A CASE
OF
ACTINOMYCOSIS OF THE VERMIFORM
APPENDIX
CAUSING PERITYPHLITIS.

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J. B—, æt. 50. General health good. Habits active and temperate. No previous illness of note, except, about the middle of 1886, he experienced a slight uneasiness in the right inguinal region, and, fearing hernia, consulted Mr. Bryant. Nothing was found, and he soon got well. The present illness began about the 12th of October, 1888, with some severe, but indefinite and occasional abdominal pains, felt at uncertain intervals, and increased by certain movements of the right leg, such as getting into a dog-cart. He had to take opium twice or thrice, but continued to walk and drive about until October 21st. On that day he was suddenly seized, while sitting at table, with intense pain in the right iliac fossa, so that it was with great difficulty that he could move to the sofa. I saw and

examined him about an hour after, and, on palpation, felt a distinct, firm, and rather uneven solid mass, very tender to pressure, and in the position of the cæcum. He was believed to have a perityphlitis, and treated by morphia, laxatives only when needed, rest in bed, and bland diet. He improved while resting; the bowels acted painlessly; all the other functions were normal. There was no rise of temperature, and the lump felt in the right iliac fossa diminished in size and tenderness. However, on November 17th and 18th, having walked a little in his bedroom without uneasiness, and even stood upon his right leg without pain, he had an evening temperature of $99\cdot6^{\circ}$ F.

November 20th and 21st.—He went downstairs and rested on a sofa. This was followed by an evening rise of temperature to $100\cdot6^{\circ}$ F., with an increase of pain, of swelling, and of tenderness in the iliac region. From this date he remained in bed until the end. The swelling soon increased, so that in a few days it involved the whole iliac fossa, and extended above the crest of the ilium, as well as outwards beyond the axillary line. The tenderness was extreme, so that deep palpation was very difficult. The temperature varied much; at times rose to $102\cdot8^{\circ}$ F. The pulse 84—90. November 25th.—Was seen in consultation by Dr. P. H. Pye-Smith, whose diagnosis was “typhlitis, with suppuration behind the cæcum.” Strict rest and fluid diet were enjoined, and the morphia was continued, but no laxatives were given.

December 5th.—Was suddenly taken with very severe pain in the right iliac region and all down that leg, with a general sense of distress, followed rapidly by venous turgescence, so that in four hours the whole limb was swollen, tender, and livid, with strongly marked superficial veins. Soon this condition was extended to the whole iliac fossa, and all the parts involved were œdematous. Thrombosis of the right external iliac vein was inferred. It is somewhat singular that the temperature, which had been about $100\cdot5^{\circ}$ F. for some days, was normal on the 5th and 6th, although it rose again directly after.

9th.—After a consultation with Dr. Pye-Smith and Mr. C. J. Symonds, an aspirating needle was introduced, with antiseptic precautions and under an anæsthetic, from a point internal to the anterior superior spine of the ilium, in a direction to reach the parts behind the cæcum ; but no pus was obtained. There was no subsequent general or local reaction. The treatment was continued as before.

January 4th, 1889.—By this date the œdematous swelling and venous turgescence had almost disappeared from the whole of the right lower extremity and parts above Poupart's ligament, as if the circulation had in some way been restored. It was now again possible to palpate the iliac region, and at this date deep-seated induration was felt from a point near to the anterior end of the eleventh rib down as far as an inch and a half below Poupart's ligament near the great vessels. This area was visibly swollen, and while it was lost without definite boundary outwards towards the flank, it was fairly well defined inwards by a gently curved line convex inwards and forwards. This line appeared to be rather undulating, and also variable according to the states of the gut which bounded it towards the median line. The resistance of the swelling was that of a solid, and so hard, especially near to the crest of the ilium, as to feel like a continuation of the bone. There was but moderate tenderness, and nowhere could fluctuation be detected.

10th.—The swelling and œdema had returned in the right iliac region ; the right loin became involved, as well as the buttock and the upper part of the thigh. After a consultation with Dr. Pye-Smith he was treated with Liq. Hydrarg. Perchlor., ʒss ter die. So far, although the skin had been involved in the œdema, and the turgid veins gave a livid colour at times to the parts affected, it had not itself apparently been involved in any truly inflammatory process. About January 24th the skin over the swollen regions was inflamed, a sort of patchy erythema, with redness, induration, and but little tenderness.

