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THE MODERN TREATMENT

OF

APPENDICITIS.

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P R E F A C E.

Is appendicitis a medical or a surgical disease ?

If it is on the whole surgical, should it ever be treated medically ?

Can the present mortality of the disease be reduced ?

What rule of treatment, if any, can be laid down for all cases ?

These are the questions which, in the light of a series of one hundred cases coming under my personal observation, I have here attempted to answer.

W.S.S.

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PART I.

I N T R O D U C T I O N .

It is difficult to say whether appendicitis should be considered as a medical or a surgical disease. For at the present time, though the surgeons undoubtedly claim it as their own, yet in nearly every hospital we find medical beds occupied with appendicitis.

It must be admitted that the growth in our knowledge of this disease is primarily due to the surgeons. It was not till 1884, when Kronlein first removed a perforated appendix on the second day of the disease, that the condition was first recognised. Before this time appendicitis was always considered to be secondary to perityphilitis.

In 1885 Treves produced his work on the anatomy of the peritoneum and a well known surgical publication of the time, in reviewing his work in some detail, dismissed what he had to say on the appendix with the remark that it was of anatomical rather than of surgical interest.

In 1886 R.J. Hall performed the first successful appendicectomy for perforation.

In 1887 we find that surgeons generally were afraid of laparotomy. The needle was in vogue for diagnostic purposes followed by an exploratory incision along its track while still in position. R.F. Weir published a paper on the first twelve collected cases of the operation of appendicectomy done for perforation. Of the first eight cases in only one was a perforation found at the time of operation, but in the last four cases all four perforations were found. Obviously as knowledge of what to look for advanced the operation was more thoroughly carried out. In this paper Weir recognised that the majority of perityphilitic abscesses were due to inflammation or perforation of the vermiform appendix. In 1887 an excellent paper was published by Mr F. Raston on the treatment of appendicitis, ending up with the following words:- "an early operation, with a doubtful diagnosis of perforation of the appendix, lessens the likelihood of its confirmation by a necropsy and hence no time should be lost in awaiting developments."

By 1888 the names perityphilitis etc were falling into disuse and we find the term appendicitis definitely established.

In 1889 Archibald Dixon reported a case of perforated appendicitis which was operated on and which recovered. Another case was reported shortly after. Treves, Senn and McBurney advocated and practised the removal of the appendix to prevent perforation in chronic cases.

By 1890 there was a record of some 26 cases operated upon with nine deaths. McBurney in 1891 reported 24 cases of acute appendicitis with one death and it is interesting to note that preparation of the skin by the iodine method, which has recently come so greatly into prominence, was recommended at this time by G.R. Fowler. In this year too Weir collected some 26 cases of operation in the quiescent period with one death; he favoured early operative interference. Treves on the other hand said that too many appendices were being removed. He also considered that the 4th day was early enough to operate; that many cases had numerous attacks and recovered; and that when an abscess was present it was better to leave things alone as much as possible, and to rest content with the simple drainage thereof.

From 1891 to the present time our knowledge of appendicitis has advanced but slowly. There have been some improvements in details but the paper

referred to above by Archibald Dixon in 1888 might well be taken from the pages of the most modern text book.

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I feel that I must offer some excuse for writing on a subject which would appear to be worn threadbare by this time. My justification must be found in the fact that many people have lately gone back to what Treves said in 1891 and are repeating to-day that "too many appendices have been and are being removed." This idea has gone beyond the ranks of the profession and one constantly comes across it among the laity. I have found several references to this subject in the medical papers, a good example being the paper by Mr James P. Warbasse entitled "Cases of Appendicitis which do not require operation." Mr Warbasses in this paper gives a list of some fifteen conditions where operation is admittedly necessary. The list is as follows:-

- I. Appendicular abscess.
- II. Appendicitis giving rise to an inflammatory mass.
- III. Appendicitis, with great distension of the appendix by pus.
- IV. Fulminating appendicitis.
- V. Gangrenous and perforating appendicitis.

- VI. Appendicitis which does not subside, if severe on the second day, or if mild by the seventh day.
- VII. Any of the above involving neighbouring structures.
- VIII Diffuse peritonitis.
- IX. Intestinal obstruction.
- X. Sudden or gradual exacerbations.
- XI. Appendicitis with evidence of metastatic infections elsewhere.
- XII. After a second severe attack.
- XIII After the subsidence of acute appendicitis, where the symptoms of chronic disturbance persist.
- XIV. If the patient be about to reside far from surgical aid.
- XV. When in doubt as to the advisability of an operation.

He then goes on to say that some 75 per cent of cases of appendicitis cannot be classified under any of the above headings. At first sight this appears an extraordinary statement, but on thinking the matter over a little more carefully it is obviously a question of the definition of the word "appendicitis."

At the end of this paper I have analysed 100 cases of appendicitis and I find on looking through these that 90 per cent of them would come under one or other of Mr Warbasse's headings. Yet I do not think Mr Warbasse

is far out in his statement, for to realise what appendicitis means we must look at the pathology of the disease, and I have very little doubt in my own mind that a very large proportion indeed of these attacks are never discovered.

ANATOMY AND HISTOLOGY.

The vermiform appendix is about 9 cm. long as a rule - it may vary in length from 2 cm. to 25 cm.

The base is situated at the back and inner side of the caecum, about one inch from the ileo-caecal valve. The base varies in position, but not to any very great extent.

The remainder of the appendix is a free mobile organ in the abdominal cavity. In health the position which it takes up is generally one of pointing towards the inferior angle of the spleen.

The three longitudinal muscular bands of the caecum converge at the base of the appendix, and are prolonged over the appendix covering the longitudinal muscular layer.

The lumen of the appendix is generally T or H shaped.

The meso-appendix connects the appendix with the ileum, and as a rule extends for about two-thirds of the length of the appendix. It may extend to the whole length of the appendix, and Professor R.J.H.

Berry states that it invariably reaches to the tip, though this may not be obvious to the naked eye.

The coats of the appendix on section consist from within outwards of

- A. The mucosa.
- B. The submucosa.
- C. The muscular.
- D. The peritoneal.

A. The mucosa.

The mucosa consists of a single layer of columnar epithelial cells upon a delicate basement membrane; of tubular glands imbedded in adenoid or lymphoid tissue, and of lymphoid follicles.

It also contains a vascular and lymphatic system, and nerve endings.

The lymphoid follicles are of great importance. Once the epithelial lining of the lumen is destroyed, the lymph canaliculi are open to the entrance of whatever bacteria happen to be present.

An average appendix contains some 200 of these follicles.

The lymphoid follicles are related to the lymphatic system in the following manner:- The base of the follicle reaches to the submucosa where it is surrounded by a large semilunar lymph sinus. This sinus surrounds about half the circumference of the base of the

follicle, and opens freely into the lymphatics of the submucosa, which again communicate through the hiatus muscularis with those of the peritoneum and meso-appendix.

B. The submucosa.

The submucosa consists of delicate connective tissue, blood vessels, nerves and lymphatics. It is separated from the mucosa by the muscularis mucosae. The submucosa varies greatly in thickness.

C. The muscular coats.

There is a thin outer longitudinal muscular coat, which is easily stretched till gaps occur in its wall.

The circular muscular coat is twice as thick as the longitudinal.

D. The peritoneum.

The peritoneal covering is a thin one, and is hardly visible to the naked eye. It is continuous with the meso-appendix, and at the junction there are gaps in the muscular coats, termed the hiatus muscularis, which serve for the transmission of the nerves, blood vessels and lymphatics from the meso-appendix to the mucosa. This is a most important point, as it allows an infected mucosa to become directly continuous with the subperitoneal coat.

The blood supply is from two sources - a caecal artery which is the earliest source of supply, and the arteries of the meso-appendix. These two supplies anastomose freely. They are both derived from the posterior ileo-caecal artery.

PATHOLOGY.

Now the appendix suffers from numerous diseases and these may conveniently be divided into two groups:- those in which an inflammatory process is the main result and secondly, the others.

The first group is of considerable size and includes the inflammations due to the Bacillus Coli, Bacillus of Typhoid, Tubercle Bacillus, and to the Gonococcus, Diplococcus of Pneumonia, and the various strepto and staphylo-cocci.

The second group is not so large. For all practical purposes it consists of the malignant neoplasms,

Taking the second group first, most of these diseases are comparatively speaking rare and if we are to confine their activities to the appendix alone they become of very little interest except from the Museum point of view.

Some authorities however place their frequency as high as 3 per thousand.

I pass, then, to the inflammatory processes that may attack the appendix. Now here it is necessary to take a broad common sense view of what is going on. It matters little what bacteriological agent produces the disease so inflammation results. In the vast majority of cases there is a history something like this.

(1) The inflammation is very severe. In this case one of two terminations is probable; either the so-called obliterative appendicitis will result (a very rare form and one which few surgeons see more than once or twice in a lifetime. Of course in speaking of this obliterative appendicitis I refer to the disease as it was originally understood - where the whole appendix from base to tip undergoes at one attack an inflammation so severe as to completely obliterate the lumen throughout its entire length) or else we may have the form which includes perforation and general peritonitis. In this case the attack is so severe and the tissues are so little able to resist it that perforation occurs almost at once and before any limiting adhesions can have formed in the neighbourhood. The infection spreads with great rapidity throughout the peritoneum and naturally the organism which can cause so swift an injury to the appendix is

also capable of setting up an extremely severe form of peritonitis. The course of such a case is simply one of acute peritonitis. These cases are not, however, common. In every one of the cases which I have analysed below a perforated appendix was found to be the result of constriction of the lumen - the legacy of previous attacks. We can therefore dismiss this first very severe attack as being rare but, when it occurs, more than usually fatal to life.

(2) In the second variety the inflammation is mild and by mild I mean where the inflammation is of so slight a character that it does not cause any definite local symptoms. It is to this heading that Warbasse refers 75 per cent of his cases; I am not at all sure that he might not say 85 or even 90 per cent and still be within the mark.

The structure of the appendix is closely allied to that of the tonsils and it must be perfectly obvious that in all probability the average appendix suffers from nearly as many mild attacks of inflammation as does the tonsil. But as the average patient does not rush off to his doctor for every slight sore throat that he may contract in the winter time still less does he do so for these mild attacks of appendicitis - attacks which he certainly does not recognise himself as being such and which as certainly his physician would be unable to diagnose with any certainty.

These attacks probably give rise to no sensation of definite and localised pain. They cause a certain amount of discomfort, a general feeling of not being up to the mark, and possibly a slight rise of temperature, and the remark is made that he has eaten something which has disagreed with him and that he will be all right again in a day or two - and so he is. Some of these attacks are so mild that they leave no pathological trace of their existence. Others again are just sufficient to weaken the resisting powers of the appendix. They do not of themselves cause much damage and in time no doubt the appendix recovers completely from their effect, but should another attack of the same mild inflammation recur within a few weeks the tissues are undoubtedly less resistant and the appendix is laid open this time to an attack of greater though still of moderate severity.

