care, gave charts of the temperature in each case, and a daily record of their progress to recovery. I regret that pressure on the space of the BRITISH MEDICAL JOURNAL prevents me publishing all the cases in full or inserting the charts. In all he treated successfully eight cases, and of three of these I shall now give his report.

CASE I.—A. McW., aged 15, admitted January 2nd, 1892. History: Illness began 14 days ago with headache, shivering, and diarrhoea, no abdominal pain. He had been confined to bed for 8 days. Temperature on admission 102.8° F. Notes on admission: Patient was quite intelligent and did not complain of any pain, abdomen somewhat distended, no tenderness over the right iliac region, but slight pain caused by palpating the spleen. Some rose spots observed on abdomen and back. The spleen did not project below the costal arch. The area of dullness extended from the seventh to the eleventh ribs and increased forwards; a sense of resistance was felt on palpating underneath the ribs. Tongue was dry, glazed, and slightly brown in the centre. Heart sounds pure but weak. Urine showed a faint trace of albumen. Carbolic acid pill (1½ grain) four times a day.

January 5th. Bowels have moved twice since admission, motions not characteristic. He had some difficulty in swallowing carbolic pills and to-day was inclined to be sick after taking one. Temperature remits well in morning.

January 8th. Doing well. Morning temperature is now 99° F., but evening temperature is still keeping up. Tongue bare and glazed. No abdominal pain or distension. Bowels are now inclined to be loose. Two motions in the last 24 hours. Pulse 84. Urine very slightly albuminous. He now took the pills more easily.

January 12th. Temperature normal for two evenings.

February 21st. Dismissed well.

CASE II.—W. H., aged 14. Admitted January 12th, 1892. History: Illness began eight days ago with headache and shivering and pain in the abdomen. He was constipated until three days ago when castor oil was given and his bowels have been loose since. He has been confined to bed for four days. Temperature on admission 103.4° F. Notes on admission: Patient was quite intelligent. The abdomen was considerably distended but was neither painful or tender. There were several rose spots on the abdomen, chest, and back. The spleen could be felt projecting slightly beneath the costal arch. He had two motions since admission, one "pea-soupy" in character. Tongue moist with slight white fur. Heart sounds pure. Pulse 108, full, soft, and regular. Some sibilant râles are heard at the base of both lungs, but especially over the right one. Urine slightly albuminous. Carbolic pills (1½ grain) four times a day.

January 15th. Some fresh rose spots noted to-day. Has had characteristic loose motions since admission; tongue remains moist; sleeps well without hypnotics; takes carbolic pills easily.

January 18th. This boy continues to do well. The abdominal tenderness, which was very marked on admission, is now very much less. He has two or three loose motions in the twenty-four hours; at first they were "pea soupy," latterly they have been of a more healthy type. He has no pain, no delusions, and sleeps well. Some fresh spots noticed to-day.

January 23rd. Temperature normal for four mornings.

March 5th. Dismissed well.

CASE III.—M. G., aged 13, admitted December 25th, 1891. History: Illness began four days ago with shivering, headache, sickness, vomiting, and pain in the chest. Bowels were constipated until she had a dose of castor oil, after which they became loose. Temperature on admission 101.2°. Notes on admission: Her face is flushed, eyes clear, abdomen is not distended or painful, spleen cannot be felt, tongue is dry and brown in the centre and at the tip; at the sides it is coated with sordes. Pulse 108.

December 27th. No abdominal tenderness, spleen markedly enlarged, but not below the ribs. She had a loose, enteric-like motion to-day.

December 29th. There is a rose spot noticed in the left umbilical region. She is passing on the average two "pea soupy" stools in the twenty-four hours; tongue brown and dry, thickly furred; pulse 108, small and weak; urine free from albumen; temperature shows distinct morning remissions; to have carbolic pills 1½ grain four times a day.

December 30th. Had a good night, and is progressing favourably. There is a fresh rose spot noticed in the epigastrium to-day, and two fresh ones in the back.

January 1st. Tongue becoming moist; three fresh rose spots; abdomen slightly distended; two loose yellow motions in twenty-four hours.

