The Treatment of Appendicitis

John Allan, M.B., Ch.B. 1903
In the Annals of Medicine there is no branch which has undergone such rapid changes and progressive development as in the treatment of abdominal diseases. Until quite recently the abdominal cavity was looked upon as the privileged preserves of the physician, but now it has come to be the happy hunting ground of our younger and more enlightened surgeons. Formerly and not so very long ago, it was an unheard of thing to open into the peritoneal cavity, but now in some of our larger Hospitals it is an almost everyday occurrence. Some one or other once said 'abdominal surgery is abominable surgery,' but this is a maxim which no longer holds good. Old ideas have given place to new ones, old fashioned remedies, well tried, have been found wanting. Former fallacies have been swept away by modern methods, past prejudices have fallen before our present progressive policy.

Among abdominal diseases perhaps there is none so common, or at any rate none so frequently talked about as appendicitis. Judging from the attention devoted to this
disease by our lay confères one would think that it occurs much more frequently than formerly. But is this apparent great increase not more imaginary than real? That there has been some increase in the number of persons affected by this disease is undoubted, but then it is also true that in bygone days cases of appendicitis were not described as such, & skilled diagnosis had not reached such perfection as in our time. Carless has pointed out that it is now a well established fact that Dr. Allison in 1836 described it, but both in this country & in others the association of a localized abscess in the right iliac fossa with trouble in the appendix was overlooked & the caecum was considered the cause of the mischief. In France Dupuytren described a "phlegmon of the right iliac fossa", but maintained its caecal origin, this influence in maintaining this error was all-powerful until a comparatively recent date. The term periappendicitis occurs here & there in text books up till 1870, but always with the idea that the caecum was primarily at fault. The
general recognition of the part played by the appendix & certainly the treatment of appendicitis by surgery are subsequent to that date. Carless goes on to say “one cannot but conclude that there is an absolute increase in the frequency of the affection. As one looks back on the medical & surgical work of the eighties of last century, one realises that whilst there was an occasional case of generalised peritonitis from this cause, yet we did not see the cases which are so common nowadays & which frequently result in localised abscess urgently demanding surgical treatment. One cannot believe that our predecessors could have overlooked these abscesses in the right iliac fossa had they been at all common.”

Whether there has been much increase or not, it is true that appendicitis is a comparatively common ailment, & that affection of this little organ, the function of which has given rise to so much conjecture & discussion, frequently cause death. M‘Cwan \(^2\) at the opening of the 1904-05 Winter Session of the Charing Cross Medical School discussed in an able & interesting address the probable function
of the appendix. It is not, however, about its supposed function that I intend to deal with in this thesis. Whether it has a function or not I do not dispute (although I am inclined to believe it must play a part in the working of our intricate mechanism), but the fact remains that it is subject to pathological changes & inflammatory processes which necessitate our interference as medical men. It is the treatment I intend to discuss. It is a wide subject & one that has been much debated, debated as to whether the treatment should be medical or surgical. Many of our younger surgeons maintain that all cases require operative interference. With all their enthusiasm they apparently do not come up to their confères across the Atlantic, where it is said that if one's appendix has been removed one has for safety to wear a badge in one's buttonhole with the inscription "My Appendix has been removed." There is a story told of a man who had a fit in the street, & when his shirt was loosened there was seen in large letters the following inscription - "Only a fit! Don't operate on me for appendicitis!"
as my appendix has been twice removed already!' These gentlemen seem to forget that God intended us to use our eyes first and then our hands or put somewhat differently, 'Hear, see and then touch.' There are others in our profession who go to the other extreme, who will hardly hear of operative interference at all. With them the motto regarding the organ seems to be 'Requiescat in pace.' After the recovery of King Edward from his attack of appendicitis, thanksgiving services were being held in various churches, and at one of them the hymn 'Peace, Perfect Peace' was being sung, and it so happened that the hymn was at the very end of the book. 'Let us conclude our service,' said the minister, 'By singing the hymn 'Peace, Perfect Peace' in the appendix.' Now this is the goal we are all striving for, and the question arises as to the best means of attaining that. With our ever increasing knowledge it is possible to determine pretty exactly what cases should be operated on, what should not, and we can draw a fairly clear line of demarcation between the two. There is hardly any subject which has given rise to
so many conflicting opinions, few writers
could be found whose opinions exactly coincided.
The opinions of a few will suffice to illustrate
this diversity.

