perhaps, be made in the case of the well-to-do, with whom the risks of waiting are relatively small, but even with them the length of time taken by expectant treatment is so great that operation is preferable.

When the involvement of glands is widespread and the disease has reached the lower members of the cervical chain, the question of treatment is harder to decide, because the golden opportunity for excision has passed, and not only are the operation risks, especially that of injury to the spinal accessory nerve, increased, but also the resulting scar is apt to be large and unsightly. In cases of this sort, unless there is some special reason for hurry, medical treatment should be given an extended trial, in the hope that even if not completely cured the glands may be so much reduced that a subsequent operation for their removal may be a relatively easy and safe procedure. But it must be clearly understood that extensive involvement of glands is a state of things which is easily prevented and only occurs as the result of pursuing the hopeless policy of waiting during the earlier stage, when the disease is localized.

I do not propose to discuss in detail the operations for excision of glands. Suffice it to say that there are two points which are essential: (1) all obviously enlarged glands must be removed; and (2) the incisions must be placed in such a way that they will be least noticeable when healed. Both of these essentials are readily secured if the case be taken early. If it be left until adhesions have formed, the difficulties may be such as to tax all the skill of the most experienced operator.

One is sometimes confronted with a case in which softening tuberculous glands are associated with tonsils which obviously require extirpation. Now, if the tonsils are removed in the hope that the glands will subside there is a very considerable danger that the operation in the mouth may precipitate a state of suppuration in the neck and lead to the formation of a cervical abscess. To avoid this unfortunate event it is best in these cases to remove the glands and the tonsils at the same time. The double operation has no deleterious effect on the healing of the wound in the neck, and the patient is thereby saved, not only the risk of a cervical abscess, but also the trouble and expense of a second operation.

Treatment of the Second Stage.

My remarks on the dangers of non-operative treatment during the first stage apply with still greater force when suppuration has occurred. It is true that aspiration, or repeated aspiration, of tuberculous pus may cause an abscess eventually to dry up, but the process is so slow and so uncertain in its result that I do not think this method of treatment is justified. Operation, to my mind, is clearly called for, and it only remains to consider how extensive an operation is advisable. It is obviously best, when possible, to excise the whole area of diseased tissue, and if the abscess is small and the mass of glands is not large or closely adherent to the surrounding structures this can usually be done without much risk. But if the abscess is a large one, and particularly if there is, as is often the case, a considerable amount of surrounding cellulitis, the risk of injury to important nerves by an attempted excision is so great that it is best not to attempt it. The safer course is to open the abscess widely, and then, having thoroughly scraped the walls of the cavity, to search for the opening by which it communicates with the caseating gland. This can generally be found and through it the semi-solid caseous material can be removed from within the capsule of the gland by means of a sharp spoon—a most important step, for unless the contents of the gland itself are evacuated a discharging sinus is certain to result. The wound is then sutured with a small drain at its lower end, which is removed after two days, by which time any oozing from the abscess wall will have ceased. Healing is usually rapid, and if only one or two glands are caseous no further operation may be required. In any case the cellulitis quickly subsides and any remaining tuberculous glands or infiltrated muscle can be excised, if necessary, at a later date.

Treatment of the Third Stage.

When sinuses have formed and the suppuration has reached a chronic stage, the only satisfactory course is to

excise the whole mass of tuberculous tissue, and this should be done unless the area of disease is so wide that its excision would leave a gap too large to close. But it must be remembered that at this stage the tough adhesions between the glands and the neighbouring structures will have made the operation a very difficult one, which should not be undertaken by anyone who has not had a large experience of cervical surgery. If the diseased area is too large for excision it is possible, by opening up the sinuses and scraping out the caseous material from the glands to which they lead, to get them to heal, but to obtain a complete cure this must be followed up by a long course of heliotherapy and, if the skin is involved, x-ray treatment.

THE DIAGNOSIS OF MALIGNANT DISEASE OF THE LARGE INTESTINE.*

BY

HAMILTON DRUMMOND, F.R.C.S.ED.,

SENIOR ASSISTANT SURGEON, ROYAL VICTORIA INFIRMARY, NEWCASTLE-UPON-TYNE.

