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Original Communications.

THE MEDICAL TREATMENT OF PERITONITIS.

By Joseph Eichberg, M. D., of Cincinnati, Ohio.

The treatment of peritonitis must necessarily be adapted to the cause, and varies greatly as we are dealing with a primary or a secondary form of the affection. Yet, in many cases, the search for the cause is neither easy nor successful; and while uncertainty on this point may exist, our duty to the patient demands prompt action. The whole history of this affection is so recent that it is rather to be marvelled at that the plan of treatment now generally adopted has been matured in so short a time, and that, if properly carried out, it will in many cases prove so successful, independent of the causal condition.

A moment's consideration of the natural function of the peritoneum will help us considerably to understand why certain measures must be used to attain a favorable issue. As a delicate, smooth investment of nearly all the important organs of the abdominal cavity, its presence greatly facilitates those constant changes of size, position, and mutual relation that result from the various phases of the digestive process; its surface, kept constantly moist by the lymph that finds its way into the cavity, is never with an excess of fluid, because of stomata, or little lymph-mouths, that readily afford exit into the lymphatic circulation of any fluid that may accumulate in undue proportions—under physiological conditions.

With the appearance of inflammation the smooth, pliant, moist covering of the abdominal viscera becomes turgid and roughened, its surface covered with a viscid rather than a liquid product, its stomata closed, its cavity filled with

the accumulated inflammatory exudations, for which there is no escape. It is now that the necessity for treatment arises. The patient, in the great majority of cases, experiences that symptom, common to many affections, of pain, and pain in a most severe and intolerable form. It is here that we have an indication both causal and symptomatic, for pain itself is prostrating, and pain will kill. The organs covered by the peritoneum are richly supplied with nervous connections, and through these they influence by reflex action the heart and circulation. We know the sudden, it may be fatal, collapse that follows a severe blow or injury upon the abdomen, and it is not difficult to believe that an irritation of less intensity and longer duration would bring about similar results. The pain in peritonitis is continuous, exaggerated by every movement, by every breath; it excludes every other consideration, and prevents sleep and needed rest. It is here that opium comes to our aid—the sheet anchor, as it has been called, in peritonitis, the splint to the wounded peritoneum. I speak now of cases of acute diffuse peritonitis, the cases that are commonly met with.

It has seemed singular to me, after all that has been written and spoken upon this subject, that it should so frequently be necessary to encourage physicians to a more ready resort to this agent. It would seem that the proper amount of attention has not been given to the teachings of Alonzo Clark, who has summed up his own therapeutic experience of more than fifty years in the article upon this subject in Pepper's *System of Medicine*. Why it is that where such obvious indications for a remedy exist, so many medical men manifest an ill-founded timidity I cannot understand. Assuredly, it cannot be the fault of their teaching; and if they only dared to use it properly, their first experience with

opium in peritonitis would soon give them the needed confidence to do right by their patients. I feel very strongly upon this point, because it has happened to me to see several cases that made a lasting and very unfavorable impression. In one of these, a case of puerperal peritonitis is seen in consultation not long ago, the patient had been receiving for six days—mark it well—an average of one-fourth of a grain of morphine daily. She had not slept one hour in all that time, and, it is almost needless to say, she died. In another case of acute peritonitis in a boy of fourteen years, I was assured by the attending physician that he gave a hypodermic injection of an eighth of a grain of morphine as often as he thought necessary—as though it were not necessary every half-hour!

The average medical graduate leaves college with the carefully-acquired information that the dose of opium is from one fourth to one-half a grain, every three or four hours, but that there are marked idiosyncrasies, and that its administration must be anxiously watched. He will, accordingly, treat his case of peritonitis on this plan, constantly feeling uneasy lest in his absence the patient develop narcotism. Finding that no symptoms of poisoning develop he will rest satisfied that he has done the full measure of his duty, and will repeat the small dose every three or four hours in his next case.

It is no imaginary picture that I am drawing; it is what I myself have seen; and it is time that the profession learned to regard this timorous, faint-hearted misuse of opium, deceiving alike to the practitioner and the patient, as malpractice; as criminal as the neglect to recognize a fracture, and place it in a suitable dressing. It has been said that there is no dose of opium for pain. This may be extended, and it may be as truthfully said that the smallest suitable dose of opium in peritonitis is that which will promptly carry the patient to the limits of narcotism, and that the frequency for its repetition is to be determined solely by the degree of narcotism. It is not conscientious regard for the patient's life that prevents the physician from following this plan. It is his own lack of courage which sacrifices the patient.

I am fully aware of arguments that have been advanced in answer to Dr. Clark's report of the case, who, at the height of the attack, received for six days the equivalent of from 421 to 467 grains of opium every twenty-four hours. It is said that of all this large amount but the smallest fraction was absorbed; that to get the proper dose it should be given hypodermically, etc. Supposing it was necessary to give 467 grains to obtain absorption for the amount required to cure the patient, then 467 grains was the proper dose in that case. Hypodermic medication, is unnecessary, as morphine can easily be given in concentrated solution by the mouth, and most of it will be absorbed before it enters the stomach,

to say nothing of the intestines. The basis of some of the opposition is, that in the inflamed condition of the peritoneum, the mesentery and its contained vessels, and the intestines and their lacteals, are unable to perform their physiological duty. The full measure of their physiological duty, we will admit, but certainly not a large fraction of it, else how could nutrition be maintained!

A word more as to the opium treatment. To secure its best effect it must be given early. It has for some time been my rule in every case commencing with fever, prostration, and an acute, localized, continuous pain, to begin the treatment at once with opium or morphine, without regard to the possibility of existing constipation. Should the painful symptoms subside in the course of a day or two the bowels may be opened by a mild saline cathartic, or, by what seems preferable me, repeated minute doses of calomel; but opium first, and all the time, until convinced that peritonitis, in its diffuse form, has not developed. Little attention need be paid to the bowels at the start. Clark says that he has allowed patients to go for fourteen days without a stool.

The use of opium does not always prevent the regular evacuations, and I have seen a patient who had one movement daily during the entire course of his disease, though for two weeks he was receiving half a grain of morphine every hour, and, doubtless, many similar instances could be narrated. These cases should be regarded as exceptional, since the effect of the opium, as usually observed, is to retard greatly, if it does not wholly arrest, intestinal movements. By diminishing the frequency of respiration, the opium tends to eliminate another source of pain, as well as to prevent that rapid spread of the disease which the constant attrition of diseased against healthy portions of the peritoneum will almost surely entail. Upon the circulation, too, the action of the opium must be regarded as largely beneficial. The slowing of the heart-beats with the rise in arterial tension following its use, are ample testimony that, if properly controlled, it is a cardiac tonic. We obtain this result at once, but it is necessary to carry the patient beyond this point, and to induce a sedative action on the circulation.

How are we to judge of the proper degree of narcotism, seeing that it is easy to carry the patient beyond the desired point, especially while employing such large doses? Not by the relief of pain, for this result may be attained early; nor by the contracted pupil, which also shows itself after very moderate doses. The index of the proper degree of narcotism is furnished by the respiration, the pulse, the continual drowsiness of the patient, and the partial relaxation of the abdominal wall. The frequency of the respirations, increased by the embarrassment of the abdominal movements, should be

brought down to twelve or ten per minute, and maintained at this rate as long as the symptoms persist; should it fall below this limit, the interval between two successive doses can be lengthened. The pulse of peritonitis is hard and wiry; under the influence of these full doses of opium it becomes slow, soft, and compressible. The drowsiness of the patient is a symptom that should be watched by the physician himself, and not trusted to either nurse or attendant. It should be a drowsiness from which the patient can be readily roused, and should never be allowed to become a stupor. It is well in connection with this, to bear in mind that the maximum effect of any dose of opium or its derivatives is not obtained until three hours after administration—a safe criterion in deciding the frequency of repetition of our doses. With the patient fairly narcotized, there is slight relaxation of the abdominal muscles, the tympanites becomes less, with corresponding relief from the feeling of tension.

One effect incidental to the use of opium remains to be mentioned, and that is, its influence upon the secretions. It diminishes the saliva and the urine promptly and decidedly; it slightly increases the amount of the perspiration, and thus may aid in counteracting an excessive elevation of temperature. With regard to its use in peritonitis Brunton says that "Opium, by its action on the peripheral terminations of vaso-motor nerves, will prevent or diminish the reflex dilatation of the vessels, which the local irritation would otherwise produce; congestion will thus be diminished, and inflammation will be relieved." The action of opium in peritonitis is, therefore, probably twofold: First, it lessens peristaltic movements of the intestines, and thus diminishes local irritation; secondly, it lessens reflex activity of the centres through which local irritation causes dilatation of the vessels, and thus it diminishes peritoneal congestion.

The unpleasant effect of opium and its derivatives upon the secretions has led me to combine with it minute doses of a drug at one time very generally used in the management of this disease, but latterly decried on all sides: I refer to a salt of mercury, the mild chloride being the form commonly employed. The physiological effects of mercury and its salts upon the saliva and the urine are directly antagonistic to that of opium, both of these secretions being increased by its use. By combining with our opiate a small quantity of calomel we are frequently enabled to avoid the furred tongue, the dry lips, the pasty and unpleasant taste in the mouth, that so frequently attend the employment of large doses of opium. Nor need there be much fear of ptyalism when the two drugs are combined, as each in a measure counteracts the effects of the other. It is certain that mercury is tolerated better and for a longer time when combined with opium than when given alone.

Upon the urinary secretion the action of the mercurous salt is no less welcome. With the diminution of the secretion and the blunting of sensibility in the bladder, and with the impairment of muscular strength in the wall of this organ from the existing inflammation of its outer tunic, the expulsion of the urine is often effected with the greatest difficulty; at times, indeed, it becomes impossible. It is in relieving these symptoms that calomel often assists, especially when combined with digitalis in small doses.

It seems to me that calomel has yet another virtue that entitles it to particular consideration here, namely, its action upon the intestine and intestinal contents. It cannot longer be gainsaid that mercury and its salts in physiological doses act as cholagogues. As Brunton says in his admirable work upon pharmacology, "The real action of mercury as a cholagogue consists, not in its stimulating the liver to form more bile, but in removing more readily from the body the bile which is already present in excess." It appears to perform the function by stimulating the upper part of the small intestine, and thus causing the evacuation of the bile before time has been allowed for its reabsorption. The reasons for this supposition are: (1) That mercury is so beneficial in bilious disorders; (2) that it does cause the appearance of bile in the stools, for Buchheim has proved by analysis that the green stools which occur after purgation by calomel owe their color to bile; and (3) that in the stools passed after mercurial purgatives, leucin and tyrosin, the products of pancreatic digestion, have been found.

Now we know that one office of the bile is to promote peristalsis. If we can assist in regularly transmitting to the lower part of the intestine some of this fluid we counteract by just so much the obstinate constipation that, if too long continued, may in itself constitute a menace to the patient suffering from acute peritonitis. Bile also has a tendency to prevent decomposition of the residual alimentary mass, and it is assisted in this by the presence of mercury, which acts as a disinfectant of the intestinal contents. In peritonitis this tendency to decomposition is greatly assisted by the sluggish movement or inaction of the bowel, by the temporarily increased local temperature, and by the presence of a large amount of inflammatory fluid, and any remedy which can counteract this tendency is useful.

It has been my practice to combine one-tenth of a grain of calomel with each half-grain of morphine, and to continue the administration of both drugs until the bowels are easily moved. This result is generally obtained on the fourth or fifth day, when several stools are apt to follow in quick succession. Should the tendency to diarrhoea become annoying, the calomel is discontinued and the patient given a little of Hope's camphor mixture.

The only contraindication for the use of opium

may be furnished by the condition of the kidneys. Chronic interstitial nephritis, so insidious in its onset that the patient himself has never received any warning of its presence, is very apt to be revealed by the excessive effect of a single moderate dose of an opiate. The tendency to uræmia seems to be favored, if manifested before, or even to be developed, when not previously indicated, by the use of opium. Even in peritonitis, where there usually exists so remarkable a tolerance for this drug, the ill effects have not been wanting; so that patients suffering from peritonitis, occurring in the course of chronic Bright's disease, have quickly passed into a state of uræmic coma, with no symptoms of narcotism, and have died comatose, without rallying from the first attack.

