

## CARCINOMA OF THE JEJUNUM AND ILEUM.\*

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THE present communication deals only with carcinoma of the jejunum and ileum, and does not include growths in the duodenum or ileocaecal valve. In the latter situation the disease is not very rare, but in the duodenum, if carcinoma of the ampulla of Vater is excluded, it is almost unknown. This extraordinary freedom of the duodenum is not only true of primary growths, but is also well seen in the behaviour of pyloric cancer, which, whilst spreading freely into the adjacent stomach wall, is almost invariably abruptly limited on the distal side, and shows little tendency to spread into the duodenum.

The rarity of carcinoma in the jejunum and ileum is well recognized, and it appears not uncommon for a surgeon of wide experience to pass through his career without meeting a single case. In this part of the intestine cancer appears to be more common near the extremities than elsewhere, but it is much less rare in the lower part of the ileum than in the upper part of the jejunum.

Published statistics illustrating the sites of election of intestinal cancer are numerous, and give striking evidence of the rarity of the disease in the small gut. Thus, among 41,838 autopsies performed at the Vienna General Hospital, 3585 were cases of cancer; of these, 343 were intestinal, 10 being in the ileum but none in the jejunum. Among 584 carcinomas of the intestine collected by Hinz<sup>1</sup> from the records of various pathological institutes, 18 (3·08 per cent) were in the small intestine, excluding the duodenum. The fluid nature of the contents, and the absence of abrupt bends in the small intestine, may be important factors, whilst the very different nature of the contents and the liability to stasis may, in part at least, explain the frequency of the disease in the large gut.

Three personal cases—two jejunal and one ileal—illustrate some clinical aspects of the disease.

*Case 1* was that of a married woman, 46 years old, who for two or three months had complained of pain in the upper abdomen, not related to the taking of food. Soon occasional vomiting occurred, and increased in frequency up to six or eight times daily. The vomited matter was bilious; there was no hæmatemesis. Constipation was obstinate, and enemas brought away only small hard masses; there was no history of melæna or the passage of mucus. The patient, always thin, had lost weight slightly.

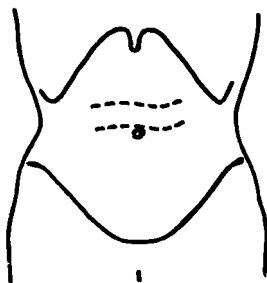


FIG. 425.

On abdominal examination very marked peristaltic movements were visible above the umbilicus, the abdominal wall being frequently raised into a prominence in the middle line, and the waves of contraction passing across it in a direction from right to left (*Fig. 425*). During the occurrence of the contractions, gurgling was very obvious. In other respects abdominal examination revealed nothing abnormal, and rectal examination was negative. The presence of such extremely well-marked visible peristalsis indicated without doubt that a mechanical obstruction was present, and that operation was imperative. In considering the probable seat of the obstruction, the conclusion was made that it was most likely in the small intestine. The pylorus was excluded because of the direction of the peristaltic wave and the absence of any relation between the vomiting

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and the taking of food. On the other hand, an obstruction in the large intestine causing such a degree of visible peristalsis would have been expected to cause also a considerable degree of abdominal distention and not such urgent vomiting. Further information could no doubt have been obtained by special methods, but it was not thought well to postpone operation while these were carried out.

Accordingly, on Oct. 8, 1908, the abdomen was opened above the umbilicus, and an intussusception of the small intestine was at once exposed. The upper end of the intussusception was about 18 in. below the duodenojejunal flexure. The bowel was not congested, and the intussusception was very easily reduced. A firm rounded tumour



FIG. 426.—Carcinoma of jejunum (Case 1).