I FEEL encouraged to draw attention to this subject for several reasons: first, because it is a common condition, and secondly, because recent advance in methods of diagnosis and treatment have greatly improved our chances of dealing radically with cancer of the large bowel. Moreover, I have been much impressed, during the last few years, by the late stage at which these cases come to seek surgical advice. That the surgeon does not see these until a late stage—often too late—is generally admitted, and the fact is due to one of several reasons—namely, that the patient ignores the symptoms caused by the disease; that the symptoms are so slight as not to give rise to any trouble until the disease is advanced; or that the symptoms, whether slight or severe, have not impressed the practitioner sufficiently to lead him to make a thorough examination of his patient.

Mr. Wilkie¹ of Edinburgh recently, in an address to the Newcastle-upon-Tyne and Northern Counties Medical Society on diagnosis in surgery, made the following statement, with which I entirely agree:

“Diagnosis is the crux of modern surgery, and that the latter is now attended with so much success is due, in my opinion, to the improved diagnosis of the general practitioner much more than to the advance in surgical methods and technique, great as these have been. One has but to consider the results of the operative treatment of urgent conditions such as perforated ulcers of the stomach and duodenum and acute appendicitis to realize this fact. The many patients whose lives are now saved by prompt operation should bestow their gratitude on the men who made the early diagnosis, not on the surgeons whose task was made easy.”

This is quite in keeping with what occurs in the Royal Victoria Infirmary at the present day, which forms a striking contrast to the time, a few years ago, when I was house-surgeon, when it was common experience that the majority of cases of appendicitis presented themselves with abscess or general peritonitis, while now the pathology is nearly always limited to the appendix.

The diagnosis of carcinoma of the colon has certainly not kept pace with these cases of abdominal emergency. I have no hesitation in saying that the most successful cases of operation for cancer of the large bowel which have come under my care have been sent by a few enthusiastic practitioners who seldom miss an opportunity of making a complete examination, whenever symptoms, however slight, show themselves.

It is to the necessity of early diagnosis I wish to draw special attention, and to emphasize the fact that without the co-operation of the practitioner this is impossible; and that it is upon him the fate of the patient must largely depend. It is for him to say in doubtful cases that further investigation by one or other of the special diagnostic methods is essential to success in treatment.

What are the points of greatest importance that assist us in the diagnosis of a carcinoma of the large intestine, before laparotomy is performed? If a student be asked this question he will often give the following answer: A bismuth

* An address delivered before the Hartlepool Division of the British Medical Association on January 31st, 1924.

meal and x-ray examination; or a sigmoidoscopic examination; digital examination of the rectum, or abdominal palpation. It seldom occurs to him to give an answer that the history of the patient, carefully taken, should come first; and indeed it is often of more value than any other method of diagnosis, and should always have careful consideration. Following on this a careful examination of the patient should be made, and next, special efforts of diagnosis, which I will refer to later, may confirm or refute an opinion already suggested.

PATHOLOGY.

The symptoms chiefly depend on the type of growth and the portion of gut involved. Cancer occurs in certain portions of the bowel with greater frequency than others. My own series of cases support the statistics of others. They consist of 84 cases of malignant disease of the large intestine. Of these, 42 occurred in the rectum and 42 in other parts of the large intestine. Of the 42 cases other than the rectum, 21 (50 per cent.) occurred in the pelvic colon, 11 in the ascending colon, 4 in the splenic flexure, 3 in the descending colon, 2 in the transverse colon, and 1 in the caecum.

It will be seen, therefore, that cancer has a special affinity for certain sites, the rectum and pelvic colon being positions in which it is most commonly found, and though statistics vary considerably they are all agreed upon this point.

SYMPTOMS.

Intestinal obstruction—acute, subacute, or chronic—the discovery of a tumour, or bleeding from the bowel, are the chief indications of intestinal cancer. Whatever portion of the large intestine may be affected the symptoms resulting from obstruction are as a rule the first complained of; but in some cases obstruction never develops at all, so that we may divide the cases into three different groups, according to the symptoms these patients complain of when they first seek advice: (1) Those who complain of acute intestinal obstruction; (2) those who have subacute or chronic intestinal obstruction; and (3) those who have had no obstruction at all.

Of 42 of my cases, 8 were in the first group, 21 in the second group, and 6 in the third group. In the remaining 7 cases the history was not sufficiently definite to classify them.