January 2nd. Two fresh rose spots.

January 6th. Fresh rose spot noticed; temperature normal in morning, 100° in the evening; tongue moist; pulse 96.

January 8th. Evening temperature normal.

January 15th. Pills stopped.

February 10th. Dismissed well.

TREATMENT OF TYPHOID FEVER IN PRIVATE PRACTICE BY CARBOLIC ACID PILLS.

Consideration of the reports from Belvidere justified me in concluding that greater and more decisive benefit might be obtained from their employment in private practice when cases of enteric fever can be treated at an earlier stage of its development than when patients are admitted to a fever hospital, and the disease has taken a complete hold of the system. On my advice Dr. Sloan, of Galashiels, decided to try them in his practice, as he had opportunities for doing this, since typhoid fever in spring and autumn is not uncommon in the district where his lot is cast. At the end of last July he reported that he had treated seven cases successfully, and from these he selected one as evidencing the influence which car-

bolic acid has in reducing the temperature and in curtailing the progress of the fever.

M. L., female, aged 26. Illness began six days ago with shivering, headache; and on the seventh day of her illness when I saw her I detected some rose-coloured spots on the abdomen, and tenderness was evinced on pressure over the right iliac region. The temperature was 102.5° F. in the morning, and 104.5° in the evening. There was slight diarrhoea. The following day (June 24th) I found the symptoms in no way different, and I ordered her carbolic pills (2½ grains in each) thrice daily.

June 26th. She takes the pills easily, and the evening temperature is now 101° F.

June 27th. Temperature in the morning normal; in the evening 100° F.

June 28th. Temperature normal morning and evening. The pills were continued for two days, and on July 1st were stopped. She continued to do well until July 10th, when owing to an indiscretion in her diet, the temperature rose to 101° F. and diarrhoea reappeared. The pills were again ordered thrice daily, and in the course of two days the temperature was normal. Yet I considered it advisable to continue their employment for four days afterwards. There was no further increase of the temperature, and she made a satisfactory recovery.

GENERAL CONCLUSIONS.

I am perfectly aware that the record of cases of typhoid fever treated by carbolic acid is not conclusive, yet I think it has sufficiently proved that no danger attends this method of treatment in the doses mentioned, and even the dosage might, if necessary, without peril be increased.

Wisely and timely undertaken, I believe benefit will be derived from its adoption by medical men in general practice, who see the fever at its onset, and consider it inadvisable or impossible to remove the patient to a fever hospital. At the same time the reports from Belvidere Hospital show that in suitable cases, even where the disease is advanced, it will moderate the diarrhoea, sweeten by its antiseptic action the intestinal tract, and check the fœtor of the stools.

There are other internal uses of carbolic acid, and I have elsewhere recommended its employment in cholera as a prophylactic and therapeutic agent, and also stated that it might be tried in diphtheria with advantage and safety in doses of two grains every two hours to control the development of the pathogenetic organism on which this disease depends. Others have advocated its use in flatulency with great distension accompanied by pain. But to enter into details on these points would be extraneous to the scope of this article.

I conclude by saying that this research clearly shows that the pure acid should supplant the objectionable and impure acid at present sanctioned by the *British Pharmacopœia*. Our official melting point is below the standard of any other civilised nation, and doubtless this glaring defect will be altered when another edition of the *Pharmacopœia* is issued. Meanwhile it is the obvious duty of surgeons to see that the pure acid is alone employed in hospital and private practice, and if this be attended to I have little doubt that the untoward results accruing from its use, emphasised by Billroth in 1889, would no longer be observed, and that it would resume its position of unquestioned superiority over other antiseptic agents.

ON PERFORATION OF THE MASTOID PROCESS IN CASES OF ACUTE OTITIS MEDIA DUE TO INFLUENZA.

By ADAM POLITZER, M.D.,

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PURULENT inflammation of the middle ear appears to occur with exceptional frequency in connection with influenza, and I am inclined to attribute this fact to direct infection by the passage of pathogenic organisms into the middle ear from the pharynx. The affection is in many cases limited to the lower part of the Eustachian tube, without reaching the cavity of the tympanum. In other instances, however, a catarrhal or suppurative inflammation of the middle ear is observed, which is apt to prove much more dangerous than ordinary cases of acute otitis media.

