Original Articles.

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FIBRO-CYSTIC TUMOR OF UTERUS.—HYSTERECTOMY EXHIBITION OF SPECIMEN.*

By Dr. A. F. McKENZIE, Monkton.

Mr. President and Gentlemen,—About eighteen months ago I had the privilege of presenting for the consideration of the members of this Society a young woman, twenty-nine years of age, who had been suffering for a little over a year from symptoms referable to a uterine tumor. She dated her illness from November, 1895. For a couple of months previous to this she had been working very hard as a domestic. The first symptoms noticed were scantiness of urine, sacral pain, leucorrhœa, shortness of breath on exertion, increased menstrual flow, brown pigmentation on the face, and swelling of the feet after standing for any length of time. After awhile she gave up her place finding that she was unable to fill it properly and accepted another where the work was lighter. She found, however, that she was not able to do the work even there and so she came home to her parents. She first came under my care in June, 1896, when she complained of all the above symptoms. The urine was very scanty, only seventeen ounces being passed in twenty-four hours. Her menstrual periods were regular but prolonged. She thought she lost at each period about twice as much blood as she did when in previous good health. The thyroid gland was somewhat enlarged. This enlargement had been noticed about the time that the other symptoms commenced. Suspecting the presence of some pelvic trouble I suggested an examination, and to this, after some delay, the patient consented. Inspection and palpation of the abdomen revealed a swelling extending from the pubes half way up to the umbilicus. It was uniform in shape and semi-elastic to the touch. It resembled very much in shape, size and consistence a pregnant uterus of about four or five months. The positive assurances of the patient, with the absence of the other signs of pregnancy, together with the intact hymen, excluded this supposition, and it was considered safe to use the uterine sound. An unsuccessful attempt was made to pass this, but instead a small catheter was passed

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to the distance of four and a half inches. The uterine mass was movable and free from tenderness, nor was there any history of attacks of acute pain with fever, such as would suggest local peritonitis with formation of adhesions.

A diagnosis of uterine fibroma was made, and the patient was put upon medicinal treatment of different kinds, including ergot, potassium, iodide, arsenic, diuretics, laxatives, etc. As the result of treatment, combined with the rest she was able to get at home, there was some improvement in the general health, an increased flow of urine and more regular action of the bowels. The thyroid swelling also diminished considerably, but the uterine growth continued to enlarge, so that when I presented her to the Society in January of 1897 the uterine diameter had increased from $4\frac{1}{2}$ " to $5\frac{1}{2}$ ", with a corresponding increase in general bulk. At this time the enlargement did not appear to be quite so uniform as it was when I first examined her, and by means of the sound, together with external palpation, it could be determined that the growth was confined mostly to the left and slightly to the front of the uterus. The general opinion of the members of the Society, who then saw her, was that it would be wisest to pursue medicinal treatment for a longer time before resorting to eradication by surgical means. From this time onwards, with very little change in the general symptoms excepting the onset of some vesical tenesmus and occasional metrorrhagia, the tumor continued to steadily grow, until in December last the growth reached nearly to the umbilicus and the uterine diameter was about $7\frac{1}{2}$ ".

For some months it had been noticed by the patient that the enlargement was considerably greater just before menstruating, and measurement of the uterine diameter before and after menstruation showed a difference of from $\frac{1}{2}$ inch to 1 inch. After consultation an operation was decided on, and for this purpose the patient was taken to the Stratford Hospital. The operation was performed on the seventh of January, 1898, there being present Dr. Robertson, of Stratford, who administered the anæsthetic, Drs. Fraser and Deacon, of Stratford, Dr. Wood, of Mitchell, and myself. Chloroform was used throughout most of the operation, ether being substituted for a time. The aseptic and antiseptic precautions in vogue at the hospital were strictly followed. The abdomen, vagina and neighboring parts of the patient were thoroughly scrubbed with ethereal antiseptic soap, and this was followed by the free use of solutions of permanganate of potassium, oxalic acid, perchloride of mercury and sterilized water. The uterine cervical canal was curetted and swabbed with carbolic acid. After the bladder was emptied the abdominal wall was opened in the median line by an incision extending from the umbilicus to within half an inch of the pubic bone. After the abdominal wall was opened a hand was passed around the uterine mass and it was found to be free from adhesions. The tumor was then drawn out as far as possible by combined traction and pressure. The surface was dark red in color and scattered over with numerous veins. It felt very elastic and almost fluctuating, insomuch so that an attempt was made to diminish its volume by aspiration, but only a small quantity of bloody serum was withdrawn. The uterine mass was then drawn to one side and the left ovarian vessels were divided between two ligatures of stout catgut passed by means of a blunt pointed pedicle needle. The artery and veins were tied together. The remaining portion of the broad ligament, together with the round ligament, was divided between clamp forceps, care being taken to keep close to the uterine mass. The neck of the uterus was reached and no particular difficulty was encountered in securing the uterine artery which was divided between two ligatures. A peritoneal flap was reflected from the anterior surface of the lower part of the growth, and this, together with the bladder, was pushed well forwards. The

right ovarian and the right uterine vesssls were secured in the same way as those on the left side. A posterior peritoneal flap was reflected back. An assistant now passed his finger well up in the anterior vaginal fornix, and using this as a guide the vaginal vault was punctured with sharp pointed scissors close to the cervix.

Taking this as a starting point the vaginal ·ault was gradually, by means of scissors, separated from its connection with the uterus. This was the most awkward part of the operation, and during its performance the right uterine artery was nicked below its point of ligature. It spurted for a few times in a manner sufficiently alarming for those concerned. It was, however, fortunately quickly secured with forceps and again ligated. As it was necessary to include a certain amount of tissue in the ligature, some fear was felt that the ureter might possibly be injured, but subsequent events showed that this was not the case.

Throughout the operation the ureters were not seen to be recognized as such. Several small vessels around the divided edge of the vault of the vagina bleed freely, and some of these were secured with long fine silk ligatures. The uterine vessels on both sides and the ovarian on one side were also secured with long silk ligatures, it being thought best not to trust to the catgut alone. All the silk ligatures were now brought down through the vagina and the peritoneal flaps were allowed to fall together, but the edges were not sutured. The vagina was packed with iodoform gauze, one strand being placed slightly through the opening in the vaginal vault. The intestines and omentum were replaced in position and the abdominal wound was closed, the peritoneum by a continuous catgut suture and the muscular aponeurosis and skin by interrupted sildworm sutures. The patient was put back to bed and was in very good condition considering that she had been under chloroform four hours. Although the operation was for various reasons a long one, the amount of blood lost was very small. The subsequent management of the case was left in the hands of Drs. Fraser and Deacon. The recovery after the operation was very satisfactory. The highest temperature recorded was 100 1-5°. Shortly after the patient was put to bed one hypodermic injection of 1-8 gr. of morph. sulph. was given, but no anodyne was subsequently needed. There was a slight vaginal discharge, but the gauze did not require changing until the fifth day. An evacuation of the bowels was secured about the same time. The abdominal sutures were removed about the tenth day. About tne same time the first silk ligature came away from the vagina. The last one did not come away until the end of the fifth week, and to cause it to come away some elastic traction was necessary. The patient was able to sit up out of bed at the end of the fourth week.

At the present time, seven months after the operation, the patient expresses herself as feeling well. She is able to do a fair day's work. Has no pain, excepting a slight backache if she is on her feet most of the day, but a short rest in the recumbent posture soon relieves this. She has the hot flushes which are generally present after removal of the ovaries. The brownish pigmentation spots have mostly left her face; the abdominal cicatrix is firm. A digital examination shows the vagina to be closed in at its upper part by a slightly puckered cicatrix; there is, however, no perceptible shortening of the canal. There is no tenderness, nor signs of pelvic exudation, nor a·iy tendency to prolapse of the vaginal vault. With the exception of a few doses of a laxative she has taken no medicine since leaving the hospital.

The specimen which I present for your examination consists of the enlarged uterus, the fibroid growth and the uterine appendages. It has been preserved in a solution of formalin, and as a result has become changed from a dark red

to almost a white color.   At the present time the uterine canal measures six inches, and the mass weighs 2¾ pounds.   At the time of removal the uterine diameter was 7½ inches.   The weight was not taken at that time, but was probably between four and five pounds.   After removal an incision was made into the growth and a considerable quantity of bloody serum escaped.   The growth is intramural and made up of bundles of fibro-myomatous tissue, inter-lacing with one another in such a loose manner as to leave spaces which were filled with bloody serum.   These spaces are probably not cysts in the proper sense of the word, and instead of calling the tumor a fibro-cyst it would pro-bably be better to style it an œdematous intramural fibro-myoma.   Micro-scopical examination shows it to be made up of interlacing bundles of loosely connected fibres.   The right ovary is slightly enlarged and cystic.

Probably a few further remarks concerning the operation would not be out of place.   First, as to the advisability of surgical interference.   In spite of persistent medication with the remedies ordinarily used the tumor kept steadily growing ; at no time had the patient any very severe pain, and she enjoyed a moderately comfortable existence as long as she did not have to work.   Had she been ten or fifteen years older it might have been wise to temporise in order to see what effect the menopause would have on the growth. The patient, however, was young—had probably ten or fifteen years of mens-trual life before her, and if the tumor kept growing as it had been doing, no doubt it would have been only a year or two longer until she would be a help-less invalid.   Moreover, some authorities teach that these œdematous myomata have not the same tendency to become self-limited and cease growing at the menopause as have the firmer varieties.   Treatment of these growths by electrolysis is strongly advocated by some authorities   I have no personal acquaintance with this method, but judging by what I could learn of the mat-ter by reading, I did not think the prospects of cure by the use of electricity were sufficient to warrant me in advising the patient to incur the risk and expense of the experiment.   Of surgical procedures choice had to be made of the following :   (1) Enucleation of the growth alone ; (2) Removal of the ovaries and appendages in order to bring on artificially the menopause ; (3) Amputation of the uterus, leaving behind the whole or portion of the cervix ; (4) The method which was adopted, viz., complete removal of the uterus with the appendages, or as it is styled by some, pan-hysterectomy.

Regarding the removal of the growth alone this would certainly have been the most desirable operation had it been practicable, but the base of the tumor was so intimately incorporated with the substance of the uterine wall and extended so closely to the mucous surface, that it appeared that it would be extremely difficult and hazardous to the patient to undertake any such pro-cedure.   Removal of the ovaries would probably have stopped the menor-rhagia, and in course of time might have caused the growth to disappear. After removal of the ovaries, however, there is no very good reason for leaving the uterus in a case of this kind.   If on opening the abdominal wall it were found that the ovaries were within easy reach and the growth and uterus were bound to important organs by strong adhesions, it might possibly be wise to remove the appendages alone.   Amputation of the uterus, leaving the cervix or a portion of it, would have been difficult in this case owing to the amount of the cervix which was involved in the growth.   At the time of the operation it appeared that it would be easier to remove the entire uterus.   Another reason for performing complete extirpation was that the appearance of the growth srongly suggested that it might be sarcomatous.

The principal points to be observed in the performance of this operation are prevention of sepsis, control of hæmorrhage, and avoidance of the ureters

After proper ligation of the ovarian and uterine vessels on both sides, there is no possibility of alarming hæmorrhage although there may be troublesome bleeding points after division of the vaginal vault. The use of long silk ligatures and leaving them to cut their way through the vessels may seem like a rather primitive method of procedure. However, we did not feel like trusting to the catgut alone for the control of the large vessels, as it was first intended to do. Moreover, the silk ligatures being brought into the vagina, acted as a means of drainage, and after they had done their work there were no foreign bodies left in the pelvis such as would have been the case had they been cut off short. It would perhaps have looked more like skilful surgery to have sutured the peritoneal flaps, but the result showed that this was not necessary. It has been urged by some that in removing the entire uterus there is greater likelihood of vesical, rectal or vaginal prolapse, than if the cervix were left. It is stated, however, by some who have a considerable experience, that this objection is more theoretical than practical, and certainly in this case up to the present time there is no sign of prolapse whatever. Avoidance of the ureters is a very important point. In its normal position the ureter on entering the pelvis crosses the bifurcation of the common iliac arteries and running beneath the broad ligament makes its way toward the bladder. The distance of the ureter from the side of the cervix is given by different authorities as from $\frac{1}{2}$ to $\frac{3}{4}$ of an inch. At this point it is crossed by the uterine artery. As stated before, the ureters were not seen to be recognized as such throughout the operation in this case. In some cases, however, particularly where adhesions are present, the ureter may be much displaced from its normal position.

SOME LEADING EUROPEAN GYNÆCOLOGISTS.

By A. LAPTHORN SMITH, B.A., M.D., M.R.C.S. Eng., Montreal, Can.

This letter will give a short description of what I saw at Leipsic and Brussels, and will conclude my series of three articles on the above topic :

SANGER of Leipsic is a man of about forty-five years of age, and, like all the great men I have seen over here, he is a tremendous worker. Although he is titular professor of the University, he has no beds at the public hospital, but he invited me to his private hospital, No. 24 Koenig Strasse, where he has twenty-five beds, and attends rich and poor alike. He told me that he had had no death there for seven months, during which time he had performed two hundred and twenty operations, seventy of them being laparotomies, either vaginal or abdominal. He attributed his success to his very rigorous asepsis, he and all his nurses and assistants preparing their hands for twenty minutes before the operation. For ten years he has been using coarse sand and soft soap for his hands, followed by alcohol and then sublimate water. He uses nothing but silk, which is prepared as follows : 1st, it is boiled in 1–100 of washing soda to remove the dirt, and then in Bergman's solution, namely 10 of sublimate, 200 of alcohol, and 800 of water. It is then wound on little pieces of wood on which the size is marked and kept in sublimate alcohol. The patient is always shaved the day before and her skin is prepared with soap and water, ether and alcohol and sublimate The preparation of the patient occupied three-quarters of an hour. The assistant in charge of ligatures burned them instead of cutting them. The

first operation was for the removal of a four pound fibroid by abdominal hysterectomy. He removed it with clamps very quickly and then tied each artery separately with No. 6 silk. He only crosses his first knot once. His hemostasis is very perfect, and he keeps on tying until the wound is absolutely dry. His method of sewing up the abdominal wound is peculiar; he passes silk sutures on two needles from within every centimetre apart, including the whole abdominal wall, but only the very edge of the skin. Before tying them he put in another row of interrupted No. 3 silk sutures so as to bring the fascia and muscles together exactly, and these remain permanently. Between the through-and-through stitches he placed superficial silk ones every half centimetre, so that they were very close together. The wound was then covered with a light strip of idoform gauze and covered with a large strip of plaster very carefully sealed. Next day he did a precisely similar operation. He takes about one hundred minutes to do the operation, being the most careful man I have yet seen. Ether was the anæsthetic used and the inhaler was a large wire mask covered with rubber, completely covering the face, so that a comparatively small quantity was employed. As the patient was only twenty-six years of age he left the ovary and tube in the peritoneal cavity so as to prevent her from having the nerve storms of the artificial menopause. The third morning he removed a hernial sac from the left inguinal canal, which contained a rudimentary uterus, a tumor of the right tube and ovary and a rudimentary left tube. This was a very rare case, there being only a few on record. The fourth morning he performed implantation of the ureter into the bladder. I was fortunate in seeing this operation, as this was only the third time that it has been done in Germany, once by Wurtzel and once by another operator whose name I forget, although it has been done in America several times, I think by Boldt of New York. On opening the abdomen he found that she had closed tubes and that one ovary contained a large cyst. He cut out the cyst and left the rest of the ovary after carefully sewing up the flaps with fine interrupted silk ligatures. He opened up the closed tubes by cutting off the fimbræ, and sewing the mucous membrane to the peritoneal edge, so as to make a new pavilion. The patient, who was a young woman, had had a very severe first confinement during which the uterus and ureter were torn across, and when they healed there was a utero-ureteral fistula and her urine poured constantly from the cervical canal. Sanger began by cutting the ureter off level with the uterus after putting a temporary ligature on it. He then sewed up the hole in the uterus, after which he dissected out the ureter from its original home beside the iliac artery until he had it free to a distance of six inches. He then closed the long opening in the peritoneum, after which he threaded the ureter attached to a bodkin, so to speak, between the peritoneum and the abdominal wall into the top of the bladder where he carefully stitched it. I have since heard that the operation was a perfect success. I was perfectly delighted with the few mornings I spent with Sanger, and I have no hesitation in classing him among the world's gynæcologists of the first rank.