In the early stages it is not necessarily pain, but rather the discomfort of an increasing constipation, necessitating the use of purgatives, of which these patients complain. An aphorism always impressed upon us as students by Professor Rutherford Morison was: "Increasing constipation of recent origin in an elderly person, only overcome by purgatives, suggests malignant disease of the colon," and this complaint demands thorough investigation if the patient is to have a fair chance.

Attacks of diarrhoea, apparently without cause, when chronic colitis may be suggested as the diagnosis, may also be an early symptom of obstruction in these cases. Later on, as the obstruction increases, borborygmi can be heard, and may be so loud as to be noticed by people anywhere in the room. It is unfortunately a fact that people afflicted with these symptoms, and without pain, very often fail to seek medical advice. As the growth gradually occludes the bowel the sense of discomfort increases and may be associated with alternating diarrhoea and constipation. Sir Berkeley Moynihan² remarked as follows:

"It is a remarkable feature in cases of carcinoma of the colon that the patient is often able to localize the seat of the obstruction. He will describe the accumulation of flatus in a certain point of the intestine where the difficulty seems to lie, and may say also that a trickle of escaping fluid and gas is felt to be followed at once by relief."

I am able from my own experience to verify this; for example, I recently operated on a woman, aged 71, who complained for nine months of increasing constipation, loud rumblings, and wind rolling down the left side to a point in the pelvis. Invariably her sense of discomfort was complained of in the same area. At operation she was found to have a constricting carcinoma in the middle of the pelvic colon.

The pain of intestinal obstruction is familiar to you all. It is due to the contraction of the intestine above the stricture, and, like all spasm of circular involuntary

muscle, is cramp-like in character. The pain of obstruction may occur at any time and has not always relation to the intaking of food. It may be only when obstruction is almost complete that pain is complained of, for as long as flatus is passed the patient can live under fairly comfortable conditions. It is interesting that out of 21 cases of malignant disease of the pelvic colon, 18 gave a history of pain like that resulting from intestinal obstruction as the first symptom. This could be expected, as the type of growth which occurs in this region is nearly always of the constricting variety.

Often sudden obstruction is due to the impaction of some faecal or foreign matter in the rapidly constricting growth, and the sufferer may obtain instantaneous relief from an enema. If left untreated, the whole colon above the stricture dilates and the greatest tension occurs in the caecum, which may result in gangrene occurring in patches, liable to rupture, and cause fatal peritonitis.

Carcinoma occurring in the ascending colon frequently gives rise to attacks of diarrhoea without pain, and may not cause obstruction at all until very advanced. It is in such cases that the patient becomes anaemic, and often to such a degree that he is thought to be suffering from pernicious anaemia until the true nature of the condition is brought to light by the discovery of a palpable tumour.

Haemorrhage as a result of a carcinoma of the colon is unusual and is more common in connexion with growths situated in the rectum, but it may occur as the first symptom in the case of cancer of the colon, and is often a god-send to the patient, as it may herald the discovery of the growth at its early stage, because the sudden loss of a quantity of bright blood is a symptom which cannot but alarm the patient and cause him to seek medical advice at once.

A few years ago I saw a man, aged 38, who complained that for six months he had passed large quantities of bright blood by the rectum, but haemorrhage occurred apart from stool and was at times accompanied by some abdominal pain. After sigmoidoscopic examination was made and nothing was seen, with the aid of an anal speculum it was found that he had several small vascular haemorrhoids, which I regarded as the cause of the haemorrhage and performed the operation of ligature for the cure of the condition. The day following I went on holiday abroad and on my return was surprised to hear the following story:

A week after the operation the patient had had another copious haemorrhage from the rectum, and this time accompanied by severe abdominal pain. Professor Rutherford Morison, who saw him in my absence and during an attack observed that the pain was spasmodic in character, found a tumour in the left side of the abdomen. He made the diagnosis of an intussusception due to growth, and operated forthwith. His diagnosis was confirmed, the cause of the intussusception being a small movable columnar-celled carcinoma in the descending colon. This was a lesson never to be forgotten by me, and I hope it may be remembered by all who are here.

On the other hand, blood may only be detected on microscopical examination of, or be seen adhering to, the faeces.

Although haemorrhage from cancer of the rectum is a common symptom, it seldom makes its appearance until the disease is far advanced. Then the blood is commonly found mixed with liquid faeces. It should be borne in mind that bright blood may be passed by patients suffering from cancer of the rectum and its origin be from haemorrhoids, and not from the new growth, but this must be regarded as exceptional.