He had more abdominal pain, and more morphia became necessary.

February 14th.—Pointing appeared rather suddenly close to the spot where the aspirating needle had been introduced.

16th.—The swelling burst spontaneously, and yielded a little brownish, offensive, thick pus.

On the 17th Mr. Wright enlarged the opening and let out about 1 oz. of dirty, thick, offensive pus with a fæcal odour. The cavity was explored with a probe and with the finger to the depth of two inches, but no bare bone was felt, nor was any deeper channel found. A drainage-tube of two inches in length was inserted. No anæsthetic was used.

20th.—Was seen by Dr. Pye-Smith, and it was agreed to leave off the mercuric chloride, which had not produced any noticeable effects. After the operation on the 17th the temperature fell to about 100° F.

28th.—After a consultation with Mr. Symonds an anæsthetic was given, a long probe was passed by that gentleman from the existing aperture to the loin, just above the level of the iliac crest, cut down upon there, and with the finger in this last aperture a sinus and cavity were explored in the region behind the cæcum. Although the limits of the cavity could not be reached, Mr. Symonds was able to speak of it as having soft anfractuous walls, yielding in front towards the gut, firm behind towards the muscles, and nowhere feeling hard or nodular or like a growth. A rubber drainage-tube of 5½ inches in length and ½ inch in diameter was introduced from the lumbar opening in the direction of the cæcum, and another rather longer one was passed from the anterior to the posterior aperture. During the operation there escaped some gas, and a moderate amount of fœtid and fæcal-smelling pus, with blood; also some flakes of lymph and of soft granulation tissue were squeezed out of the apertures during the manipulation, and these were preserved in spirit for future examination. The sinuses were syringed out with

weak carbolic acid solution, and the whole was dressed with mercuric wool ; afterwards weak iodine solution was used to syringe the sinuses. The discharges continued free for about a week, and were chiefly from the lumbar aperture. The temperature, which had fallen as above said to 100° F. after the operation of the 17th, fell to normal after that of the 20th, and remained so with but slight fluctuations for nearly a month.

It is noteworthy that up to this date the bowels acted well and easily with enemata, the stools were normal in character and free from pus or blood ; the appetite, digestion, respiration, and circulation also normal, and the urine copious and normal in aspect and composition.

The fragments squeezed out during the operation on the 28th, when examined, were found to consist of shreds of coagulated fibrin, of dead connective and fatty tissues infiltrated with leucocytes, and some very vascular granulation tissue. No evidence could be found of any neoplasm. The foetid and faecal-smelling discharges contained numerous small, deep brown or blackish specks, which, on examination, were proved to be faecal masses, mostly of deeply tinged vegetal tissue, and one or two were found having an obscurely crystalline fracture suggestive of a broken concretion. After some days these dark specks ceased to appear, as if a communication with the gut had closed.

March 20th.—The skin having again become inflamed and swollen about midway between the two openings, as if pus were there confined, Mr. Wright made an incision at this point under an anæsthetic, and let out a small quantity of dirty foetid pus without faecal odour. No sinus could be traced leading towards the cæcum, but a tube was inserted leading to the lumbar opening, and another to the anterior one.

29th.—The last operation was not followed by any increase of discharge or relief to the local redness and swelling, while the temperature rose to 100° F., and a

colourless œdema extended to the right foot, the upper half of thigh and hip, as well as to the scrotum.

31st.—Consultation with Dr. Pye-Smith and Mr. Symonds, who withdrew the drainage-tubes last introduced, as they yielded nothing and appeared to irritate. He attempted in vain to reach the deeper cavity from this last made aperture.

April 2nd.—Consultation with Mr. Anderson, who passed a small tube some three inches in the direction of the cæcum from the central aperture, and a little old pus escaped ; but the next day this tube was forced out, and could not be introduced.

4th.—As the drainage-tube in the lumbar aperture had been gradually shortened until it was only two inches in length, Mr. Anderson passed a smaller tube from the same aperture more than five inches in the direction of the cavity behind the cæcum, and this tube was gradually replaced by a larger one until a full-sized tube was introduced on April 9th. A tube was also placed between the anterior and the central apertures, but in spite of these apparently sufficient provisions for efficient drainage very little pus escaped, probably not more than was furnished by the walls of the long sinuses. The skin remained red, tender, œdematous, and the temperature was over 100° F. Appetite and sleep were fair, and the patient was hopeful, but he had to take rather freely of morphia and of alcohol.

