On Appendicitis: with special reference to diagnosis.

"Appendicitis" is a term which has only recently been employed in medical phraseology. Its use, I take it, implies a growing conviction of the responsibility of the Appendix Vermiformis for most of the pathological conditions which formerly were included under the heads of Typhlitis, Perityphlitis and Paratyphlitis. It implies in short, the general appreciation of the fact, now made clear by the progress of anatomical, pathological and surgical knowledge, that while the Caecum itself plays a comparatively secondary part in the production of perforations of the intestinal tube, and of consecutive inflammatory changes starting from the right iliac region, the Appendix, on the other hand, - till lately treated, as it has been quaintly put "in a step-motherly fashion", and somewhat overlooked by pathologists, has a very

important bearing. The researches of Fitz and Others show conclusively that this is so, and the term Appendicitis is therefore a convenient and expressive one. It is sounder than its predecessors which were based on partly incorrect ideas of the anatomy and pathology of the region. It includes the consideration of catarrh, of ulceration & of perforation of the Appendix and of their causes: also of the inflammatory processes resulting from them, external to the intestine, and within the cavity of the peritoneum.

It is only comparatively of recent years that the subject has excited very much interest or attention, and even still the information acquired on it has hardly become so crystallized, so to speak, as to find a place in even recent editions of standard works on Medicine & Surgery. The older authors are either silent on it, or dismiss the subject with a few lines. Our knowledge of it must therefore be sought in the form of solution - scattered amidst the vast mass of medical periodicals and reports. It would seem as if

the advances which have taken place in abdominal surgery, which have at once rendered possible the treatment, and thrown light on the conditions of many obscure abdominal affections, have stimulated the study of this interesting malady.

It is not my intention in this paper to touch more than incidentally on the pathology or treatment of Appendicitis. Both are, indeed, instructive and fruitful topics; but it is chiefly with the question of diagnosis that I propose to deal - a very weighty one.

For while, on the one hand, the recognition of the disease clinically may be very difficult, and fraught with various possibilities of error; on the other hand, it is frequently of the highest importance for treatment - and especially for surgical treatment - that the disease should be localized, if possible, and that with the least possible delay. For here, certainly, operative treatment, to be effectual, must in the majority of cases, be early. Otherwise, it may well turn out to be that as [illegible]

Goodhart puts it "a few hours pass by, and the patient is moribund, and the hour of surgery for that case has set". It is to this question of diagnosis, then, that I chiefly address myself.

Appendicitis presents itself clinically under various aspects, & in various grades of severity. It may break out suddenly, in an acute form, leading rapidly to the most acute diffused peritonitis: or alternatively to localized abscess formation - a form of empyema suppurative peritonitis. In either case the course may be extremely rapid, & the tendency is towards a speedily fatal result. It is this variety which is capable of arrest by surgical procedure.

Or it may appear as a comparatively mild and tractable disease readily amenable to purely medical measures, capable of speedy resolution, and rarely leading to death.

And again the disease may assume a recurrent form. The

symptoms, at first acute, gradually subsiding, only to burst out again and again at short intervals with renewed and even increased severity.

This form, again, is very amenable to surgical treatment.

The Acute form usually manifests itself quite suddenly, often in a person who has previously been in perfect health. Sometimes there is a history of constipation or diarrhoea, or other digestive disturbances, and occasionally of precedent undefined abdominal pain or uneasiness although this is by no means common. Not very unfrequently however the illness is dated from a child, from some blow or injury, or sudden strain; and now and then from some unusual exertion which has been immediately followed by a sense of something having given way within the abdomen. The disease is more common in the male than in the female. Of exceptional occurrence in infancy, it is common in childhood. The period of election would appear to be between the ages of 10 and 30. After the latter age its frequency declines, and it is rarely

met with after 40, and in the later periods of life. It is by no means uncommon to find that a similar illness, often of slight severity, has been previously experienced.

There may be an initial chill or rigor, but this is not constant. The cardinal symptom which is complained of is abdominal pain, and generally it sets in suddenly and is very severe. Dr Samuel Fenwick states that of eighty-five cases collected by him, in sixty-three pain was the first symptom. (Lancet vol ii 1884 p. 1039). The pain may make its appearance from the outset in the right fossa iliaca or it may be at first diffused over the whole abdomen. Sometimes the hypo-gastrium is most complained of: or as so frequently happens in abdominal diseases, it may be referred to the region of the umbilicus. It may even occupy the epigastrium or the left iliac region. The pain may radiate into the testis, the groin and perineum, and the thigh.

Very often the pain is accompanied

or rapidly followed by vomiting. It may be very slight, or may become a marked and very distressing feature. Food and medicine being persistently rejected, and it often assumes a Stercoraceous character.

The tongue generally becomes furred, dry, or glazed. The bowels may be confined, or, less frequently, they are relaxed. Rectal tenesmus is but an uncommon feature, and is often accompanied by frequent painful micturition, resulting in the passage of only a very small quantity of urine. The pulse is rapid and instable, and remains so, even if the symptoms appear appears to amend. The temperature shows no constant degree of elevation. It is rarely high. Usually it stands at 100°. or 101°. Sometimes it may reach 103°. or it may stand at 99°. In cases in which collapse rapidly occurs the temperature may be depressed below the normal: but even when this is not the case, it frequently sinks to a normal or subnormal level, generally after a period of greater elevation, and

during the continuance of the disease.

Tenderness on pressure soon presents itself, and is usually but not always, most marked in the right iliac or hypogastric regions. It may be generally diffused over the abdomen, and is sometimes very severe, the slightest touch eliciting acute pain. The situation of the maximum tenderness on pressure is a valuable aid to diagnosis for it may be localized in the iliac region, while the pain is referred to some other part of the abdomen.