Such an eminent physician as Professor Adler
writes "There is no medical treatment of appendicitis?.
Haeberlin recommends operation as soon as
the diagnosis is established.

Paar at the German Surgical Congress in 1903
recommended early surgical interference, by which
he meant operation performed soon after the
appearance of the symptoms, though
these symptoms might be mild. But of 53 cases
of his, 21 were operated on within 48 hours of the
first appearance of the symptoms. He claimed
good results, his mortality being between 2 and 3 percent.

At a meeting of the British Medical Association
in July 1903 the medical treatment of
inflammation in the caecal region was discussed.
A number of those present expressed views in
favour of the medical treatment of appendicitis.

Mynser from a study of the subject concludes
that appendicitis is a surgical lesion and ought to
be treated by surgical means, as medicine is
unable to prophesy as to the results in a
given case or to prevent gangrene or perforation with resulting fatal peritonitis.

Hood in a little pamphlet has vigorously advocated medical means in the early treatment of appendicitis.

Treves does not believe in opening the abdomen in all cases. He advises immediate operation in all acute cases, and also where there is reason to suspect suppuration; but he is against indiscriminate operation. He points out that the greater proportion of attacks recover spontaneously, and that there is a high mortality in operation in cases in the acute stage—20 per cent.

Burney, who quotes largely from Treves' article, advises medical treatment in the majority of cases.

While expresses somewhat similar opinions. Russell in introducing the subject of the treatment of appendicitis at a meeting of the Edinburgh Medical-Chirurgical Society in 1903, while not actually condemning the Conservative School, stated that he would not be far from the radical position himself.

Repton at the same meeting said he would urge my medical friends to send for the surgeon the moment the attack commences in order
That the appendix may be removed at the beginning of the catarrhal attack." Rutherford Morrison writes: "In cases of appendicitis of the type which allows its possessor to attend business regularly and which never interferes with a dance there is grave doubt whether removal of the appendix is useful or even justifiable. But in cases that commence with acute pain and vomiting and are attended by inability to rest, elevation of temperature, quickening of the pulse, tenderness and rigidity of the abdomen—the sooner operation takes place the better. When some doubt has been felt at first, none should remain at the end of twenty-four hours. Every case in which all symptoms and signs are not improved in that time require operation; it is not enough that there may be benefitment in some of them." Richardson of Newcastle confirms this statement. Writing again recently, Morrison says: "It is now generally admitted that many of these cases get well and require no immediate operation. Such patients are obviously never seriously ill, and recover in a few days with rest and
abstinence from food & purgatives. A first attack, if entirely recovered from, need not be followed by an interval operation. A tender nodule or a variety of uneasy sensations or marked tenderness left after an attack demands operation. Relapse or recurrence of the illness is due to permanent pathological Changes in the appendix, & indicates excision as the safest treatment. The serious cases only should be dealt with by immediate operation, that is within the first 24 hours.

Schmitz, dealing with 116 papers representing Continental opinion sums up definitely against expectant measures. Except in slight acute cases all should be operated on within 48 hours. The others are generally interval cases. Lockwood, though an enthusiastic surgeon, admits that expectant measures have a legitimate place in the treatment of appendicitis.

Brook is speaking of the treatment of simple appendicitis during the attack says it. Here we are on extremely debatable ground. Some surgeons urging early operation & removal of the appendix; others, of whom I am one, holding that we should wait, & unless the
Symptoms point to fulmination, endeavour to tide the patient over the attack by rest & medical treatment.

Thomson & Miles write, "If within 24 hours of the onset there is a decided improvement in all the symptoms operation may be deferred, but the patient must be kept under continuous observation. We would advise operation in all cases seen within 24 hours of the onset, in which from the first the symptoms have been pronounced, & the temperature is rising & the pulse becoming more rapid or the pain persisting or increasing in severity; particularly if at the same time the abdomen is ceasing to move with respiration or is becoming more tender."

