fatty food. The perforation in the stomach was not found, being probably closed. On August 12th an empyema of the lower part of the left pleura was opened, giving exit to pus which was very foul, although there was no perforation of the diaphragm. The abdominal wound was healed by August 28th, and for nearly a fortnight afterwards the patient made good progress; but then diarrhoea and other symptoms of septic poisoning set in, and she succumbed on September 15th.

The necropsy was made by Dr. Rolleston, who found that there had been no general peritonitis, and that the subphrenic abscess had entirely contracted. There was a cicatrised ulcer on the small curvature and posterior surface of the stomach adherent to the pancreas, the neighbouring part of the stomach being adherent to the under surface of the left lobe of the liver. In the upper part of the left pleural cavity was a small quantity of pus. The lower part of the cavity, where the empyema had been originally, was partly closed by adhesions.

With the view of comparing the frequency of general peritonitis and limited peritoneal suppuration or subphrenic pyo-pneumothorax, as results of simple gastric and duodenal ulcers, I have examined the *post mortem* records of St. George's Hospital, which extend over a period of more than fifty years, having been begun with the year 1841. These records contain 37 examples of perforation of simple gastric or duodenal ulcers into the general peritoneal cavity without any or with but slight attempt at limitation, 25 of which were gastric, 12 duodenal. Of the duodenal ulcers one was the acute sequel of a burn.

The examples of more or less completely circumscribed peritoneal suppuration from the same causes are 24 in number, 23 of which were due to gastric perforation, one to duodenal. These are given in the tabular form.¹ Nine were incompletely circumscribed, 15 completely. Many of the latter must from their origin in perforation of an air-containing viscus, and situation immediately beneath the diaphragm have been of the nature of subphrenic pyo-pneumothorax, though it is in a small proportion only that the presence of gas in the cavity is mentioned in the *post-mortem* description, or, as having been recognised during life, in the accompanying clinical history.

As regards the stomach, this analysis of forty-eight cases of perforation into the peritoneal cavity may be taken as giving a fair representation of the chief results of such perforation, perhaps warranting a generalisation.

The most important point brought out is that in a large proportion (in the present analysis nearly half) of the cases of gastric perforation, no matter in what part of the stomach the perforation may be, the extravasation and peritonitis are more or less limited at first. In most cases where general peritonitis is found at the *post-mortem* examination the inflammation is most intense in the subphrenic region, perhaps the more solid of the extravasated gastric contents remaining here in a cavity half closed by adhesions; while sometimes the extravasation has clearly taken place into a cavity so circumscribed that the peritonitis became generalised merely by the rupture of an adhesion some days after the perforation. In fact there are all degrees of transition between a perfectly unlimited peritonitis and a typical subphrenic pyo-pneumothorax.

The practical importance of this point has been illustrated by the formation of a subphrenic collection of pus after laparotomy for general peritonitis, the site of the earliest extravasation from the stomach having probably escaped thorough cleansing at the operation,² and by the recent experience that secondary suppuration in the chest is to be feared even after the abdomen has been opened for general peritonitis of but a few hours' duration.³

The table, amplified as it is from a previous paper, further substantiates other points to which attention was there directed, such as the partiality of subphrenic pyo-pneumothorax for the left side of the abdomen with boundaries which are in many cases very similar, and the frequency and nature of the thoracic complications which add so seriously to its fatality.

Among the more recent publications dealing with the subject of subphrenic pyo-pneumothorax or the treatment of perforating gastric ulcer to which reference has not been made either here or in the papers quoted are the following:

R. F. Weir, *Laparotomy for Perforating Round Ulcer of the Stomach*,

¹ Ten of these cases have been already published by Dr. Penrose and myself, *Clin. Soc. Trans.*, vol. xxvi. In this paper the same question was considered, but on less valid a basis.

² Taylor, *Birm. Med. Rev.*, 1888.

³ Kriege, *Berl. klin. Woch.*, Dec. 5th, 1892; Haward and Dickinson, *Clin. Soc. Trans.*, vol. xxvi.