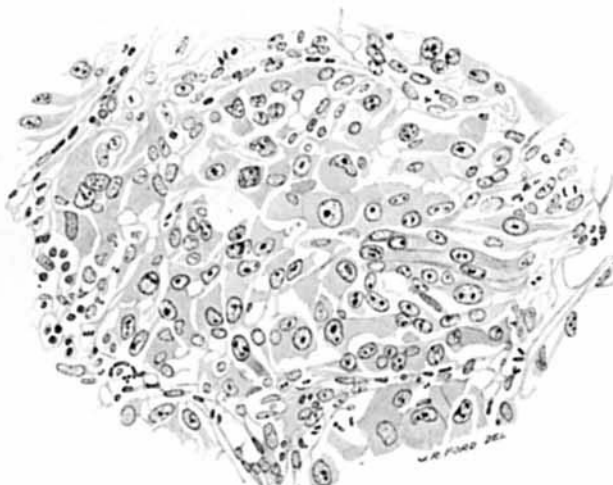


FIG. 427.—Microscopic section of the tumour in Fig. 426.

could then be felt in the lumen of the gut, and at the site of its attachment the peritoneal surface presented a small rounded depression, caused by the traction of the growth. Resection was performed and an end-to-end union made. The patient recovered normally, and six years later was known to be well.

The tumour is illustrated in Fig. 426, and the microscopic structure in Fig. 427.\*

Case 2 occurred about five years later, and was that of a man, age 32, who was admitted into University College Hospital on Oct. 23, 1913. The symptoms were of only two weeks' duration, and consisted of abdominal fullness and vomiting, with a 'rolling sensation' in the upper part of the abdomen after taking food. The vomiting occurred about six times during the week before admission, usually about half an hour after food. There was troublesome constipation.

On admission, the man's general condition was good. There was no general abdominal distention, but from time to time a transverse swelling appeared below the umbilicus (Fig. 428); it persisted for about thirty seconds, and peristalsis was very evident in it, but the direction of the contractions was not obvious. Distention of the stomach (by giving tartaric acid and sodium bicarbonate) showed it to be lying in its normal position, and distention of the colon with air did not affect the peristalsis in the distended

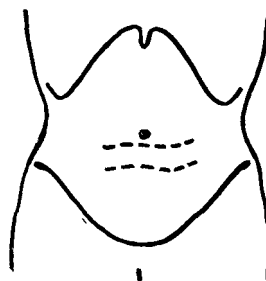


FIG. 428.

\* From *Choyce's System of Surgery*, by kind permission of Messrs. Cassell & Co. Ltd.

coil. X-ray examination showed some delay in the emptying of the stomach, a small quantity of bismuth still remaining in it after six hours. In view of these findings it seemed probable that the obstruction was situated in the small intestine.

On opening the abdomen to the right of the middle line, the distended coil above described proved to be part of the jejunum greatly distended and hypertrophied above a nodular annular stricture, looking externally as if a piece of string had been tied around the bowel. On the peritoneal surface of the bowel were some minute nodules of the size

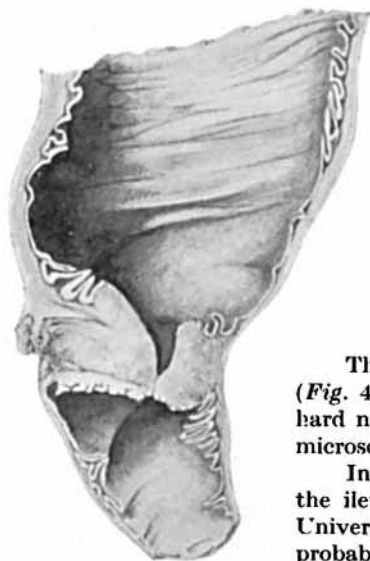


FIG. 429.—Carcinoma of jejunum (Case 2). The specimen includes only part of the bowel removed.

of a pin's head and looking more like tubercles than growth. The mesenteric glands were not enlarged. The growth was situated between three and four feet from the duodenojejunal flexure. Twelve inches of the gut were excised, and, in view of the great difference in diameter of the proximal and distal ends, a lateral anastomosis was made. The patient made a normal recovery, but after remaining well for several months he began to experience abdominal pain, and in July, 1914, a medical man who saw him found the liver much enlarged and its surface marked by large projections, evidently of growth. Other masses could also be felt in the abdomen. Death occurred on Aug. 12, nine and a half months after operation.