ZWEIFEL of Leipsic is the *geheimrath* or chief professor of gynæcology, and has a large number of beds in the public hospital for women, which is a large and beautiful building. He is about sixty-five years of age. I saw him perform a very difficult operation for vesico-vaginal fistula in a woman who had hysterectomy several years before in another city. As the day was dark he used a very nice electric head light supplied from the street current. The nurses did all the shaving and scrubbing in the operating room while the assistants were getting ready. As it was high up he had the greatest difficulty in paring the edges and in passing the ligatures, and then he found that

in paring the fistula he had opened into the peritoneal cavity. He at once, without rising from his seat, made a nine-inch incision in the abdomen and instead of using Trendelenburg's posture to get the intestines out of the way, an assistant took the bowels out of the abdomen and held them back so as to give him room and in this he had great difficulty. As Leipsic is Trendelenburg's town, I was surprised to see anyone in Leipsic open the abdomen with the patient horizontal. He finally succeeded in closing the fistula so that it stood the test that the bladder being distended with water, none escaped either into the peritoneum or into the vagina. He closed the abdominal incision with one layer of catgut for the peritoneum ; a second for the fascia and a third for the skin with a sort of sewing machine lock-stitch, with two needles, which I had never seen elsewhere, and which made a very fine union of the skin. His assistant then operated on a ventral hernia which had followed laparotomy. As he did not employ Trendelenburg's position he had a good deal of difficulty in keeping the bowels in. I saw a very interesting operation performed by Dr. George Trendelenburg's assistant. It was a colostomy for cancer of the rectum and uterus, and instead of opening the colon in the inguinal region, he made a median incision near the epigastrium and drew the transverse colon out two or three inches and sewed it there. Then he made another incision two or three inches to the left of the first, but only through the skin. The loop of intestines was passed under the skin and brought out of the second incision and carefully stitched there. The first incision was carefully closed and sealed with collodion, after which the bowel was opened at the second incision and the mucous membrane sewed to the skin, when the pent-up fœcus poured out. By this ingenious operation, invented by Winzel and Van Hacker of Innsbruck, perfect control of the artificial anus is obtained, simply by pressing a pad over the colon as it passes under the skin, and the patient can have one or two evacuations a day.

TRENDELENBURG of Leipsic. Although not a gynæcologist, yet he has, next to Lister, done more for gynæcological surgery than any other man living, and I made him a visit especially to tell him that we thought of him and thanked him every time we did an abdominal hysterectomy or other piece of difficult pelvic surgery. Those of my readers who have never seen a bad pair of pus tubes removed in the pre-Trendelenburg days, can have no idea of the misery which the operator endured nor of the danger to which the patient was exposed. As the work was all done in the dark, the intestines were often torn or infected without our knowing it, or some little artery would be steadily pumping into the peritoneum without being seen. Now all that is changed ; the intestines are out of the way, and we cover them with sterilized towels and we have a large, well lighted space to work in, so that we tie every oozing point until the peritoneum is perfectly dry and clean. As I did not see any nice table there it would be quite appropriate if the abdominal surgeons of America were to present him with a solid silver Trendelenburg table. I attended one of his clinics at which there were over a hundred students present, and it was easy to see how much he was beloved by them. He is a man of over fifty, but of exceeding modest appearance, and as he called batches of students down to the arena to examine the patients who were wheeled in, he gave each one the marks he had earned.

JACOBS of Brussels, although only thirty-five years of age, has by his enormous industry reached one of the highest positions in Europe. I am told that he is not connected with the University, the position of professor of gynæcology there being held by a military surgeon ; nor has he any beds at any of the public hospitals of Brussels : but he has forty-five beds at his own private hospital which is the most beautiful I have seen either in Europe or

America, and its cost being over a hundred thousand dollars. The nurses are Catholic sisters. He has opened the abdomen by vagnia, mostly for hysterectomy, seven hundred times with a death rate of less than two per cent., and he has performed over one hundred abdominal laparotomies for removal of the uterus and appendages with less than two per cent. of deaths. His method of disinfection is peculiarly his own, so I will describe it : 1st. He scrubs the patient with green soap dissolved in alcohol, and shaves her himself. If the operation is a vaginal one then he uses a sponge on a holder to scrub the vagina. The field of operation is then scrubbed with equal parts of saturated solution of carbonate of ammonia and bitrate of soda. He then scrubs with alcohol, then with two per cent. of formaline. The first morning he did a perineorrhaphy, taking a great deal of time to it, but doing it beautifully, using black silk for most of the stitches, only three of them being of silkworm gut. The stitches were only one-eighth of an inch apart. He then sealed the wound with alternate layers of iodoform and collodion, so that it was quite air and water proof. He obtains his silk from a Bordeaux chemist already sterilized, wound on glass tubes and enclosed in other tubes sealed with a rubber band. The Bordeaux firm buys it from a Philadelphia firm, which in turn buys it from an English firm, which in turn obtains it from China. He has also the daintiest operating room I have ever seen, all the tables being of polished brass and plate glass. Next day he removed the uterus tubes, and ovaries by the abdomen for double pyosalpnix, an ovarian cyst and a fibroid tumor. One peculiarity about his method is that he cuts first and ties only the vessels which spurt as he goes along, his object being to put four or six ligatures at the most on the isolated arteries and not on the nerves. And this reminds me of his answer to the important question which was the main object of my visit to Brussels. Why, I asked, did he abandon vaginal hysterectomy with clamps in which he had become so wonderfully successful ? Because, he said, with the clamps you compress the nerves and cause the woman so much suffering for two days that it takes her two weeks to get over it, while if you tie only the arteries and close up the peritoneum, she will be practically well the next day. In this case as the tubes were adherent to the whole anterior surface of the rectum, he carefully detached these with scissors until he had entirely freed the two large tubes as thick as sausages. He then removed them in one piece with the uterus at the level of the internal os, and cauterized the cervical canal, and sewed the two flaps of the cervix together. The denuded rectum was cleverly covered by sewing the anterior flap to it. He had the fewest assistants I have yet seen, one of them being dispensed with by using an abdominal speculum or retractor at the lower end of the incision, and this was held tightly drawn down by having a chain and a weight attached to it, and he did not have any side holders. In closing the abdomen he used thin buried silkworm gut for the peritoneum and fascia, and larger ones for the fat and skin, and he dressed it with plain dry sterilized gauze ; but this was covered most thoroughly with diachylon plaster, several layers, each piece overlapping the other. He was very careful and took nearly two hours to the operation, chloroform being used ; he tells me that he considers half an hour more of no consequence compared with the importance of thorough hemostasis. Like Sanger, he brings the skin sutures very near the edge of the wound. Next day he removed an ovary and tube from a young woman, although he told me that his experience with conservative surgery was far from satisfactory. In cases in which he had cut out the half of an ovary they had suffered for many years afterwards from cicatrical contraction in the portion that was left ; while in cases in which he had

removed the uterus for fibroid, leaving the ovaries, the latter had within two years completely atrophied. Moreover, he said that since we had ovarian extract at our command, we no longer have anything to fear from the artificial menopause. To every woman in whom this occurs he gives extract of cow's ovaries every morning in a glass of port wine, which makes it so palatable that they do not know they are taking it. He says he has even cured insanity with it. The next day he removed tubes and ovaries from a woman whose peritoneum was covered with miliary tubercle which, he said, he had several times seen cured by laparotomy. He allows his patients to eat heartily the day before the operation, but not for several days after; he does not fear distension of the bowels, which he says always remains sepsis. He never gives strychnine, but gives them plenty of morphine if they are in pain. He thinks that the high death rate of certain celebrated operators is due to their working at such great speed that rigorous asepsis is impossible. Next day he removed a cancerous uterus by the abdomen, first getting rid of the appendages and fundus down to internal os. He then split the cervix down the middle so as to get his left forefinger into the vagina, previously stuffed with sublimate gauze, rendering the removal of the cervix very easy, as he had only to cut it all around as it lay on his finger, at the same time feeling if the vagina was infiltrated. He also feels if there are injected glands in the broad ligament and removes them. In all his work Jacobs is an artist, using his knife like a paint brush, while in his plastic work one would think he was sketching with a pencil. I had the pleasure of spending an evening with him at his palatial residence, 53 Boulevard Waterloo, full of rare works of art, and was astonished to see him and one of his assistants sit down at two pianos and play Wagner's most difficult pieces at sight while another sang.

This concludes my series of three articles, and I trust that my effort to share the priceless privilege I have enjoyed of seeing these great men at work will be appreciated by those who cannot get away and who must see these things through the eyes of others.

Special Selections.

THE TOXIC ORIGIN OF DISEASE.*

By Thomas Richard Fraser, M.D., F.R.C.P.Edin., LL.D.Aberd., F.R.S.,

Professor of Materia Medica and Clinical Medicine, University of Edinburgh.

When this Association last met in Edinburgh the Address in Medicine was delivered by the accomplished and universally beloved physician, Dr. Warburton Begbie, and notwithstanding the lapse of time, I can still recall—and there are others here also able to recall—the thesis which formed the subject of the address, expressed in the inquiry, Has the practice of medicine made a single step since the time of Hippocrates?

In dealing with this thesis, Dr. Begbie described the history of medicine from its beginnings, as only could be done by one who had not only carefully studied the writings of the Fathers of medicine, but had also made himself familiar with the work of their successors. The doctrines regarding the nature of disease, which successfully replaced each other during the twenty-three centuries dealt with, were clearly described, and, as was to be expected from the practical physician, he fully discussed the bearings of these doctrines upon treatment, and pointed to the more conspicuous acquisitions in the healing art which had enriched practical medicine.

He had the opportunity of showing how greatly medical doctrine had been transformed by Harvey's discovery of the circulation of the blood; how the diagnosis of pulmonary and cardiac disease had received an extension and previously unknown definition from Laennec's discovery of auscultation; how the memorable discoveries and courageous applications of nitrous oxide, ether, and chloro-

form, by Horace Wells, Morton, and Simpson, had deprived the knife of the surgeon and the reproduction of animal life of much of their former terrors and anxieties; and how by that vaccination, which will ever be associated with the name of Jenner—the first and still unsurpassed means of restricting the ravages of a fatal infectious disease—an almost incalculable benefit had been conferred upon the human race.

From his elaborate survey of the history of medicine, he concluded that no general doctrine—chemical, physical, humoral or physiological—had been propounded which satisfactorily explained the nature and production of disease : that therapeutic advancement had been obtained, chiefly by the observation of patients, by adhesion to the classic method of rational empiricism ; and that by this method such valuable accessions to the means of treating disease had been gained as the administration of turpentine in pulmonary gangrene and bronchitic affections ; of quinine in intermittent fever ; of iodide of potassium in syphilitic periostitis and thoracic aneurysm ; of bromide of potassium in epilepsy ; and of cod-liver oil in pulmonary tubercle.

It may not be without interest to consider to-day how far, and in what directions, this great and wide subject of medicine has chiefly advanced since Dr. Begbie delivered his address. The intervening period is the relatively brief one of scarcely a quarter of a century. It has, however, been signalized by a great increase of know-

* Address in Medicine at the Annual Meeting of the British Medical Association at Edinburgh, July, 1898.

ledge regarding the fundamental sciences of chemistry, physiology, and morbid anatomy ; by the creation of pharmacology as a science of the action of remedies ; by steady advance in symptomatology and diagnosis, and above all by so remarkable a development in our conceptions of the nature and production of many diseases, that we appear almost to have attained a position, vainly sought for during centuries by our predecessors, of being able to formulate a doctrine of disease, founded upon the satisfactory basis of experimental demonstration, and sufficient to explain many of its forms and to already provide us with assured means and principles for its prevention and treatment.

While fully acknowledging the merits of the workers in medical science and practice by whom this gratifying progress has been made, it cannot be forgotten that the necessary pioneer work was undertaken amid difficulties of exploration in dark and unknown regions ; and that but for this pioneer work the present generation would not have been able to-reap so prolific a harvest of medical discovery.

This indebtedness to our predecessors is nowhere more conspicuously shown than in the advancements that have been made in the diagnosis of disease. Observation, careful and intelligent, practised by the Fathers of medicine, had already constructed a nosology sufficient to distinguish the great majority of diseases and so complete that it is doubtful if much advance could have been made had the methods in use at the commencement of this quarter of a century alone be trusted to. The introduction, however, of physical aids to our senses, and of chemical applications and methods—each rendered possible by the growth of collateral science—has placed us in a position from which we have been able to advance in accuracy of diagnosis, and even in the discovery of new diseases.

By the apparatus now in use for blood determinations the condition of this fluid in regard to many of its most important constituents can be exactly determined, and information can be obtained valuable for treatment, and previously unattainable by any perfection of intelligent observation by means of the unaided senses. The sphygmograph depicts with precision of detail changes in the pulse which are difficult to apprehend by the unaided finger, even after a long apprenticeship, and above all increases the usefulness of the physician by indicating the characters which, without its use, he should be trained to detect. He is thus enabled to appreciate changes, which are not only of the highest value in prognosis, but are also frequently sufficient, either in themselves or aided by the most superficial of further observation, to justify without auscultation the diagnosis of the cardiac lesion which is present. The ophthalmoscope has increased the certainty of diagnosis of many nervous affections and toxic processes, and some of the difficulties of clinical observation have been overcome by radiography, whose capabilities, however, are as yet undeveloped.

By the introduction of chemical processes applied especially to the examination of the stomach contents, and of the urinary and other secretions, diagnosis has also been advanced, and previously unknown precision has been obtained. The agglutinating effects of the blood serum in certain infective diseases, as typhoid, Malta, and relapsing fevers, and in cholera and anthrax, upon their respective pathogenic organisms ; and the application of chemical pigments to reveal the existence of the microscopically minute organisms of such diseases as pulmonary tubercle, pneumonia, and diphtheria has removed many of the perplexities of diagnosis and rendered identification almost a mechanical art.

While by these and other means

the diagnosis of diseases—a funda-
mental work in the art of medicine—
has conspicuously advanced during
the last quarter of a century, this
advancement, however great, does not
in itself justify any claim to a nearer
approach to the realization of the
highest aims and objects of medicine.
Diagnosis, for the most part, deals
only with symptoms, it has no imme-
diate concern with the true nature of
the malady, and until this has been
de'ermined progress in treatment can
only be tardy and unsatisfactory.
The history of medicine has shown
that the advarce in these two depart-
ments has rarely, if ever, been
parallel or equal. The one may
reach a position of almost ideal per-
fection, while the other still remains
in the initial stage of vague specula-
tion. This is exemplified by the pre-
sent state of knowledge of nervous
diseases. Minute symptoms have
been identified, and have been so
arranged in groups as to constitute
special diseases, and thus numerous
forms of disease associated with
morbid lesions of parts of the spinal
cord or brain have been created. The
elaboration is a remarkable triumph
of painstaking and skilful observation
in symptomatology and in morbid
anatomy. It presents a field for the
training of the powers of observation
and reason, probably unsurpassed by
any other problems in practical medi-
cine, and the solution of these prob-
lems is undoubtedly a cause of satis-
faction to the physician, as it frequent-
ly also is to the patient. To what
extent, however, is the patient a
gainer ? To what extent is the object
of diagnosis and of all medical know-
ledge fulfilled ? It must be admitted
that the gain in most cases is disap-
pointing. The natural course of the
disease is no doubt often beneficially
modified, but usually to only a slight
extent, unless surgical treatment be
successfully applied, which even the
scientific discoveries of Ferrier and
Horsley and the surgical skill of
Durante, Kocher, Macewen, and

others have rendered possible in rela-
tively few cases. Whether the inves-
tigation of the condition of the patient
leads to the diagnosis of acute ascend-
ing paralysis or anterior cornual de-
generation, of spastic paraplegia or
locomotor ataxia, of syringomyelia or
bulbar paralysis, the methods of
treatment are much the same; and
while we may have some satisfaction
in adopting measures to relieve symp-
toms or to protect the patient against
conditions favorable 'o the progress
of the disease, or to increase the
general powers of resistance, we most
frequently find ourselves in the mor-
tifying position of being unable to
cure the disease. In those cases, on
the other hand, where it is possible to
advance from diagnosis to the deter-
mination of the actual cause of the
disease, wher remedies are employed
which have been proved to be cura-
tive as regards that cause, the disease,
whatever be its position in the artifi-
cial nosology of nerve affections, may
in many instances be arrested in its
progress, and many even be cured,
provided the affected tissues have not
already undergone incurable destruc-
tion.