13th.—The local conditions remaining without improvement, a consultation was again held, and Mr. Symonds under an anæsthetic made a free incision through the thick integuments from the anterior aperture outwards and upwards to the middle one, placed just above and about the middle of the iliac crest. He explored deeply with a probe and with the finger in the direction of the deep focus behind the cæcum to a distance of 5½ inches, and breaking down the soft tissues carefully with the finger he established a free communication with the deep focus from the lumbar and from the anterior openings.

Into this channel he passed a large fenestrated rubber tube, so as to provide for satisfactory drainage from the deepest cavity and from intermediate sinuses. During the operation there escaped little or no pus, and only a very moderate amount of dark venous blood. Some soft masses of granulation tissue were squeezed out and preserved for examination. After the operation great pain and distress followed, and for some time the temperature rose to 103.4° . For two days there was no other discharge than bloody serum, followed by only a moderate amount of pus tinged with blood, having a rather foetid but not a faecal odour.

The discharge contained shreds of dead tissue, flakes of lymph, and some dark brown specks of faecal matters. It was also now noticed to contain other yellowish, or deep reddish or brownish spherules, having an appearance which reminded one of certain minute ova; these, after careful examination, proved to be the spherules or colonies of actinomyces. I think they could be readily recognised, by any one who has noticed them, by their naked eye characters. If the pus be mixed with water, or the dressings be washed and the fluid be given a movement of rotation, the spherules sink to the bottom, especially the larger and more deeply coloured ones, as quite peculiar bodies. To the naked eye they seem, although variable in size, mostly about the size of a very small pin's head, and appear to have an adhesive slimy or gelatinous envelope with a coloured centre. Under a good pocket lens, and seen as a transparent object with oblique light, the coloured centre appears rather like an irregularly cleaving yolk (see Plate I, Fig. 1). The diagnosis can be readily placed beyond doubt by the employment of a microscope with a moderate magnifying power. The process of preparation need not be complex, and can be carried out at once in the ward. I found it sufficient to place two or three spherules fresh from the washings of the dressings on a slide with a drop of water, covering lightly without greater pressure than the weight of the

cover-glass, and then on examining with a power of 135 diameters one of the smaller spherules at its margin, where the envelope of leucocytes is a little detached, the appearances presented in Fig. 2 are seen, and are, I think, such as suffice for diagnostic purposes.

I do not propose to deal here with the histology of these colonies, but I may briefly point out that the envelope of leucocytes appears to be maintained in its position by a number of fine radiating filaments, some of them with small club-shaped terminations; and these radiating filaments are external to the more closely approximated and swollen clubs, which present the higher refractive index and usually the yellowish or greenish colour. When it is not convenient to employ the microscope thus upon fresh colonies, they may, if they have been preserved in spirit, be sufficiently well seen for diagnostic purposes if they be softened in moderately weak solution of potash, and then soaked and mounted in glycerine (see Fig. 3, which shows a colony thus prepared and magnified 75 diameters).

No relief followed this operation. The implicated regions remained swollen, painful, and tender, and about the iliac region and flank the skin became red, and an eruption of vesicles appeared, which soon became confluent and at length excoriated. By its distribution this eruption seemed to be due to the local irritation of the discharge. Slight diarrhoea came on for a few days, and the general condition became worse.

April 21st.—He was seen again by Dr. Pye-Smith, and on May 2nd by Sir James Paget. After this he took freely of morphia, was rather too somnolent, at times delirious, and on May 6th began to pass urine in bed.

May 8th.—Some increase of diarrhoea, but no actinomyces found in the stools.

12th.—The eruption appeared on the prepuce and scrotum.

21st.—Had a severe rigor, with rapid brief rise of temperature to 102.6° F., great prostration, pulse 156,

respirations 50. Alcohol was freely given, and it seemed to help him to rally.

23rd.—A striking diminution had been noticed for a few days of the local œdema about the flank and of the granulations at the openings. After this he gradually lost flesh, strength, and intelligence, was very restless and distressed, but not in great pain. The temperature rose to a higher average, and on June 19th he had another rigor with a temperature of 103° F. He died on June 21st, having shown no evidence of any lung complication except an irritable cough for the last three days of his life.