The tumour in this case formed a typical ring stricture (Fig. 429), the lumen being almost completely obstructed by a hard nodular growth, the surface of which was ulcerated. The microscopic structure was that of a columnar-celled carcinoma.

In Case 3 the growth was situated in the lower part of the ileum. The patient, a woman, age 32, was admitted into University College Hospital on Sept. 14, 1917, as a case of probable pyloric obstruction. The history was that for six months she had suffered from abdominal pain, chiefly in the umbilical region, with occasional vomiting. The pain occurred in attacks, usually starting shortly after taking food, and when vomiting occurred it relieved the pain. The latter gradually

increased in severity, and the vomiting became more frequent and more copious. Flatulence was distressing, and there was much sensation of gurgling in the abdomen. Constipation also became increasingly obstinate. The patient's health previously to the onset of the present illness had been good, and there had been no earlier abdominal symptoms. Two weeks before admission the woman had been delivered prematurely at seven and a half months.

On admission, she was much wasted. The abdomen was distended, and four or five coils of intestine showed clearly through the abdominal wall as transverse prominences (Fig. 430). Visible peristalsis was very marked, and, commencing just above the pubes, progressed upwards in distinct waves. There was considerable shifting dullness in the flanks. Tenderness was present above and to the right of the umbilicus, and much splashing and gurgling could be felt over the whole abdomen. No tumour could be felt by abdominal or rectal examination. The patient's condition rendered any investigation by bismuth meals, etc., impossible, but the diagnosis of pyloric obstruction was at once negatived. The distention and visible peristalsis were evidently in the small intestine and not in the stomach, and malignant disease of the large intestine seemed to be the most probable cause of the obstruction.

The abdomen was opened by a right rectus incision, and coils of greatly distended

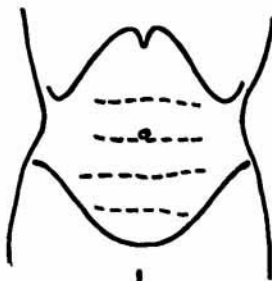


FIG. 430.

small intestine were at once exposed. There was no free fluid in the peritoneum. The distention of the gut stopped at a point six inches above the ileocaecal valve, where there was a very hard growth in the gut, feeling extraordinarily like a Murphy's button uniting the distended and hypertrophied bowel above to the pale and contracted bowel below. The coils of the distended bowel filled with fluid contents were evidently the cause of the shifting dullness, which had suggested the presence of free fluid.

In the presence of such a degree of obstruction immediate resection was considered inadvisable, and an artificial anus was therefore made a short distance above the growth, and a Paul's tube inserted. Twelve days later a second operation was performed and about 13 in. of the ileum were removed, including the growth and artificial anus, together with the corresponding part of the mesentery, the lower section of the bowel being made 1 in. above the ileocaecal valve. The two divided ends of the ileum were closed, and a lateral anastomosis was made between the proximal loop and the ascending colon.

The patient remained in hospital for five months after the operation on account of her very weak and emaciated condition, almost certainly due to secondary deposits in the abdomen, and when transferred to an Infirmary it seemed unlikely that a fatal result would be long delayed.

The tumour in this case formed a tight annular stricture; microscopically it was a columnar-celled carcinoma, and one of the mesenteric glands contained a deposit of similar growth.

In reviewing these three cases it may be pointed out that in none of them was a correct diagnosis made before operation, although in two of them it was thought probable that an obstruction was present in the small intestine. Indeed, carcinoma of the jejunum or ileum is so rare that it is hardly likely to receive serious consideration in an obscure case of actual or impending obstruction. When the case presents itself as one of more or less complete obstruction, special investigation before operation is hardly possible, although *x*-ray examination after the introduction of a barium enema might exclude obstruction in the large intestine with some certainty. In several instances, as in the last above recorded, the case has been regarded as one of pyloric obstruction.

