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Original Communications.

THE OPSONIC THEORY.*

SIR ALMROTH EDWARD WRIGHT, M.D., F.R.S.

DEAN REEVE: Mr. Chancellor, President, Ladies and Gentlemen: By the courtesy of the President, who generally takes the chair on these occasions. I have the honor of introducing the lecturer of the evening. We have had the privilege of listening to distinguished strangers on occasions similar to this, year after year, not always from abroad, but we have generally—in fact I may say always—secured one who would both interest and instruct you, or those who happen to be present. As a rule our guests or visitors have been from England or Scotland. To-night we have the pleasure of listening to one who is a graduate of the famous old Trinity College, Dublin. (Applause.) How it has been accomplished I need not say, but as a matter of fact for one or two hundred years at least there has been a bright succession of men of genius and of eminence in Great Britain who have well sustained the balance against the brilliant and accomplished French savants and the erudite and profound Germans, and in this regard the Emerald Isle has played well her part. (Applause.) In regard to medicine proper I need only recall the names of Cullen and Stokes and Graves and Churchill and Collis and Tuffnill and others. You all know them, in fact their names are household words. Pasteur on one side of the Channel and Lister on the other, and it would seem that of late the mantle of one at least who has gone to his reward has fallen upon the

* Opening lecture of the Medical Faculty, University of Toronto, for Season of October 3, 1906.

shoulders of a few men mainly residing in Great Britain or Ireland. I need only mention one, Donald Ross, and the guest of this evening, Sir A. E. Wright (applause), and without any further preface I will call on Sir A. E. Wright to give his address.

SIR ALMROTH E. WRIGHT (rising amid applause): Mr. Chancellor, Mr. Dean and Gentlemen, as you may have noticed, the Dean did not announce the subject matter of my address. That was what we call in the laboratory "a touch of nature"—I mean it was done by design. When I was asked to give this inaugural address I was overcome with the feeling of responsibility in addressing so many people, for I have not addressed more than a half or a third of this number at one time, and of course responsibility increases with the number of auditors. Again, when I came to consider the subject matter of my lecture I thought of addressing you on the "Physiology of Belief." When I suggested that subject to some of my fellow passengers on the steamer they said, "Anything else but that"; but I still want to leave it in doubt whether I am going to address you on the "Physiology of Belief" or as an alternative on some of the work I have been doing with my pupils on inoculation. I hold that the physiology of belief would be far more interesting and far more important. It would be a disquisition on the changes that occur in the body when you accept anything as true, and the evidence on which you accept things as true. The most important faculty of the human mind is not to remember things told, nor is it even to comprehend and pick up things given, but it is judging between truth and falsehood, and if I could in an hour's time tell you the test whereby you could determine whether the things you believe are true or not, I think I should have done more service than if I gave you one shred of knowledge that we have collected in our work. But I know your feelings would be against that, therefore I am not going to address you on the physiology of belief and why we accept some things as true and others as not true, but I am going to put that aside and consider the alternative subject, which is the treatment of certain diseases by inoculation. The work I am going to bring before you indeed is not my work alone, for I have had a number of very zealous students with me. When I tell you we can get men to sit up till three o'clock in the morning, not one day alone, but day after day, in order to plot the curves which hang before you, and that every dot in those curves represents three or four hours' work as a rule, and that we have people who will take curves like that and sit up night after night, dividing the night into watches, in

order to see what happens with the protective substances in the blood in the course of a fever, you will understand that I speak with very great thought of all the men that have helped me to do this, and not the least among them is one that has come from among you, Dr. Ross (applause). As I have said I have had a number of earnest co-workers, and it is only by the combined effort of a number of people that you are able to ascertain the facts put before you in these numerous diagrams.

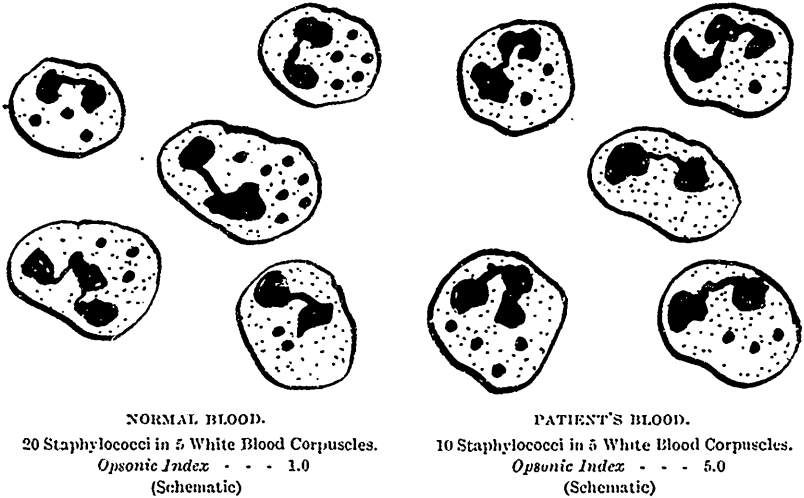
Let me tell you the subject matter about which I am going to discourse to you. Whatever opinions you may hold about medicine, there are some who believe that medicine is a very effectual thing, and mankind has discovered the secret of *curing* all kinds of diseases. As a matter of fact man has discovered the way to *tend* diseases. Disease is like a flood along the banks of which the medical man goes so that he may watch it, and prevent an excessive amount of damage. That is about my idea of medicine. You had better take it in this way: Man has a great control over disease, but there are some diseases over which he has very little control, and in these cases all he can do is to adopt the expectant treatment, that is, to sit by the patient's bedside and feel his pulse and take his temperature and let nature play her part. Nature does play her part very often and brings a number of people through. In typhoid fever she saves nine out of ten, and sometimes nineteen out of twenty. There are some cases where the records are very much worse than that. In the advanced cases of phthisis you say everybody is going to die: in the case of boils the medical art is able to do very little, and even in those trivial diseases such as pimples on the face, which make some people miserable from the age of 15 to the age of 30, medical art is notoriously unable to avail much. In such intractable cases what are you going to do? You can either wait till somebody gets a cure by definite inspiration—and if you look at the advertisements, even the advertisements in Toronto papers, you will see that there are a great many people who profess to cure all sorts of incurable diseases. You cannot believe in those "cures," because you know Nature does not give cures into the hands of people without work. Nature takes ample care that nothing is found out except through an infinity of work. In the case of those incurable diseases you have your choice, you can either go to the advertisements in the papers for cures, or you can say, "It is a task for me to sit down and study these conditions very carefully and see if a cure will not come out of the proper understanding of them." I have had problems of that description thrust upon me in the

different rôles I have had to occupy. For instance, I was connected with the Army as a civil professor and we used to see great numbers of people come back from India wrecks from typhoid, and the returns showed that about two per cent. of a battalion were attacked with typhoid every year, and that half of that number died. There was no remedy for that unless a remedy could be sought at the hands of Science. I sat down to work with my assistants and we studied the problem of resistance of the blood against typhoid fever, and we elaborated a system of inoculation which I think is doing useful work in the world. I am not going to discourse to you about preventive inoculation against typhoid—that lies rather remote from your life. The chances of getting typhoid even here in Toronto are not sufficiently great to induce people to undergo preventive inoculation against typhoid. But I began working on that matter, and when anti-typhoid inoculation had come to an end for a period, a man chanced to come to me who was covered with boils from head to foot. He had had blood poisoning some nine years before, and his beard was in a state of severe inflammation; he had styes in his eyes and his life was a misery through his staphylococcus infection—staphylococcus being a microbe that grows on and in the skin. Now this man had very little resistance against this particular microbe and therefore staphylococci grew freely in his tissues. Instead of an ointment I applied some of the knowledge we had acquired in connection with typhoid to the treatment of this man and we were very successful in getting him entirely well.

This is only an aside to tell you how the work began. The point I want to impress is that you have to study the question of bacterial disease very carefully. Why do microbes invade the body? What does Nature do to ward off these microbes or to cure the invasion after it has begun? These are the problems I want to consider with you for a time. You have learned, or will learn in your classes that when you introduce a microbe, such as the staphylococcus, into the artificial nutrient media we employ in the laboratory, that it increases and millions of microbes are produced in a very few hours. It is obvious to consideration, if you sit down to think of it, that the blood cannot be such a medium as our artificial laboratory medium. When you introduce microbes into the blood they do not proliferate at random in that fashion. There are protective or bacteriotropic substances in the blood that prevent them growing and increasing in the body. You will suggest that the blood might not be a proper nutrient medium, but bacteriological investigations show that

the tubercle bacillus, the diphtheria bacillus, and the staphylococcus all grow extremely well in the blood; in fact that they grow by preference in the blood. Therefore the explanation cannot be that the blood does not contain nutrient media. Our bodies contain very succulent food indeed, and the microbes would be only too glad to live on us. When you consider how the blood differs from the nutrient medium used in the laboratory, you find two outstanding differences. To begin with, it contains white blood corpuscles, and these have the faculty under certain circumstances of picking up the microbes and ingesting them and killing them. Now the blood fluids are not simply an indifferent medium—as Metchnikoff the author of the theory of Phagocytosis thought. In other words the blood differs from the broth not only in the fact that it has white corpuscles, but that it also contains substances which act on the bacteria. They act upon them somewhat after the manner of antiseptics; the analogy is not very close, but it is something of that sort. In other words your blood represents a fluid somewhat comparable to weak carbolic acid in which are white corpuscles. These antiseptics in the blood may be partly responsible for keeping the blood free from bacilli, but are not wholly so. By a certain technique we found that it was possible to separate the white corpuscles from the blood fluids, to test them separately and see what white corpuscles could really do. So we took white blood corpuscles obtained from our own blood and an emulsion of bacteria, mixed them together in capillary tubes, kept them at blood heat for about half an hour and watched to see what occurred. We were astonished to find that under those circumstances the white corpuscles did not ingest the bacteria; and therefore it looked as if the white blood corpuscles were of no use at all. Then we mixed with the bacteria and the white blood corpuscles a portion of the fluid of the blood, and we found the fluid of the blood influenced the microbes in such a way as to prepare them for ingestion. If you will refer to this diagram (Fig. 1), you will see that almost all of the white blood corpuscles have picked up tubercle bacilli. We found then that when you mix bacteria and white blood corpuscles together the white blood corpuscles have no power of taking up the bacteria; but when, on the other hand, you add the fluid of the blood to the mixture of leucocytes and bacteria, the fluid of the blood alters the bacteria in such a way as to make them palatable for the white blood corpuscles. In other words the blood has prepared the bacteria for ingestion. For this phenomenon we had to find a name, and spending some time over Greek and

Latin dictionaries we found the word *opsono*. *Opsono* means, "I prepare for dinner"; it must be sharply distinguished from an almost identical word which means, "I advertise or proclaim with a trumpet." These substances that prepare for ingestion are what I wish to speak of as *opsonins*. It was a question at the same time whether the white blood corpuscles or the opsonin in the blood was the more important agent. In order to answer this question we took a patient who was very badly infected with the tubercle bacillus, and we contrasted the blood of this patient with what we call "pool." Now "pool" in our laboratory language means the pool of the blood of all the normal men in the laboratory. Everybody when he come into the laboratory bleeds himself: he sticks a needle into his finger and draws blood off



and contributes his few drops to those of his fellow workers. So pool is made and no man who is not normal may contribute to pool. When we catch a tubercular man contributing to pool he has such a bad time he never comes near us again. With our pool blood as control we contrasted the blood of this highly infected tubercular patient of whom I spoke, and we investigated the question as to whether the patient's white blood corpuscles or the opsonins in his blood were deficient. Without wearying you with the details of this experiment I will ask you to accept the results. We found that the white blood corpuscles of our patient were just as active in phagocytosis as were our own normal white corpuscles, but that the patient's

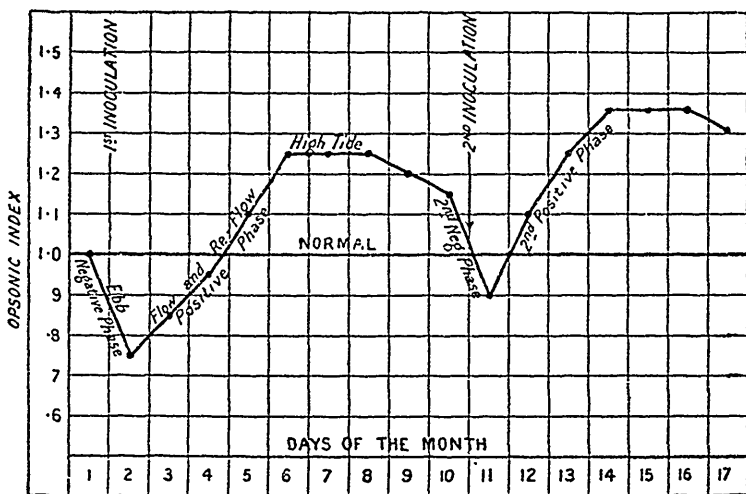
serum was only half as active as our own serum. Hence if we express the activity of normal serum for phagocytosis as 1.0, obviously we must express the abnormal activity of the patient's serum as 0.5. These figures represent respectively what we term the opsonic index of the normal person and of the diseased.

The first generalization I will ask you to remember, therefore, is that every patient, at any rate in the early stage, in the uncomplicated stage, who is infected by bacteria under ordinary circumstances has got diminished resistance, and that deficiency of resistance does not reside in his white blood corpuscles, but resides in the fluids of the blood. In other words, you can say that a patient with a low opsonic index is at least a candidate for infection by a particular microbe. One could go through a series of people and find out whether they had a normal power of resistance against the tubercle bacillus, or a diminished power of resistance, and in a world which is filled with tubercle bacilli you may be sure that a person with a diminished resistance becomes a patient; for we live in a world where no person reaches mature years without meeting the tubercle bacillus. Whether he is infected or not depends on his power of resistance. We find that a patient in the early stage has a low resisting power and we assume that if we had been able to get him before infection we would have found him in the same condition.