Unless the rigors mentioned above were related to a metastasis there were no distinct indications of any such event having taken place throughout the course of the malady, and there were no such disorders of the functions as pointed to any viscus so affected. Palpation and percussion often made during the illness revealed only some enlargement of the liver without change of form or increase of solidity, so that its border was never distinctly felt. The abdomen remained rather large, especially in the hypochondriac regions throughout, certainly it was not reduced in the same proportion as the rest of the body. The vesicular eruption mentioned above appears to have been infective, as it appeared once or twice on his face after scratching. During the short period, some fortnight before death, in which the local swelling was so much reduced, deep palpation was again possible, and a deep-seated solid resistance was felt in the iliac region like that described on January 4th, but much smaller.

The venous turgescence and œdema of the right lower extremity which appeared on December 5th, 1888, as mentioned above, had almost disappeared in about a month, but the more localised œdema which returned about January 10th, 1889, persisted in some degree to the end, affecting the scrotum about the middle, and the left leg towards the end of March, 1889. Gradually, although the œdematous skin remained pale and the

smallest venules and capillaries were not distended, the larger veins on both sides of the abdomen became too visible, and in June, 1889, the superficial epigastrics on each side were visibly continuous with the thoracic veins. It was thought that the venous thrombosis had extended to the ascending vena cava. Throughout the illness the urine was abundant, free from albumen and from sugar, normal in aspect, and contained, on the single occasion on which the examination was made, 1·5 per cent. of urea.

The heart was examined each time before an anæsthetic was given, and was found normal. There was at the end great wasting of muscle and of fat, notwithstanding the large quantities of food taken, his inactive existence, and his apparently fair digestion.

It is noteworthy that of the numerous congenital lipomata met with under his skin, some had, it was believed, quite disappeared, and nearly all had diminished in size. The colonies or spherules of actinomyces were still met with in the discharges up to the last, but their numbers were much reduced. At different times during their appearance some of the spherules were sent to three different pathological laboratories in London, and also to Cambridge, for artificial cultivation, but these attempts did not succeed.

Autopsy (June 22nd, twenty-five hours after death).—Very little decomposition present, slight rigor mortis. The œdema very perceptible in both legs, more especially in the left. The blood had, however, disappeared from the surface, and except in the dependent parts the skin was very pale. The capillary engorgement which during life had been so marked a feature of the right iliac region and flank had disappeared, and in this region the swelling was also very much reduced. The superficial epigastric veins were no longer striking objects, nor was their continuity with the thoracic veins at all noticeable. There was, however, a little brown stain in the skin where it had been so long inflamed, and where it had been excoriated there was seen a dry brownish scale. The openings

of the sinuses gaped, and were almost dry; the whole region was much reduced in palpable as well as visible swelling, having become bloodless.

Thorax.—Very little obvious change on first opening the body. The lungs pale, especially in front, with marked black marbling. Left apex adherent, slightly puckered, on section pale in front congested behind, and cedematous. Right apex more firmly adherent, and puckered and firmer, and more congestion seen on section. No solid masses seen anywhere in either lung; a few small scattered recent patches of lymph on pleura. No adhesion of lungs to diaphragm.

Heart normal in size, colour, and texture of muscle. The mitral, tricuspid, and pulmonary apertures and valves normal. The aortic orifice normal, the valves competent, but there were small hard nodules upon two of them. The ascending aorta was somewhat dilated, and there were several patches of atheroma upon its surface, one of which was eroded. Only the usual post-mortem clot seen in the right heart.

Abdomen, when first opened, presented no strikingly abnormal aspect, except that the edge of the liver was far too low, although its surface was smooth and yielding to the touch. There were no striking indications of recent peritonitis or of enteritis. The intestines were pale with rather scanty contents, stomach empty and collapsed. Near the cæcum a few loose films of recent lymph were seen, and deeper in the pelvis a small amount of clear serum.