These mild attacks, then, are by far the most numerous of all. They are rarely severe enough to cause the patient any anxiety and from their nature they cannot be diagnosed with any degree of accuracy.

(3) I pass now to the third group and this group, though not so large as the preceding one, is yet the largest group of the three, and for this reason - that the cases belonging to this group are those which can definitely be recognised as appendicitis. These are the cases known as "attacks of mild or moderate severity," and as a rule they are the result of attacks belonging to the second group.

The bacteriology is very indefinite and may be caused by almost any organism, the vast majority being due to the Bacillus Coli.

The infection occurs in many ways.

1. By direct infection through the peritoneum - as from an inflamed ovary or pyosalpynx.
2. Through the blood stream as in some cases of tuberculosis.
3. From the lumen of the bowel - where the organisms make their way into the lymphatic system once the epithelial barracade is broken down.
4. And lastly, through the lymphatic system from neighbouring sources of infection.

A reference back to the histology of the lymphatic system, which I have gone into in some detail on page 10, will make clear the way in which the infection can spread rapidly through these channels.

However the organisms reach the appendix they set up there some inflammatory process which may affect the appendix throughout its length but more commonly seems to concentrate at one or more points giving rise to an ulcerated condition of the mucosa. In time the inflammatory tissue is replaced during the process of repair by fibrous tissue which contracts considerably, and on the amount of this contraction depends the liability of the appendix to future infection.

Should there be little or no contraction the appendix may no doubt in time become entirely regenerated, but contraction of even a moderate degree of severity is permanent and lasting.

A large body of writers believe that the contraction which follows inflammation in the appendix, is not so much due to the cicatrisation of the ulcer, as to the organisation and cicatrisation of inflammatory lymph in the submucous and peritoneal tissue - and is in fact paralleled by the urethral stricture.

I believe myself that the former process is the one which most usually takes place; but it is quite possible that some strictures may be caused by the latter.

The attack, let us say, has resulted in the formation of an ulcer which has healed with a moderate degree of contraction - producing of course a certain amount of stenosis of the lumen of the appendix. For some time nothing further occurs. The appendix, when it is operated on at this stage, would probably be found perfectly free in the abdominal cavity. No kinks of any description would be found in it and nothing would be noted till, after its removal, it had been opened from end to end. Then the narrowing of some portion of its lumen would become apparent, not only from its appearance to the eye, but also from

the sense of touch which conveys a distinct impression of hardening and thickening at the point in question.

I believe that every attack of recognisable appendicitis will leave behind pathological evidence which can be easily recognised with the naked eye and without the use of the microscope.

The latter of course gives us information of immense importance, but it is not the only means by which we can recognise the effects of inflammation in these cases. A careful search aided by the sense of touch will invariably bring the injured portion of the lumen into view.

This appendix, then, normal to all appearances on looking at it in situ in the abdominal cavity is nevertheless very strongly predisposed to a further and more severe attack. It is quite certain that an appendix which has had one attack of moderate severity is always more liable to a further attack than a perfectly normal and healthy appendix, and when the attack comes the infection seems disposed to settle, if possible, at the site of the previous injury. The result this time will in all probability be more marked. The mucous membrane, which has been regenerated over the area of the previous ulcer, will become inflamed and swollen, but now, owing to the constriction at this point, there is scarcely any free passage

left. The rest of the mucous lining of the appendix secretes freely and the secretion finds its way into the lumen and has difficulty in getting past the constriction. There is no doubt too that this condition of affairs in the lumen of the appendix predisposes towards the formation of concretions which, small at first, grow rapidly under such favourable conditions.

Concretions in the appendix were, owing to their peculiar shape, at first thought to be cherry stones, date stones, and other foreign bodies.

Later on the belief that they were simply faeces moulded by the appendix to resemble these foreign bodies was generally accepted.

But quite lately Lockwood and others have conclusively proved that by far the largest number of concretions are merely inspissated masses of bacteria. Hence the great risk which the patient undergoes once these concretions escape into the general peritoneal cavity.

Many concretions no doubt, in their early stages, manage to escape into the coecum. If the inflammation persists however they may find themselves trapped so to speak, and then they will probably increase in size with more or less rapidity, according to the state of the appendix.

This time possibly the effects of the inflammation are passing off. They have spent their violence and the mucous membrane shrinks once more, the contents of the appendix pass out with less difficulty, and the appendix itself returns more or less to the condition in which it was before, but with two exceptions.

In the first place, this second inflammation following on the first, further constricts the lumen of the appendix, but as this is a gradual process and occurs as the inflammation in the mucous membrane dies down, the contents of the appendix are allowed to pass out without difficulty, but, on the other hand, so narrowed is the lumen that the concretion which has been formed during the last attack is unable to pass.

Secondly, during this last attack, which has been more severe than the previous one, not only has the mucosa been infected and the muscular walls also, but the peritoneum on the outside has been so weakened that, though it has not given way, organisms of one kind or another have been enabled to pass through it and have caused a certain amount of local peritonitis on its surface. The results of this will depend on the position which the appendix has taken up at the time. In its normal state it is a freely mobile organ, and the most serious consequences seem likely to occur when the appendix is either tucked under the coecum or

points downwards to the pelvis. There can be little doubt that in these positions the appendix is more liable to become firmly anchored to its surroundings than when it is pointing in some more superficial direction. This state of affairs is probably due to the fact that a condition of the appendix which causes peritonitis on its exterior also increases its specific gravity (due to the accumulated fluid etc in its lumen) to such an extent that it is more liable to take up its position as low down as possible.

After this attack, then, the appendix has suffered in two ways. Its mobility is restricted by one or more adhesions. Possibly there is a sharp turn or curve in its lumen and the lumen itself is further constricted at the original point. Very likely there has now occurred a second constriction, no doubt to a slighter degree; and lastly, there is a probability that above one or more of these constrictions will be found the commencement of a concretion.

Again the appendix recovers and resumes, to a greater or less extent, its normal appearance. The adhesions may indeed become absorbed but I doubt whether this is of common occurrence, for in the nature of things a further attack will probably ensue before this desirable end is accomplished. The attack, when it does come, will have an appendix to work upon

which is very considerably stenosed in one or more places, which may contain a concretion, and which is probably closely bound down to neighbouring organs. The infection need not be more severe than any of its predecessors but the results are infinitely more serious. The mucosa swells once more but this time it is found to block almost completely the already narrowed lumen. Secretion accumulates rapidly in the distal end of the tube and the concretion is forced by the pressure inside into the neck of the opening, which is now completely blocked. The pressure of the fluid increases the severity of the inflammation and the fluid itself is rapidly converted into pus of a more or less virulent character. The distal extremity of the tube swells to a greater or less extent. The peritoneum which covers it is seriously inflamed and adhesions grow up in all directions. Possibly, at this stage, if the concretion be not too large, the pressure of the fluid may be sufficient to force it down through the narrow opening and immediate relief occurs. The fluid is enabled to escape, the appendix resumes its normal size, but, unfortunately, the adhesions which have grown up and which are now contracting rapidly prevent it from taking up its normal position. There is probably a sharp kink in it and at the next attack this kink will become another constriction. If the attack should not terminate in this

way it is probable that ulceration will occur in one or more places, most likely in the neighbourhood of the concretion. Perforation follows, and the contents of the appendix escape into the general peritoneal cavity.

What happens now will depend upon several factors - the severity of the infection, the site of the perforation, the number and density of the adhesions already formed, and the quantity of infected material which passes out. In the greater proportion of cases, perhaps, a localised abscess is the result; and this is due not only to the presence of adhesions, but also to the fact that the surrounding coils of intestine have already been infected to some extent though not sufficiently to cause definite adhesions. The infection is, however, sufficient to glue the intestines loosely together and on the escape of the pus the slight peritonitis already present is sufficient to prevent the spread of the infection in all directions. The adhesions become more and more dense and the abscess is definitely encapsuled.

On the other hand, should this perforation of the appendix take place with more rapidity, the infection is likely to be a general one. In an abscess so formed, the appendix may be found embedded in one of the walls or loose in the abscess cavity, and possibly

entirely separated from its proximal end. It is almost the rule to find one or more concretions free in the abscess cavity.

If left alone several terminations are possible. The abscess may burrow towards the surface, adhesions starting up before it as it goes. More probably one of the coils of surrounding intestine becomes weakened and the abscess, discharging into its lumen, is eventually evacuated per rectum. The abscess may become encapsuled with a dense wall and gradually and slowly be absorbed. The last, most common, and most deadly complication is a further rupture of the abscess into the general peritoneal cavity.

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Such is the process which I have described under the headings of various separate attacks, but the same results might equally well be obtained by one long and severe attack, or by many attacks of a rather milder character. If however the attacks persist, perforation of the appendix is a certainty. This consideration of the pathology of appendicitis enables us to say that the vast majority of attacks are never seen by the physician or the surgeon, and that if they are seen the condition is not recognised. It is obvious that a slight infection of the appendix causes no more disturbance than a slight sore throat due to inflammation

of the tonsils. The difference in the ultimate result is due entirely to the fact that the tonsils are a mass of glandular tissue perfectly free in the pharynx, while the glandular tissue of the appendix is situated in a long and narrow tube whose walls are so narrow and thin that any infection of the glandular tissue is certain to spread to the walls themselves and so result in a permanent weakening of the tube which will predispose to further trouble.

Of the other cases which are severe enough to be recognised as appendicitis a very large proportion will undoubtedly suffer from further attacks and these attacks will in time, if continued, go on to perforation of the appendix with all its complications.

S Y M P T O M S.

The symptoms of appendicitis are an entirely variable quantity. The mild form, as I have pointed out above, does not result in such pathological changes as to cause any definite outward manifestations. A feeling of malaise, general discomfort in the abdomen, possibly some diarrhoea or constipation, slight rise of temperature, nausea and headache may be all that there is to discover. And these are not sufficiently definite symptoms to enable us to diagnose the condition as one of appendicitis.

When we come to the more severe symptoms the following are generally considered typical:-

Pain in the right iliac fossa.

Constipation.

Abdominal distension.

Vomiting.

Rise of temperature and pulse rate.

Rigidity of the abdominal muscles on the right side of the abdomen.

Tenderness on rectal examination.

Feeling of resistance, or of a definite lump in the right iliac fossa.

Pain.

Pain is of two kinds - what the patient feels, and what the physician causes.

The pain at the commencement of an attack of moderate severity is seldom if ever localised to any one place. It is referred to the abdomen generally - usually the upper part at first, and a little later to the region of the umbilicus.