So far all this is only legitimate gratification of the intellect. We are able to explain to ourselves now why in a world where we all come in contact with infection, some people take tubercle and some do not take tubercle, why some get boils and some do not get boils. Some advertise in the street that they have a small resistance to the staphylococcus, because they have spots on the face. So one sees that resistance is the important thing. The next point is. What is the good of that unless you can alter it?; and when you throw back your thoughts to what has been done in connection with the prevention of infectious disease you will see that inoculation is resorted to. Commonly when we speak of inoculation we mean vaccination, and people that are subject, as we all are, to attack by the smallpox microbe take precautions through inoculation that they have a higher resisting power. Therefore the question suggested itself in connection with the patient I spoke of with the boils whether something could not be done in the way of inoculation to increase his resisting power to the particular microbe that affected him. In order to do that we must first study what happens when the microbe attacks the body. That meant that we must undertake an experimental inoculation with the particular microbe under consideration.

For obvious reasons we could not use living bacteria, but we could use bacteria which had been devitalized at a comparatively low temperature—so low that though life was rendered extinct the chemical constitution of their protoplasm was not greatly altered. So we took cultures of our bacteria and killed them at 60° centigrade, thus obtaining what we call a “bacterial vaccine.”

Now, when we put a proper quantity of vaccine into the body what happens? (Vide Fig. 2). The beginning of the tracing represents the normal, healthy resistance. At that point, indicated by an arrow, an inoculation is performed. When we test the resistance afterwards we find it reduced. That is called



* Diagram of opsonic curve—varying as a result of inoculation.

the “negative phase.” The inoculation of a considerable quantity of vaccine thus reduces the resistance of the patient. Then after a time we find that the resisting power increases. That is spoken of as the “positive phase.” Then after a time it falls away and eventually the blood of the patient does not differ very much from the normal. In other words, after inoculation there occurs first a diminished resisting power and afterwards an increased resisting power; that increased resisting power lasts for a period and then it falls away. Now, when the resisting power has fallen away the patient is not what he was originally. He has retained the faculty of rapidly manufacturing protective

* From paper by Dr. George W. Ross, *B.M.J.*, July 6th, 1906.

substances again, these opsonins, as soon as he is re-inoculated. We want to know what happens when we give a second inoculation. After the first there occurs the negative phase and then the positive phase; and on the declining wave of the latter we re-inoculate. The opsonic power goes down again and then rises higher than before and so on in this step-ladder fashion (vide Fig. 2). At one time we thought it was only a question of inoculating a man at definite periods to increase the resisting power to very many times the normal. That can be done in the case of typhoid, and occasionally though to a lesser degree in certain other infections, but I would have you consider this "positive summation" as the exception rather than the rule. One can, however, usually increase the effects of a primary inoculation by a secondary inoculation, though one cannot do so indefinitely. But there is another and a serious aspect of the question. Here is an inoculation (referring to a chart) after which the resisting power runs down; but after a time it rises and the patient is re-inoculated with a large dose; the resistance goes down further and before he can recover another dose is given and the resistance goes down still further. So anybody can inoculate with successive doses and reduce the resisting power to anything he likes. It is quite easy by this method to reduce the resisting power of the blood enormously. There is no doubt that when Koch brought out his method of inoculating with tuberculin he inoculated with too large a dose and produced a fever; as soon as the fever was over he gave another inoculation; as soon as the fever produced by that was over he gave another inoculation, and eventually many of the patients so treated got a general infection and died. This is the reason why you cannot inoculate at random without testing the blood every time. If you inoculate giving excessive doses, although you are not anxious to do it, although you are anxious to avoid it, you may be reducing the resisting power of the patient by each successive dose. Therefore we have these considerations to keep before our minds that after every inoculation the resisting power of the blood lessens and then it increases, and that when it is increased you may give another inoculation and keep it up. This is the only course we now take in connection with inoculation. We try to get only a small negative phase and a fairly big positive phase; when this is falling off we give another inoculation and so keep the patient on an average considerably above normal. Let me now summarize the principles of inoculation; after you have found that a patient is infected with a microbe you isolate the microbe in pure culture and then test the resistance of that

patient's blood to see whether or not it is able to kill off that microbe as well as normal blood can. If he is not able to do so, you inoculate with the proper vaccine, with vaccine made from staphylococcus if it is staphylococcus infection, from the tubercle bacillus if it is tubercle infection, and so on. Throughout the whole course of inoculation we endeavor to keep the resistance of the patient's blood as high as possible.

Let me now tell you of the results I got by inoculating two little girls who had been staying at a seaside resort along with a patient who had phthisis. They developed tubercular glands in their necks. They were brought to me and I tested their resistance to the tubercle bacillus and found that one had an opsonic power of 0.8 and the other 0.6 of the normal. I then undertook inoculation of these children with new tuberculin, carefully safeguarding each inoculation by an investigation of the blood. One got quite well, and the other was quite well for about a year; after that a small portion of an infected gland caseated and had to be discharged. Recovery then went on uninterruptedly.

I have led you to expect that you would find that patients affected with a bacterial disease were always lower in their resisting power than normal persons. As a matter of fact you would not have made many examinations of patients before you would find that that was not always so. Ordinary clinical observations should lead to a similar conclusion for if a patient's resistance is lower than the normal throughout the course of typhoid fever, what chance is there of his killing off his microbe? Obviously if a patient does not react to the typhoid bacillus the typhoid would always get the better of him, but we know that in the course of typhoid fever as in all bacterial fevers the body makes an effort to throw off the disease, in other words the body inoculates itself. As soon as the poisons get into the blood the body sets to work to produce protective substances and there occurs the phenomenon which we speak of as "auto-inoculation." You may get auto-inoculation progressing favorably as in about four out of five cases of typhoid fever. In fact the patient gets well of his typhoid because he inoculates himself from his bacterial focus and thus produces his own protective substances. In cases in which you have a strictly local infection, however, such as tubercular glands, such as acne, such as all those purely local diseases where you have not constitutional disturbances, the body takes no steps to protect itself and the disease runs on practically indefinitely. You may find the disease lasting through life, and then you will find the opsonic power low. This is because the bacterial focus is closely shut off from the lymph and blood streams and

consequently no auto-inoculation can take place. In many of those cases where the body is not inoculating itself you can inoculate for it and bring about a favorable result. Let me refer to a case of empyema which was treated by Dr. Ross at the Victoria Park Chest Hospital in London. The patient's acute symptoms were over, but the conditions seemed to be going on indefinitely. Investigation of pus from the sinus gave a pure culture of pneumococcus. On testing the patient's blood to the pneumococcus it was found to be normal on two occasions; but that makes no great difference, for if the normal resisting power of the patient is not enough to kill off the microbe, what are the indications? Obviously you should increase that power and get a higher power. An inoculation with a vaccine prepared from his own microbe was undertaken and immediately the opsonic index rose from 1.0 to 2.4. Two more inoculations were undertaken at appropriate intervals as shown by examinations of the patient's blood and in the short space of two weeks the discharge ceased, the sinus closed and the patient was discharged cured.

Here happens to be the chart of another case of Dr. Ross's (referring to chart). It refers to a boy who had tubercles on both irises. Inoculation with new tuberculin in proper doses and at appropriate intervals greatly increased the resistance of his blood and maintained a high degree of opsonic power for many months. Although the eye surgeons had seriously considered the advisability of removing an eye (so severe was the involvement of one iris), the patient has so improved under this treatment that his eyes might easily pass for normal and doubtless they will get completely well.

The next case we shall consider is one that has some interest because it shows us that when some cases get well of themselves it may be due to the fact that auto-inoculations have taken place. The patient was a child who had a tubercular knee. While lying in bed two observations were made, and the resisting power upon both occasions was normal. Then the patient's affected knee was massaged. When you massage a part what you do is, you knead it and you press out the fluid from that part into the blood or lymph system. If the tubercle bacillus happens to be growing in a knee, your massage is the equivalent of an inoculation from the fact that you are driving out into the circulation fluid infected with the bacillus. After our first massage there was a lowering of the opsonic power, but the patient came up to normal again. With another massage we got the same result; and to show that this auto-inoculation was the same as an inoculation put under the skin, an inoculation was undertaken with new

tuberculin when we obtained a series of events similar to that which had followed massage. Our next case is that of a patient with gonorrhoeal arthritis affecting the knee. The patient was taken to the hospital, where the resisting power was found to be very low; he was inoculated with gonococcus vaccine, and the resisting power to the gonococcus went up very definitely. At that period the patient was put on massage. The knee joints only were massaged and immediately after we found that the resisting power of the blood went down and then rose again exactly as it does with an inoculation of a vaccine. Here again we did two more massages, and the same series of events occurred. In association with the great increase of opsonic power all the other joints cleared up; even the joints that were not massaged, the shoulder joints and clavicle joints got well. It would therefore appear that the tendency of bacterial disease to get well of itself, is due to the fact that in the course of the disease auto-inoculation is taking place constantly and that you get increased resisting power as a result of this. However, the auto-inoculation that takes place may be very ill-adjusted. Sometimes you get inoculation of much too large a dose and then you find a diminution of the resisting power instead of an increase. A friend and pupil of mine came up to work in the laboratory; he was the subject of phthisis. We found his resisting power was above the normal, 1.4. He spent a long and tiring day in the laboratory learning opsonic technique, and the next day he had to take to bed. We then found that the resisting power of his blood was down to 0.4. He took a fortnight to recover. Obviously the explanation of this unfortunate occurrence was, that man by working too hard caused changes in his circulation, drove out poisonous substances from his lungs into his blood stream and got the same effects as he would get by a larger inoculation of new tuberculin, in other words, a very formidable negative phase; the positive phase that came a fortnight later probably did not recompense him for his long period of lowered resistance. This is the life of a patient with severe phthisis. He does work and tires himself, gives himself an auto-inoculation and gets ill, gets well a fortnight afterward; and so see-saws between a low and a high opsonic power. By such your tubercle patient is very little likely to get well, and we do not look with kindly eyes on auto-inoculation, because we feel it is often done in too large doses, and done indiscriminately. You cannot ask a patient to go and dance to bring on an auto-inoculation, because you do not know how big an inoculation he is going to give himself. What you have to do is to keep him for as long a period as pos-

sible as high as possible above normal. If the patient should get down much below normal the tubercle bacilli may take the opportunity to spread throughout his body and he may get general tuberculosis. The negative phase has to be closely watched, and you have to test the resisting power of the patient after each inoculation. You must give such a dose of your vaccine that will not reduce your patient's resisting power much (a dose that produces practically no clinical result), and yet large enough to give a good positive phase following a slight negative phase. I want to point out to you also that in the class of case which we speak of as septicemias, that is where the microbes have got into the blood stream, the patient frequently inoculates himself and gets through his fever, but notoriously there are cases in which he fails to do so. Hence certain types of general infection or septicemias are nearly always fatal. Such a type is malignant endocarditis where the microbes get into the blood stream and attack the valves of the heart. These cases nearly always come to a fatal end. We have a case of that sort, which we inoculated, and you may wonder at our courage in inoculating such a case. You would think to yourself that if you inoculated a patient who was already suffering from too much microbe you would certainly make him worse, but you have got to consider that the microbe is in the patient's blood. This situation is not the most favorable for the production of protective substances. When we do an artificial inoculation we put our vaccine into the subcutaneous tissues. There is very little doubt that this is a great deal more effective in making protective substances, than if we inoculated directly into the blood stream; furthermore, you do not get poisoning effects if you inoculate the patient into the subcutaneous tissues. Knowing those facts we favored inoculation in this case of malignant endocarditis where the streptococcus was in the blood itself and was attacking the valves of the heart. I saw the girl; she was about 18 or 19 years old. Her illness had begun with a severe sore throat; then a large tumor came in the side of her neck and it was supposed to be an inflamed gland. It disappeared of itself; but the microbes got into the blood stream and then she developed a high temperature which had been continuing for six or seven weeks before we came on the scene. Before this, however, the patient had been treated in various ways: first she had had many kinds of drugs. Drugs I take it are ineffectual in killing microbes in most cases. Then she had anti-streptococcus serum in large quantities. I take it that the anti-streptococcus serum is not a good method of treatment; but it would take me much too long to enter into

that question here. In this particular case it certainly had no effect. For weeks she had daily inoculations of serum and yet her temperature went on as high as ever. At the end of about six weeks we came in and made cultures from the blood and found the streptococcus; that is the first stage in the treatment, namely, to know what microbe you have to deal with. Then we tested the resisting power of her blood to this streptococcus and her resisting power or her opsonic index came out as 0.4: that is to say, that although she had microbes in her blood she was not successfully auto-inoculating herself. We then prepared a vaccine from the streptococcus obtained from her blood and inoculated her with a small dose. Immediately her blood power rose well above normal and the temperature began to come down. Successive inoculations were undertaken over a period of several weeks as indicated by investigation of the opsonic power of her blood, and the result was most gratifying. With the rise of opsonic power came the fall of temperature and amelioration of the patient's symptoms. The final result was that the patient made an absolutely uninterrupted recovery and she is to-day in robust health. (Applause.) That case made a great impression on us because inoculation seemed such a desperate thing to do. In the historical order we had already done something similar in certain cases of Malta fever, which, as you know, is caused by a microbe. You see nothing of it on this side of the water, but the microbe is very commonly distributed through the world; and in India and China and at all the Mediterranean stations there is a great number of patients. Five per cent. of the Malta garrison take Malta Fever every year. Nine of us altogether in the laboratory got Malta fever from working with the microbe, therefore we have a very healthy respect for Malta fever. Not that it is dangerous; only one of us died and that was the laboratory man. (Laughter.) The mortality of Malta fever is about two per cent., not a formidable fever in its immediate results, but very formidable from the fact that it sometimes runs on for two years. The average period in hospitals of soldiers is ninety days, but it frequently goes on for a year, and it frequently leaves people with crippled joints. It is a fever that is in fact not very toxic, but nevertheless lasts a very long time. We ascertained that in many of these cases nature made protective substances extremely slowly, and that the fever lasted a very long time. In the case of myself the protective substances could be determined in my blood when it was diluted six thousand times, and I got over my attack very easily. In other patients I have observed the protective substances so small in

quantity that they could hardly be measured. In such cases, while there is little danger of the patient dying, there is great danger of the fever continuing a long time. We have inoculated eight or nine cases now, and in every case we have found that the resisting power of the blood was increased as a result of inoculation, and that the temperature soon came down. If any of you get Malta fever, come over and be inoculated. (Applause.) Where we do not know what to do with a disease, where the microbes insist on living in the body, where, for instance, after a surgical operation the wounds fail to heal, because the microbes continue to multiply themselves, there is still a way out. You can find out the microbe, test the patient's resisting power to this particular microbe, and set to work by appropriate inoculations to increase the resisting power of the patient. I think that you will almost always see enormous clinical improvement. That is one reason why I would like to have discussed with you the physiology of belief: for when I make these statements I don't know whether they come home to you or indeed whether they ought or ought not to come home to you. You should take what I have told you to-night with very great incredulity; you ought to be very critical; you should not say that what I have told you is true; every man should test these things for himself. That opens the question as to what ought to be done if work is to continue along these lines here in our midst. Obviously only the fringe of the subject has been touched so far; it requires a great deal of effort to find out all that can be found out about therapeutic inoculation. There are very many diseases yet to be tried. In each case you can see that if you can find the microbe, you can test the patient's resistance, make inoculations and strive for favorable results. Where you have to deal with any bacterial disease I would like your thoughts to go immediately to the question as to whether or not this can be treated by inoculation. I look to the future and expect that the medical profession will be divided somewhat differently. There will be, of course, the general practitioner who will know that arsenic is useful in some cases, that the syphilis microbe is killed by mercury, and so forth. Then it might be possible for all medical students to learn the physiology of immunization: I hope that that will come to be taught. It is not ready to be taught yet, because it is being developed, but it ought to come into the physiology of the future. In the physiology that is to be of every day practical value what is the most important thing? Not how to digest your meals, but what steps does Nature take to get rid of the microbes that are playing havoc within you: and what

happens after microbes are introduced into the body. That physiology of immunization should come to be taught as a matter of course in every medical college. As a natural outcome of such development in medical science a new type of practitioner would appear, namely, the immunizator. He would say, You are infected with a particular microbe and my business is to find out the microbe, make a vaccine from it and inoculate you and bring up the resisting power of your blood. For such skilled service you will require a man who has spent years of study to master the technique; to know how to make the vaccines, to know where to look for the microbes, to know which are the most important microbes, to know how to isolate them, and most of all, a man with sufficient experience and ability to apply all these things.