The history of a case of cancer of the rectum offers a clue of the strongest diagnostic importance. The patient will tell you how, on going to the lavatory in the morning, he feels that he is about to have a normal motion, but, instead, the attempt at defaecation results in the passage of flatus accompanied by a little moist bloody fluid having the appearance of beef-tea. The relief attained only lasts a short time before his visit to the lavatory has to be repeated, and perhaps many times before he has gained sufficient relief to carry on his day's work.

EXAMINATION OF THE PATIENT.

An abdominal tumour, which is palpable in the case of cancer of the colon, is not always the primary focus. Occasionally a case presents itself with the primary growth in the pelvic colon and in a position that is not palpable, while a tumour is felt in the right side of the abdomen, which is a secondary deposit in the liver. Another abdominal tumour, other than the primary focus, may be felt in

the left iliac fossa, which is really a hypertrophied iliac colon, or a bowel laden with faecal matter due to the obstruction of a growth in the upper rectum or pelvic colon. Again, a tumour palpable in a case of colon growth, and, indeed, often visible, may be the distended caecum due to obstruction lower down. Here the caecum is resonant on percussion and often mobile from side to side. It varies in size and consistency. Tenderness of it suggests inflammation or ulceration and demands immediate treatment.

Growths of the colon are much more frequently palpable when cancer occurs on the right half of the colon than on the left, and this is explained in several ways. In the first place the character of growths found in the caecum and ascending and transverse colon differ from those on the left side, as they are larger and often of the cauliflower type, while those on the left side, as has previously been stated, form a tumour seldom larger than a walnut and present the appearance of a string tied tightly round the peritoneal coat of the gut (the signet-ring type). It must also be remembered that the splenic flexure and its adjacent portions of the bowel lie well under the costal margin, whilst the opposite flexure (the hepatic) in the right side is at the costal margin and is not tucked away under it.

Again, the pelvic colon lies normally in the pelvis, and, when the seat of malignant disease, frequently becomes fixed in the recto-vesical pouch or, in the female, adheres commonly to the pelvic genital organs. I should like to illustrate this from my own series of cases. If a vertical line be drawn through the middle of the transverse colon bisecting the large intestine, it will be seen that of the 35 growths 10 occurred in the right half of the colon, of which 9 were palpable, and 25 on the left side, of which 5 only were palpable.

RECTAL EXAMINATION.

A rectal examination is an important part of the examination of every abdominal case. It is told of the late Mr. Jordan Lloyd that, anxious to impress on his students the importance of making a rectal examination, he used to say: "Gentlemen, if you do not put your finger in, you will put your foot in it."

Often a growth in the upper part of the rectum can only be felt through the mucous membrane, the palpable mass being obscured by a Heuston's fold; or a growth situated in the pelvic colon may come to lie in the pelvis on or adherent to the front of the rectum and be palpable through the bowel wall. In such cases occurring in women additional help may be got from vaginal examination. If the statement has been made by another observer that he has felt a growth in the rectum, and you fail, on examination, to corroborate his findings, it will be well not to dispute the point until after a complete examination has been made.

I recollect the case of a middle-aged man admitted to hospital who for some months had been subject to attacks of abdominal rumblings and rectal tenesmus. His doctor, who saw him during an attack, felt a growth in the ampulla of the rectum. On admission to hospital the patient appeared to be well and free from symptoms. Rectal examination was negative. After an enema the rectum was again examined, and a constricting carcinoma, easily palpable, was felt low down in the rectum. The condition of affairs turned out to be a growth originating in the pelvic colon which was the cause of a chronic intussusception prolapsed into the rectum.

There is no part of the large intestine in which malignant disease is so difficult to get hold of in the early stages as the rectum, for there may be no symptoms until the patient has a large palpable liver full of growth. This is frequently the case when the primary growth occurs in the ampulla of the rectum and when a large mass encircles the lumen of the gut without giving rise to obstruction, and local and general spread of the disease has rendered a radical operation hopeless.