M: Burney of New York has pointed out that in adults, the point of greatest tenderness to pressure in these cases, (a single finger being employed) is situated between an inch and a half and two inches on a straight line drawn from the anterior superior spinous process of the ilium to the umbilicus. The determination of this point he regards as being pathognomonic of appendicitis. (New York Medical Journal Dec: 21st 1889 and Braithwaite Retrospect I 1890)

Stimson confirms M: Burney's observation, but is disposed to limit

its use to the earlier stages, before the abdomen has become tense, and before the formation of a large abscess. He finds also that in some instances, the point may be somewhat lower down or cover a wider area than D. M. Bunney indicates. (New York Med. Journ. Oct. 25th 1890. and Philth. Retrospect I 1891. Taken in conjunction with other signs, this one may prove a valuable aid to differential diagnosis.

The abdominal muscles over the right iliac fossa are usually rigid. The rigidity comes on at an early period, & can be clearly distinguished as being much more pronounced than over other parts of the abdomen. Frequently the abdomen becomes distended and tympanitic. When the disease leads to general peritonitis the whole abdomen is distended; when only a localized abscess is formed, the lower abdomen only is distended, or there may be only fulness over the iliac fossa or hypogastrium. According to M. Bunney (loc. cit.) abdominal distension is no measure of the relative severity of the case. It may be marked in a mild case, & slight or early absent in a very bad one.

At some period of the case, tumour is usually to be made out. In the earlier stages, and in those which proceed rapidly to a fatal issue, there may be only an undefined sense of resistance. In those of longer duration it gradually becomes more perceptible. When present, it may give rise to dulness on percussion, but this may not be easy to make out on examination, for the intervention between it and the anterior abdominal wall of a coil of intestine containing air may give rise to a tympanitic note. In many cases the tumour is to be detected by an examination per rectum, or per vaginam. The administration of an anaesthetic is generally necessary to the satisfactory accomplishment of such an examination. Fluctuation is rarely to be made out, except in cases of long continuance: it manifestly is largely dependent on the depth of the abscess from the surface, and on what lies between. The tumour is found on subsequent examination to be very variously constituted. Sometimes it is composed of a mass of intestines, matted together by lymph, and enclosing pus. Sometimes a distended ruptured

appendix forms the tumour - In a case of Mr Rumsey's it consisted of such an appendix enveloped in folds of thickened omentum.

The characters of the disease vary a good deal, according as it leads to general peritonitis, or to a more localized peritonitis ending in abscess - In the former event the signs of general peritonitis rapidly supervene, and the local origin is frequently quickly obscured by the general severity of the disease. The first fixt signs of abdominal disease may be rapidly followed by profound and even fatal collapse. But, as was pointed out by Laudet, one of the first to make an exhaustive survey of the subject, (Archives Générales de Médecine 1859 tome XIV) general peritonitis is the rarer event - rarer than in perforations of other parts of the intestine - Collapse may follow as sudden and as fatal as that which follows the perforation of a gastric ulcer: but usually the process of ulceration which precedes rupture proceed so slowly that a certain amount of adhesive and conservative peritonitis is set up, which may shut the damgerous spot off from the general peritoneal

cavity, and so ward off the more rapidly lethal result. In addition, the dependent position usually occupied by the appendix is not favourable to the rapid diffusion of any faecal matter it may contain throughout the peritoneal cavity; and moreover the contents of the bowel at this point are less irritating than, say, the contents of the stomach, and at the same time usually of more consistence. Thus it is not an unknown event for a perforation to be found, plugged by a hard faecal mass, which in turn prevents a diffused peritonitis. But it is the presence of limiting adhesions which constitute the greatest safeguard.

Localized peritonitis, tending to suppuration, is thus the commoner event, and when that is so, the case is longer in duration, and the evidence all points to the iliac fossa as the chief seat of the mischief. Signs of peritonitis are indeed present, but the tenderness in that region is more pronounced; tumour or sense of resistance gradually becomes more and more palpable, and it may be felt for rather to occupy a fixed position in the direction of the caecum. Fluctuation

may be detected, as the general signs of suppuration begin to show themselves.

The patient lies on his back usually keeping his right thigh flexed, and objects to have it extended. Often, especially in children, it is maintained rigidly in a flexed position. It is seldom that there is to be seen any evidence of suppuration over the in the condition of the integuments over the tumour. Yet this is sometimes the case. In a case reported by Godlee to the Clinical Society of London† the position of the abscess was very clearly defined by a reddened area on the skin over the caecum. And in another, a similar red spot appeared in a similar situation, and extended with such rapidity to the axilla, that erysipelas was diagnosed, and an attempt made to stay its progress by painting the skin with nitrate of silver solution.

In a certain proportion of these cases, either from some unhappy accident, or from injudicious treatment, the frail newly-formed adhesions are broken down, and the circumscribed peritonitis is quickly turned into a general peritonitis, and the patient

† Godlee. Lancet. vol ii 1885 p. 1143.

rapidly succumb from collapse or the general severity of the disease.

Such, Helier, was the course taken by the first case which came under my notice (Case I) The patient was a medical man aged 32. He had an irritable digestive system, and was of confirmed habit and a martyr to all the manifestations of dyspepsia. Coming suddenly into an active practice, and very rapidly achieving reputation and success, he had been working very much above his physical powers, which were not at any time of the most robust.

One evening, when playing tennis, he was suddenly seized with acute pain in the abdomen. He immediately limited home, & when seen, was found writhing with pain, which was general over the whole abdomen, but most severe in the umbilical region and was of a colicky nature. He presently vomited several times. A hypodermic injection of morphia, followed by some morphia and belladonna in full doses by the mouth, allayed the pain & he passed a fairly comfortable night. Next day he seemed better, the symptoms were somewhat

ameliorated, and although the abdomen seemed unduly resistant in places, his temperature was almost normal, and really there seemed but little ground for apprehension. He himself inclined to the belief that the attack was merely one of ordinary colic associated with constipation, from which he had frequently previously suffered. Accordingly, on his own responsibility, and in the absence of his attendants, he got a servant to administer a dose of castor-oil.