My preference for morphine has always been strong, and I am in the habit of giving it in the form of a standard solution in cherry-laurel water, one grain to the drachm. Of this solution a sixth, fourth, third, or half can easily be given, and the cherry-laurel water acts in part as a gastric sedative, preventing the tendency to vomit which morphine produces in some patients. Where this tendency nevertheless exists I have given the morphine by suppositories or have substituted codeine, which must be given in doses four times greater than those of morphine, but is easy to administer, and little likely to produce gastric derangement.

With symptoms that from the beginning are chiefly local, it is but natural that local measures should have early occupied a prominent place in treatment. The local application of leeches, the use of blisters and other powerful counter-irritants have had their place and are now, happily, no longer relied upon. Not so with topical applications intended, by their temperature, to influence the course of the inflammation. Cold applications, hot applications, turpentine stupes, flaxseed or other poultices have had their champions, and are still very commonly used. It is sometimes difficult to decide what form of application may be best suited to the individual case, but it is a safe rule, in every instance, to consult the comfort of the patient, and to let that influence the selection of hot or cold applications. All of these applications are open to one serious objection, namely, that they require to be constantly changed—the cold applications, lest they get too hot, the warm, lest they grow too cold; and in these frequent manipulations the tender abdomen is liable to fresh injury.

It was formerly the practice in acute peritonitis, when mercury stood high in favor as the preliminary step in all kinds of treatment, to apply freely mercurial ointment to the abdomen, the ointment being spread upon flannel or some other soft fabric and left in contact with the abdomen. In the reaction following the excessive use of mercury the drug in all its forms was practically banished from the materia medi-

ca, save for a few specific purposes, and this use of it in peritonitis was banished with the rest. But the pendulum has swung a little too far in the other direction, and, I think, we must again return to many of the things that were found useful by our fathers in medicine. For the last three years every case that has come under my care, in hospital or private practice, has been treated by the free application of mercurial ointment over the whole abdomen. It has promptly relieved the feeling of rigidity and painful distention; the immediate effect has been cooling and pleasant to the patients and the tympanites has subsided as quickly as after any other local application. It constitutes a dressing that easily adapts itself to the shape of the abdomen; it does not annoy by its weight; there is no wetting of the bedclothes, and the patient is not disturbed for its frequent removal, the ointment being renewed but twice in twenty-four hours. In all of these particulars it possesses decided advantages over other local applications. The mercury is evidently absorbed very slowly, for I have yet to see a case of ptyalism from its use; and in many instances it has remained in contact with the skin for two or three weeks.

Of the individual symptoms but two require especial mention in connection with the treatment, namely, the vomiting and tympanites. The former, which frequently ushers in the whole train of symptoms, is often so severe at the outset as to suggest intestinal obstruction; yet it is promptly controlled, as a rule, by large doses of opium. When occurring later in the disease, cracked ice taken freely into the mouth, small quantities of iced champagne, alone or in combination with aromatic spirit of ammonia, or half-drop doses of creasote in emulsion of sweet almonds, usually succeeds in controlling the trouble. Champagne has the advantage of being a stimulant and at the same time a gastric sedative; it is readily taken by children as well as by adults, and its use can be continued through the entire course of the disease.

Tympanites is always present to a greater or less degree but rarely, except in peritonitis of septic origin, and especially in those forms incident to the puerperal period, does it become excessive. The abdominal distention may, however, attain such proportions that the upward pressure of the diaphragm becomes a dangerous impediment to the circulation and respiration, and calls for immediate relief. A rectal tube carried high into the bowel, and left there, may accomplish all that is necessary; but this result cannot be confidently expected, since the gaseous distention is found mainly in the small intestine. Under these circumstances it has been recommended to puncture the bowel with a hypodermic or aspirator needle through the abdominal wall. I cannot regard such a plan at wholly devoid of danger, and should resort to it

only in extreme cases, selecting a needle of the smallest calibre to be found. It is true that puncturing a healthy bowel is a matter of very little moment, since the muscular layer quickly contracts about the minute orifice, thus preventing the escape of liquid or gaseous intestinal contents; not so when puncture becomes necessary as a curative measure. Is not the tympanites itself evidence of paralysis, or great loss of tone of the bowel; and would not the increased pressure within the intestine tend to favor the escape of some of the intestinal contents as soon as the needle is withdrawn? Such considerations call for the exercise of the greatest care and discrimination with regard to this step.

The diet should be liquid, easily assimilated, and of a kind likely to leave but little residue. Some form of peptones, or peptonoids, now readily obtained, or, if need be, prepared by artificial digestion, constitutes at once a palatable drink and a food. A little alcoholic stimulant, brandy or whiskey, may be added from the first, and will help to sustain the patient. There should be plenty of fresh air, with a limited number of attendants. Above all I would enforce rest and quiet; and the constant stream of visitors that besets so many a sick-room is to be wholly interdicted.

I have made no reference to surgical measures, because I have been here dealing with what is known as acute idiopathic peritonitis, and surgical treatment is never called for in this disease, unless the case ends in abscess or diffuse suppuration. But with prompt resort to the treatment as here outlined such a termination is unlikely; and even in many of the secondary forms, occasioned by typhlitis or perityphlitis this treatment will obviate the necessity for an operation, which, however brilliant its results, is yet a very grave step for the patient, and not to be undertaken rashly. Despite the almost reckless manner in which the peritoneum is now treated by surgeons, we have the opinion of so brilliant and renowned an operator as Schede, advising against surgical intervention in peritonitis, simple or acute, and in perityphlitis during the height of the process, unless it can be pretty clearly shown in the latter case that perforation and a distinct tendency to sacculation exist.

The treatment of chronic peritonitis need occupy us but briefly. It may, indeed, well be questioned if such a disease as chronic peritonitis ever occurs, excepting that due to tubercular or cancerous infiltration. In both of these conditions supporting treatment, fresh air, good hygienic measures, and, in case of tubercular disease, the selection of a suitable climate, indicate the extent of the physician's power.

In cases of tubercular or cancerous peritonitis it frequently becomes necessary to interfere, by surgical means, owing to great distention of the abdominal walls by fluid effusion. The operation of tapping is the classic remedy for this

condition, but abdominal section, in the tubercular variety, seems to promise better results, as by means of it some cases have been cured. It is a question for pathologists whether these cases have really been tubercular in character, or whether the miliary nodules may not have been of the character of the tumors described as endothelioma, of which the peritoneum is the most frequent seat. At all events, we have not had records of every case successfully treated by incision, in which an autopsy subsequently revealed the return of the affection, nor can we understand from carefully-acquired knowledge of the life and habits of the tubercle bacillus how the mere exposure to the air for a few moments, and the contact with a warm solution of boric acid or plain boiled water, should permanently alter the conditions upon which its vitality depends. This question trenches, however, on the surgical aspects of the disease.

I am well aware that there can be no claim of novelty in the treatment here outlined, but it is sometimes desirable to burnish our old silver, and let the treasure appear in its true light.—*Philadelphia Med. News.*

Correspondence.

OUR BERLIN LETTER.

BERLIN, 27th Dec., 1890.

(From our own Correspondent.)

Editor CANADA MEDICAL RECORD.

DEAR EDITOR,—As promised in my last letter I now beg to furnish some account of work done with Koch remedy at Charité Hospital in the clinics of Von Bergman, Gerhardt, Leu, Rosenthal, &c., as well as at other hospitals, where good work has been done. The worst case of lupus treated here is the following: Jager, æt. 28, man of good physique and good family history, suffered from lupus for many years. On entering hospital the diseased tissue extended over both cheeks as high as malar bones, and outwards some two inches beyond angles of each jaw, downwards over lips, chin and neck to pomum Adami. Nose eaten away to bony septum and lupoid tissue extending upward over remaining nasal structure to lower border frontal bone; in fact, the face presented was a suppurating, ulcerating, putrid mass, emitting such a horrible odor as to make his presence in the ward unsupportable had it not been for the aid of antiseptics and deodorants. Treatment by Koch's lymph alone was begun on 9th December last by injection of 1 centigram. Reaction followed in five hours with T. of 103, P. 112. Three days after, on repeating the same dose, about similar results followed, and this happened until the

5th dose was given, when instead of fever following a sub-normal T. was caused. By increasing dose one-half a normal T. was reached, again on giving double original dose, viz., 0.02, T. became subnormal. This was on 23rd December, and the Christmas holidays interfering the patient received no further treatment until 29th December, when 0.03 c.c. were given without reaction. At this time, in spite of the intermission of about a week in treatment, the appearance of this patient was so remarkable in contrast to his condition on entering that one could not be otherwise than delighted at the wonderfully good effect produced. The last time I saw and talked with this man, only a number of isolated nodules of ulceration remained, and I know from experience in less aggravated cases that a week or two more would leave his face smooth and practically healed. In the same ward of the "Charité" another case was quite cured where the nose was half gone, while the face, hand and arm had been badly affected, there remaining only the smooth dark blue cicatricial surface where formerly for twelve years a distressing condition existed. In private talks with these patients they assured me that for the chance of attaining such good results they would be willing to undergo the worst phases of reaction and all its attending unpleasantnesses. Are not these results that call forth one's admiration? Suppose we admit that a recurrence of this disease is possible, even probable, and up to the present time no evidence is afforded to support such a conclusion, look at these patients to-day who have undergone years of misery of the most trying kind both to themselves and relatives. They would give their right hands for such relief as has already been afforded, and I would only add briefly that my conviction is the relief afforded by this remedy, even in reference to the disease of lupus alone, is worthy the highest praise we can bestow upon it.

The scope of this letter will not permit me to furnish one fractional part of the evidence collected in proof of the efficacy of the lymph, while a comparatively short account would contain most of the evidence against its use.

In *tuberculosis* of the lungs it is already established that far from being applicable to every case of this disease it is decidedly injurious and hastens the end in greatly advanced cases, with large cavities; on the other hand, both London and Berlin afford us abundant proof that in selected cases it is remarkably beneficial. My notes show that in many instances where moist rales and other evidences of tubercular deposit existed in both apices, extending over both back and front of chest with the usual accompanying signs of progressing tubercular disease such as cough, expectoration, night-sweating, emaciation, loss of appetite, dull percussion, etc., these conditions have been changed remarkably, and in a shorter time than

any other remedy was ever known to afford. This change meant briefly a decreased expectoration and lessened cough, cessation of sweating, gain of weight and good appetite. A clearing up of the moist rales with clear percussion, and instead of bronchial breathing a more vesicular murmur. Although an increase of the bacilli occurs after the first injections this passes off in most instances as the case progresses and few or none are discoverable later.

One case I saw in Charité Hospital where phth. pulmon. developed after typhoid fever, and patient gained, when this treatment was begun, just 13 lbs. in two weeks; this was looked on as phenomenal it is true, but he continued to gain steadily though more slowly in the following weeks, during which I saw him. His cough had quite left him, and although looking pale and anæmic he assured me he felt about as well as ever, and hoped soon to go home. At a recent meeting of Berlin Medical Society, Dr. Frenkel read records of the encouraging results in general improvements, a general diminution of dullness over the infiltrated areas, and in many cases a prospect of cure by Koch's remedy. Up to the time I left Berlin few cases had yet been discharged as cured from the hospitals. I had the good fortune to see one case of a youth, aged 18, who was treated in Dr. Cornet's private clinic, and who had the day I saw him received his last injection previous to being sent home. The lymph had ceased to affect him although at first the reactions were marked. He said that his trouble began three years previously, and although his symptoms were not of an aggravated kind his case was quite pronounced. He improved under treatment rapidly, so that eight weeks later he was allowed to return home with instructions to report in a month for another test injection. In his case I could not conveniently ascertain the action of the bacilli under treatment. Weight, strength and appetite were restored satisfactorily in every way. Cases of incipient phthisis it is considered take five to six weeks, and bad cases three to four months for satisfactory treatment. On the other hand, a young woman in Dr. Kranske's clinic told me that she was worse after six weeks of Koch's remedy and intended going home next day. A young man in a different ward of the same clinic expressed himself in the same terms. These were both cases with good-sized cavities, and the attending physicians were rather hopeless regarding them. I remember another case in London: said that he never had night sweats until beginning this treatment, and blamed it accordingly; and so from time to time one would meet occasional cases which discouraged treatment, but these were certainly the small minority. In advanced cases no good can be looked for with any confidence. Distinct contra-indications for the Koch treatment are great loss of strength, amyloid; or other degen-

eration of tissue, albumen, urea and cardiac complications of a serious nature. Koch does not regard slight heart disease as an obstacle, the pulse being increased long before the rise of T. I have seen hæmoptysis caused by the lymph in several instances, but after waiting three or four days, and no further indications, treatment was resumed without bad effect.