At the present epoch in medicine it
is especially interesting to recognize
that the latter gratifying results are to
be obtained when there is reason to
believe that the disease has been
caused by a toxic substance present
in the body, and that according as this
substance is the poison of syphilis, or
of rheumatism, or of malaria, is the
cure effected by remedies which have
proved capable of annulling the toxic
effects of these poisons. It is thereby
shown that the disease is not truly a
product of the structural alterations
which are present, but of a hurtful
substance or poison capable among
other effects of producing these struc-
tural alterations. Similar facts are
observed with many ordinary poisons,
and an association, highly significant
in regard to the production of disease,
is thus indicated. Many of the more
common poisons also produce changes

in structure closely simulating the changes of disease, as the peripheral neuritis, anterior cornual degeneration, granulo-fatty degenerations, and arterial sclerosis of lead ; the liver steatosis and yellow atrophy of phosphorus ; and the fatty degenerations and diffuse sclerotic of hyperplasia of the liver, the peripheral neuritis and the atheromatous changes in blood vessels produced by alcohol.

By such facts, acquisitions of modern pathology, it is strongly suggested that the structural changes found in many diseases may, after all, be mere manifestations, associated with other effects, of a cause which would thus assume the importance of being the essence, the *vera causa*, of the disease, and that this essence is a toxic substance. This idea is rapidly becoming the predominant doctrine of the present-day conception of disease, and as investigation proceeds it is almost daily receiving support from new facts. It has been demonstrated that the body is constantly subjected to the risks of poisons produced within itself, as well as of poisons introduced into it from without. Many of the poisons produced in the body, such as the ptomaines and leucomaines, are of the chemical nature of the previously known alkaloids, and not a few of them rival the vegetable alkaloids in toxic power and reproduce their leading effects. Nervine, for instance is lethal in minute doses, and acts in many respects like pilocarpin ; while muscarin finds its analogue in the active principle elaborated by poisonous fungi.

The organism, even in a state of health, is a veritable storehouse of these toxic substances. Many of its normal constituents, such as potash salts and carbonic acid, are well-recognized poisons; many of the products of its glands, such as saliva and bile, contain toxic ingredients ; many of the substances formed in the processes of disassimilation, and which enter such secretions as the urine and the intestinal canal, are capable of disordering health and even of endangering life ; and in disorders of function, even if they amount to little more than mere disturbance of nutrition, poisons not found in the healthy body are generated and produce the symptoms of disease. By such toxic influences the symptoms of cholæmia, gout, rheumatism, uræmia, diabetic coma, stercoræmia, and probably also of chorea, sunstroke, neurasthenia, asthma and the idiopathic anæmias receive a sufficient explanation, even although the toxic substances have not in all cases been identified.

The doctrine of the toxic origin of disease has also been applied to mental affections. Auto-intoxication from poisons produced in the intestinal canal is believed to be an important factor in the causation of insanity, and already neurologists, such as Nissr and Van Giesen, have expressed the opinion that the toxæmic theory is destined to clear away much of the present vagueness regarding the pathogenesis of mental disease. Further, it is not improbable that in cancer, auto-intoxication by a poison generated in the cancer cells, equally with, and in some instances to a greater extent than, structural degenerations of invaded tissues, accounts for the symptoms and for the fatal termination—a probability which has been strengthened by the separation from cancer of a substance possessing a hyperthermic and powerfully lethal action.

The widely acting pathogenic influence of poisonous substances has, however, received its most definite and convincing support from the remarkable discoveries in bacteriology which have signalized this period. The gravity and wide prevalence of infective diseases had rendered them a subject of special study from the earliest period. Rhazes in the seventeenth century propounded the view that smallpox was essentially a fermentative disease, and thus originated the doctrine of the fermentative nature of all infectious disease. Previously

to this time a theory of the parasitic origin of these diseases have been propounded, and its more enthusiastic supporters gave a reality to their views by such statements as that syphilis was caused by a minute worm, and measles, smallpox, and plague by infusorial animals or invisibly minute insects. With the introduction of the compound microscope the parasitic theory disappeared in this gross form of it, and the fermentative theory was again adopted. It was not, however, until 1861, when Pasteur's great discovery of the nature of butyric fermentation was made public, that the sufficiency of the theory became revealed. His demonstration of the essential part played by minute living structures in the transformations which constitute the process of fermentation at length removed the process from the mysteries which had previously surrounded it, and opened up applications to the pathogenesis of infective diseases which have revolutionized medicine. He pointed out that the organisms of fermentation are similar to those which had already been discovered by Rayer and Davaine in anthrax. He subsequently demonstrated the virulent nature of the microbes of pyæmia and infected gangrene, and, following Koch's work on the cultivation outside of the body of the bacillus of anthrax, he proved also that this bacillus, as well as that of fowl cholera, is able when grown in suitable media, to reproduce itself almost indefinitely, and to retain for many generations its power to cause the symptoms of the original disease when inoculated into animals.

The way was thus opened up for important additions to the knowledge of the etiology of infective diseases, and, in rapid succession, the pathogenic micro-organisms of swine fever, glanders, tubercle, Asiatic cholera, septicæmia, erysipelas, pneumonia, and numerous other infective diseases were discovered.

The pathogenic action of the microbes was at first attributed either to mechanical obstruction of the blood vessels, caused by their accumulation in them, which resulted in asphyxia of organs essential to life ; or to a biological action which enabled them to appropriate nutritive materials destined for the tissues of the body, and thus to deprive these tissues of life. While, in the case of a few of them, both of these actions may to a slight extent explain their effects, it was subsequently proved that these effects are mainly caused by the poisons which they produce. The poisons are of complex composition ; some are alkaloids, and others modified proteids, and others, again, have altogether unknown chemical composition. Many of them are of extreme and almost indefinitely great activity ; one milligramme, for instance, of the dry poisonous constituents of tetanus toxin is sufficient to kill a horse, or 600 million times its weight of living tissue ; while the hyperthermal effects of tubercle toxin are appreciable when the dry toxin in doses of from one to two-tenths of a milligramme, is injected, representing a strong reaction on 60 trillions of its weight of living human substance. Like other poisons, further, they are capable of producing structural changes, exemplified in the skin eruptions produced by many infectious diseases ; the focal necrosis of peripheral nerves produced by the diphtheria poison ; the fatty changes and longitudinal fibrillation of the heart muscle produced by this poison, and also by that of anthrax ; the cerebro-spinal meningitis produced by the poison of influenza ; the anterior cornual and muscle degenerations and the neuritis produced by the poisons of tetanus and diphtheria ; the acute parenchymatous and hæmorrhagic nephritis produced by serpents' venom; and in the production of nodules in the lungs, reproducing the characteristics of pulmonary tuberculosis, by dead tubercle bacilli.

The demonstration of the toxic

origin of infectious diseases has thus added greatly to the number of diseases which are caused by poisons, and has thereby been largely instrumental in establishing the doctrine of the toxic origin of disease. Unlike the older doctrines of the iatrochemists, humoralists, and physiologists, this doctrine is supported by an abundance of convincing facts ; and it may confidently be anticipated that it will have an endurance which former systems of medicine have not possessed.

Large numbers of disease-producing poisons are thus ever present in the body, created by the normal processes of life, and abundantly produced by departures, even in themselves unimportant, from these processes. Many substances well known to have poisonous properties are intentionally introduced into the body, such as alcohol, tobacco, tea, and opium, while others, such as lead, accidentally find their way into it. The respiratory passages and intestinal canal are crowded with micro-organisms, and they teem in the soil, air, and articles of food. Many of them are producers of virulent poisons, and when they effect a lodgment in the body and find conditions congenial to development, they proliferate with so great rapidity that a single bacterium may in twenty-four hours have multiplied itself into many millions of separate toxin-creating organisms.

In these circumstances, it is of interest to inquire what defence man and other animals can oppose to the disease and death-producing poisons by which they are so constantly endangered ? Instances have long been known of the possession of defensive powers against the ordinary poisons, organic and inorganic. Certain animals are, by hereditary endowment, able to receive with impunity large quantities of poisons, which in minute quantities are hurtful to other animals, well exemplified in the enormous quantities of belladonna and opium which may be administered without

injury to the herbivora. It is also notorious that man and other animals may become so habituated to the action of several toxic substances that, in the course of time, doses greatly in excess of the minimum lethal are no longer able to cause death or even much inconvenience. Such acquired powers of defence are produced against arsenic, opium, alcohol, and tobacco, and they are also illustrated in the effects of nitrile ethers.

Explanations for these exceptional powers of defence have been found in the special activity of the processes of elimination, and particularly of elimination by the kidneys, whereby the quantity of poison requisite to cause injury is prevented from being present in the blood ; in an unusual power of producing decomposition, probably dependent on special chemical conditions of the blood, by which, for example, herbivorous animals are enabled to convert very large quantities of atropine into relatively inert tropine substances ; and on the property which certain organs, and especially the liver. possess of absorbing and retaining toxic substances and of thus preventing their access to the structures on which they act in quantity sufficient to be hurtful. In the case, further, of many organic poisons, absorption and diffusion are impeded by the walls of cells, as in the instance of the slow absorption of strychnine through the stomach walls and of many albuminoid poisons through the intestinal epidermis.

These explanations, however, do not account for all the observed phenomena, and it must in the meantime be assumed that tissues may gradually become accustomed, possibly by exhaustion, to the perturbations produced by substances which modify their normal condition, so that by-and-by a tolerance is induced.

Anticipating some statements which will afterwards be made, a fundamental difference exists between both congenital and acquired defence against ordinary poisons and that re-

sulting from the action of disease toxins, venoms, and such-like poisons, in so far that in the former there is not produced in the blood any substance which plays the part of an efficient counter-poison or antitoxin.

The subject has, however, gained a new importance from the remarkable facts discovered in connection with the poisons generated by pathogenic micro-organisms, and in connection also with other poisons of very similar chemical composition, represented especially by the venom of serpents and by the vegetable products abrin and ricin.

It had long been known that many infectious diseases conferred upon those who had suffered from them a power of resistance against subsequent attacks of the same disease. After the discovery had been made —and to this I have already alluded —of the microbian origin of infective diseases, it was experimentally shown that if the microbes constituting the cause of any infective disease were inoculated into animals, not only were symptoms of the disease produced, but also that the animal, if it survived, reproduced still further the events of an infectious illness, by acquiring a power of successfully resisting the morbific influence of the same microbes subsequently inoculated. It has likewise been found that each of these events could be reproduced by the filtered, and therefore microbe-free, solution, in which the pathogenic microbes had been cultivated, and thus it was demonstrated that neither the original disease nor the subsequently acquired production was actually due to the microbe, but to toxic substances produced by it.

From this position the further great advance was made that the blood serum of protected animals, itself destitute of poisonous properties, when introduced into non-protected animals conferred upon them a resisting power which might be so great that even large lethal doses of the virulent micro-organism and of its toxin no longer produced death or even symptoms of poisoning.

These remarkable results of experiment deservedly claim much attention. They irrefutably demonstrate that infectious diseases are in their essence poisonings; they throw much light on the mystery, previously shrouded in metaphysical phrases, of the nature of the protection acquired by attacks of infectious disease or conferred by vaccination; and they have not only at once led to valuable therapeutic results, but they indicate further applications, both in the prevention and treatment of disease, exceeding in their possibilities any expectations that had previously been originated by discovery in medical science.

Inquiry into the nature and cause of this protection has thereby been removed from the position of speculation long occupied by it to one in which experimental methods could be pursued with some hope of solving the problems. Many of the results, however, are yet difficult to explain, and considering that new facts bearing upon them are almost daily being obtained, it is not to be expected that altogether satisfactory solutions had been found or unanimity of opinion obtained. More especially does this apply to the nature of the process whereby protection or immunization is obtained, to the origin of the protection-producing substances or antitoxins, and to the manner in which they act as curative or therapeutic agents.

As in the case of some of the ordinary poisons, mineral and vegetable, it may be admitted that a portion of the acquired protection is due to the tolerance brought about by the accustoming of the structures of the body to the action of the poison, but this tolerance could not continue for the long periods during which acquired immunity sometimes persists after the infected disease has been recovered from. It may also be admitted that pathogenic micro-organisms absorb

and thus remove from the body certain constituents necessary for their growth and vitality, whose removal may, to some slight extent, render the body unsuited for the further growth of these organisms ; but, apart from other objections that might be advanced, it is inconceivable that this cause could operate in the bodies of animals which so rapidly change the composition of all their constituent parts, and that therefore the substances which have been removed would not very soon be again restored to the body, and thus render it vulnerable to fresh infections. The doctrine of phagocytosis, enunciated and ably and strenuously supported by Metchnikoff, in which protection is attributed to the power possessed by leucocytes of absorbing and destroying microbes, may, to a limited extent, account for the destruction of living microbes, but it probably accounts to a greater extent for their disappearance after life is extinct ; while it can have but little influence upon the soluble toxins which, since the introduction of the theory of phagocytosis, have been proved to be in most cases the true cause of the disease symptoms.

The frequent persistency of immunity, not only exemplified in the after-history of patients who have recovered from certain of the infectious diseases, but also in vaccination against small-pox, as it alone serves to disprove each explanation yet advanced of the essential nature of acquired protection, must be taken into account in formulating explanations. The micro-organism of an infected disease introduced into the body produces the characteristic symptoms of the disease, and, if the animal recover, subsequent inoculations of this micro-organism no longer produce any injury. The animal has become protected against the disease, and there is abundant clinical evidence to show that in the case of the majority of infectious diseases the immunity lasts for many years. The

pathogenic organism of the same disease cultivated outside the body produces a toxin which, when administered to an animal, likewise reproduces the symptoms of the disease, and if the animal recover, and further quantities of the toxin are successively administered, an immunity may be acquired so great that the animal suffers but little inconvenience when 50 times the minimum-lethal dose, or even a larger quantity, of this toxin is now administered to it. The immunity required in the latter case is, however, of only short duration. I do not know if the duration of it has been defined with any of the toxins of disease, except with the toxin of diphtheria, and Roux and Klein have shown that with this toxin it lasts only from five to seven days. Enough, at least, has been done to show that it is brief when compared with the immunity produced by the microbes from which the toxins had originated, and Klein remarks that a serum which may be relied on to afford any durable protection is still a desideratum. It is also interesting to note that Monckton Copeman has found that lymph filtered so as to remove from it all solid particles, and therefore presumably all micro-organisms, can produce only a briefly lasting protection against unfiltered vaccine lymph of normal potency. In the case of the venoms of serpents— which in composition, and in other important respects, are analogous to the toxins of disease—the duration of immunity has, however, been defined ; and experiments have shown that if an animal be protected so as to survive the minimum-lethal dose of the cobra venom, the protection produced against the same dose of venom does not last longer than a few hours ; and even when the process of immunization has been carried so far that the animal can survive four times the minimum lethal, the protection against this dose of venom exists for only thirty days.

The protecting substance, antitox-

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in or antivenin, which appears in the blood after inoculation with pathogenic microbes, or after the injection of toxins or venoms, is chemically unstable, and is subject also to the general processes of elimination. Its presence in the body, even when the quantity of toxic substance to which it owes its origin is greatly above the quantity of toxin which has been elaborated in a case of infectious disease by the pathogenic organisms of that disease, is to be measured by days only; and, nevertheless, the protection produced in a patient by an infectious disease may apparently endure for a lifetime, and the immunity from smallpox gained by vaccination for at least seven years. It appears to me impossible to explain these contrasting facts on any other supposition than that, in the instances of prolonged immunity, successive supplies of the antitoxin of the disease, or of smallpox, must be furnished to the body during the time that protection continues. It is not possible, however, that these supplies could emanate from the pathogenic organism itself, for the life of the host would not endure were it retained in the body in its condition of original virulence. Jenner himself believed that vaccinia is a modified smallpox. The microbe of smallpox, like all other microbes, is greatly influenced by its surroundings. When transferred from man to the calf, it is now known that it may gradually acquire the characteristics of vaccinia, and elaborate substances which reproduce in man the protective effects of inoculation with human vaccine. The microbe of small-pox, therefore, has obviously become so modified that, while it can no longer produce a virulent toxin, it still retains the power of elaborating a protective antitoxin, and also retains sufficient vitality to reproduce its like through many generations in the human body.

Evidence pointing in the same direction has been obtained with other pathogenic microbes. Pasteur found

that the microbe of fowl cholera, when treated in a certain manner, can have its virulence greatly lessened, and if it be then injected into the tissues of fowls, only slight poisoning is produced. From fowls thus treated, microbes are obtained also capable of producing only slight poisoning, and inoculations can be carried through a successive series of fowls with a like result. Each of these fowls had by this inoculation with a weakened or attenuated microbe become protected against the original and virulent microbe.