The effects were almost immediately disastrous and lamentable. The pain returned with increased severity: the castor-oil did not move the bowels, but the vomiting was reproduced. The temperature rose to 100° and over the right iliac region a very definite hardness and fixity of the muscles became apparent. On the morning of the third day of the illness the temperature was 102°. The face had assumed a pinched and peritonitic aspect. His pulse was rapid and tiny: the abdominal pain and tenderness were marked. He was manifestly very ill.

Still none of the medical friends who were in attendance on him suspected that anything in the way of immediately fatal illness was imminent. All that we could say was, that he had a bad attack of pericarditis, which apparently had its starting-point in the right iliac fossa, and as his general state of health was not such as for that to be regarded without much anxiety. But we had all seen patients in much more plight recover. I left him at 10. a.m. in charge of a medical friend, and returning about three hours later, I was horrified to find him in a state of profound collapse. It appeared that about an hour after my leaving him, the vomiting was renewed, and he complained of severe abdominal pain: shortly afterwards the first initial signs of collapse showed themselves. When I saw him he was practically moribund. The face was pale & clammy with perspiration: the pulse extremely rapid and feeble: the extremities cold and already becoming cyanotic: the intelligence fast waning.

Energetic stimulant measures had, of course, been resorted to from the first moment, and were persisted in as long as a chance of success remained. Death occurred about six hours after the first appearance of the collapse.

Not till afterwards did we learn that some months before, he had had a severe attack of pain in the abdomen which had necessitated his giving up work for several days, and that he had resumed practice while the pain was still actually present.

No autopsy was made: but I think that the facts related justified the diagnosis of perforation of the appendix, and that the sudden fatal result may very possibly have been due to the breaking down of recent adhesions: with the escape of purulent or faecal matter into the general peritoneal cavity.

This sad case is but an example of a type, in which, before the fault is but half suspected, the insidious course is suddenly interrupted by a violent outbreak, and the patient is placed beyond the reach of help.

A very similar case is related in

the Medical Times and Gazette (vol. ii 1870 p. 497) In that case the initial symptoms were those severe, and pointed more distinctly to the fossa iliaca as the seat of the malady. After a period of apparent amelioration, the patient was allowed by the nurse to turn the right side. An immediate relapse followed, and death ensued twelve hours afterwards in a condition of collapse. The autopsy showed general peritonitis, most marked around the caecum, and an appendix which had sloughed almost entirely. Near it was found a concretion and a quantity of faecal matter.

Such terminations, however, are fortunately by no means general. The abscess, walled in by protective barriers of lymph from the general cavity of the peritoneum, may be developed on its own lines, without the intervention of a diffuse peritonitis. In that event the signs of continued suppuration become apparent. There is fever of a hectic kind, with nocturnal exacerbation, and general debility and emaciation.

An occasional feature, which in

a doubtful case may prove of value for diagnostic purposes, is the occurrence of parotid bubo, which may either resolve again, or proceed to suppuration and add a complication of its own. The abscess may burrow and finally open into some adjacent part of the intestine - the caecum, the colon, the ileum, or the rectum, and its contents being thus evacuated, a spontaneous cure may result - It may burrow behind the ascending colon in the cellular tissue, following the layers of the meso-colon: & even, peritonitis the diaphragm, lead to pleurisy and pneumonia - It may descend into the pelvis; or if, as may happen, the appendix be situated either in the pelvic brim, or in the pelvic cavity, the abscess may be pelvic from the first, and may discharge into the bladder or vagina, or may burrow extraordinarily & still through the rectum - And finally the abscess may attack the abdominal parietes, making its way through the anterior abdominal wall: or burrowing into the

substance of the psoas and iliacus muscles, it may appear from under Poupart's ligament, like an ordinary psoas abscess. It may even infiltrate the muscular layers of the thigh, or penetrating the ileum, give rise to abscess of the hip-joint.

In a case which recently came under my notice a good many of the points above referred to were illustrated, and as it is a remarkable one, I venture to give it somewhat in detail - (Case II). The patient, Owen K. aged 11, came under observation on March 8th of the present year. He was a healthy lad, and had been in robust health until his illness began, with the exception of a mild attack of scarlet fever, from which five years before, from which he recovered very well.

Three days before I saw him he had been playing football in a cold wind, & there was a somewhat doubtful account of a blow or kick in the abdomen received during the game. Next day he appeared out of sorts, and complained of slight pain in the lower part of the abdomen. An aperient was administered which moved the bowels naturally, but

the pain persisted, and he began to vomit occasionally - When I saw him he did not at first sight appear very ill, but the pain, although not very severe, was quite marked in the right iliac region and the hypogastrium, and there was tenderness on pressure in these situations. Over the right iliac fossa the abdominal muscles were somewhat contracted and tense. No tumour could be made out, nor was any dullness on percussion to be found anywhere. The tongue was furred thickly: vomiting was pretty frequent and the rejected matters consisting of food mixed with a greenish bilious fluid. The temperature was 100°, the pulse 120. Next day the condition was similar, with the addition of a new feature in the shape of frequent and painful micturition, the very little urine which was passed being loaded with urates. There was also rectal tenesmus. The frequent movements of the bowels being accompanied by much pain and straining. The pain & tenderness had become more pronounced: the temperature still was 99.4°. The changes for the first few

days were not marked. The pain and tenderness gradually extended toward the left iliac region, the abdomen became moderately distended, especially the lower part. Presently the vomiting ceased: the vomiting became less frequent and gradually finally disappeared. The temperature, never rose over 101°, was often 99°, was sometimes normal. The pulse however remained quick and incessant, varying between 120 and 130.