At present we have no short cuts (with one or two exceptions) that make it possible to treat bacterial disease by inoculation without following closely the changes that take place in the blood of the patient from time to time as a result of inoculation. Whether these short cuts will emerge after much further study of this subject is a matter upon which it is impossible to express an opinion. Gentlemen, that is all I have to say to you to-night. (Applause.)

Editor's Note:—This lecture is published by special permission of Sir Almroth Wright. The stenographer's copy has been revised by Dr. George W. Ross who has been associated with the lecturer's laboratory for the past two years.

A STATISTICAL REPORT OF THE RESULTS OF OPERATIONS IN SARCOMA OF THE NOSE BY METHODS GENERALLY ADOPTED, WITH A PLEA FOR THE MORE EXTENDED USE OF THE ELECTRO-CAUTERY IN SUITABLE CASES.*

BY J. PRICE-BROWN, M.D., TORONTO.

Writers differ widely from each other in their general views in regard to this disease, and in introducing the subject a brief resume of prevailing opinions may not be out of place.

Lennox Browne in his voluminous work upon diseases of the "Nose and Throat," does not even mention the existence of sarcoma of the nose.

Shurly says that myxosarcoma is the variety that occurs most frequently within the nose; and that the usual seat of growth is either the middle turbinal region or the external wall, thus granting the primary origin of the disease within the nasal cavity. He also says that while the original growth may be pedunculated, the pedicle is soon lost, the base rapidly becoming broader, until it finally loses itself in the mass of involved tissue.

Kyle, on the other hand, says that "primary sarcoma of the nose is not of frequent occurrence, but as a rule has its origin in adjacent structures, and spreads thence into the nasal cavity." He insists upon early and complete eradication as the best line of treatment, to be accomplished by the use of the curette and galvano-cautery.

Bosworth in his report of 41 cases treats of it as a primary affection occurring in a single tumor, that may arise on the outer or inner wall of either nasal cavity. He further states that there is no clinical evidence in support of Weber's idea, that sarcoma is usually accompanied by several deposits of the same neoplasm in neighboring regions; and also, that the growth is soft and flabby, and that the tumor is invariably pedunculated.

Coakley says that sarcomatous degeneration is occasionally met with in cases of nasal polypi and other benign tumors, after these have been removed a number of times, a view which is accepted by many surgeons; and also, that the appearance of sarcoma within the nose may be the first evidence of the presence of sarcoma within the antrum. He says that the growth

*Read before the Clinical Society of the Western Hospital, October, 1906.

has a hard feel, as of solid tissue, and is not usually very movable even when of considerable size.

Harris in a paper published several years ago refers to a series of 103 cases, reported up to that date, including his own: and from the investigation of which he draws the following conclusions: That round-celled and spindle-celled sarcomata are about equally frequent in their occurrence; that the cartilaginous septum is the part most frequently involved, and next to this the middle turbinal body; that it usually proceeds from a well defined pedicle; that the growth is soft to touch and bleeds easily; and that sarcoma is a small tumor, usually pedunculated and rarely multiple. In speaking of treatment he says that while many cases require removal by external radical operation, there are others in which an intranasal operation is alone justifiable; but that no matter how treated, more than half the cases are ultimately fatal.

Halsted believes that the period of life most susceptible to this disease is between the fortieth and the fiftieth years. His graphic description of the symptoms is worth repeating: "The conspicuous absence of pain while the disease is confined to the soft tissues; the presence of epistaxis as a prominent symptom; the nasal obstruction so great that both breathing and eating become distressing to the patient: while speech becomes difficult and the senses of smell and taste are either lost or severely impaired; until finally, as the disease advances into the accessory sinuses or the cranial cavity, pain becomes severe and continuous; and death either from sepsis or exhaustion is the result."

In order to bring the results of investigation down to the most recent date in the preparation of this paper, I sent one hundred circulars to leading laryngologists in the United States and Canada, and as a result I have received about fifty replies. Although not by any means as satisfactory as one would like, yet they contain much valuable information, and I extend to the gentlemen, who forwarded the answers, my most cordial thanks. A synopsis of these reports I here give:

Frudenthal writes me that he must have had under observation, in hospital and private practice "surely twenty cases or more." Unfortunately he has no distinct records of them. But the percentage of permanent recoveries after intra-nasal operative treatment he reports as "none," and after external operations likewise as "none."

Otto Stein says that he must have seen between twelve and twenty cases of nasal sarcoma, which were treated by "various methods" with "varying results."

Thompson reports twelve cases, nine of which were inoperable. Hence these nine, with Stein's twelve to twenty, and Frudenthal's twenty, are not tabulated in my present report.

Now and then, though rarely, a detailed report of a single case has been forwarded, which in itself is intensely interesting, giving at a glance, a vivid picture of the whole scene. For instance, Freeman reports one that he referred to Keen for external operation. I quote his own words: "The sarcoma evidently began in the naso-antral wall and extended into the frontal sinus, antrum, ethmoid and sphenoid, by finger-like projections, but it did not seem to infiltrate the lining of these cavities, as it was easily shelled out, leaving them, with the exception of the orbital plate and the naso-antral wall, practically uninjured. The incision was so extensive that the interior of all the accessory cavities on the affected side could be plainly examined. The septum was not involved, and after the operation, the eye was kept from falling into the antrum by packing. Although the operation was done eight or ten years ago, there has been no return."

Norval Pierce mentions six cases. All were treated by intra-nasal methods, although of what nature is not mentioned. All recurred but one, in which there was complete removal at a very early date. In this case the recovery was permanent. In two of the cases external operations were subsequently done with only temporary benefit.

Chevalier Jackson reports eight cases. All were operated on by the external method. Two of these disappeared afterwards, so that no trace could be made of them. But the other six all died of recurrence of the disease at varying intervals after operation.

To be definite, the following is a summary of all cases reported as operated upon, whether internally or externally, in which the patients were kept under observation until final results were obtained.

No. of Cases.	R. Nas. C. affected	L. Nas. C. do.	Both C's. do.	Sept. do.	Ant. do.	Int-Nas. Oper.	Recurrence.	Extra-Nasal Oper.	Recurrence.	Deat
51,	32,	29,	9,	11,	27,	19,	13,	33,	25,	37

In several of the above, operations were done both intra-nasally and extra-nasally.

Permanent recoveries after intra-nasal operations, six out of nineteen, or 31%.

Permanent recoveries after extra-nasal operations, eight out of thirty-three, or 24%.

Total permanent recoveries after operations of whatever kind, fourteen out of fifty-one, or 27%.

We must add to these the inoperable cases and those refusing operations, which presumably would all be fatal.

In one point the concensus of opinion among authors appears to be unanimous; and that is in the absence of pain when the soft tissues are alone affected.

Before speaking of my personal experience in the treatment of this disease, I may say that I have drawn a wide distinction in my meaning between intra-nasal operations and extra-nasal operations; all classes of intra-nasal operations being included in the one, the work being done through the anterior naris only and without injury to it; and in the other, all classes of external operative work done by surgical incisions through the true skin, and by this means aiming at the removal of the sarcomatous growth.

Personally I have had four cases under treatment. Only one of them suffered from pain within the nasal cavity. The main signs and symptoms in all four were intra-nasal. All were males, their ages being eighteen, twenty, fifty and fifty-eight years. All were subject to severe epistaxis upon very slight provocation. With one exception there was complete blockade of the affected nasal passage. By the process of exclusion, as well as by the signs and symptoms, the disease in three of the cases was pronounced to be sarcoma by competent medical authorities before the cases were referred to me for treatment; and in each of these, two or more distinct microscopical examinations verified that the diagnosis of sarcoma was correct. In the remaining case, histological examinations were made at my request and the case was pronounced a spindle-celled sarcoma. In this patient the growth was the smallest.

Although the results in my cases have been unusually favorable, I do not give any credit to the skill of the operator but to the method of operating, and I emphasize the latter, because the work has been principally done by the use of that much-abused instrument, the electro-cautery knife.

The first three cases were reported in the August number of the *Journal of Laryngology* in 1903. At that time eight years had elapsed since the final operation upon the first case. The case was well then, and is well now, with no recurrence whatever of the disease.

In the second case, and this was of the spindle-celled variety, already referred to, occurring in a man aged fifty, the growth had been removed about a year when the case was reported.

At the present time, three years later, he is still a healthy man following his daily occupation as fireman, and free from any re-development of sarcoma.

The third case was the most extensive purely intra-nasal sarcoma that I ever saw, filling the left nasal cavity, bulging the anterior naris, flattening the nose and cheek, more than half filling the naso-pharyngeal space, and holding the soft palate immovably in a horizontal position. This case was referred to me in October 1902, now four years ago; and was reported by me with the exhibition of pathological specimens and micro-photographs at the meeting of the American Laryngological Association at Washington the following year. As, however, it was considered rather premature to report so recent a case, I again read a paper upon it, reporting progress, at the annual meeting of the same Association at Atlantic City in 1905. I still further exhibited, the patient himself this time, at the Laryngological Section of the British Medical Association in Toronto in August, 1906. There have been slight recurrences at the junction of the posterior naris with the naso-pharyngeal vault up to February last; but they were always controlled by a touch of the cautery. The man is well nourished, presenting a rugged and healthy appearance. The nasal cavity is wide and free throughout its whole extent, exhibiting in some measure the great size which the growth had assumed before its removal. When required he keeps the passage free from accumulations by the use of an oleaginous spray. His occupation is that of telegraph operator, in which he is regularly employed. He learned the art since the removal of the sarcoma four years ago:

These cases were all treated by intra-nasal electro-cautery operations, the parts being anesthetized by cocaine. The first one, operated upon eleven years ago, was treated before the advent of adrenalin, and was attended by some terrific hemorrhages. Still the work went on with the result already stated. In the second and the third, adrenalin was used freely and with marked advantage. In the third, however, the hemorrhages were often exceedingly severe, possibly in some instances due to a desire to remove too much at one sitting. These three men are all well, busily following their occupations in Toronto, to-day.

In all these cases I believed that the growth was mainly if not entirely confined to the nasal cavity. The method of operating, particularly in the third case, was as follows:

After producing local anaesthesia and anemia by the free use of cocaine and adrenalin, a large tubular speculum was introduced into the nasal passage as deeply as possible; and then

perpendicular incisions with the electro-cautery knife at a high degree of temperature, were made into the basal attachment of the growth on the turbinal side. They were made as deeply as possible without producing alarming hemorrhage. The moment this threatened to be severe, the operation ceased, and temporary tampons would be inserted to control the bleeding; but almost invariably, they would be removed before the patient left the office.

On his return, one or two days later, the cauterized tissue would be removed either by snare or forceps, and the parts cleansed by sprays. Then anaesthesia and anemia would again be induced and the operation repeated. Thus, successively, piece by piece, and day by day, with the electro-cautery blade at almost a white heat, would the sarcomatous tissue be dissected away, working gradually from before backwards, until the posterior naris was reached; and the patient to his delight would be able to blow his nose through a free passage again—something he had not done before for months, perhaps for years.

CASE 4.—This, my most recent case, was referred by Drs. Carleton and Langstaff.

On August 2, 1906, the patient, a retired butcher, aged fifty-eight years, was first seen by me. A pathological section had already been excised and microscopically examined, and the case was pronounced one of malignant disease.

I found on examination that the left nasal cavity was filled completely from the anterior to the posterior naris with a dark red growth, dense in character, but which bled readily on being touched. I removed a section, and microscopical examination proved it to be a round-celled sarcoma.

Family history. His father had died at the age of seventy-two years, presumably of some cerebral trouble, but on post-mortem examination, his family physician had found a hard cancer of the stomach.

Personal history. A number of years ago, small growths, presumably polypi, had been removed from time to time from the nose; and latterly, while otherwise healthy, he had been troubled with a good deal of yellow discharge from the left nostril. This was supposed to arise from left antral disease. During the present year the left nostril had gradually closed up by the formation of the new growth; and as the cavity filled the discharge lessened. For six weeks there had been practically no discharge, but an external swelling had formed over the left nasal bone in the region of the lachrymal sac. This had been opened with

a lance, giving exit to a free discharge of pus, particularly on pressure. Accumulation recurring, relief was given from time to time until I saw him—the conclusion being that the external discharge of pus was really a vicarious outlet from the closed antral cavity.