In the case of the pathogenic microorganism of anthrax, this great pioneer in the field of the microbian etiology of disease discovered similar facts. If grown outside of the body at a temperature of $42.5°$ C. for eight days, this microbe could no longer produce the disease in susceptible animals, but, notwithstanding, it endowed them with a certain degree of protection against the original virulent microbe. Similar results were obtained with the microbe of hog fever, and it is important to note that a duration of immunity exceeding that known to be produced by any toxin was obtained, for the protection following inoculation of the attenuated microbe lasted for at least one year.

These instances are sufficient to show that immunity equally with poisoning is dependent upon a soluble substance produced by the microorganisms; that the duration of even a high degree of immunity resulting from the introduction into the body of the immunizing substance as distinguished from the microbe is only of brief duration; and, accordingly, with the existing evidence, it is impossible to account for the prolonged immunity following upon the recovery from many infective diseases, or from inoculation with vaccine lymph, otherwise than by assuming that so long as immunity continues the microbian sources of infective disease continue to exist in an attenuated and otherwise modified form in the protected body.

Attenuation for the purposes of protection would therefore appear to be essentially a process in which the condition of life of the microbe is so altered that its capacity for manufacturing poisons is weakened or destroyed, while its disease-preventing properties are retained. Unless by education we can so tame and civilize a pathogenic microbe as to subdue its virulent and hostile disposition, while at the same time its beneficial and protective properties are left unimpaired, the hope of obtaining—as for plague, cholera, and tubercle—immunizing vaccines equal in efficiency to the lymph of vaccinia will probably never be realized.

The theory which I have suggested implies that long-enduring protection from infective disease cannot be obtained by the introduction into the body of either the poisonous or the immunizing products of microbes—the toxins or antitoxins—but only by inoculation of such microbes as are capable in the body of assuming a non-virulent form, or of microbes already converted into this form.

I would here point out that, however highly we may value the objects and success in some important directions of the experiments of Dr. Monckton Copeman and others on the effects of glycerine upon vaccine lymph, it must not be overlooked that the powerful microbicidal action of glycerine upon the contaminating organisms of this lymph, may, in the course of time, weaken or even destroy the activity of the specific organism by which the long-lasting protection against smallpox is produced.

In the case of some diseases it is possible that the modification of the pathogenic power of the micro-organism necessary to convert it from a poison-producing to an antidote-producing agent cannot be accomplished in the body. Thus may be explained the failure of certain diseases to protect the body from subsequent attacks of the same disease, well recognized in the instances of pneumonia, influenza, diphtheria, rheumatic fever, erysipelas, and tubercle. On the other hand, the microbes of other diseases may, in small numbers, and attenuated both in virulence and in power of conferring protection, persist in the body after convalescence has been established and actually rendered it not only more susceptible to fresh infection but also to a recurrence of the disease by auto-infection. Results obtained by experiments with toxin and venom support the former possibility, for owing to some as yet unexplained individual peculiarity, an animal which had received a number of successive doses of toxin or venom, each considerably below the minimum lethal, instead of having thereby acquired protection, may unexpectedly exhibit serious symptoms of poisoning, and may even die when it receives a dose considerably below that required to produce death in an animal which had not previously received any toxin or venom. The probability of the second event is supported by the well-known effects upon the life and pathogenic power of microbes of changes, even although slight, in the conditions to which they are subjected. A change in temperature, the addition to, or removal from the fluid in which they are grown of a minute quantity of a chemical substance, may convert a non-virulent form of a pathogenic organism into a virulent form. Similar causes may, outside the body, also render moderately or intensely virulent a previously non-virulent microbe, and thus may be explained variations in the severity of epidemics, as well as the occurrence of outbreaks of infectious disease not originated by infection from any previously existing case.

The dependence of microbial existence upon the composition of nutrient media may also partly account for the age liability which forms so conspicuous a feature in the history of such infectious diseases as scarlet fever, measles, and whooping-cough. Further, pathogenic microbes atten-

uated as to their virulence but not as to their protective power, may enter the body and render it immune by a process of accidental vaccination ; and thus may be explained, without recourse to such unsatisfactory phrases as individual or racial peculiarities, well-authenticated examples known to all of us, of repeated exposure to infection without the production of disease, and of the immunity enjoyed by the inhabitants of towns and districts daily subjected to the virus of typhoid fever, malaria, or yellow fever.

These are not mere hypotheses unsupported by experimental data. Describing the results of his experiments on anthrax, Pasteur states that when fowls are inoculated with the virulent microbes of this disease, they remain well until they have been cooled down to a subnormal temperature ; and, in the earlier stages of the poisoning thus induced, if the temperature be again raised, the symptoms of anthrax disappear and the fowls recover. Anthrax microbes, as well as those of fowl cholera, if cultivated at a temperature between those of 42° and 43° C., acquire varied degrees of lethality according to the age of the culture, and the microbes of each variety of lethality can be almost indefinitely reproduced by maintaining certain conditions of cultivation. If microbes so grown as to be no longer able to produce anthrax in rabbits are first inoculated in a successive series of experiments in young, and, for that reason, extremely susceptible rabbits, and if the microbes obtained from the last of the series are then inoculated into somewhat older and finally into adult rabbits, the original virulence of the microbe is found to have been regained. "The work in my laboratories," he states, "has established that pathogenic microbes are not morbid entities. They can assume various forms of physiological activity, depending on the media in which they live and multiply. As a consequence, one can modify their viru-

lence. It can be exalted or enfeebled, and each state can be fixed." Impressed by the far-reaching possibilities suggested by these and other fruits of his fertile imagination, it is not astonishing that the great discoverer, whose divining rod of science had thus thrown a clear light on the mysteries of centuries, should exclaim, "The hour has now arrived when we may enter the enchanted grotto full of priceless treasures."

Passing now to consider the origin of the protection-producing substances—antitoxins or antivenins—it is important to bear in mind that the symptoms of a pathogenic disease, the toxic phenomena by which it is characterized, are, with a few doubtful exceptions, directly caused by the poisons generated by micro-organisms, and not by the micro-organisms themselves. The production of microbicidal agents does not, therefore, in connection with this question, require consideration, but it may be pointed out that there is evidence of the production, both by toxins and by micro-organisms, of substances specially unfavorable to the vitality of the micro-organisms themselves.

The production of antitoxin in the body, whether following the introduction of virulent microbes or of toxins entirely free from microbes, has generally been explained by a reaction occurring in the tissues of the body, whereby either a proliferation of leucocytes and the production by them of the protecting substances is excited, or the normal cells of the body are stimulated in such a way that they secrete the protective substance.

I have, to some extent, already discussed the question of phagocytosis, which is involved in the first explanation. To the objections that have been stated there are others which can be derived from the results of observation and experiment. In many instances, when immunity to a high degree has been produced by venom, no increase can be found in

the number of leucocytes immediately, or at varying periods, after the subcutaneous injection of large, though in the circumstances, easily tolerated doses of venom. Further, when one-half more than the minimum-lethal dose of venom is mixed outside of the body with antivenin, and the mixture injected into an animal, the quantity of antivenin required to prevent this lethal dose from producing death is only the quarter of a cubic centimetre; whereas if the antivenin be administered half an hour before the same dose of venom, as much as three cubic centimetres are required. That is to say, in conditions which are the more favorable for the proliferation of leucocytes, or for the production by them of protecting substances, the antivenin is less efficient as a protecting agent than when the conditions are much less favorable.

As to the second thery, often termed the reaction theory, it is also opposed by the experiments I have last mentioned, but equally so by the fact that a high degree of immunity can be produced by an appropriate adjustment of doses without any observable reaction occurring. Even when a distinct reaction, such as an elevation of temperature, is produced during the process of immunization, the production of the reaction is in itself of no other significance than that a dose of an active substance, sufficiently large to cause an observable effect, had been administered.

The subject, however, is surrounded by difficulties, not a few of which have arisen from the attempt to obtain an explanation without separating the influence of the microbe from that of the toxin, with the result that biological conceptions have perhaps been introduced unnecessarily into the consideration and discussion of the subject. As a contribution to the solution of the problem I would advance the following facts: Although searched for, no proteolytic or fermentative action has been discovered in the case of any toxin or venom; by subjection to certain external influences, such as elevation of temperature, and the influence of electric currents and of certain chemical reagents, toxins and venoms may have their poisonous action destroyed, while the immunizing or protective action is retained; and toxins have been found actually to contain protective or remedial substances along with their toxic ingredients, as shown, for instance, by Hunter in the case of the toxin of tubercle.

These considerations suggest that the protecting substance originates directly from the toxin, or is indeed an ingredient in its complex composition. The suggestion is supported by experiments which show that the degree of protection artificially produced in an animal—for it is, perhaps, not unnecessary to state that protection and immunization are only relative and not absolute—is proportional to the total quantity of toxin or venom introduced, rather than to the amount of reaction produced in the animal by any of the several administrations. The remarkable facts which have been described in connection with the stomach administration of venom, obtained also by Ehrlich and Kobert with the somewhat similar bodies abrin and ricin, and by Valli with the virus of hydrophobia, seem likewise to receive their most satisfactory solution on this supposition. A dose of venom, several hundred times greater than is requisite to produce death by subcutaneous injection, fails when introduced into the stomach to produce any poisonous symptoms whatever, but still so protects the animal that considerably more than the minimum-lethal dose may now be subcutaneously administered without producing death.

It is difficult to account for these facts otherwise than by assuming that the venom while in the alimentary canal had been subjected to a process of analysis, as the result of which its toxic constituents had been

separated from those that are anti-toxic or protective; and while the former had either been destroyed or had failed to be absorbed, the latter had passed into the blood in suffici-ent quantity to protect the animal against otherwise lethal administra-tion of venom.

There are, undoubtedly, many facts still required before a convincing ex-planation can be formulated of the origin of the antitoxic substances that appear in the body after the reception of pathogenic or other similar toxins ; but the facts already ascertained ap-pear to indicate that the antitoxic or immunizing substances originate not from vital reactions upon constituents of the body but from the toxins them-selves, being produced by chemical changes in them, or being actually among their normal ingredients.

The question is not only of scienti-fic interest, but it has also a practical bearing. The manufacture of the immunizing substance is attended with much difficulty. A satisfactory antitoxin can rarely be obtained until a tedious process, extending over several months, has been followed. Antipneumococcus serum requires as long a time as six months, the im-munizing serum of yellow fever from twelve to eighteen months, and the nearest approximation yet obtained to a satisfactory protecting serum for tubercle the almost impractical period of several years. Were it recognized that the antitoxin originates directly from the toxin, the preparation of it would be freed from existing difficul-ties and mysteries, and, after some necessary chemical research, it could be produced in the laboratory and thus brought into closer relationship with ordinary medicinal substances.

Any generalization in medicine, while it may serve the useful purpose of emphasizing advancement in know-ledge, must remain barren of practi-cal result unless it also supplies gen-eral principles as well as specific indications for treatment. It may with some confidence be stated that

the doctrine of toxic origin of disease does not fail in these respects.

In the case of ordinary poisons it has been well established that re-covery is largely promoted by hast-ening the removal of the poison from the body, especially by means which it is the province of pharmacology to indicate ; and the eliminative treat-ment which has long been followed in many diseases thus finds in their now definitely established toxic origin a sufficient explanation and justifi-cation. Clinical and experimental evidence, not restricted to ordinary poisons, but gained also from the study of the effects of toxins and venoms, has taught us that treatment should also include the adoption of measures for increasing the resistance afforded by the body to toxic and morbific processes. If a dose of venom below the minimum lethal be admin-istered to an animal, and, after all obvious symptoms of poisoning have disappeared, this dose be followed by a second, also considerably below the lethal, the animal may die, although each dose was in itself insufficiently large to cause death. If an animal has been inoculated by a non-lethal quantity of the virus of a recognized disease such as anthrax, and, after recovery has ap-parently been established, if a non-lethal dose of the virus of another disease be inoculated, death will fol-low the inoculation of the second dose, although that dose is quite in-insufficient of itself to produce death in an animal which has not previous-ly been thus treated. In both cases the power of resistance has been so weakened by the first and apparently recovered from administration that a quantity of virus in itself sufficient to cause death now succeeds in doing so. From such examples the ex-planation is found of the widely pre-valent employment of means to in-crease the strength or resistance of a patient, of the value of tonics and foods and of fresh air and light, not only in promoting recovery from ill-

ness, but also in actually preventing a fatal termination. Expressed in another form, they constitute means for slightly increasing for any given degree of disease the minimum quantity of the disease-producing influence or substance required to produce that degree of disease.

These as well as other methods of treatment that might be referred to do not, however, directly affect the true cause of the malady. Hitherto this cause could be counteracted or opposed only in the instances of the well-known poisons which are dealt with by toxicology, and of a very few diseases such as as ague and syphilis, in which the case was surmised, without being proved, to be a poisonous substance; and in substances fitted to antagonize these poisons by chemical combination, or, though only to a limited extent, to counteract their effects by physiological processes, therapeutics has possessed satisfactory resources. By the demonstration of the production of many diseases by toxins generated by micro-organisms, the opportunities for the application of these principles has been greatly extended. Diseases whose treatment had previously rested on an uncertain basis have now been brought into the range of rational therapeutics; and it has been shown that morbific processes which had already become so definitely established as to display serious symptoms can be entirely arrested, and, above all, that illnesses which would otherwise inevitably terminate in death may be so perfectly controlled that the fatal termination can be prevented and recovery ensured.

A dose considerably above the minimum lethal of the toxin of tetanus is administered to an animal. Several hours after the administration, when symptoms of tetanus had manifested themselves, the antitoxin of tetanus, derived from an animal which had been immunized against the virus, is injected under the skin, and in a short time afterwards the

symptoms of the disease disappear and the animal recovers.

A dose of cobra venom sufficient to cause death in two or three hours is administered to an animal; the venom illness is developed, and while it is quickly advancing to apparently an early death, a dose of antivenin—the blood serum of an animal highly immunized against this venom—is administered, and by-and-by the symptoms become mitigated, and in a few hours the animal, which otherwise would certainly have died, is restored to a perfectly normal condition.

By this antidotal treatment, further, not only is disease arrested and even death conquered, but the structural alterations in the muscle fibre and elsewhere that the tetanus toxin produces, and also the acute and rapid changes in the parenchyma of the kidney, characterizing the poisonous action of serpent's venom, are altogether prevented from occurring.

How are these marvellous therapeutic or curative effects to be explained? The explanations that have been advanced are essentialy the same as those applied to the productions of immunity, and they have already been disposed of in the discussion of that subject. Specially bearing on the therapeutic aspect of the question are the further considerations that antitoxins are destitute of any distinct physiological action, and, founding on Declory's recent work on antivenin, antitenanin, and the antitoxin of diphtheria, they have even no influence on the processes of ultimate nutrition. Their curative action cannot therefore depend on physiological antagonism, and it is highly improbable that it has any biological basis whatever.

Referring again to experiments made with serpent's venom, when this venom in lethal quantity is mixed in a test tube with a small quantity of antivenin, the venom almost instantly loses its toxic power. Further, if the smallest quantity of anti-

venin required to produce this change after contact for a definite time with a lethal quantity of venom be determined, it will be found that if the time of contact is lessened this quantity of antivenin is no longer able to remove the toxicity of so large a quantity of venom. When, again, venom is injected under the skin of an animal at the same time as, but in a different position from, the antivenin, the quantity of the latter required to prevent death is for the same dose of venom about twelve times larger than when the two substances had been mixed together before they were injected. Such distinctions are difficult of explanation otherwise than by supposing that a combination, chemical or mechanical, is effected between the antivenin and the venom, for they indicate that when the conditions are the more favorable for ensuring contact between the antitoxin and the toxin, the antidotal action is more powerful than when the conditions are less favorable for this contact.

This view is also supported by the fact that if the antivenin be administered after the venom, the dose of the former required to prevent death is enormously larger than when the two substances are simultaneously administered after they have been mixed together outside of the body. In the case of antivenin and venom the difference is as great as 1 to 1,200.

This experimental result, harmonizing altogether with a physical as distinguished from a biological explanation of the antidotal action of antitoxin, emphasizes the lesson, gradually receiving acceptance in practice, that for the effective treatment of an infectious disease the quantity of antitoxin must be a very large one, and at least 1,000 times greater than is indicated by the *in vitro* experiments by which their antidotal power has usually been determined and standardized.