Although there was thus some improvement in the general symptoms, the pain also being less complained of, there was no diminution in the size of the abdomen; there was more pronounced tenderness in the right iliac fossa, and a sense of resistance, at first very ill defined, began to be experienced there. After frequent examination, slight dulness was detected, most marked just above Poupart's ligament. The signs, in short, were beginning to localize in the iliac fossa. Towards the end of the second week, a new feature appeared in the shape of pain and swelling behind the angle of the lower jaw on the left side. A painful lump formed

but fortunately did not proceed to suppuration. By this time, the swelling & hardness in the iliac fossa were clearly marked: and a little fluctuation could be made out. The little patient began to lose flesh and strength rather rapidly. I therefore explained my views of the case to the parents, and urged the necessity of operative interference.

To my dismay - for I took a bad view of the prognosis - the proposal was absolutely rejected, and by way of compromise, a consultation was arranged with my friend Mr Dyson of Sheffield. On the afternoon of that day, however, I was hurriedly summoned. I found the boy had been seized with a sudden fit of coughing since I had seen him earlier in the day, & that what he was spitting up was chiefly pus with a marked faecal odour, which was continually welling up into the mouth and being spit out. The pulse had become extremely rapid and feeble, the temperature was 102°: the expression very anxious, and the face pale and somewhat inclined to the cyanotic. The general condition was so

alarming that I did not venture to make any exhaustive examination of the chest, till Dr Hoobler had rallied somewhat. Free administration of stimulants achieved this; and when I saw him a little later with Dr Byron, we found dulness over the whole base of the right lung, with bronchial breathing and abundant crepitation. We agreed that the general condition was such as to preclude any possibility of successful operation, and we entertained the worst fears of the result.

For the next 24 hours the situation was very critical, but at the end of that time there was a free evacuation of the bowels, quickly followed by a second and a third, and with this the iliac tumour began rapidly to diminish in size. It is noteworthy that, from the end the first week of the illness the bowels had acted with trouble, and that the faecal matter had been fairly firm in consistence. Now however the evacuations were fluid, with a few scybalous masses, and rather resembled typhoid stools in colour & general appearance. After the lapse of a few days, the abdominal

distension had wholly disappeared. While the ileus swelling gradually dwindled away, till it came to be represented only by a hard lump of the size of a walnut. It was evident that the original abdominal trouble was tending to improve. The temperature however was still persistently elevated, the pulse rapid. There was still dulness over a wide area of the right lung: fluid in. sounds could be heard in places, and the same purulent material was coughed up. For two weeks the issue was doubtful; but very gradually - almost imperceptibly - improvement set in. The expectoration became more tenuous, and less purulent: it had lost its odour. & its quantity first diminished: then it ceased entirely. The temperature first showed a downward tendency, & finally became normal, and remained so; the tongue cleaned, & the appetite improved. The pulse improved in strength, but its frequency was longer in disappearing. For several days it remained 110, but at last it also returned to a more normal character. The lung began to

to clear somewhat. and, in short, the patient began to be convalescent & the to put on a little flesh. At the date of writing the improvement continues and I have every hope of his restoration to health.

In a case such as that narrated, where recovery ensues, there is always room for speculation and difference of opinion, for there is no means of checking clinical observation by post-mortem examination. The existence, however, of appendicitis

Note - Case of Owen. K. The subsequent progress of this case has been entirely in the direction of recovery. There is still at this time (April 28th 1892) some resistance to pressure experienced on ~~pal~~ palpating the right iliac fossa, but considerable pressure fails to elicit any pain. There are no chest-symptoms, although a certain degree of dulness is still to be made out at the base of the right lung chiefly in the axillary region. The appetite is restored, & the improvement in strength & general appearance is very marked.

medical literature. Fenwick (Lancet vol ii 1884 p. 1040) reports a case where a minute opening, resulting from the perforation of such an abscess, existed for many years in the vagina. It gave rise to a purulent discharge, and was finally closed by the galvano-cautery.

In the Medical Times & Gazette (vol. i) for 1862, is the report of a paper containing analogous cases, read before the Royal Medico-Chirurgical Society. In one of these the abscess burst externally over Poupart's ligament discharging pus and faeces.

Another series collected by Moore (Lancet 1864 vol. ii) show similar events. In one of these quoted from Shaw in Transactions of the Pathological Society for 1858, the abscess was in the scrotum where the appendix occupied a hernial sac. Another reported from Rindon Bennett, resulted in burrowing between the anterior abdominal muscles and the peritoneum, the pus ultimately being discharged in the left groin.

In a third case the abscess perforated the iliacus muscles, and extended through the muscle of the thigh to the knee, causing inflammation of that joint.

And in a fourth the hip-joint was gone into, leading to prolonged suppuration and ungluit disease.

An occasional, though rare termination is the occurrence of pyaemia, with pylephlebitis and abscess in the liver and mesenteric glands. It is pointed out by Fenwick that this is usually prevented by the abscess cavity being shut off from the liver vessels by the effusion of abundant lymph. Such a case is reported by Ashby where the liver contained several large secondary abscesses, the spleen was enlarged, congested, and there was in addition pyaemic endocarditis. (Lancet 1879 vol ii. p. 649) A similar case is reported by Robinson, where a soldier of the Scots Guards died of abscess following perforation of the appendix, with pyaemic symptoms. An abscess was found in the liver and in several of the mesenteric glands (Lancet vol i. 1885. p. 333). +

A still more uncommon event is ulceration into the internal iliac artery and death from haemorrhage. A case is recorded by Habershon, however. (Diseases of the Abdomen p 324)

In nearly all such cases as have been described the Appendix is

+ See also Colquhoun. Lancet vol ii 1887 p. 607.

formed on subsequent examination to have been the starting-point of the mischief.

