

in cases where the air douche drives out some pus, and yet on inspection it can be seen that more matter remains behind. In aspirating (with Siegle's instrument) we should look to see from what point the pus comes. The value of this method is shown when we apply it to a dissected part, where a full view of its action is attainable. We then see that it will draw fluid even from the recesses of the mastoid antrum. Its value is more marked in cases where the cavity of the tympanum is divided into loculi by bands of inflammatory formation, when inflation and syringing would fail to dislodge the matter.

It is impossible to describe the exact method of action of the remedies employed. We only know that many remedies—especially alcohol and powders—withdraw water from diseased tissues, and that others have a caustic action and set up strong reaction and speedy alteration in the circulation and nourishment of the mucous membrane; further, that the chemical and mechanical irritation caused by certain agents sets up a disintegration and reabsorption of round-celled infiltration; and, finally, that the antiseptic treatment prevents putridity and decomposition and exercises a good influence (through its germicidal property) on the progress of the suppurative process. In conclusion, I must touch on the operative treatment which may be required. If the perforation is very small it may be necessary to enlarge it. When two small perforations exist it may be advisable to unite them into one. The extraction of the ossicles, in my opinion, should only be performed when they are carious or when the membrane is destroyed and they are of no more use. After cessation of discharge operations may be required for the consequent adhesions—a subject which cannot be included in the present lecture.

TWO CASES OF GASTRO-JEJUNOSTOMY.

By C. W. MANSELL MOULLIN, M.D. OXON., F.R.C.S. ENG.,
SURGEON TO THE LONDON HOSPITAL.

THE first case was that of a patient sent to me from the country in December of last year. He was a tall and well-built, but exceedingly emaciated, young man, twenty years of age. His illness had commenced very gradually about three years previously with symptoms of chronic gastritis. For many months past he had been unable to take solid food and had suffered much from sickness. Of late he had obtained some relief by having his stomach washed out, four or five pints of fluid—more than he had taken in the preceding twenty-four hours—being frequently removed. On examination the abdomen was found to be exceedingly thin and the stomach evidently dilated. Nothing of the nature of a tumour could be detected. As might be expected, the bowels were described as constipated and very little urine was passed. In other respects the patient appeared to be healthy, although there was a suspicion of dulness about the left apex. Dr. Gilbert Smith, who saw the patient in consultation with me, agreed that there could be no doubt as to the existence of pyloric obstruction. From the patient's age, the length of time the symptoms had lasted and the absence of any evidence of tumour, it could not be of a malignant character; but, with the exception of a vague history of peritonitis when the patient was three years old, there was nothing to suggest a cause. The condition was explained to the patient and he returned home. For a month or two there was some improvement, and then his weight, although he was already exceedingly thin, began to fall away so rapidly that sixteen pounds were lost in the course of seven weeks. The pulse-rate when he lay down was only 56; the least exertion, even that of standing up, made it rise from 25 to 30 beats in the minute and the temperature was persistently below normal. For a week an attempt was made to increase the reserve of strength by feeding him with nutrient enemata, but this proved of no avail and early in March operation was determined upon without further delay. The night before and the morning of the operation the stomach was thoroughly washed out with boracic acid lotion, the contents being peculiarly offensive. On opening the abdomen a moderate degree of dilatation was found, the pylorus was thickened and hard, but there was no tumour or adhesion, or anything so far as the serous surface was concerned that could explain the obstruction.