There was no particular enlargement, but there was oppressive head-ache and some soreness of the nasal region. The temperature varied from 99° to 101°. Mouth breathing was compulsory, and there was a severe odor of antral disease. He had lost twenty-five pounds in weight during the last four months. The corresponding cheek was not swollen but there was eversion of the lower eyelid, which the patient affirmed had existed for years, and was due, he said, to severe exposure during a winter storm.

After careful examination, I arrived at the conclusion that the attachment was probably to the outer wall, and that while the middle and the inferior turbinals were involved, the vault and septum might be free; and that if the antrum was affected, it would be near the middle of the naso-antral wall.

I believed also from my past experience, notwithstanding the age of the patient, that I would be justified in operating upon similar lines. To this the patient gladly assented; although at the same time, I told him of the risks of operation, and the possibilities of non-success and recurrence of the growth.

For each operation upon the growth the patient came a mile and a half on the street cars, then walked into my office, then walked out again, and returned in the same way.

August 7th. After applying cocaine 8%, and adrenalin 1 in 1,000, the first operation was done as already described, the cuts being made with the electro-cautery knife at a bright red heat. The tissue was dense and hard to penetrate, but the bleeding was slight, care being taken not to cut in too deeply on this tentative occasion. Pain also was slight. Faintness there was none. No tampons were inserted.

August 8th. Returned to office, sloughs removed. Operation repeated.

August 9th. Exactly similar treatment with operation.

August 10th. Also similar to the previous occasion with operation.

By these four operations, the tumor which had filled the left nasal cavity almost to the tip of the nose, had been dissected back for more than an inch, leaving the vault, septum and floor clean. On the outer wall, the front parts of the middle and inferior turbinals, which had been softened in character by the

development of the disease, had been dissected away, without any appearance of recrudescence.

As I was leaving the city for a few days, the man returned to his own home, sixteen miles away, during my absence.

August 20th. Under exactly similar conditions to those already mentioned, he again came for treatment; and electro-cautery operations were done under cocaine and adrenalin anaesthesia as before, on August 20, 21, 22, and 23. The sloughs were taken away on the day following each operation before renewing the burning. By this time the greater part of the middle and inferior turbinals had been removed and the patient could force air pretty freely straight through the passage. Of course, together with the removal of the sloughs daily, the cavity was freely sprayed out with an alkaline solution, washing away the debris as well as the pus which found freer outlet from the antrum.

August 25th. On this day the last electro-cautery operation was done, burning away, so far as could be seen, the last remnants of sarcomatous tissue. The lower turbinal was entirely gone, and a large part of the middle turbinal as well. The naso-antral wall was still intact. The movements of the soft palate could be easily observed through the nasal passage, and the patient could blow out that side of the nose with much greater freedom than he could the well side.

For several days the passage was freely sprayed, but as pus was still constantly oozing from the ostium, chloroform was administered to him at the Western Hospital, and I opened the antrum through the central part of the inferior meatus, where the bone was soft and easily penetrated. A wide opening was made, but anterior and posterior to the site of operation, the bone seemed to be of normal density. Probably where opened the osseous tissue was involved in the disease. The operation was attended with very little hemorrhage. Pus, mingled with blood and some sloughing tissue, was washed out, and then the antrum was swabbed with peroxide of hydrogen.

After this date no further operative treatment of any kind was required. The antrum was washed out once a day with warm sterilized water, and for some days this was followed by the application again of peroxide. Then the latter was discontinued as the condition improved. Still the nose was regularly sprayed two or three times a day with Dobelle's solution.

As the operations were comparatively painless, with little loss of blood—the cauterizations being confined to the line of sarcomatous attachment—the depressive effect of the operative

treatment was slight; and for a couple of subsequent weeks, the patient seemed to rally. Then a species of malaise set in, accompanied by rise of temperature, with furred tongue, tympanites and many of the symptoms of typhoid.

The operations being over, he returned home to the care of his family physician; and as the discharge from the antrum steadily decreased the interval between the washings was made longer. From this time I saw him through the kindness of his physician once a week and personally washed out the antrum. Five weeks after opening the antrum it was washed out for the last time as pus had disappeared. There were no sloughs and the water came out of the ostium of a clean, pale, straw color. There was also no return of sarcomatous tissue—the passage being perfectly free from anterior to posterior naris.

In one way I was disappointed. The extra-nasal pus cavity, notwithstanding the regular antiseptic treatment it received, did not close up after the free opening of the antrum, and careful exploration by the probe failed to discover any connection between the two. Still the discharge from the external cavity gradually diminished under treatment, although it did not disappear.

When I last saw the patient in consultation with Dr. Langstaff, six weeks after opening the sinus, the nasal condition was the same, but he was suffering from low delirium, sordes round the teeth, and dark heavily furred tongue. There was some effusion within the abdomen and extremities, although examination of urine showed no trace of albumen.

It seemed to be clearly a case of septic infection, possibly from absorption of ptomaines from the sarcoma, possibly from the long continued presence of pus in the antrum and facial cavity, or from both combined.

The patient died exactly seven weeks after opening the sinus, seemingly not of sarcoma, as there was no visible sarcoma present; but of sarcomatous septic infection.

Fatal, although the result was, I believe the operations, as done upon this patient were both justifiable and advisable; inasmuch as, while the suffering from the operations was slight, the gain in comfort to himself and friends was of a very marked character. The distressing respiration disappeared, the fulness and pressure in the face was relieved, and the progressive deformity of the nose ceased to exist. All these would have been severely and continually aggravated, while life lasted, if relief had not been obtained.

Further still, from my experience in the former cases as well

as in this one, inasmuch as the growth seemed to be entirely removed, I feel convinced that the intra-nasal operations gave greater freedom and comfort to the patient than would have been probable by external operative treatment; and the disastrous results attending the latter in advanced cases are so great that I would not advise it in a case like this.

The advantages of intra-nasal operations over extra-nasal operations, in nasal sarcoma, in cases in which the large bones of the face are not involved, are very marked indeed, while unfortunately, the methods that can be successfully used are very limited. Of my four cases, not one was a pedunculated sarcoma when referred to me for examination. The nearest was the second case, but even in this one the base was as broad as the growth itself. It is impossible to snare these widely attached sessile growths away. And when we try, our earliest reward is more likely to be an alarming hemorrhage than anything else. I well remember such a result in the first attempt at operation in my third case. After applying cocaine and adrenalin freely, I passed a snare along the floor of the nose in the hope of grasping and removing a good sized segment to begin with. For a moment I was delighted with a successful result. A smooth oval piece of the *growth* as large as a pigeon's egg dropped into the bowl. For some minutes I could not examine it, as the hemorrhage was enormous, and required vigorous and tight packing to check it. When, however, I could take a look at my pathological prize, it proved to be a large piece of gauze which at some former time had been inserted in the nose of the patient to check a bleeding and which had not been removed.

Neither can these large sessile growths be cut out of the nose successfully by means of knife or scissors. When small and pedunculated no doubt they can. But as sarcoma of the nose in its early stage is painless, these cases rarely come into the hands of the specialist until they are well developed and have lost their pedunculated form. The base of the growth becomes widely sessile; and it would be simply impossible to dissect out through the narrow naris, such a hemorrhagic tumor as a sarcoma with attachment along the whole of one side of the nasal cavity from the anterior to the posterior choana.

Possibly it is for this reason, that so many of these cases are referred to the general surgeon for external operation, while it would be much better, cosmetically and in every other way for the patient, if the rhinologist could remove the growth intranasally.

We are living in an age of brilliant operative surgery, in

which the clean cut, done once and for all, is considered the operation *par excellence*. And it is only natural that the laryngologist should be willing and desirous to emulate his surgical brother in the accuracy and finish and finality of his work—alas for the patient, the finality is sure enough in nasal sarcoma. Leaving out the twenty cases reported in the one instance as all fatal, and the others that either disappeared or were inoperable in the list already given, there were only fourteen permanent recoveries out of the remaining fifty-one cases—27%. I fear this is the worst report that has yet been published; but I have the record over the signatures of the men who so kindly and promptly answered my questions—and all honor to them for doing so.

Granting then that the external surgical operation rarely results in permanent cure; and that internal operation, neither by knife nor snare, nor scissors, nor curette, nor all combined, can remove successfully a large sarcoma having an extensive bony attachment—why not accept the electro-cautery knife as the instrument of excision, when by its judicious and patient and regularly repeated use, the work can be successfully and safely accomplished, for the time at least? Not only can this be done; but by the removal of the sarcoma in this way, we have the additional advantage over an external operation, of retaining a wide patulous nasal cavity, through which the growth can again be attacked and destroyed if recurrence should take place.

The claim I make is, that inasmuch as a large majority of the cases of nasal sarcoma originate in the soft tissues of the nose—even Freeman's case, described so graphically, illustrates this point—they can at almost any time be operated upon with the electro-cautery, provided the bony framework of the nose has not become affected with the disease. That in many of these cases a cure can be accomplished by thorough and careful and painstaking treatment; and that even in cases usually considered inoperable, great and beneficial relief can in some cases be secured to the patient by the same means.

THE OCCURRENCE OF BABINSKI'S SIGN IN NORMAL PEOPLE DURING SLEEP.*

BY ROBERT D. RUDOLF M.D., (EDIN.) M.R.C.P.
Associate Professor of Medicine in the University of Toronto.

The phenomenon known as Babinski's sign has been known to the profession since 1898, when M. J. Babinski published his discovery of it in *La Semaine Médicale*.

The sign may be shortly described by saying that it consists in such a disturbance of the normal plantar reflex that the great toe and often the other toes as well becomes dorsi-flexed, or extended, when the sole of the foot is irritated, instead of being flexed towards the sole.

If the sole of the foot of a normal infant be stimulated, a number of muscular contractions occur resulting in the extension of the great toe. The other toes are usually also extended and spread apart. Other movements also occur, such as the early contraction of the tensor fasciæ femoris, but with these we will not deal. This infantile type of plantar response is the normal one in all apes.

If the sole of an older person be similarly irritated, the great toe and the other toes do not bend backwards, are not extended, but instead are flexed towards the sole. If in an adult, or indeed in any person beyond early infant life, the dorsal type of reflex occurs, then Babinski's sign is present.

Babinski stated that with two exceptions the sign was a certain indication of organic disease of the upper motor neurons, *i.e.* of the pyramidal system. The two exceptions were that it occurred normally in children who had never walked, and that it was absent in cases of complete transverse lesions of the spinal cord, as were all reflexes.

A great deal has been written about this sign in the last eight years, and it has been very thoroughly tested, and on the whole has stood the test a great deal better than is usual in the case of first statements regarding new signs of disease. A few exceptions have been recorded, some in which no disease has existed in the upper neurons or near them and yet the sign had been typically present, and others in which there has been such disease present and yet the sign has been persistently absent, but in the main the statement made by Babinski has been fully endorsed.

The sign was very fully investigated by Dr. James Collier at the National Hospital for Epileptics, and his article (*Brain*,

1899), remains the classic upon the matter in the English language. He confirmed in the main Babinski's results, but found that the sign was present in several cases of complete transverse lesion of the cord. Also that it was present for a short time after an epileptic fit, and, as had already been noted abroad, after a poisonous dose of strychnine. But Dr. Collier noted a point, which with a few exceptions, has been persistently omitted by subsequent writers. This point has been the subject of our investigations, and it is that the extensor type of plantar reflex, Babinski's sign, is present in a considerable proportion of normal people during sleep.

He wrote as follows.—“In some children up to the age of twelve years, who presented the adult flexor response when awake, I have observed a most interesting phenomenon. During deep sleep there is a typical infantile response, with the extension and spreading of the toes and eversion of the foot. In children between the ages of six and twelve years this peculiarity was found in a minority of the subjects examined.”

Dr. Stanley Barnes later stated (*Review of Neurology and Psychiatry*, May, 1904) that “a healthy child up to the age of eight may give an infantile response if tested while soundly asleep; an adult when asleep never gives an infantile or extensor response. . . . In adults an extensor response never occurs during health; it is always indicative of organic disease.”

In a discussion on Functional Paralysis opened by Dr. Buzzard in the Section of Medicine of the British Medical Association in 1902, all the speakers, with the exception of Dr. Judson Bury, agreed that Babinski's sign was never present except in organic disease.

I was not aware of the exception as regards sleep, and hence was surprised when I discovered that the sign was markedly present in two perfectly healthy deeply sleeping children aged five and seven years. On the advice of Dr. Spiller I started an investigation, and with the willing and able assistance of Drs. Rolph and Masson at the Victoria Hospital for Sick Children and of Dr. Lemon at the General Hospital came to the following conclusions:—

35.5 of all sleeping children between the ages of 2 and 15 years show a marked degree of extensor response to plantar stimulation. About the same number give indifferent results in that the response is either quite absent of any kind or else is neither markedly flexor nor extensor in type. The rest gave a typical plantar flexion. We classified the cases into two classes according as the sleep was deep or light. Of these children deeply

asleep 47 per cent. gave the sign markedly. In the lighter sleepers the sign was present in 22.7 per cent. Among the marked cases the average age was 6.5 years, and the oldest child was 13 years.

As regards the adults, over fifty were examined, but Dr. Lemon found that it was hard to catch them sufficiently asleep in many instances, and he often met with some response other than the Babinski one when he stimulated the soles of insufficiently asleep men and women. However, sixteen of the cases did not wake up and of these three gave an extensor response. They were aged respectively 19, 23 and 84 years and were suffering from pleurisy, convalescing cerebro-spinal meningitis and senility.

Somewhat dubious results have, no doubt, been due to the method of testing for the sign. The method we used was that described by Dr. Edwin Bramwell. (*Clinical Studies*, April, 1905.) The outer part of the sole was stimulated.

In the main our results agree with those of Collier, Barnes, Harris and others, but they go further, in that the sign occurs oftener than has been stated and also occurs in apparently normal adults at times. It would be a tempting subject to theorise as to the cause of this extensor reflex occurring during sleep. It is the normal plantar reflex in young infants and in apes. Do we during sleep lie back to our arboreal ancestors? On the surface it would seem that during sleep the upper neurons tend to sleep more deeply than do the lower ones with the result that they tend to lose control of these for the time being.