After a variable time, however, it seems to "settle down" in the right iliac fossa. The point of maximum intensity is not constant by any means; it is certainly no guide to the position of the inflamed appendix.

Very often a chain of inflamed lymphatic glands will cause more pain than the appendix itself.

The pain elicited by pressure is of the 'acute tenderness' variety. This pain again is no satisfactory guide to the position of the appendix. It may be due as before to a chain of enlarged and inflamed lymphatic glands, or to a peritoneal surface which has become infected at some distance from the appendix itself.

A feeling of tenderness in the right iliac fossa, with acute pain elicited on firm pressure, is strongly suggestive of appendicitis.

Constipation.

Appendicitis is usually attended with constipation, but this is by no means the invariable rule. Diarrhoea is present in an appreciable proportion of cases, and occasionally one comes across a case with no disturbance of the action of the bowels.

Generally where the bowels act naturally in a mild case of appendicitis, after a short period of constipation, the patient is well on the road to recovery.

Abdominal distension.

This is generally a very good indication of the severity of the attack. It is present in every case where the peritoneal surfaces are involved and increases in direct proportion to the progress and severity of the infection of these surfaces.

The distension is actually due to the accumulation of gas in a paralysed bowel. The paralysis of the bowel being caused by its disinclination to peristalsis, when this peristalsis causes acute pain owing to the movements of inflamed peritoneal surfaces on each other.

Vomiting.

Vomiting usually occurs at the commencement of an acute attack. It is not persistent as a rule. In a case which has been allowed to go on too long, and where

acute peritonitis is present, the vomiting may return and this time it will persist, becoming stercoraceous in character.

Temperature, Pulse, and Respiration.

The temperature is raised as a rule - 100-102.5 . Any higher rise will probably be due to some complication such as peritonitis.

A high temperature without any rise in the normal pulse rate, does not betoken any serious condition of affairs, and may be of a transitory character. When the pulse rate rises in conjunction with the temperature, acute inflammation is probably present.

A high pulse rate with a subnormal temperature points to collapse, and probable infection of the peritoneum.

The respiration depends upon the pulse rate and the temperature. It serves as a useful check upon deductions taken from them.

The respiration is never quickened without either an increase in the pulse rate or a heightened temperature.

Rigidity of the Abdominal Muscles.

The rigidity of the abdominal muscles over the appendix is perhaps the best individual sign we have of the presence of inflammation.

The rigidity is confined to the right lower quadrant of the abdomen. It varies in degree in different cases, but I have never seen it entirely absent.

The rest of the abdomen moves with inspiration and once the patient's confidence is obtained, can be readily palpated. The muscles over the affected area remain more or less contracted, and unless the swelling beneath be exceptionally large and distinct, it will be found impossible to define it, or even be sure of its presence, with any accuracy.

The right lower quadrant either does not move at all with respiration, or else its movements are so obviously restricted that this becomes a most noticeable feature.

Of course in cases of general peritonitis, the whole abdomen becomes hard and boardlike, and palpation is resented equally in all directions.

Tenderness on rectal examination.

This is a valuable aid when present, but as a rule I have found that in the cases where it is present, the diagnosis was fairly certain already.

On the other hand it is often unobtainable in cases where the inflammation of the appendix is unmistakable and even marked.

As a rule when an abscess is present, it can be made out with greater ease in this way, especially if the abscess be wholly or partially in the pelvis.

Feeling of resistance, or of a definite lump in the right iliac fossa.

This is another valuable indication, but one which is only found in the more chronic cases.

The feeling of resistance is due either to a definite abscess, or to an indefinite inflammatory mass being made out through the resisting abdominal muscles.

In many cases where a definite lump can be made out, nothing is found under an anaesthetic, and the lump is probably due to a localised contraction of one of the abdominal muscles.

In other cases one can apparently roll a definite hard appendix under the examining fingers, only to find on operation, that the appendix occupies quite a different situation.

In these cases the supposed appendix is either a rolled edge of one of the abdominal muscles i.e. the rectus - or more commonly it is an enlarged chain of lymphatic glands.

As a rule I have found that it is extremely difficult to make out during the operation what exactly caused this curious phenomenon.

When a definite lump can be made out abdominally, the infection is probably subsiding. Of course in very large abscesses which are coming to the surface, this statement does not hold good. But in these cases the condition is obvious at a glance.

DIAGNOSIS.

The Diagnosis of appendicitis can be made from the symptoms enumerated above without much difficulty.

Various abdominal diseases have simulated appendicitis - more particularly when they have not been quite typical themselves.

The most common of these affections is perhaps disease of the gallbladder - more particularly the suppurative inflammatory lesions of this organ.

Suppuration in the ureter is another cause. A woman aged 43 was admitted into hospital with what appeared to be typical appendicitis. There was a feeling of resistance over the whole of the right side of the abdomen. The temperature was 100.5, the pulse 120, the respiration 24. Pain was localised a little higher than usual. Nothing could be made out per rectum.

At the operation, the appendix was found to be perfectly normal, but on enlarging the incision upwards the upper portion of the right ureter was found to be enlarged and full of pus. The right kidney could not be discovered.

An attempt was made to drain the abscess, but the patient died two days later.

At the subsequent post-mortem examination, the left kidney was found to be atrophied to a large extent, and was situated exactly over the promontory of the sacrum.

The right kidney was rather large, and the pelvis was distended with pus. It was situated behind the upper portion of the liver, between this and the chest wall.

There was complete obstruction of the right ureter, and this accounted for the absence of pus in the urine, the right kidney being still functional, though atrophied.

It is of course practically impossible to diagnose such an extraordinary case before operation - even here we were completely puzzled at the apparent absence of the right kidney, till after the post-mortem examination.

Lockwood reports a case which was the exact counterpart of the above.

In his case, an appendix abscess, situated rather high in the abdominal cavity, perforated the ureter, and evacuating itself by this route, gave rise to the diagnosis of pyonephrosis.

Salpyngo-ovaritis.

When this occurs on the right side only, it may be extremely hard to differentiate between it and appendicitis.

As a rule however it occurs simultaneously on both sides, and this point should be sufficient to establish the diagnosis.

Pelvic inflammation.

It may be very hard indeed to distinguish between an inflammation of the cellular tissue of the pelvis, and an inflammatory condition round about the appendix. Localisation in the latter case is the most valuable sign.

Duodenal ulcer.

The effects of perforation in a duodenal ulcer may very closely resemble appendicitis even during operation, as the following case will illustrate:-

A.B., a labourer, forty-five years old, was admitted into hospital with the typical signs and symptoms of definite peritonitis localised to the right half of the abdomen. He gave a history of several previous attacks of appendicitis. Nothing else in his history was of any importance.

He was operated on within an hour of admission, the incision being made over the appendix area. On

opening the abdomen, a considerable amount of peritonitis was found, and the appendix was seen free but obviously inflamed. It was removed in the usual way. The amount of fluid and peritonitis seemed excessive as compared with the condition of the appendix, and when the latter was slit open, no traces of any present or recent inflammation could be made out. There were however constrictions, the legacies no doubt of the previous attacks mentioned in the history.

A second incision was therefore made in the epigastrium, and a perforation of the duodenum brought to light. When this had been dealt with and the abdomen thoroughly swabbed dry, both wounds were closed without drainage. The patient made an uninterrupted recovery.

An American surgeon has recently drawn attention to this condition, which he says is often overlooked.

It might well have been so here, but for the large amount of fluid which was found, in all directions. The absence of a gastric history in these cases I believe to be quite common. The important point to note is that the appendix was inflamed on the outside, owing to the general peritonitis, but was not the source of the trouble, as was seen as soon as its lumen was opened up.

It is a wise precaution to do this in all cases of appendicitis, where there is marked peritonitis in the vicinity.

Various other conditions have been from time to time mistaken for appendicitis.

Renal colic, biliary colic, intussusception, strangulation of the bowel by bands etc., etc. Each case must be decided on its own merits. It is impossible to lay down general rules for the differential diagnosis of the disease - and when all possible care has been exercised, even the best surgeons and physicians may be at fault.

After all an exploratory laparotomy in any doubtful case of appendicitis will do no harm, and even if the diagnosis is wrong, the cause of the trouble can be definitely ascertained and dealt with.

PROGNOSIS.

The prognosis depends entirely on the severity of the case and upon its treatment. In the mild cases the condition invariably passes off without any treatment whatsoever. If the cases of moderate severity were operated upon as soon as the condition was recognised the mortality would be next to nothing in these cases also. When we come to the severe attacks, whether these are caused by previous attacks of moderate severity or whether they are due to one acute infection, operation is recognised by everyone as the only possible means of procedure. But this class of cases will be very considerably reduced should all cases in the second class have been previously operated on.

The prognosis, then, is good in the first two groups. In the third group the mortality rises to anything above 7 per cent. And here again the mortality is directly dependent, so far as I have been able to judge from actual practice, on the amount of time which elapses between the hour of operation and the commencement of the severe attack. In only one case

in the series, which I analyse later, is death due to anything but what I may call criminal neglect to operate at the right time. I am referring entirely to cases in the third group at present.

Cases of appendicitis which are treated medically in our great hospitals show extraordinarily good results. The mortality is nil. On this fallacious statement is, I think, based the idea that it is far safer to treat appendicitis medically if you can do so. But when we look into the question of appendicitis as it reaches the medical beds in the hospital we find, taking first of all the ordinary hospital where cases are sent in by medical men residing in the surrounding district, that all the worst cases are sent in directly to the surgical side accompanied as a rule by a telephone message to say that the case requires immediate operation. The cases which manage to reach the medical wards, on the other hand, are as a rule sent in from out patients. They are not serious, in one sense; they generally have had several attacks and under ordinary rest and quiet may subside more or less quickly. But should they, on the other hand, develop into serious and acute cases, the first thing, or perhaps I should say, the eventual result, is that they find themselves in the surgical ward, and I regret to say

that the mortality from cases which were transferred from the medical to the surgical wards in my own hospital was considerably greater than that of the acute cases sent in by the general practitioner outside. Apparently the physicians, recognising that an operation could be performed on the patient at any minute, were encouraged to put this operation off far longer than the practitioner outside who had no facilities to hand. And so we see that in the ordinary hospital there are no medical deaths from appendicitis; the worst cases are transferred to the surgical side - too late as a rule - and help to swell the mortality there.

But the point I am endeavouring to bring out as regards the prognosis is this; the cases of slight appendicitis do not require treatment even should they be diagnosed. The cases of acute appendicitis, it is admitted by everyone, must be operated upon. By acute cases I mean such cases as would fall under this heading in Warbasse's list. The difference of opinion occurs when we come to the moderate cases. If every moderate case of appendicitis was operated on at the first possible opportunity the number of cases which would be classified under the heading of "acute" would drop by over 95 per cent and the mortality would drop in conformity with this. The mortality in cases which are acute and which are not operated upon is something like 80 per cent.