A prominent feature in each case was the marked visible peristalsis, and a study of recorded cases shows, as might be expected, that this sign is very commonly present. Speaking generally, it may be said that visible peristalsis is a certain proof of mechanical obstruction, and is also a proof that the obstruction has existed long enough to cause a considerable degree of muscular hypertrophy in the bowel above it. In comparing the case of cancer of the lower ileum with those in which the growth was in the jejunum, an interesting difference is observed. In the two cases of jejunal cancer the distention and visible peristalsis were limited to a single coil lying transversely, in one case above and in the other immediately below the umbilicus (*Figs. 425, 428*). In the former of these the distended viscus might from its position have been the stomach, but that the peristaltic waves in it passed very constantly from right to left. In the case of cancer of the lower ileum, on the other hand, the aspect of the abdomen was very different; there was considerable general distention, and the 'ladder' arrangement was very marked, the peristalsis being seen in four or five separate transverse coils, lying partly above and partly below the umbilicus (*Fig. 430*).

Incidentally I may refer again to the fact that in this case there was very marked shifting dullness, although at the operation it was shown that there was no free fluid in the peritoneal cavity. This sign was evidently due to shifting of the coils of gut loaded with fluid contents, and was clearly demonstrated when the abdomen was opened by the way in which the distended coils behaved when drawn out of the incision. The point seems to be one of clinical interest.

A study of some of the recorded cases of carcinoma of the jejunum and ileum shows that the symptoms, before the onset of complete obstruction, are almost constantly abdominal pain, vomiting, increasing constipation, and often rapid emaciation. The pain is usually paroxysmal, and, if visible peristalsis is present, will be found to be coincident

with the contractions of the distended bowel. Vomiting is very constant and, like the pain, may or may not be associated with the taking of food. Although it might be expected that the higher the disease the more marked would be the relation of the pain and vomiting to food, a study of recorded cases shows that this evidence is often misleading. The pain is often accompanied with much gurgling, obvious both to the patient and the surgeon. Constipation is generally mentioned as increasingly obstinate; but the irregularity of the bowels, with the occasional passage of loose stools, so common in cancer of the colon, appears only very rarely to occur. The detection of blood in the stools is exceptional, but is said to be more common in the stenosing form of growth.

The discovery of an abdominal tumour before operation is rare, and when present it is hardly possible that its position or characters will serve to indicate its nature. In a case under the care of Batty Shaw in University College Hospital, the specimen from which is preserved in the Museum, the growth, which was situated three feet from the duodeno-jejunal flexure, formed a hard fixed mass in the left iliac fossa. It is interesting that in another case of malignant disease of the jejunum, which was admitted to the Hôtel Dieu, Paris, on June 14, 1827, and a drawing of which, by Sir Robert Carswell, is preserved in the same Museum, the growth formed a hard fixed tumour in the left iliac region. In this case the symptoms were of six months' duration, and the patient, a man of 44, died of perforative peritonitis.

The duration of the symptoms before operation is very variable, in some cases extending to a year or more, and in others being only a few weeks. In one of the cases above recorded, the patient was quite free from symptoms until two weeks before his admission to hospital, although the growth formed a very tight ring stricture of the jejunum. The fluid nature of the contents of the small intestine doubtless explains this occasional absence of symptoms until the obstruction has become almost complete. It is less surprising than the fact that a similar absence of symptoms may be met with in carcinoma of the colon until an acute obstruction occurs.