During the last two epidemics in Vienna the complication of acute middle ear inflammation with the formation of mastoid abscesses was remarkably common, and in a considerable number of these cases perforation of the mastoid process became unavoidable.

Classification of Mastoid Suppurations.

In the normal condition, the mastoid process exhibits considerable variations in its structure. In most cases probably it is made up of cellular spaces, in others it consists entirely of diploetic tissue, while in a third group the air spaces are found combined with diploë, the latter structure constituting the lower and posterior portion of the process, the rest of which is formed of cells. According to my experience the type of mastoid process containing air cells is that in which abscesses most frequently develop. The explanation of this fact is to be found in the facility with which the purulent exudation may be pent up by obstruction of the communication between the cellular spaces of the bone and the mastoid antrum. In ordinary cases of middle ear suppuration, such circumscribed collections in the mastoid process are no doubt frequently reabsorbed, while in the cases under consideration much less tendency to this is observed, probably on account of the destructive effect upon the bony tissue exercised by the pent-up pus infiltrated with the special micro-organisms of the disease. This pronounced destructive influence of the inflammatory exudation in influenza may be recognised upon opening up the abscess in the bone after the morbid process has lasted from a week to a fortnight. The osseous structure limiting the abscess cavity is seen to be softened by caries, and the cavity itself partly filled up with spongy granulations of unhealthy appearance. Besides the class of cases just described, I have met with others in which abscesses of the mastoid process were developed in the diploë. These were most commonly situated quite near the surface as small purulent collections, either discrete or confluent, and had no apparent connection with the antrum. I have rarely observed spontaneous evacuation of such abscesses through the cortical layer of the bone.

Symptoms.

With regard to the symptoms indicating abscess formation in the mastoid, I attribute a particular importance to the following:

- a. Spontaneous pain, seldom intermittent, in the mastoid process, with great tenderness on pressure over its middle and lower part.
- b. Increased temperature over the same region as compared with the healthy side.
- c. As a general rule, no notable cutaneous infiltration is perceptible, but redness and swelling may be observed where external periostitis is present.
- d. The occurrence of fever is of special significance. In some cases the temperature is but slightly raised, but it usually reaches 100° or 102° F., though this is seldom exceeded. As in most other inflammatory affections, the greatest febrile exacerbations occur in the evening. In exceptional instances prominent swelling and fluctuation was noticed in connection with discharge of an abscess through the bone externally.

Course of the Affection.

The development of abscesses in the mastoid in many cases occurred together with purulent accumulation in the tympanic cavity, without perforation of the drum membrane. In these, paracentesis of the membrane was required, as well as the opening of the mastoid process. In the majority of cases operated upon, however, perforation of the membrane took place before symptoms of abscess formation became prominent. While the abscess remains an abundant discharge from the ears is present, usually blenorrhœal in character. Sometimes reabsorption of the abscess and spontaneous cure results, as in certain cases of common otitis media. I observed this much more frequently during the last than in the preceding epidemic, a fact pointing probably to the milder form of the latter. As a rule, however, the morbid process continues in spite of rigid antiphlogistic measures, and leads to destructive caries, the arrest of which demands timely operative treatment in order to prevent the occurrence of the most grave complications. There is no doubt that the lateral sinus may also become implicated. In one case, I found upon opening the mastoid process a cavity filled with large granulations and bony detritus, and limited internally by the exposed venous sinus. The abscess cavity ultimately became obliterated by granulation tissue, and complete recovery ensued. In the absence of an operation, the disease would

probably have extended so as to involve the intima, and have ended fatally by setting up phlebitis of the sinus and pyæmia.

Treatment.