The prognosis of each individual case must be taken on its merits and in the healthy young adult the risks are very small but they increase with age, and an acute attack of appendicitis in a man of 70 is likely to be fatal. In children also below the age of seven the prognosis is not good, chiefly because the cases are generally allowed to go on much further before operation than they would be in the case of adults.

T R E A T M E N T .

Osler says that there is no medicinal treatment of appendicitis. I will go a step further and say that when appendicitis is recognised there is, except under special circumstances, no medical treatment of the disease. Let us take our three groups again.

The first group need not be operated upon. These are the cases which form the largest proportion of all cases of appendicitis. They are as a rule too mild to be diagnosed definitely as appendicitis and they may be safely left either to cure themselves or to go on to a more severe attack.

I am not concerned with the more acute cases which are generally admitted to require operation as soon as practicable. As regards these cases I will only point out that the surgeons, who see far more of such cases than do the physicians, are one and all agreed that the sooner acute cases are operated upon the better is the patient's chance. It is the greatest mistake to put off the operation upon a definite case of acute appendicitis on the excuse of seeing how it will turn out.

But it is the second group - the group of moderately severe cases - around which the question of treatment is being fought out at present. In this group we have on the one hand the point of view that all these cases, with a few trifling exceptions, will recover if they are treated by quiet rest in bed. On the other hand we have the view, and the view which I consider to be the correct one, that all these cases should be operated upon and have their appendices removed as soon as it is possible to make a definite diagnosis of appendicitis no matter in what state the appendix is presumed to be in at the moment of diagnosis. Between these two points of view we have all shades of opinion.

I have endeavoured to show, by what I have said concerning the pathology of the disease, that every attack of appendicitis predisposes to a further and more severe attack. And if this be so it must be admitted that the medical treatment of such cases is at least of doubtful value. When we have to add to this the fact that every attack of inflammation which the appendix undergoes renders its eventual removal a matter of greater difficulty the expectant method of treatment should be very seriously reconsidered. I do not say that all these cases of moderate severity can be operated upon in every instance. I will deal

with some of the exceptions further on, but I do say that the only advice which should be tendered to the patient or his friends is that operation in these cases is a matter of urgent necessity. I cannot point out too often that the mortality in cases of appendicitis of moderate severity which are operated upon during their first definite attack and at any stage in this attack (the earlier the better) is nil.

The operation is a perfectly simple one and one which every general practitioner should be able to perform. I do not wish to deal with the details of the operation. That is a matter of purely surgical interest. Any operation which can be quickly performed, which entirely removes the appendix, which buries its stump, and which closes the wound in layers may be considered perfectly satisfactory. These are the points which are insisted upon by all good surgeons and the further details are a matter of no importance. The operation, when done at this stage of the disease, is, as I have pointed out before, a very simple one and I have known it performed by a general practitioner in the provinces in seven minutes.

The more attacks the patient has had the more severe will the operation be. Of course one does come across cases where the patient has had a dozen or more definite attacks and yet the appendix is not

in any way kinked or bound down by adhesions. But in these cases are exceptional and when a patient has had numerous attacks the operation may well be considered one of the most difficult in the domains of surgery. It is impossible to follow the history, to see the operation, and to examine the appendix, without being forced to understand the part which previous mild attacks play in the causation of acute appendicitis, and further to realise, in those patients whose appendices are removed with some difficulty at, say, their second or third severe attack, that the condition which has obviously come about as the result of the previous attack would undoubtedly provoke the most serious consequences at the next infection.

It is not advisable in any case of appendix abscess, to be content with draining the abscess only. Such cases invariably recur - or more probably they do not heal completely, and a persistent discharging sinus is left, necessitating further operation.

Of the seven cases which died in the following list, it will be noted that five did not have the complete operation performed.

The only two who died after having the appendix removed and its stump buried, were both suffering from general intestinal paralysis, and succumbed to the resultant absorption of toxins.

Thus it is no more dangerous to do the radical operation where an abscess is present, than when the appendix is free.

In a few cases the appendix cannot be found or if found the stump cannot be reached and buried, and it is these cases which will be found to yield a very much higher mortality than any others.

There are of course times when operation is not advisable. The patient may refuse; other concurrent disease may make it a questionable procedure; the circumstances in which the case is situated may make an operation a matter of greater risk than the one of leaving it alone; but there is no doubt that, if the advice of immediate operation during the first attack of appendicitis was given in every case, the mortality would be immensely reduced in consequence.

The only exception which I am prepared to make in this general statement is in the case of children. The diagnosis is far more difficult than in the adult, and children, especially under the age of five years, do not stand well even a simple abdominal operation.

One should remember also that in cases of moderate appendicitis in the adult it is impossible to say whether the condition is subsiding or not. Time after time I have seen cases which, apparently subsiding, quietly took a sudden turn for the worse: - perforation and general peritonitis being the outcome of this expectant mode of treatment.

The treatment, then, which I would advocate as regards appendicitis of moderate severity is that every case should be operated upon without delay and at the earliest possible opportunity and that no exception should be made of those cases which are apparently subsiding quietly. In the first place because such cases may suddenly perforate while they appear to be subsiding and, in the second place, because little is gained by waiting.

If the appended list of cases is glanced through, it will be noticed what a very considerable number of cases were operated on in the acute stage - acute being taken to mean those cases where the patient was suffering from acute symptoms of appendicitis and where definite and severe inflammation was present in or around the appendix.

Of these cases six died, and everyone of these six cases was operated upon in extremis - where a favourable result was considered almost impossible.

That is to say, in no case where the condition was acute, and where the appendix could be properly dealt with in the usual way, was there any unfavourable result.

We may therefore dismiss as a myth the idea that operation in acute appendicitis is more dangerous to life than operation in the quiescent period.

Added to this is the fact that in non-perforating appendicitis the adhesions which so complicate an operation done in the quiescent period, are easily dealt with when in process of formation during the height of the attack.

The only case in the following series which died, to which at the time of operation one would have given a good prognosis, was where a healthy man with a third attack of definite appendicitis came into the hospital on the medical side. The attack subsided and when all his symptoms had disappeared he was sent down to the surgical ward for removal of the appendix in the quiescent period. Owing to its being Christmas time he did not have his operation done for about a fortnight and during this time had no further symptoms. Yet at the time of operation, though the appendix was quiescent, a suppurating gland was opened in the course of the operation and apparently caused the death of the patient later on. In cases too where there is stenosis of the appendix it is quite common, on operating at the so-called quiescent period, to find that the appendix is in an inflamed condition and on the point of bursting.

It is, as I have pointed out before, quite impossible to make an accurate diagnosis of the actual condition of the appendix in any given case.

It is often possible to say that the appendix is almost certainly gangrenous. It is never possible to say that the appendix is uninflamed and normal.

As regards the question of blood counts as an indication for operation I have found that these were so variable in the results they gave that it was impossible to rely upon them in any way. In one of the two cases where the appendix appeared normal before it was opened I had previously done a blood count and found a leucocytosis of 20,000. There was no possibility of error in the count in this case as it was independently checked by my colleague; and similarly I have found a normal leucocytosis in cases where there was a large though no doubt chronic abscess.

Another point of diagnosis on which treatment used often to depend is a rectal examination. This I have also found to be quite unreliable, some patients with scarcely anything the matter with them complaining of acute agony in the region of the appendix, while others have had a large, inflamed, and distended appendix and complained of nothing more than slight discomfort. Of course I need not say that it is generally possible to recognise the presence of an abscess by this method.

Should operation be contraindicated by one of the reasons I have given above, the treatment consists in absolute quiet and rest in bed, fluid diet, morphia or opium to relieve the pain, cold or heat applied locally

for the same purpose, and enemas to open the bowels. Purgatives are not to be recommended in the acute condition, and local blistering is most inconvenient should an operation have to be performed subsequently.

To sum up the treatment.

Every case which can be diagnosed definitely as appendicitis should be operated upon forthwith, unless operation is contraindicated, and no condition of the appendix is a contra-indication to immediate operation.

PART II.

INTRODUCTION.

The following epitomised notes are from a series of one hundred consecutive cases which I had the opportunity of studying from the date of their admission into hospital, till they left cured or till they died. I assisted at all the operations and had therefore every opportunity of seeing closely into the condition of affairs when the abdomen was opened.

Full notes in each case were written down immediately after the operation was concluded, special care being taken with the morbid anatomy and naked eye appearances of the appendix.

In every single case operated on, where the appendix could be made out at all and was removed, one or more constrictions were found in the lumen of the appendix. In fact this may be described as the one and only constant feature of the disease. It is worthy of note that this narrowing of the lumen was found even in those cases where the most careful questioning failed to reveal any history of a previous attack, and where the operation was performed in the

acute stage - thus discounting the possibility of its having been formed at the commencement of this first attack.

Later on, page 81, I have endeavoured to analyse these cases, and have dwelt at some length on those features which impressed me most at the time and which led me to draw attention to this subject.

EPITOMISED NOTES ON CASES.

No	Name	Age	Sex	History	Condition	General Peritonitis	Localized Abscess	Gangrenous Appendix	Adhesions Present	Tumescant Appendix	Position of Appendix	Treatment of Appendix	Drainage	Operator	Result		Days in Hospital		
															Cured	Death	Total	Before operation	After operation
1.	H. Pritchard	38	M	Definite	Acute	-	-	-	+++	-	-	Removed. Stump buried	-	G	Cured	-	36	10	26
2.	Annie Adams	31	F	Definite	Acute	-	++	-	+	-	-	Removed. Stump buried	+	M	Cured	-	48	-	48
3.	Violet Franklin	12	F	Definite	Acute	-	++	-	+++	-	No attempt made to find appendix	-	+	G	Cured	-	55	1	54

Notes on Cases

Appendix found with great difficulty owing to the mass of adhesions present. Tip of appendix in apposition to its base. Tip and last inch swollen and on the point of bursting. Fluid pus inside. Base thin and cordlike. Intervening loop between tip and base lying against front of the sacrum; very deeply situated in pelvis. Surface wound broke down. Healed rapidly.

Appendix found without much difficulty. Adherent to mass in pelvis. Separated and removed. Slightly inflamed. Mass exposed and found to contain double pyosalpynx, with loose pus. Both tubes and ovaries removed; drainage inserted. Condition of tubes thought to be secondary to old attacks of appendicitis. Excellent result.

Patient exceedingly ill 24 hours after operation. Temperature remained high at 102.4. Pulse weak at 160. Abdomen distended. No pus coming away from wound. Injection of anti-streptococcus serum given. Patient improved very gradually, two further injections being given. Wound healed very slowly, much pus coming away. See later note on Violet Franklin - Case No 33.

