coat in the crushed portion. To this crushed base of the appendix, close to the caecum, an ordinary thin catgut ligature is applied and cut short (Fig. 5). A purse-string suture is then inserted around the root of the appendix (Fig. 6), but not tightened until the appendix has been removed, which is effected by seizing it with the pressure forceps just above the crushed portion and cutting it through between the ligature and the forceps. The ligatured stump of the appendix, consisting merely of a little nipple of tissue, is depressed by means of a probe or a pair of Lister's sinus forceps and the purse-string suture tightened.

Fig. 4.—Forceps applied to root of appendix.

Fig. 5.—Crushed portion of root of appendix with ligature applied close to caecum.

This entirely buries the ligatured root of the appendix, making the surface of the caecum appear as in Fig. 7. For additional security another purse-string suture may be applied, this taking up the root of the mesentery so as to make it form an additional cover to the tip of the caecum. The ligature of the crushed stump of the appendix is not absolutely necessary, as the crushing quite seals the lumen of the appendix. If thought desirable, it may therefore be omitted, but personally I usually apply the ligature.

Fig. 6.—Purse-string suture applied but not yet tightened.

Fig. 7.—Dimple seen after tightening the purse-string suture.

The caecum is then returned, and the peritoneum closed by a circular suture, after which the muscles, none of which have been divided, fall together. Two or three interrupted catgut sutures are applied to unite the separated margins of the internal oblique, and then several sutures are in like manner applied to the edges of the aponeurosis of the internal oblique muscle to secure accurate apposition, after which the skin is united by several interrupted sutures.

A dry aseptic dressing is then applied, and not disturbed for ten days, at which time the patient may be allowed on the sofa. The damage to the abdominal wall is so slight that no belt is necessary or even desirable.

In acute cases, where the root of the appendix cannot always be safely brought to the surface, I have found that crushing the root of the appendix and applying a catgut suture to the stump has been sufficient to secure freedom from a faecal fistula; but in the usual operations in the quiescent period, as described above, I always apply the purse-string suture in addition.

It will be seen that the first part of the operation, the splitting of muscles, is similar to the one advocated by Dr. McBurney, but the treatment of the appendix which I have employed for years was original on my part, though I believe it does not differ much from the method pursued by Dr. Ochsner of Chicago and by Dr. Doyen of Paris, both

of whom probably arrived at the operation as I did, independently of one another.

If there are no special complications to cause delay, the operation can be readily completed in from ten to fifteen minutes. Where the diagnosis is doubtful, and it may be necessary to examine the abdominal contents more thoroughly than is generally necessary in a simple operation on the appendix, a vertical incision through the outer part of the rectus sheath is employed and the muscle is displaced inwards, when the posterior sheath of the rectus and the peritoneum are divided together in a vertical direction; in this way a free opening can be made large enough to admit the fingers or even the hand without dividing any muscle. When the operation is finished, the posterior and anterior parts of the rectus sheath are united separately, and a strong abdominal wall is left. Through this incision the appendix, the pelvic organs, the kidney, and the gall-bladder region can be readily explored, and if needful to do any further operation on these organs the incision can be extended without division of muscle or serious weakening of the abdominal wall.

UNUSUAL CASE OF SUPPURATIVE APPENDICITIS.

By GEORGE A. CLARKSON, F.R.C.S.ENG.,
Leicester.

THE appendix being liable to considerable variation in position, the abscess resulting from inflammation of that body is liable to extend in many directions. In the following case the abscess not only produced intestinal obstruction by pressure on the anterior wall of the rectum, but subsequently having perforated the pelvic fascia forming the sheath of the psoas, the pus passed below Poupart's ligament in the sheath of that muscle.

A man, aged 32, was taken ill in February, 1901, with a mild attack of appendicitis. With rest and treatment the symptoms gradually subsided, and at the end of a month the patient was able to get about again.

At the beginning of May, 1901, there was a relapse, and before long difficulty was experienced in getting the bowels to act, and the patient suffered much discomfort and pain. Aperients and enemata had less and less effect, and by May 19th there was almost complete obstruction. This was due to pressure on the anterior aspect of the rectum by a fluctuating swelling, which could easily be felt by the finger and which was obviously an abscess. The walls of the rectum were completely flattened against the sacrum. The amount of swelling in the right iliac region was very slight. On May 20th the abdomen was opened in the Leicester Infirmary, and an abscess containing extremely fetid pus was found behind the bladder. Nothing could be seen of the appendix owing to adhesions. The abscess cavity was drained, and the wound closed in fourteen weeks.

After a lapse of two years—that is, in July, 1903—a fresh attack occurred, and a large inflammatory mass formed in the right iliac region. This gradually subsided, but by the middle of September a large mass was again present, accompanied by severe constitutional symptoms, great pain, and consequent loss of flesh and strength. The pain, which was so intense as to necessitate the free use of morphine, extended down the right thigh as far as the knee. The thigh then became gradually flexed on the pelvis, and the least movement of it caused great suffering.