Dean believes that if seen at the commencement of the attack, the appendix should be removed. If not seen until 2 or 3 days after the commencement of the attack & if subsidence has set in he advises the tiding over of the attack by appropriate medical treatment, & he only advises surgical interference during this stage if the symptoms point to serious mischief.
Bishop writing on the subject sums up as follows what to his mind seems to be the consensus of opinion on the matter: "And the combined result appears to be this: there exists, at present, a widespread belief that in appendicitis we have an extremely dangerous and treacherous complaint, the course of which cannot be predicted in any given instance; that the most simple may have, without warning of any kind, a fatal ending; that medicine and nursing are alike powerless against it; that, when once abdominal pain, becoming localized in the right lower quadrant, vomiting, rise of temperature occur, there is no safety for the patient, or equanimity of mind for the surgeon, until that abdomen has been opened and the appendix removed; that at any moment after every case, gangrene or perforation may occur, and the whole abdominal cavity be flooded with pus, or other intensely poisonous material. Every case, therefore, should be operated upon as soon as seen, should, as it were, be shot on sight." In commenting on this he says: "I venture to enter a modest, but not the less firm, protest against this view." He points
out that Mr. Paul in his address to the Liverpool Medical Institute, Mr. James Berry have expressed opinions against these very advanced methods.

Steward writes: "If the case is seen within 48 hours after the onset of the attack, in my opinion operation should be performed at once in all cases. In this way I am convinced that many valuable lives will be saved. If the operation is done during this period — that is the first 48 hours — the risk is a small one, the gain a great one. For the appendix can always be removed, the wound is nearly every case closed at once. Then the patient is placed in safety, the attack is cut short, the possibility of future attacks eliminated."

Dowden says: "From my experience I have not the very slightest hesitation in saying that with our present powers of diagnosis the only logical lifesaving treatment for this disease is the removal of the appendix at the earliest possible moment."

Southam of Manchester & Burgess of Manchester have recently published statistics of appendicitis operations in which they point to the
advantages of early operation to its safety.

I could give the opinions of many others on this subject, but I think I have quoted more than sufficient to illustrate the great diversity of opinion on the treatment of appendicitis. In commenting on the above I may say that, if Mr. Wood's views mirror the opinion of the medical profession in Edinburgh at the present time, I am not in entire agreement with them. I am not prepared to deny that this early operative intervention may afford the best means of treatment, but I object to it, because some cases will be operated on unnecessarily, and that I consider is quite unjustifiable. The advocates of this method point out that the early operation is perfectly safe, but that does not make me alter my opinion. Be it safe or not, operation means that the patient will have to lie up for at least a month, to subject anyone to such a trial when he might have been cured by medical treatment does not seem to me to be scientifically sound. This leads me to the statement that in a certain percentage of cases medical means will effect a cure, and only those in general practice can testify
to such cases. I have discussed the question with many practitioners of long standing, and they have been able to quote cases in which patients have had attacks of appendicitis 15 or 20 years before, but in whom there has been no subsequent trouble. It seems to me that if this early operation is to be of use it must be done within 24 hours of the commencement of the attack, and I should like to point out that with all the weapons in our diagnostic armamentarium it is often extremely difficult to conclusively say within that time that the case is one of appendicitis. Later the condition is probably just reaching its acme, or it may be that subsidence has set in, or in such my opinion is that an operation, which before was safe, cannot now be undertaken without a certain element of danger. I am not referring to the culminating, perforating or gangrenous cases which necessitate prompt operation, but to those cases which, though acute, will settle down under medical treatment, but in which an operation, undertaken when the inflammatory process is at its height or is just beginning to subside,
may turn the scale against the patient. It will certainly cause the patient unnecessary suffering, if it does not risk his life. In case No. 67 of my series an operation was done on the third day when the symptoms were abating. The appendix was found to be intensely inflamed & congested, but there were no signs of perforation & the mucous membrane was not even ulcerated. For 48 hours after the operation he suffered from very acute pain which was only relieved by morphia. There was subsequently a little suppuration. Had this case been medically treated, it would most probably have subsided. The operation could then have been done a few days afterwards, & I feel sure that the recovery would have been uninterrupted & that the patient would not have suffered the agony like he did. The secret of the safety of the intervention during the quiescent stage seems to rest in the fact that the bacteria which before were active have lost their virulence or been killed, & the tissues have to a certain extent recovered their tone, & are better able to withstand or repel any organismal raid. An operation
cannot be done without to some extent damaging the tissues. In the case referred to the operation probably just did sufficient damage to give the bacteria their chance, and their initial raid possibly explained the pain. As the tissues recovered they were able to overcome the micro-organisms, and the result of the battle was evidenced by the pustule which later escaped.