Internat. Med. Mag., February, 1892; S. Pozzi and E. Ricklin, *De l'Intervention Opératoire dans les Cas de Perforation d'un Ulcère Simple de l'Estomac*, *Rev. Intern. de Thérap. et de Pharm.*, January 18th and 30th, 1893; J. W. Taylor, *On the Surgical Aspects of Peritoneal Perforation*, *Provinc. Med. Journ.*, May, 1893; Clifford Allbutt, *A Clinical Lecture on Sub-diaphragmatic Abscess*, *Clin. Journ.*, June 7th, 1893; R. A. Stirling, *Case of Perforating Ulcer of the Stomach, Laparotomy, etc.*, *Austral. Med. Journ.*, June 15th, 1893; C. Vaulair, *Contribution à l'Étude des Abscès Sous-diaphragmatiques Gazeux*, *Rev. de Médecine*, July 10th, 1893; A. L. Mason, *Subphrenic Abscess, with special reference to those Cases which simulate Pyo-pneumothorax*, *Trans. Assoc. Amer. Phys.*, 1893; W. F. Haslam, *Some Points in the Surgical Treatment of Simple Ulcer of the Stomach*, *BRITISH MEDICAL JOURNAL*, November 11th, 1893.

A CASE OF ENTERECTOMY FOR GANGRENOUS BOWEL.

By F. T. PAUL, F.R.C.S.,

Surgeon to the Liverpool Royal Infirmary.

THE following case, together with one reported by Dr. Horrocks, of Bradford, disposes of an objection which has been urged against my operation, namely, that it would not always be possible to invaginate the enlarged proximal end of the bowel into the distal shrunken end, and that in such cases it would therefore be useless. I was quite aware before by experiments that it was apparently as safe to invaginate against the flow of the faecal current as with it in healthy dogs; but I was far from sure that the same would prove to be the case under the different conditions associated with strangulated bowel, and I did not intend to practise invagination upwards in the human subject until it was absolutely necessary to do so. There are now two cases in which the operation has been done in this way, and both have made a rapid and complete recovery, and it may therefore be conjectured that it is practically unimportant which way the bowel is invaginated, though I think the downward method should be preferred when feasible.

S. R., aged 51, came under my care at the Royal Infirmary on June 20th, 1893. She was a rather delicate-looking woman, had never been very strong since she suffered from spinal curvature as a child of 11. Early in December, 1892, a week after lifting a heavy weight, she first noticed a lump in the left groin; it was soft and painless, and had remained there ever since. For a few months she had been subject to attacks of vomiting near the menstrual period, but they had not been accompanied by any change nor pain in the lump. One of these attacks commenced very suddenly on June 14th, and continued on the two following days. On June 17th she was put under medical treatment, and the vomiting remained in abeyance until June 19th, when it returned and was inclined to become stercoraceous. There had been no movement of the bowels nor passage of flatus since June 14th.

When the patient was first seen on June 20th the abdomen was slightly distended; there was severe umbilical pain, absolute constipation, and vomiting, together with a small femoral hernia, tense but painless. Her general condition was quiet, pulse under 90, temperature 98.2°. She was at once taken to the operating theatre, and placed under the influence of chloroform. When the sac was opened the small knuckle of bowel exposed looked recoverable, but, upon releasing the constriction, and drawing down a little more bowel for inspection, it was found that on the proximal side there was a line of ash-grey slough, through which the contents began to ooze. The entire length of constricted bowel was 1½ inch, and on the distal side there was no distinct slough. An incision was next made in the median line of the abdomen between the umbilicus and the pubes, and a sponge was introduced and placed beneath the inner opening of the hernial sac. Then, after cleansing the bowel in the sac, it was reduced with the left hand outside, and rapidly withdrawn from the abdomen with the right hand, previously placed inside to receive it. The peritonum was not at all soiled in the process. The bowel was then clamped above and below, the injured part quickly cut out with scissors, the bleeding points tied, and one of my bone tubes (1 inch by 1½ inch), sutured into the upper end. In this case, however, the upper end was very dilated and thickened, and it proved impossible to invaginate it into the shrunken lower end. The tube was therefore changed for a smaller one (¾ inch by 1½ inch), which was sutured into the lower end. The traction thread was passed, the cut ends attached, and invagination performed as described in a previous case.¹ The only difference—a marked one—being that the bowel was invaginated upwards instead of downwards, a variation which was not found to increase the danger in the original experiments on dogs. As the traction thread had been passed through distended and, perhaps, partially paralysed bowel, the needle puncture was secured with a single Lembert suture. Very fine green catgut was used for all internal sutures, and fishing gut for the abdominal wall. The abdomen was closed without drainage, after sponging out of the peritoneal cavity a little blood-stained serum which was present before the operation. The hernial wound was only closed above, the lower part being left open for drainage. The entire operation, including the administration of chloroform, lasted 1½ hour.