From a practical point of view it is important to remember that in patients examined during sleep, as children so often are, Babinski's sign is of little value.

TABLE OF CASES EXAMINED FOR BABINSKI'S SIGN.

Children between the ages of two and fourteen years. Examined by Drs Masson and Rolph at the Children's Hospital.

	Marked Babinski's Sign.	Indifferent.	Absent.	Total.
Deep	23	12	14	49.
Light	10	23	11	44.
	<u>33</u>	<u>35</u>	<u>25</u>	<u>93.</u>

35.5 per cent. of all sleeping children between the ages of 2 and 14 years had the sign markedly.

47 per cent. of all those in deep sleep showed the sign markedly.

22.7 per cent. of all those in light sleep showed the sign markedly.

The average age of the cases showing the sign markedly was 6.5 years.

The youngest was 2 years and the oldest 13 years.

Adult cases Examined by Dr. Lemon at the Toronto General Hospital.

	Marked Babinski's Sign.	Indifferent.	Absent.	Total.
Sleep				
Deep	1	3	6	10.
Light	2	2	2	6.
	3	5	8	16.

List of Cases showing marked Babinski Phenomenon during sleep, with age.

	Age.
Morbus Coxae	3 years
Pott's Disease	3½ "
Deformed Limbs	5 "
Osteomyelitis	2 "
Ricketts	2 "
Fractured Femur	3 "
Morbus Coxae	8 "
Pott's Disease	8 "
Morbus Coxae	6 "
Pott's Disease	6 "
Anterior Poliomyelitis Acute	2 "
Talipes	3 "
Adenitis	6½ "
Talipes	4 "
Morbus Coxae	10 "
Congen. dislocation of hip	2 "
Morbus Coxae	6 "
Pott's Disease	4 "
Morbus Coxae	11 "
Do	7 "
Ant. Poliomyelitis Acuta	8 "
Conjunctivitis	7 "
Rhinitis	4 "
Vaginitis	6 "
Lachrymal discharge	7 "
Paraplegia	8 "
Osteo-myelitis	3 "
Congenital Dislocation	9 "
Cleft palate	14 "
Fractured Femur	6 "
Osteo-myelitis	13 "
Psoriasis	12 "
Ricketts	4 "
Pleurisy	19 "
Senility	84 "
Cerebro-spinal Meningitis	23 "

Selected Articles

"DUHRSSSEN SCNITT" OR VAGINAL CESAREAN, SECTION IN THE TREATMENT OF PUER- PERAL CONVULSIONS AND THE RE- PORT OF A SUCCESSFUL CASE.

BY HERMAN E. HAYD M.D., M.R.C.S. ENG. BUFFALO, N.Y.

The following instructive case is contributed to the literature of the management of puerperal convulsions.

August 13th, 1906, I was called to see Mrs. Edith K., *primipara*, *act.* twenty-three, who was in convulsions, and I found in attendance Drs. Allen and Baker of Williamsville, N.Y. The first convulsion occurred at six A.M., and she had had seven up to two P.M. Large doses of *tinct. veratrum viridi* had been administered and half grain doses of *codeia* hypodermically. She had also taken five drops of *croton oil* by mouth in solution with olive oil.

After cleansing the vagina and giving a bichloride douche, a vaginal examination was made, when it was found that the os was hard, but slightly dilated and admitted one finger, and there was also a show of blood. An attempt was made to forcibly dilate the cervix, but this was at once abandoned, not only because it was impossible to make any impression upon the tissues, but the irritation immediately brought on a terrific convulsion. A second convulsion occurred in about half an hour and it was then decided to remove the patient to the German Deaconess's Hospital for operation. The baby was alive, as was made out by stethoscopic examination over the bare skin, the heart beats being strong, and the term of pregnancy about eight and a half months. While in the ambulance en route to the hospital the patient had two more seizures. She reached the hospital about five-thirty P.M., and was at once taken to the operating room and prepared for operation.

Chloroform was administered, the bladder was emptied and the urine quickly examined, which was found to be nearly solid by the heat and nitric acid test. After shaving and scrubbing the parts thoroughly, the cervix was seized by two *volsellum* forceps and pulled well down into the vagina, and with a scissors a long anterior incision was made up to the vault. A transverse cut

was then made across the roof of the vagina and the bladder and soft parts were quickly separated and pushed well up upon the uterus. Upon passing the finger into the uterus a few fibers of the sharp internal os, or Bandel's ring, remained undivided. These were severed with a blunt bistoury well up into the body of the uterus. There was no hemorrhage. The membranes were then broken and the position of the child accurately determined—left occipito-anterior—the forceps applied and the delivery was slowly and cautiously effected, but with considerable force and some difficulty. After the head had engaged in the vagina and was well upon the perineum, the forceps was removed, the head and shoulders were carefully delivered, and the baby—a boy weighing six and three-quarters pounds—was given at once to the assistant, who spent at least thirty minutes in energetic and resourceful efforts at resuscitation.

The placenta was delivered in due time and the cervix was immediately sewed up, as were some tears in the vagina due to the blades of the instrument—and a piece of iodoform gauze was passed up into the uterus through the united cervix. The patient was put to bed in excellent condition. A quart of salt solution was now injected into the loins, in the hope of further flushing the kidneys, and a hypodermic of morphia— $\frac{1}{4}$ grain—was ordered every third hour.

At seven-thirty P.M., she had a convulsion and also a slight one at four-thirty A.M. The next day, August 14th, her condition was excellent; pulse 86, temperature 100°. The morphia was discontinued, and high-up rectal injections of a pint of salt solution were administered every fourth hour. The bladder was emptied by catheter every six hours, and a copious supply of urine was obtained each time. In the evening she began to swallow water and then there was added one drachm of a saturated solution of sulphate of magnesia every half hour until free catharsis resulted.

August 15th.—Temperature 99; pulse 72; condition excellent. Mind a little hazy, and taking water freely in large amounts.

August 16th.—Temperature and pulse normal; mind clear. Milk was now administered and baby placed to breast. Gradually a semi-solid diet was given and on the seventeenth day the patient left the hospital well and strong, with the vagina and cervix healed perfectly.

This case demonstrates clearly, first, the wisdom of emptying the uterus as quickly as possible in a bad case of convulsions; and second, the ease and facility with which delivery can be

accomplished by employing the anterior cervical incision of Dührssen. I am satisfied that without surgical intervention in this case we should have lost both baby and mother, because the patient had already had ten convulsions before the delivery was brought about, and was a primipara in whom after many hours of waiting and delay, dilatation had only commenced.—*Buffalo Med. Jour.*

IRRIGATION AND DRAINAGE OF THE SEMINAL DUCT AND VESICLE THROUGH THE VAS DEFERENS.

BY WILLIAM T. BELFIELD, M.D.

(Abstract from Proceedings American Association of Genito-Urinary Surgeons
June, 1906.)

The vas deferens can easily be brought by the fingers against the skin of the scrotum and held there by a half-curved needle passed through the skin under the vas. A half-inch incision through the skin and envelopes of the spermatic cord—painless under local anaesthesia—exposes the vas. A transverse or longitudinal incision into the vas opens its canal. The blunted needle of a hypodermic syringe can be passed into this minute canal and a watery solution of any desired agent injected; this liquid traverses the vas and the ampulla, and distends the seminal vesicle.

This operation, and its utility in the treatment of gonorrhoeal and other pus infections of the seminal vesicle, were presented by me to the Chicago Medical Society and described in the *Journal of the American Medical Association* (April, 1905). Further experience has improved the procedure and widened its scope. When deemed necessary, the vas is stitched to the skin by a fine silkworm gut suture which passes through the lumen of the canal at each cut surface. Thus a fistula is maintained so long as desired; and through this fistula the vas and vesicle may be injected daily. Moreover the vas serves as a drainage tube for the ampulla, which drainage may be facilitated by passing a fine silkworm or horsehair thread along the vas to the ampulla, where it is left until removed for the next injection.

By this procedure direct, repeated and successful medication of the vas, ampulla and seminal vesicle is for the first time made possible, and without a serious operation. I have usually made

the operation in my office, often unassisted, the patient walking away at its conclusion and losing no time from his vocation.

Irrigation and drainage of the seminal duct and vesicle I have found to be invaluable in the treatment of the following conditions:—

1. Chronic gonorrhoeal infections of the seminal canal (vesiculitis), with or without a gleet discharge.
2. Chronic pus infections of the seminal canal in the middle-aged and elderly, (usually mistaken for enlarged prostate).
3. Recurrent epididymitis, which results from repeated invasion of the epididymis by an infection persistent in the seminal vesicle or deep urethra.
4. Acute gonorrhoeal spermato-cystitis; in this condition and in other severe infections, incision into the vesicle from the rectum with the galvano-cautery is sometimes desirable for the immediate relief of severe symptoms. Liquids injected into the vas then escape into the rectum.

In two cases of acute gonorrhoea which presented the symptoms usually preceding extension to the epididymis, including pain and tenderness in the inguinal canal, the vas was opened and injected with argyrol solution. No epididymitis occurred; but further experience must determine the possibility of averting gonorrhoeal epididymitis by this simple procedure.

In one case of tuberculosis of epididymis, vesicle and prostate, the vas and vesicle were irrigated with carbolic acid solution—after Rovsing's method for vesicle tuberculosis—without appreciable benefit.

The first injection into the vesicle should not exceed 30 minims; a larger amount may cause painful contractions of the vesicle—spermatic colic—and retention of urine, both of which effects I witnessed in my early work. As the inflammatory swelling subsides, the subsequent injections may be carefully increased in quantity.

When complete division of the vas has been deemed wise, end-to-end anastomosis is easily made, after freshening the cut surfaces in old cases, by running a fine catgut or silkworm suture through the lumen of each cut end. That the catgut is absorbed I have witnessed in dogs; if silkworm gut be used, the ends may be brought through the skin and tied loosely outside, and removed at the end of a week or more. In either case the lumen of the vas is maintained during healing. The fistula made for treatment is closed in the same way.

The infections of the seminal vesicle and vas constitute a neglected field; for the symptoms caused by spermato-cystitis-

pyuria, frequent and painful urination, even complete retention of urine—are generally referred to the bladder and the prostate, and treated as cystitis and prostatitis. If the subject be above forty years of age—and spermato-cystitis is common after that period—he is charged with harboring an enlarged prostate and advised to submit to prostatectomy. These are the cases that were temporarily benefited by resection of the vas deferens, when that operation was popular.

By my method, these very important because very common ailments are made amenable to treatment without danger to the patient or to his sexual function. It is well known that even complete occlusion of both seminal canals, as by double gonorrhoeal epididymitis, does not impair sexual desire or capacity, though preventing the passage of spermatozoa into the urethra, and my operation does not even occlude the vas.

The suppurating seminal vesicle has been exposed and drained through an extensive perineal incision similar to that for perineal prostatectomy. This operation, first practised by Dittel and recently modified by Fuller, is severe and bloody, entailing risks and requiring weeks of confinement; it seems justified, if at all, only in cases of peri-vesiculitis. The method that I have devised, with or without a cautery incision from the rectum, suffices for the treatment of the vesicle, as well as the ampulla and vas.

NOTE.—We have washed through the vas deferens in chronic inflammation of the seminal vesicle with great benefit, the operation is painless when carefully done and the result satisfactory.

Progress of Medical Science.

SURGERY.

IN CHARGE OF EDMUND E. KING, GEORGE A. BINGHAM, C. B. SHUTTLEWORTH
AND F. W. MARLOW.

Prostatectomy.

A. H. Ferguson, Chicago (*Journal A.M.A.*, October 13), classifies the cases of prostatic hypertrophy as follows: 1. Cases manifesting genito-urinary functional disturbances in the first congestive stage of the disease, in which proper hygienic and local treatment may effect a cure, or at least in some cases avert operation. 2. Cases with partial retention, in which the condition progresses insidiously revealing itself in an acute attack of retention with subsequent residual urine and the necessity of catheterization, or more chronic gradual distention of the bladder with intermittent dribbling of urine. 3. Cases with complete retention with frequent involuntary urination and almost constant dribbling at night. 4. Cases of absolute incontinence and no residual urine. Prostatic enlargement does not always call for operation: the gland may be extremely large and yet cause no obstruction. Obstruction is the one important thing. Ferguson enumerates in detail the pathologic indications for prostatectomy; the conditions that interfere with the function of the vesical meatus; the obstruction of the flow of urine in the prostatic urethra; the contraction and cicatrization of the organ from chronic inflammation, the deleterious effect of prostatic obstruction on the bladder, kidneys and rectum. He reviews the literature bearing on complication, sequelæ and mortality, and describes his own practice in performing the perineal operation. He puts the patient preferably in the extra lithotomy position, and, while he prefers to open the membranous urethra and proceed down to the sinus pocularis at the point where the ejaculatory ducts open, he has frequently removed the prostate without any injury to the membranous urethra. After splitting the capsule laterally, it is best to enucleate the lateral lobes first, carefully avoiding injury to the ejaculatory ducts. The finger is pressed into the prostatic urethra and acts as a guide while the fibrous attachments between it and the prostate are cut away with cutting forceps. In case the ducts are pushed to one or both sides, and the prostatic enlargement rises up into the bladder, he inserts the depressor into the bladder through the perineum to aid the finger in the enucleation. Care should be taken not to injure the vesi-

cal sphincter in removing prostatic nodules behind the bladder and it is best, he states, to do this, piece by piece, with the biting forceps. When there is a polypoid middle lobe projecting into the bladder he removes it by way of the internal vesical orifice. While it is sometimes impossible to save the upper prostatic urethra, especially if the enlargement completely surrounds it, it is not necessary to remove the whole of it as is done in the suprapubic operation. In suitable cases it is possible to remove the whole prostate without injury to the bladder, ejaculatory ducts or prostatic urethra. In cases in which there is no necessity of saving the procreative power, ejaculatory ducts are deliberately severed and this expedites and facilitates the operation. If it is very desirable to save the ducts, Ferguson says another expedient may be adopted which aids as a guide to save them. This is to open the inguinal region and seeking out the vas deferens, to pass a fine probe down to the sinus pocularis. The best material he has found for this is fine aluminum bronze wire doubled on itself. If catheterizing the ducts is impracticable, methylene blue can be injected which will make it possible to recognize this tissue if it is injured. He makes it a practice to stain the bladder and prostatic urethra in all cases, and before operating to wash it out of the bladder and in its place leave a solution of boric acid, sufficient to distend the bladder to its utmost capacity. As regards drainage he thinks the technic is improved and convalescence hastened by draining through the penis by an ordinary retention catheter, No. 23, American. The article is very fully illustrated.