The treatment of mastoid abscess will be influenced by the duration of the affection, the degree of fever, the intensity of the subjective symptoms, and the general condition of the patient. At an early period, when pain has been present only two or three days, the inflammatory process will sometimes recede by painting over the surface with tincture of iodine, by inunction with unguentum cinereum, or by the application of cold by means of Leiter's apparatus. The effect of these remedies is greatly assisted by washing out the tympanic cavity with a lukewarm solution of sterilised water, or a 1 to 2 per cent. tepid solution of boric acid. With amelioration of the local symptoms, the purulent discharge from the ear also diminishes, and after the employment of these measures for some weeks a cure is obtained.

Operative Treatment.

If, however, the febrile condition, together with the local symptoms just described, should have continued for more than eight days; or, if in more recent cases, active antiphlogistic treatment should afford no relief either in respect of the local symptoms or of the fever, then it will become necessary to resort to the procedure of making an opening in the mastoid process. Immediate interference is indicated in these cases, since not only may extension of the morbid process in the bone involve vital regions, but the operation being, as I believe, in no way dangerous, it may be performed without hesitation.

Description of Operation.

The following is the manner in which it is carried out. The external parts having first been thoroughly cleansed with an antiseptic solution, and anæsthesia having been induced, an incision 4 to 5 centimetres in length, and slightly curved, is made through the skin, half a centimetre behind the attachment of the concha, and reaching almost to the upper limit of the mastoid process. The periosteum is then divided, and separated from the bone with an elevator, so as to expose the middle and lower part of the process. The lips of the incision being now held apart with hooks by an assistant, the cortical layer of the bone is removed to the depth of $\frac{1}{2}$ centimetre to 1 centimetre by means of a gouge 6 millimetres in breadth, which is to be held obliquely to the surface. In the course of the process one comes across the purulent focus, situated sometimes immediately beneath the cortex, sometimes at a depth of $\frac{1}{2}$ centimetre to 1 centimetre only from the surface, and filled up with pus and granulations. In some cases I have found several small abscesses, either isolated or in communication with each other. After having sufficiently enlarged the opening in the bone, the abscess cavity must be scraped out with a sharp spoon so as completely to remove the surrounding softened and infiltrated bony tissue. The procedure is apt to be accompanied by somewhat active hæmorrhage, which may be arrested by plugs of sublimate gauze. In no case operated upon, except one, could I ascertain the existence of any communication between the abscess and the antrum. The abscess cavity should be thoroughly irrigated with a 1 per cent. solution of corrosive sublimate, and afterwards filled with iodoform gauze. Finally, the external incision is to be partly closed by a couple of sutures above and below, and a suitable bandage applied. The latter need not be renewed before six or eight days if the case goes on well.

Results of the Operation.

The beneficial effect of the operation is in most cases shown by a rapid decrease of temperature, which by the next day generally falls to normal, or even lower. The discharge from the ear also becomes notably less in a few days, and disappears with the healing of the cavity, sometimes in a week, sometimes not before a fortnight. In one case only did a case end fatally after operation. This was during the epidemic of 1890, and was of a very severe character from the first. In the most recent epidemic no fatal termination was observed. The length of time necessary for complete cicatrisation depends partly upon the size of the cavity left after the

operation, and partly upon the extent of disintegrated tissue which may, perhaps, remain behind. Under normal circumstances, the wound takes three or four weeks to heal when dressed with iodoform gauze, the cavity filling up with granulation tissue. With a superficial abscess, leaving a shallow cavity in the bone, I consider it advisable at once to bring together the edges of the incision, leaving, however, a small space below for the passage of a thin strip of iodoform gauze. If no suppuration should take place, the lower opening may be allowed to close up after a few days, providing the healing process goes on in a normal manner. With more deeply situated abscesses, its duration may be shortened by the adoption of Gruber's recommendation to insert a suture at a later period.

I wish, in conclusion, to point out the simplicity of the operation, a knowledge of which is of the greatest importance for the surgeon, especially in country practice, where, if danger threatens, immediate interference becomes necessary.

Need for Compulsory Instruction in Otology.

I cannot refrain also from expressing how desirable in my opinion it is that aural surgery should be made an obligatory subject of examination for the student, in order that this branch of medicine should become the common property of all practitioners.