Fitz, from the examination of a large number of cases, comes to that conclusion (International Journal of the Medical Sciences no. CLXXIII. 1884); and Sir Dyce Duckworth, dealing with the cases occurring for a long period at St Bartholomew's Hospital, was unable to find any that had originated otherwise. (Lancet vol. II 1888 p. 653). In a large number a faecal concretion or a gall-stone or some other foreign body - as a stone or seed of fruit or a pin - is found to have been the initial cause of the trouble. But even where no such cause is discoverable the appendix is perforated, gangrenous or even sloughed off from the caecum, and around it is pus and faecal matter in greater or less quantity. The appendix may also become ulcerated through disease with mucus: its outlet being obstructed by contraction of its canal, or by the organ being twisted on itself.

The appendix in man is nearly a functionless organ: from an evolutionary standpoint it may be regarded as the degenerate representative of the large caeca of some vegetable-

feeding mammals. Its blood supply is not abundant, while its cavity is adapted for the collection and retention of any pathogenic micro-organisms that may be carried in the intestine. These considerations, among others, may serve to throw light on its liability to catarrh and ulceration.

But the disease also presents itself in much milder shape. The symptoms in general are those which appear in the more serious variety, but they are not so pronounced. The pain may be sudden in appearance, but is usually not so severe and it does not extend to more distant parts, nor is it usually referred to other parts of the abdomen than the iliac fossa. Micturition and defecation are not interfered with. There are no rigors, and the vomiting is not so severe. While there is tenderness on pressure it is not so marked, and the tumour is said to be quicker in appearance and less fixed: (Trans. British Med. Journ. vol. II 1889 p. 1030 et seq.)

It must be confessed however that the difference in symptoms is

rather one of degree than of kind: and that there is very little in the mode of onset to distinguish the more benign form, in its inception, from that which will end in the most pronounced grade of appendicitis. Case I previously related, as well as the case of Owen K. (Case II) both began with symptoms which one would naturally associate with the less severe kind. It is only by the subsequent course that the distinction is to be drawn: the milder form resolving itself in a few days and leaving no trace, or but little, of its presence.

Such a case presented itself to me sometime ago. (Case III) A bright lady, aged 36, was seized suddenly in the night with pain in the right iliac fossa. She was habitually constipated, but had never suffered from any trouble affecting the uterus or its annexa. She had however some years before, experienced a somewhat similar attack to that of which she then complained. The tongue was dry and furred: she vomited pretty freely and frequently: the temperature rose from 100° to 101°.5 and the pulse was

was rapid. Over the iliac region there was considerable tenderness on pressure and the abdominal muscles were contracted. Remembering the insidious commencement of my first case (Case I) I watched this one with anxiety, but in the course of a few days, the condition began to ameliorate. The temperature fell: the pulse resumed its normal frequency and the contraction of the abdominal muscles gave way. She had rather a tedious convalescence, some tenderness and a sense of weariness remaining in the iliac fossa for over five weeks, whilst now and then. She had some pain in the same region as movement. She ultimately recovered perfectly. But when last I heard from her some six months after her illness she had still occasional pain.

These are the cases which lead to the primary difficulty in the differential diagnosis of the affections of this region. A large number - the majority - are due to a local peritonitis over the caecum, owing its origin to the accumulation of faecal matter in the

caecum itself and consequent cellular and glandular - a stercoral ulcer. the Typhlitis Stercoralis of German writers - But in a certain proportion the trouble is due to disease of the appendix, as pointed out by Treves (loc. cit.) giving rise at first to mild symptoms and subsiding spontaneously without suppuration or general peritoneal involvement A patient of Mr Treves' had fourteen such attacks, and subsequent operation showed diseased appendix, but he has recovered. Gairdner (Medical Times and Gazette, vol II 1884, p 398) gives the opinion that there is no good reason to suppose that the cases which terminate fatally differ essentially from those which do not - A patient of his suffering from pleurisy was attacked with the symptoms of Typhlitis & recovered After death from other causes the appendix was found perforated, and outside it was a small abscess which contained faecal masses. He thinks that in such cases the adhesive changes proceed so quickly as to forestall & prevent the more serious results of perforation. Fagge (Practice of Medicine

of Medicine vol ii p 173) relates an almost exactly similar case.

The difficulty in practice is that we cannot distinguish those which are going to become troublesome from those which will presently resolve. Where there is a history of a previous similar attack, or of several such, I think we may with reason incline to the former supposition. But sometimes the question resolves itself into one of waiting, and of individual clinical tact and skill. Smith of New York. (London Medical Records 1881) says that by the end of the second week the distinction can usually be drawn, and that is all that can be said when one is willing to accept the dictum of the more advanced school of abdominal surgeons, and cut the Gordian knot in a doubtful case by exploratory incision.

Closely allied to these doubtful cases is the third variety - the relapsing form. Here the primary attack may be moderate in severity and is recovered from, only to be followed by others of increased severity. A handsome

or tumour may persist from the first attack as in a case published by Mr Teale (British Medical Journ. vol. i 1891 p 110). There is often persistent constipation, and frequently the attacks recur in spite of the greatest care, so that the patient becomes a chronic invalid. Mr Teale's patient had four attacks, and was finally cured by excision of the appendix. Treves is of opinion that the condition is due to disease of the appendix, which does not go the length of producing suppuration. In a case of his (Lancet vol i 1889. p. 267) the cause of the trouble was an enormously thickened and distended appendix, filled with mucus. This he thinks is the usual pathology. The appendix is twisted on itself, or its connection with the caecum is obliterated by contraction following an ulcer; or occasionally the attacks are produced by the presence of a foreign body. (British Medical Journal 1889 vol. ii p. 1061.) There are numbers of such cases reported, in which upon ~~the~~ exploration has discovered a mass of matter such as described by Mr Treves -

A disease so varied in its manifestations is sure to give rise to frequent possibilities of error in diagnosis. There are a number of affections which Appendicitis may simulate, or which on the other hand may be mistaken for it.