Pyloroplasty, which had been contemplated being negatived by the thickening of the pylorus, it was determined to perform gastro-jejunostomy with Senn's plates. The omentum and the small intestine were turned over to the right and the commencement of the jejunum was found at once. An opening was made in the stomach on its anterior surface at the pyloric end and one of the plates was inserted. The same thing was then done on the convexity of the loop of the jejunum a sufficient distance down to give full play to the intestine as it wound under the transverse colon; the two surfaces approximated and the ligatures were tied. A few points of Lembert's suture were placed around the margin as a precaution and to ensure a sufficiently wide surface of apposition and the abdominal wound was made secure. Owing to the extreme emaciation and the peculiar hardness and inelasticity of the tissues considerable difficulty was experienced in bringing the edges of the peritoneum together and a double set of sutures was required. The shock was very severe; the temperature remained below 97° F. for many hours; the water that was injected on two occasions to wash out the bowel was retained and absorbed, and only a few ounces of highly coloured turbid urine were secreted in the first two days. Nutrient enemata were given every four hours and feeding by the mouth with small quantities of peptonised milk was commenced the day after the operation. There was a constant feeling of sickness, and the patient vomited several times, a certain amount of altered blood being present at first; bile was noticed on the third day. After this the patient gradually rallied, and though there was a great deal of retching caused to a large extent by the collection of tenacious phlegm in the pharynx, and occasional vomiting of bile-stained fluid, his strength improved so that he was able to sit up in bed. The diet consisted chiefly of peptonised milk with essence of beef and farinaceous food, brandy and champagne. Small quantities of custard and fish were taken without discomfort and dark-coloured formed motions were passed naturally. The wound was dressed at the end of a week; the deep part had healed soundly, but the skin had retracted a good deal on either side. The temperature, which had risen once to 100° F. on the third day after the operation, fell to normal and everything appeared to be progressing satisfactorily. A fortnight after the operation the regurgitation from the intestine began to be troublesome, the patient being sick two or three times a day and bringing up large quantities of nearly pure bile. The amount of food taken and digested continued ample; but it soon became apparent that no real ground was being gained. Nothing seemed to do the patient any good and, if possible, he became thinner than he had been previously. Wandering delirium at night was noted at the end of the fourth week; the urine and then the motions were passed unconsciously and the patient gradually sank and died six weeks after the operation. The wound had quite healed; for the last ten days there was no sickness and the motions were deeply coloured with bile. A few days before death there was some diarrhoea, which was checked at once by starch and opium injections; but up to the very day before death liquid food was taken well and in sufficient quantity and apparently was digested. The temperature after the operation continued normal until the last three days, when it rose in the evening to 101°, 102° and 103° respectively, falling again to normal in the morning. At the time of death itself it ran up rapidly to 106·2°. At the post-mortem examination the abdominal wound was found to be sound, a loop of small intestine being adherent to its posterior surface. There was no peritonitis; the jejunum, about fourteen inches from its commencement, was firmly adherent to the stomach three inches from the pylorus. On opening the stomach the pylorus was found to be reduced to the size of a pinhole; the thickening which had been noted at the operation had almost disappeared and therefore was probably muscular in origin, and there was no scar in the stomach or duodenum to account for the contraction. The artificial opening was soundly healed and admitted the tip of the little finger easily. By it, lying in two small sinuses, were the silk threads that had been passed through the coats of the viscera hanging free. No trace of the plates was to be found anywhere. The stomach contained a small quantity of liquid; the large intestines contained some semi-solid faeces, and there was a small amount of bile in the gall bladder. The other viscera were exceedingly dry and bloodless but otherwise healthy.

The second case was that of a woman thirty-five years of

age who was admitted into the London Hospital under the care of Dr. Sansom suffering from carcinoma of the pylorus. The patient was of fair height, and according to her own account had weighed 11 st.; her present weight was 4 st. 6 lbs. Her illness had commenced nine months before with pain across the abdomen and in the back. Frequent vomiting then set in; the loss of flesh became exceedingly rapid, and a hard mass made its appearance in the abdomen to the right of the middle line and just above the umbilicus. On examination this mass did not appear to be fixed by adhesions. The stomach was much dilated, extending into the left iliac region; the other organs appeared to be healthy. There was no doubt as to the diagnosis. The operation was performed on May 8th, the same steps being taken as in the former case, but Mayo Robson's bone bobbin was used instead of Senn's plates, and everything was completed in forty minutes. The shock was not so severe as in the former case. Nutrient enemata were given every four hours and the following morning she was fed with small quantities of peptonised milk and whisky by the mouth. The temperature on the day after the operation rose to normal, and then steadily sank lower and lower until the sixth day, when it barely reached 96°, and death ensued from exhaustion. At the post-mortem examination the abdominal wound was found to be sound and the jejunum firmly adherent to the anterior wall of the stomach. On laying the latter open the bobbin was found to be loose inside, slightly softened and with its edges somewhat rounded off. The opening was of very fair size, admitting the forefinger readily, and the mucous edges were adherent round the margin.