Anastomosis of the Vas Deferens.

G. F. Lydston, Chicago (*Journal A. M. A.*, July 21), reviews the objections to and the indications for vasectomy, and points out that it is a perfectly safe operation when properly performed, and that while it has a profound influence on the innervation and circulatory supply of the prostate and seminal vesicles, it does not necessarily cause permanent sterility. It has a certain range of application in sexual neurasthenics, spermatophobias and in genuine spermatorrhea. In intractable prostatitis and seminal vesiculitis it is of the greatest value and deserves a trial before the major operations. Recurrent epididymitis also furnishes an important field for this operation, and it has a certain range of application in suspected or known tuberculosis or malignant disease of the testes. In some cases of enlarged prostate with hemorrhages from the vesical neck, unsuitable for the radical operation, he has succeeded in so improving the conditions by a preliminary vasectomy that a prostatectomy could

be performed. In enlarged prostate when prostatectomy is disallowed or is inadvisable, vasectomy is indicated. The technic of the operation is described. In a certain, as yet undetermined, number of cases it is possible to re-establish the continuity of the vas deferens after a previous vasectomy has been performed. The chief indication for this is in cases of accidental severance of the vas, but in case of double resection, followed at a longer or shorter period by anastomosis, there are two chances of restoring fertility. One or the other vas is liable to regain patency. The time that should elapse between the vasectomy and the anastomosis varies, of course, according to the improvement in the condition for which the vasectomy was performed. Lydston describes his method of anastomosis, which consists in excising the nodule at the point of resection, bringing the two ends together and uniting them after having inserted into their lumen a strand of large-sized silk-worm gut, the proximal end of which is passed out by the threaded needle about an inch and a quarter above the anastomosis and out through a puncture in the skin a little above the upper angle of the wound. The object of this silk worm gut thread is to preserve the continuity of the lumen and it should be removed at the end of a week. A portion of the free edge of the fascia, which was divided to expose the parts, is wrapped closely around the vas so as to close it in completely. The fascia is closed with fine catgut and the edges of the scrotal wound brought together with fine silk worm gut or horsehair. There is very little reaction after the operation, though a certain amount of exudation and nodulation may be perceptible for several weeks. Out of four cases thus operated on, one patient has shown, microscopically, a restoration of function by the presence of spermatozoids in the urine, one is apparently a failure, and there has been no opportunity as yet to determine the condition in the other two. The operation is illustrated.

MEDICINE.

IN CHARGE OF W. H. B. AIKINS, H. J. HAMILTON, C. J. COPP
AND F. A. CLARKSON.

The Open-Air Treatment of Pneumonia.

W. P. Northrup, New York City (*Journal A.M.A.*), for over eleven years has been using free ventilation and fresh air treatment in pneumonia, and during the last year he has followed the practice of putting his patients in the New York Presbyterian Hospital for six hours a day out on the roof in all weather

in which harsh high winds, rain and snow did not prevent. He gives histories of two cases, both serious, and in one of which he thinks the patient could not have recovered under other treatment. The hospital authorities are so well satisfied of the value of this method that they are making a colossal roof garden on the medical side of the hospital to be an open-air ward for these cases. The patients most favorably affected by open-air treatment are those with severe poisoning, with delirium, partial cyanosis or deep stupor. In Northrup's experience all patients do better in cool fresh air, which can be secured in private practice by screening off a portion of a room by an open window. None have been harmed, in his observation, and some have been greatly benefited and possibly saved by the cold fresh-air treatment. If pneumonia, due to an infecting agent, is thus benefited, the value of the treatment for other infectious diseases is suggested, and, in fact, he has tried it in many others, including typhoid fever with severe bronchitis, whooping cough with bronchitis and convulsions, with excellent results. He considers it, in fact, the ideal treatment for septic fevers. The only regulation is to keep the patient comfortable and especially to keep the feet warm.

A Review of Fifteen Hundred Operations Upon the Gallbladder and Biliary Passages.

Mayo (Annals of Surgery) analyzes the work of his brother and himself in this field between 1891 and 1906. He considers the three most important considerations to be the mortality, the permanence of cure, and the disability arising from the operation. The mortality in the 1,500 operations was 4.43 per cent. This includes death from acute perforations with septic peritonitis, malignant disease, pulmonary embolus, myocarditis, and various chronic conditions. Of the 845 cholecystostomies the mortality was 2.13 per cent. This is the normal and the safest operation. Future trouble after this operation may come when the cystic duct is obstructed, the gallbladder taking no part in the biliary circulation, and when it is thick walled and functionless. In common duct operations a functioning gallbladder should not be removed except for direct indication. Of 319 cholecystectomies 3.13 per cent. were fatal. The authors prefer this operation when the organ can be easily removed, and the disease is confined to it. Of 207 operations upon the common duct the mortality was 2.9 per cent. in cases in which there were no immediately active symptoms, 16 per cent. when there was active infection in the common duct and in the ducts of the liver, 34 per cent. when there was complete obstruction of the common

duct, and 33 1-3 per cent. when there was malignant disease. In eighty-six of the 1,500 cases there was involvement of the pancreas and eight were fatal. The lesson from this experience was that early operations were most likely to be successful.—*New York Medical Journal*.

Exercise for the Lungs.

Frederick Rogers, in the *Medical Record*, of Oct. 6th, reviews at some length the relations between the playing of wind musical instruments and pulmonary disease, with special reference to tuberculosis of the lungs, both as an etiological factor and a curative agent. He fails to find that musicians are particularly subject to such diseases as emphysema, in so far as their occupation is involved. In selected cases he advises in the early stages of phthisis the substitution of exercise for the lungs by means of playing wind musical instruments, for the usual pulmonary gymnastics, the moral effect of the former is also a factor to be reckoned with; as a prophylactic agent in the predisposed, it is also worth consideration, and in his opinion not fully recognized.

Cranial Percussion.

In the *Medical Record*, of the 29th of Sept., Henry Koplik discusses the use of percussion of the skull as a means of placing the indication for the performance of lumbar puncture, with special reference to its application in cerebrospinal meningitis of the epidemic type. As a therapeutic measure lumbar puncture is applied in the various forms of hydrocephalus, whatever its cause, acute or chronic, but it is of questionable use in such diseases as tumor cerebri, etc. In cases of meningitis, the first result of intra-cranial pressure is to distend the ventricles with fluid, and it is the early detection of this fluid which gives us the absolute indication to relieve the distention by means of lumbar puncture. The mode of detecting ventricular distention by means of percussion is discussed by McEwen in his work on pyogenic disease of the brain and cord, and he describes accurately the elicitation of a differential note, this note elicited at a given spot (as the pterion) varies with position of the head, it has a peculiar musical, tympanitic quality, conveying the idea of hollowness. Koplik recently showed that certain cases of cerebrospinal meningitis exist, in which apparently puncture is indicated, on account of symptoms as sopor, headache, delirium, and hyperaesthesia, pointing to intra-cranial pressure, but in which pressure cannot be shown to be present, in this class as in

the toxic class, beyond being of use in diagnosis, puncture is useless. He concludes that lumbar puncture is of value only in such cases as can be definitely shown to have an increase of intraventricular pressure, and that at present percussion is our only means of determining its existence, without using puncture as a diagnostic agent.

B. O'R.

Value of Tuberculin Reaction.

At the recent meeting of the Budapest Inter-hospital Association Dr. Schmidt discussed the value of tuberculin reaction. He proved that the tuberculin reaction is not infallible in the diagnosis of tuberculosis. His technique is as follows: After absence of fever has been assured for several days by four hourly measurements, one m. of tuberculin in fresh solution is injected, then after four to five days, five times this amount. In sixteen cases with positive reaction, tuberculosis was found at autopsy in only nine; in two carcinoma of the liver and stomach were the sole lesions, in five other pathological conditions. In one there was no reaction, yet evident tuberculosis. Despite such small doses and great care in injecting, serious accidents may occur, and a latent process may suddenly become active and even lead to a rapid fatal issue. This happened to the author in three cases—one of leprosy (in Bosnia) combined with tuberculosis, and one of affection of the serous membranes. A source of error is to be found in hysterical patients; they sometimes re-act after tuberculin injections and even after injections of plain water.—*Medical Press*.

Russo's Reaction in Enteric.

Russo, of Catania, has recently introduced a substitute for the "Diazo" reaction as used in typhoid fever. His method is to add 4m of a 1-1000 solution of methylene blue to 4 c.c. of filtered urine; in the event of a positive reaction a uniform emerald green color is observed in shaking the test tube; if the result is negative the solution retains its blue tinge, or at the most only a faint greenish tint is seen. Rolliston reports in the *Medical Press* of September 19th his conclusions after a series of practical tests, which corroborate the findings of Russo. He believes that the reaction is more constant in enteric fever than the "Diazo" test, that its disappearance coincides generally with the commencement of lysis and is a more certain sign of convalescence than the older method, also that in relapses Russo's more frequently becomes again positive.

In common with the "Diazo" it is often detected at an

earlier stage in the disease than Widal agglutination reaction. Unfortunately he has also found it positive in measles, contrary to Russo's experience. Rolliston finds it occasionally present in lobar and broncho-pneumonia, diphtheria and scarlet fever, consequently he does not believe it to be of great diagnostic value.

B. O'R.

Salt in Nephritis.

A note in the *Boston Medical and Surgical Journal* takes up the question of limitation of ingestion of Na. Cl. with the food in chronic or renal disease. Certain authorities argue that the quantity of salt required by the human organism for its healthy action is comparatively small. In view of the theory of Widal and Juval that a retention of sodium chloride in the tissue results in an œdema, on account of the residual salt of the tissues requiring a certain amount of water to maintain proper molecular concentration, the advisability of the normal saline injections so frequently administered in nephritis is also called into question.

B. O'R.

Diabetes.

Williamson, in the May number of *Medical Chronicle*, reports on the treatment of the milder forms of diabetes mellitus with aspirin, apparently its value is limited to these cases. In a series of experiments he allowed the ordinary hospital diet, excluding only sugar; white bread, rice and starches, etc., being admitted. For the first few days no drugs were given, the sugar being carefully estimated daily throughout the treatment; salol and camphor were then administered for periods of about a week each, with but little diminution in the daily excretion of glucose. Aspirin was then substituted in doses of gr. xv. every four hours and a progressive fall in the sugar index was noted, in some cases it entirely disappeared after a few weeks. In view of the above aspirin at least seems worthy of a trial. No explanation of its action is attempted.

Editorials.

PUERPERAL ECLAMPSIA.

We publish in this issue an interesting report of a case of puerperal convulsions in which vaginal caesarean section was performed with gratifying results.

It is now many years since Dührssen first proposed incisions of the cervix for rapid delivery of the child, although the procedure was really an old one which had been practised long before Dührssen was born. As this distinguished obstetrician has changed his method of procedure so frequently, and adopted so many different forms of procedure, there is a certain amount of confusion as to what his methods really are. However, we believe that we are right in saying that his chief incisions in a case of this sort are the anterior (and frequently posterior) incision of the cervix, and the transverse incision of the anterior vault of the vagina. In certain cases he also makes a perineo-vaginal incision which includes the tendons of the levator ani muscle. We do not know why in Dr. Hayd's operation the name "Senitt" is used in connection with that of Dührssen. We think, however, that in this case the surgeon did an operation that was perfectly justifiable, and that the results were all that could be desired. Opinions differ very materially as to the advisability of such an operation when eclampsia occurs before labor.

It unfortunately happens that emptying the uterus does not always stop the convulsions. It is also a fact that accouchment forcé, whether by Harris' method, or Edgar's method, while the cervical canal is intact, is exceedingly dangerous, while the use of any form of bag or ballon is both unsatisfactory and dangerous. Therefore many conservative obstetricians prefer not to treat eclampsia occurring before labor by any attempt at emptying the uterus, but rather by the use of medicines.

We think opinions have materially changed during recent years since Dührssen's methods have been carefully studied. We believe that in skilled hands, especially in well ordered hospitals, the operation as performed by Dr. Hayd is generally suit-

able and the results usually satisfactory. Unfortunately, however, Dührssen's vaginal caesarean section is a difficult operation which cannot be safely performed as a rule in private practice. Even in cities well supplied with hospitals and skilled surgeons no definite rules can be laid down which all agree to.

There is one very important consideration, however, in connection with this subject; and that is that an immediate operation in skilled hands (so far as the operation itself is concerned) is generally safe for the mother, and, at the same time, greatly improves the chances of the unborn babe.

MILK.

There are beginning to appear in the public press some signs of a consciousness that our milk supply might be improved. Some citizens have even been so rash as to object to the addition of water to the same. But the most serious thing, much more serious than the addition of water, has never yet been alluded to in the public discussion of the matter, we need not say that we mean the addition of dirt. Dirt means germs and germs mean poison. Dirty milk fed to an infant often poisons it as surely as strychnine. Indeed, the person of our acquaintance who knows most about milk, who knows, indeed, all about it as far as Ontario is concerned, can by no means be persuaded to take a glass of milk. Knows too much about it.

We must attend to this subject. Milk is probably the most dangerous food we have. The cow, the place of milking, the utensils, and the milker, should all be in a safe and clean condition. At present they are not, as a rule. And just as soon as we, who pay for milk, make the personal acquaintance of the cow, and see for ourselves the condition, and demand clean milk, just so soon we shall get it. It is significant, as showing that this matter is neglected, that in the 2nd edition of Prof. Dean's excellent text book on Dairying (Toronto: William Briggs), this part of the subject is dismissed in half a dozen lines, although the book itself is in other respects a most valuable exposition of the subject. Every physician has a professional,

as well as a personal interest in this matter. If the milk supply in Ontario is to be improved, it will probably not be until we draw attention to the matter, and do our part towards finding a remedy for the existing state of things.

