case there will be recurrence of the growth which has been for the time so successfully removed. We also know that they are associated in some way with sepsis and tubercle of chronic type ; that on the skin, burn scars, which take a long time to heal, and scars resulting from tubercle, are their favourite sites ; and that they are more common in the black than in the white races.

It is not so generally recognized that similar growths are to be found elsewhere in the body, and it seems to me probable that all of them possess a similar etiology and pathology. The normal tendency of scar tissue to contract seems in them to be inverted, and the fibrous tissue of which they are composed, instead of contracting, takes on the habit of growth.

Such examples are to be found in the mouth and the gastro-intestinal tract. In the mouth they are known as gum tumours or epulis, one form of which is a fibrous tumour growing from an old septic tooth cavity and requiring a radical operation if its recurrence is to be prevented. In the stomach a similar development is known as linitis plastica, and the simple, not cancerous, type is associated with chronic gastric ulcer.

In the small intestine a similar growth has usually been preceded by strangulation of the portion of bowel invaded. The usual result of such a strangulation, which has not been sufficiently long-continued to cause gangrene, is fibrosis and contraction of the involved bowel. This is what could be anticipated from a knowledge of what occurs in the arm as a consequence of too tight a bandage taken off in time to avert gangrene. Arrest in the circulation of the arm is followed by fibrosis, and the condition is described as Volkmann's ischæmic contraction. But in a small percentage of cases strangulated bowel, instead of contracting, develops a fibrous growth of its walls and forms a tumour causing intestinal obstruction. Such a portion of bowel, when strangulated, is of course infected as a consequence of the damage produced.

In the cæcum a similar condition is described as hyperplastic tuberculosis, but I have excised several of these fibrous tumours in which no macroscopic or microscopic evidence of tubercle or cancer could be found in them or in glands related to them.

In the pelvic colon a fibrous tumour developed around infected sacculi has often been excised in the belief that a resulting intestinal obstruction was due to cancer, until macroscopic and microscopic examination of the specimen proved the contrary. The Americans call this peridiverticulitis.

It is well known, but perhaps not sufficiently considered, that cancer of the large intestine may develop either in the form of a contracting ring, or as a tumour largely composed of fibrous tissue ; and what determines the one type or the other is unknown. To answer the question for keloids and the other fibrous growths mentioned is probably to answer it for cancer.

I am indebted to Dr. Charles Burman, of Ladysmith, S. Africa, my late house surgeon, for the photographs.

ABDOMINO-THORACIC GUNSHOT WOUND: DIAPHRAGMATIC HERNIA OF THE STOMACH.

BY SEYMOUR BARLING, BIRMINGHAM.

THE following case is of interest from the point of view of diagnosis, and is one of the many unusual conditions arising out of the aftermath of war.

The patient, age 28, was wounded on Aug. 12, 1918, by a machine-gun bullet, which struck him in the back over the lower part of the left thorax. He was operated on the same day, the wound being excised, fragments of rib removed, and the chest closed. The foreign body, a distorted bullet, was left *in situ* ; the *x* rays showed that it was closely related to the heart, and moved synchronously with the heart-beat. He suffered from hæmaturia for a day or two after his wound. Following the wound he developed a left-sided empyema, which was at first aspirated and then drained. The wound continuing

to discharge, he was transferred to England and came to the Rubery Military Hospital in November, 1918.

About this time he began to get severe attacks of pain in the epigastrium and in the left shoulder; the pains at these two sites were synchronous, and were relieved to some extent by dieting.

He was seen by Sir Gilbert Barling, who considered that his pain was probably due to the foreign body, which lay $2\frac{3}{8}$ inches anterior to the angle of the 10th left rib, either just within or just without the pericardium, and in close relation with the left phrenic nerve. On Dec. 6, portions of the 9th and 10th ribs being removed posteriorly and the old empyema cavity opened up, access to the foreign body was obtained, and it was removed from the pericardium. The wound was drained freely. The patient improved considerably after this operation, and could take ordinary diet without discomfort until February, 1919, when he began to get attacks of his old pain in the epigastrium and left shoulder.

The attacks were now associated with vomiting, and on two or three occasions with

FIG. 445.—The bismuth meal at first passed easily into the stomach; then the latter part of the meal remained in the esophagus and showed pulsation with respiratory movements. The picture is taken obliquely.

haematemesis, and persisted in spite of fluid diet. The radiographic findings after the administration of a bismuth meal were by no means clear, the presence of the heart and the thickened pleura at the left base obscuring the diaphragmatic shadow and its relations to the stomach. The following points were demonstrated, however :—

1. The lower border of the stomach was raised to the level of the 12th dorsal vertebra (*Fig. 446*).

2. The first portion of the meal passed easily through the cardiac orifice and demonstrated its patency; when the remainder of the meal was given, however, it remained in the esophagus, and the column of fluid pulsated with the respiratory movements (*Fig. 445*). This appeared to point to some valve-like closure of the cardia when the stomach was filled beyond a certain amount, and probably resulted from the abnormal position of the stomach.

