindsay & Blakiston's) for 1900. Forty-ninth year of its publication. Philadelphia: P. Blakiston's Son & Co., 1012 Walnut Street.

Once more this popular visiting list has made its appearance. Its method of keeping accounts with the least possible trouble and greatest amount of accuracy is as apparent as ever. It is very handy in size, and is published in three sizes—the regular, perpetual and monthly editions. (See advt. page cxxvii. this issue.)

Rough Notes on Remedies. By WM. MURRAY, M.D., F.R.C.P. (Lond.), Newcastle-on-Tyne. Third edition. London: H. K. Lewis, 136 Gower Street, W.C. 1899.

In this little work of 142 pages the author takes up some of our standard remedies, such as arsenic, mercury, belladonna and turpentine, and shows that our knowledge of these drugs is by no means complete. The author, in the case of arsenic and belladonna, pushes his dosage to a greater extent than is generally considered advisable, but his results seem to justify his practice.

A chapter of considerable interest is devoted to "Our Mistakes," and another to "Liqueur Brandy."

We think the author's idea of working up the therapeutics of our old standard remedies an excellent one, and one calculated to do much good.

We hope another edition may soon appear, with a much extended list of drugs. The type is clear, and printed on good heavy paper. W. J. W.

Insanity and Allied Neuroses, Practical and Clinical. By GEO. H. SAVAGE. Cassel & Co. 1898.

In the present revised edition of this well-known text-book many changes have been made by which it has been brought up to current opinion upon the subject. Though many other short works upon insanity have appeared, both in America and England, during the last few years—works, moreover, which

exhibit the highest degree of excellence—there have been none which contain more in so small a space, present the subject in clearer form, or, in a word, possess, to a greater degree, all the essentials of a very concise, yet authoritative, text-book on psychiatry. E. H. S.

On Failure of Brain Power—Its Nature and Treatment. By JULIUS ALTHAUS, M.D. London: Longmans, Green & Co. 1898.

In this interesting and useful volume the author has gathered together a large mass of facts which belong neither to insanity proper, nor to general medicine, yet which have a bearing upon certain nervous conditions with which the general practitioner is constantly meeting. The mode of treatment is sound, the matter is in touch with the most recent developments of scientific research, and the therapeutic suggestions are worthy of the closest attention.

E. H. S.

No. 5 John Street. By RICHARD WHITEING. Toronto: Methodist Book and Publishing House.

In this book the characters live, speak, and tell their own story—the story of life's contrast between the rich and the poor; pathetic, often grimly humorous, sometimes tragic, yet truthful. The book fascinates, and the interest never flags during the reading of it. The man who wrote the book is an artist, he paints his picture true to life, and lets his models pose themselves. He does not strain at a gnat, and give his readers a camel to swallow in the shape of a moral treatise; his characters tell the tale, and he leaves his readers to understand.

LITERARY NOTE.

"Imperative Surgery for the General Practitioner, the Specialist and the Recent Graduate." By Howard Lilienthal, M.D., Attending Surgeon to Mount Sinai Hospital, New York, is the title of a work on the press for immediate publication by The Macmillan Company. In a grave emergency, and in the absence of expert assistance, any physician may find himself obliged to perform the work of the surgeon. To shirk responsibility may cost a life or make a cripple. Dr. Lilienthal's book, which deals with just these conditions, will be a particularly valuable possession for the general practitioner and the recent graduate. The reader is not embarrassed by descriptions of a multiplicity of operations for the relief of a single diseased condition, but is presented in each instance with one good method, as simple in character as is consistent with good surgery. Original illustrations from drawings and photographs of the actual field of operation render the explanation still clearer. The book deals with fundamental principles.

PAMPHLETS, REPRINTS, ETC., RECEIVED.

"The Medical Treatment of Movable Kidney." By Alfred Stengel, M.D., Philadelphia.

"The Blood in Diseases of the Cardio-Vascular System." By Alfred Stengel, M.D., Philadelphia.

"Gastroptosis—Report of a Case in which a New Operation was Undertaken, and the Patient Gradually Improved." By Alfred Stengel, M.D., Philadelphia.

"A Brief Onset in Typhoid Fever." By William Pepper, M.D., LL.D., and Alfred Stengel, M.D., Philadelphia.

Announcement of the College of Physicians and Surgeons of Ontario, and Reports of Proceedings of Ontario Medical Council, July, 1899. For the academic year, 1899-1900.

"The Treatment of Hemorrhoids and Rectal Prolapse by Means of Interstitial Injections." By Dudley Wright, F.R.C.S. London: Henry J. Glaisher, 57 Wigmore Street, Cavendish Square West. 1899.

Selected Articles.

PROTONUCLEIN IN GENERAL PRACTICE.*

BY G. W. SHERMAN, M.D., DETROIT, MICH.

My first practical experience with protonuclein was on myself. About two and a half years ago I was taken with a severe attack of acute catarrhal inflammation of the nasal mucous membrane, which rapidly extended down the trachea into the bronchi. It began on a Friday morning with an almost incessant sneezing accompanied by blocking of the nose, fulness in the head and headache, followed later in the day by a thin, copious discharge from the nose, and an irritating cough. By five o'clock p.m. the same day my headache was severe, my limbs all ached, and on taking my temperature it registered 101°. I had had similar attacks before, none apparently quite so severe, which always ran a course of from one to three weeks. I had tried quinine and other remedies without any appreciable benefit, and was a willing subject to try something new. I had a few samples of protonuclein and began to take them *ad libitum*, starting about five o'clock in the evening. By Saturday morning I felt some better and continued taking the preparation through all the day, still *ad libitum*, and by evening, twenty-four hours after its use, felt considerably improved. I continued taking more during Sunday, when my nose cleared up, and the headache, fever, cough, and soreness in my limbs disappeared. By Monday evening, after three days' treatment, I was practically well and attended a meeting of the Detroit Medical and Library Asscciation. Since then I have always prescribed protonuclein in these acute catarrhal affections, with the same happy result. Experience has taught me that the proper dose for such cases, in the adult, is from six to twelve grains repeated every two to three hours. The treatment should be continued with smaller doses for a few days after the disease has disappeared to prevent a relapse.