In Hamburg the treatment of tubercle was carried on effectively at the large general hospital there, and the results were most encouraging. All conditions and stages of phthisis pulmon. were treated, consequently ill effects presented themselves as well as good. In cases that were not too far advanced the patients showed unmistakable signs of benefit. At first the effect of reaction was loss in weight and strength, but that was very temporary, for a permanent gain in strength and flesh generally followed, with a relish and desire for food previously unknown. Owing to the fact that the good effects of this remedy are mostly confined to cases of the early stages of consumption, and to the fact that many cases in this condition when removed from the hardships of their every day life to where they are warmly housed and abundantly fed with what is wholesome and nourishing, frequently improve, it has been asserted that the effect of Koch's lymph is really secondary to the effect of the improved hygienic surroundings. Against that assertion we have emphatic statements from most of the leading medical men of our generation in praise of the remedy, and these men are well known to give stint praise where it is not merited. I think it may safely be said that this remedy to be successfully handled calls for a more accurate estimate of the patient's physical condition than any other known means of cure, and several days careful observation of the patient's condition are a necessary preliminary to treatment; a rule that is without exception. Then the continuance of this strict observation during reaction is as called for as the treatment itself, and this work must be carried out by competent trained assistants in order that every detail in the progress of the case may be noted. When as in this treatment the temperature has to be taken every two hours it would be unwise to trust to the assistance of a patient's relatives as a rule.

In local tuberculosis the results are regarded as generally beneficial. As in lung tubercle, so it is here foolish to look for markedly good results in every case treated. We are fairly well able now, however, to indicate from experience thus far afforded what kind of cases are most amenable to this treatment. In cases of chronic enlargements of joints I have seen after the subsidence of reaction a decided diminution of the morbid material, but surgery must still hold its own in such cases, and the necrotic material removed by drainage or otherwise. In chronic enlarged strumous glands remarkably good

results have been produced after two week's treatment.

Again, a case of chron. tubercular diarrhoea in the Charité Hospital, which had resisted every remedy they had given yielded in about a week to the lymph. No other remedy being employed while the lymph was given it was at least reasonable to suppose this agent effected the cure. The case progressed well subsequently under the same treatment.

In *Laryngeal tuberculosis*, I saw some excellent results without the evil effects that were dreaded so much at first when it was known the reactions were accompanied by various cedematous conditions. In Krause's clinic some interesting throat cases were treated with good effect. One instance in this clinic, where both laryngeal and lung tubercle were well developed, I would like to bring to your notice briefly. Wende, æt. 38, fair complexion, medium height, good family history, merchant, had symptoms of lung and throat trouble two years. On entering hospital the records show that he had severe cough with purulent sputum, smothered breathing, moist rales and dull percussion extending from apices of both lungs as far as fourth intercostal space; on left side a subclavicular cavity was found. Body shows general emaciation, and night-sweating was troublesome. Voice very hoarse, and throat showed a chronic laryngitis, with infiltration of left vocal cord, presence of bacilli in considerable amount demonstrated. Patient given full diet and put on lymph treatment by injection of 0.001 c.c. This small dose caused T. 103, P. 112. and respir. 40. This subsided but rose next day to 102° T., again becoming normal following day. Next injection given forty-eight hours after first, was increased to 0.0014 c.c., or an increase of about half a milligram. This gave sharp reaction, T. rising to 104° F. in about six hours, then dropping to normal, and next day rising to 103° and subsiding. The doses were gradually increased until in six weeks he was receiving 0.075 c.c. Results: night sweats arrested, laryngitis cured, improved percussion, diminished rales, patient claims to be greatly better and as cheerful as possible regarding his condition, cough much less, sputum less purulent and less in amount; formerly could not lie on right side, now comfortable in any position. The hoarseness was still marked but the generally improved condition of this patient was not only most gratifying to himself but satisfactory to his physician, for the case gave promise of best results even in the presence of fairly well advanced disease. In taking this patient's private address he promised to write me in a couple of months regarding his condition, for he was quite sanguine that about three months of the same treatment would enable him to work again and return home.

Diagnostic value of the Lymph. Although the remedy has been shown to be most insidious

in attaching itself to tubercular tissue generally this quality has been proved by no means invariable, for records are given where no reaction took place in the presence of undoubted pulmonary tubercle after injection of from 1 to 10 milligrams. Again fatal result has followed in some few instances from a minimum dose, where the case was supposed to be incipient phthisis but where the autopsy revealed unsuspected deep-seated cavities. Of the half dozen post-mortems witnessed by me in Europe after this treatment in every case the condition of the lungs was found to be such as would not warrant us giving the remedy in our present knowledge of its effects. In every case the tissues were either permeated generally by large tubercular deposits, some caseous, others softened into areas of pus, or the presence of cavities large and small have determined the fatal issue. Another factor very evident was the frequency in these cases of great emaciation and debility, such as would deter a cautious man from applying so powerful a remedy in even the smallest doses. The intravenous method of injecting the lymph as tried by Barcille in Italy, and which produced reaction when the hypodermic method failed, has not been done to any extent in Berlin, London, or Paris. As bearing on diagnostic value I will furnish the outline of a case treated in in Berlin. It was believed by the hospital surgeons to be cancer of soft palate, pharynx and tonsils. An injection was given experimentally with no expectation of reaction, but contrary to the accepted views a severe reaction followed. The affected parts within sight became swollen and quite red from congestion. In two days a sloughing condition presented itself over same surface which sloughs were in time expectorated, leaving red glazed patches behind, and in two weeks the throat was practically healed, while patient's health generally was greatly restored.

The latest phase of the Koch treatment is carried out at the hospital in Moabit, a suburb of Berlin. I refer to a few cases where resection of the ribs has been done to permit of cleansing out lung cavities, cauterizing these cavities, and local application of lymph thereto. Prof. Sonnenburg, who has the surgical wards in the Moabit hospitals, gives an elaborate account of these operations in the last *Deutsche Medicinische Wochenschrift* and their results, which are certainly satisfactory up to the present time. For the technique of the operation and the details of the work I would refer those interested to that journal. The surgical skill combined with the precision in medical diagnosis demanded by such operations precludes procedure of this kind outside of large hospital centres, but the Koch treatment outside of this phase of it can be creditably undertaken by the general practitioner who will assume the labor of clinical experience which alone can qualify him.

G. T. ROSS.

Society Proceedings.

MEDICO-CHIRURGICAL SOCIETY OF MONTREAL.

Stated Meeting, November 7th, 1890.

F. J. SHEPHERD, M. D., PRESIDENT, IN THE CHAIR.

Drs. Muirhead and Thompson were elected members of the Society.

Syphilitic Osteitis.—Dr. Johnston exhibited specimens of severe condensing osteitis of the skull-cap and tibia, due to syphilis. From the same case, several black pigmental plaques were found situated in the pharynx on the left side, at the level of the glottis. The mucosa was thickened and deeply pigmented; the submucosa beneath was white, dense and very firm. There was no evidence of scarring or ulceration in the neighborhood. This condition was possibly due also to syphilis.

Severe Syphilitic Ulceration of the Rectum leading to Perityphlitis.—Dr. Johnston showed to the Society, from the same case, this very interesting specimen.

Dr. Shepherd, referring to the above specimens, dwelt upon the interest of a case with such widespread lesions, and the possible beneficial results that might have been obtained from antisyphilitic treatment; alluding to the perityphlitis, it was his opinion that an operation would have been justifiable if suppuration had occurred.

Chronic Gastric Ulcer, Perforation and Fatal Peritonitis.—Dr. Reddy related the clinical history of the case. The patient, a girl of 20, was acting as wet nurse when she first consulted him a few months ago. She then had symptoms of indigestion, for which pepsin was given. Two days later she felt well, and remained so for the following twelve days. When, apparently, after undue exposure to cold, she was seized with severe abdominal pain, and soon developed all the symptoms of an acute peritonitis. Salines were given and hot stupes applied. The pain was relieved, and for some hours the patient appeared much better; when she complained of slight pain in the left hypochondrium, vomited once, and suddenly died, thirty-six hours from the onset of her illness. Dr. Reddy remarked that at no time, during the illness, were there any symptoms pointing to the primary disease. He had since found out that the patient had been under treatment a year ago in the Montreal General Hospital for gastric ulcer. Dwelling upon the obscure symptoms of many of these cases of ulcer of the stomach, he mentioned the case, which had come under his notice, of a nurse who had died suddenly without ever evincing any signs indicating the lesion of the stomach.

Dr. Johnston exhibited, for Dr. Reddy, the stomach, which showed a small perforation in the base of a chronic gastric ulcer. The ulcer was one-half by one-quarter of an inch, situated posteriorly on the lesser curvature, midway between the pylorus and the fundus. About the ulcer were distinct, radiating fibrous bands in the submucosa. There was general acute purulent peritonitis with very marked cloudy swelling of the liver, kidneys and heart, the latter being probably the cause of the very sudden death noticed in the case.

Discussion.—Dr. Shepherd did not think that the relief from pain which followed the administration of salines could be attributed to the action of the salines; he rather believed that it was the quiet which in many cases precedes death.

Dr. Laphorn Smith cited his and others' opinion that salines alleviated pain in acute peritonitis.

Dr. MacDonnell dwelt upon the prevailing idea of the essential union of peritonitis with pain. We were too apt to regard peritonitis as always accompanied by pain. He referred to a fatal case of appendicitis which had been under his care in the hospital. The patient had been free from pain for two days previous to his death. Had he not been deceived by this lull in the symptoms, he believed that operative interference might have proved successful. Dr. M. thought that the explanation of the disappearance of the pain which occurs in some cases of acute peritonitis might be attributed to the peritoneum becoming accustomed to the inflammation.

Submaxillary Calculus.—Dr. Hutchinson exhibited this specimen, which was about the size of a marble. The patient, a man about 45, had come to him complaining of a sore mouth and difficulty of mastication. A hard lump was felt which proved to be a calculus, around which suppuration had commenced. It was situated in the Whartonian duct.

Dr. Shepherd remarked that these cases were comparatively rare. He referred to a specimen which Dr. Hingston had shown to the Society. Dr. H. had removed it from a patient who had been sent to him as the apparent subject of malignant disease. There had been considerable swelling and suppuration.

Dr. Laphorn Smith stated that he had exhibited before the Society a calculus the size of a pigeon's egg which he had removed from the parotid gland.

Fibroma Pendulum.—Dr. England brought before the Society a middle-aged man with a tumor, pendulus and pedunculated, growing from the upper and inner part of the thigh. The tumor, in size and appearance, was not unlike the scrotum. It was eight months since it was first noticed, and was growing more rapidly

of late. Patient complained of no pain beyond the inconvenience it gave him.

Dr. Johnston would not express himself positively as to the nature of the tumor short of a microscopical examination. He mentioned cases of congenital growths which, after a period of quiescence, suddenly took on active action.

Dr. Shepherd had seen several cases somewhat similar to the one under examination. He believed it allied to fibroma molluscum, found singly or in connection with smaller growths.

Enormous Enlargement of the Liver.—Dr. R. L. MacDonnell related the history of a female patient who had been sent to his clinic at the Montreal General Hospital for advice. She was 30 years of age, married, had three children and two miscarriages. There was every appearance of good health. There had never been anæmia, jaundice, ascites, nor gastric derangements. Ever since her first child was born she has suffered from occasional attacks of pain in the right hypochondrium, with a sense of discomfort at times, but she has not been laid up in such a way as to prevent her doing housework every day. There is no history of alcohol, but syphilis is highly probable, since her husband has been a man of very dissolute habits, and she has had a purulent uterine discharge for many years. The abdomen is not distended, but the walls are remarkably flaccid. The liver can be plainly felt extending downwards to a line two inches below the umbilicus, filling up the greater part of the abdominal cavity. The outline is uniform, and the cleft between the lobes can be distinctly felt. On palpation, the enlargement is uniformly dense and resisting. There is no fluctuation and the surface is quite smooth. The area of hepatic dulness in the right mammary line extends from the third rib to a line two inches below the umbilicus, and measures thirteen inches and a half. In the axillary line the liver extends as high as the 6th rib, and the dorsal line, its upper limit, is as high as the 9th rib. No splenic enlargement was discovered. Examination of the urine afforded negative evidence of disease. Dr. MacDonnell remarked that this was the largest liver he had ever measured, and that he thought it was larger than any on record. There were several noteworthy features in the case; (1) the excellent condition of the patient's health; (2) the absence of evidence of implication of the kidney or of the spleen was against the diagnosis of waxy disease; but still, it would be impossible to imagine a liver corresponding to a greater extent with every detail of the classical description of waxy disease. Moreover, there was fair evidence of a combination of two potent causes of waxy disease—chronic suppuration and syphilis. Cases are, however, on record both of cases of amyloid disease of the kidney in which no evidence was given by the urine, and of cases of amyloid disease of the liver in which the kidney was not

involved. He would make further observations of the case and report at a later date.