Liver was removed, and seen in so doing to be enormously large, without much change in form except a slight diffuse prominence at the most convex part of the right lobe, where there was a patch of dark slate colour like a post-mortem stain. This part was also thicker than normal, and suggested the presence of a deep cyst. The organ as a whole was soft and greasy to the touch, and on section showed a coarse mottling with portal venous congestion in patches. Section through the pro-

minent part of the right lobe showed there, close under the surface, without, however, involving its tissue, a metastatic focus fully as large as the doubled fist, having a somewhat spherical form and soft consistence. In the centre it consisted of a pale greyish sort of muco-pus, only more ropy and consistent than is usually seen; it scarcely flowed at all on section, and was contained in a thick soft tissue of altered liver without any definite wall or limit. It was not possible to make even fairly good sections, so some roughly cubical masses of the outer portions were cut and put into methylated spirit for examination, and some of the softer central mass separately preserved. There were no other foci in the organ, and nowhere was the capsule of the liver or the peritoneum inflamed.

Spleen large, about twice the normal size; no deposits in it.

Kidneys large, rather coarse in structure to the naked eye. The left rather soft to the touch, without visible deposit. The right rather firmer and similar in aspect, but with a few minute pale points which might be deposits. A sample was placed in methylated spirit.

The whole length of the intestinal canal appeared normal except the cæcum and the parts immediately adjacent; here there was slaty-black discoloration visible behind the outer border from the vermiform appendix upwards as high as the kidney, and there was thickening of the peritoneum with some old adhesions so mixed up with the thickening as not to be separable. The vermiform appendix was tortuous, bound down, and almost lost to sight; touch was more helpful than sight here, and by it marked induration was felt behind the cæcum, and both above and below it. This induration was certainly much less, at least outwards in the direction of the flank, than observation during life had led me to expect. It extended inwards so as to be continuous with the tissues upon the right side of the bodies of the vertebræ, was traceable downwards along the great vessels to Poupart's

ligament, and a short distance over the margin of the true pelvis in the direction of the rectum. Everywhere, however, the region was free from either purulent accumulation or solid masses ; the long drainage had emptied old collections, and no large solid masses probably had ever existed.

The ascending colon was divided and removed together with a short piece of the ileum ; and in doing so one had to divide the indurated walls of a considerable cavity behind the cæcum, which extended from the sides of the bodies of the vertebræ outwards to the sinuses, upwards nearly to the kidney, and downwards along the great vessels nearly to Poupart's ligament; this cavity was very irregular in form with anfractuous walls, a very maze of communicating channels, for the most part with thin soft walls in front, and nowhere either very hard or thick. The firmest parts of the walls and the thickest were towards the psoas muscle, and about the neighbourhood of the vermiform appendix. In removing the cæcum with the vermiform appendix a rather wide sweep was made with the knife through the thickened tissues, and here portions of the common iliac vein and artery with a short length of the external iliac vessels were in part removed with the gut, just where they were involved in the thicker parts of the abscess wall. After removal of the gut the posterior walls of the abscess were exposed, lying in and on the psoas magnus and neighbouring muscles, and in close proximity to the ascending vena cava, nearly as high as the right renal vein. The ascending vena cava was full of clot, soft, deep red, and easily falling out in the upper part near the right renal vein ; firmer, whiter, and attached to the walls lower down near the common iliacs, which, as well as all the veins below, seemed to be blocked. The vena cava, together with the left common iliac vein and its branches down to Poupart's ligament, was removed without difficulty ; but the right common iliac vein and its affluents were so involved in the indurated walls of the abscess behind the cæcum that they

had to be separately removed, part being engaged in the wall of the abscess removed with the cæcum, and part subsequently being cut out from the walls left behind. The removed cæcum and appendix on being opened showed a fairly normal aspect of the mucous membrane, and no ulcerated aperture was found. There was no mycelium seen, such as has been described by Chiari. Near the aperture leading into the vermiform appendix the mucous lining was thrown into strong transverse and concentric rugæ, corresponding to a considerable induration of the tissues behind the gut. The vermiform appendix was bound down, covered and obscured by adhesions and thickening of the peritoneum, which were continuous with that part of the abscess wall. The aperture of entrance from the gut into the appendix was patent.