For this reason the antitoxic serums frequently in use at the present time must be regarded as too dilute solutions. It is indeed probable that the process of immunization, even when carried to its utmost limits, is incapable of producing antitoxic serums sufficiently powerful, in doses which can be administered, to cure a patient suffering from the effects of a large lethal quantity of toxin. Chemistry, however, has as yet left almost untouched the investigation of antitoxic serums, and it may confidently be expected that, when more knowledge has been obtained of their chemical composition, the difficulty will be overcome by the separation of the curative from the worthless ingredients.

By such results as are exemplified in the experiments that I have described a new era has been originated in practical medicine. Considering how limited were the means—if, indeed, they previously had existed—of actually preventing death when the fatal disease conditions were already present, a special fascination attaches itself to the subject of the antidotal treatment of disease, the newly created serumtherapeutics. It has merely entered the first stages of its devlopment, and has had to contend in its applications to human beings with the difficulties presented by ihe presence of undiscoverable amounts of disease toxins, diffused by living generators, which are present in the body in unknown quantities and in varying toxic potentialities. The results already obtained are, however, of much value. Diphtheria has had its case mortality reduced from 70 per cent. to 26 per cent., or, according to another estimation, from 40 per cent. to 8 per cent. ; hydrophobia has been so far brought under therapeutic control, by means which have not as yet been developed to their full efficiency, that its mortality has shrunk at least from 16 to 1 per cent. ; the prognosis of tetanus has been deprived of much of its gloomy forebodings ; the cure of pneumonia, of tubercle, of erysipelas, and of septicæmia is on the eve of be-

ing realized ; a complete demonstration has been obtained of the power of antivenins to prevent the toxic and lethal effects of venoms ; and the experimental data are being surely accumulated for completing the greatest triumph of preventive medicine by the discovery of an antitoxic serum for the cure of smallpox.

These, however, are to be regarded as merely the first fruits—in some cases requiring further maturing by the light of science—of the ample harvest which is ripening. Their acquisition, at the same time, has been sufficient to supply materials for constructing, in imperfect outline, the doctrine of the toxic origin of disease to which I have ventured to ask your attention. This doctrine has at least the merit of being able to bind together in one harmonious unity the conception of the actual nature or essence of a large number of diseases, including those which most urgently demand consideration. It supplies a simple and intelligible basis for treatment. Under its directing influence it may confidently be anticipated that Medicine will reach a position of definiteness previously unattainable ; and, above all, that the healers of disease will have their resources in this beneficent function rendered more effective and valuable for mankind.

THE MEDICAL ASPECTS OF APPENDICITIS.*

By H. A. HARE, M.D., Philadelphia, Pa.

In reading this paper on the medical aspects of appendicitis I am well aware that in view of the beliefs of some surgeons I am ordered to lead a hopeless cause. I hope to show, how-

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ever, that this is not the case, although it is necessary for us to arrive at a definite idea as to what this title means. If it refers to the medical treatment in distinction to the surgical treatment and in the sense of the use of medicines in place of operative interference, then I am the wrong one to have asked to write on it, not that I believe that all cases are operative, but because I believe some are and some are not. If the diagnosis of the appendicitis is at issue other lines of experience must be followed out, and if the pathologic aspect of the case is before us, still other thoughts must be expressed. Taking up for consideration the diagnosis of appendicitis. I may first point out that he who asserts that diagnosis is always easy has not seen many cases and probably mistakes other maladies for this one, and that it is the experience of active practitioners that cases continually occur in which the very gravest doubt as to the character of the case must arise. The extraordinary variation in the severity and locality of the pain as it occurs without palpation and with it, the difference in its character in various patients, and finally the extraordinary dislocations of the viscus anteriorly, posteriorly, above and below, and behind the liver, make us think of the disease whenever a disturbance occurs in the abdomen, for cases have been recorded in which the appendix has been found almost anywhere and there is in the current number of the journal (June 4) an instance recorded in which the appendix was found under the left clavicle. Nor are we to expect to find the morbid lesions alike in any two cases. In some there is pus in excess, in others a small gangrenous tip with no pus or but little, in a third class a large indurated mass surrounding the appendix as a nut-shell surrounds its kernel, and it is an unfortunate fact that the more fulminating the inflammation, the more dangerous the condition and the fewer the physical signs. Indeed,

aside from pain and general systemic symptoms, no signs are to be found. In the gangrenous type pain is often but a fleeting symptom and the speedy development of septic painless peritonitis misleads the physician, who canr ot elicit it even on pressure. Nor are we to regard appendicitis as being always an acute process. It is often subacute or chronic, insidious and provocative of aberrant symptoms which mask the real trouble. Lately I have seen a lad of nine years who was seized while at the sea-shore with indefinite pain in the belly occurring in paroxysms. He had fever, and the local physician gave him quinin and frankly said he knew not the cause of the fever. His fever disappeared and he returned home only to go to bed in a few days with fever persistently remaining about 104 degrees and no other symptoms. Finally repeated examination revealed right iliac pain, referred to the epigastrium on deep pressure, and the diagnosis of appendicitis of a subacute variety was made. Some days later he developed well-marked typhoid fever, the local appendicular signs disappearing under the local use of cold. I believe that this patient had a typhoidal infection of the appendix. Another case seen by me and afterward by Dr. Keen is instructive

A man, forty-three years of age, suffered from what was apparently a · violent attack of appendicitis, in the summer of 1896. At that time he suffered from one attack of severe pain which he believed to be due to cholera morbus, and a few days later suffered from another attack of much less severe pain, with, however, a general sensation of illness which forced him to go to his bed. An examination by his physician revealed the fact that he had a marked swelling in the right iliac region, which was not only to be felt, but which could be readily seen. From that time until the first of March, 1898, he was entirely free from any symptoms in connection with his ap-

pendix, the swelling disappearing within a week after it was first noticed, upon the application of counter-irritation, cold, and absolute rest in bed. In March of this year he presented himself to me complaining of aching pains through the bones and through his entire body and a general feeling of illness. The symptoms were more characteristic of influenza than of any other ailment, but no fever was present. Two days later I was sent for to see him at his house. I found him dressed and in an arm chair, feeling quite wretched, and with general diffused pains as before. His temperature at this time was 102½. I had already examined the right iliac region when he was at my office, because of his history of appendicitis, and I now made another thorough examination with negative result. His temperature continued to rise higher from day to day and he gradually developed, as his fever progressed more and more, pain in the right side of the abdomen until finally it hurt him to extend his leg or to raise his arm above his head. There were, however, at no time any signs of induration or very great tenderness on pressure in the neighborhood of his appendix. At this time he developed the rash of typhoid fever, his liver and spleen were found to be slightly enlarged, he had the curious odor of typhoid fever and presented a typical picture of enteric fever. At the end of his second week of typhoid, the pain in the right iliac region having increased, daily examination gradually revealed slight swelling in the right flank, which finally extended from the border of the last rib to the anterior superior spine of the ilium, but the tenderness was very moderate. He was seen in consultation with me on two occasions by a well-known physician, the second occasion being due to the fact that I had insisted upon the family allowing me to call in a surgeon and, owing to their fear of the knife, they asked for a medical opinion as to the wisdom of calling in a

surgeon. This physician entirely agreed with me as to the necessity of interference. Dr. Keen, b ing called, also agreed and made an incision in the neighborhood of McBurney's point, from which escaped a pint and a half of exceedingly fetid pus having the characteristic odor of typhoid stools, but containing no fecal matter. A bacteriologic examination of this pus showed no typhoid bacilli, but the bacillus coli communis, and, floating free in the pus was a large mass which we thought, at first glance, to be a sloughed-off-appendix, but which Dr. Keen asserted, upon dissection, was sloughed-off omeotum. After the operation the patient, who of course was desperately ill, gradually progressed to a complete convalescence. We have then a case of typhoid fever, complicated by a recurring appendicitis perhaps due to impaired nutrition of the patient, in which the symptoms of typhoid and appendicitis were so complicated, and so masked one another that a diagnosis was most difficult, and had the peritoneal cavity not been walled off by a wall of lymph, there is no doubt that my patient would have died of septic peritonitis, complicating typhoid fever.

There are other cases in which the typhoid symptoms are due to septic absorption from the appendicitis and the diagnosis is that of typhoid fever first and appendicitis afterward.

As to the diagnostic symptoms of acute cases, rigidity is certainly of great importance. Its presence always makes one call the surgeon at once for his opinion, and I do not call a surgeon who believes that every case should be operated on, rather one who will be broad enough to know that judgment and expediency are to be applied to the decision of every case. I call a surgeon not as I would call a servant to do as I tell him, not as a master to direct what I shall do, but as a colleague who will present the surgical aspects to me as I will the medical ones to him. He is to take part in my joys and sorrows and not

to be weak and indecisive nor dictatorial and ambitious.

I have recently published in the *Medical News* some interesting cases of appendicitis which show how one may be harassed by conflicting experiences. In one case I implored, besought, pleaded and insisted that a young fellow with a history of nine attacks in six months should have an operation. He had an immense mass of inflammatory material about his appendix. He finally consented. One of the most eminent surgeons living operated. Stercoraceous vomiting speedily ensued with collapse and death. I forced this man to an early death. In another instance I advised delay, because after this experience I had lost my nerve, for it came to my hands a few days after. Death met me again. Another case had a sharp · attack of pain with every classical sign of the disease. A surgeon said operate. The weather was excessively hot, the patient a feeble woman of fifty, and I felt sure the operation would kill her. I called a medical consultant who agreed with me. No operation was done and the patient is now well and has had no attack since. I could go on with such cases indefinitely and reach no clearer ideas as to the subject.

As a matter of fact we can divide all cases into three sets : those which undoubtedly should be operated on at once, those about which doubt exists, and those that get well of moderate attacks and have no more. One man injures his knee-joint, it must be opened ; another injures it and the question arises, shall we save it ; a third gets well without the knife with good sensible external treatment. There are no cases to be met with in practice which need identical routine treatment, for individuals differ, infections differ and circumstances differ. When the profession recognizes that appendicitis is a disease in which medical and surgical opinions are always to be married and when dogmatic operators cease to combat dog-

matic physicians then will these cases present the best statistics of recovery.

Finally a word as to opium. It will not cure the disease, nor will it limit it. If it is used to excess it is harmful in more ways than one ; but used with judgment it is of value to take the edge off the excessive pain and to support the system. If it is used in such amounts as to remove the pain and produce sleep, it is abused. The question is not opium or no opium, it is whether it is needed as a palliative of pain until the diagnosis is clear or the surgeon is ready. —*The Jour. of Am. Med. Assn.*

GOLF FROM A NEUROLOGICAL VIEWPOINT.*

By IRVING C. ROSSE, M.D., Washington, D.C.

Long before the Columbian rediscovery of America our hardy Caledonian ancestry amused themselves by playing the royal and ancient game which has been defined as the putting of little balls into little holes with instruments very ill-adapted to the purpose. In those days certain ascetic and lugubrious persons, like the sham-pious reformers of the present, who condemn as sinful anything that makes people feel happy, cried down golf, football and other so-called unprofitable sports, which were prohibited by decree, the legislative blight being a canon of the old Scotch Parliament against golf.

Being difficult to extinguish strong instincts, people gave no heed to such prohibitions against the natural and wholesome promptings of the play impulse and manly pastimes of a vigorous race, and to-day we find a game with a long pedigree taken up

*Read at a meeting of the American Neurological Association in New York, May, 1898.

and assimilated from Scotland, and so fascinating as to have spread around the English-speaking world.

Instead of dividing mankind, as some mathematicians do, into two classes, namely, those who have read analytical geometry and those who have not, it is now more appropriate to say those who play golf and those who do not, or as an enthusiastic devotee to golf might put it, those who are long drivers and those who are not.

What was yesterday the fad of a few has to-day become the practice of many sorts and conditions of men, who find in the exhilarating game of golf (which experts prefer to call a study) a means of hygiene and sport of inestimable value.

A short time since, in a paper prepared for this Association " On the Conservative Value of the Play Impulse." I endeavored to point out the individual and phylogenic good brought about by the exercise of the manly sports and amusements that brought together men and women of the leisure class at such places as the tennis-court, the hunt, the meet, the golf links. Since then the game of St. Andrews in Fifeshire has encircled the earth, like the world-invading Campbells and the descendants of a race to which Piper Findlater belongs take their amusement seriously at seaside links or on grassy moorlands at a game than which none is a severer test of nerve and none requires more stupid, dogged patience and harder work.

Any golf-player familiar with the niblick shot out of sand in front of a bunker cliff will, I am sure, recognize the cool judgment and prompt action required by a successful player who makes a good drive and avoids or extricates himself from awkward hazards, as well as the many advantages entailed thereby in the way of invigorating and healthy employment of the highest bodily activities.

Doubtless from the sportsman's point of view, and that of the hygien-

ist, the value of golf is quite apparent, but its therapeutic value, not so well established, is practically an untrodden field, and in need of an exponent.

In the capacity of physician and neurologist it is impossible to familiarize one's self with the facts of the game in this relation without seeing its many advantages and acknowledging merits beyond all praise.

To the neurologist, who trusts to physic, mechanical and hygienic influences rather than to drugs for treatment, the theme is replete with magnificent possibilities of prophylaxis and even of therapeutics. We have a royal road to physical exhilaration in a game that can be played all the year round, independent of atmospheric vicissitudes, during all the seven ages of man, by delicate young girls as well as by strong athletes, and even by decrepit old men, whose declining powers do not admit of severe exertion. It combines exercise, pleasure and fresh air without the risk of injury to heart, lungs or nervous system of some other exercises in which there is high blood pressure and arterial tension. To be more specific, there is absolutely no danger attached to the game, and consequently no accidents ensue. Unlike the bicycle, it is doubtful if any such thing as an accident insurance was ever paid for injury incurred at golf. Nor is the game contraindicated in heart lesions, arterial calcification, albuminuria, old age, childhood, and certain hysterical conditions which would be aggravated by such exercise as bicycling, swimming, horseback riding, or by mountain climbing.

To be more explicit, I may say that in all affections marked by slowing of oxidation, or in those consequent upon intoxication by the products of organic disassimilation, the game of golf is to be recommended as the best adjuvant method of bringing about a cure.

The obesity and degeneration of middle age, when the biceps has diminished and one's energy is want-

ing, may be helped by devotion to golf. The further tendency of the exercise is to eliminate the so-called diatheses and thus do away with gout, lithemia, headache and dyspepsia; while its hygienic and therapeutic consequences are admissible in cardiac and pulmonary affections. Although moderation is advisable in such circumstances, there can be no doubt of the benefit derived in some cases of cough, nervous asthma, and in affections of the bladder and prostate.

But it is pre-eminently in functional nervous disease that our great Anglo-Saxon game is to be recommended, both as prophylactic and curative. No exercise or recreation is better for the mentally overworked, the hysterical, the melancholic; none helps to preserve the concerted action of eye, brain, and muscle known as the psychological moment; none, perhaps, with the exception of swimming, gives one so good an appetite; there is not a more sovereign remedy for dyspepsia, and as to insomnia, such a thing scarcely exists among the devotees of golf.

Improvement in appetite and digestion has come under the notice of nearly every one connected with a golf club. Only two years ago the breezy air of the Newport golf-green caused such an improvement in this respect that the members of the club discharged a French for a negro cook, whose dishes were considered more wholesome and better suited to a golfer's appetite.

In addition to the unconscious vigor of body and mind imparted by golf, the social amenities arising therefrom are of unquestionable therapeutic value, since the genial influences of the game, by expanding the ideas, tend to promote the good fellowship that comes from diversion and sensuous amusement, and by oiling the wheels of life, so to speak, makes them go on with rattling glee. In these days of excessive drive, competition and over-pressure, when,

undue waste of vital energy shows itself to the clinician in the way of various neuropathic conditions and decayed nerve elements, the problem of averting or mitigating such mischief comes to us with much seriousness. An obvious help in the solution is the encouragement of all innocent sports and recreations as a compensating factor in the phenomena of life. The condition applicable to the greater number is partly met by the present "boom" in a game that accurately reflects and expresses a great race and falls in with the spirit of our age of haste and subjectivity.

If there be one innocent recreation adapted more than another to all sorts and conditions, but more especially to the gloaming of life, when the mind needs an alterative, that healthful tendency is to be found in the national game of Scotland.—*The Journal of Am. Med. Assn.*

SIMULTANEOUS BLOOD-WASHING AND BLOOD-LETTING.