THE RUGBY FOOTBALL.

The students of the University of Toronto were sadly unfortunate at the commencement of their season of sports. Before a rugby match was played two young men were killed, and two seriously injured in ordinary practice play. The first victim was Mr. Cameron Paulin, a second year student at the School of Practical Science. He was playing on the University campus on the afternoon of Oct. 4th. During the play he was injured, and after a short res. went to the gymnasium to change his clothes; while there he was seized with dizziness and soon became unconscious. He was removed to the General Hospital, but never regained consciousness, and died about half past ten that night.

The second victim was Mr. W. Glynn Ellis, of 15 Elm Ave., Toronto, a fourth year student in Arts. He was taking part in a practice game, Oct. 10th, when he received an injury which made him feel quite ill. Although his illness was not considered very serious for a time he died on the following day.

The inexpressible sadness connected with the death of these two popular young men caused the greatest gloom which has been known in University circles since the Battle of Ridgeway in 1866.

One of the students injured, Mr. Ray Forsythe, is suffering from the effects of a serious fracture of the leg.

THE CANADIAN MEDICAL ASSOCIATION.

We have received from Dr. George Elliott, general secretary of the Canadian Medical Association, a report of the Special Committee on Re-organization, with a book of the proposed new situation and by-laws. One of the most important recommendations is

the proposal to create an executive council, which shall be the business body of the association. It is proposed that it shall consist of delegates elected by the affiliated societies, the Dominion and Provincial Boards of Health and the Canadian Medical Association. It shall elect all officers of the association except the president by ballot, and transact all the general business of the association. It shall determine the time and place of the annual meetings of the association. The executive shall annually appoint five of its members as a Finance Committee which shall also be a Publishing Committee. Funds for the purposes of the association shall be raised by an equal annual assessment of \$5.00 upon each ordinary member, and in any other manner approved of by the Finance Committee.

The following clauses refer especially to the Executive Council:—

1. No one shall serve as a member of the Executive Council who has not been a member of the association for at least two years.

2. Members of the council shall be elected for every year.

3. Every affiliated medical society shall be entitled to elect one or more delegates.

4. At each annual meeting 15 members shall be elected by ballot to act on the Executive Council for one year.

5. Every three years the Executive Council shall appoint a committee of five to examine the registers of membership of the affiliated societies.

SIR A. E. WRIGHT'S VISIT.

Toronto was honored, during the first week in October, by the visit of an eminent English physician, Sir A. E. Wright, one of the few men who has received his Knighthood for original research. During his short stay in the city he delivered two addresses—one as the opening lecture to the Medical Faculty, which we are able to report in full, and the other at a meeting of the Toronto Medical Society, both of which were exceedingly instructive and attracted large audiences.

Before the Toronto Medical Society, the subject of the address was "The coagulability of the blood and its practical application." Prof. Wright devised a method of estimating the time taken for blood to clot, and found that although this occurred in a normal individual in about $1\frac{1}{2}$ minutes, there were very wide variations. He also observed that in some diseases such as urticaria and eczema the blood coagulated very slowly, while in others, as in convalescing typhoid, the clot was formed almost instantly. A further research also revealed the fact that the time of coagulation could be retarded by the administration of citrates or tartrates, and the formation of the clot could be hastened by giving the patient some salt of calcium or magnesium. The lecturer spoke of his own troubles with urticaria, which he invariably had after eating fruit. This contained citrates in abundance, the normal calcium salts of the blood were precipitated, coagulation was more difficult, and a certain amount of serum made its way through the vessels and appeared on the surface as wheals. These were relieved in a very short time by taking calcium chloride or magnesia. Similarly, in those surgical wounds with dry surfaces which refuse to heal, the administration of citric acid by lessening the power of coagulation, causes serum to exude and the cut is soon healed.

The thrombosis which occurs in about 6% of all patients recovering from typhoid was due to the excessive amount of calcium salts taken in the form of milk, during the course of the fever. About the third week these accumulate so much as to cause marked increase in the coagulability of the blood, and a clotting takes place in one of the vessels. This can be avoided entirely by administering citrates.

In replying to the vote of thanks at the conclusion of the meeting, Sir Almoth expressed himself with no uncertain sound upon the medical teaching which fills the student with theory and does not teach him how to apply it. A great deal of the laboratory work, as carried out at the present time, was useless for this reason. The laboratory worker should spend part of his time at the hospital, and his experiments are not complete till they are taken to the bedside.

It is seldom that the medical profession of this city are favored

with an address so full of practical points, and so bristling with interesting results. We hope Sir A. E. Wright may visit us again.

THE SANATORIUM TREATMENT OF PULMONARY TUBERCULOSIS.

The *London Lancet* recently submitted to those it considered most able to answer a series of questions, soliciting their replies for publication.

In the January sixth number of 1906, they publish the replies at length. The questions were as follows:—

1. Has experience demonstrated the therapeutic value of the sanatorium treatment generally?

2. Are successful results obtained usually (a) in well-to-do patients; (b) in the working classes?

3. In the working classes must an elaborate system of insurance be combined; and are convalescent homes necessary to prolong the treatment?

4. What are the arguments for believing that the educational value of sanatoriums will be great and widespread?

5. Sanatoriums are considered by some people as places where severe cases may be segregated and by others as places where incipient cases may be cured. Ought there to be two sets of buildings?

6. What is a medical officer to say when he is asked whether a county authority or a private philanthropist is doing the best for tuberculosis by building a costly sanatorium?

Sir Richard Douglas Powell favored judicious sanitariums and hospital treatment and asserts that sanatoria are essential to success. His paper explains details at length and with ability.

Sir William H. Broadbent gives an affirmative answer to all these questions, and favors in answer to the 5th, isolation and separate wards, but not separate buildings.

Dr. Theodore Williams answers these questions in the affirmative, and as to segregation favors three classes of buildings: 1. A hospital for acute cases. 2. A sanatorium for patients with

incipient and limited lesions. 3. A settlement or colony for assorted cases where light employment might be utilized.

Dr. J. Kingston Fowler refers in his answer to his well-known paper on the open air treatment read November 14, 1899. He endorses the Nordrach System as confirmed by his experience and observation since 1899, which is:—

1. An absolutely open air life day and night, in sunshine, fog or rain.

2. No liegehalle.

3. An abundant diet, regulated by the physician in charge, who must attend at all the meals.

4. Rest before meals.

5. Exercises regulated by the strength and temperature of the patient.

Dr. Fowler goes into extended details and gives strong arguments and strong conclusions in support of his views. He thinks every hospital should have a sanatorium attached.

NOTES.

We understand that Sir Victor Horsley expressed the opinion that the Toronto meeting of the British Medical Association was the best ever held from a scientific standpoint, excepting, perhaps, that of 1886.

Notices have been sent to many physicians throughout the United States and are appearing in the medical and public press regarding an "American International Tuberculosis Congress" to be held in New York City, November 14th to 16th next, and an association known as "The American Anti-Tuberculosis League," which is to meet in Atlantic City next June at the time of the meeting of the American Medical Association.

It should be stated that the gathering in New York next November and the one in Atlantic City next June have no connection whatever with the International Congress on Tuberculosis authorized at the last session in Paris in 1905, which will hold its

meeting in Washington in 1908 under the auspices of the National Association for the study and prevention of tuberculosis.

We are assured by Professor Adami that his name has been advertised in connection with the former schemes wholly without his authority, and that to his knowledge no physician of repute in the United States has signified his participation in the above "American International Tuberculosis Congress."

The next annual meeting of the British Medical Association will be held in Exeter, Devonshire, one of the most beautiful counties of the south eastern portion of England. The population of Exeter is about 47,000. Dr. Henry Davey of that city will be the president.

Senate of the University of Toronto.

At the election of the Senate of the University of Toronto, the following were elected to represent the graduates in medicine. The total vote was 1,421, of which Dr. H. J. Hamilton received 1,175, Dr. Chas. Hastings, Toronto, 826; Dr. W. H. Harris, Toronto, 708, and Dr. Wm. Burt, of Paris, 625.

The following nominees were not elected, Dr. Angus McKinnon, Guelph, 580; Dr. R. B. Nevitt, Toronto, 395; Dr. W. J. Wagner, Toronto, 315; Dr. R. T. Shiell, Toronto, 197.

We understand that Drs. Wagner, Burt, Nevitt, McKinnon and Shiell were nominated without their knowledge or consent, and most of them took no active interest in the election.

The election was purely friendly and personal in character, there being no special issues before the electors. We think that Dr. Burt and Dr. McKinnon would have been excellent representatives from districts outside of Toronto.

The following representatives of the medical faculty were elected: Dr. D. Gibb Wishart, Dr. Jas. F. W. Ross, Dr. Geo. Bingham, and Mr. Irving Cameron, all of Toronto.

Personals.

Dr. Frank Martin, of Dundalk, has been appointed an Associate Coroner for the county of Dufferin.

Dr. Andrew Gordon returned to Toronto, Oct. 7th, after a visit to Winnipeg.

Dr. J. E. Elliott, after a pleasant motor trip to Cleveland, returned to Toronto, Oct. 8th.

Dr. Goldwin Howland, who was married in London, England, in September, has returned to Toronto; and is practising at 540 Spadina Ave.

Dr. W. Harley Smith is the Honorary Vice-President of the Anglican Club, in connection with Wycliffe College for the coming year.

Dr. E. K. Purvis has gone to London, Eng., to take a special course in diseases of the eye, ear, throat and nose in Moorfields and Central London hospitals.

Professor Wm. Osler, of Oxford, will leave England in the latter part of November to attend the gathering of the "Osler Clan" to celebrate the anniversary of his mother's birthday, December 15th, when she will be one hundred years old. No jokes about the "chloroform age" will be in order on this interesting occasion.

Dr. C. P. Coughlin, of Peterboro', has been appointed superintendent of the Institute for the Deaf and Dumb, Belleville, Ont., in the place of Mr. R. Mathison, resigned. Dr. Coughlin graduated in 1890, and after practising for a number of years in Arthur removed to Peterboro' in 1902. As announced in our last issue he was appointed by the Ontario Government a member of the new Provincial Board of Health. We learn from the daily papers that when he lived in Arthur he was the Conservative candidate against Hon. J. M. Gibson in East Wellington. It is also stated that he has always been an active politician. We presume, therefore, that he is well qualified for the new position which he has been called upon to occupy.

Obituary.

CAPT. LOUIS P. FARREL, M.D.

Capt. Farrell, the second son of the late Dr. Edward Farrell, of Halifax, died at Satara, Bombay, September 12th. He graduated from Dalhousie in 1899 and went to Great Britain the same year. After receiving the double surgical and medical qualification of London in 1901 he joined the Indian Medical Service, contracted fever in 1904, and was never robust afterwards. His death, however, was sudden and unexpected, and the immediate cause is unknown at the time of writing.

FRANCIS PERCIVAL COWAN, M.D.

Dr. Frank Cowan, of Toronto, died at the Western Hospital, October 17th, aged 40. He graduated, M.D., Trinity University in 1888, and after acting one year as a resident physician in the General Hospital commenced practice in Toronto. He was very popular and successful for a time, but in about five years his health failed and he did but little active practice during the last twelve years.

JAMES STEWART, M.D.

Canada has lost one of her ablest physicians through the death of Dr. James Stewart, which occurred at his home in Montreal, Oct. 6th, following a recent stroke of paralysis.

After graduating from McGill University, Montreal, in 1869, he went abroad and did post graduate work in Edinburgh, London, Berlin and Vienna. After returning to Canada he settled in the county of Huron, practised for a time at Verna, and then for a number of years at Brucefield. He was called to McGill about twenty years ago, and was appointed Professor of Materia Medica and Therapeutics. He devoted himself to medicine for a number of years, and especially to diseases of the nervous system, and for some time was senior physician in the Montreal General Hospital, and at the opening of the Royal Victoria Hospital became Physician-in-Chief of that institution.

He possessed great ability, untiring industry, and was an

admirable teacher and practitioner of medicine. Although somewhat reserved, he was very much beloved by his intimate friends, and very highly respected by all his acquaintances.

GEORGE S. ARMSTRONG, M.D.

Dr. Geo. S. Armstrong died at his home in Spokane, Washington, Oct. 3rd, aged 48. He was born in Flesherton, Ont., and received his medical course in Trinity Medical College, Toronto. After taking a post graduate course in Great Britain he returned to Canada, and was one of the surgeons during the construction of the Canadian Pacific R.R. on the North Shore of Lake Superior, and was subsequently associated with Dr. Sproule, M.P., at Markdale, Ontario. Nearly 20 years ago he settled in Spokane, and continued in practice there up to the time of his death. He was for a number of years recognized as one of the leading surgeons of the Pacific Coast.

Book Reviews.

The Operating Room and the Patient. By Russell S. Fowler, M.D., Surgeon to the German Hospital, Brooklyn, N. Y. Octavo of 172 pages, fully illustrated, Philadelphia and London: W. B. Saunders Company, 1906. Cloth, \$2.00 net. Canadian Agents—J. A. Carveth & Co. Limited, 434 Yonge street, Toronto.

Dr. Russell Fowler's admirable book is the only work on the market devoted entirely to operative technic, with the pre-operative procedures of sterilization and preparation. It clearly describes the preparation of material of all kinds, indicates the instruments required for the various operations, details the preparation and care of the patient before and after operation, and the methods of anesthetization, describes and illustrates the position of the patient for different operations, and contains all other information a knowledge of which is necessary to produce the highest efficiency.

Progressive Medicine.—A quarterly digest of advances, discoveries and improvements in the medical and surgical sciences, edited by Hobart Amory Hare, M.D., and H. R. N. Landin, M.D. September 1st, 1906. Lea Brothers & Co., Philadelphia and New York. \$6 per annum.

The contributors to this, the 3rd volume, are Drs. Ewart, Gottheil, Norris and Spiller, names sufficient to guarantee the usual high level of the articles. If we might specify one of the many good things, we would allude to the superior resumé of the recent advances in the diagnosis of chest and heart diseases, well worth in itself the year's subscription. No other work in the English language covers the ground as well as *Progressive Medicine*—always complete, always terse, and ever welcome to every physician who keeps abreast of the times.