As the patient desired that an attempt should be made to relieve his condition, on October 1st I opened the abdomen over the inflammatory mass. The caecum and adjacent coils of small intestine were found densely adherent in all directions, and the active trouble apparently lay behind and internal to the caecum. As an attempt to separate the adhesions nearly resulted in the bowel tearing, the wound was closed. Following the operation, the right thigh continued to become more and more flexed on the pelvis, the severe pain persisted, and profuse sweats occurred.

Early in December swelling and fluctuation was obvious below Poupart's ligament, and an abscess was opened in the sheath of the psoas containing more than 20 oz. of very foul-smelling pus. This gave great relief to the pain, but the patient continued to emaciate, and the thigh remained in the same flexed position. Large quantities of pus were discharged daily, and the patient died of exhaustion on April 29th, 1904.

Had the patient consented to an operation at the time of the first attack, probably there would have been little difficulty in dealing with the appendix; but with the recurrence in 1903 a condition arose which surgery was powerless to relieve.

PERFORATED DUODENAL ULCER:

WITH A REPORT OF THREE CASES.

By H. S. CLOGG, M.S.LOND., F.R.C.S.ENG.,
Assistant Surgeon, Charing Cross Hospital; Surgeon to In-patients,
Evelina Hospital for Sick Children.

THE three following cases of perforated duodenal ulcer which have recently been under my care present some points of interest, and hence I venture to record them:

CASE I.

Male, aged 44. He had always enjoyed very good health; it was impossible to obtain any history of previous gastric or intestinal disease. Whilst lifting a heavy packing case he was suddenly seized with acute pain in the right hypochondriac region; he became very faint and was carried to the hospital, a distance of about 100 yards. On admission he had recovered to a great extent from his initial collapse; the pulse was of good quality, 80 per minute; temperature 97°. He vomited three times in rapid succession; the vomit was bile-stained. He complained of considerable pain in the right hypochondriac region, and this region of the abdominal wall was held very rigid; the maximum point of tenderness was about 1 in. above and to the right of the umbilicus. Apart from the right hypochondriac region the abdomen was free from all tenderness and moved freely on respiration. No food had been taken for some two hours previous to the occurrence of the severe pain. Two or three hours later the pain was much easier; he again vomited some bile-stained material. The temperature had risen to 100.6° and pulse to 104. During the night he slept well and appeared free from pain.

The following morning he did not complain of any pain, but on deep pressure some tenderness was elicited in the right hypochondriac region. The temperature was 100° and the pulse 98 to 106. The abdomen was perfectly soft, and moved uniformly on respiration. On percussion it appeared quite normal. Later in the day his condition changed, and rather suddenly so. The pulse increased in frequency and reached 130 per minute; the temperature rose to 102°; respirations were unaltered. The abdomen was slightly distended generally; abdominal movements were free, except in the right hypochondriac region, and there the wall was held rigidly fixed and great tenderness was complained of, the remainder of the abdomen being free from all pain and tenderness. On percussion there was an area of tympany reaching from the umbilical level on the right side upwards to the fifth rib in the nipple line, backwards to the mid-axillary and inwards to the mid-lines. There was absence of liver dullness anteriorly. When the patient was turned on to his left side this tympanitic area extended backwards to the scapular line, beyond which level some impaired resonance was obtained over the right base where the entry of air was deficient. Some impaired resonance was also present in the right loin. These signs pointed to a localized collection of fluid gas in the right hypochondrium, and from the situation and the absence of all previous symptoms a perforated duodenal ulcer was suspected.

Operation.—Twenty-eight hours after the initial symptoms a median epigastric incision was made and lengthened eventually to about 5 in. On opening the peritoneal cavity some turbid fluid escaped; this was coming entirely from the right side; the remainder of the peritoneum was not infected apparently, and was shut off by sterile gauze packing. The duodenum just beyond the pyloric opening was considerably thickened and adherent to the liver; from amongst these adhesions fluid was seen issuing. The adhesions to the liver were separated and a perforated ulcer exposed in the centre of a very indurated duodenal wall; the perforation was about the size of a threepenny piece. An attempt was made to close the hole with Lembert sutures. The bowel, however, was too friable to permit this. The free edge of the omentum was brought up and stitched around the perforation. The peritoneum was carefully dried as thought. A counter incision was made in the right loin, just below the last rib, and immediately the peritoneal cavity was opened some few ounces of turbid fluid escaped. The anterior wound was closed with the exception of about 1 in., through which a rubber drainage tube was passed to the surface of the ulcer; the lumbar wound was drained by a rubber tube also. The operation lasted about thirty-five minutes. At the close Oij of saline solution were put into the median basilic vein. The following morning the patient had a rigor, the temperature reaching 105° and the respirations 36. Lung trouble was anticipated, but the alarming symptoms subsided in a few hours and the temperature fell to normal in a few days. The tubes were removed on the eighth day. A few days later a small abscess developed in the abdominal wall, presumably due to stitch infection. This was treated and all went well. Now, seven months later, the man is in perfect health; he has no symptoms of duodenal ulceration, active or healed.