It has already been pointed out that in the majority of cases a correct diagnosis can hardly be made before operation. The mistakes likely to be made are well illustrated by several of the 52 cases of carcinoma of the jejunum and ileum abstracted by Hinz<sup>1</sup>, of which four are personal. In several instances carcinoma of the stomach, and in two at least duodenal ulcer, was diagnosed. The latter diagnosis was made in the case of a man, age 32, who for a year had suffered from recurrent attacks of vomiting, with pain in the upper abdomen. Death occurred after a severe attack of diarrhoea and vomiting lasting three days; there was a carcinoma of the upper part of the jejunum. In another recorded case a diagnosis of typhoid fever was made; the illness was of only three weeks' duration, and was marked by abdominal pain and varying diarrhoea. Death was preceded by signs of peritonitis, and examination disclosed the presence of a perforated carcinoma of the lower ileum.

In a remarkable case under the care of Riese, and recorded by Hinz, an operation was performed for a strangulated right inguinal hernia. Twelve days later vomiting returned and became faecal, and contracting bowel was felt in the right side of the abdomen. A recurrence of strangulation was suspected, but operation revealed a long intussusception in the lower part of the ileum. The intussusception was reduced, and part of the gut, containing a carcinomatous tumour as large as a hen's egg, resected.

Strangely enough, Riese had another case in which a woman, age 64, had undergone operations for umbilical and femoral hernias three years previously. Abdominal pain of three days' duration occurred, associated with resistance beneath the umbilical scar. A diagnosis of strangulated umbilical hernia was made, but operation showed a large growth in the ileum, with numerous adhesions.

When the symptoms follow a previous abdominal operation, it is only natural that the cause of the obstruction should be suspected to be a peritoneal band or adhesion. A specimen of carcinoma of the ileum from a case under the care of A. E. Barker, and preserved in the Museum of University College Hospital, is of interest in this connection. In this case, a woman, age 36, double ovariectomy had been performed two years

previously. There was a three months' history of paroxysmal pain in the lower abdomen, vomiting, constipation, and loss of flesh. During the paroxysms of pain a transverse distended coil of bowel appeared below the umbilicus and subsided with much gurgling. At the operation, 30 in. of ileum were resected, including two strictures 18 in. apart. The upper stricture was caused by a columnar-celled carcinoma; the lower stricture was fibrous, and was situated at the point where the gut was adherent to a chronically inflamed appendix.

The operative treatment of carcinoma of the small intestine, assuming the growth to be suitable for removal, must in the first instance depend on the presence or absence of actual obstruction. In favourable cases the affected part of the bowel should, of course, be resected, together with the corresponding part of the mesentery. Fagge<sup>2</sup> has recorded a case in which he successfully resected 8 in. of the jejunum in which the growth was situated, together with part of the colon to which the growth had become adherent. In one of three cases of carcinoma of the jejunum under the care of Moynihan, and reported by Tatlow,<sup>3</sup> 2 in. of the duodenum and 18 in. of the jejunum were resected, a posterior gastrojejunostomy was performed, and the distal end of the duodenum implanted into the jejunum. If the tumour is considered unsuitable for removal, a lateral anastomosis may be performed.

In the presence of a marked degree of obstruction, surgeons are agreed that immediate resection of intestine is almost certain to lead to disaster. When such a degree of obstruction complicates a growth in the small intestine, especially high up, the outlook must be very grave. An artificial anus should be made above the growth—a procedure attended with much danger to the patient, partly on account of the rapid emaciation likely to occur, and partly because of the damaging effect of the escaping contents of the bowel on the surrounding skin. The latter may for a short time be prevented by the use of a Paul's tube, but the second operation for the resection of the growth must be carried out with as little delay as possible, the resected part of the gut including the artificial anus as well as the growth. In the third case of my own this procedure was followed, the second operation being performed twelve days after the obstruction had been relieved by ileostomy.

