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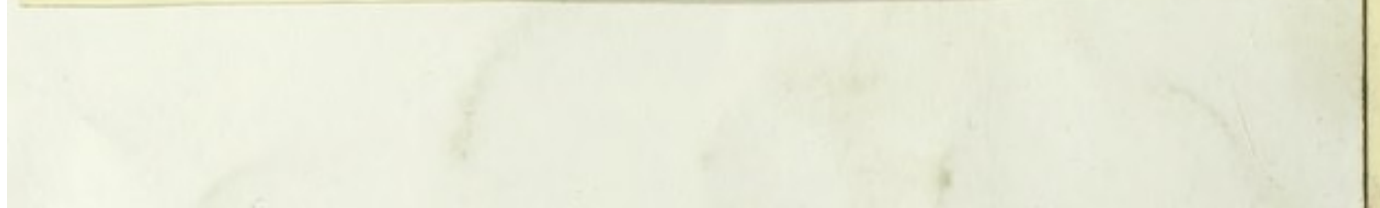
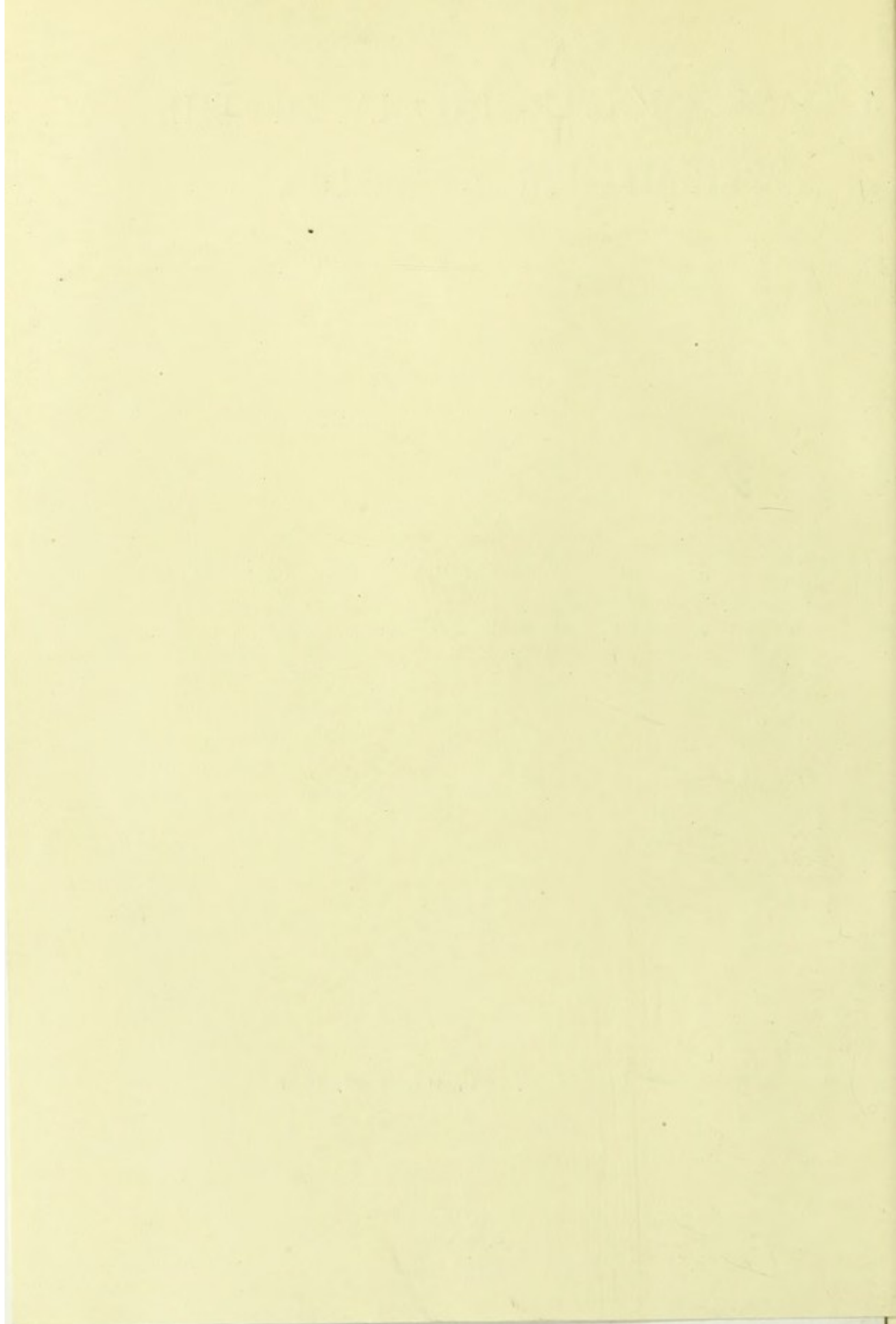
A CASE OF CARCINOMA OF THE  
VERMIFORM APPENDIX