By A. B. KNOWLTON, M.D., of Columbia, S.C.

During the past year much has been written about the various uses of normal salt solution as a restorative agent. It is now injected into the rectum, the vagina, the cellular tissues, and directly into the circulation, through all of which avenues it affords marked and positive results in cases of rapid exhaustion from any cause. It is the *simultaneous* practice of blood-washing and blood-letting to which I wish especially to allude, and it is this *combined* procedure to which I have seen practically no reference whatever. The only treatment reported along this line that has come under my observation was a case of puerperal eclampsia reported in the *Therapeutic Gazette* for February,

1898, and in which case the saline solution was administered hypodermically, while the post-partum hemorrhage that occurred was permitted to have its way until the patient was sufficiently bled. The idea was to relieve the patient of some of the poisonous blood by depletion and to dilute the remaining blood and re-establish the vasomotor tension by the injection of normal salt-solution. I adopted practically this same treatment in the following two cases, one of which antedates the one just quoted, the difference in my treatment being that I injected the normal salt-solution into the *vein directly* and *at the same time* that I bled the patient from another vein on the opposite side of the body. My object was the same, however, *i.e.*, to relieve the blood of its toxic element, whatever that is, and to counteract shock, and dilute the remaining blood.

CASE I.—On November 16, 1897, I was called to Mrs. P., who had passed through a normal labor the day before, having given birth to a healthy, full-term child, and who had been in convulsions for two hours. In addition to the usual treatment, normal salt-solution (three pints) were injected into the right median basilic vein, and at the same time about twenty-two ounces of blood were drawn from the left temporal. The patient rallied somewhat, but did not regain consciousness, dying in three hours after my arrival.

This is the earliest reported treatment of puerperal eclampsia with *simultaneous* blood-washing and blood-letting that I know of.

CASE II.—On April 15, 1898, I was called to see a colored girl, Maggie P., who was in the eighth month of pregnancy, and had had four convulsions of increasing intensity during the two preceding hours. There were no signs or symptoms of labor, and although the patient was unconscious, I decided to make a thorough test of

this treatment, and, accordingly, did not dilate or empty the uterus. I injected three pints of normal salt-solution into the right arm (median basilic vein), and simultaneously bled about twenty ounces from the left. This was the only treatment. In half an hour after the injection and the bleeding, the patient had one convulsion, which was said by the woman present to be much lighter than any of the others. In six hours more she had another convulsion, which was even still lighter and amounted only to a faint tremor. In the meantime the patient became conscious and called for nourishment. In eight hours more (fourteen hours since the injection and the bleeding), I dilated the cervix under chloroform, and delivered the child. The woman had no more convulsions, and made a good recovery.

In view of the increasing intensity of the convulsions before the treatment, and their lessening intensity and subsidence before I emptied the uterus, I am persuaded that the patient's life was saved by the treatment ; and while I was hardly justified in assuming the great risk incurred by so tardily emptying the uterus, I am much gratified at the result obtained. I believe that the day is not far distant when this means of depletion and dilution of the blood will be considered the most rational treatment in all forms of grave toxemiæ, such as uræmic coma, puerperal eclampsia malarial toxemia (except when there exists too great a dyscrasia) and in any condition in which the blood is surcharged with poison.

Now a few words relative to intravenous saline injections when there exists a condition of shock or rapid exhaustion, and when, of course, we would not bleed. As a means of dispersing shock or of resanguinating the victim of profound hemorrhage I know of no treatment that will compare with the injection. I have had considerable experience with it as a

restorative and I have always found it prompt, safe, and most effective. There are a variety of instruments for, and many methods of giving the solution thus, and as I have seen a number of men, who were otherwise good surgeons, fail in the attempt to do this simple operation, I beg leave to submit the method that has often served me well and than which I believe there is none better. The instruments needed are a scalpel, a piece of bandage, and a fountain-syringe armed with an ordinary No. 3 aspirating needle. The normal salt-solution having been prepared and put into the syringe, an incision an inch long is made diagonally across any vein of the arm (usually the median, basilic or cephalic) and fearless dissection is continued until a portion of the vein is thoroughly exposed. Now (and not before) the piece of bandage is applied tightly above the wound by a bow-knot, so that it may be readily and easily released—it is important not to apply the bandage until the vein is thoroughly exposed or the vein becomes distended and is easily wounded. The solution is permitted to flow from th syringe for a moment, till the cooler portion is lost, and, while the solution continues to flow, the point of the needle is inserted obliquely into the vein. The bandage is now released and the syringe is suspended as high as possible. If no lump or node occurs near the point of insertion it may be concluded that the solution is passing into the vein, but if one does occur it is positive evidence that the solution is passing into the cellular tissue around the vein. In cases of hemorrhage the amount of fluid injected should bear some proportion to the amount of blood lost. I have injected as much as five pints, with only favorable results. Should too much fluid be injected, it is rapidly dealt with by a beautiful and wonderful compensatory vasomotor system, and by diuresis and diaphoresis. I would impress upon those who are

"far from the madding crowd," but who none the less have to do with the thready pulse, the pinched countenance, and the flagging heart, that in intravenous saline injection we have a more simple, safe, and effective means whereby to turn the ebb-tide of many a life we would save.—*Phil. Med. Jour.*

THE WOUNDED SOLDIERS AT BELLEVUE HOSPITAL.

Although the number of wounded (twenty-five) now at Bellevue Hospital is too small to allow one to draw final conclusions relative to the surgical results of the battles fought before Santiago, a brief analytical study of the convalescence of these soldiers and the conditions influencing the same may not be without interest. It should be remembered that all were wounded on the first day of the present month, during the first two weeks of which they were treated in the ill-contrived hospitals in or near Siboney. On the 14th instant they were loaded upon transport No. 5 (*Seneca*), which occupied almost one week in reaching New York. The unsanitary condition of the vessel and the neglect to which the men were subjected is at present the subject of official investigation. After four days in the wards of Bellevue we find many of the men daily expecting to be pronounced well enough to take advantage of well-earned furloughs.

The nature of the wounds received can at present be determined only by the patients' accounts and an examination of the existing conditions. The surgeon is able with approximate accuracy to classify them as (*a*) 2 wounds of the skull, (*b*) 3 and perhaps 4 wounds implicating the lung, (*c*) 4 wounds involving the bones or joints, and (*d*) 15 flesh wounds or those in which the involvement of bony or other important structures is insignificant.

The experiment of providing each soldier with an emergency outfit was suggested by Dr. N. Senn, and the results attending its use in the first extensive engagement are accordingly interesting. Of the 21 who had immediate recourse to the outfit, 16 escaped infection altogether, and 5 had more or less suppuration. Among the latter one had a wound of the skull above the eye, from which the bullet was subsequently removed with considerable operative difficulty. But of the 4 who delayed or omitted the use of this dressing, 2 were infected and 2 escaped. When the exposure of these men in the hot and wet trenches, involving a liability to infection almost unsurpassed, is considered, the above statistics cannot be regarded otherwise than a signal victory for aseptic methods. Inquiry as to the first aid supplied by the surgeon shows that 4 men were dressed upon the field without delay, 2 were taken immediately to the first dressing stations, and there received attention, while 5 others were dressed at the same stations, but not until a variable time (2 to 31 hours) had elapsed, 11 had their first surgical attention at the Division Hospital in from 2 hours to several days, and 3 were not dressed until they reached the general or Red Cross hospitals.

Subsequent dressings have been applied as the character and condition of the wounds demanded. Some have required daily attention, while others have healed under two dressings.

The present condition of the wounds, taken on the whole, is eminently satisfactory. Fifteen are closed, or virtually so, three are clean but not completely filled in, leaving seven which are suppurating. Of the latter, two present a minimum amount of pus, and none is serious save one. This man received a bullet at the junction of the right seventh rib with its cartilage. It passed through the lung backward and to the right, making its exit three-quarters of an inch

behind the middle axillary line and half an inch below the level of the nipples. Prompt use was made of the emergency outfit, and attention was received almost immediately at the first dressing station. Daily dressings were applied while in the general hospital and thereafter. Pus is now found in the pleural cavity and an abscess of the liver has developed. The patient's temperature is ranging high (104° F.), and his condition is not satisfactory.—*Medical News.*

THE THERAPY OF CARCINOMA OF THE RECTUM.

Dr. Hochenegg has operated in 129 cases of rectal carcinoma since 1890; of these thirty-four were colos-tomies, eighty-nine sacral extirpa-tions, and six perineal amputations (*Wiener klinische Wochenschrift,* 1897, No. 32). Of the eighty-nine sacrally operated cases, eight were fatal, though three of the deaths had no connection with the operation. This is certainly a magnificent record. The writer re-fuses operation in cases of marked general debility and when there are symptoms of internal metastases; in cases in which the tumor is immovably fixed in the pelvis; and when the glandular infection cannot be limited by the examining finger. Adhesions to the prostate, bladder, vagina, or uterus form no contra-indication to a radical operation, since these organs can if necessary be extirpated. In doubtful cases a colostomy is at first performed; two weeks later, when the tumor becomes less fixed, the extir-pation is done. Symptoms of acute intestinal obstruction also form a contra-indication to radical operation. Radical extirpation may be perform-ed by either of two methods, different in principle; perineal and sacral. Hochenegg applies the perineal method in those cases also in which the carcinoma has not involved the anal portion very high up and in which the rectal mucous membrane is

soft and easily movable over the tumor. In all other cases he prefers the sacral operation. His procedure in the sacral operation is as follows: With the patient on the left side, a convex in-cision is made—with the convexity toward the right—from the left sacro-iliac synchondrosis to the right lateral border of the coccyx. After the skin has been raised, the coccyx is extir-pated and the left wing of the sacrum is chiselled off; in extensive carci-nomatous disease the sacrum is sever-ed transversely. Further procedure depends upon the location and extent of the tumor. If the anal portion be also involved, an incision must be made around this portion; the rectum is then isolated and amputated to a point above the site of the neoplasm; the lumen of the remaining rectum is drawn down and sewed in the place of the removed anus, or is brought under the skin at the site of the re-moved sacrum (anus præternaturalis sacralis); the writer prefers the latter method. If the anal portion be not diseased and the sphincter intact, the severed rectum and the healthy anus are sewed together; this is the "ideal" operation. To prevent separ-ation of the line of suture, because of the insufficiency of the circular stitch, Hochenegg proceeds as follows: The tumor is isolated and cut off above, and is then isolated below, but not yet amputated. The healthy rectum above is then isolated and the amount of its mobility is tested. If this por tion of the rectum can be easily brought to the anal opening, the tumor is cut off transversely at a point one centimetre above the sphinc-ter, the anal portion everted and freed of its mucous membrane with forceps and scissors; through the tubular wound surface thus produced the healthy rectum above is drawn and is sutured *in situ.* There are two rows of sutures: one, introduced from the outside, in front of the anus; the other, introduced through the sacral wound. Finally, the ring of the sphincter is connected with the rectum

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by several buried sutures. If the healthy rectum above is not sufficiently movable to be brought so far down, less of the anal portion must be sacrificed. If the rectum cannot even for a short time be brought through the anal opening, nothing is left but to introduce the sutures through the sacral wound. After the introduction of the sutures the writer leaves enough of the wound open to secure drainage. The bowels are moved after the fifth day of operation. At the slightest sign of phlegmonous inflammation, the whole wound is immediately reopened and drained.—*Med. Record.*

TO DIAGNOSE GASTROPTOSIS.

Dr. Langerhans ("On Enteroptosis," *Archiv fur Verdauungs-Krankheiten*, B. iii., Heft 3) employs an ordinary stomach tube, furnished at its end with a soft-rubber balloon; after introduction of the tube the balloon is distended with a measured quantity of air. In cases of true gastroptosis, at first a circumscribed portion of the abdominal wall arches forward, generally in the median line or to the left of the median line, at about the height of the umbilicus; this tumor soon takes the shape of a mass lying crosswise, from left to right, at the umbilical line, and from the left side a perpendicular portion arises and loses itself under the margin of the ribs. The important etiological factor of enteroptosis is the relaxation of the abdominal muscles (postpuerperal enteroptosis, "enteroptosis of Landau"), which physiologically hold the abdominal organs in their position in some unknown manner. Another cause of enteroptosis is a true chlorosis, which probably brings about the sinking of the hollow viscera by the dragging of the normal stomach and intestines upon the anæmic peritoneal ligaments, or by the overweighting of the anæmic stomach through stagnation of its contents, or in other unknown

ways. This is the "enteroptosis of Meinert." Langerhans further believes that nervous dyspepsia may lead to gastroptosis; he acknowledges also a hereditary disposition to enteroptosis. The corset is not a factor in the above described cases of gastroptosis. The enteroptosis of mild degree, caused by frequent parturition and consequent relaxation of the abdomen, when it is gradual is physiological and causes no symptoms. The "enteroptosis of Meinert" rarely runs its course without symptoms. The disease causes severe subjective and objective dyspeptic symptoms, with changes in secretion and motility of the stomach. The sinking *per se* of the hollow viscera produces a change in mechanical relations, causing "insults" by pressure on the unprotected kidneys, increased work in forcing out the stomach contents, and stretching of the mesenteric folds. The cumulative effect of these continued irritations is finally to affect the central nervous system; depending upon the individual, hysteria or neurasthenia will result, the abdominal symptoms being predominant. Enteroptosis is the most frequent cause of intestinal hysteria and neurasthenia. Abdominal bandages are of benefit only in the "enteroptosis of Landau;' in this form, abdominal massage with alcohol is also of advantage. Operative fixation of the kidney may be helpful in the few rare cases in which other organs are not at all or only slightly out of place. Massage of the lumbar muscles and faradization of the abdomen the writer considers of no use. He has had no results from the administration of beer yeast. Langerhans lays stress upon gymnastic exercises, particularly upon the bending backward and twisting of the lower portion of the body, both in sitting, standing, and lying-down postures. Careful observation and treatment of the nervous system are to be carried out.—*Centralblatt fur innere Medicin*, No. 3, 1898. —*Medical Record.*

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DR. ADAMI'S DISCOVERY.

We have received an advanced reprint from the Montreal *Medical Journal*, upon " The Existence of Minute Micro-organism Associated with cases of Progressive Portal Cirrhosis," by J. G. Adami, M.A., M.D., Professor of Pathology, McGill University.

It will be remembered that Prof. Adami, working in Nova Scotia in 1894 and 1895, confirmed the previous observation of Wyatt Johnston that a cattle disease, raging in a portion of the Peninsula at that time, was infectious and epizootic, and also obtained from cases of this Pictou cattle disease a characteristic micro-organism pathogenic for rabbits and guinea-pigs.

We might say here, incidentally, that it is studies like these that prove the absolute necessity of laboratories devoted to comparative pathology, such as the one we endorsed so heartily in our last issue.

As Professor Adami points out in his paper, the French School of Pathologists have for some years, notably Hanot, insisted that one form of cirrhosis—the large smooth cirrhotic liver with jaundice, the form now frequently spoken of as Hanot's cirrhosis—is of infectious origin, though they have not been able yet to declare what is the microbe. To the best of his knowledge, however, no one has so far ventured to state that the common or so-called atrophic cirrhosis, the ordinary hobnailed liver, is of microbic causation. While the time has gone past when it was taught that such hobnailed livers are directly caused by alcohol, the prevailing opinion is that alcohol or other irritant, by setting up a condition of chronic gastro-enteritis and destruction of the mucous membrane of the upper portion of the intestinal canal, permits the absorption of toxic substances from the food, and these

toxic substances, taken up by the portal blood, induce a surrounding chronic phlebitis, with or without direct action upon the liver cells.

From our own studies recently made, we would consider the intoxication from putrefactive products, particularly those of the large intestine, insufficiently irritant to produce the results ascribed to them. Our study was purely chemical and pharmacological, but the best proof of their slight toxicity is Dr. Adami's discovery of a microbic cause. He has since his first discovery in connection with the Pictou. cattle disease, for the past four years studied cases of cirrhosis in the Royal Victoria Hospital, and on many occasions has been able to prove the presence of these specific organisms. Further than that, he has, as he states, through the kindness of Professor Hektoen and Dr. Flexner, had the opportunity of examining fifteen other livers, showing distinct evidences of portal cirrhosis, and in these cases he has been able to recognize the micrococci and also diplococci.