A patient, the subject of cancer of the rectum, although at best unfortunate, is less so when the neoplasm occurs in the upper part of the rectum, because the character of the growth simulates that found in the pelvic colon and obstruction occurs early, driving him to seek surgical

advice before dissemination has commenced. Bearing on this point I should like to quote the following case:

A man, aged 56, consulted me for bleeding from the rectum when the bowels were moved, which he stated he had noticed for three weeks. The blood was in small quantities and he was under the impression it was the result of "piles." A week later he began to have diarrhoea, which persisted for three days, during which time he complained of tenesmus with the passage of flatus. He looked in good health, his appetite was good, and he had lost no weight, nor had he suffered the slightest pain. On examination in the lower part of the rectal ampulla, and within easy reach of the finger, was a large, hard, craggy mass adherent to the anterior rectal wall. It was so fixed that it offered no hope of resection, and this opinion was also given by a celebrated rectal specialist in London whom he also consulted.

This history, with the condition found, occurring in the case of a highly intelligent man, demonstrates the difficulty in getting a case at the early stage, for the reason that the disease may be, and often is, practically symptomless in the operable stage.

Glands in the neck may be found in the left posterior triangle secondary to any abdominal viscus—most commonly the stomach—and rarely in the case of the colon or rectum. They should, however, be looked for, and, if present, are found at the posterior border of the left sterno-mastoid in the region of the thoracic duct. Secondary tumours in bone are also rare clinically, although I once saw, in consultation, a woman from whom a surgeon had removed the rectum, by Kraske's method, three years previously. She appeared to be well, and showed no signs of local or abdominal recurrence, but complained of pain in two small nodules adherent to the vault of the skull over the parietal bones. A small portion of growth was removed under local anaesthesia for microscopical examination. The report was returned: "This is a columnar-celled carcinoma containing spicules of bone."

DIFFERENTIAL DIAGNOSIS.

Attention has been drawn to the resemblance between appendicitis and malignant disease of the right side of the colon, cases being reported by Rutherford Morison,³ Grey Turner,⁴ and others. Turner states that:

"A growth in the caecum may be associated with attacks like appendicitis. These attacks may be due to obstruction or to inflammation in the pelvic parts around, and this may go on to the formation of an abscess which may exactly simulate one due to appendicitis."

The following is an illustrative example:

A man, aged 27, came under my notice who gave a history that for several months he had not felt well, was unable to take his food as usual, and was constipated. Ten days before admission to hospital he complained of aching pain in his right lower abdomen, but not serious enough to prevent him carrying out his work as a labourer. Three days before admission the pain became worse, was paroxysmal, and was felt across the bowels, and he was unable to take food. He stated that he had had a similar attack six months previously which had passed off.

On admission to hospital there was a large tender mass in the right iliac fossa. The case was thought to be one of appendicitis associated with local suppuration, or tuberculous disease of the caecum.

Operation revealed a large growth involving the caecum and ileum, with a mass of malignant glands at the ileo-caecal angle. The lower few inches of ileum, together with the caecum and a portion of the ascending colon and glands, were removed, and the condition proved to be a round-celled carcinoma—a rare type of growth, and usually followed by a fatal result from dissemination within a year.

The patient made a good recovery from the operation, but died six months later at home from abdominal recurrence.

It is when cancer attacks the posterior wall of the caecum, or ascending colon, that early perforation with fixation and suppuration closely simulates subacute appendicitis. One is always suspicious of a fixed right-sided tender mass, and with comparatively slow onset in a patient over 40 years of age, and preparation, prior to operation, should always be made for complete excision of the right half of the colon in case the condition should turn out to be carcinoma without any gross suppuration. This is a type of case that, when admitted to hospital along with other emergencies, is apt to be diagnosed hastily and operated upon without due care and preparation.

Another mass occurring in the region of the caecum which may be most difficult to distinguish from cancer is hyperplastic tuberculosis of the caecum, and when this disease is suspected tubercle bacilli should always be looked for in the faeces.

As in the body elsewhere, syphilis, too, can so closely simulate cancerous growth of the intestine as to be indistinguishable until microscopic examination or antisyphilitic treatment and time have cleared up the diagnosis.

In the region of the hepatic flexure inflammatory masses associated with the gall bladder, kidney, and liver have to be excluded; these, as a rule, are to be recognized—that is, whether or not they are in the colon—by palpation of the abdomen under the fluorescent screen after the administration of a barium enema. The same method of diagnosis will assist in distinguishing growths of the transverse colon from malignant disease of the stomach, should the history of the case not be straightforward.