Typhoid fever in an Infant Eight Months Old.—Dr. F. R. England then read a paper on this case.

Stated Meeting, November 21th, 1890.

F. J. SHEPHERD, M. D., PRESIDENT, IN THE CHAIR.

Dr. J. Elder was elected a member of the Society.

Spina Bifida.—Dr. Johnston exhibited this specimen for Dr. Gurd. It was a female foetus, apparently about the 6th month. The extremities were well formed, amnion nowhere adherent. There was well-marked acrania (exencephalia) and spina bifida. In addition, there was a sharp angular curvature of the spine forwards, with moderate double lateral curvature in the lower dorsal region. The state of the nervous system could not be made out accurately, as the specimen was not received quite fresh. Recent researches by v. Recklinghausen and Klebs tended to show that the primary cellular disturbances, terminating in the production of spina bifida and rachischisis, took place at a much earlier period than had hitherto been supposed. Klebs even considered that the initial error of development was certainly to be placed as early as the time when active cellular growth was commencing in the notochord, and was even inclined to place them earlier still, at a period before the closure of the medullary canal, possibly even to abnormal arrangement of cells about the primitive groove, when the folds of the amnion were being formed. This view would materially alter the bearing of so-called maternal impression in this condition, as the impression, to be effective, must thus have occurred about the time when the first menstrual period was missed, presumably before the mother was conscious of being pregnant. A number of well preserved embryos in the early stages would be necessary to settle this question, and in order to be of real service in this way the specimens should be put in many times their volume of strong alcohol, a few hours, at the latest, after the abortion occurred, as by the end of twenty-four hours the delicate nervous structures were too far altered by decomposition to repay careful study.

Dr. Gurd said that this was an 8½ months foetus, and the second similar kind of monstrosity which this lady had given birth to. He had exhibited the first one about three years ago. It also had an encephalocele. He thought the deformity might be put down as resulting from maternal impressions, as the mother had each time, during pregnancy, visited her mother, who has been suffering from a form of insanity for about five years. Mrs. L., who had

given birth to this monster, has three well-formed, intelligent children living, one of whom was born about two years ago. This monster came with the arm presenting, but as it was felt to be so small, and as the abdomen indicated a small child, turning was not resorted to, and the case was left to nature for its delivery. The absence of a cranial vault did away with the usual difficulty of a cross-birth. The child weighed two pounds. There was an unusually large amount of amniotic fluid present.

Discussion.—Dr. Shepherd had found in many of these cases a musculus sternalis. It was absent in the present case.

Dr. F. W. Campbell did not think that in the present instance the abnormality in the development of the foetus could be attributed to maternal impressions.

Dr. Mills said that with respect to the representation in offspring of conditions in the ancestors, observation seemed to show that defects of the nervous system were especially liable to a varied or multiple manifestation. Insanity was not always insanity in the offspring but might be some other deviation from the normal, expressing itself, however, chiefly in the nervous system. And when one considered that at the outset the whole of the influence of ancestors was represented in two cells, the ovum and sperm cell, which cells, by union, segmentation, growth and development, gave rise to the whole being; and that during this the environment might be very variable, it was possible to understand even great organic differences, not to mention dynamic or functional ones. The whole brain at first was represented by but a few cells, and it seemed, possibly owing to environment, that in some cases hereditary tendencies might work out into the total absence of certain cells when there was much hindrance to normal development, and in other cases only to an imperfect functional action of cells present in the usual numbers and locality; hence a great variety of results from modifications at an early period of the history of the embryo. He could conceive this hereditary weakness of parts resulting, not in a corresponding functional defect in offspring, but in actual deficiency of parts; and that might have been the case in this monster, but, of course, it could not be demonstrated.

Rare Form of Tumor of the Kidney.—Dr. Jas. Bell then read a paper on this case.

Discussion.—Dr. Johnston believed the tumor to be of the nature of an adenoma of the kidney, and showed a series of specimens illustrating the principal forms of adenomata of the kidney.

Dr. Mills said there were three ways in which to account for the peculiar character of the contents of the cavity of the tumor. Either the fecal odor was due to the agency of bacteria that had in some way got into the sac and acted

on its contents, as they do in the intestines, and these give rise by their action to those chemical compounds responsible for what we term a faecal odor. Or the odor might be due to the absorption by the kidney (diseased one) of this body from the blood of the compound after it had passed in the blood—no doubt a normal action of the kidneys—at all events when skatol and indol were in excess. Or, again, the kidneys may normally remove from the blood bodies usually excreted in greater abundance by the intestines. The last two supposed cases were not in opposition, as both might happen together. For his own part, he had long been convinced that the excretions were much more complex than our analyses made them. If all the excretory organs were considered supplementary to one another, each possibly removing, in variable quantity, at least some of the bodies removed or manufactured from the blood, he believed the physician would have a truer and more useful view of eliminative processes. He had observed that in more than one portion of the body the secretions of parts were characterized in a way that suggested that they took on the nature of excretions that were, in some of their peculiarities, more in harmony with what was recognized commonly as the normal in those regions. He would instance the excretions of sebaceous glands and the mucous membrane of the nose, pharynx, etc. Micro-organisms might have something to do with this, but the general principles he had referred to seemed to him very inadequately recognized both by physicians and physiologists, and were of great practical importance.

Dr. Roddick had been present at the operation. It occurred to him that it was very likely that this faecal odor might have been due to the close contact of the bowel to the tumor, so that gases from the bowel reached the cavity of the tumor, or else, to the entrance of bacteria. He remarked that in many cases of abscess cavity in near neighborhood to the intestines a marked faecal odor was perceptible where there existed no apparent communication.

Dr. Smith agreed with Dr. Roddick, and believed the interchange between the bowel and the sac to be more or less osmotic.

Dr. Shepherd said that an abscess near the abdominal cavity never occurred without faecal odor.

Dr. James Bell, in replying, said that he agreed with Dr. Mills as to the probable cause of the faecal odor which, at the time of the operation, was so powerful that he thought there existed a communication with the bowel. A close examination at the post-mortem proved the contrary.

Dr. Johnston, referring to the very penetrating faecal odor, remarked that intestinal gases alone, without the presence of bacteria, could not produce it. Bacteria cut off from air usually

produce a different odor. The intestinal bacteria had entered the cavity of the tumor, and there, acting in a closed sac, had produced this very penetrating faecal odor.

The Extra-Peritoneal Treatment of the Pedicle in Abdominal Hysterectomy for Fibroids.—Dr. Laphorn Smith read a paper on this subject. Referring to those fibroids which were not amenable to Apostoli's method, and in which an operation was necessary, he urged the choice of abdominal hysterectomy, and the extra-peritoneal treatment of the stump. Dr. Price of Philadelphia, who employed this method, had had twenty-three consecutive hysterectomies without a death. The death-rate of the best operators using the intra-peritoneal method of treating the stump was as high as 50 per cent. The advantages of the extra-peritoneal method were:—

1st, The speed with which the operation could be completed, very important factor in producing a low death rate;

2nd, The absolute security against hemorrhage, which is either directly or indirectly the cause of most of the deaths by the intra-peritoneal method. It is concealed, and the patient may die from hemorrhage without the operator's knowledge, while with the extra-peritoneal method, not a drop of blood could be lost without its being seen;

3rd, Even if hemorrhage were diagnosed in the intra-peritoneal method, its arrest would necessitate a serious second operation by the operator himself. In the extra-peritoneal method, the nurse could instantly stop it by making a quarter of a turn of the serre neud;

4th, By the intra-peritoneal method, it is absolutely impossible to sew the stump in such a way as to completely arrest oozing, owing to the oedematous nature of the tissues, and to the fact that the few ounces of bloody serum left in the cavity would offer a culture field for bacteria, with the results of septic peritonitis, which he had found present in those fatal cases so treated, in which the patient had not died from concealed hemorrhage. With the extra-peritoneal method, there is little or no oozing; but what little there is, is absorbed by the dressing and removed every few hours;

5th, In either case, if adhesions have been torn, a drainage-tube must be used;

6th, The constriction of the elastic band or other means of controlling hemorrhage during the preparation of the stump for intra-peritoneal treatment, causes paralysis of the blood-vessels and sometimes death of the peritoneum. In one case he had found the whole stump sloughing. With the extra-peritoneal method, downward sloughing of the stump has sometimes occurred, but this could be avoided by taking care to exert less pressure on it with the serre neud; as a rule, far too great force is applied; only enough should be applied to barely control

the hemorrhage, the wire being gradually tightened by the nurse on the appearance of oozing;

7th, Although the extra-peritoneal method gives an enormously smaller death-rate than the intra-peritoneal method, neither is an ideal one. The only ideal method is (1) removing the tumor by abdominal section, leaving a rubber band on the stump, (2) dropping the stump into the abdominal cavity, (3) thorough disinfection of the vagina, and (4) vaginal extirpation of the stump, leaving lock forceps on the broad ligaments.

When this method is thoroughly known and practised by the best operators, the death-rate will probably fall to almost nothing. Dr. Mary A. Dickson of Brooklyn claims that she was the first to employ this method.

Dr. Bell, referring to the dangers of catgut mentioned in the course of Dr. Smith's paper, said that he used catgut when prepared by himself, and had had no occasion to regret its use. It could with proper care be properly sterilized.

Dr. Roddick thought that the rigid drainage-tube used in abdominal surgery might possibly do harm, and believed some more pliable material would be generally adopted.

Dr. Smith, in his reply, remarked that he condemned commercial catgut, but not that specially prepared by the surgeon himself.

Appendicitis.—Dr. J. H. B. Allen related the following clinical history:—Chas. B—, aged 86, consulted him about the 16th May last for intense and constant pain about the umbilicus. Patient had always enjoyed good health with the exception of an attack of colic a year ago, which lasted a few days, and was relieved by poultices and a free purge. He had first felt the pain the day before he saw Dr. A. The patient was unable to stand erect. There was no vomiting, and the bowels had moved once. On examination, there was marked tenderness in the right iliac region; no signs of tumor; pulse 66; temperature 101.2°. A quarter of a grain of morphia was given hypodermically and an enema and poultices ordered. Patient did not improve, and on the 17th the symptoms had become more aggravated. The enema had not acted, the bowels had not moved for 48 hours; vomiting had now set in, and was almost constant. Abdomen distended and tender; no dullness on percussion and no tumor felt. Temperature higher; pulse 66. Thinking an operation necessary, Dr. Shepherd was called in consultation. It was decided to give the patient a drachm of sulphate of magnesia, and operate the next morning should there be no improvement. The next day, patient's condition being improved, the operation was deferred. A large enema of soap and water, with half an ounce of turpentine, was given, which brought away a considerable amount of feces. The patient improved steadily from this out, and made a good recovery. Dr. Allen believed the case to be one

of appendicitis. The onset was sudden, with signs of obstruction and localized tenderness. There was no history of biliary calculi, and no calculi were found in the feces. The history of his illness a year previous favored the appendix. The absence of the tumor, he thought, could be explained on anatomical grounds, as shown by Dr. Ransohoff in a recent paper. The appendix being deeply seated behind the cæcum and below the mesentery of the ileum, abscess about it may continue for some time without the occurrence of a tumor. He said the writer had directed attention to another clinical feature of many cases of appendicitis, the occurrence of intestinal obstruction which this case showed very well, and was probably due to the pressure of the thickened appendix upon the ileum from below and behind.

Dr. Shepherd mentioned that many cases of catarrh of the appendix passed off without further pathological change.

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Stated Meeting, December 5th, 1890.

DR. FRANCIS J. SHEPHERD, PRESIDENT, IN THE
CHAIR.

Fibroid involving Posterior Wall of Uterus.