The opinions held and the methods advocated by some who do not believe in early operation are unsatisfactory. In the first part of this thesis it shall be my endeavour to analyze the various cases to see if some form of treatment on a scientific basis cannot be advanced as an alternative to that of the school of early operators. The aim of every one be he physician or surgeon is to save life. To further reduce the heavy mortality in this condition now in many instances death supervenes, because the case has been left too long, therefore the patient dies in spite of, not because of, the operation. In dealing with the cases I shall take them as we may meet with them, but the classification is only a rough one and not scientifically.
sound. I venture to doubt if there will ever be a clinically scientific classification in the condition, because so great variation is exhibited in sequela, symptoms & course of appendicitis. There is hardly any disease regarding which it is so unsafe to make dogmatic statements. Each case has to be taken individually & many things have to be considered in deciding as to our course of action. Thus it is very difficult from a clinical point of view to "group" the cases, as I have already said, the classification which I adopt is only a rough one. Locock has demonstrated that pathologically, a fairly exact & scientific classification may be made - based, of course, on cases which have been submitted to operation.

I shall now proceed to elaborate my views on the subject. I neither support those who advocate immediate operation in every case, nor do I support those who too strenuously worship the God of medical treatment. I take up a position between the two extremes. My views will be developed as I proceed & what I suggest as a safe policy in treatment
will be more apparent.

In dealing with the cases first of all I shall take a class which is characterised by attacks of very slight severity which cause a certain amount of pain and discomfort for a few hours, but are not attended by the presence of a tumour. These attacks are generally brought on by apparently trivial causes, such as slight exertion etc. They may begin acutely, but there is never any suggestion of collapse, the severity of the symptoms diminishes in the course of the first 24 hours instead of increasing. There is rigidity of the muscles in the right iliac fossa, pain on pressure over Dr. Burney's point, but he tumour can be made out even under an anaesthetic. In these really slight cases where there has been no collapse where improvement has set in in 3 or 4 hours no operation is required if it was clear that the attack was brought on by some definite indiscretion on the part of the patient, for instance, by his eating something which disagreed with him, or by his indulging in violent exercise shortly after a heavy meal, or by his neglecting or
being unable to masticate his food properly, it is unnecessary to operate. If in future the cause is avoided no evil consequences will follow. These are the cases which men in general practice often see & a patient may never have another attack. Unless there were some strong indications for operation (such as I shall refer to afterwards) I should not advise operation in cases of this nature.

The following case may be taken to illustrate this group.

A. R. — a professional gentleman about 40 years of age had a slight attack of appendicitis towards the end of 1904. The attack followed a period of heavy work when his meals had been hurried & irregular. The symptoms & signs consisted in pain in the right iliac fossa with rigidity of the muscles over that region, tenderness on pressure over McBurney's point, purged twice, constipation & slight increase in the pulse rate. There were so few signs of collapse & no tumour could be felt in the right iliac fossa. Under medical treatment subsidence quickly took place the was about again in about 10 days. He has had no further attack. Without unduly restricting himself he is careful about his diet, he keeps his bowels regular, he does not overwork himself. In case No. 16 (R. H.) we have another case Illustrative of this group. This was a laundry man, aged 18, who had a mild attack of
appendicitis following acute indigestion. I was able to follow the case for 2 years, when I lost sight of the girl. During that time she had no recurrence although she did not take any particular dietetic or other precautions.

Passing on, I now take a group of cases in which the symptom at the beginning are of an acute character. The onset is generally sudden, there is severe abdominal pain, tenderness is elicited on pressure over McBurney's point, there may or may not be some fulness in the right iliac fossa, the temperature is high, the pulse rate is accelerated and there may be apparent collapse. The symptoms however abate in about 24 hours, and the attack terminates favourably in a few days. In this group also I believe that medical means afford the best method of treatment; and operation should certainly not be undertaken during the acute stage. Case 67 to which I have already referred comes under this group. The following is an illustrative case—

L.R. (case No. 25) a little girl 12 years of age was admitted to Hospital in August 1905. On the day before admission she was seized with sudden acute pain in the stomach and vomited once. The pain later became localized in the right iliac
On admission, her state was as follows - She lay propped back with the right leg drawn up, and complained of severe pain over the cecal region. There was great tenderness over this region, the muscles were kept rigid, and there was a fulness (hardly amounting to a tumour) in the region referred to. The tongue was furred, the bowels constipated, and the face bore an anxious expression. The pulse rate was 92, and the temperature 101.8°F. About 12 hours after admission the symptoms became less severe, and about a fortnight she had quite recovered under medical treatment.