On further examination of the removed cæcum and appendix it was found that the vermiform appendix was dilated immediately beyond the aperture from the gut, that this dilated part had irregular walls, and that it had more than one communication with the abscess cavity. No continuous channel could be discovered between this dilated part and the rest of the vermiform appendix, which was turned here at a right angle, and was apparently closed at both ends. There was no discoverable enlargement of the mesenteric glands. One mass like a large *lymphatic gland* was removed from the right groin, as it had been noticed during life ; but on inspection and section it appeared to be a firm lipoma, which had been somewhat inflamed.

The other viscera were not examined. The walls of the abscess and sinuses showed, when closely inspected, even with a lens, no indications of any actinomyces spherules *in situ*, and on careful search among the débris washed from the specimen I found only a very few of them.

The spherules which had passed in the discharge, as well as those found after death and preserved in spirit,

were examined in various ways, so that I satisfied myself of their being truly colonies of actinomyces; and in similar ways I examined the spherules which were found in the soft semi-fluid centre of the hepatic focus, with a like result.

In these examinations, made by teasing, &c., without sections or staining, I relied chiefly upon the radially arranged threads, tending to form groups which gave to the whole colony a sort of morula aspect, upon the evident branching of these threads as they advanced to the periphery, and upon their tendency to present a club-shaped form when they could be isolated either at the periphery or when broken off. I think the tendency of the elaborate researches on actinomyces by Boström (see Ziegler's 'Beiträge,' Bd. ix) is to reduce the diagnostic value of the thick, firm refractive clubs.

Afterwards sections were made by my son, Dr. W. B. Ransom, by the paraffin method, and stained by the Gram process (gentian violet and eosin), of the walls of the metastatic focus in the liver, which showed remarkably well the colonies of actinomyces *in situ*. Similar sections were made by him also of the walls of the abscess behind the cæcum and of the vermiform appendix, where it was dilated, eroded, and communicated with the abscess; but in these no such colonies were found *in situ*. Neither were they met with in similar sections of the external iliac vein just where it was almost included in the indurated wall of the abscess. The separate spherules, which had been at various times discharged from the abscess when similarly embedded and cut in paraffin, exhibited the characteristic and well-known structure. In sections, however, by this process the eosin did not bring out the separate clubs. The fragments of soft tissues, the walls of the sinuses which had been squeezed out and preserved in spirit after the operations of February 28th and April 13th, were also similarly cut and stained and examined for actinomyces colonies without result. They consisted apparently of granulation tissue, much of it modified by

the thrombosis and œdema, and exceptionally vascular, so that it is not surprising that at the earlier examination of these fragments, made soon after the operation of February 28th, no evidence of the true nature of the malady was furnished. The only thrombosed vein thus examined was the right external iliac near to the common iliac. It was here reduced to a mass of scar tissue and organised clot, with numerous canals in it. The other veins were not thus examined, but judged of by their aspect to the naked eye they did not present the appearance of actinomycosis. I concluded that the coagulated mass in the veins was not specifically affected by the ray fungus.

Search was made for bacteria by the methods of Loeffler and of Gram in the sections of the liver and of the granulation tissues of the sinuses removed by operation without result, but in sections of the abscess wall through the eroded vermiform appendix numerous thick bacilli were seen well stained by the method of Gram. There can be no doubt, however, but that numerous bacteria existed in the pus of such sinuses.

Remarks.—On reviewing the case, I think it may be said that the first diagnosis was in part justified, and in part not. I had considered the clinical features conclusive as to the existence of a perityphlitis, and when in the progress of the case evidences of a fæcal abscess appeared this view was strengthened. I had also adopted the view that the vermiform appendix was primarily diseased, and that such disease was due to a fæcal concretion of some kind. In this respect the event showed that I had fallen into an error, which was not removed until the spherules of actinomyces were found in the discharge.

In the main my colleagues were in accord with me in their opinions, being, however, more cautious than I had been, and not responsible in any manner for that part of the diagnosis which events proved to have been wrong. There was a period during the case, especially when the exploring needle failed to reach pus, and before

a distinct point appeared, when the question of a growth was considered either as an alternative diagnosis, or as a supplemental one. Mr. Symonds was, I think, rather inclined to sustain the diagnosis of a growth of some kind, either sarcomatous or carcinomatous, but by the medical attendants as a whole these views were held in suspense.

Had I made, as I ought to have done, an adequate examination of the earliest discharges on February 16th, I cannot doubt but that the diagnosis might have been made two months earlier than was the case. The rule carefully to examine all discharges is one I have long accepted if not always followed, but the importance of it is well seen in such a case as this.