In speaking of the morbid anatomy of cancer of the jejunum and ileum, it is necessary to insist upon the necessity of confirming the naked-eye appearances by a careful microscopic examination. In this connection Venot and Parcelier,<sup>4</sup> in an exhaustive article on the subject, refer to two cases in which a stenosing tumour of the small intestine, believed to be a carcinoma, proved on microscopic examination to be tuberculous. They also refer to a third case, observed by Chalié, in which multiple deposits in the small intestine, believed at the operation and subsequent autopsy to be tuberculous, proved to be colloid carcinoma.

The disease in its more important features and in its mode of extension closely resembles carcinoma of the colon. Four varieties of the primary growth may be recognized: (1) The stenosing form, producing a ring stricture of the gut (*Fig. 429*); (2) The polypoid form, in which a rounded mass of growth projects into the lumen (*Fig. 426*); (3) That in which the growth is accompanied by extensive ulceration; and (4) Colloid carcinoma. In at least two recorded cases multiple growths were present—four in number in each; the proximal growth being apparently the primary one, and the more distal growths being possibly the result of implantation. In each of these two cases metastases were present, and the tumours were evidently not examples of the 'carcinoids' to be presently described.

Reference has already been made to more than one case in which the growth caused an intussusception, and also to the fact that acute perforative peritonitis may result. Intussusception appears to be more common in the polypoid than in the stenosing form of growth. This complication occurred in a case, the specimen from which, presented by Rodrigues, is preserved in the Museum of University College Hospital. The tumour has a striking resemblance to that illustrated in *Fig. 426*, and was situated in the ileum 42 in. above the ileocaecal valve. The case is of special interest by reason of the complete

absence of previous symptoms. The patient, a man, age 42, was seized with severe abdominal pain and vomiting, and later in the same day the vomit was stercoraceous. A tender sausage-shaped swelling was felt below the umbilicus, and proved to be an intussusception, which was easily reduced; the affected part was resected. Death occurred ten weeks later, and metastases were found in the mesenteric glands, liver, and right lung. The tumour was a spheroidal-celled carcinoma.

The extension of the disease to the outer surface of the intestine may lead to a localized abscess, or the gut may become adherent to some other part of the intestinal tract and a fistulous communication result. Voelcker<sup>5</sup> has recorded a case in which an ulcerated carcinoma of the jejunum led to the formation of a communication with the ascending colon; and in another case of carcinoma of the ileum, under the care of Keetley, it



FIG. 431.—Carcinoma of the jejunum, from a drawing by Sir Robert Carswell in the Museum of University College Hospital, London.

opened into the rectum. In Voelcker's case the patient, a man of 33, appeared to be quite well until three weeks before his death—another striking illustration of the latent course sometimes pursued by the disease until the sudden development of obstruction or some other complication.

Metastases are frequent, the most common sites being the mesenteric glands, peritoneum, and liver. In one of the cases of multiple growths above-mentioned there were secondary deposits in the lungs and bones, and another in the spinal dura which caused compression of the cord at the level of the 2nd and 3rd dorsal roots.

Histologically, carcinoma of the small intestine is usually of the columnar-celled form, but in some cases the structure is that of a spheroidal- or polyhedral-celled carcinoma. In the two of my own cases in which the growth formed a ring stricture, the structure was columnar-celled, and a deposit in a mesenteric gland in one of them was of similar structure. In the remaining case, in which the tumour formed a poly-

roid mass projecting into the lumen of the jejunum, the cells were polygonal (*Fig. 427*), and in another example of this form of tumour the structure was similar. The spheroidal-celled form of growth is probably the more malignant.

Among a large series of water-colour drawings of morbid anatomy by Sir Robert Carswell, preserved in the Museum of University College Hospital, are three of carcinoma of the jejunum, in all of which perforation occurred. These drawings were made in Paris between 1828 and 1831. A sketch of one of them is reproduced in *Fig. 431*; in the dilated bowel above the growth are two small ulcers, which are probably stercoral, and there is a growth in the mesenteric glands.

Reference has already been made to the second case, in which the growth formed a hard fixed tumour in the left iliac region.