An intussusception, the result of a growth, may occur in any part of the colon and form a tumour out of proportion to the size of the primary growth, which is as a rule small and polypoid in type.

Of the lesions that simulate malignant disease of the left side of the colon we have the condition known as "diverticulitis," which, as you know, is due to multiple small pathological sacculi of the colon—in reality herniae of the mucous membrane through gaps in the muscular coat, the gaps, as a rule, being the openings for blood vessels as they traverse the intestinal wall. These small sacculi, usually the size of a pea, are much more commonly found in the pelvic colon, and although they occur in other parts of the large intestine they appear to develop more readily, and certainly are more likely to give rise to complications in this area than in other parts of the gut. In an old-standing case the mesentery is found to be very much shortened, the gut wall chronically thickened, and the appendices epiploicae, into which these sacculi frequently open, have become adherent to the gut and surrounding tissue.

A sacculus may be compared with a vermiform appendix, inasmuch as their pathological findings in some ways resemble one another. Many of the sacculi harbour enteroliths similar to those found in the vermiform appendix; ulceration may occur in these sacculi, resulting in local or general suppuration, and in a pelvic colon with dense hard fibrous walls deficient in active muscular tissue and very much narrowed in the lumen; indeed, so much so in some instances that intestinal obstruction occurs, which is most frequently mistaken for that due to carcinoma of the colon.

There is another type of case which, though rare, requires mention and serious consideration, as the diagnosis, though not easy, is important. The patient, usually of middle age, has not been well for weeks or months; often suffering from indigestion and getting thinner, but with indefinite symptoms. An attack of sudden abdominal pain drives him to send for his doctor. He vomits, it may be blood or "coffee grounds," and has abdominal pains with rumblings and increased peristalsis. He is constipated and belching wind, passing little by the rectum. The abdomen is swollen and tender, if not generally, in parts. At an early date fluid may be detected in the abdomen, and on rectal examination there is a hard nodular growth to be felt anteriorly (felt per vaginam in the female). This mass, however, is not a primary rectal cancer, but a deposit of growth in the recto-vesical pouch secondary often to a stomach cancer. The absence of violent peristalsis, the fact that after rectal examination faeces may almost always be found on the examining finger, that some flatus escapes by the rectum, the abdominal tenderness, the presence of fluid, the very ill condition of the patient, the fact that the rectum overlying the growth is not ulcerated, make it clear that a diffuse malignant peritonitis is present, that the patient will quickly die, and that any operation will bring no relief, but add to his misery and hasten his end.

The differential diagnosis rests on the history of the case.

Of special methods in diagnosis we have two, both most valuable at times, supplementary to the ordinary physical examination. I refer to the sigmoidoscope and the use of the x rays after the administration of barium meals and enemata.

Sigmoidoscopy.

This is very valuable in the diagnosis of malignant growths in the upper rectum and pelvic colon, and I consider it a method not employed to anything like the extent it should be. Its usefulness lies in the fact that growths

are not only common in these regions but are seldom palpable by the rectum or abdomen. It is practically free from risk in skilled hands, and can be carried out without an anaesthetic with little more inconvenience to the patient than a digital examination of the rectum.

To ensure a clear view of the lower portion of the intestinal tract the patient should be prepared beforehand with a purgative, followed by an enema, and the necessity for this preparation is made clear when we consider how difficult it may be to obtain a clear view of a growth in a patient the subject of chronic intestinal obstruction, even after repeated enemata following on purgation. For all practical purposes the most suitable position is on the left side with the knees drawn up to the chest, with a sand-bag to raise the pelvis and the buttocks projecting well over the side of the table.

After the instrument is introduced into the rectum it must be passed further along the bowel by sight, for without this precaution it is possible to inflict injury of a serious kind upon the intestine—indeed, perforation and fatal peritonitis have followed its unskilled use. As a rule, in a normal case, no difficulty is met with in the passage of the instrument until just beyond the upper end of the rectum. At the entrance of the lower part of the pelvic colon the bowel often appears to end blindly, owing to a sharp anatomical turn about the level of the first sacral vertebra. To overcome this apparent cul-de-sac the instrument must be withdrawn for a couple of inches and again advanced in another direction until the valve-like aperture is found—and on no account must any force be used.