—Dr. George Armstrong exhibited this specimen, which he had removed from a patient aged 31, married ten years, the mother of one full-grown child. The patient had been in fair health until last January, when menstruation became profuse; she was unwell twice a month, each time lasting thirteen days. These symptoms continued until October, when she was seen by Dr. Armstrong. She was then very anæmic. Under examination, the cervix was found lacerated and the fundus somewhat enlarged. Nothing further abnormal was noticed. The cervix was then dilated and a fibroid found involving the posterior wall of the uterus, one-fifth of its surface being adherent to the uterine wall. The patient made a good recovery. Her menses were delayed, not reappearing until the 23rd November, six weeks from the date of the operation.

Submucous Fibroid.—Dr. Armstrong also showed this specimen, which he had removed from a woman aged 32, married thirteen years, sterile. Menstruation began at 12 years, which had since been regular, but scanty. When seen by Dr. Armstrong she was complaining of considerable bearing down pain and retention of urine. A large mass occupied the pelvic cavity, and the uterus was pushed up and out of the pelvis. The patient had had electrical treatment for six weeks without benefit (her weakened condition had not permitted the application of a strong current). The abdomen was opened and the tumor removed. The extra peritoneal method was adopted in the treatment of the pedicle.

Dr. Laphorn Smith referred to the advantages of the extra-peritoneal method of treating

the stump. He believed, however, the ideal operation would be removal of the tumor by abdominal section and vaginal extirpation of the stump.

Dr. Alloway, alluding to the first specimen exhibited by Dr. Armstrong, remarked that in cases of hemorrhage it was well to dilate and examine the cavity of the uterus, as the source of the hemorrhage often proceeded from growths, which, on being removed, improved all the symptoms. With regard to the operation adopted in the removal of the second specimen, he considered the treatment of the pedicle of prime importance. The danger in the use of the present method of constriction by Koeberlé's wire was sloughing above and below the constriction. The returns from this method were good, but not satisfactory. Dr. Alloway approved of the method employed by Dr. Kelly of Baltimore in hysteromyomectomy, an improvement on Schroeder's method of multiple sutures. "The abdomen is incised as usual, the tumor turned out, and a rubber ligature made to constrict the neck. The uterus is thus removed by V-shaped incisions. The raw surfaces are thus approximated by stout, buried, continuous catgut sutures, and the peritoneal edges by interrupted ones. The peritoneal sutures are left long, so that the stump can be drawn well up. The uterine arteries are then tied on each side by passing a silk ligature through the substance of the cervix, the rubber ligature is removed, and then the peritoneal surface of the stump united to the parietal peritoneum by continuous silk or catgut. No other sutures are applied, but the ligatures uniting the peritoneal edges of the stump are held by artery forceps."

Dr. Wm. Gardner had been very successful with the wire clamp. He believed that the constriction should be as little as possible. Tait always cut the wire on the second or third day, and so limited the amount of downward sloughing. He thought Dr. Kelly's method suited for typical cases of myoma when the cervix only is involved.

Dr. Geo. Armstrong removed the tension from forty-eight to seventy-two hours after the operation.

Radical Cure of Femoral Hernia.—Dr. Kenneth Cameron read the report of this case.

Dr. Mills asked Dr. Cameron his explanation of the nervous symptoms in this case.

Dr. Shepherd allied the nervous symptoms to those of hyster-epilepsy; the disappearance of which was most probably due to the moral effect of the operation.

Dr. Kenneth Cameron, in replying, believed the nervous symptoms present to be those of hysteria, aggravated, possibly, by family troubles.

Compound Comminuted Fracture of the Thigh complicating the Knee-joint.—Dr. James Bell brought before the Society a man, aged 30,

who, about three and a half months ago, had been brought to the hospital with a severe fracture of the lower third of the thigh, with extreme laceration of the soft parts. Amputation was deemed advisable, but patient's consent could not be obtained. Under ether, the wound was thoroughly cleansed; several small, loose fragments of bone removed, and one inch of the bone excised, equal, altogether, to four inches of the shaft of the femur. The articular end was split and the condyles pulled apart; these were brought together and pinned with MacEwen's nails for excision of the knee joint. No bad symptoms occurred. The temperature never rose above $99\frac{1}{2}^{\circ}$. The patient was discharged within three months and twenty days, with good union and a fair amount of motion in the knee-joint, which Dr. B. believed would be improved by passive motion. There were three and a half inches of shortening.

Dr. Shepherd had seen the patient and had thought amputation necessary. He had never seen a better result from such a severe accident. Thought Dr. Bell should be congratulated on the result.

Cardiac Phenomena in Typhoid Fever.—Dr. McKechnie then read his paper.

Dr. James Stewart complimented the writer on a paper so thorough and well prepared. He agreed with the conclusions of Dr. McKechnie as to the origin of the murmurs. Referring to Case I, he did not believe that much stress should be laid on the diagnosis of dilatation by percussion, as it was open to many sources of error. He did not think that mere dilatation was sufficient to account for the murmur in Case I.

Dr. Mills believed that a dilatation could suddenly develop, which he based upon recent investigations on the heart. That this increased dilatation was due to the stimuli acting through the nervous system, on removal of which, the heart returned to its original contour, leaving no physical signs of dilatation.

Dr. McKechnie, in his reply, remarked that the capillary pulse noticed when Case II came under observation disappeared as the heart-walls weakened and reappeared as convalescence advanced.

G. H. Mumm & Co. stand on the list with the extraordinary importation of 90,130 cases of champagne. This is the highest figure ever reached by them, and in congratulating Messrs. Fred'k de Bary & Co. upon their grand success in 1890, we take occasion to point out that their advance during the year from 63,020 cases in 1889, or over 27,000 cases, is unprecedented in the annals of champagne importation.

This success, while largely owing to the remarkable quality of the wine, is likewise due to the untiring energy of the agents, who have our best wishes for the future.

Progress of Science.

THE ATMOSPHERIC TRACTOR.

A NEW INSTRUMENT, AND SOME NEW THEORIES IN OBSTETRICS.*

By Peter McCahey, M. D., Philadelphia.

On December 26th, 1848, and February 7th, 1849,, Professor J. Y. Simpson, of Edinburgh, described before the Obstetric and Medico-Chirurgical Societies of that city, a device for assisting labor which he termed an Air-Tractor. In its first form it consisted of an ordinary metallic vaginal speculum, fitted with a piston and coated with leather at its cone-shaped end. This was finally discarded for a short brass syringe attached to an inner cup of metal, which was covered with an outer cup of rubber. The mouth of the inner cup was covered with a diaphragm of wire, within which was a piece of sponge or flannel, "with the view of preventing injury to the scalp and not allowing it to be elongated and drawn up into the vacuous space in the manner which we see occurring in the skin in the common operation of cupping. Such an instrument when fixed to the palm of the hand lifted readily a weight of thirty or forty pounds. This Dr. Simpson showed by experiments before this society." (Simpson's *Obstetric Memoirs*: Philadelphia, 1855.)

Professor Simpson in his eloquent and thoughtful manner pointed out the dangers incidental to prolonged labor and also to the use of the forceps, and declared his belief that the air-tractor would eventually prove a substitute for them in many cases. He explained the well-known principle of atmospheric pressure upon which it is based, and referred to the many instances in which the same principle is employed by the lower animals, such as the leech, the limpet and the cuttle-fish, to secure their food or to move about. He added that while the Tractor had been used in several cases "with results answering his best expectations, it admitted of much further improvement in construction, in mode of application, in working and in other details."

Unfortunately for humanity, it did not work, and was finally abandoned by its gifted inventor. So complete was its failure that, although Dr. Simpson lived until 1855, he did not publish any more in reference to it, nor is it mentioned even as a curiosity by any of his English or American contemporaries or successors.

Dr. Horatio R. Storer, the American editor of Professor Simpson's *Obstetric Memoirs*: stated in 1855 that "the chief objection to the practical use of the tractor is doubtless in its appli-

cation, and not in its power of traction; the large size of the caoutchouc cup rendering difficult its introduction within the maternal passages. To this may be added the difficulty of keeping the valves in working order. Dr. Simpson, however, holds, and we believe, correctly, that if ingenuity could suggest any form of tractor which umbrella-like could be folded into a little space for introduction and afterwards expanded over the scalp and then exhausted by the attached piston, it might supersede the forceps in many cases. . . . When we revert to the history of some of our most useful obstetric instruments (contrast, for example, the rude form of the early forceps with their present improved construction), we have reason to hope that the tractor may at some future time be so far improved as to be easily applied and used."

Dr. Simpson's tractor failed partly because of the difficulty of operating an air-pump within the vaginal canal, and partly because of defects in the construction of the cup.

If I had read of his failure, I would probably have considered it hopeless to try further experiments in the same direction.

In common with a great many others, I had not heard or read of them until after I had, as the result of independent inquiry and over five years of study and experiments, constructed a new and entirely practicable Atmospheric Tractor. On learning a few weeks ago of Dr. Simpson's efforts, I was at first disappointed to find that it was not, as I had supposed, the first to suggest its use. After further consideration, however, I think it will be admitted to be as great an honor to have succeeded where so brilliant an obstetrician and so able a man as Professor Simpson failed, as to have evolved the original idea.

I began the study of the subject in 1885, in the hope of finding some means of preventing the annoying retrocession of the head. I at first endeavored to secure this by a modification of the old abdominal bandage; but the forces driving the head were stronger than any power that could be exerted with the bandage. This led me to think that there must be some other agency producing the retrocession besides muscular resistance and bony rigidity. No doubt every physician has observed many cases in which the head retroceded, not only before the pelvic muscles could act, but even before it reached the pelvic floor. Further reflection and observation led me to the conclusion that atmospheric resistance is the principal factor in producing this retrocession and is in many cases a potent factor in delaying delivery.

When the uterus contracts round the body of the child, it expels all or nearly all the air from the uterine cavity, just as, when the hand firmly grasps a ball, the air is squeezed out from between it and the palm and fingers. The abdom-

* Report of a demonstration before the Philadelphia County Medical Society, November 26th, 1890.

inal muscles then contract, forcing the fundus of the uterus down and pushing the child's body into the pelvic cavity. While this is occurring, there is a partial vacuum in the upper part of the uterus or that portion of it which is firmly contracted around the child. When the abdominal muscles relax, the pressure of the external air, and the expansive pressure of the air in the vagina are exerted against the head and shoulders of the child, and force it back until sufficient air enters the uterus to overcome or break up the vacuum and elevate the fundus. A similar process can be observed every day in the use of the ordinary ball-valve cupping apparatus. Pressure on the top of the ball drives out a certain quantity of air from the cup, but in a moment or two the expansive pressure of the remaining air forces the ball into its usual globular shape. The advantageous results which have been obtained by moving the forceps from side to side in cases where extraction is difficult, can readily be accounted for when it is realized that such motion permits the free ingress of air from the vagina and breaks up the uterine vacuum.

That the retrocession of the head is due to atmospheric pressure almost altogether and only in a small degree to muscular resistance or pelvic rigidity, must be obvious to those who have felt the head stop and recede before it had reached the pelvic floor and while it was still suspended in space a half an inch or more above the muscles.

Professor Duncan (Duncan's *Obstetric Essays*), who must have frequently noticed this apparent anomaly, realized the inadequacy of the commonly accepted theories on the subject, and ascribed the retrocession in such cases to the "retentivity of the abdomen," but failed to perceive that this retentivity is almost entirely the result of atmospheric pressure.

Being convinced that atmospheric pressure is one of the principal causes of delayed labor, and knowing that there is nothing more easily displaceable than air, I began to work upon the problem of how to lessen or remove it during labor. I am convinced that I have succeeded and that the atmospheric tractor which I have the honor to demonstrate before you this evening will inaugurate a new era in the history and practice of the Obstetric Art. It will be, not only a substitute for the forceps in cases in which instrumental aid is absolutely necessary, but it will also be an indispensable assistant in cases which are usually left to the tedious and painful efforts of Nature. With it the physician can dispense with anæsthetics and reduce the expulsive stage of labor to a few minutes, instead of hours, the agony of child-birth will be reduced to an infinitesimal degree without incurring any risk or inflicting any injury on either the mother or the child, and many lives will be saved which would otherwise be lost.