No	Name	Age	Sex	History	Condition	General Peritonitis	Localised Abscess	Gangrenous Appendix	Adhesions Present	Tenderness Appendix	Position of Appendix	Treatment of Appendix	Salpingo-ovary	Operator	Result		Days in Hospital		
															Cured	Death	Total	Before Operation	After Operation
4	Clementine Godwin	30	F	Definite	Acute	+	++	-	+	-	Free in abscess cavity	Removed. ^{not} Stump buried	+	M	-	Death	3	-	3
5	Mabel Gibbs	12	F	Definite	-	-	-	-	++	+	Downwards	Removed Stump buried	-	M	Cured	-	45	16	29
6	William Hill	17	M	Definite	Acute	-	+++	-	++	-	Not found	-	+	M	Cured	-	43	-	43
7	Sadie Osbury	5	M	Definite	Acute	-	++	+	++	-	Upwards	Removed Stump buried	+	M	Cured	-	37	-	37
8	Jane Mann	26	F	Indefinite	-	-	-	-	-	+	Free	Removed Stump buried	-	M	Cured	-	50	5	45

Some signs of general peritonitis, but no free pus. Appendix found quite free, and apparently not much injured in abscess cavity. Right ovary tube semi-gangrenous (quite outside localised appendicular abscess cavity). Removed together. Not expected to recover.

Uneventful recovery.

Very foul abscess cavity opened. No signs of any appendix. Shreds of material floating about in pus. Concretion also found. Appendix thought to have sloughed off and to have become disintegrated.

Discharged freely. Excellent result.

Discharged freely. Excellent result.

History quite indefinite. Swelling in right inguinal region for 10 years, varying in size from time to time and apparently having some connection with menstruation.

At present her period is 7 days overdue. Has not been irregular previously.

Pain over lump severe at times, and worse of late. Lasts for periods of from three days to a week. Attacks come on about the menstrual periods. Temperature about 99.4. Pulse regular at 80. Diagnosis - salpingo-ovaritis. Discharged freely. Excellent result.

No	Name	Age	Sex	History	Condition	General Peritonitis	Localized Abscess	Gangrenous Appendix	Adhesions Present	Inflamed Appendix	Position of Appendix	Treatment of Appendix	Drainage	Operator	Result		Days in Hospital		
															Cured	Dealt	Total	Before operation	After operation
8	Jane Mann (cont)	26	F	Indefinite	-	-	-	-	-	+	Free	Removed Stump buried	-	M	Cured	-	50	5	45
9	Floa Clayton	21	F	Definite	Acute	-	-	-	++	+	Bound down tightly	Removed. Stump buried	-	F	Cured	-	58	28	30
10	Edward Sacey	25	M	Definite	Acute	+	-	-	-	+	Free	Removed Stump buried	-	M	Cured	-	25	-	25

At the operation the incision was made in the middle line. The uterus was found very markedly antiflexed. Both tubes and ovaries were normal.

Appendix was long, and contained two large concretions. It was also almost entirely obstructed by cicatricial contraction at one point.

Uneventful recovery, delayed by attack of rheumatic fever.

Uneventful recovery.

Symptoms pointing to general peritonitis but temperature normal throughout except for post operative rise to 101 lasting 12 hours.

On opening the abdomen, the intestines had some loss of lustre, and were gummy, but no definite lesion was found to account for this. The appendix was slightly kinked, but quite free, and there was no evidence of even the smallest perforation, and there were no signs of recent inflammation.

The condition of the intestines was general throughout the abdomen, which was opened in the middle line.

Uneventful recovery.

No	Name	Age	Sex	History	Condition	General Peritonitis	Localized Abscess	Gangrenous Appendix	Adhesions Present	Tumescant Appendix	Position of Appendix	Treatment of Appendix	Drainage	Operator	Result		Days in Hospital		
															Cured	Death	Total	Before operation	After operation
11	Maud Thomas	16	F	Indefinite	Acute	+	-	+	++	-	Bound down into pelvis	Stump not buried	+	P	Cured	-	84	1	83
12	Walter Harber	17	M	Definite	Acute	-	-	+	-	-	Free	Removed Stump buried	-	P	Cured	-	29	3	26
13	Jane Titcombe	54	F	Definite	-	-	-	-	-	+	Free & very long	Removed. Stump buried	-	M	Cured	-	31	3	28
14	Ada George	8	F	Definite	Acute	-	+	+	+++	-	Bound down	Removed. Stump buried	+	M	Cured	-	46	10	36
15	John Mills	45	M	Definite	Acute	+	-	-	-	-	Free Pinked	Removed Stump buried	-	P	Cured	-	27	-	27
16	Francis Cooper	24	M	Definite	Acute	-	-	+	++	-	Disintegrated	Removed Stump buried	+	M	Cured	-	53	23	30
17	James Early	24	M	Definite	Acute	-	-	-	++	-	Disintegrated	Removed Stump buried	+	P	Cured	-	40	14	26
18	Willie Seabatter	5	M	Definite	Acute	-	-	-	-	+	Free	Removed Stump buried	-	M	Cured	-	30	-	30

Uneventful recovery.

Came in in very acute state of general peritonitis. Was not operated on for 24 hours. In this time the temperature had come down to normal. The pulse had improved. The abdomen moved once more with respiration, and pain had almost ceased. She felt better in every way, and was far less restless. No drugs were given. Discharged for long time.

Uneventful recovery.

Very collapsed 12 hours after operation. Intravenous injection of one pint saline produced immediate effect. **Uneventful recovery.**

Uneventful recovery. (kept in for Christmas).

Uneventful recovery.

Uneventful recovery.

Uneventful recovery.

Uneventful recovery.

No	Name	Age	Sex	History	Condition	General Peritonitis	Localised Abscess	Gangrenous Appendix	Adhesions Present	Quiescent Appendix	Position of Appendix	Treatment of Appendix	Drainage	Operator	Result		Days in Hospital		
															Cured	Death	Total	Before (After) Operation	
19	Daisy Barton	14	F	Definite	Acute	-	++	-	+++	-	Not found	-	+	M	Cured	-	132	-	132
20	Charles Lucas	34	M	Definite	Acute	+	-	-	-	+	Free	Removed Stump buried	-	M	Cured	-	35	-	35

Patient had a very large abscess; owing to very numerous adhesions, the search for the appendix was not persisted in. The wound healed eventually, but left the abdominal wall weak. Two months later she came in again to have this repaired. On opening the abdomen, there were no adhesions of any kind to the parietal peritoneum. A cystic tube and ovary, the size of a small orange, was discovered and removed. The scar tissue was removed, and the wound closed. She made an uninterrupted recovery.

The diagnosis here was perforated appendix following upon repeated previous attacks. General peritonitis was obvious.

The abdomen was therefore opened in the middle line, but beyond some kinking and concretion the appendix appeared quiescent. It was removed in the usual way, and a further search revealed a perforated gastric ulcer. This was sewn up, the whole abdomen swabbed out dry, and the wounds sewn up without drainage.

Later on the patient, who was making an uninterrupted recovery, unfortunately developed scarlet fever, an epidemic of which had at that time just invaded the hospital.

He was removed to the Fever Hospital and left that institution cured six weeks later.

No	Name	Age	Sex	History	Condition	General Peritonitis	Localised Abscess	Gangrenous Appendix	Adhesions Present	Tumescant Appendix	Position of Appendix	Treatment of Appendix	Drainage	Operator	Result		Days in Hospital		
															Cured	Death	Islet	Days After Operation	
21	Eliz. Rampion	49	F	Definite	Acute	-	++	-	++	-	Matted	Removed, Stump not buried	+	M	Cured	-	27	-	27
22	Lydia Flowers	23	F	Definite	-	-	-	-	+	+	Bound down to caecum	Removed Stump buried	-	M	Cured	-	35	5	30
23	Isa Shaw	27	F	Definite	-	-	-	-	-	+	Free	Removed Stump buried	-	P	Cured	-	37	10	27
24	Fred Collins	22	M	Definite	Acute	-	+	+	++	-	Bound down behind	Removed Stump buried	+	F	Cured	-	49	-	49
25	William Wakefield	22	M	Definite	Acute	+	-	+	++	-	Bound down to pelvis	Removed Stump buried	+	F	Cured	-	62	-	62

Patient recovered but a persistent sinus remained. At a subsequent operation 3 months later, an attempt was made to close the sinus, but the enormous amount of cicatricial tissue present rendered such a measure almost impossible. The sinus was therefore stretched, scraped, and packed with gauze. At the first dressing a large concretion came away on the gauze drains, and next day a foecal fistula was in full blast. Patient was extremely ill for a fortnight. The fistula eventually healed up, and she left the hospital cured.

Uneventful recovery.

Uneventful recovery.

A fortnight after the first operation, the patient became acutely ill again. His temperature rose, and there was a distinct boggy swelling to be felt per rectum. The abdomen was reopened, but nothing further than a good deal of acute pelvic cellulitis was found. After this the patient made a rapid recovery.

Developed broncho-pneumonia a couple of days after the operation. This cleared up but when convalescent he had an attack of scarlet fever, and was eventually transferred to the Fever Hospital, where he made a complete recovery.

No	Name	Age	Sex	History	Condition	General Peritonitis	Localised abscess	Gangrenous Appendix	Adhesions Present	Insistent Appendix	Position of Appendix	Treatment of Appendix	Drainage	Operator	Result		Days in Hospital			
															Cured	Death	Total	Before operation		After operation
26	Kate Holloway	47	F	Definite	Acute	-	-	+	++	-	Bound down to pelvis	Removed. Stump buried	-	F	Cured	-	85	-	85	Wound suppurated.
27	Norman Penwell	8	M	Definite	Acute	+	-	-	-	-	Not found	-	+	F	Cured	-	120	1	119	Parotitis in 12th week. Much discharge. Wound reopened in 2nd week.
28	Charles Cox	52	M	Definite	-	-	-	-	+	+	Bound down to colon	Removed. Stump buried	+	G	Cured	-	31	9	22	Uneventful recovery.
29	Brothy Deacon	11	F	Definite	-	-	-	-	-	+	Free	Removed Stump buried	-	P	Cured	-	31	4	27	Uneventful recovery.
30	Jane Fever	19	F	Definite	-	-	-	-	-	+	Free	Removed Stump buried	-	P	Cured	-	39	11	28	Uneventful recovery.
31	James Heating	30	M	Definite	-	-	-	-	-	+	Free	Removed Stump buried	-	F	Cured	-	34	3	31	Uneventful recovery.
32	Jack Betts	26	M	Definite	-	-	+	-	++	-	Matted	Removed. Stump not buried	+	F	Cured Death	21	20	1	Came in with a subsiding attack of appendicitis. All symptoms and signs had disappeared at least 10 days previous to operation. A teaspoonful of pus was discovered on separating adhesions during the operation and was caught on a swab, apparently without contaminating anything. The rest of the operation was tedious (owing to numerous adhesions) but uneventful. The patient was very collapsed after the operation - apparently suffering from shock. All the usual remedies, including intra-venous transfusion of saline solution, were tried without avail. He died in 24 hours.	