3. *Fig. 446* is difficult to interpret: the curved shadow immediately above the opaque meal was believed by the radiographer to correspond to the paralysed left cupola of the diaphragm. It lies at the level of the 2nd costal cartilage, and it is more probable that it represents the thickened pleura on the under surface of the collapsed left lung, and that the diaphragm is at a much lower level, its movements and outline being masked by the adhesions in the pleural cavity. No paralysis could be demonstrated at operation, nor was the diaphragm as high as the shadow shown would indicate.

As the patient's nutrition had suffered severely, it was considered desirable to improve it before operation was carried out. He therefore returned to his home in the country, and by careful dieting managed to lessen the severity of his attacks.

FIG. 446.—The level of the diaphragm on the right side is normal; on the left side a curved shadow at the level of the 2nd costal cartilage was taken for a raised paralysed diaphragm; it probably represents the thickened pleura on the under surface of the collapsed lung. The stomach is much raised, the lower border corresponding to the 12th dorsal vertebra.

He was referred to me in the latter part of July, 1919; he had put on weight since leaving hospital, but during the month he had had three attacks of his old pain, though he had dieted himself carefully. He relieved his pain whilst in hospital by putting his finger down his throat; this induced vomiting, which immediately relieved his stomach pain, and the pain in the shoulder gradually died away during the next fifteen minutes.

It was decided to endeavour to replace the stomach, and operation was performed on Aug. 7, 1919. The abdomen was opened by median incision in the epigastrium, and access to the under surface of the left dome of the diaphragm was secured by division of the left rectus muscle, the incision thus being T-shaped. The patient being a spare man with a wide epigastric angle, this incision provided very good access. On tracing up the

left border of the stomach, it was found to pass through the diaphragm just to the left of the aortic opening: on pulling on the viscus, it was found firmly anchored to the margins of the diaphragmatic opening by adhesions. These were torn through with difficulty, and the stomach, once it was freed from the margins of the opening, was easily withdrawn into the abdomen. About one-half of the viscus lay in the thorax. The opening, which would just accommodate the tips of two fingers, was then closed by five mattress stitches of chromicized catgut. The depth of the opening and the proximity of the aorta rendered the passage of these a little difficult.

The patient made an uninterrupted recovery; he was able to leave hospital at the end of three weeks, and was then taking his ordinary diet. He has remained fit and well, with the exception of some slight breaking down of his old empyema scar.

An almost identical case was recorded in the *British Medical Journal*, Sept. 27, 1919, and reference was made in that paper to two other cases. Nevertheless, the condition must be a rare one. Many abdomino-thoracic wounds were operated on during the war, and the mortality was high even after closure of the opening in the diaphragm; survival without closure must be very rare. Diagnosis is difficult unless the condition is borne in mind, and in all the above cases it remained undiagnosed for months. Once suspicions are aroused, a bismuth meal may be of assistance in confirming the diagnosis, though even this, as shown above, is not infallible, and the radiographers who had to do with the case at different periods gave different findings; one diagnosed a diaphragmatic hernia of the stomach, and the other a high paralyzed diaphragm with stomach sub-jacent. The old empyema and its resulting pleural adhesions obscured the radiographic appearance and led to confusion.

The approach from below was satisfactory, and access to the opening for freeing adhesions and closure was easy in this case, the patient being spare and the thorax rather short; in patients in whom the opposite factors were present, access from below would be very difficult.

Considering that three operations had already been performed across the thorax, and an empyema cavity had been draining for some months, it was extraordinary that the stomach had contracted no intrathoracic adhesions, and reduced quite easily into the abdomen once it was freed from the margins of the diaphragmatic opening. When operation was contemplated, it was feared that reduction from below would be impossible; nevertheless this route was determined on in view of the doubt as to the diagnosis, the intention being to supplement it by transpleural operation in case of necessity.

RETROPERITONEAL HÆMATOMA AFTER RADICAL CURE OF INGUINAL HERNIA AND VARICOCELE.

BY CHARLES H. FAGGE, LONDON.

GENERAL A., age 60, was seen with Colonel B. at an officers' hospital in London in January, 1916. He had been sent from the Indian Army in Mesopotamia to Bombay for the radical cure of a right inguinal hernia; this was done on Nov. 6, 1915. "The wound healed without complications by first intention; but during this time the patient's general condition was not very satisfactory. He had frequent attacks of abdominal pain, with nausea, and there was a rise of temperature to between 99° and 100° on Nov. 11 and 12. On Nov. 16 a fullness was detected in the right iliac fossa, and there appeared to be a soft tumour behind the ascending colon. Colonel C. saw him in consultation, and was of opinion that the condition was due to hæmorrhage following on the operation. The patient was treated by a course of calcium chloride and potassium iodide without much improvement. On Dec. 5 Colonel C. was again consulted, and he was still of opinion that hæmorrhage was the cause of the trouble. During the interval between the two consultations the patient's general condition was fairly satisfactory, but there was nearly always