The patient soon recovered from the shock of the operation, which was

¹ *Clinical Society's Transactions*, 1892.

but slight. She vomited once a little during the night, and complained of pain in the back. The next day she was more comfortable, and the temperature varied between 98.6° and 99°. From this time onwards she progressed very favourably, with one exception. On the eighth day after the operation she had an attack of pain and sickness, which was apparently due to an excess of food, and which was rapidly recovered from when the amount was lessened. The highest temperature reached was 99.2°; it occurred on the evening of the sick attack. She left the hospital cured on July 31st, scarcely six weeks after the operation.

Food.—During the first twenty-four hours she had the yolk of an egg, two ounces of brandy, one small tin of Brand's essence, ice, and a little water. Second day, the same, but a little more in quantity, and a little beef-tea. Third day, the same. Fourth day, the same, with a small cup of tea and more beef-tea. Sixth day, two rusks allowed. Eighth day, food lessened. Tenth day, increased again. Twelfth day, sherry whey added. Thirteenth day, arrowroot and rusks. Then gradually put on to light solid diet.

Bowels.—Flatus passed freely after the operation, but the bowels were first moved with glycerine enema on the seventh day; next naturally on the sixteenth day, and subsequently at intervals of every two or three days, often with the help of an enema. No trace of the bone tube could be discovered in any motion.

I think from the three cases which are now on record that it may be conceded that the operation is rapid, safe, and successful, and that the ultimate condition of the bowel is, so far as we can judge, perfect. This patient is now, six months after the operation, in as good health as she has enjoyed for many years, and is at work daily as a nurse amongst poor people. This makes the third time I have done the operation. The first patient recovered as well and more rapidly than this. The second was a "too late" case of intestinal obstruction, and died in thirty-six hours, but with a water-tight union. I have previously been careful, and still wish only to recommend this operation for the small intestine; most parts of the large intestine are too fixed to permit of a sufficiently free manipulation of the bowel, and are, therefore, unsuitable for it.

EXCISION OF INTESTINE FOR MALIGNANT DISEASE: CIRCULAR ENTERORRHAPHY BY PAUL'S METHOD.

By WILLIAM HORROCKS, M.B., F.R.C.S.,
Honorary Surgeon to the Bradford Infirmary.

THE choice of operation in the following case was determined by its suitability to maintain the continuity of the bowel, without increasing the number of intestinal, wounds. As was anticipated, the gut above the stricture was more dilated than that below. On this account it would have been difficult to invaginate the upper into the lower bowel. In this case, and in one of Mr. Paul's cases just recorded, the lower was invaginated into the upper without ill-effect. The tearing of the mesenteric attachment is one of the difficulties of the operation. It was avoided by the use of a small-sized tube, which fitted easily into the intestine, and by the application of two stitches along the mesenteric attachment to prevent tearing or stretching. The invagination of the intestine required care, and was accomplished, partly by pushing the bone tube, partly by drawing the intestine over it.

I must express my thanks to Mr. Paul for the useful information, which he promptly gave me.

C. H., a married woman, aged 38, was admitted to the Bradford Infirmary on August 29th, 1893, with obstruction of the bowels. She had been an in-patient in October, 1892, with similar symptoms, which were relieved by starvation and opium. She suffered almost constantly from severe abdominal pain, shooting round the loins to the back. The pain was spasmodic, sometimes lasting several hours, and when very severe caused emesis. The bowels were usually relaxed, but during and after the severe attacks of pain they were confined, sometimes for several days. She had had four children, the youngest being 14 years old. Menstruation was painless and regular. She was a spare woman, who showed no signs of general wasting. A systolic *bruit* was heard at the apex of the heart, which was not displaced.