Cases in this group begin acutely, but in from 24 to 48 hours subsidence sets in under suitable treatment, convalescence is quickly established. The appendix wall is markedly congested and acutely inflamed, but there is no actual destruction. Medical treatment will bring about recovery in these cases, and then the question of an interval operation can be discussed.

In the next place I shall consider a class of cases of a very different nature from those mentioned above. The class I refer to consists of the fulminating cases, where, from the very first, the attacks are most acute and severe, and instead of
Diminishing they go on getting steadily worse. There is marked collapse, rapid, running pulse, vomiting, excruciating pain which may be confined to the right iliac fossa or as is very often the case over the greater part of the abdomen, and marked abdominal distension and tympanitis. In these cases there can be no question that an operation is required. The question is when the operation should be done. Dr. Munsell Moulin is a strong advocate in these cases of what he calls a preventive operation, that is to say, the operation should be done at once before there has been time to allow of the general peritoneal cavity being infected. The argument brought forward by some opponents of this early operative procedure that the mortality in this increased is utterly worthless. The case without operation is hopeless and an operation gives the patient a chance of recovery and this chance of recovery is greater the sooner the operation is performed. The following case will serve to illustrate this point:

F. G. (Case No 61) a bright boy 12 years of age woke up during the night with excruciating abdominal pain which tended to be of greater severity in the right abdomen. He was sick and vomited. Hot fomentations to the abdomen
had little effect in alleviating the symptoms. He spent a very restless night, suffering pain all the time with occasional bouts of very severe pain. On the morning of the day following he was seen by a medical man who advised his immediate removal to hospital. He was admitted about 2.30 p.m. on October 3rd, 1907. On admission he lay on his back with the right leg drawn up. Breathing was almost entirely thoracic. He complained of pain in the right iliac fossa. Attempts to examine that region apparently caused much intense agony that they had to be deserted from. The pulse rate was 130 and temperature 97.4°. The medical man who had seen him in the forenoon then found the pulse 112 and temperature 101.2°, so that there had been an increase in the pulse rate and a decided drop in the temperature, both signs of undoubted gravity. The face conveyed the impression of intense suffering and reflected in no uncertain manner the gravity of the condition. The abdomen was opened about an hour after his admission to hospital, and the appendix was found to be gangrenous and perforated, the gangrene lying in a small faecal abscess. It was removed and a drainage tube was put in. The boy tolerated the anaesthetic (ether) very badly, indeed during the whole operation he was on the verge of a fatal collapse. For the next 24 hours he lay between life and death, but by the use of normal saline enemata and by judicious
Stimulation was induced over the dangerous stage; and after 48 hours his progress towards recovery was rapid. His condition caused but little anxiety. He was discharged on October 31st.

The mortality of fulminating appendicitis is enormous. This case indicates that prompt operation affords a means of saving life. The operation was done in less than 24 hours from the onset; another 24 hours delay would probably have rendered the case hopeless. Fortunately, the percentage of fulminating cases is small, only about 1 percent, but if the cases are recognised at once and early, then the mortality should be small treated by operation. Another argument commonly brought forward against early operation is that some cases would be operates upon which would recover without operation. It is an argument as worthless as the one mentioned above and is one which has no foundation on fact. The cases which I am now considering under the name fulminating constitute a small but distinct class — a group, characterized by intense local changes plus toxemia in which the only chance of saving the patient's life is immediate operation. As I have previously mentioned it only occurs in about
In a case in 100, so that the practitioner must always be on the look out for such cases. Once seen, it cannot be mistaken, for the clinical picture is quite different from that exhibited by in an acute case where perforation occurs. What I understand as fulminating cases never recover if left to chance, and I am extremely sceptical about any records which chronicle the recovery of fulminating cases of appendicitis under medical treatment. They may have been very acute cases, but in my opinion, they could not have been fulminating cases. At any rate statistics go to prove that cases not operated on, if left too long before operation is done have a very heavy mortality. Different authors give different figures, but they all prove that if things are left to chance or if there is procrastination as regards operation, it is a bad look out for the patient. In view of the appalling mortality of fulminating appendicitis, in view of the fatal outlook of such cases if left to nature, the importance to the proved beneficial results of early operation, I should always advise immediate operation for these patients, in fact this is the only variety of appendicitis
in which I advise immediate operation.