The examination of sections of the fragments of tissue obtained during the operation was made as soon as opportunity served by Mr. Symonds and by myself, but gave no satisfactory help in the diagnosis. It only showed what in other ways was learned, that an inflammatory process was in operation, and both destructive and reparative processes were going on side by side. Afterwards, as a result of the examination of many sections of the abscess walls, of the hepatic focus, of the peripheral inflamed tissues in the neck and face of another case, confirmed by reading the reports of various observers, I felt less surprised that these sections gave no ready clue to the nature of the case. For it appears to be the rule in man that the ray fungus produces an inflammation which is suppurative in character in its immediate vicinity, and protective through a peripheral zone of rather considerable thickness ; so that except in comparatively rare cases, and only then if the tissues have been carefully embedded in either celloidin or in paraffin, the sections would not show the ray fungus *in situ*, even when properly stained. In short, from the readiness with which the spherules fall out and pass away in the discharges, it is a much more facile way of diagnosing a case to search the pus than to examine the tissue.

It is a question of much interest from a diagnostic

standpoint to decide whether or not the general clinical characters of the malady suffice to distinguish it, or at any rate to raise a suspicion as to its nature, such as might direct the inquirer aright. I think the answer must be that neither the local nor the general reactions are sufficiently characteristic to permit of a positive diagnosis, but that the local reactions when observed through a sufficient period of time, or when a good history of their previous course can be obtained, suffice for a provisional diagnosis such as may guide the observer.

The case recorded by Boström (p. 168, Ziegler's 'Beiträge,' Bd. ix), in which a tubercular swelling under the jaw was diagnosed as actinomycosis, shows that even in the hands of experts a certain diagnosis is at present not to be made without a microscopical examination of the swelling or its contents. That a probable one is possible, is evident from two other cases reported by the same writer (l. c., pp. 13 and 21), in which the diagnosis was made before any opening appeared, and the whole mass on removal and examination proved its correctness. That the external examination of actinomycotic swellings may suggest a sarcomatous growth is shown in the case of this disease reported by the same author (l. c., p. 29), in which the operation was undertaken on the supposition that the swelling was a malignant sarcoma.

These difficulties of diagnosis become still more marked in cases like the one here reported, where a hollow viscus is involved, and various other pathogenic organisms and substances become factors. The case before the Society had also a further and, as I think, an accidental complication tending to obscure the regular course of an actinomycosis, viz. the thrombosis of the great veins and the consequent venous turgescence and œdema which began early in the case, and never ceased to affect its aspect in some degree until the end.

However, I think from my observation of this case, and of two others which I have since had the opportunity of seeing, as well as from such reports as I have read,

that when a subacute or chronic inflammation occurs which spreads without much elective affinity for any tissue or viscus, but which tends to spread in all, although in the main downwards, which is hard, even woody to the touch, involves the skin, and softens in the centre slowly, at length yields pus in rather scanty proportions relatively to the bulk of the swelling, and does not heal when freely opened and drained, it is almost certainly an infective malady, and actinomycosis may be strongly suspected, and the spherules or colonies should be sought for.

It may be perhaps assumed that in this case the earliest seat of the disease was in the vermiform appendix, that here a fragment of or a whole grain of corn or of grass lodged, and the actinomyces parasitic upon it developed, and the destructive inflammatory processes it set up in its immediate vicinity perforated the posterior walls of the appendix, so, however, that being all through accompanied by a peripheral protective process leading to adhesions and limitations, the contents of the appendix escaped only into the connective tissue behind the cæcum; then doubtless the factors at work in exciting the further inflammatory process were more complex, as the intestinal contents are known to be very varied, and many of them pathogenic. Even the peripheral or protective inflammatory process appears, however, in this case as in many others, to have been in large part responsible for some of the most striking and painful of the symptoms.

Without taking up too much time by trying to describe all these effects, I may note that the venous thrombus, with all its grave and striking results, was a direct consequence of the vein having been involved in the peripheral zone of the inflammation.

Looking back, the question is a proper one to ask, could we, by an earlier clear diagnosis, or in any other way, have found good grounds for a different and successful treatment? I fear not. Although great success has attended the surgical treatment of actinomycosis of super-

ficial parts, as yet I know of no satisfactory mode of treating visceral actinomycosis.