Often the signs are so clear as to leave no room for doubt, but there occur cases in which the exercise of the utmost diagnostic ability may fail to unravel them, and which even exploratory incision may fail to clear up. Each case, indeed, presents its own particular difficulties and doubtful points, and whilst in some it may not be urgently necessary to come to an immediate solution, and we can afford to wait the course of events, yet if we suspect a disease, in which the progress from apparent security to the most grave issues is but a step, we must always feel uneasy till the doubt is determined. This anxiety is the greater when questions of treatment, and more particularly of treatment involving surgical procedure, hang on the decision.

This question of differential diagnosis is a very wide one, involving

as it does the consideration of a number of very different affections.

The full discussion would be, in effect, the discussion of the differential diagnosis in abdominal diseases. It will be sufficient here to indicate the chief conditions which may cause confusion, and which must at least be kept in mind in coming to a decision.

The most ordinary difficulty I have already alluded to. A simple typhlitis, due to local peritonitis over the caecum may be, at first, indistinguishable from the initial results of disease of the appendix. As I have before remarked, in their commencement the symptoms are similar, only differing in degree - disease of the appendix being usually attended with graver appearances from the first. Yet even this is by no means invariable. The graver form may exhibit itself mildly, or the reverse may be the fact. One of the cases reported by Fitz exhibits this character. A sailor who after his death was discovered to have a perforated appendix, did his work during twelve days before entering the hospital.

If speedy resolution occurs we may presume that we have to do with a simple typhlitis. When the case assumes a grave aspect; or when the signs - especially the tumour, if present, are now in disappearing, we may suspect appendicitis in some grade.

It is pointed out by Habershon (Diseases of the Abdomen p. 327) that local peritonitis or even suppuration may follow an injury in the iliac fossa and may at first give rise to doubt.

While the distinction may not be easy to draw at first sight, as time goes on the true cause of the local affection, with absence of the more pronounced signs of appendicitis will permit a decision to be made.

Such a set of circumstances will however, give rise to anxiety, because we know how frequently a true appendicitis is associated with a history of injury. Indeed, Habershon relates such a case further on (p. 349.)

Spinal disease with suppuration has been mentioned as likely to give rise to doubt. It is possible that a very chronic case of abscess from perforated appendix might be so

mistaken: and I have note of a case in which a very chronic and neglected empyaema, gave rise to spinal abscess and then, following the course of the psoas muscle, to abscess in the iliac fossa. In default of a clear history, the error might possibly have been committed in that case. But usually the careful examination of the patient & consideration of the history will solve the difficulty. In a case of appendicitis there would be nothing peculiar to the spine: while in the reverse case there would be nothing to indicate intestinal disease. An abscess resulting from caries of the ilium, or disease of the sacro-iliac joint, might possibly lead to greater difficulty.

The possibility of confusion with Hip-disease has been noted by various authors. The error is specially liable to be committed in the case of children. It arises in such cases in which the thigh is partially flexed - as it often is in such cases - & where extension gives rise to pain. But although there is pain in extension, the limb is capable of painless rotation, and the trochanteric major is in its proper relative

position to the pelvis: there is no obliteration of the pleated fold, or of the fold of the groin, so general in early hip-disease; and a case of appendicitis which has advanced to the degree of simulating disease of the hip, will almost certainly give rise to distinct swelling and tenderness in the iliac fossa.

More important, because usually more difficult to discriminate are the intra-abdominal conditions which give rise to doubt.

Certain conditions connected with the right kidney may possibly lead to error. The pain accompanying the passage of a renal calculus may in a person who has not previously suffered in that manner, or whose history is unknown, be confounded with the pain arising in appendicitis. Both would give rise to pain on the right side, spreading downwards into the testicle and scrotum and right thigh, to a certain amount of vomiting and retching. Both are apt to be distinguished by a sudden onset.

The error is not, however, likely

to prove of long duration. In the case of appendicitis, the localisation of the pain in the iliac fossa, & the condition of the temperature would soon lead to suspicion of the true state of matters, while an examination of the urine would probably give some hint as to the existence of renal calculus.

In certain exceptional instances appendicitis may be confounded with abscess around the right kidney Mr Treves has shown in his Lectures on the Anatomy of the Intestines. (British Medical Journal 1885) x that it is not unusual for the appendix instead of lying in its normal position, behind the termination of the ileum and pointing towards the spleen, to assume a position which carries it upwards vertically behind the ascending colon; & that in such circumstances it may even come almost into relation with the liver and gall-bladder. When appendicitis occurs in an appendix thus placed, it might present appearances very closely resembling a perinephritic abscess

x p. 527.

Such an abscess has been known to
open in the human vagina, and supposing that no alteration in the mind took place, the condition might be well-nigh impossible to distinguish.
A case quoted by Talamon (La Médicine Moderne vol. j 1892 p. 31) shows that even exploratory incision may fail to clear up so perplexing a set of circumstances. In that case the patient was seized suddenly with a pain, first severe under the right costal margin, quickly followed by signs of collapse. There was extreme tenderness over the right side of the abdomen, but the fact and tenderness diminished as the iliac fossa was approached. Laparotomy was done without result, no disease again being discovered. At the autopsy - the patient having succumbed - a perforated appendix was found, which had given rise to a small abscess. The appendix, abnormally long, ran directly upwards behind the caecum and colon.
In such a case as this one might easily refer the

symptom to some affection of the liver; and indeed an attack caused by the passage of gall-stones might at first sight be confounded with commencing appendicitis. Where the appendix is normally placed a few hours should make the distinction clear. The pain in Hepatic colic is usually complained of chiefly in the hypochondriac or epigastric region, radiating to. round the back, and the shoulder.

The pain of an appendicitis, if it radiates at all, strikes rather towards the perineum and thigh.