FOUR CASES OF MYXŒDEMA TREATED BY INJECTIONS OF THYROID EXTRACT.

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HAVING had the opportunity of treating four cases of myxœdema with injections of thyroid extract, in the manner recommended by Dr. George Murray,¹ it seemed that a record of them, at a time when the treatment has been recently under discussion, might be of some value.

CASE I. Advanced Myxœdema (15 years' standing) : Marked Improvement under Treatment.—Mrs. C. B., aged 48, had been a confirmed sufferer for about fifteen years, and on a previous occasion an in-patient at St. George's Hospital, but no treatment had produced any alleviation of her symptoms. In 1889 she became too weak to leave her room, and had not done so for three years previously to the present admission.

On January 5th, when she became an in-patient for the second time, she was in an extremely advanced stage of the disease. Her physical strength was at such a low ebb that she could hardly walk alone; the senses were blunted, and all movements slowed to a remarkable degree. There was no dropsy. Perspiration had been absent for some time. She had not menstruated for ten years.

She was at first kept in bed, and the treatment was commenced on January 9th, the injections (m xxv) being made weekly into the back. When she got up, she at once resumed the classical habit of gravitating to the fireside. These little journeys at first could only be performed with assistance, and she complained occasionally of a feeling of faintness, not occurring particularly after the injections. By the end of January she could walk about slowly without help, and announced that she felt decidedly better. She was then troubled by œdema of the legs, which continued to appear and subside occasionally during the whole of February. By the end of that month there was a marked improvement in her speech, perspiration became more free, and even profuse after each injection, while she evinced increased vivacity by quarrelling with a fellow-patient about a trifling difference of opinion. Early in March she began to sew, and she thought that her hair was beginning to grow. She regained strength slowly but surely up to the time of her leaving the hospital on March 14th. During her stay the temperature was taken night and morning. It was at first markedly subnormal, but rose very rapidly after the treatment was begun, and then with one trifling exception never varied much from the normal line. Observations unfortunately were not made on the daily quantity of urine passed with regard to diuresis being set up, but when questioned subsequently about this point, she was certain that she had passed more than usual. Since March 14th the patient has come up to the hospital from time to time, and has been injected on each visit. At first she felt weak, was troubled with œdema of the legs and profuse perspiration, and was unable to walk 300 yards to the nearest omnibus, being obliged to take a cab. By April 21st, however, she was much brighter and stronger; she walked as far as the omnibus for the first time, and had ceased to be troubled with swelling of the legs; her aspect was clearer, and had lost much of the heavy look characteristic of the disease; and a profuse crop of new hair was noticed for the first time in parts of the head which had previously been nearly bald. By May 11th she was able to do all her own washing and dusting, and had foreworn the delights of the fireside. By June 1st she had succeeded in scrubbing the floor for the first time for fifteen years; her new hair was still growing in length, her speech had become fairly brisk, but was still below the normal standard. Her strength improved, and she showed signs of a degree of mental acumen and alacrity of movement which had for years been foreign to her nature. The temperature was taken on each visit, and showed a marked fall following the ex-

change of the comforts of the hospital ward for a far from luxurious home, but it subsequently rose nearly to the normal line.

From June 1st a long interval elapsed before she made her reappearance at the hospital; and at her next visit on August 31st it was obvious that there was a slight deterioration in her condition; her face was duller and slightly puffy, and her bodily strength less than before. She was still able, however, to do most of her household work.

The case shows that a great change was brought about, and this presumably by the treatment. She was at the time of her admission in such a state of physical prostration that one cannot but think that her feeble spark of life would have soon become extinguished, had not some means been found to fan it into fresh vigour; and inasmuch as no decided improvement had taken place during her previous stay in the hospital, one is justified in attributing this to the injections rather than to the nursing and comforts of the ward. As a proof of her changed aspect, it may be mentioned that, whereas she had in January been more than once sent up to the Examination Hall for the purposes of the Conjoint Board examination, the examiners thought that she was not in April a sufficiently marked case. No unpleasant symptoms followed any of the injections in this case. I am indebted to Dr. Whipham for permission to publish these notes.