The operation is extremely simple. It consists in applying a cup or concave disk of rubber or other air-tight flexible material, to the child's head, and creating a vacuum within or beneath it, so that it will be firmly affixed to the head by atmospheric pressure, and then making traction on the handle of the cup or disk. Any amount of desired power can be obtained by employing a cup of sufficient area. The normal pressure of the atmosphere being fifteen pounds to the square inch, it is obvious that the tractile power capable of being exerted through a cup or disk of four square inches of area, and within or beneath which a vacuum has been formed, will be sixty pounds. The cup which I have here, covers when expanded a surface of about five square inches. If the vacuum beneath it were perfect and if the surface to which it is affixed were homogeneous, polished and solidly coherent, it would furnish a tractile force of almost seventy-five pounds. Allowing fifty per cent. for the loss of power consequent upon the elasticity of the cup, the flexible character of the scalp, and the mechanical impossibility of producing a complete vacuum, there will still be left a force of thirty-seven and a half pounds, which when properly applied is more than sufficient to quickly, and safely terminate any case of labor. It has been claimed that there are cases in which an enormous force is requisite, cases where the physician has been obliged to pull upon the forceps with all his force and even to ask an assistant to furnish additional power. Reflection will show, however, that in no such case has the physician exerted his entire muscular strength in endeavoring to extract the child. He may think he did, but he was involuntarily prevented from so doing, partly through the intuitive fear of injuring the mother or the child and partly by the expenditure of a considerable amount of his strength in maintaining his own equilibrium. Were a physician in any such case to exert his whole muscular force, he would pull patient and child out of the bed or haul both the bed and the patient around the room.

The large amount of force apparently required in some cases is because it is misdirected. The head is not properly flexed, and traction is exerted in a direction that would tend to pull the occiput through the pubic symphysis, instead of under the pubic arch, and it must be remembered that a great amount of force is unconsciously expended in maintaining the grip of the forceps on the child's head; especially if traction be made at the moment when the uterine vacuum is most complete. Experiment with any globular surface will show that unless increased pressure accompany the tractile efforts, the jaws of the forceps will be expanded and slip uselessly over the body that they were intended to move.

Scientific manipulation is the requisite in ob-

stetrics, and not great force misapplied. If the occiput be lowered so that the head can revolve or pivot against and under the pubic arch, the voluntary or involuntary contraction of the child's posterior cervical muscles will be sufficient in many cases to throw the face upwards and outwards and facilitate or complete delivery. If the head be in a proper position for this final upward and outward rotary movement, comparatively little force is needed to complete delivery. Professor Duncan in his researches upon the power employed in labor arrived at the conclusion that "the maximum force in the most difficult labors does not exceed eighty pounds; that the great majority of labors are completed by a propelling force not exceeding forty pounds, and that in the easiest labors comparatively no force at all is exerted, the child gliding into the world by its own weight." An examination of his calculations will show that these estimates of eighty and forty pounds are much too high. He made the mistake of confounding the result of the force employed with the force itself. His experiments, briefly stated, consisted in fastening a series of sections of the amnion over a conical vessel, the mouth of which was about sixteen square inches in area. He connected this with a waterpipe of one inch in area and found that the amnions of minimum strength were ruptured when the pressure on the water in the pipe reached four ounces and those of maximum strength, when it reaches three and one-tenth pounds. He then calculated that if the pressure on one square inch of the strongest membrane at the time of its rupture was three and one-tenth pounds, the pressure on the entire thirteen square inches of it, when the bag of waters was projected through the os into the vagina, would be forty pounds. This was correct, but he erred in assuming that this forty pounds manifestation of pressure implied that there was forty pounds of force exerted to produce it. The laws of hydrodynamics and the laws of the multiplication of forces show that there is a very great disproportion between a force and its results or between the power exerted and the weight which that power will move. A force of one pound in the tube of the water bellows will lift one hundred pounds on its surface. A man with a crow-bar can move ten or fifteen tons. It may, therefore, be safely assumed that the bursting of the membranes under the pressure of three pounds to the square inch does not mean that there is a force of forty pounds or more exerted against the other end of the uterus. The proposition that eighty pounds of force is exerted in other cases as the result of muscular efforts is not much less extravagant than the assertion in *Tristram Shandy* that the force of the efforts in strong labor pains is equal upon an average to the weight of four hundred and seventy pounds, acting perpendicularly upon the head of the

child. A force of eighty pounds applied to the body of an unborn infant weighing five or six pounds would be equivalent to a force of two thousand pounds applied to the body of an average adult—more than sufficient in either case to produce immediate death.

Exerted as a tractile force, eighty pounds of power will move a weight of four hundred pounds, which is more than the usual weight of the bed, patient and child combined.

The problem in labor is to move a two-pound head two inches in one direction and eight or nine inches in another, through a channel, the walls of which are soft and yielding and covered with an unctuous secretion—conditions which reduce the element of friction to the lowest point. The occiput is only required to traverse the depth of the pubic symphysis, whilst the forehead and chin must traverse the entire depth of the pelvic cavity and extended perineum. It is obvious that the most rational way of accomplishing this complex movement is not to attempt to make the head advance as a whole, but to move one end first and then the other.

With the forceps the head must be moved more or less as a whole along the imaginary curve of Carus. With the forceps, practically nothing can be done but to pull. Rotation may be attempted, but in trying to perform it the points of the blades may, and often do, inflict serious injury upon maternal tissues.

With the Atmospheric Tractor nothing is more easy than to apply it to the upper portion of the head and bring down the occiput. It may then be applied to the lower portion of the cranium, and the forehead and chin may be easily drawn upwards and outwards, and delivery completed. If the head is caught on the pubic bone, as in a semi-frontal or brow presentation, it can be easily pushed back with the tractor, and then depressed or rotated in any desired manner before being brought down. The tractor is practically a clamp which can be firmly attached to a large area of surface, placing the head under the absolute control of the physician and enabling him to lift it, to turn it and to move it in any desired manner.

In order to apply it, all that is necessary is to see first that the os uteri is sufficiently dilated or dilatable to permit of its introduction. After having decided on the part of the head to which it is to be applied, place one hand against the abdominal projection, in order to prevent the head from receding, and introduce the tractor into the vagina or within the os, and firmly press it against the child's head until the handle or vacuum producer has driven out all the air from within the disk or cup. The handle can then be grasped, and extraction proceeded with. If, as occasionally happens, the head is dry, it ought to be moistened with water, or rubbed with some unctuous material.

The principal objections which may be urged against the use of the tractor are :

1. That the hair on the child's head will prevent it from being firmly applied.
2. That it is difficult to apply.
3. That its application will require injurious pressure.
4. That when applied it will exert injurious pressure.
5. That it will act as a cupping glass, producing an unsightly swelling or even—as has been thoughtlessly asserted—"draw out the child's brains"
6. That in using it the scalp might be torn off.
7. It will carry infection.

The first of these objections I will dispose of by a practical illustration. (Dr. McCahey here affixed the tractor on the head of an infant six weeks old, and after moving it around a cot which had been provided for the purpose, lifted it up in the air two or three times, the tractor remaining in position all the time and the child apparently suffering no pain.) These, and other objections which may be raised, are based upon a misapprehension, or a forgetfulness of the laws of hydro-dynamics.

As to the second objection, as you have just seen, the tractor is not difficult of application. As to the third, the amount of force necessary to create the desired vacuum is less than ten pounds at starting and decreases to almost nothing as the air is driven out of the cup, and it is exerted not on the head, but on the air within the cup.

The tractor cannot exert injurious pressure on the head. With it on the head there is no more pressure upon the area it covers than before it was applied. It merely takes the place of the lowest strata of air and is held against the scalp by the ordinary atmospheric pressure.

It will not act as a cupping glass, because it is applied flat against a large area, while a cupping glass is applied against a narrow circle, into which it is driven by the overlying air.

It will not produce an unsightly swelling, because there is no cavity into which an effusion can take place, and even if there were a large central opening, the brain would not be sucked up into it, because there is no internal pressure sufficiently strong to force the brain either through or against the scalp. The tractor may be applied with absolute safety over either the bony part of the skull or over the fontanelles.

There is no danger of detaching the scalp because the tractor is not sewed or glued to the skin. It is affixed against it by a certain atmospheric pressure. Traction exerted in excess of that pressure, will merely result in a separation of the disk from the scalp and not the tearing of the scalp from the bones. It can thus be seen that injurious or excessive force cannot be employed with it.

It is well to remember in this connection that while we do apparently pull the head and lift the child with it, in reality we simply relieve the front of the head from the pressure of a five-inch cylindrical column of air, thereby allowing the head to be moved forward or the child to be lifted by the expansive force of the air behind or beneath it. No greater force of traction can possibly be exerted by this apparatus because at the instant when it passes beyond eight or ten pounds to the square inch, it will separate from the head.

If the disk or cup were left on the head for a long time it might produce a slight congestion of the skin or even a small swelling, but nothing comparable to the caput succedaneum or the cephalhematoma sometimes occurring, which are the result of continuous pressure against the rigid os or the bony pelvis. Even if there were a slight discoloration or effusion, it would be certain to pass away in a few hours or days, and must not be allowed to weigh for one moment against the instantaneous relief from pain and the quick and safe delivery obtained by the employment of the tractor.

Pain is due to the resistance met with by muscular action. The resistance encountered by the abdominal muscles when pressing the head of the child against the bony pelvis is productive of intense pain. If the position of the head be changed with the tractor, and the abdominal muscles be relieved of the necessity of expelling the child, the pain ceases as if by magic.

The danger of infection is absolutely nil, if ordinary cleanliness be observed. After using the tractor all that is necessary to purify it for the next case, is to place it for a few minutes in boiling water or any antiseptic solution.

I have constructed various forms of tractors, some with a ball-valve, some with an air-cock, to which a rubber tube three or four feet long is attached, and an air pump adjusted at the other end of the tube so that the nurse or other attendant could readily produce the desired vacuum, some with curved edges, some with concave edges; but the form I have exhibited to-night is the most readily applicable and the most reliable and best. As you see, it flattens itself out when applied to the head, thus giving an area of contact and traction equal to its entire surface. With the other forms, traction and contact can be obtained only with a limited area around the circumference.

The cups in which the air is exhausted by means of a pump or ball-valve are open to the serious objection that their valves would become clogged up with the material on the child's head, which would require that they should be taken apart and cleaned or discarded entirely after each case.

I have used the tractor in five cases, and in each case affected delivery with it in five

minutes. Without it labor would have been prolonged in all for hours—hours of suffering to the mothers and hours of more or less anxiety to the attendant. An instrument capable of producing such beneficial results is certainly to be universally employed within a comparatively brief period. *Report from Medical and Surgical Reporter, November 29th, 1890.*

219 North 22nd Street, Philadelphia.

THE APOLLINARIS SPRING.

The Chicago *Inter Ocean* quotes the following from the London *Times* :

Apollinaris water is as familiar in millions of mouths as any household word. In the English translation, evidently made in Germany, from a German book on the mineral springs of the Ahr Valley, I find it stated that the mineral water from "the fountain Apollinaris is counted among the most luxurious drinks." Yet others than the spoiled children of luxury can afford to buy it, as the water is cheap as well as good, and the moderation of its price is one reason why the demand for it is great and increasing. It is not unworthy of note that an English company has the credit of having brought Apollinaris within the reach of all water drinkers. The company began its operations in 1873. The spring itself was discovered twenty-two years before.

There is a legend connected with nearly every mineral spring of note. In many cases it is very difficult to ascertain the actual facts or to separate fact from the mass of fiction. That the thermal springs of Bath and Teplitz should have been discovered by pigs, and those of Carlsbad by dogs may be true, but the evidence is of doubtful value. There is no question, however, either about the way in which the Apollinaris Springs was found, or as to the place after which it was named. Herr George Cruzberg, who lived at Ahrweiler, had a vineyard on the left bank of the River Ahr, at a short distance from the village of Neuenahr. He noticed that the vines would not flourish on a particular spot, and learned that carbonic-acid gas issued from the ground there. An eminent geologist, Professor Bischof, of Bonn, was consulted as to whether anything could be done in the matter, and he suggested that search should be made for a mineral spring, which might prove quite as remunerative as the most productive vines that the earth could produce. Accordingly a well was sunk, and at the depth of forty feet a spring was reached which rose to the surface with a force and effect of a small Icelandic geyser. This occurred in 1851. The Apollinariskirche is not far distant from the spring, which was named after it.

Chemical analysis showed a close resemblance between the Apollinaris Spring and those at

Selters and Ems, while in one respect it differed from any one of those which were then in high repute. This consisted in its containing such an extraordinary proportion of carbonic acid as to cause the water to boil upward as if it had been forced from below under strong pressure. The volume of gas is so great that it is dangerous to approach the spring on a windless day. More than one fatal accident has been caused by approaching the spring and inhaling the gas. At the outset it was found difficult to bottle the water. However, a means was devised for doing so.