It may be that a growth seen through the sigmoidoscope is not typical in appearance, and when such is the case a small portion of the tumour should be removed through the instrument with long forceps and submitted to a competent pathologist for microscopical examination. This I have found most useful on many occasions in finally settling the exact diagnosis. It may be that on account of a suspicious history of malignant disease one is led to make a sigmoidoscopic examination, with the result that instead of a malignant growth one or more simple polypi are seen. As these simple tumours are so commonly found in association with cancer one is justified in opening the abdomen to explore the colon for a more serious condition.

X-ray Examination.

X-ray examination of the colon has made great strides during the last ten years, and it has been the means of altering our views as to the anatomy and physiology, and has assisted us very much in diagnosing the pathological conditions to which the viscus is liable.

We are indebted to Cannon of America for many important observations on the peristaltic and antiperistaltic action of the colon, first worked out in the case of animals. He showed that the prevailing movement in the right half of the colon was antiperistaltic in character, and that a series of waves conveyed the fluid contents of the bowel back to the caecum; while the left half of the colon has its prevailing movement in the carrying onward of its contents towards the rectum.

In describing movements of the colon Case¹ describes the mass movement seen under the fluorescent screen, which he attributes to Holzknicht² as being the first to record it. The bowel is seen to lose its haustral marking and the contents are seen to form masses with rounded ends, the mass travelling over a considerable distance at about twice the rate of the peristaltic wave of the stomach. When the movement has ceased, the normal haustra make their appearance once more. These movements occur about six times daily. The movements of the colon are greatly influenced by respiration, and Case has noted that the contents of the colon are difficult to move by palpation of the abdomen, it being impossible to pass the contents of the ascending into the transverse colon.

By means of the x rays we have at our disposal two methods of examination—by the barium meal and the barium enema. The meal is the method to be employed where the function of the colon is to be thoroughly investigated; but where a definite stricture has to be located in the large intestine the enema is the method of choice.

The meal, when given by the mouth, may of course be of great value. When there is any marked obstruction this barium will show up on the proximal side of the stricture as a thick black shadow with a sharply defined rounded end, and later thin flakes of the metal may be seen escaping through the stricture, the dense black mass remaining for long on the proximal side. All barium meals should be verified a second time in order to avoid any fallacy.

It is an interesting fact that, however tight a stricture may be, as long as the hypertrophic compensation is good on the proximal side, and no great obstruction is present at the time the barium is passing along the intestinal tract, the salt will travel to the distal side of the obstruction in an amazing way. We must remember that a barium meal is not at any time palatable, and that any one the subject of carcinoma of the colon with obstruction is apt to be sick, and thus render the value of this method of diagnosis not practicable.

The method of giving barium by the rectum in the case of malignant stricture of the colon has this advantage over the mouth method—that it may be done much more quickly, and that long and frequent examinations are not necessary. It has for long been known that enemata given by the rectum will travel the whole length of the large gut to the caecum, and that on introducing a solution of barium sulphate into the rectum by the tube and funnel it will travel to the caecum within a few minutes. To enable this procedure to work satisfactorily the colon must be empty. The patient is laid flat on the back, there being no need to adopt the knee-elbow position. In the case of obstruction to any marked degree the salt will be arrested on the distal side of the stricture, enabling the site to be distinguished.

During the past few years I have had considerable experience in the use of barium enemata as an aid to diagnosis of malignant strictures, and although I regard it as a valuable method of examination in the diagnosis of the condition I feel that it is not to be relied on alone.

The following case is of interest:

A growth was located in the sigmoid; the patient was given a bismuth enema and the salt was seen to pass through the growth without delay to the caecum. Later, at the operation, when the growth was removed, the lumen was found to be reduced by half.

This is a point of great importance, showing that a growth producing partial obstruction does not necessarily interfere with the passage of the barium.

I recently saw a man, aged 58, who had been suffering from diarrhoea and rectal tenesmus for upwards of a year. There was occasionally blood in the stool, but never bright. He was seen by a distinguished radiologist, who administered a barium enema. The barium solution travelled the whole length of the colon to the caecum, and on account of the free passage of the salt along the bowel the radiologist reported that the patient was suffering from colitis, whereas on rectal examination the lower edge of a hard craggy carcinoma could be felt adherent to the bladder. This was verified by operation shortly after, when secondary deposits were found in the liver, and he died nine months later from general dissemination of the disease.