While I was under the domination of the idea that the disease was essentially an ulceration of the vermiform appendix due to a fæcal concretion, I had some hopes that Mr. Symonds might be able to find such concretion, remove it and the vermiform appendix, and possibly even at the cost of some risk to life bring about an imperfect recovery. Mr. Symonds, however, during the operations which he performed, made it clearly manifest that such a course was not practicable or justifiable; and further, that he could not ascertain the existence of any growth or mass which could be removed so as to benefit the patient, and with this conclusion all the medical men in attendance agreed. It may be a question, however, whether or not in this case the bold and adventurous course which has been recommended, of removing the vermiform appendix quite early in the illness, might not have had a favorable termination. On the whole I think that the infective character of the malady would have led to a disastrous result, and that the conclusion which we all came to at first not to advise such an operation was justified, seeing that this was a first attack.

If any question of operation arose in a case of visceral actinomycosis, it would be of great value to know whether at the time any other important part was affected, especially if any metastasis had occurred. This case unfortunately does not at all tell us when the metastatic focus in the liver began. Considering its large size, it could hardly have been so late as the first rigor on May 21st, just a month before death. There were no sufficiently definite indications locally ascertained during life, and it may be said that although on pathological grounds the hepatic focus was expected and sought for at the autopsy, it had not been diagnosed during life. The fever, which persisted in some degree with few and short cessations for the last seven months of the eight during which the illness endured, was, I conclude, neither directly a result of

actinomycosis, nor of the metastasis, but in all likelihood due to the action of other pathogenic factors derived from the intestinal canal. There can, I think, be little doubt that the metastasis took place through the portal vein, and the absence of any such foci in the lungs strengthens the opinion formed on other grounds, that the thrombus in the vena cava and its branches was not affected by the ray fungus.

Although up to the present, treatment has failed in visceral actinomycosis, it is conceivable that a successful result might follow in certain cases where the primary focus is within a moderate distance of a depending opening to the surface, either natural or artificial. For, apart from the statements made about the occasional cure of this disease in cattle after free discharges, there is some ground for adopting such a hopeful view, founded on the facts observed in this as well as other cases recorded, viz. that the exciting cause of the destructive inflammation is thrown off freely, and that in long-standing sinuses but few spherules are left behind.

These hopes are strengthened also by the tendency so generally met with for the periphery of the disease to form a defensive scar tissue. There is also some ray of hope to be found in the chance that injections of not too poisonous or escharotic substances might in certain positions reach the extreme limits of the sinuses, and there restrain the further growth of the ray fungus.

I ought, before closing these remarks, to call attention to the facts noticed by Boström and others, that in some cases the spherules of actinomyces are translucent and colourless, and then easily escape observation; in others, although more or less opaque, they have only a pale grey colour. In each case my description of them would prove insufficient. That that description, however, holds good for a majority of the cases I do not doubt, judging from the testimony of various observers, and from the three cases I have had the opportunity of seeing.

The case here recorded was the first I had seen, and

I was not familiar with the appearance of the spherules, nor would they have attracted my attention probably had I not been searching in the discharges for evidence as to the relation of the abscess with the gut.

I availed myself, therefore, of the writings of various authors, but more especially I have to express my obligations to those of J. Israel, Partsch, Crookshank, and Boström, the last of whom has made the most exhaustive and recent researches in actinomycosis with which I am acquainted.

(For report of the discussion on this paper, see 'Proceedings of the Royal Medical and Chirurgical Society,' Third Series, vol. iv, p. 16.)

DESCRIPTION OF PLATE I.

Actinomycosis of the Vermiform Appendix causing Perityphlitis
(Dr. W. H. RANSOM).

FIG. 1.—Spherule or colony of actinomyces, $\frac{1}{18}$ inch in diameter, from discharge, seen in water as transparent object with lens. Magnified 10 diameters.

FIG. 2.—Marginal part of a smaller spherule, showing the peripheral radiating and branched threads and some small clubs. Magnified 135 diameters.

FIG. 3.—Smaller colony, $\frac{1}{36}$ inch in diameter, from spirit, treated with solution of potash and mounted in glycerine. It shows the rays very delicately with oblique light. Magnified 75 diameters.