I have long had a desire to visit the spring, to drink the water on the spot, and to see the arrangements for bottling and exporting it, but that desire has only now been gratified. The English company, which has enjoyed the exclusive right to bottle and export the water since 1873, has resolutely objected to make the place one where visitors might enjoy a new sensation, and by their presence impede the operations. Besides, many precautions have to be observed lest a fatal accident might happen through inhaling the carbonic-acid gas with which the air near the spring is heavy and deadly. Birds that alight near it die almost immediately. I saw three dead lying within half a yard of the spot. The English managing director, having kindly made an exception in my favor, I have now examined everything that is to be seen at the Apollinaris Spring; I have drunk the water as it issues from the source, and I watched the process from the moment the water is pumped from the spring till it is bottled, corked, labled, and packed for transmission to all quarters of the globe. The operations are many in number, and are carried on with an attention to detail which is beyond praise. Many difficulties have had to be surmounted, and the ingenuity displayed in overcoming them is highly creditable to all concerned.

The problem which had to be solved was how to bottle the water in such a way that all the carbonic-acid gas, which makes it sparkle, should be retained. As the temperature of the spring is 68° F., the tendency of the gas is to fly off on reaching the surface, and it is owing to the quantity of gas escaping where the spring raises from the ground that the surrounding air is mephitic. Without entering into mechanical details, I may concisely state that the process adopted consists in conducting as much of the gas as can be collected at the surface of the water to chambers, where it is compressed. The water is drawn from a depth of fifty feet below the surface and is elevated into tanks above the bottling house. This water and the natural gas are then brought together and mixed before entering the bottles, the result being that the bottled water is not only as pure, but as gaseous as the same water is far down in the rock through a fissure in which it ascends. Moreover, a part

of the carbonic-acid gas is forced under pressure in each empty bottle so as to expel the common air before the water enters it, and thus the drinker of the bottled water is certain of obtaining the water in its purely natural state.

It is scarcely necessary to explain, I think, that artificially aerated waters contain carbonic-acid gas, but this gas is not a product of the chemistry of nature. There is no difficulty in making it; the puzzle is how to obtain it as pure as it is in its natural form. The artificial gas can be washed, and the manufacturers of the best aerated waters take every precaution to insure the purity of the beverage which they supply; yet natural chemical processes are the only perfect ones, and the popularity of Apollinaris water is chiefly due to its irreproachable character. Though the water itself be so good, and the method of bottling it so complete, yet other things have an importance which is almost paramount.

The empty glass bottles are placed neck downward on a revolving table, and a stream of water is repeatedly forced into each under high pressure as the table moves round. A woman is stationed at one side of the table to watch each bottle, when empty and before being taken off, and see whether any impurity remains. As an electric glow light is behind the bottle the slightest speck in the glass can be detected by her at a glance. The stone bottles are kept filled for twenty-four hours, and if any leakage is perceptible they are broken up, and they are repeatedly washed before being filled with mineral water. Though the water forced into them is the same as that in the glass bottles, yet, as they cannot be corked with the same lightning rapidity, a portion of the gas escapes, and thus the water when poured out of them is less sparkling.

A few statistics will probably have greater attraction for those who have read what has been written; indeed, the figures in this case are more eloquent than any phrase. It was in 1873 that the Apollinaris Company began operations, and in that year the number of glass and stone bottles filled and exported was a little under 2,000,000. Last year the number was nearly 16,000,000, and orders have been given for a still larger supply of bottles in expectation of an increasing demand next year. The corks used last year weighed fifty-seven tons. These figures are gigantic, and were I not certain of their accuracy I should not give them. I was quite prepared for hearing that the total amounts were extraordinary, as I took pains to estimate the speed at which the bottles were filled during my visit, and found that the filling went on at the rate of 90,000 a day. Four hundred and fifty persons are engaged in the several operations.

The question may be put by others which I put after visiting the springs: "Should the de-

mand continue, can the supply keep pace with it?" Careful tests have been made, which demonstrate that the existing supply is adequate for filling 40,000,000 quart bottles yearly. When the demand is in excess of these figures, then the Apollinaris Company may have to sink a second well. It is quite clear, however, that the Apollinaris Spring yields enough water not only for present requirements, but also for those of a future which is still remote.

ARGYLE-ROBERTSON PUPIL.

At the February meeting of the Berlin Medical Society, Mendel read an interesting paper on this condition, of which the following is a condensed abstract taken from the *Centralblatt f. pr. Augenheilkunde*, February, 1890:

In 1869, Robertson first called attention to a special symptom in patients suffering from nervous disease. In eyes of normal vision and appearance the pupils failed to show the least direct reaction to light, contracting, however, readily on accommodation for near objects or on convergence. His observations were confirmed by other observers, and Erb showed that this symptom appears especially in two diseases, namely, tabes and the progressive paralysis of the insane, and in them so constantly as to be of considerable value in diagnosis, more especially as it is an early symptom, indeed sometimes the earliest. We should therefore be on the watch for it in suspected cases. In consideration of the importance of this symptom it is natural to ask where it is localized, with what changes in the nervous apparatus associated, or by what produced. An affection of the optic nerve will not produce it, as the Argyll-Robertson pupil may be found for years without change in visual acuity, neither can it be due to changes in the peripheral oculo-motorius, as it is hard to see how these nerve-fibres could act to accommodation and not to light-stimulus. It only remains, therefore, to accept the view that the defect is somewhere in the so-called "central reflex bow." The first experiments in this direction were by Flourens, who located the seat of the symptom in the corpora quadrigemina, where, according to his view, the nervous stimulus is transferred from the optic to the oculo-motorius. His opinion has been maintained up to the present time by ophthalmologists, and Magnus sketches the following course of the stimulus: Optic tract, corpora quadrigemina, nucleus of the sphincter iridis, and lastly oculo-motorius trunk to eye. That this view is false, Mendel believes to be shown by the experiments of Gudden, who removed the corpora quadrigemina without observing any interference with the pupillary movements. The seat of the nervous transmission can therefore not lie in them, and Gudden locates it in the external corpus geniculatum, without, however

offering any proof in support of his belief. Mendel, in his experiments, removed the iris as completely as possible in new-born animals (dogs, cats and rabbits). Phthisis bulbi or suppuration destroyed the majority of such eyes; some, however, were preserved which showed during life no impairment of the visual act. All his results showed the following conditions:

In those cases in which, in consequence of destruction of the eye, the optic nerve atrophied, there was found in the brain a demonstrable atrophy of the external corpus geniculatum of the opposite side—results already published by Gudden and his pupils. In addition, however, he also found, even when the eyeball was preserved, all atrophy of the ganglion habenulæ of the same side. When in all cases during life the single abnormal symptom is absence of iris-function, and after death an atrophy of the ganglion habenulæ of the same side is found, one is certainly justified in believing that it is the center for the iris-movements. That it is a reflex center is evidenced by other appearances: as the fact that the pupillary fibres of the opticus in part enter the ganglion habenulæ.

Besides, Gudden, although regarding the external geniculate body as the iris-center, reports that removal of the anterior corpora quadrigemina causes no disturbance of the pupillary movements, such disturbance, however, following the removal of a "prominence" in front of them. This prominence is obviously the ganglion habenulæ. In support of his views Mendel mentions that Bechterew and others have in various ways come to the belief that the center for pupillary movements lies in the wall of the third ventricle, and especially at its posterior part. This belief corresponds fully to the experimental results obtained by Mendel.

The question as to the course of the fibres from the ganglion habenulæ to the oculo-motorius is answered by Mendel as follows: He found the ganglia habenulæ of both sides connected by a commissure, corresponding to the lowest part of the posterior commissure. This would be in accord with the physiological postulate that the pupils act symmetrically. The commissure showed a certain degree of atrophy on the side of the atrophic ganglion, which could be traced into the posterior commissure, so that according to this the course of the fibres from the ganglion habenulæ to the oculo-motorius would be through the posterior commissure. It is further remarkable that with changes in the pupils, the nucleus of the oculo-motorius was constantly normal. Mendel found, however, in the cell-accumulation of Gudden's nucleus, a difference between the two sides. This cell-group is situated below the oculo-motorius nucleus, and Mendel traces out the "central reflex bow" thus: Retina, optic nerve and tract, ganglion habenulæ of the

same side, posterior commissure, Gudden's nucleus, oculo-motorius, and sphincter iridis.

In man a decision will be only possible after careful examination in tabies and paralysis of the exact spot located by Mendel as the pupillary center. Some scattering observations, in part confirmatory, have already been made, though Moeli was unable, in cases of Robertson pupil, to detect any atrophy of the posterior commissure (a reference by Senator in the discussion of Mendel's paper). While the Argyll-Robertson pupil occurs in mydriasis as well as myosis, it is especially observed in connection with the latter.—*Brooklyn Med. Journal*.

TREATMENT OF DIABETES MELLITUS.

Prof. Lepine (*Semaine Médicale*) writes as follows on this interesting subject:

It was formerly supposed that an infinitesimal quantity of virus was sufficient to cause, in an animal, a virulent disease. Later researches have shown that this idea is erroneous. There are certain ferments which act like poisons; a sufficient quantity is required to produce certain effects; a too small quantity of glycolytic ferment will not destroy a large amount of glucose. If we desire to obtain a clear view of the pathogeny of diabetes and the indications for its treatment, we must take account both of the amount of sugar to be destroyed and of the means of destroying it which are at the disposal of the patient. In other words, in the treatment of diabetes we must endeavor (1) to increase the destruction of the sugar, and (2) to diminish its production in the economy or its introduction with the food.

Can we furnish the patient with a glycolytic ferment? It is to be hoped so, though the efforts that I have made for a month are not very encouraging. Pancreatine does not possess an appreciable glycolytic power, and pilocarpine, which was relied upon to increase, to a certain extent, the pancreatic function, has not thus far succeeded in any case except that of M. Lanois. Although we cannot, just now, provide the diabetic patient with a ferment, we may try to increase its power. *In vitro*, carbonic acid diminishes it greatly; oxygen, on the contrary, acts favorably; advantage might be taken of this fact in treatment. Ozone, it is said, has been tried without effect; but that is no reason why further experiments should not be made.

It has long been known that alkalies favor the destruction of sugar. But when we recall the very small amount of bicarbonate of soda contained in a glass of Carlsbad water, of Bourbonne, or even of Vichy, and besides the manifest utility of these waters in certain cases, we are forced to the conclusion that they act otherwise than through their bicarbonate of

soda. Perhaps by exciting digestive activity they increase the production of the glycolytic ferment.

Without acting upon this ferment, we may increase the destruction of the sugar by muscular exercise. To Bouchardat belongs the credit of having first clearly shown this fact; but in his practice he carried it to excess, Diabetic patients cannot over-exercise with impunity. The physician should see to it that his patient does not take too much exercise. In general, massage is of more value than exercise; I have obtained excellent results from its employment.

I now pass to the consideration of the means of diminishing the production of sugar. Opium has long been recognized as one of the most valuable remedies in the treatment of diabetes. Some years ago M. Villemain recommended that belladonna be associated with opium. I have never perceived the utility of this suggestion, for the belladonna dries the patient's throat, and I have never seen a diabetic patient derive any material advantage from its use. Quinine, bromide of potassium, salicylate of sodium, and antipyrine have also rendered great service to a certain number of diabetics, but all of these drugs, except the bromide, have a common vice, upon which I have insisted for the last ten years, and that is, that while they diminish the production of sugar (which I was the first to prove experimentally), they also check its destruction. I may say to-day that this effect is due to the inhibitory action which these substances exert upon the glycolytic ferments.

We may understand, therefore, to what extent these agents are useful. The diminution of the glycosuria which they effect is really advantageous only to those patients in whom there is an over-production of sugar; in them they place an obstacle to an exaggerated denutrition. In other patients the diminution of the glycosuria, if it take place, is deceptive, since it may really aggravate the morbid condition by impeding the formation of the glucose necessary to maintain life.