He has not yet been able to obtain methods of staining that are thoroughly satisfactory to him, but for the present the following is his description of the forms : " Many of the forms present resemble closely minute editions of the gonococcus. Further, the micro-organisms vary to some extent in size ; this may be a matter of imperfect staining, or may be another evidence of the polymorphism to which I have already drawn attention. On the whole, inasmuch as certain samples are distinctly bacillary, the organism then should be placed among the bacilli rather than the diplococci."

He concludes by saying that " at the present time I will go so far as to say that in a certain number of cases, at least, of hobnailed liver, there is present, more especially in the liver and the abdominal lymph glands, a minute micro-organism resembling closely that found pathogenic in the nfective cirrhosis of cattle ; a form which is present most frequently as a minute micrococcus, but sometimes has a more bacillary appearance, and which is thus to some extent polymorphous."

It is with more than usual pleasure that we chronicle a discovery like this, one which will possibly clear up one of the most obscure fields in pathology, and it will undoubtedly be another triumph for the bacteriologists if they are able to show that the many diseases which have resulted from increased activity on the part of the connective tissue corpuscles, are due to a microbic action, and not, as has so long been supposed, to a chemic irritant.

THE TORONTO GENERAL HOSPITAL STAFF.

We append a list of the staff of the Toronto General Hospital.

HOUSE STAFF :

H. Anderson,	John McCrae,
F. H. Bethune,	C. M. Stewart,
N. E. Farewell,	G. A. Sutherland,
W. E. Graham,	W. C. White,
G. McGillivray.	T. Bradley.

REGISTRARS :

G. W. Badgerow,	John McMaster,
Geoffrey Boyd,	K. C. McIwraith,
Wm. Britton,	R. D. Rudolf,
F. Fenton,	G. P. Sylvester,
W. J. Greig,	C. B. Shuttleworth,
B. Z. Milner,	A. A. Small.

OUT-PATIENT DEPARTMENT :

Surgeons.	Physicians.
H. A. Bruce,	W. B. Thistle,
C. A. Temple,	G. Gordon,
F. Winnett,	J. E. Elliott,
A. H. Garratt,	W. H. Pepler,
F. N. G. Starr,	A. R. Gordon,
B. E. McKenzie.	H. C. Scadding.

EYE AND EAR INFIRMARY :

R. A. Reeve,	G. H. Burnham,
G. S. Ryerson,	Chas. Trow.

NOSE AND THROAT DEPARTMENT :

G. R. McDonagh,   D. J. G. Wishart.
James D. Thorburn.

PATHOLOGISTS :

John Caven,
H. B. Anderson,
H. C. Parsons, ⎫
J. A. Amyot,   ⎬ Assistants.
J. A. Orr.   ⎭

ELECTRICIAN :

C. R. Dickson.

ORAL SURGERY AND DENTISTRY.

G. S. Cæsar,   E. H. Adams.

BURNSIDE AND GYNÆCOLOGY :

J. A. Temple,   J. F. W. Ross,
A. H. Wright,   A. A. Macdonald,
U. Ogden,   L. M. Sweetnam.

ASSISTANT PHYSICIANS AND SURGEONS :

(ACTIVE STAFF, EMERGENCY BRANCH, BAY STREET, TORONTO.)

Physicians.   *Surgeons.*

A. M. Baines,   Geo. A. Bingham.
W. P. Caven,   N. A. Powell,
J. M. McCallum,   B. Spencer,
J. T. Fotheringham, A. Primrose,
Graham Chambers,   E. E. King.

PHYSICIANS AND SURGEONS :

(ACTIVE STAFF, TORONTO GENERAL HOSPITAL.)

Physicians.   *Surgeons.*

J. E. Graham,   F. LeM. Grasett,
J. L. Davison,   I. H. Cameron,
A. McPhedran,   L. Teskey,
Chas. Sheard,   R. B. Nevitt.
T. F. McMahon,   G. A. Peters.
W. H. B. Aikins.   B. Riordan.

MEDICAL SUPERINTENDENT :

Charles O'Reilly.

It would be an interesting psychological research to study the reasons which induce so many men to sacrifice their time and talents on the altar of public philanthropy. It is safe to say, however, that the great majority of them are animated only by the desire for greater facilities for scientific research in their chosen profession, or by helping suffering humanity, to humbly follow in the footsteps of the great Healer.

GREAT HEAT.

The power of adaptability of the human system to heat, at least to temporary changes in surrounding conditions, is nowhere better shown than in the conditions which have to

be faced owing to the changes in the modern methods of warfare.

We have recently seen large numbers of men leaving California, a tropical climate, for the Klondike, and getting along not badly in that country of almost permanent ice ; but from the Klondike to the engine and fire rooms of some of our modern war vessels is a far cry ; and while one can with suitable clothing resist the Arctic temperature, there is practically no means of alleviating intense heat. Further than this, we know that heat is much more destructive to animal and vegetable life than is cold. We find the men on some of these vessels working at very high temperatures ; for instance, on the *Amphitrite* a temperature of 120° Fahrenheit in the engine-room was reported, while in the fire-room it was 148°. On the *Terror* it was 140° in the engine room, and 155° in the fire-room ; while in the case of the *Cincinnati* a temperature of 205° is said to have been registered. This last temperature is only 7° less than the boiling point of water. We presume that these temperatures, which are given in the *Nation*, are accurate, but one can scarcely imagine the terrible strain on the economy of a man laboring in such a heat.

As was shown originally by Walther, we have a very great increase in the pulse rate under the influence of heat. He shows that in the case of a man in hot air (100° C., or 212° F.), the pulse rose to 160° per minute, just about double the normal rate. In the matter of ability to stand heat, we find only very rarely, with the older authorities, heats approaching those given above ; thus (Tillett, 1763) that a temperature of 132° C. has been borne for ten minutes ; this would be equivalent to a temperature of 270° F., or 58° above the boiling point of water, as (Fordyce and Blagden) the body temperature only rises 38.6° to 38.9° C. Of course, all this is due to the poor conductive

power of the air. For instance, it would be dangerous to life to remain in a bath of water 112° to 114° F. for eight minutes. The effect of the moisture in increasing the conductivity of the air is very marked. As Bathels has shown, in a Turkish vapor bath of 127° to 140° F., the internal temperature, as measured in the rectum, rose to 104° to 109°. As we said above, when, therefore, you take the fact that a man's heart is beating at the rate of 160 per minute, and also that he is exposed to such high temperature, the strain he undergoes must be something terrible, and we can easily understand a man fainting under those conditions from the mechanical inability of the heart to keep the immensely dilated vascular system filled with blood.

ANTITOXIN.

It is unnecessary for us to go into the history and development of the serum treatment. The serum treatment of disease, as we find it to-day,

was the work of many masters, each of whom did his share, and we are indeed sorry to see that Behring, who undoubtedly did much, has allowed the lustre of his name to be dimmed by its use by a German manufacturing firm to obtain a patent on this well-known remedial agent—a patent which, we believe, will be a curse rather than a benefit to the American users. We are satisfied that the German products are to-day not one whit in advance, if they are as good, as the products of this country.

We are pleased to receive a letter from Messrs. Mulford & Company who assure us that they have secured the services of the most eminent attorneys in their city (Philadelphia) to fight this absurd claim, we understand, which had been refused some five or six times previously at the Patent Office, but has now slipped through no one knows how. From the well-known excellence of their products, Messrs. Mulford are only asking for a fair field. They further say that they will protect all users of their preparation.

Editorial Abstracts.

PIGMENTATION EXPERIMENTALLY PRODUCED

CHARRIN (*Comp. rend. hebd. Soc. de biol.*, 1897, p. 769) states that he has succeeded in producing brown-black spots in dogs by the glycerine water extract of the suprarenals of guinea-pigs. On stopping the injections gradually, a part of the pigmentation disappears.

OX GALL IN CONSTIPATION.

THE *Therapeutische Monatstrefte* (1898, p. 239) quotes *Le Monde méd.*, 1898, No. 1, for the statement that Pfaff speaks highly of ox gall in chronic constipation due to weakened peristalsis of the small intestine. He uses it in pills coated with salol to

hinder its absorption by the stomach. One to two grammes pro die are given before meals.

POISONING BY STRYCHNINE AND TETANUS.

BRUNNER.—Poisoning by strychnine and tetanus. (*Arch. russes de path.*, v. 5, 1898, p. 395). After the injection of the minimal lethal dose of strychnine into guinea-pigs, the course of the poisoning is scarcely influenced by the tetanus antitoxine, and in mice the pulp of the normal brain possesses no antitoxic or neutralizing properties against strychnine, so that the action of strychnine and of the tetanus poison upon the nerve centres must be very different.

ANTIPYRIN CLYSTERS IN DYSENTERY.

ARDIN.—Antipyrin in the form of clysters in dysentery. (*Montpellier méd.*, 1897, No. 42). On account of its analgesic and hæmostatic properties, antipyrin clysters seemed indicated in dysentery. It was used in large doses 4.0 to 5.0 gm. two or three times a day. The number of stools and the tenesmus gradually diminished with rapid cure. No symptoms of poisoning were observed.

SUCCESSFUL BONE TRANSPLANTATION.

RICARD (*Munch. med. Woch*, 1898, p. 226) reports two favorable cases of bone transplantation. One case, in which there was a large gap in the frontal bone from the removal of an osteosarcoma, he covered it with the scapula of a freshly killed dog. In the second case, a woman of twenty-eight years, he did a rhino plastik with the fourth metatarsal ; the bone healed but was absorbed in a year and a half, leaving in its place an elastic fibrous thickening, giving the nose a normal appearance.

SALICYLIC OINTMENT IN ARTICULAR RHEUMATISM.

STERLING.—Salicylic ointment in articular rheumatism. (*Munch. med. Woch.*, 1898, No. 10.) In the treatment of articular rheumatism, salicylic ointment, made according to the formula of Bourget—

Acid salicyl.
Ol. Terebinthin.
Lanolini āā 15.0.
Azung. porci ad 1000.

is first rubbed on the affected joints, and over this is placed a layer of absorbent cotton, which is then held in position by a flannel bandage. The author also uses internally sodium salicylate until improvement begins, while the ointment can be continued. The advantages of this treatment are that less salicylic acid

is required, that the stomach is less taxed, and that patients have more confidence in medication direct to the affected spot. If the skin seems irritated after long application the turpentine can be removed and thus eczema and renal irritation be avoided.

DIGESTIVE LEUCOCYTOSIS IN CARCINOMA VENTRICULI.

HOFMANN.—Digestive leucocytosis in carcinoma ventriculi. (*Zeits. f. klin. med.*, v. 33, pt. 5 and 6, 1897). In most cases of carcinoma of the stomach digestive leucocytosis is absent, but there are cases in which undoubtedly it is present. Again this leucocytosis is absent in other diseases of the stomach associated with anatomical lesions, and appears in other severe long-standing gastric troubles without rhyme or reason, so that it cannot be used as a diagnostic point.

HYPERLEUCOCYTOSIS IN ANIMALS BY GUAJACETIN.

GEMUEND.—Hyperleucocytosis in animals by guajacetin. (*Munch Med. Woch.*, 1898, p. 229). Guajacetin, which is the sodium salt of brenzcatechinmonoacetic acid, is very soluble in water, and non-toxic. Even in a 5% solution it does not hinder yeast fermentation. Administered subcutaneously or per os it causes in animals an hyperleucocytosis in about six hours. The blood of these animals at this time gave only once out of three cases an increase of the bacteriacidal power of the blood toward the bact. coli. It acts as an irritant.

IMMUNITY TO BEE-STINGS.

DR. LANGER, of Ruschowan, in Bohemia (*Practitioner*, v. 60, 1898, p. 167) stated that the majority of bee-keepers in that district acquired or had inherited an immunity to the sting of these insets. Of 153 whom

he questioned, nine had always been immune, 118 had acquired immunity and twenty-six had not. It was so complete that intoxicated men had been stung in fifty to a hundred places with less suffering than from so many flea-bites. He claims the poison is an alkaloid, and that the best treatment is the subcutaneous injection of a 2 to 5 per cent. solution of potassium permanganate, as it is destroyed by this salt in the proportion of 1 in 20.

OREXIN AS A STOMACHIC.

KOELBL reports on the use of the base orexin as a stomachic. (*Wien. med. Woch.*, 1897, Nos 51 and 52). Auto-experiments and observations on forty sick and nine healthy persons have convinced the author that orexin acts better and more energetically if given one hour before the principal meal. The treatment was successful in thirty-eight cut of forty cases; the patients who had previously taken little food demanded much and even solid food ; in some the feeling of satiety was lost. Vomiting occurred in two cases of neurasthenia, and in one of gastric catarrh. Three cases refused to take it. In the above cases the base was used in 0.5 gm. in tablets. The taking of large quantities of warm water after its use seems to favor vomiting.

CHLOROTIS SPLENALGIA AND OSTEOMYALGIA.

GOLOUBOFF.—Chlorotis splenalgia and osteomyalgia. (*Arch. russes de path.*, v. 5, 1898, p. 206). In chlorosis pains in the region of the spleen are so common that they may be considered as pathognomonic. These pains are either seated in the spleen itself or near it, and are due to changes in the spleen. The intercostal pains come reflexly through the sphlanchnicus major sinister and rami communicantes. Another symptom which frequently occurs is osteomyalgia—the patients complain-

ing of pain along the course of the tibiae. Moderately strong pressure produces no pain, while percussion is very painful, so that this osteomyalgia is probably due to changes in the bone marrow. Both symptoms clear up under the use of iron.

LARYNGITIS FROM POT. IODIDE.

FRANKENBERGER.— Acute laryngitis, after the internal use of iodide of potassium. (*Monats. f. Ohrenheilk,* 1897. 12.) A man, who was being treated with 2 gm. of potassium iodide pro die for some ear trouble, suddenly developed symptoms of great laryngeal stenosis and moderate fever. The larynx showed hyperæmia and swelling of the ary-epiglottic folds and posterior laryngeal wall; on account of the irritation the vocal cords could not be seen. The iodide was stopped, cold applications and ice pills were ordered, and in three days the larynx appeared normal with subsidence of all the symptoms. One week later the patient began again to use the iodide and laryngeal symptoms developed on the following day. In this case there was not merely an œdema, but an intense reddening and infiltration of the mucous membrane and submucous tissues.

DIFFERENT FORMS OF LEUCOCYTOSIS IN CHILDREN.

ENGEL.— The different forms of leucocytosis in children. (*Berl. klin. woch.*, 1897, p. 705.) In children of good health below one year in age the blood contains such a small number of polynuclear neutrophilic leucocytes that it frequently offers a conclusion as to the age of the child. The eosinophiles vary from 7 to 8 per cent., while of the large lymphocytes, with round lobulated nuclei, there are from 5 to 10 per cent. In pneumonia the polyneuclear neutrophiles may reach their highest, 92 per cent., and

up to the crisis the eosinophiles are absent. In congenital syphilis the absolute number of leucocytes was increased, but this number was mainly in small lymphocytes, the eosinophiles were increased to 14 per cent., a few nucleated red corpuscles were present, and always normoblasts and megalo-blasts; Elnlich's myelocytes were frequent. Certain complications, as suppuration of the ear, increased the polynuclears. In measles at times the polynuclears fell with the fever.

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VALIDOL, AN ANALEPTIC AND ANTIHYSTERIC.

SCHWERSENSKI.—Validol, an analeptic and antihysteric. (*Therap. Monats.*, 1897, p. 604). In looking over the camphor-like bodies for an analeptic, menthol, from its wide therapeutic use, was selected, and to avoid its local irritating action was combined with valerianic acid. The author had previously noticed that the administration of valerianate of bismuth combined with menthol was very efficient in persistent painful gastric affections, while other bismuth salts, with or without menthol, were inefficacious. The new preparation consists of a chemically pure combination of menthol and valerianic acid, mixed with a little free monthol to increase its stimulating action, usually 30 per cent. is the most suitable. It is a clear, colorless fluid, of about the consistency of glycerine, with a mild refreshing cool bitter taste, and as it readily dissolves menthol may serve as a convenient vehicle for it. Unlike most analeptics it is also a stomachic, and while it has a local stimulating action yet is non-irritating. As a stimulant it may be used in from 10 to 15 glt. on sugar. In hysteria and its complications it is useful, not only because of its harmlessness, but also because the stage of stimulation is not followed by depression. Its stomachic value is probably due partly to the antiseptic and anti-fermentative action of the menthol, and partly to a direct action on the gastric nerve terminals. It also acts as a carminative. In beginning catarrh of the respiratory tract by rubbing a few drops on the hand and inhaling it, good results are obtained, likewise in deposits on the throat and tonsils the local application cleans without injury or causing pain, probably due to the bacteriacidal power of the menthol. It has also been recommended as a disinfectant for the skin.