Still talking of severe cases let me say a few words about a class of cases in which the symptoms come on most acutely apparently with even greater severity than in the class I have just spoken of above. The attack sets in with violent pain and sickness, high temperature, a rapid pulse, and great flatulent distension of the bowels. If the blood is examined a high leucocyte count is registered and the leucocytosis is progressive. The acute symptoms are maintained for 24 or 36 hours and just as the surgeon may be thinking of operating there is a sudden change. The acuteness of the various symptoms disappears, the pulse rate lessens, there is a gradual fall (not a sudden drop) of temperature, the leucocyte curve falls, and if looked for pus will as a rule be detected in the stools. In these the indication is not for operative interference and removal of the appendix, but rather the contrary, especially if the patient is an adult. Indeed if you find that an adult has an acute attack of such severity as to threaten life, the
probability is that there may be no necessity to operate for removal of the appendix, because it is very likely that it may have been destroyed. In some such cases as these you will find a definite history that pus has been passed by the bowel, and if you can definitely ascertain that pus has been passed you may say that there will be no necessity for operation, for the severity of the attack has resulted from an inflammation which has exterminated the very organ which was the seat of mischief. The minute abscess which forms to discharged into the caecum and the pus and effete products are carried away in the alvine discharges. Nature不失时机 seals up the opening, the patient's danger is over, and a permanent cure is effected. In acute cases of this nature an operation has sometimes been undertaken with a view to removing the appendix, but when the region came to be examined no appendix could be found. The stump is there, a silent tribute to nature's amputation! Though not so delicately or artistically fashioned as if done by the surgeon, the
stump is sufficiently good to form an efficient safeguard for the patient. Mr. Bowlby has described several cases in which he operated and found that the appendix had been destroyed in which operations surgically speaking were unnecessary. These cases simulate very closely those in the last group, but there is this difference, that the cases under discussion never have the appearance of toxæmia no matter how acute the attack may be, yet the end of 24 to 36 hours they take a turn for the better and rapidly convalesce, while cases in the preceding group exhibit marked toxæmia from the very first, their course is progressive, they go from bad to worse. Owing to the similarity of the cases to this and the preceding group, it is probable that those recorded cases of fulminating cases were really cases in this latter group. The cases I have just described require most careful watching for a few days after the decrease in severity of the acute symptoms, as the happy ending might not always occur, but it does
occur in a certain percentage of cases
the sufficient number to constitute a
distinct class of appendicitis cases.

In this connection I feel constrained to
quote the following case which occurred
in the practice of a medical friend.