To sum up, in diabetes we should increase the destruction of glucose; unfortunately, our abilities in this regard are exceedingly narrow, although we are at present acquainted with the glycolytic ferment. We can much more easily impede the formation of sugar, but the drugs used for this purpose unfortunately restrain its destruction, which is a serious fault. This gives an additional reason for insisting on abstinence from amylaceous foods. My views on this subject are too well known for me to repeat them here. I deem it advisable, however, to call attention to the inconveniences of the ingestion of too great a quantity of meat. Prof. Naunyn recently reported several cases of diabetes in which the increase in the meat diet

caused a re-appearance of the glycosuria, which disappeared under a moderate diet.

Another drawback, still more serious, of a too abundant meat diet is the acid diathesis, leading to coma if not promptly combated with alkalies in large doses.—*N. O. Med. and Surg. Journal. Lancet-Clinic.*

THERAPEUTICS OF INTESTINAL ABSORPTION.

Dr. Leubusher (*La Médecine Moderne*), arrives at the following conclusions: Quinine and morphine, even in the weak solution, diminish intestinal absorption. Morphine exercises the same action, even when it penetrates into the organism by the hypodermic method. Alcohol in very weak solution (one-half to two per cent.) increase absorption, but it rapidly diminishes it when the solution is made stronger. Glycerine has no action in this respect. Chloride of sodium in small doses increases absorption: Carlsbad water is without influence. Experiments made on man show that the iodide of potassium is eliminated slowly when it has been administered in concentrated alcoholic solution. In the urine the iodide is more rapidly and abundantly eliminated when it is given in a moderate amount of alcohol. In glycerin, water, or milk, the iodide is less rapidly eliminated by the urine.—*Therapeutic Gazette.*

CHLORIDE OF SODIUM AS AN ANTISEPTIC.

Fritsch, of Breslau, recommends chloride of sodium in solution, carefully sterilized and warmed, for the purpose of douching wounds after operations instead of the antiseptics ordinarily in use. This solution he has employed in such operations as removal of uterine fibromyomata, ovariectomy, and in one Cæsarean section, in all cases successfully. In his opinion, cold atmospheric solutions should never be used in surgery, but always douches of chloride of sodium, sterilized and warm, 0.6 per cent. strength. He believes that by this means patients complain of less discomfort after the operation, and more quickly recover.—*Med. Press and Circular.*

A NEW TEST FOR LEAD.

Brennstein says (*Pharm. Zeitung*) that if a solution of sodium phosphate be added to the suspected liquid, after the latter has been first acidified with acetic acid and then made ammoniacal, either an opalescent appearance or a strong turbidity will result, according to the amount of lead present.

DIETETIC RULES IN DISEASES OF THE DIGESTIVE ORGANS.

Dr. J. Boas (*Deutsche med. Zeit.*, No 43, 1890) deals generally with the dieting of stomach and intestinal disorders. In considering diet in such conditions, three points must be looked to: (1) The constitutional condition and the state of nutrition of the patient; (2) the surroundings and customary habits of the patient. Thus, the dietic treatment of the workman must be considered from another standpoint than that of the well-to-do. Thirdly, the most important point is the prescription of diet with the actual disturbance of digestion in view. The stomach, for example, gets out of order in two of its functions—the motor and the chemical; absorption in the stomach plays a very small part in the functions of the organ, so that an endeavor must be made (by the use of the stomach sound) to discover (1) whether there is a disturbance of the gland function, and whether there are fermentative processes going on; (2) whether the motor activity of the stomach is at fault; or (3) whether both these conditions are present. There are cases, for example, in which the stomach seems incapable, owing to deficiency of gastric juice, of digesting proteids; in these cases the digestion of carbohydrates may be perfect. Proteids in these cases must, therefore, be given in a prepared or semi-digested form (albumen, peptone). In these cases fat is digested with difficulty, or, rather is split up into fatty acids by the fermentation in the duodenum, and so does not enter the lymph channels in the usual form of an emulsion of neutral fat. Sodium chloride is useful in these cases, since it helps to form the hydrochloric acid of the stomach, which tends to stop fermentative processes. On the other hand, there are cases where there is hyperacidity in the stomach. In these cases proteids are exceedingly well digested and carbohydrates but feebly acted upon, so that the digested forms, such as dextrines, malted foods, etc., have to be prescribed. For insufficiency of the motor activity of the stomach, enemata of half a litre, with a proper diet, are beneficial.—*Supp. British Med. Journal.*

TREATMENT OF HABITUAL CONSTIPATION.

Professor Nothnagel, in a recent lecture, reported in the *Wiener Med. Presse*, considers the three most important elements in the treatment of habitual constipation to be massage of the abdomen, electricity, and abundant exercise. Abdominal massage cannot be properly performed by the patient upon himself, the effort required causing contraction of the abdominal muscles, which prevents deep pressure and man-

ipulation. An efficient substitute for a masseur is a metal ball, weighing from three to six pounds and covered with cloth to prevent chilling the skin. The patient should every morning roll this over the course of the large intestines for five or ten minutes, beginning in the right iliac region. Professor Nothnagel believes that in the end massage is invariably of benefit, but that we must not expect much benefit for weeks and perhaps months. As cases of long duration react but slowly to almost all methods of treatment, we must (in order to guard against the results of fecal accumulation) have resort to laxative mineral springs, drugs, or enemata. Nothnagel believes it better, under these circumstances, to avoid drugs, and only to use an enema, either of pure water or one containing common salt, olive oil, or, preferably, glycerine. Acid fruits should be freely taken, along with a nutritious and easily digested diet. Should a vegetable laxative be called for, notwithstanding these remedial measures, Nothnagel recommends a pill composed of podophyllin and the extracts of aloes, rhubarb, and taraxacum.—*Philadelphia Med. News.*

It is said to be possible to restore one who is helplessly intoxicated to the almost complete use of his faculties in a very short time by administering to him a half teaspoonful of ammonium chloride in a tumbler of water.

NEWS ITEMS.

ALVARENGA PRIZE OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA.—The College of Physicians of Philadelphia announces that the next award of the Alvarenga Prize, being the income for one year of the bequest of the late Senor Alvarenga, and amounting to about \$180, will be made on July 14, 1891. Essays intended for competition may be upon any subject in Medicine, and must be received by the Secretary of the College on or before May 1, 1891. Charles W. Dulles, secretary.

Eight patients are being treated in the Post-Graduate Hospital by Koch's lymph. Three of them are cases of lupus; four are cases of phthisis pulmonalis, and one laryngeal tuberculosis. The inoculations are in charge of Dr. W. C. Bailey, who was for a long time a student in Koch's laboratory, assisted by the Director of the Laboratory, Dr. J. H. Lineley.

Messrs. J. Calvet & Co. are to be congratulated upon the enormous advance that Messrs. Frederick de Bary & Co. have made with their wines during the year. In 1889 the importations amounted to 30,600 gallons in wood and 3,439 cases, and in 1890, 54,060 gallons in wood and 7,387 cases, being an increase in one year of over 85 per cent.

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MONTREAL, FEBRUARY, 1891.

THE KOCH TREATMENT.

This is still a very absorbing topic among medical men, although fortunately, the excitement of the lay press has somewhat subsided. In the meantime, the treatment is being carried out with regard to the minutest details at the General Hospital, at the Western Hospital, and at the Hotel Dieu in Montreal; but owing to the great caution required in order to avoid fatal results, only small doses have been injected, and the improvement has accordingly been somewhat slow. But it is better to take some time in order that if no good is done, at least it may not be blamed for doing harm. An immense body of the profession is still opposed to it, the prevailing idea being that it will follow the fate of other highly vaunted methods of treatment. This of course, proves nothing against the remedy, because the general tendency of the profession is towards conservatism, and the very best methods which have come to stay, have nearly always been strongly opposed during many years by the majority of the profession, which however has adopted them when their merits have been sufficiently proven. This is as it should be. A great deal of loss of professional prestige has followed the too great credulity of practitioners in believing what has been said of different new reme-

dies, staking their reputation upon the success or failure of the latter.

There is, on the other hand, a small but compact body, composed largely of those who have seen the effects of the Koch treatment, and who firmly believe in its efficacy, either as a diagnostic agent or as a means of cure. The plan which Koch and his advisers have adopted for introducing the remedy to the profession, is to be commended; it has been placed first, not in the hands of those who would be likely to make money out of it, irrespective of its value, but rather in the hands of scientific workers, principally professors in universities and hospital attendants, who have the means for making accurate observations and who could have little or no object in exaggerating or depreciating its real value. A good deal of angry feeling and of ill natured remarks have been made upon Koch's determination to keep the method of its manufacture secret. Some of them state that he is not likely to divulge it as long as he and his two associates' exclusive possession of it continues to bring in what the Germans call the "colossal" revenue, of a million marks a year for himself and a quarter of a million apiece for his colleagues.

While we are anxious to see this, or any other remedy which has been vouched for by a scientific observer, given a fair trial, and while we shall be only too happy to record its brilliant success, we fear it will hardly realize the sanguine expectations of its inventor and his followers.

We may mention with some pride that two of the professors in Bishop's College, Drs. McConnell and G. T. Ross, were the first and only ones so far from the metropolis to visit Berlin for the purpose of observing on the thousands under treatment, the effects of the remedy and its method of employment. In response to the general feeling of the profession, that none of its members should continue to derive any profit, from a secret preparation, Dr. Koch has made a partial disclosure of its method of

manufacture. It would appear that a quantity of sterilized culture fluid is inoculated with colonies of tubercle bacilli, which rapidly multiply until they have exhausted all the nutrient material, when further multiplication ceases. During the process of growth, these bacilli which are among the lowest form of vegetable life, give off certain excreta, the presence of which in a cultivation fluid in sufficient quantities, may itself exhibit the growth of the tubercle bacilli, in a somewhat similar way that a certain quantity of alcohol in a solution of sugar and water will put a stop to the process of fermentation set up by the growth of the yeast plant, which is however, a little higher up in the scale of vegetable life. In case however, that any of the bacilli should remain alive in the cultivation fluid, the liquid is passed through a chamberlain filter to remove the germs. The excreted substance, is then extracted from the cultivation fluid by a 50 per cent solution of glycerine. It is this glycerine extract of the excreta of the tubercle bacilli which fills the little bottles of golden colored fluid sold for six dollars, for 75 minims or 5 grammes and which is diluted 100 to a 1000 times before being used. A great deal of care is exercised in the preparation of the liquid, and every lot is tested on at least, three tuberculous animals before being allowed to leave the laboratory. As Koch says himself, it would take a good bacteriologist six months to learn how to manufacture this liquid. So that taking all things into consideration, we think it better in the interests of humanity, that Koch and his friends should receive a handsome reward, than that so powerful a drug should be entrusted to incompetent manufacturers, who, in their greed for gain would lower the cost of production at the expense of accuracy. Our attitude, therefore, will be one of patient expectancy, feeling sure that we shall soon know the true value of the remedy, which is being so carefully experimented with by such a large army of trained and reliable observers.

DR. A. P. SCOTT.

The late A. P. Scott, M.D., was born in the Eastern Townships of this Province in the year 1859, and at an early age he studied for pharmacy, and subsequent to passing his pharmaceutical examinations he acted as assistant to several well-known druggists in Montreal, until finally in 1884 he entered into partnership with Mr. Avery Reed and started business for himself on St. Catherine street west, the firm being known as "Scott & Reed."

In the spring of 1883 he matriculated for the Medical Faculty of the University of Bishop's College, and entered that institution the same year. Through his four years' course at this university he proved himself a steady and persistent worker, and took a high standing in both his primary and final examinations.

In the spring of 1887 he graduated the degree of C.M., M.D., being conferred on him. Shortly after this he went to London, Eng., and there studied in the various Metropolitan hospitals, also presenting himself before the Royal College of Physicians and successfully passing the required examinations entitling him to the qualification L.R.C.P., Lond. He remained in London for about eight months, returning to Montreal late in the fall of 1887, and at once started practice.

In 1889 he was appointed Professor of Anatomy in the Medical Faculty of the University of Bishop's College, and continued to fill this very arduous position, to the satisfaction of all, up to the time of his decease. In his professional life he was a general favorite amongst his confrères, and was ever ready and willing to do a good action by giving his services even when well aware no return would or could be made. On the 29th of December, 1890, he took seriously ill (although for some weeks previous to this he had been feeling far from well) and was compelled to take to his bed, the cause of all this proving to be pleurisy. Several of his professional friends were in daily attendance, and he appeared to be progressing to a favorable termination, when on the morning of January 16th, 1891, on endeavoring to sit up in bed heart-failure suddenly set in, and before medical assistance could be secured he expired. He was married in 1884, his widow surviving him.

Requiescat in pace.