There are also some interesting notes of the case from which Carswell's third drawing was made. The patient was a man, age 50, "of remarkably strong make and constitution. He had served for some time as a *sapeur* in the army, and wore an immense beard—his fine head, expressive eye, and aquiline nose, which the long, flowing, slightly greyish beard rendered somewhat patriarchal, enabled him to gain an occasional livelihood by sitting as a model to painters". He was admitted to La Charité complaining of failing strength, bad appetite, and abdominal uneasiness, "and appeared to have come in for bed and food rather than disease". On examination, however, a large tumour was discovered in the upper part of the abdomen, and death occurred with signs of perforative peritonitis in thirty-two hours. There was a "cerebriform cancer of the jejunum", without actual obstruction, the bowel above and below the growth being funnel-shaped.

In conclusion, a short reference may be made to certain multiple tumours occasionally found post mortem in the small intestine, which, although presenting the minute structure of carcinoma, show little, if any, evidence of malignancy. In 1904 Bunting<sup>6</sup> recorded in the *Bulletin of the Johns Hopkins Hospital* a case of "multiple primary carcinomata of the ileum". The patient, a negro, age 52, died of heart disease, without any history of intestinal symptoms. Through a length of 50 cm. of the upper ileum were scattered six firm opaque white nodules 3 to 7 cm. in diameter, and covered by the mucous membrane. The nodules were composed of small, closely-packed, polymorphous cells, which invaded the muscular layer; in one nodule a small group of the cells was found in the subserous tissue. Bunting referred to six other recorded cases of similar nature, in one of which the two nodules in the ileum were as large as cherries. In all these cases death resulted from other causes. Bunting was struck by the resemblance of the structure to that of the tumours described by Krompecher in his monograph on basal-celled cancer of the skin. These intestinal growths have been further investigated by Krompecher<sup>7</sup> himself, and form the subject of an article entitled "Basal-celled tumours of the cylindrical-celled mucous membranes, with special reference to 'carcinoids' of the intestine", to which Mr. T. W. P. Lawrence has kindly drawn my attention.

The tumours in question, which consist of small spheroidal cells, are supposed to have their origin in the basal cells which lie between the cylindrical cells of the crypts of Lieberkühn, and are met with in the intestine and vermiform appendix. They are allied to the basal-celled tumours of the skin, and, like them, are of relatively low malignancy. Krompecher admits that tumours of this structure may possibly also arise in pancreatic rests.

In the intestine these tumours, which are usually quite small, are generally multiple. They look like small scirrhus cancers, and not being circular do not cause stenosis. In structure they exactly resemble the tumours of the vermiform appendix, and, like them, rarely show any evidence of malignancy.

According to this view the so-called 'carcinoma of the appendix', which has such a very considerable literature, is a 'carcinoid' or basal-celled tumour. Although true carcinoma of the appendix has been recorded, it has always been difficult to believe that the small yellowish tumours sometimes found in the appendix, usually in cases operated on for appendicitis, are really malignant growths. Judging from the microscopic struc-



ture alone, the conclusion that the tumours are spheroidal-celled carcinomas is difficult to resist, and the view expressed by some pathologists that the structure is that of an endothelioma does not seem satisfactory.

If Krompecher's view is correct, these strange little tumours of the appendix and small intestine belong to the group of 'carcinoids'—tumours having the histological but not the other features of a small spheroidal-celled carcinoma. This may not seem altogether satisfactory; but the fact remains that in deciding upon the nature of a tumour it is necessary not only to consider its minute structure, but also to take into account its other features.

Oberndorfer, quoted by Krompecher, states that the cells of these basal-celled tumours contain an abundance of a doubly refracting substance. Probably this is fatty in nature, and the yellow colour of the appendix tumours may be due to it.

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- <sup>3</sup> TATLOW, *Lancet*, 1912, i, 991.
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- <sup>7</sup> KROMPECHER, *Ziegler's Beiträge z. path. Anat.*, 1919, lxv, 79.