Then again the localization of the pain in the former disease, - pain tenderness, rigidity of muscles & tumour, would point out the existence of appendicitis - In any event, as in the case of renal colic, the doubt would not be permanent beyond the early period of the illness.

Still more important is the very possible confusion with intussusception or some form of intestinal obstruction. A sudden violent attack of pain - very often

referred to the right iliac fossa: severe vomiting, becoming stercoraceous: obstinate constipation; collapse: tenderness with partial suppression of urine: and the presence of a tumour, one sign, which may be observed in either affection.

The confusion is still more confounded in those cases, in which the ileo-caecal valve or the intestine in its neighbourhood, is the seat of inflammation. Here both pain and tumour are in the iliac fossa, in the position they might be expected to occupy were the case one of appendicitis.

It is particularly in the cases where a sudden perforation induces general peritonitis that the difficulty arises; and, as a matter of fact, the error has frequently been committed. Several such cases are referred to by Talamon (loc. cit. p 15) in which laparotomy was performed for a supposed strangulated ileus, the case turning out to be one of Appendicitis. The differential characteristics mentioned by various authors are somewhat vague.

Tennick (Lancet 1884 vol. ii p 1041) says that in strangulated hernia vomiting and constipation were severe: the human bowels, more defined, less tender - all signs manifestly liable to more illusory: the passage per anum of blood or mucus, also mentioned by Tennick - would certainly relegate the case to the category of intussusception. The condition of the temperature gives no certain indication, because, although it may be certainly raised by the peritonitis following perforation, it is as often as not lowered to the normal point or below by the attendant collapse. Talamon regards it as only of value in those cases in which the signs of obstruction coexist with a localised peritonitis with suppuration. He thinks that in such cases the existence of a high temperature, rising in the evening, and taken in conjunction with the other circumstances described, may fairly lead to a correct diagnosis. The signs on which he is most inclined to

place reliance in the acute cases is the presence or absence of distension of the abdomen. In strangulation, he says, meteorism is always marked: in peritonitis from perforation, on the contrary, the abdomen is lax and rigid through the contraction of the abdominal muscles.

In any case, the decision is an anxious one, as in any doubtful abdominal case; and more particularly in view of surgical treatment. While abdominal section is equally indicated in either event, the procedure to be adopted if appendicitis be diagnosed is very different in its methods from that which one would adopt to make search for strangulated or invaginated bowel.

It would appear at first sight as though no confusion were possible with typhoid fever. In ordinary well-marked cases the slow invasion, the typical temperature-curve, the characteristic diarrhœa, the enlarged spleen and lastly the typhoid eruption would leave no doubt existing. Yet in certain atypical cases the abdo-

Lancereaux - In a sub-acute case of appendicitis the iliac pain and tenderness with either relaxed or confined bowels, the temperature rising in the evening, and the patient losing flesh, might very well lead to the suspicion of typhoid fever. Such a case is quoted by Talamon (Loc. cit. p. 28) where in the presence of high temperature constipation, abdominal pain & tenderness, and occasional vomiting, the patient - a child - was supposed to be suffering from appendicitis. An operation was proposed, but rejected by the family. An expectant treatment resulted in the relief of the constipation, and the disease turned out to be typhoid fever, with an ordinary course, and a characteristic eruption.

A case where appendicitis simulated typhoid fever is reported by Ward (Lancet vol. i 1864). The matter is complicated by the fact that disease of the appendix is not altogether a rare event during or after typhoid: and might be taken for a relapse of the original disease. In a case reported by Symonds to the Clinical Society of London

(Lancet vol. i 1885 p. 895) the patient suffers from recurrent attacks of appendicitis after recovering from typhoid. I was cured by removal of a calculus which was formed in the appendix.

The subacute form of appendicitis - particularly, according to Talamon, when it assumes the recurrent type - may be mistaken for tubercular peritonitis. There is a strong similarity in the signs. The patient becomes gradually emaciated, the abdomen is enlarged, and there is fever and tenderness about it, often limited to the hypogastrium. dullness on percussion may be made out. a nodular mass may be discovered which may easily be taken for the tumour in appendicitis. The temperature is elevated, especially at nights; and now and again, there are severe attacks of fever and rigor, which may simulate very well the relapses of recurrent appendicitis. The condition of the bowels, sometimes relaxed sometimes constipated would give no definite information. Here again the diagnosis may be most difficult.

The chief point to be ruled is as to a careful consideration of the history of the case: the absence and presence of tubercular disease; if there be dulness, the altitude of the line with the limits of the patient. Rectal examination would give a negative result. The pain and tenderness would probably be more generally diffused, not localized in the right iliac region. It is in such cases that the sign referred to by Mr. Murray, if clearly made out, would be most useful. Of course, the discovery of the signs of pulmonary tuberculosis will have a most important bearing, but at the same time it must not be forgotten, that, as pointed out by Timmick, disease of the appendix is by no means uncommon in phthisis. (Lancet vol II 1884 p. 987 et seq) In such cases there is usually perforation diarrhoea, and there are but slight symptoms pointing to the appendix, the pain and swelling being but slight. In phthisical subjects the process of ulceration of processes so slowly

as to give ample time for the occurrence of evident proofs of consecutive adhesion.

The results of tuberculous ulceration of the caecum itself, or of the ileum, would be impossible to distinguish during life from those due to ulceration of the appendix.