BY

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## A CASE OF CARCINOMA OF THE VERMI- FORM APPENDIX.<sup>1</sup>

IN the routine histological examination of appendices removed at operation it is not uncommon to find the lumen narrowed or occluded by strictures the result, as a rule, of post-ulcerative cicatrisation. Sometimes these strictures are only detected when longitudinal sections of the organ are examined microscopically, there being no external evidence such as diminution of the circumference of the appendix at the seat of the occlusion ; but occasionally the stricture is apparent externally by a deep constriction. Usually the appendix becomes distended beyond the stricture and various pathological changes take place therein. In the present case there is not merely a constriction but the appendix is completely divided into two segments, and in the sequestered distal portion there is present an unmistakable carcinoma.

Carcinoma of the appendix is a condition which has been recognised for a considerable time, but as regards the earlier cases there is some doubt, owing to the want of any histological examination and also to the fact that in some it was quite possible that the disease was secondary. However, now that it is customary to have all appendices removed at operation submitted to microscopical examination, the cases reported have become more numerous and their nature has been placed beyond doubt. An excellent summary of the literature and cases on record until 1906 was given by Rolleston and Jones in their paper on Primary Malignant Disease of the Vermiform Appendix, read before the Royal Medical and Chirurgical Society in February, 1906, from which

<sup>1</sup> Sections of the appendix were shown at the Pathological Society of Great Britain and Ireland at their meeting held at Glasgow on July 9th and 10th, 1909.

the following list of cases has been taken. The first case of malignant disease of the appendix was reported by Merling in 1838; the next case (Prus) was reported in 1865; and two years later four cases of carcinoma were reported by Rokitansky. All of these cases, however, must be considered doubtful owing to the absence of histological examinations. The next case of carcinoma was recorded in 1875 by Kolaczek, but here the tumour involved the cæcum also, and it is possible that this was its primary seat. In 1880 Bierhoff reported a case, but in this instance there was tumour in the rectum and other organs, so that we cannot exclude the appendicular growth from being secondary. In 1882 the first undoubted case was recorded by Beger. In 1883 another case was reported by Maydl, but no details are given. In Draper's case in 1884 the cæcum was involved, and so it also must be considered doubtful. The next case was recorded in 1896 by Stimson. In the following year 4 cases were reported, but one of these is rather doubtful. In 1898 another case (Wright's) was recorded, whilst there were reported 8 cases in 1900, 4 cases in 1901 (one of which is doubtful), 3 cases in 1902, 3 cases in 1903, 2 cases in 1904, and 4 cases in 1905, all of these being probably true primary carcinomata of the appendix. Apparently the condition has never been diagnosed before operation or post-mortem examination, and this is not surprising, because in the great majority of cases the symptoms have been those only of appendicitis.

The patient from whom the present specimen was obtained is a man, 49 years of age, who until recently had enjoyed good health. The first illness occurred three years ago, when he was confined to bed for 14 days with an attack resembling influenza. In January, 1909, he was seized with a similar influenzal attack, characterised by shivering and backache. He had to go to bed, where he remained for two weeks, and, improving greatly, three weeks later he was able to resume work. But from about this time he continued to lose flesh. About three weeks before admission to hospital he was seized with a similar attack, with fever (at onset only) and vomiting. His medical attendant on this occasion suspected the appendix region, and found there was tenderness on pressure at this place.