No	Name	Age	Sex	History	Condition	General Peritonitis	Localised Abscess	Gangrenous Appendix	Adhesions Present	Tumescant Appendix	Position of Appendix	Treatment of Appendix	Gauge	Operator	Result		Days in Hospital		
															Cured	Death	Total	Before operation	After operation
33	Violet Franklin	12	F	Definite	Acute	-	++	-	+	-	Not looked for	-	+	G	Cured	-	83	-	83
34	Mabel Diaper	5	F	Definite	-	-	-	-	+	+	Free	Removed Stump buried	-	P	Cured	-	29	5	24
35	Edith Pearce	16	F	Definite	Acute	+	-	+	+	Bound to pelvis	Bound to pelvis	Removed Stump buried	+	G	Cured	-	77	-	77
36	Ruth Harding	25	F	Definite	-	-	-	-	-	+	Free	Removed Stump buried	-	M	Cured	-	60	21	39
37	Kate Smith	36	F	Definite	Acute	-	+	+	++	-	Disintegrated	Removed, Stump not buried	+	M	Cured	-	75	-	75

See Case 3. The same case as referred to above. Was all right for three months, when large swelling came up under old scar. On admission this was on the point of bursting externally. She had little or no pain. Temperature and pulse raised. The abscess was opened, contents being very thin and watery pus. The temperature and pulse fell at once, and the wound healed after some time. Six months later she had had no return of the trouble. The appendix probably came completely away in the last abscess.

Uneventful recovery.

The appendix had perforated in two places, and the last inch was quite gangrenous. It was only dealt with with considerable difficulty owing to its very deep adhesions in the pelvis. There was a considerable amount of general peritonitis present - confined to right side. The wound healed up slowly as the drains had to be left in for a considerable time, and there was at first a large amount of discharge.

Phlebitis of left leg when convalescent, otherwise uneventful recovery.

A large localised abscess was situated in the iliac region. No definite appendix could be made out, owing to the very numerous adhesions present. The discharge took a considerable time to clear up after the operation.

No	Name	Age	Sex	History	Condition	General Peritonitis	Localized Abscess	Gangrenous Appendix	Adhesions Present	Inflamed Appendix	Position of Appendix	Treatment of Appendix	Drainage	Operator	Result		Days in Hospital		
															Cured	Death	Ward	Before Operation	After Operation
38	Edwin Castle	12	M	Definite	Acute	++	-	+	-	-	Free	Removed, Stump not buried	+	M	-	Death	1	-	1
39	Katherine Hobson	52	F	Definite	Acute	-	-	+	-	-	Free	Removed, Stump not buried	-	G	Cured	-	30	-	30
40	C. Hawthorne	12	M	Definite	Acute	+	+	+	+	-	Matted	Removed, Stump not buried	+	M	Cured	-	65	-	65

The history in this case pointed to general peritonitis having been present for 48 hours previous to admission. Operation was undertaken immediately, but the amount of peritonitis gave no hope of any recovery. The tissues of the coecum were so rotten and sodden, that any attempt to stitch it resulted in the suture cutting through immediately; the stump was therefore not buried. The boy died twelve hours later.

Uneventful recovery.

Considerable amount of peritonitis present. Also dense adhesions. The appendix was gangrenous for two inches. The peritonitis was recent and not diffuse. A concretion was found loose near the appendix. A considerable amount of drainage was used here, and eventually the wound healed completely. After being kept under observation for two months as an out-patient, he was allowed to go away for change of air. Within two days he had an attack of severe indigestion, and was diagnosed to be suffering from obstruction of the bowel, and was removed to the nearest hospital. Incredible as it may seem, he was not properly examined for 12 hours after admission, and was not operated upon till more than 24 hours after admission. He was by this time moribund and died shortly after, Nothing was found at the operation, save an adhesion which was

(cont)

No	Name	Age	Sex	History	Condition	General Peritonitis	Localised Abscess	Gangrenous Appendix	Adhesions Present	Tumescant Appendix	Position of Appendix	Treatment of Appendix	Drainage	Operator	Result		Days in Hospital		
															Cured	Death	Total	Before Operation	After Operation
40	C. Hawthorne (cont)	12	M	Definite	Acute	+	+	+	+	-	Matted	Removed, Stump not buried	+	M	Cured	-	65	-	65
41	William Pomroy	19	M	Definite	Acute	+	-	+	++	-	Matted	Removed, Stump not buried	+	M	Cured	-	65	-	65
42	Margaret Green	25	F	Definite	-	-	-	-	-	+	Free	Removed, Stump buried	-	P	Cured	-	32	3	29
43	Fred Dorey	20	M	Definite	Acute	-	-	+	-	-	Free	Removed, Stump buried	-	M	Cured	-	33	-	33
44	Evelyn Stalwood	6	F	Definite	Acute	+	-	+	-	-	Free	Removed, Stump buried	+	G	Cured	-	46	-	46
45	Fanny Champion	21	F	Definite	Acute	-	-	+	-	-	Free	Removed, Stump buried	-	G	Cured	-	29	-	29
46	Daisy Barker	20	F	Definite	Acute	+	-	+	+	-	Matted	Removed, Stump not buried	+	M	Cured	-	74	-	74

No 40 (cont).

constricting the terminal portion of the small intestine. I have no doubt that had he been properly attended to, he would have been alive now. I understand that an enquiry was made into the circumstances attending the case by the board of the hospital.

This case was almost identical with the last, except that he had no further trouble after leaving the hospital.

Uneventful recovery.

Uneventful recovery.

Uneventful recovery.

Uneventful recovery.

There was a very large circumscribed abscess in this case extending beyond the middle line. The appendix could be reached and was removed, but it was impossible to get at the stump and bury it. A very copious foul discharge persisted for a long time - which was not surprising considering the enormous size of the abscess - nearly as large as a foetal head.

No	Name	Age	Sex	History	Condition	General Peritonitis	Localised Abscess	Gangrenous Appendix	Adhesions Present	Inflamed Appendix	Position of Appendix	Treatment of Appendix	Irrigation	Operator	Result		Days in Hospital		
															Cured	Death	Total	Before operation	After operation
47	Samuel James	37	M	Definite	Acute	++	-	+	+++	-	Up by Kidney posteriorly	Removed, Stump buried	+	H.S.	-	Death	3	-	3
48	Frank Seymour	12	M	Definite	Acute	-	+	+	+	-	Matted	Removed, Stump not buried	+	P	Cured	-	50	-	50
49	Cyril Browne	14	M	Definite	Acute	+	-	+	+	-	Matted	Removed, Stump buried	+	M	Cured	-	64	-	64

Came in a very weak state, with advanced general peritonitis. A large mass of small intestine seemed extremely congested, and semi-gangrenous. Not much pus found. All intestines matted together to a great extent by recent adhesions. Appendix found away up under the ascending colon in apposition to the upper part of the right kidney. The small intestine above referred to seemed paralysed. Nothing was found either at the time of the operation, or at the subsequent post-mortem to account for this condition, which was possibly due to embolism of a large branch of the mesenteric artery.

The appendix was situated in a very foul abscess with thick walls, and it was considered safer not to bury the stump here, on account of the danger of causing infection of the general peritoneal cavity.

There was slight localised peritonitis in this case round the appendix, but the infection was not limited in any way. A considerable amount of gauze was therefore used for drainage purposes, and after three or four days the discharge became very copious and very foul. There was no sign of a foecal fistula. In the end the discharge dried up quickly and there was no gaping of the abdominal wound.

No	Name	Age	Sex	History	Condition	General Peritonitis	Localised Abscess	Gangrenous Appendix	Adhesions Present	Tumescant Appendix	Position of Appendix	Treatment of Appendix	Drainage	Operator	Result		Days in Hospital		
															Cured	Death	Total	Before Operation	After Operation
50	Cissie Hill	19	F	Definite	-	-	-	-	-	+	Free	Removed Stump buried	-	P	Cured	-	41	13	28
51	William Marshall	10	M	Definite	-	-	-	-	+	+	Nearly free	Removed Stump buried	-	G	Cured	-	29	4	25
52	Minnie Tyler	10	F	Definite	Acute	-	+	+	+	-	Adherent to caecum.	Removed Stump buried	+	P	Cured	-	30	-	30
53	Frank Miller	29	M	Definite	Acute	-	-	-	-	+	Free	Removed Stump buried	-	P	Cured	-	28	4	24
54	Florence Doran	25	F	Definite	-	-	-	-	-	+	Free	Removed Stump buried	-	P	Cured	-	37	12	25
55	Charles Picketts	13	M	Definite	-	-	-	-	-	+	Free	Removed Stump buried	-	P	Cured	-	27	2	25
56	Leonard Johnson	16	M	Definite	Acute	-	+	+	++	-	Bound down behind	Removed Stump buried	+	P	Cured	-	64	1	63
57	Claud Baker	19	M	Definite	Acute	+	-	-	-	-	Free. Strictured.	Removed Stump buried	-	M	Cured	-	27	-	27
58	F. Bellamy	28	M	Definite	-	-	-	-	+	+	Bound to caecum	Removed Stump buried	-	M	Cured	-	26	4	22
59	Amy West	44	F	Definite	-	-	-	-	-	+	Free	Removed Stump buried	-	M	Cured	-	26	3	23
60	William Welland	20	M	Definite	-	-	-	-	++	+	Bound beneath caecum	Removed Stump buried	-	M	Cured	-	31	3	28

Uneventful recovery.

Uneventful recovery.

Uneventful recovery.

Uneventful recovery.

Uneventful recovery.

Uneventful recovery.

The adhesions in this case were exceptionally firm, and difficult to break down. The wound broke down gradually, and discharged freely for a very long time. Eventually all the deep stitches came away, and the wound healed by granulation. The scar was quite firm, and six months afterwards there was no sign of hernia.

Uneventful recovery.

Uneventful recovery.

Uneventful recovery.

Uneventful recovery.