This case brings out several points:

1. How a most advanced cancer of the bowel will allow a barium enema to traverse it.
2. That the method of investigating the case was wrong; for had the history been obtained and a rectal examination made, and if necessary sigmoidoscopy, the diagnosis would have been clear.
3. Radiologists should not make a diagnosis on their findings alone.

It would be difficult to exaggerate the value of palpating the barium-filled colon under the x-ray screen in the diagnosis of lesions of the large intestine. The colon stands out in a dense shadow and can be freely moved about the abdomen. When an abdominal tumour is present its exact relation to the colon can be detected, for the visible colon is easily altered in position in relation to the swelling; so that it can be ascertained whether or not a tumour has its origin in the large gut. The method is useful chiefly in the case of tumours which are in the immediate neighbourhood of the colon, such as those of the kidney and pancreas, swellings in the psoas sheath, and for certain retroperitoneal growths.

Abdominal palpation, aided by sight, may be of great value, and all practical physicians and surgeons should be familiar with it.

REFERENCES.

¹ Diagnosis in Surgery, Newcastle-upon-Tyne and Northern Counties Medical Journal, April, 1923. ² Lancet, July 5th, 1923. ³ Surgical Contributions, Vol. 2, p. 930. ⁴ Edin. Med. Journ., December, 1909. ⁵ Surgery, Gynecology, and Obstetrics, December, 1914, p. 581. ⁶ Münch. med. Woch., 1909, No. 47.

TWO CASES OF RAT-BITE FEVER.

BY

W. T. COLLIER, M.C., M.D. OXON.,

HONORARY ASSISTANT PHYSICIAN, RADCLIFFE INFIRMARY, OXFORD.

MORE than twenty cases of rat-bite fever have now been described in this country alone, and the clinical picture is well established. The following cases are recorded because in the first the disease was caused by the bite of a cat, and in the second the diagnosis was established by gland puncture during an afebrile period.

CASE I.

A woman, aged 52, was admitted to the hospital in September, 1921. Three weeks previously she had been bitten on the back of the hand by a cat. The cat lived in a barn and was known to be a rat killer. One week before admission the hand became very swollen and was incised by her doctor. On admission to the surgical ward there was a granulomatous ulcer on the back of the hand with some cellulitis, and enlargement of epitrochlear and

axillary glands. The local condition rapidly yielded to treatment, but during her stay in hospital she had three bouts of fever, each of four to five days' duration, in which the temperature mounted gradually to 103° F. A fourth bout was aborted by an injection of novarsenobillon. Each bout of fever was accompanied by an eruption of purplish blotchy non-itching spots, as well as by headache, sore throat, and pain in back and limbs. The blood culture was negative, and during the fever there was a polymorph leucocytosis of 30,000 per c.mm. The spirochaete was not found in the blood, but it was not sought by dark-ground illumination.

I have found three other cases described in the literature of this country in which the disease was not due to the bite of a rat. In two cases it followed the bite of ferrets, and in the third that of a kitten which had been playing shortly before with the body of a dead rat.

CASE II.

A farm labourer, aged 26, was admitted to the hospital in February, 1924. Five weeks previously he had been bitten on the hand by a rat while ferreting. The wound healed, but a fortnight later became inflamed and was incised by his doctor. It then healed rapidly, but a week later he developed sore throat with a temperature of 104° F. and red blotches all over his body. The fever subsided after several days, only to recur shortly before admission.

The temperature was 102.8° and the body was covered with large purplish macules which appeared to be already fading. By the following evening the temperature had fallen to normal, and there was no subsequent rise above 99° during the remaining ten days of his stay. On the third day, after the temperature had fallen to normal, Dr. Gibson punctured the epitrochlear gland with a hypodermic needle and injected a small quantity of sterile saline. He then removed a small quantity of gland juice, in which he was able, by dark-ground illumination, to demonstrate the presence of spirochaetes. Two days later the first injection of novarsenobillon was given.

These are the only cases which have occurred in the practice of this hospital since the war. As the hospital serves an agricultural area of about twenty miles radius, it is possible to form some idea of the frequency of the disease in this country.

I have to thank Mr. Bevers and Dr. Gibson respectively for permission to publish the notes of these two cases.