The patient was seen by Dr. T. K. Monro in consultation on May 4th, 1909. He had been obviously losing strength considerably; there were progressive failure of health and

weakness, with considerable loss of flesh; and, taking everything into consideration, Dr. Monro came to the conclusion that these were incompatible with the condition being one of simple appendicitis. He had a suspicion that the patient was suffering from some malignant disease in the appendix region, not necessarily in the appendix because of its great rarity, but probably in the cæcum. For these reasons Dr. Monro advised his removal to hospital for observation. He was admitted to Dr. Monro's wards at the Royal Infirmary here on May 11th. On the 13th he was transferred to Mr. H. Rutherford's wards for exploratory operation. When examined on the 18th by Mr. Rutherford before operation the only suggestion of appendicitis was the persisting tenderness in the right iliac fossa. Pain had quite gone, and there was no recognisable tumour. The abdomen was opened in the usual way. The appendix was rather bulbous and hard, adherent, running inwards and partly buried in adhesions of the small bowel and mesentery. About it, when separated, was seen some whitish material like the incompletely absorbed remains of an abscess. The appendix was cut away, and the stump was inverted in the usual way. The wound healed by primary union, and the patient was dismissed well on June 5th, and has since remained well. Mr. Rutherford states that at the operation there was nothing found which in any way suggested to him that there was any malignant disease present in the appendix, cæcum, or the neighbourhood.

The appendix was sent to the Pathological Department of the Glasgow Royal Infirmary for examination after it had been fixed in formalin and preserved in spirit. It was shorter and thicker than the normal, and it was completely divided, transversely about its middle, into two distinct segments, proximal and distal, which were held together only by the meso-appendix. The two segments were almost equal in length, but the proximal was slightly the longer of the two. For purposes of examination the appendix was divided in its long axis; one-half, consisting of the two segments, was embedded in paraffin and cut into longitudinal sections. Transverse sections were also prepared from the distal segment of the other half.

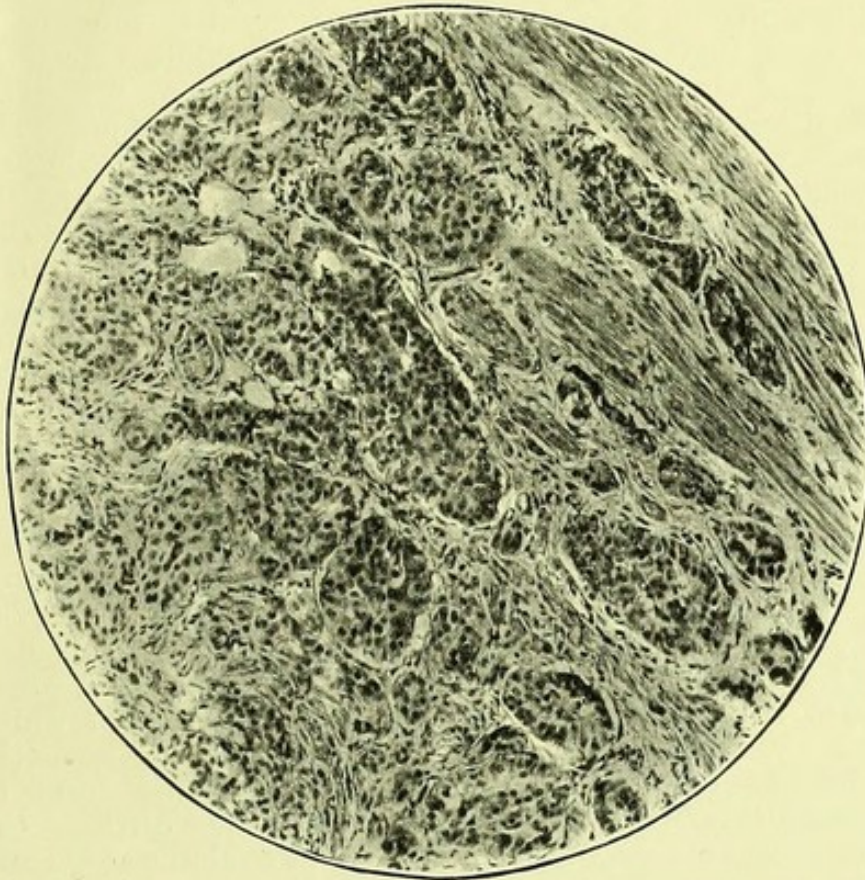
*Microscopical examination of longitudinal sections.*—*Proximal segment.*—All round the appendix in the peritoneal coat there is evidence of recent inflammation. The meso-appendix

shows marked evidence also of fairly recent inflammation—there is abundant lymphocytic exudation; the adjoining muscular coat of the appendix is also superficially infiltrated with these round cells. The muscular coat shows some fibrosis, and there is thickening of the submucous fibrous layer, probably the result of some former acute attack. The mucous membrane shows an overcrowding with lymphocytes, but there is no evidence of acute inflammation; the mucous membrane is fairly well preserved. There is not the slightest trace of carcinoma in this segment.