CASE II. Myxœdema in Early Stage : Great Improvement.—Mrs. R., aged 46, had first noticed symptoms of the disease early in 1890. She was admitted into the hospital in January, 1891, when she stated that she had altered so much in face that her friends failed to recognise her. The question of thyroid transplantation was considered and negatived. There was no change in her condition during her stay. Her hair was then beginning to fall off. This patient was not admitted into the hospital for treatment, but attended weekly as an out-patient to have the injections performed. She was, at the commencement of the treatment on April 5th, a well-marked case, whose only peculiarity was that she was subject to profuse perspirations.

After the first injection (m xxv) she had much giddiness and headache for twenty-four hours. By May 15th she felt stronger in the legs, and could use her hands better; and by May 30th there was also distinct improvement noticeable in her aspect; she found that she was able to work better, and that she no longer felt languid and tired, or suffered from aching in her legs as formerly, while her speech was quicker and less nasal in tone. After the injection on that day (made at one spot in the back) she said that she, to a great extent, lost the use of her hands for two days. She was injected on June 14th, but after that an interval of four weeks elapsed, and on July 11th the temperature, which had previously risen from subnormal to normal, had fallen to 97°. She had by this time began to feel the want of the injections, and complained of her hands feeling "woolly," but her gain in strength was evinced by her ability to wash blankets for two days, a feat which before the commencement of the treatment was quite beyond her powers. On July 20th the temperature had once more reached normal. She mentioned again the weakness and pain in the arms following the injection for some hours. Her improvement in speech and in vigour had been sufficiently plain to call for much comment from her fellow servants and her mistress. On August 15th she was still improving although no injection had been given since July 20th. There were numerous new black hairs visible about 1½ inch long, among the old grey hair. She had not noticed any increase in the quantity of urine during the treatment. Although much stronger, she did not think that she was as strong as before the onset of the disease, but volunteered the statement that she was becoming more like a photograph of herself taken at that time.

CASE III. Myxœdema of Seven Years' Duration : Marked Improvement.—Mrs. M. B., aged 54, had been a sufferer from myxœdema for seven years, and was once a patient in St. George's Hospital for a few days, but had never derived any permanent benefit from medical treatment. At the time of the commencement of the treatment she was a very well marked case, having much œdema of the face and legs, chilliness, red nose, red patches on either cheek, and her speech so greatly affected as to be unintelligible to strangers, while her weakness incapacitated her from fulfilling her household duties. Her menopause took place in 1887.

The first injection was given on March 16th, and she attended weekly as an out-patient for their repetition. After the first few injections she was troubled for some hours with sensations of faintness and nausea. By April 12th the œdema had almost disappeared, and she noticed that her movements were sharper. No further unpleasant symptoms were complained of as following the injections till May 24th, the injection on that day being followed by pain and swelling at the seat of puncture for nearly a week. Improvement in all respects was slowly taking place during this time. After the injection on May 31st she had frequent fainting fits, while after that on June 7th, which was performed very slowly, she felt "queer" and unable to raise her arms. Since that date she has had the injections less frequently—about one every three weeks. On these occasions mxxv were not all injected at one spot, but one-half of the dose injected on either side of the back, and no unpleasant symptoms have followed any of them. On August 16th she stated that she felt wonderfully well, as strong as before the onset of the disease; that she could now kneel, scrub, shake up beds, and do all her washing; that the services of an interpreter were no longer needed in her shopping; that, though her hands still felt "woolly," she could sew better and thread a needle without putting on her spectacles; and that she seemed to be growing younger instead of older. No new hair was noticeable, but she thought that her old hair was growing longer. She was also sure that since the employment of injections she had passed more water than before, but the fact of her having attended as an out-patient has precluded any confirmation of this statement. Her aspect at this time is still of the kind diagnostic of the malady, but to a far slighter degree than at the commencement of the treatment. The temperature, formerly below 96°, reached the normal at the end of May, and has rarely fallen

¹ BRITISH MEDICAL JOURNAL, October 10th, 1891.