Cancer of the caecum, or of the ileo-caecal valve, is another disease which it may be very difficult ~~even~~ to distinguish from the subacute form of appendicitis, & the mistake is the more likely to occur, when it happens, as it sometimes does in young subjects. Two such cases are given by Habershon (Diseases of the Abdomen pp. 358-9). The diagnosis may be still further drawn by the occurrence of actual perforation and abscess - The occurrence of vomiting, of local fever, of pain, tenderness, and tumour in the iliac fossa might be due equally to either affection; and in the young subject would probably be referred to appendicitis; while in the case of an older patient, over 40, in whom malignant disease is as likely as appendicitis would be ~~most~~ unusual, cancer would probably be diagnosed - In a good many

cases, a history can be got of the existence of a painful tumour, small at first, but gradually increasing in size & situated in the ileo-caecal fossa; and this history, which is not altogether that of the development of tumour in appendicular disease, may, perhaps, coincide with the appearances of the patient, leads to the suspicion of malignant disease - On the other hand, it would quite easy to make this opposite error, and diagnose cancer when the disease was really appendicitis. The occurrence of secondary tumours in this situation - as in one of Haberkamp's cases would be the most certain indication of the nature of the case, but obscure would only be a late symptom.

Perforation of the intestine in this situation than the appendix may give rise to symptoms so closely resembling those observed in appendicular disease, that the distinction may be well-nigh impossible during life, unless the case has been under observation previously, and the precedent condition recognized; or the whole history is available a clear and distinct account of what has

gone before. Exploratory incision may fail to reveal where the mischief lies. A series of very instructive cases of this kind, is published by D. H. W. J. Mackenzie (Lancet vol. II 1888 p.p. 1061. and 1117) In two of these cases, which after death turned out to be due to duodenal ulcer, and in a third, in which there was perforation of the gall-bladder, the features due to might well have been ascribed to appendicitis. Perforation of the lower part of the ileum would lead to similar error, and any hitting diagnosis would probably fall in with the possibility of either affection.

In these very difficult cases the chief dependence must be placed on the previous history of the case if it be obtainable. It is the acute forms of appendicitis which are most apt to be mistaken by the perforation: in the more lasting cases, the absence of pain in the iliac fossa, and the negative results of examination per rectum, might at any rate, permit of appendicitis being excluded.

Acute diagnosis in case of chief importance from the point

rise of surgical treatment. The surgeon who has opened the abdomen, expecting to find a diseased appendix which does not exist, will be confronted with the alternative of giving up the quest or of undertaking a delicate and probably arduous investigation into the real cause of the illness.

In the female, appendicitis is comparatively rare, as appears from Tennick's statistics: (Lancet 1884 vol II p. 989) but when it occurs in a patient of that sex, it may be confounded with many of the various pelvic disorders. The frequency of these latter, would certainly direct suspicion towards them in a doubtful case. M: Treves investigations on the Anatomy of the Intestines show that both the caecum and appendix may sometimes become pelvic organs, and lie in contact with the uterus or bladder: and even when the caecum is normally placed, the appendix, either from unusual mobility or extraordinary length, may hang over the brim of the pelvis, or actually reach into its cavity. Here it may contract adhesions to various pelvic organs, the bladder, uterus, ovaries, & Fallopian

tubes. An appendicitis occurring in an appendix so placed would infallibly give rise to symptoms and physical signs, which would be confused as indicating disease of some pelvic organ. Cf. these pelvic disorders. Confusion would be most probable in the case of pelvic cellulitis. Both diseases indeed might give rise to almost precisely similar symptoms, which the information gained by vaginal and rectal examination may not help much. The history of the case would form the safest guide. An account previous pelvic disorder, or of recent parturition or other known cause might relegate the case to the category of cellulitis. More dreaded even is the possible confusion with salpingitis such as case is quoted by Solomon (Medicine Medicine vol i. '92. p. 31) where a case which had been diagnosed as salpingitis was found on exploration to be due to a diseased appendix, adherent to the right Fallopian tube.

Chronic inflammation of the right ovary is not likely to give rise to much doubt, of a lasting kind.

But in those rare cases in which there is acute inflammation or abscess of the ovary, the diagnosis may be impossible. Such a case - a very remarkable one - is given in detail by D. H. W. J. Mackenzie (loc cit. p. 1116) the appearances dressed might well have been attributed to appendicitis. At the autopsy, however, the origin of the mischief was found in the right ovary, which had contained an abscess, and had set up an acute peritonitis. peritonitis rarely occurs in the vicinity of the appendix, with a large purulent effusion. Another such case is mentioned by Henderson. These cases are, however, extremely uncommon, & their only possible solution and salvation would, in any case, lie in abdominal section.

Pelvic haematocele is another condition which has been mentioned as leading to error, & Talamon mentions two cases, in one of which appendicitis was diagnosed and haematocele was subsequently found; while precisely the reverse occurred in the other case. These cases show that the error is a more possible

one item would appear at first sight

The variety of appendicitis which is most likely to be mistaken for hæmatocele is that in which a sudden perforation rapidly induces collapse and peritonitis. Both affections may give rise to painful swelling with sudden onset, prostration, vomiting and possible painful micturition or retention of urine. It is the tumour that would constitute the chief diagnostic point. In a case of appendicitis the result of sudden perforation, there would, in all likelihood, be little or no tumour distinguishable.

One of the most characteristic signs of hæmatocele, on the other hand, is the sudden formation of a large and comparatively fluctuating tumour, distinguishable per vaginam very unlike any tumour which is likely to be met with in cases of appendicitis of equally sudden occurrence. The occurrence of the attack in all probability at a menstrual period, and the rapid blanching of the patient, would usually in most cases lead to the correct solution. In those cases

in which suppuration subsequently occurs in a haematocele, the difficulty if the history is unknown, would be considerably greater.

The diagnostic difficulties which I have thus endeavoured - very cursorily and imperfectly, indeed - to pass in review, may present, I am well aware, as perplexing problems as are to be found in the range of medical practice. In attempting their solution, one point appears to me to stand out saliently. In these dubious cases, it is even more than usually important to obtain as complete and as accurate an account as may be, both of the origin and progress of the present condition, and of bygone illnesses. It is only by that means that we can enlarge and correct the information gained from the observation of symptoms & physical signs; and so save ourselves, if that be possible, at all, from the mazes of mere conjecture.