No	Name	Age	Sex	History	Condition	General Peritonitis	Localised Abscess	Gangrenous Appendix	Adhesions Present	Tumescant Appendix	Position of Appendix	Treatment of Appendix	Drainage	Operator	Result		Days in Hospital		
															Cured	Dealt	Still	Refr	After Operation
61	Bertha Fenwillet	10	F	Definite	Acute	-	++	+	+	-	Not found	-	+	P	Cured	-	68	1	67

This case was remarkable in the symptoms it presented before operation. I saw the case very late one night, when it presented typical signs of peritonitis. Owing to a misunderstanding it was not operated upon immediately. The surgeon in charge of the case had seen it before I did, and we both saw it together early on the following morning. The child was then to all intents and purposes perfectly well. No pain - sitting up in bed quite happy - pulse and temperature fallen to normal (no drugs had been given) and the only witness to what I had seen the night before was the temperature chart. The surgeon told me that she was now in very much the same condition as when he had seen her the night before. However he decided to operate immediately, rather against his better judgment so he told me afterwards, and we discovered a local abscess, which had burst into the general peritoneal cavity, setting up general peritonitis of an acute variety. This was treated with multiple incisions and free drainage, and the child recovered after discharging freely for several weeks. I am totally at a loss to account for the child's condition on the morning of her operation. The abscess probably ruptured between the times when the surgeon examined her in the evening and when I saw her very much later on.

No	Name	Age	Sex	History	Condition	General Peritonitis	Localised Abscess	Gangrenous Appendix	Adhesions Present	Quiescent Appendix	Position of Appendix	Treatment of Appendix	Drainage	Operator	Result		Days in Hospital		
															Cured	Death	Total	Refr. after operation	
62	Lucy Edwards	18	F	Definite	Acute	-	-	+	-	-	Behind caecum	Removed. Stump buried	+	P	Cured	-	44	-	44
63	Ernest Holloway	8	M	Definite	Acute	+	+	+	-	-	Not discovered	-	++	F	-	Death	15	2	13
64	Kate Aording	41	F	Definite	-	-	-	-	-	+	Free	Removed. Stump buried	-	M.	Cured	-	28	3	25
65	Rose Searle	19	F	Definite	-	-	-	-	-	+	Free	Removed. Stump buried	-	P	Cured	-	27	2	25
66	William Stomer	20	M	Definite	Acute	++	-	-	+++	-	-	Removed. Stump buried	+	M	Cured	-	90	8	82
67	Hellie Hindry	19	F	Definite	Acute	-	-	+	-	-	Free-hung ready to burst	Removed. Stump buried	-	M	Cured	-	28	-	28

Discharged freely for some time.

There was marked peritonitis of an acute variety, and not localised at all. Only the one incision was made over the appendix. Later on an abscess on the left hand side was opened, and an attempt made to drain the abdomen more thoroughly, but by this time there were dense adhesions everywhere, and little resulted. In my opinion the first operation was not nearly thorough enough - and the second was put off far too long. Had the appendix been sought for carefully and extracted, I should have expected a more favourable result. The age of the child, and the evident severity of the infection were however against a successful issue.

Uneventful recovery.

Uneventful recovery.

The appendix was extremely difficult to discover as all the intestines were densely matted together, and had lost their normal positions and relations. It was removed eventually and the stump buried, but a persistent sinus resulted, which refused to heal for a long time. In the end it closed up quite suddenly, and for no apparent cause.

Uneventful recovery.

No	Name	Age	Sex	History	Condition	General Peritonitis	Localised Abscess	Gangrenous Appendix	Adhesions Present	Tender Appendix	Position of Appendix	Treatment of Appendix	Drainage	Operator	Result		Days in Hospital		
															Cured	Death	Total	Before operation	After operation
68	Emily Scott	12	F.	Definite	-	-	-	-	-	+	Free-kinked -stenosed	Removed. Stump buried	-	M	Cured	-	31	3	28
69	Harry Sharp	24	M	Definite	-	-	-	-	-	-	Free	Removed. Stump buried	-	M	Cured	-	25	2	23
70	Edward Gunn	39	M	Definite	Acute	+	++-	++	-	-	Free	Removed. Stump buried	+	M	-	Death	2	-	2
71	Willa Townsend	10	M	Definite	Acute	+	-	+	+	-	Free	Removed. Stump buried	-	P	Cured	-	40	-	40

Uneventful recovery.

Uneventful recovery.

There was a history which pointed to perforation of the appendix 24 hours before admission. He was operated on immediately and the appendix was dealt with without much difficulty. The intestines were red and distended, but did not show much sign of acute peritonitis. They seemed to be paralysed. A search was made at the time of operation for any possible obstruction, but nothing was discovered. Death took place 48 hours after operation, and at the subsequent post-mortem examination all the small intestine was found to be very much infected and distended, but there was no obstruction anywhere. This man probably died from the effects of toxic absorption from a paralysed bowel. I believe that this is a much commoner cause of death than is usually recognised.

There was a certain amount of localised peritonitis, and a completely gangrenous appendix on the point of bursting. The appendix was removed and the stump buried with some difficulty, owing to the sodden condition of the peritoneum covering the coecum. The experiment was tried here of closing the wound without drainage. It gave excellent results, but unfortunately the skin wound broke down and caused delay. The suppuration did not reach the muscular layers.

No	Name	Age	Sex	History	Condition	General Peritonitis	Localised Abscess	Gangrenous Appendix	Adhesions Present	Inflamed Appendix	Position of Appendix	Treatment of Appendix	Drainage	Operator	Result		Days in Hospital		
															Cured	Death	Total	Before Operation	After Operation
72	Emily Gibson	49	F	Definite	Acute	++	-	+	-	-	Free	Removed Stump buried	++	M	Cured	-	44	-	44
73	Ellen Hopwood	29	F	Definite	-	-	-	-	-	+	Free-stenosed	Removed. Stump buried	-	M	Cured	-	30	6	24
74	Lucy Maggeridge	21	F	Definite	-	-	-	-	+	-	Only stump found	Removed Stump buried	-	M	Cured	-	42	6	36
75	Barry Digweed	21	M	Definite	Acute	-	+	+	+	-	at bottom of large abscess	Removed. Stump not buried	++	M	Cured	-	39	-	39
76	Clara Ford	28	F	-	-	-	-	-	+	+	Behind caecum	Removed. Stump buried	-	M	Cured	-	46	2	44
77	Winifred Howland	23	F	Definite	-	-	-	-	+	+	Bound down to caecum throughout	Removed. Stump buried	-	M	Cured	-	31	3	28
78	Suey Meeks	10	F	Definite	Acute	-	++	+	++	-	In abscess cavity	Removed. Stump buried	+	M	Cured	-	80	-	80
79	John Gustace Thomas Marchion	48 26	M	Definite	-	-	-	-	+	+	Kinked & stenosed. Stump adherent to caecum	Removed Stump buried	-	H.S. M	Cured	-	56	4	52
80	John Fuggey	57	M	Definite	-	-	-	-	+	+	Kinked & stenosed. Adherent to caecum	Removed. Stump buried	-	M	Cured	-	42	10	32
81	Mabel Hodge	22	F	-	-	-	-	-	-	+	Free	Removed. Stump buried.	-	M	Cured	-	32	-	32
82	Lovatt Wallb	17	M	Definite	-	-	-	-	++	+	Bound to caecum	Removed. Stump buried.	-	M	Cured	-	34	-	34

The appendix was perforated, and there was a large amount of free pus in its vicinity. The surrounding coils of intestine were very much inflamed. The perforation was supposed to have occurred about eight hours before operation. The wound drained freely, and the patient's condition never gave rise to the slightest anxiety.

Uneventful recovery.

Uneventful recovery.

Uneventful recovery.

Uneventful recovery.

Uneventful recovery.

Very large abscess - healed slowly - no complications.

Uneventful recovery.

Uneventful recovery.

Uneventful recovery.

Uneventful recovery.

No	Name	Age	Sex	History	Condition	General Peritonitis	Localised Abscess	Gangrenous Appendix	Adhesions present	Quiescent Appendix	Position of Appendix	Treatment of Appendix	Gangrene	Operator	Result		Days in Hospital		
															Cured	Death	Total	Before Operation	After Operation
83	Thomas Michlin	26	M	-	-	-	-	-	+	+	In hernial sac R.I.	Removed. Stump buried	-	H.S.	Cured	-	28	2	26
84	George Deane	42	M	Definite	Acute	-	+	+	++	-	appendix not found	-	++	M	-	Death	4	-	4
85	Albert Orbata	18	M	Definite	-	-	-	-	+	+	Bound to caecum. Very long.	Removed. Stump buried	-	M	Cured	-	37	15	22
86	Maurice Fougnet	19	M	Definite	Acute	+	-	+	-	-	Free. on point of bursting	Removed. Stump buried	+	M	Cured	-	33	-	33

Patient was operated on for right inguinal hernia of some years duration, and which had latterly been giving rise to pain. Intestine came down into the sac, but could easily be returned into the abdomen again. At the time of operation the only content of the hernial sac was an adherent appendix in a quiescent condition, but with two well marked strictures in it. It was removed and the stump buried in the caecum in the usual way, and the rest of the operation for repair of the inguinal canal was then proceeded with. He made an uneventful recovery.

Came into hospital in a very weak state. Diagnosis of perforating appendicitis was made, but was found to be wrong at the time of operation, when only a very large foul abscess was discovered. Patient took the anaesthetic badly, and as the search for the appendix showed signs of being a very long one, the abscess was packed with gauze, and the wound closed. On the second day a foecal fistula developed, and two days later death ensued. I could not find any definite cause of death here. His operation was of course put off far too long.

Uneventful recovery.

Uneventful recovery.