The points of main interest in this case are: (1) The absence of all symptoms previous to those of perforation. This appears to be the case in about 50 per cent. of perforated duodenal ulcers. It is so common, in fact, that in a middle-aged man, in previous good health, who suddenly develops signs of acute perforative peritonitis of the upper abdomen,

duodenal ulcer should be strongly suspected. (2) The occurrence of acute symptoms during some severe straining action. This is frequently observed in gastric and not uncommonly recorded in the duodenal perforation also. In the stomach it is easy of explanation. The abdominal wall contracting would tend to compress a full stomach and cause a rupture at any weak spot. Compare the etiology of the cases of spontaneous rupture of the stomach. The condition is somewhat different in the duodenum, and it is difficult to conceive that the strain can cause a perforation in a similar way. In this case, and possibly in others recorded, I think the strain tore adhesions between the duodenum and liver, and thus caused the hole in the duodenum. (3) The length of the "latent period" and the almost entire absence of symptoms in that period. In most acute abdominal conditions after the initial collapse there comes a period in which the patient is comparatively comfortable, but generally some evidence of abdominal disease can be detected. In this case the abdomen was practically free from all evidence of disease; the pulse was a little increased in frequency, and the temperature a little elevated, and slight tenderness on deep pressure was present. Signs of peritonitis did not develop until twenty-four hours later. The perforation in the early collapse must have been very small and immediately sealed by adhesions. Later adhesions gave way and allowed of free extravasation. (4) The clinical phenomena pointing to an effusion of gas and fluid in the upper right region of the abdomen. The large area of tympany obliterating the liver dullness, changing its limits on movement of the patient on to the left side, and the general suppleness of the rest of the abdomen produced a gastro-intestinal perforation. At the operation no adhesions were found shutting this fluid collection off from the rest of the abdomen, and it is difficult to understand why it did not overflow into the general peritoneal cavity, but it evidently did not. This right renal pouch, the extent of which was first pointed out, I think, by Rutherford Morison, is said to be capable of holding a pint, and in this case it must have had its full complement. (5) The importance of a lumbar drain may be emphasized. I thought I had evacuated the whole collection from the anterior incision, and was surprised to find the escape of more fluid from my lumbar incision. Drainage from the anterior wound alone would have been very imperfect.

CASE II.

Male, aged 37. He was thought to have had an attack of acute appendicitis two years previously, and the history given of this illness strongly suggested the appendix was at fault. Apart from this there was no history of previous gastro-intestinal disease. He was suddenly seized with acute abdominal pain, chiefly on the right side, and the maximum pain was in the right lumbar region. The pain occurred two hours after dinner. Six hours later he was easier, but still had considerable pain in the right side of the abdomen. The abdomen moved freely, with some restriction on the right side; the wall was somewhat rigid here, but not particularly in the iliac fossa. Temperature, 100.2°; pulse 80 to 90. A few hours later the pain increased in severity, the pulse became more frequent, and the temperature was rising. When seen thirty hours after the onset of the symptoms, he was evidently very ill. The temperature was 102.6°, pulse 120. The abdomen was distended and its movements were very much restricted. The whole of the right half of the abdominal wall was rigid; the maximum tenderness was in the right iliac fossa. There had been no vomiting; the bowels had acted once. Liver dullness was present to the normal extent; some questionable impaired resonance was present in the right loin. He was evidently rapidly getting worse. From the previous attack of appendicitis, the absence of all other previous illness, and, when seen, the maximum pain and tenderness in the right iliac fossa, perforative appendicitis was diagnosed. Pelvic examination was negative.

Operation.—Thirty-one hours after the initial symptoms an incision was made in the right iliac fossa; on opening the peritoneal cavity some turbid, non-smelling fluid escaped; the appendix was immediately exposed and seen to be healthy. A gastric or duodenal perforation seemed therefore most probable, and the abdomen was opened in the epigastrium. A considerable quantity of turbid fluid welled up from the right side. A perforation of the duodenum was discovered about three-quarters of an inch beyond the pylorus. This was closed with a single layer of Lembert sutures. The margins of the perforation were not very healthy and did not hold the stitches well, and consequently the omentum was drawn up and stitched over the site of perforation. The peritoneum was then cleansed. The peritonitis appeared to be quite localized to the right side of the abdomen. A counter-opening was made in the right loin and a tube was passed through this. The epigastric and iliac incisions were drained with gauze. The operation lasted forty minutes. The patient made an uninterrupted recovery. The gauze drains were dispensed with on the seventh day and the tube on the tenth day. Four months later he is in very fair health, but suffers from what he terms "indigestion"—that is, occasional pain some two to three hours after food, which lasts a very variable time.