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CONTRIBUTIONS TO THE STUDY OF THE HEPATITIRS.

ROVIGHI.— Contributions to the study of the hepatitirs from intestinal auto-intoxication. (*Il Morgagni*, 1897, p. 666). Having observed six cases of cirrhosis in persons who were unaffected with alcoholism, malaria or syphilis, but who had been affected with serious troubles of the intestinal functions, especially constipation, the author endeavored to ascertain the action of the intestinal poisons upon the liver. In acute poisoning with indol and scatol he found a marked dilatation of the portal vessels and of the central lobular veins, while in more chronic poisoning, especially with indol, the hepatic cell protoplasm became more granular, the nuclei swelled or became double, around the vessels and in the intercellular spaces a slight connective tissue infiltration occurred, and in the epithelium of the renal tubules there was an accumulation of yellowish granules. In acute poisoning with phenol there was considerable congestion of the hepatic vessels and in the chronic form, slight alterations of the hepatic cell protoplasm, a thickening of the walls of the perilobular veins with slight connective tissue infiltration.

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PHOTO-THERAPEUTICS OF LUPUS VULGARIS.

FINSEN. — Photo-therapeutics of lupus vulgaris. (*La semaineméd.*, 1897, 59.) The fact that light acts markedly bacteriacidal led the author to study

therapeutically the chemical rays of the electric light. He constructed an apparatus like a telescope, in which the rays were first parallel and then became concentric, then passed through distilled water and an ammoniacal solution of copper sulphate. The strength of the currents varied from thirty-five to fifty amperes. He found that the concentrated sunlight killed cultures of the prodigiosus fifteen times quicker than the ordinary sunlight and that the concentrated electric light acts still quicker. Cases of lupus vulgaris—a superficial skin disease due to the tubercle bacillus—were exposed to the action of the concentrated chemical rays about two hours daily for from several days to several weeks. Soon the edges began to flatten out, the reddening became less and the ulcers cicatrized, the scar having a good appearance. Stronger electric light, current of eighty amperes, and a lens of rock crystal was more efficacious. Of fifty-nine cases of lupus which were treated twenty-three were cured, thirty which had improved were under treatment and six discontinued it.

ANALGEN IN MALARIA.

SCOGNAMIGLIO. — Some clinical and experimental investigations on analgen and its use in malaria. (*Keilkunde, monatsh. f. pract. med*). By the use of 0.5 to 0.6 gm. of analgen three to four times a day the author succeeded in relieving entirely within two to eight weeks various neuralgias, as sciatica, trigeminal and intercostal neuralgia, uterine colic multiple neuritis and the lancinating pains of tabes. In cephalalgia the same dose two to seven times a day acted very favorably and in acute articular rheumatism (2 to 3.5 gm. pro die) there was a distinct subsidence of the pain without untoward symptoms, so that he considers it a true specific. In three cases of bronchial asthma with a dose of 0.5 to 1.0 daily a cure resulted in three months. Its

actions in various forms of malaria (40 cases) was excellent, especially so in those cases in which quinine was not tolerated. It was given three times, in doses of 0.5 to 1.5 gm. two or three hours before the quotidian attacks and eight to ten hours in the other types. The examination in nineteen cases showed a destruction of the amoebæ in from twelve to sixteen hours after the administration of the agent. In none of the above cases were any injurious effects on the kidney proven as shown by the absence of sugar, albumen and blood. He claims that it is one of the best acquisitions of modern therapeutics, that as an antineuralgic it is unsurpassed and that it is the best substitute for quinine.

STYPTICIN IN UTERINE HÆMORRHAGES.

BAKOFEN. — Stypticin in uterine hæmorrhages. (*Muench Med. Woch.*, 1898, p. 419). While most cases of uterine hæmorrhage demand operative interference, yet there are cases in which it is unsuitable and the hæmorrhage may be influenced by drugs. For this purpose stypticin or cotarninum hydrochloricum was introduced by Freund. It is a derivative of narcotine and is chemically related to hydrastin. It comes as a sulphur yellow amorphores powder, which is readily soluble in water and can be administered in doses of from 0.025 to 0.05 several times daily, either as a powder or in solution, and may be even used subcutaneously. Suitable formulæ are as follows:

℞. Stypticin .... 0.05.
　　Sacchar. alb....... 0.5.
　　M. f. pulv.
　　D. tal. dos. no. xv.
S.—4 to 5 times daily.

or ℞ Stypticin .... 1.5.
　　Pulv. et succ. liquir. q.s. ut. ft.
　　pilul. no. xxx.
S.—4 to 5 times a day.

If it is going to prove efficacious

eight to fifteen pills of 0.05 each is sufficient, but it is suitable for continued use. Of five cases of virginal menstrual hæmorrhages in three was it efficacious, the remaining two were very anæmic girls in which hydrastis had been unsuccessfully used. While in nine cases of menorrhagia due to inflammatory disease of the pelvic connective tissues, or of the adnexa, or of malposition of the uterus associated with inflammation of the surrounding tissues, was it efficient in every case, and in twelve cases of metrorrhagia due to the same causes it acted well in eight, in one the hæmorrhage was lessened but not stopped by twenty pills, and in the remaining three it was without success. In two cases of acute gonorrhœa of the uterine mucous membrane it yielded good results. In endometritis hæmorrhagica the result was favorable in five, in one doubtful and in the remaining two without effect. Fungous endometritis he believes best treated by curettement, and on one case of myoma the hæmorrhage promptly ceased only to return in the intervals. One woman pregnant four to five months was successfully treated for hæmorrhage without exciting pains. At times patients complain of nausea and diarrhœa, and Falk has shown that in dogs and rabbits even subcutaneous use causes intestinal peristalsis. While a sedative action would be expected from its chemical composition, yet the author failed to notice any. In his forty-five cases in which operation was not immediately indicated, stypticin failed in ten cases and in four was it of doubtful use, so that the author considers it useful, especially in secondary hæmorrhages.

SERO-THERAPY OF YELLOW FEVER.

SANARELLI.—Sero-therapy of yellow fever. (*Dublin Journ. of Med. Sci.*, 1898, p. 514). It is difficult to obtain animals which are capable of tolerating large doses of the virus and of producing serum with prophylactic and curative powers. Sanarelli used the serum of horses which had been inoculated with the bacillus icteroides. These animals had been treated from twelve to fourteen months. He simply states that its method of preparation differs from that of the diphtheritic serum. Up to the present time antitoxines have not been proved in it. It is a bacteriacide, not an antitoxine. Dogs even after a year's treatment, and able to tolerate large doses, still showed toxic symptoms and acute pyrexia after each injection. The autopsy of one such dog gave 32.72 per cent. of fat, an amount which is greater than is usually obtained in yellow fever, and even in experimental poisoning with arsenic or phosphorus. In man it is only efficacious in the early stages. In yellow fever it is the nervous system and kidneys which are especially affected; they become anuric and so also have to combat with uræmia, against which the serum has no value. Of the first series of eight cases, treated with small hypodermic doses, two died. One of these was already anuric when admitted to the hospital, and the other died of cerebral troubles. In those cases which recovered after the reactionary rise in temperature from the injection, the fever fell. The serum acted as a diuretic and these cases were free from mucous hæmorrhages. After the intravenous injection of a small dose (15 c.c.) the patient remains quiet, but there soon appears a reddening of the face and chest with injection of the conjunctival, and the pulse becomes almost normal. He may have a feeling of warmth about the head with a tendency to vomit and at times attacks of cough. Some care is necessary in apportioning the intravenous dose in cases of pre-existing enlargement of the liver or spleen and myocardic lesions. Fourteen were treated by this method and of these only four died; three of these were cases for which obviously nothing could be done, and in the

fourth too small a dose was used. Taking all cases into consideration the mortality did not exceed 27 per cent. while with the usual treatment in Rio Janerio it is 45 to 50 per cent. and in St.Charles, 80 percent. In one of the prisons, where one after another of the inmates were becoming infected, Sanarelli inoculated all those yet unaffected and no further case developed. The Government of the Province of Saint Paul has now ordered a building for the treatment of yellow fever by the serum method.

Physician's Library.

A Manual of Modern Surgery, General and Operative. By JOHN CHAMBERS DACOSTA, M.D., Clinical Professor of Surgery. Jefferson Medical College, Philadelphia ; Surgeon to the Philadelphia Hospital, etc. With 386 illustrations. Price, $4.00 ; half morocco, $5 oo. Philadelphia: W. B. Saunders, publisher. Toronto: J. A. Carveth & Co.

This is the seond edition of this valuable work, and we note very many changes which have been entailed by the progress of this branch of medical science. The aim of the author, as stated in his first edition, was to prepare a book which would stand between the text-book and the compend. A work so thorough and comprehensive as he has given us, and at the same time so authoritative, should certainly be classed with the text-books. We personally do not believe in the compends at all and think that students, as a rule, would be much better without them. The matter is so condensed that it requires to be completely memorized, and certainly the student would find his knowledge easier of acquirement if the facts were rounded out into a continuous picture. We believe one of the reasons of the success of Mr. Saunders' text-books of this class has been that they were much fuller than the old-fashioned compends. While Dr. DaCosta rates his work in this way, we may say that it is so completely illustrated, the text is so clear, and has been so thoroughly brought up to date, that it will be a valuable work for the active prac-

titioner. Another point is, that very little of the mannerism of the author appears. He has carefully selected the best methods, and has had them thoroughy illustrated, as, for instance, may be mentioned Halsted's operation for carcinoma of the breast.

Diseases of Women : A text-book for Students and Practitioners. By J. C. WEBSTER, B.A., M.D.Edin., F.R.C.P.Ed Illustrated with 241 figures. Published by Young J. Pentland, Edinburgh and London. Montreal : W. Drysdale & Co.

It is not often that we meet with a work that so completely follows out the programme of the author in his preface. We reproduce here three sections of the preface to this book, and may say that a close examination of its contents shows that the book has been carefully and thoroughly done. We heartily recommend the work to any practitioner who desires a convenient hand-book on this subject. " In preparing this volume, I have endeavored to keep constantly before me the following aims, namely, (1) To give prominence to the scientific basis of each subject under consideration. For this purpose I have given the most careful attention to modern researches in sectional and dissectional anatomy, histology, embryology, comparative anatomy, pathology and bacteriology, in so far as they bear on the diseases of women, and have included the chief facts gathered by myself in original investigations carried on during the past nine years. (2) To study clinical features in their widest

relationships, endeavoring to give to them their proper proportional values, and avoiding the faults of the school whose motto is Michelet's dogma, 'Le bassin c'est la femme,' and whose work has led to the opprobrious denunciation, prevalent in so many quarters, of gynæcological practice as a narrow and debased specialism. (3) To insist upon caution in the adoption of therapeutic measures not yet thoroughly tested, especially of many of those which, in these latter days, have been hurriedly and recklessly forced into publicity." The work is well illustrated, and will undoubtedly take a place among the prominent text-books. The fact that such a work should have been prepared by a Canadian is a further cause for congratulation, and we believe that if every physician in Canada had it in his hands, he would be satisfied that the authors of his own country could produce all he required.

Conservative Gynecology and Electro-Therapeutics. A Practical Treatise on the Diseases of Women and Their Treatment by Electricity. Third edition, revised, rewritten and greatly enlarged. By G. BETTON MASSEY, M.A., Physician to the Gynecic Department of the Howard Hospital, Philadelphia; late Electro-Therapeutist to the Infirmary for Nervous Diseases, Philadelphia; Fellow and ex-President of the American Electro-Therapeutic Association, of the Société Française d'Électrotherapie, of the American Medical Association, etc. Illustrated with twelve full-page original chromo-lithographic plates in twelve colors, numerous full-page original half-tone plates of photographs taken from nature, and many other engravings in the text. Royal octavo; 400 pages; extra cloth, beveled edges, $3.50 net. Philadelphia: The F. A. Davis Co., publishers, 1914-16 Cherry Street; New York

City: 117 W. Forty-second Street; Chicago, Ill.: 9 Lakeside Building, 218-220 S. Clark Street.

This is the third edition of Massey's work, and deals largely with the application of electricity to gynæcology. The matter is very thoroughly explained. There are many nice illustrations of the benefits derived from electric treatment. The illustrations, some of them very handsome chromo-lithograph, of various infections, more particularly representing the cervix under the influence of different forms of intra-uterine inflammation, are very good. We cannot say so much of the photo-engravings of the methods of application of electricity; they do not seem to be absolutely necessary, and are open to the objection that the attending physician appears too prominently in this class of illustration. There is no doubt, however, that it is one of the best and most conservative works on electro-therapeutics of this class of diseases published, and to the physician—and there are many of them who believe that the knife should be the "dernier resort"—it will certainly prove a valuable aid.

Saunders' Medical Hand Atlases. Operative Surgery. By Dr. OTTO ZUCKERKANDL. With 24 colored plates and 217 illustrations in the text. Price, $3.00. Philadelphia: W. B. Saunders, publisher. Toronto: J. A. Carveth & Co.

This work, which we have just received, fully keeps up the standard of these valuable books, and there is nothing that we have said of the previous issues that cannot be said of this. It will certainly be a great help to the student in reading his work to have this valuable atlas alongside, and, as pointed out in the preface of this book, many of the operations are those which can be performed on the cadaver, a point which the student will greatly appreciate.

Miscellaneous

ANTICHARBON SERUM IN MALIG-NANT PUSTULE.—Salvatore (*Gazz. degli Osped.*, July 3rd, 1898) records another case of malignant pustule successfully treated by injections of anticharbon serum (Sclavo). Five injections were made, and a total amount of 80 c cm. injected without any ill-effects, either local or general. The author was particularly struck by the sense of well-being which followed the injections. The treatment promptly arrested the œdema and caused its disappearance in a short time. Morever, the destruction of tissue in the site of the pustule was consideraby limited. Reference is made to thirtc n other cases in which this serum was successfully used.—*Brit. Med. Journal.*

ARSENIC IN THE HAIR.—E. Schiff (*Wien. klin. Woch.*) reports six series of experiments made upon dogs, with a view to determining whether the ingestion of arsenic led to its deposition in the hair. The dogs were first shaved, and the hair boiled with water, no arsenic being found either in the h ir or in the extract. Arsenious acid was then administered for some weeks, commencing with doses of 1½ mg., and increasing gradually to 6 mg. (about ⅒). When the hair was long enough it was cut, and this was thrice repeated. An aqueous extract contained no trace of arsenic, but the hair itself, after destruction of its organic constituents, could be proved to contain the metal by Marsh's test. It was not, however, in sufficient amount for quantitative estimation. A further experiment was made in order to determine the rate at which the arsenic was absorbed. To this end a dog was poisoned with a large dose of arsenic, and its hair examined, with the same results as in the cases in which the drug had been continuously given.

An explanation is thus afforded of the rapid and valuable action of arsenic in skin diseases, and at the same time confirmation is afforded of the discovery of Brouardel and Pouchet, that arsenic may be found in the hair of victims poisoned by it. —*Brit. Med. Journal.*

EXPERIMENTS ON THE THERAPY OF INFECTED GUNSHOT WOUNDS.— The experiments were made by Dr. H. F. Koller (*Deutsche Zeitschrift fur Chirurgie*, Bd. xlvii., p. 211) with bacteria cultures virulent for rabbits, yet not so virulent as necessarily to cause death. Weak cultures of staphylococcus aureus, pyocyaneus, and a streptococcus capsulatus were employed. The experimental gunshot wounds were all made in the thigh, without doing injury to the arteries, nerves or bone. The after-treatment of the wounds was conducted in the following series : (1) In the control animals a simple bandage, with or without suture ; (2) energetic thermocautery ; (3) pencilling of the wound with strong tincture-of-iodine solution ; (4) drainage of the wound with iodoform gauze ; (5) glass drainage ; (6) disinfection of the wound with carbolic-acid solution (five per cent). The interesting and practical results showed that the control animals treated with the simple bandage, and the other animals treated with glass drainage or iodoform-gauze drainage, and one (infected with pyocyaneus) treated with five per cent. carbolic-acid solution, were all cured. On the other hand, the remainder of the animals treated with five-per-cent. carbolic-acid solution and those treated by iodine tincture and thermocautery all died. This proves that, despite the destruction of germs in the wound, the bacteria infected surrounding tissues and thus did much harm.—*Med. Record.*