No	Name	Age	Sex	History	Condition	General Peritonitis	Localised Abscess	Gangrenous Appendix	Adhesions Present	Quiescent Appendix	Position of Appendix	Treatment of Appendix	Drainage	Operator	Result		Days in Hospital			
															Cured	Death	Total	Before After operation		
87	George Edmond	16	M	Definite	Acute	+	-	+	+	-	Tip left behind Much matting	Removed Stump buried	+	F	Cured	-	30	-	30	Uneventful recovery.
88	Albert Ballard	13	M	Definite	-	-	-	-	+	+	Free	Removed. Stump buried	-	F	Cured	-	26	2	24	Uneventful recovery.
89	Joseph Gregory	8	M	Definite	Acute	-	+	-	+	-	Not found	-	+	G	Cured	-	58	-	58	Discharged very freely for a long time.
90	Edwin Crowe	24	M	Definite	-	-	-	-	-	+	Free	Removed. Stump buried	-	P.	Cured	-	36	3	33	Uneventful recovery.
91	Moral Wira	36	F	-	-	-	-	-	+	+	Free	Removed. Stump buried	-	G	Cured	-	40	8	32	Uneventful recovery.
92	Harriet Thomson	27	F	Definite	Acute	-	-	-	-	+	Free	Removed. Stump buried	-	G	Cured	-	30	-	30	Appendix contained actual shot.
93	Jemina Gordon	50	F	Definite	Acute	+	+	+	+	-	In abscess cavity	Removed. Stump buried	+	G	Cured	-	60	-	60	Drained for some time. Uneventful recovery.
94	Rovnia Watts	23	F	Definite	Acute	-	-	-	+	-	Hinted	Removed. Stump buried	-	M	Cured	-	31	1	30	Drained freely for some time.
95	Harriet Wiggins	21	F	Definite	Acute	-	+	-	++	-	Appendix not searched for	-	+	G	Cured	-	48	-	48	Uneventful recovery.
96	Edith Pope	24	F	Definite	Acute	+	-	-	+	-	Hinted matted	Removed. Stump buried	-	P	Cured	-	29	-	29	Complicated by bronchopneumonia. Wound healed slowly but without trouble.
97	Rosa Morris	14	F	Definite	Acute	+	+	+	++	-	In abscess cavity free	Removed. Stump buried	+	M	Cured	-	70	-	70	Uneventful recovery.
98	Alfred Hawkins	29	M	Definite	-	-	-	-	+	+	Down to pelvis	Removed. Stump buried	-	M	Cured	-	50	23	27	

99	William Hunt	43	M	Definite	Acute	+	-	-	+	-	Bound down to caecum	Removed Stump buried	+	M	Cured	-	90	-	90
100	Joseph Chapman	34	M	Definite	Acute	-	-	+	-	-	Free & ready to burst	Removed Stump buried	-	M	Cured	-	26	-	26

Faecal fistula about three weeks after operation .
Healed slowly afterwards.

Uneventful recovery.

CONCLUSIONS TO BE DRAWN FROM CASES.

The number of cases was 100.

Sex.

Of these exactly half were males and half females.

Average time in hospital.

The average stay in hospital works out at 44.5 days.

,, ,, ,, before operation was 3.5 days

,, ,, ,, after operation was 41 days.

Taking five weeks as a reasonable time for an average case to stay in hospital after operation, we find that the average stay of those cases which remained in not more than five weeks (excluding those that died) was 28 days. These cases amounted to rather more than half the total number.

39 cases remained in hospital longer than five weeks after operation. Their average stay was 66 days.

Mortality.

Seven cases died.

Of the total cases, 38 were quiescent, and one died, being a mortality of 3 per cent in these cases.

Of the acute cases, 62 in number, six died, being a mortality of 10 per cent in these cases.

Of the acute cases with general peritonitis present, five died, in 27 cases, being a mortality of 20 per cent in these cases.

But of the thirty-five acute cases without general peritonitis present, only one died, being a mortality of 3 per cent in these cases.

The average time before death in the seven fatal cases was 4 days.

From these figures it will I think be obvious first of all that operation in the acute stage, where general peritonitis is not present, is no more fatal to life than is the operation undertaken in the quiescent period; and by this I mean where the appendicitis has really subsided - not merely where it has been thought to have done so before operation.

Secondly it will be noticed that the death rate is very much higher in those cases in which general peritonitis is present. The difference here is between 20 per cent in these cases and 3 per cent in all other cases.

The most important thing therefore is to operate before the peritoneum can be infected.

As regards the general mortality in a series embracing such a high percentage of acute cases as does this one, I believe that the returns here give a somewhat lower figure than is common. I am inclined to put this down to the general principle which was adopted of operating at the earliest opportunity. This principle was sometimes transgressed, but I have never seen any

case where its fulfilment was not abundantly justified, and in several instances where it was disregarded, the consequences were most unfortunate.

Of the cases in which there was no general peritonitis, and where adhesions were not present, only three remained in hospital for a longer period than five weeks after the operation.

Of these three, one was delayed by an attack of acute rheumatic fever and the second developed thrombosis of the left leg during her convalescence.

Had all the cases therefore been operated upon during their first attack, the length of the convalescent period would have been greatly reduced.

While I am convinced that stenosis of the appendix is commonly present before the first definite attack of appendicitis occurs, I do not think that adhesions can ever spring up before this happens.

As regards general peritonitis, there is on nearly every occasion plenty of time to perform an operation before this can occur. In those very rare cases where perforation is practically the first symptom, I do not think that the mortality will ever be reduced very much. The severity of the infection and its rapid extension cannot be easily counteracted by any measures within our knowledge at the present time. No case of this sort occurs in the present series, but they have been reported from time to time.

The only fatal case in this series, No 63, operated upon during a first attack, might in my opinion have been saved had the operator only been more thorough in his methods. He made no attempt to drain a general peritoneal cavity which was acutely infected in all directions, save through a small opening in the original wound.

In speaking of the operation of appendicectomy, I laid considerable stress on the necessity of removing the appendix in all cases, and of burying the stump where this is possible.

The following points are therefore instructive.

Out of the seven deaths, five occurred in cases where the appendix was not found, or where the stump was not buried.

In these cases, where death did not occur, the convalescent period was greatly prolonged, lasting an average of 84 days as compared with 35.5 days in cases where the appendix was removed and the stump buried.

The cases were as follows -

A. Where the appendix was not removed.

No 3. Operator Mr G. Large abscess present. Search was difficult, but was not sufficiently persisted in. Result being that despite free drainage at the first operation, she returned later on with a second large abscess. Complete recovery with 137 days in hospital after her operation.

- No 6. Operator Mr M. No sign of appendix could be discovered. There was a very foul abscess present containing shreds of debris etc., and the appendix was supposed to have become disintegrated in the abscess cavity. Result - cure in 43 days.
- No 16. Operator Mr M. The appendix was not discovered, in spite of prolonged search. Free drainage was instituted, and resulted in a weak scar and eventual signs of commencing ventral hernia. A second operation was successfully performed to cure this, and the fact that a cystic ovary was found at the same time cannot prevent the time occupied by this second operation being put down to the credit of the original appendicitis. Eventual result - cure in 167 days.
- No 27. Operator Mr F. On finding a small abscess Mr F. refused to look for the appendix further, and was content with drainage of the abscess cavity. Result - cure in 119 days.
- No 58. Operator Mr P. No sign of any appendix could be discovered in a very acute abscess cavity. Result - cure in 67 days.

No 63. Operator Mr F. The search was not persisted in at all. Result - death.

No 80. Operator Mr M. After some time the search for the appendix was abandoned on account of the difficulty experienced in finding it, and also because the general condition of the patient was so bad under the anaesthetic. Result - death.

No 89. Operator Mr M. The appendix was located in the very thick wall of a foul abscess cavity. It was considered safer not to interfere with it. Result - cure in 58 days.

No 95. Operator Mr G. Similar to No 89. Result - cure in 48 days.

B. Where the appendix was removed, but where the stump was not buried.

No 4. Operator Mr M. The stump was in the wall of an abscess cavity, and burial was not feasible. Result - death.

No 11. Operator Mr P. The tissues were too rotten to hold the stitches. The attempt to bury the stump was therefore abandoned. Result - cure in 83 days.

- No 14. Operator Mr M. Burial of the stump here would have involved the freeing of the coecum from dense adhesions. On account of the laceration of the parts which would have been caused by this procedure, the attempt was abandoned. Result - cure in 36 days.
- No 21. Operator Mr M. A large abscess cavity whose walls were made up of coils of intestine matted together by very dense adhesions. It was considered advisable here to abandon the attempt to bury the stump, on account of the danger of lacerating some portion of the bowel, and on account of the loss of time which such an attempt would have involved. Result - cure in 217 days.
- No 32. Operator Mr F. In freeing the appendix from a mass of matted adhesions, Mr F. opened a small suppurating gland. He thereupon cut off the appendix and closed the wound with drainage. No attempt was made to bury the stump, though this could easily have been done here. The cause of death, which occurred within 30 hours after operation, was quite obscure. Post-mortem there was no sign of peritonitis, yet the symptoms pointed to some sort of septic intoxication. The abdomen was not flushed out.

- No 37. Operator Mr M. Appendix was lying loose in the bottom of a large foul abscess. It was about 7 cm. long, and was gangrenous. No sign of the stump could be made out in the wall of the abscess cavity. Result - cured in 75 days.
- No 38. Operator Mr M. The tissues were too rotten to hold stitches. A round needle cut through them like a knife. Result - death.
- No 40. Operator Mr M. Same as No 38. Result - cure in 65 days.
- No 41. Operator Mr M. Very dense adhesions everywhere. It would have meant too much dissection to get a large enough free portion of the coecum to bury the stump in. Result - cure in 65 days.
- No 46. Operator Mr M. Practically identical with No 41. Result - cure in 74 days.
- No 48. Operator Mr P. A very foul abscess cavity - stump not buried on account of the danger of spreading the infection. Result - cure in 50 days.
- No 75. Operator Mr M. A very foul abscess, with thin walls, which were inclined to tear easily. It was thought advisable to disturb things as little as possible. Result - cure in 39 days.

Of course statistics are notoriously misleading, and in this instance - e.g. the removal of the appendix and the burial of the stump - I may be accused of confusing cause and effect. The fact that the above cases showed such a high mortality, and took so much longer to cure, may be put down to the fact that it was only in the worst cases that it was impossible to deal with the appendix properly.

Whatever way this is looked at, the fact remains that the Prognosis in these cases is very much more serious than in the other cases.

S U M M A R Y .

Appendicitis is a disease which has only very recently - within the last twenty years - been studied at all.

The pathology of the disease shows us that it occurs in attacks of three kinds - acute, medium, and very mild.

In the acute variety the disease is well understood and the treatment is acknowledged by everyone to be immediate operative interference.

In the mild variety, the symptoms are so slight that the disease cannot be definitely recognised. Nevertheless pathological changes occur in the appendix which produce serious results later on.

In the medium variety, the symptoms are definite but the treatment varies.

Appendicectomy during the height of a first attack is a perfectly safe operation, as well as a simple one.

Appendicectomy during the quiescent period after an attack is no safer, and is far more liable to be a difficult operation. Convalescence is prolonged.

The expectant treatment of a medium attack is unsafe and unreliable. Further attacks are almost certain to occur, and operation is called for in the long run - but the operation after several attacks is attended by difficulties and dangers which are not present in an operation during the first attack.

The questions set down in the Preface may therefore be answered thus:-

Definite recognisable appendicitis should be transferred entirely to the domain of surgery. Appendectomy should not however be left to the specialist. When done at the right time it is a simple operation which can and should be performed by every medical practitioner.

Appendicitis should always be treated surgically except under circumstances where extraneous considerations make the operation a greater risk than the disease.

The present mortality of the disease could be immensely reduced were all cases operated on as soon as the condition was diagnosed. Under these circumstances the mortality should not exceed 2-3 per cent. The present mortality of the disease being from 7 to 10 per cent in all cases.

The one rule of treatment should be that directly appendicitis is diagnosed, an operation should be performed at the earliest possible moment.