Selections.

The Nutrophiles in Babies Nourished Naturally and Artificially.—Esser (Munch. Med. Wochensch).

Kurtz concluded (1) that the nutrophilic leucocytes with four or five nuclei fragments were increased for the first three or four days in babies who had been nourished by the breast; (2) that this relative number of nucleated nutrophiles was much decreased when mother's milk was suddenly changed to cow's milk; (3) that after a prolonged artificial feeding the blood picture approximated the normal adult blood; (4) that stomach diseases and atrophic conditions would cause a decrease of the number of nuclei fragmented cells and an increase in the mono-nucleated cells. Considering the multi-nucleated cells as the older and protecting cells of the organism, he thinks that perhaps these produce the antibodies in the blood. With their disappearance there would be in the blood a large amount of this protecting substance and with their reappearance the element of infection would be present. Contrary to this conclusion was the possibility that the many fragmented nucleated cells were the older forms of degeneration and were the first to be affected by processes of disintegration.—*Interstate Med. Jour.*

The Sedimentation of Sputum by Means of Hydrogen Peroxide.—Sachs-Muckle (Muench. Med. Wochenschr).

If hydrogen peroxide be added to a purulent sputum an active effervescence takes place during which all lumps and masses of pus and tissue are violently torn apart and the sputum converted into a more or less homogeneous mass. Upon being allowed to stand, the sputum separates into three layers; an upper one consisting of froth, a middle clear fluid layer and at the bottom a solid mass consisting of detritus and micro-organisms. In this lower layer, bacteria of all sorts, especially tubercle bacilli, can be found very much more readily than in the original sputum. The addition of one part per thousand of bichloride to the peroxide of hydrogen makes possible a still further extension of the method. If this mixture be placed in a vessel by the side of the patient and the latter directed to expectorate into it, the entire twenty-four hours' amount of sputum may be collected without danger of infection. Whenever it is desired to examine the sputum, the disintegration and sedimentation will usually be found to have taken place and the material at the bottom of the vessel will be suitable for examination.—*Interstate Med. Jour.*

Treatment of Pulmonary Tuberculosis by Bier's Method of Passine Hyperemia.

Leo (*Berlin. klin. Woch.*) strives to produce a hyperemia of the lungs by placing the patient on his back and elevating the head and legs. This position is to be retained four hours per day. The method has in the main been successful. In two of the thirty patients hemoptysis occurred; occasionally epistaxis was observed. In some patients dizziness and fulness of the head appeared. In the majority of the cases the posture was well borne. The usual treatment in pulmonary tuberculosis is not to be neglected.—*Interstate Med. Jour.*

Metabolism in Pancreatic Disease and the Effects of Opium and Pancreatic Extract.—(*Zeitsch. f. experiment. Path. u. Therap.*).

It is well known that the pancreatic gland elaborates ferments that chemically alter proteids, fat and starches, and thus prepare them for assimilation, and that it also produces an internal secretion that is of the greatest importance for the normal combustion of sugar within the tissues. If the pancreas is removed experimentally, diabetes mellitus will follow and the food will be improperly digested, but if the excretory ducts only are ligated glycosuria is not the rule. On the other hand, an experimental diabetes can often be corrected if a small piece of pancreas be implanted under the skin, so that the organism gets the benefits of the internal secretion. If the pancreas is destroyed in man by pathological processes (tumor, infarct, atrophy), the results are the same: fats, starches, and carbohydrate will be poorly digested and the symptoms of diabetes will appear.

A case of carcinoma of the pancreas, presenting all the typical symptoms, was selected by Ernest Meyer, of the Universitäts-Klinik, in Halle a. S., in order to determine experimentally the absorption of the different food products and to ascertain if the disturbances in metabolism and the excretion of sugar can be favorably influenced by internal medication, particularly by opium, since this undoubtedly reduces glycosuria, and by pankreon, a most effective tannin-pancreatin compound. The amount of food required by the patient was above normal and the quantity of feces voided was still larger. On the diet of meat, eggs, milk, rolls, and potatoes an analysis of the feces showed that only 34 to 38 per cent. proteids and 23 per cent. fat were absorbed, while on a diet of only milk, rolls, and butter, 41 per cent. of proteids and 38 per cent. of fat were assimilated. Neither

starch nor sugar could be detected in the feces, but by way of the urine, on the average, 90 gm. of glucose were lost daily. Pankreon was now administered in three daily doses of 1 gm. (15 grn.) for six succeeding days. The amount of proteid absorbed now reached 59 to 64 per cent.; that of fat 63 to 66 per cent.; while only 34 gm. of glucose were excreted daily with the urine, so that the patient was again in nitrogenous equilibrium. The number of calories utilized rose from 1,700 to 2,500, the stools lost their disagreeable odor and became more solid, and the general condition of the incurable patient was much improved. With opium (15 drops tinct. opii simpl. t. i. d.), 47 to 52 per cent. of the ingested proteids and 45 to 49 per cent. of the ingested fat were absorbed, and the amount of sugar excreted was also reduced, proving that opium has very much the same effect in pancreatic disease as pankreon, but to a less degree. It is probable that still better results will be obtained if both drugs are used together.—*The Post-Graduate*.

Cheese in Therapeutics.

M. Paul Gallois of Paris, entertains the theory that all forms of gastroenteritis in infants originate in dyspepsia, which, he thinks, paves the way for bacterial infection. The dyspepsia he attributes to overfeeding, and particularly to the ingestion of too much liquid. Hence he prescribes what he calls a dry diet (*régime sec*) for children who have been weaned. He explains, in the *Bulletin médical* for September 1st, that it was in pursuance of this idea of restricting the amount of liquid allowed that he was led to treat nurslings by substituting for a certain number of the daily nursings meals prepared by mixing a coffeespoonful of Swiss cream cheese with a soup-spoonful of milk and sweetening the mixture.

He realizes that cheese is of ill repute as an article of diet for children, and adds that on one occasion his proposal to use it drew a smile of astonishment from one of the women who were present. He gives numerous arguments, however, in favor of its employment. He says that, as we all know, it is very nutritious, being "the quintessence of milk," that the bacteria in which it abounds are not all pathogenic, that it contains ferments which promote digestion, and, indeed, that it is to some extent predigested milk. Whatever we may think of these arguments and of the *régime sec* theory, we must admit that M. Gallois has adduced some clinical evidence of good results having followed the use of cheese in the diarrhoeal diseases of infants. One might well hesitate to give ordinary solid cheese

to babies, but some of the finer cream cheeses may probably be used cautiously with a certain amount of confidence.

Incidentally, M. Gallois tells us that he has employed with satisfaction a mixture of butter and cheese as a substitute for meat in the diet of persons suffering with Bright's disease. In such cases, we presume, a solid cheese might be quite as acceptable as cream cheese, and its use is no novelty. A mixture of butter and almost any good cheese is palatable and highly nutritious, and we should think it might be preferred by many patients to skimmed milk and some of the other substitutes for meat. Many kinds of cheese are constipating to certain individuals, but doubtless it is quite practicable to correct this action; indeed, it often abates if the use of cheese is persisted in.—*New York Medical Journal*.

SURGICAL HINTS.

In operations for uterine fibroids special attention should be given to the heart during anesthesia, owing to the frequent presence of organic cardiac disease in these cases.

The presence of phimosis in children is a common cause of erections, but if they occur in the absence of this condition it is well to bear in mind the possibility of their being due to gravel or vesical calculus.

When purgatives are required after laparotomies salines usually serve the purpose best, while calomel sometimes acts as an irritant and increases fecal obstruction by producing a spasmodic condition of the bowel.

The occurrence of epididymitis in the course of gonorrhoea usually points to the involvement of the posterior urethra, prostate, or bladder, and it is a curious fact that the characteristic symptoms of disease of these parts begin to subside as soon as the epididymis is attacked.

While the pessary has been generally discarded by gynecologists for the treatment of many of the conditions in which it was formerly held in high esteem, it still serves an undoubted good purpose in cases of retrodeviations during the early months of pregnancy, where the support afforded by its use prevents many pressure disturbances by the uterus and facilitates the ascent of the organ.—*International Journal of Surgery*.

Acidum Picricum.

In a comprehensive monograph on picric acid and its therapeutic application, as hitherto practised in diseases of the skin and sexual organs, O. Meyer reports on the experience which has resulted from the application of the acid at the Strassburg Skin Hospital in acute, chronic, weeping, seborrhoeic, and impetiginous eczema. It was employed for the treatment of eczema of the hands in the form of hot local baths containing 0.5—1% of picric acid, also as a 0.5—1% addition to ordinary zinc starch paste or to a mixture of zinc stearate and paraffinum liquidum, in exceptional cases also in conjunction with vaseline-lanoline ointments. Whilst Meyer admits that before instituting the picric acid treatment it is necessary to make sure that the digestion is sound and the kidneys intact, he does not, like some other writers, regard the picric acid ointments as liable to give rise to general symptoms of intoxication, since he was unable to instance a single case to support this view. On the other hand, the acid is in an eminent degree endowed with the power of stimulating the formation of epidermis, which has proved beneficial both in burns and in various forms of eczema. Higher expectations should, however, not be fostered in connection with the latter, since the acid fails when once a dry epidermised surface has formed. In this case it is necessary to have recourse to another treatment, say that involving the use of tar, etc. Picric acid was at its best in seborrhoeic eczema and that of the hand, but met with the most obstinate resistance when applied to eczema of the leg, where picric acid paste, after inducing an improvement at first, gave rise to a follicular inflammation, which as a matter of fact may also occur after the use of other pastes and ointments containing no picric acid. Similar symptoms of irritation occurring in seborrhoeic patients may in Meyer's opinion be traceable to a form of idiosyncrasy.

Picric acid has proved valuable in fresh cavities resulting from radical operations where the torpidity of the tissue was the cause of a very slow formation of epidermis. Bondy dabbed in these cases the granulating surface at intervals of two or three days with a 1:10 ethereal solution of picric acid without using a tampon and ensured a rapid growth of epidermis, excepting in those cases where suppurating tubes resisted the process of healing.—*Merck's Annual Reports.*

Stypticin.

Stypticin shines among the best modern remedies as one which is practically exempt from accusations relative to unpleasant secondary properties and which does not even in excessive doses

give rise to alarming symptoms. It cannot under these circumstances surprise that so valuable a hæmostatic, since its introduction ten years ago, figures now as an indispensable remedy. From the literature of the last year it may suffice to briefly review some comments.

Isenburg secured excellent results by the internal administration of stypticine in purely climacteric hæmorrhage, menorrhagia arising from defective involution after parturition or miscarriage, profuse menstrual bleeding, grave cases of hæmoptysis and hæmaturia. He employed doses up to 0.3 grm. (= 6 tablets) per day.

The excellent action of stypticin in uterine hæmorrhage is confirmed by Zoppeli, Boldt and Chase. Zoppeli employed it also with advantage prophylactically in uterine curetting as a means of preventing hæmorrhage. According to his experience it surpasses the older customary hæmostatics, such as *secale cornutum*, ergotin, gallic acid, hydrastinin *hamamelis* and adrenalin, since it is not so toxic as some of these and, in addition, endowed with anodyne properties so as to exercise a beneficial influence upon the pains which frequently accompany various forms of hæmorrhage, dysmenorrhœa, etc. Even prolonged use does not entail inconveniences. Zoppeli has even found its efficacy to rise under these circumstances, the hæmorrhage diminishing in duration and intensity.

In cases of hæmorrhage after miscarriage, where curetting appears inadvisable the latter may be averted by a combined use of stypticin and hydrastinin.

Chase gives the following formula for this purpose:

Rp. Hydrastinin. hydrochlor.	0.06 grm. (gr. 1)
Stypticin	0.36 grm. (gr. 5½)
Syrupi rubi idæi	7.5 grm. (gr. 125)
Elixir. simpl. q. s. ad.	30.0 grm. (oz. 1)
1 teaspoonful to be given every 2 or 3 hours.	

The combination of stypticin and hydrastinin has the advantage that the properties of the two media are mutually complementary, the former being enduring, the latter prompt in action. Stypticin and hydrastinin may also be applied subcutaneously in case a prompt action should be desired.

The application of stypticin in dental surgery is commented on by Levy and Klein. It effectually stops bleeding and after-bleeding, when applied in a suitable manner to the bleeding part in the form of a powder, gauze or wadding. It may also be administered internally in cases where extraction of teeth are

found to regularly give rise to violent bleeding. In cases of this kind Klein prescribed 3 days before the operation in the morning and evening 0.05 grm. (gr. 5/6) stypticin and found this treatment to keep the hæmorrhage within bounds.—*Merck's Annual Reports*.

Artificial Nauheim Baths in Chronic Heart Disease.

P. K. Brown states that the cases particularly fitted for Nauheim treatment are those in which the heart muscle acts insufficiently either from dilatation, poor blood supply due to anemia, or arteriosclerosis with changes in the muscle, acute or chronic, tobacco poisoning, and moderate fatty changes. Twelve clinical histories are given. Concerning the use of resisted movements in connection with the baths, the author states that he does not consider them essential, and they are not in his view as lasting in their effects as is the bath. They are often very tiresome to the patient, and are in bad cases actually dangerous unless given by someone who fully understands their purpose and makes a careful study of each individual case. Brown prefers to give them an hour or two before the bath; but if this is not possible, it is better to wait some hours after the bath. As regards massage in connection with treatment, he has found it of advantage when the temperature of the water was below 90° in securing a prompt reaction from the sensation of cold which patients with sensitive skins frequently have as the result of cutaneous stimulation. It is necessary that the patient be placed in a warm room and have his extremities well rubbed if there be much discomfort from the sensation of cold. The author describes in full his experience in the preparation of the artificial Nauheim salts. In his judgment the use of these salts at home under careful supervision of the physician gives just as good results as at Nauheim, and the régime is far more convenient and agreeable to the patient.—*Boston Medical and Surgical Journal*, September 13, 1906.

It remained for a Missouri man to give to the world an effective way of getting rid of mosquitoes. He says: "Rub alum on your face and hands. When the mosquito takes a bite it puckers his buzzer so it can't sting. It sits down in a damp place, tries to dig the pucker loose, catches its death of cold, and dies of pneumonia.—*Catholic Mirror*."