The abdomen was somewhat full at the lower part, with the umbilicus everted, and the skin marked with atrophic scars. The percussion note was normal over the abdomen. Above Poupart's ligament on the right a solid tumour was felt; it consisted of two parts, divided by a vertical groove.

By vaginal examination the uterus was found displaced downwards, with the cervix pointing towards the sacrum. Occupying the right fornix, and extending in front of the

uterus, was a rounded swelling, which was continuous with the tumour felt above the pubes. This mass felt hard. It was divided into two parts by a groove, and moved independently of the uterus.

OPERATION.

On September 29th an exploratory abdominal operation was performed to ascertain the nature and connections of the growth. As the tumour was found to implicate a considerable portion of the small intestine, the wound was closed. This operation was performed by Dr. Rabagliati, gynaecologist to the infirmary. The wound healed without complication.

On October 19th, at the request of the patient, I operated with the assistance of Dr. Rabagliati, Mr. Althorp, and Dr. Wood. The operation lasted an hour and twenty minutes with anaesthesia by chloroform during the first twenty minutes, by ether for the remainder of the time. The incision, 3 inches in length, was made in the median line rather above the umbilicus. The tumour was adherent to the abdominal wall, along the line of the old scar, which was below the fresh incision. These adhesions were partly broken down, but the most adherent part of the abdominal wall was cut away with the growth. The tumour was then drawn out of the abdomen, and the opening packed with antiseptic cloths. The intestine beyond the growth on each side was emptied, and an elastic tube was passed through the mesentery around the gut. A V-shaped piece of mesentery, containing enlarged glands, was separated, and the bleeding vessels tied. The bowel was now cut across transversely on each side of the growths, and the implicated intestine with its attached mesentery removed. A Paul's bone tube was now inserted into the open end of the intestine of smaller lumen, and the free margin of the bowel stitched to the end of the tube with continuous silk suture. The thread was passed through the holes in the tube and the muscular and peritoneal coats of the intestine. Additional stitches were inserted at the mesenteric attachment. The other cut end of the bowel was now brought into apposition, after the threaded needle, connected with the tube, had been passed through the intestinal wall from within out, about 3 inches from the incised extremity. The two ends of the bowel were now stitched together by a continuous Lembert silk suture. By traction on the thread and manipulation of the bone tube the bowel was invaginated for about three-quarters of an inch. It was fixed in this position by a continuous silk suture, which included only the peritoneal and muscular coats. The needle was now cut from the traction thread, which was drawn into the gut. The margins of the mesentery were stitched, partly by interrupted, partly by continuous sutures. The extremity of the vermiform appendix was inflamed and adherent to the tumour. The appendix was ligatured near its proximal end, the distal end removed, and the stump closed in by three silk sutures. The abdomen was cleansed and a glass drainage tube inserted with its lower end reaching the bottom of Douglas's pouch. The abdominal wound was closed with silkworm sutures, the end of the drain projecting at the lower end of the wound.

DESCRIPTION OF GUT REMOVED.

The intestine removed was about 39 inches long. At two places its wall was invaded by growth. The larger mass of growth was about the size of a large orange, consisting of tumour and convoluted intestine, fixed by firm adhesions. The lumen of the intestine at this part was much narrowed, and the mucous membrane ulcerated. There was a second growth of smaller size, separated from this by healthy intestine. The mesentery showed several enlarged and infected glands. The growth was a large round-celled sarcoma, growing from the submucous tissue.

AFTER-HISTORY.

The patient rallied quickly from the operation. The pulse shortly after her return to bed was 76, good and regular. The wound healed without trouble, and the patient was discharged on November 23rd, 1893.

BEQUESTS AND DONATIONS.—The Royal Hospital for Diseases of the Chest, City Road, E.C., has just received a donation of £500 from a lady who takes a keen interest in its work, but does not wish her name to be known.