Gastro-jejunosomy has now been performed a considerable number of times, but there are still certain points in connexion with it which cannot be regarded as definitely settled. There can be no question as to the part of the jejunum which should be selected or as to the way in which it should be found. As it has to come round from under the transverse colon, sufficient length must be allowed. The omentum is usually so wasted that it does not give rise to any difficulty. The position of the opening in the stomach is not quite so certain. In cases of malignant disease at the pylorus it should, of course, be as far off as possible, and where there is much dilatation, where the walls are thin and atrophied and the muscular power lost, it should be low down on the anterior surface, as the contents have to find their way out by gravity alone. But where the obstruction is not malignant and there is a chance of the stomach regaining its muscular power this position is open to question. In the first of these two cases the opening was purposely made as near the pylorus as it could be, so that it might lie in that part of the stomach which is believed to be shut off from the rest during digestion by the contraction of the circular muscular fibres; and certainly regurgitation of bile and vomiting ceased for sometime before the patient's death, in spite of his weakness and irrespectively of the position in which he lay. Senn's operation takes considerably longer than that with Mr. Mayo Robson's bone bobbin, and the two sutures piercing the walls of the adjacent viscera are an objection; but they hold the parts together more securely and for a greater length of time, and they bring much larger surfaces into contact, so that there is less risk of the bowel dropping suddenly and bending at an acute angle. Still, although the bobbin had slipped out, it had remained sufficiently long to secure good union. Whether the opening will close again or not is a very important matter. Cases of four years' duration have, I believe, been recorded; but in the first of these two cases, though there was still ample space, there was already in the six weeks a considerable degree of contraction. The cause of death in the second of the two cases was undoubtedly exhaustion and starvation; that in the first case it is more difficult to understand. Nothing was found in any of the viscera post mortem to account for it and the clinical symptoms, especially the hyperpyrexia, pointed to the action of some toxic substance. The wound was perfectly sound and it is difficult to see where such a substance could have been generated except in connexion with the digestive organs. The power of assimilation seemed to have failed altogether. Abundance of food was taken and apparently digested, but the patient did not benefit in the least from it; and it is possible that, under the abnormal conditions present, products were formed by fermentation or decomposition in the alimentary canal which were absorbed and gave rise to the peculiar train of symptoms.

Wimpole-street, W

EXPERIMENTS AND CLINICAL OBSERVATIONS ON THE ACTION OF CHLOROFORM.

By ROBERT KIRK, M.D. EDIN., F.F.P. & S. GLASG.,
PHYSICIAN TO THE DISPENSARY FOR DISEASES OF WOMEN, GLASGOW
WESTERN INFIRMARY.

THE result of fifty experiments recently performed on animals at the Veterinary College of Glasgow is believed to prove that when chloroform is inhaled there is an action exerted by the vapour on the respiratory tract, and that a reaction ensues when the inhalation is discontinued; whilst it is maintained that both experiment and clinical observation combine to show that this reaction is the cause of primary syncope when allowed to take place at certain stages of the inhalation. A most important question therefore is—how long does the vapour take to escape from the lungs when the inhalation is discontinued? Dr. Snow concluded from the odour of the breath and from an observation on a man who inhaled the smoke of a cigar that the vapour was completely discharged from the lungs with three expirations, and my own observations on patients, and on a rabbit, cat and dog confirm this and seem to show that the lungs must be emptied in from ten to twenty seconds. The time taken to charge the lungs may be passed over, as well as the probable effects which are produced by the action of the vapour, for the reaction which follows is the most important question to be considered and constitutes in itself an irrefragable proof of the action that had taken place previously. It must here be mentioned that rabbits, cats and small dogs were chloroformed in a large glass vessel with a close-fitting lid, of a capacity of 4500 cubic inches and which had been previously charged with a given percentage of vapour. When observations were made on the heart the action was previously determined by auscultation, a binaural stethoscope being used in all but a few early experiments. An experiment on a rabbit and another on a guinea-pig seemed to show that no reaction of any importance with respect to the heart's action occurred in these animals. No observations on the pupils were made in these cases, but I think it may be claimed for those which were made on the pupils of the cat that they led to results of the most beautiful and decisive character. When a cat's pupil is dilated it is circular, as it contracts it becomes oval, and it finally, in the strongest contraction, appears as a mere line. The yellow iris so common in cats renders pupillary changes easy of observation. In one experiment a cat inhaled 4 per cent. of chloroform for two minutes. When taken out of the jar the pupil was widely dilated and it contracted to a minimum in fifteen seconds; this lasted for forty-five seconds, when there was sudden and wide dilatation and the cat recovered. In two other experiments the contraction took place in ten seconds, and the sudden dilatation occurred a minute afterwards. Similar results ensued in two cats that breathed 4 per cent. of chloroform for one minute. This contraction cannot depend on further absorption, for so long as the cat remains in the vapour the pupil remains dilated; and it is equally clear that it must be due to a sudden reaction, otherwise the pupil would gradually return to its normal condition. In deeper anæsthesia these results were considerably modified, but they may be meanwhile omitted.

It now remains to show that the vapour reaction leads to stoppages and great irregularities in the action of the heart in cats. A considerable number of experiments were performed to determine this, but it will only be necessary to instance a few. In four experiments four cats inhaled 4 per cent. of chloroform for one minute. In one instance the observation was a failure owing to the resistance of the animal, and in another the cardiac rate, which had been 140 before the inhalation, was extremely rapid when the cat was taken out of the jar; but there was a sudden stoppage in half a minute, which lasted for about five seconds, and this was followed by extreme irregularity for a minute and a half, when the cat recovered. There were pauses between individual beats in this case; sometimes after every third beat, whilst the sounds were very weak during this irregular action, and the same may be said of other cases. In the other two experiments the results were similar, rapid but regular action of the heart ending in sudden stoppage and irregularities in about half a minute. In two other experiments, in which