*Distal segment.*—Externally this segment also shows signs of recent inflammation. There is no lumen; the mucous membrane is altogether lost, and its place and the cavity are occupied by a characteristic carcinoma. The muscular walls are thickened and fibrosed, and just at the tip of the appendix the submucous layer is seen to be replaced by fat. At the distal end of this segment, within this submucous layer and replacing the mucous membrane, there is seen the carcinoma arranged in large masses in the alveoli of a firm but scanty fibrous stroma, and filling up the whole lumen. Around the tip the wall of the appendix is not involved by the growth. From the distal end the growth extends proximally right to the division between the two segments but no further. It spreads laterally through the walls of the appendix to the peritoneal surface, and it is quite possible that it has extended by continuity into the surrounding adhesions.

The cells are columnar; they are arranged in alveoli and form in most places solid masses of cells, no trace of a lumen being visible. In some parts the cells are seen several layers deep surrounding a small central space, in this way simulating tubules. Towards the tip of the appendix the alveoli are much larger than they are proximally, the masses of cells correspondingly being much larger. The fibrous stroma is rather scanty near the tip, but proximally it is more abundant and denser, and the tumour here has a resemblance to a scirrhous carcinoma. In the centre of what was once the lumen of the appendix the alveolar arrangement of the cells is fairly well preserved, but peripherally the normal limits of the tubular growth are broken, and cell-processes are seen extending out in all directions. At and around the tip of the appendix the carcinoma is limited within the submucous layer

and does not send out processes into the muscular wall ; but proximally, from within a short distance of the tip, it is seen to break through the submucous coat and to sprout out into the muscular coats. These processes are composed of solid masses of cells not quite so tall as the cells in the central part of the tumour,



Carcinoma of vermiform appendix. Transverse section at tip.  
× 75.

approaching more to a spheroidal form, and they are seen infiltrating the muscular coats right up to the peritoneal surface. The infiltration in the muscular wall looks like a lymphatic permeation, the cell-processes in places being seen passing through between some of the muscular fibres, in the hiatus musculares described by C. B. Lockwood. The microphotograph is taken from a transverse section near the

tip of the appendix and is magnified 75 times. It shows the large cell masses of that situation arranged in the alveoli of the rather scanty fibrous stroma. In a few of the smaller alveoli the tubular arrangement of the cells around a central lumen is apparent. The section also shows the carcinoma invading the muscular wall, a solid process of cells being seen above and to the right infiltrating the muscle.

There are one or two points of special interest in this case that are worth emphasising. While carcinoma of the appendix in itself is a rare condition, the situation of the tumour in this case is quite unique. The appendix has been divided into two segments, in all probability the result of cicatrisation, and in the sequestered distal portion the carcinoma is situated. This is of interest in view of Ribbert's theory of tumour formation—viz., that tumours arise from a partial or complete separation of cells or groups of cells from their organic continuity, in other words, from mechanical isolation. Although the condition has never been diagnosed, two cases in addition to the one reported above have been suspected beforehand. These two cases are mentioned by C. B. Lockwood in his article on appendicitis in Allbutt's "System of Medicine." In one instance cancer was suspected on account of the family history of cancer; and in the other on account of the marked anæmia, wasting, and loss of energy. This latter corresponds to the present case, in which there were obviously considerable loss of strength, progressive failure of health and weakness, in addition to the localising symptoms, all of which raised Dr. Monro's suspicions. In nearly every instance the symptoms have been those of one or other form of appendicitis, and as all medical men are now alive to the dangers of this condition and the advisability of early removal of the appendix, it is probable that to this is due the favourable prognosis in these cases. I am indebted to Dr. J. H. Teacher, Dr. Monro, and Mr. Rutherford for permission to publish this case.

Glasgow.