I have found protonuclein especially useful in the treatment of broncho-pneumonia in infants and children. In these cases I usually give from two to four grains, according to age, repeated every two to three hours, and find that a recovery takes place in from three to five days I have had remarkable success in treating pneumonia with this preparation and will briefly report three cases.

Case 1.—My mother, aged seventy-two years, on April 8th, 1897, suffered a severe chill about nine o'clock in the evening. Two hours later when I first saw her she complained of pain in the right

*Read before the Detroit Medical and Library Associa ion.

side; was coughing up bloody mucus, and was very uneasy. Her heart had been irregular for some years, but now the pulse was 130 and her temperature 103°. Physical examination revealed pneumonia of the right lung. I prescribed two grains of phenacetin and six grains of protonuclein, to be repeated every two hours. By ten o'clock the next day her temperature was 99⅗° and her pulse 108; the pain in her side was less and she felt much better. The phenacetin was discontinued and the protonuclein continued. By the third day her temperature was normal, and she felt so well that in spite of my protests, she was determined to sit up. She coughed up rust-colored sputum for six or seven days, but otherwise felt quite well. She has had no trouble with her lungs since.

CASE 2.—J. R., a female, aged twenty years, had a chill at six o'clock in the morning, followed by fever and pain in the left side. I saw patient first at eight o'clock p.m. next day, when her temperature was 102°, pulse 115, respiration short, with pain in the left side, and dulness on percussion over lower half of left lung. I prescribed six grains of protonuclein and two grains of phenacetin, and ordered the dose to be repeated every two hours. Next day at four o'clock p.m. her temperature was 101°, pulse 108, and she felt and looked better, but coughed up bloody mucus. The third day at four o'clock p.m. her temperature was 104°, pulse 120, and she felt worse, having more pain in her side, coughing up much bloody mucus, and feeling restless. On inquiry I found that she had only received her medicine every four hours instead of every two hours as I had directed. I now prescribed nine grains of protonuclein and two grains of phenacetin, and ordered that the dose be repeated every two hours. The fourth day at three o'clock p.m. her temperature was 99⅘°, pulse 96, and she felt better, coughed less and had but little pain. The protonuclein and phenacetin were continued. The fifth day at four o'clock p.m. her temperature was 98°, pulse 83, but little bloody mucus being expectorated, lungs clearing up, and she felt like leaving the bed. Protonuclein was continued, and phenacetin discontinued. The sixth day her temperature and pulse were normal, appetite good, and patient convalescent. I prescribed nine grains of protonuclein, the dose to be repeated four times a day for a few days, after which no further medication was required.

CASE 3.—C. G., a male, aged sixty-three years, had not felt well for several days, and was taken with a fever the day before I saw him. Patient complained of a pain in his right side, and difficulty in breathing. His temperature was 102⅗°, pulse 110, and the lower portion of his left lung was inflamed. I prescribed six grains of protonuclein and ordered that the dose be repeated every two hours. The next day there was hepatization of the lower half of the right lung, with a temperature of 102°, and a pulse of 108. The protonuclein was now increased to nine grains, repeated every two hours. The third day the temperature was 101°, and the pulse 100. He felt better and on examination the lung was found to be

clearing up. The protonuclein was continued. On the fourth day the temperature was 98°, the pulse 84; patient had enjoyed a night's rest, appetite returning, and lung much improved. The fifth day I found my patient dressed and sitting in a chair. He said he felt well, but I persuaded him to go back to bed, fearing something might happen. I continued the protonuclein four times a day for a few days, when he made a complete recovery.—*The Physician and Surgeon.*

OTITIS.

BY DR. HUGH BLAKE WILLIAMS, OF CHICAGO, ILL.

THE more I see of chronic suppurative inflammation of the ear, the more convinced do I become that the element of chronicity is due to lack of thoroughness in treatment. The method of procedure mapped out below will not succeed in cases where necrosis has occurred, but in all others it will reduce the duration of treatment from months and weeks to days.

The patient is placed upon the side with the affected ear up. The concha is filled with Marchand's Hydrozone, which is allowed to remain until it becomes heated by contact with the skin, when, by tilting the auricle, the fluid is poured gently into the external canal. The froth resulting from the effervescence is removed with absorbent cotton from time to time and more Hydrozone added. This is kept up until *all* bubbling ceases. The patient will hear the noise even after the effervescence ceases to be visible to the eye.

Closing the external canal by gentle pressure upon the tragus forces the fluid well into the middle ear, and in some instances will carry it through the Eustachian tube into the throat. When effervescence has ceased the canal should be dried with absorbent cotton twisted on a probe and a small amount of pulverized boracic acid insufflated.

The time necessary for the thorough cleansing of a suppurating ear will vary from a few minutes to above an hour, but if done with the proper care it does not have to be repeated in many cases. However, the patient should be seen daily and the Hydrozone used until the desired result is obtained.

Care is necessary in opening the bottle for the first time, as bits of glass may fly. Wrap a cloth about the cork and twist it out by pulling on each side successively.

In children and some adults the Hydrozone causes pain, which can be obviated by previously instilling a few drops of a warm solution of cocaine hydrochloride. In this note it has been the intention to treat suppuration of the ear rather as a symptom and from the standpoint of the general practitioner.—*Abstract from The Alkaloidal Clinic of Chicago for January, 1899.*