A gentleman about 40 years of age had an attack
of acute appendicitis with symptoms such as have
been described above. After about 48 hours of acute
suffering & when the question of operation was being
discussed, his bowels acted well & in the faeces
there was a quantity of pus & a “cherry-stone” (doubtless
a fecal concretion). From that time all the symptoms
decreased in severity & convalescence was rapidly
established. He lived for some 10 years afterwards,
but he never had another attack of appendicitis nor
any symptoms suggestive of inflammation of that
organ. The inference I draw from this case is that
the appendix was destroyed during this acute attack
of appendicitis & that an operation in this case would
have been quite superfluous. I feel the more
strengthened in this conclusion from the fact that
the patient did not adopt any
aphylactic measures, but lived a free
healthy life.
Passing on I shall next deal with a class of cases in which the symptoms without showing any great severity at the start steadily grow worse worse at the end of 24 hours or in the course of the first 48 hours: also those in which there is a sudden exacerbation at any period in the disease. These cases require constant watching and frequent leucocyte counts are valuable guides in determining for or against operation. Moulin believes that in the former an operation should be done before the surgeon's hand is forced by the occurrence of worse consequences; and in the latter either some unfortunate accident has occurred or a mistake has been made: the sooner steps are taken to remedy it the better. Delay in either case is only too likely to lead to disaster. These are the cases in which general peritonitis & septic absorption are most likely to occur & the patient may be overwhelmed & poisoned by the toxic products which are manufactured & absorbed. The constitutional symptoms are generally grave & of all proportion to the local ones. The prognosis in
these cases is bad, but the patient is being killed by absorption from a septic focus - so by operating & clearing out that focus you give him a chance of recovery. This group also includes cases in which perforation or gangrene of the appendix occurs - under such circumstances I should always advise operation. I have mentioned above that the local symptoms are not proportionate to the general ones. For instance, the patient may be singularly free from any very acute pain - the absence or rather cessation of which should always be looked upon with suspicion. With this cessation of pain, the patient seems better; because he has lost his pain, sleep follows, his appearance may improve, but the pulse remains rapid & small, the temperature may fall, the abdomen remains rigid or may be replaced by ominous distension. This generally means that the bowel is giving way, becoming gangrenous or that severe toxæmia has occurred. In these cases also tenderness on pressure may not be a marked feature, but the patient may often have a
Singularity alert look, with bright eyes and pinched features, he himself feels as if all were well. This combination of symptoms is likely to mislead the unwary, whereas it really be looked grave mischief and calls for operative interference as soon as possible. In watching these cases all the symptoms have to be carefully noted, especially one watches for rise in the pulse rate, increase in the tenderness, increase in rigidity, reappearance of vomiting, sudden fall of the temperature, especially if this is associated with increase in the pulse. The appearance of any of these symptoms when the patient is in bed almost certainly indicates perforation or gangrene of the appendix or spread of peritonitis; hence should be regarded as definite indications for immediate operation.

The following may be taken to illustrate this group of cases: —

G. D. (Case No. 54) a young man 23 years of age was suddenly seized with abdominal pain on a Friday afternoon when at work. He returned home, went to bed, sent for his medical attendant. The medical man
ordered a dose of castor oil, milk for nourishment, fomentations to the abdomen. On Saturday the patient still had acute pain which was more localised in the right iliac fossa, there was tenderness on pressure & he had vomited once during the night. A soap & water enema was administered & a fairly good action resulted. Instructions were given to continue the treatment previously advised. He was seen again on Sunday morning & as he appeared to be worse he was ordered in to hospital. As the patient lived in the country it was about 2 p.m. on Sunday (June 30th, 1907) before he arrived at the hospital. On his arrival he stated that he was much better, as there had been considerable decrease in the severity of the pain. On examination there were found rigidity over the right iliac fossa, some tenderness on pressure over that region & slight tympanitis of the abdomen. The temperature was 101.2 °F & the pulse rate 118. After minute (considerably higher than that reported by the doctor in attendance) the patient anxiously watched all that was going on in the ward. Several times volume heard the information that he was feeling much better but his expression gave an indication that all was not right, so at 3 p.m. an operation was performed. The appendix was
found to have perforated in two places, there was
commencing gangrene of its walls, & a large fecal
concretion was found in it. There was also a small
fistulated abscess. The appendix was removed & a
drainage tube put in for a few days. Convalescence
was quickly established there was discharged on
July 28th 1907. Case No. 72 (Mrs. S) was almost
identical in onset, course, treatment &
pathological changes found. Case No. 77 also
comes under this group as it is a case in which there
was general peritonitis I give it here. The case had
not the same happy ending as in the two I have just
mentioned & it was all the more disheartening because
the patient lingered on so long & made a most


courageous fight for life. Mrs. E – 36 years of age
complains of vague abdominal pains & pains in her
back on January 17th of this year. She was seven
months pregnant & she put the pains down to some
preliminary uterine contractions. On the next day
the pain was much more severe & she called in
her medical man. From his examination he
apparently did not diagnose appendicitis. He ordered
the patient to keep in bed the as quiet as possible.
All during Sunday, January 17th she had pain
which have not at any time been definitely
localized in the right iliac fossa) with paroxysms of bearing down pains at intervals. These latter were evidently uterine, for on Sunday night she was delivered of a seven months child. On Monday she still complained of abdominal pain, the abdomen was rigid but not specially tender & the pulse rate was only 80. Next day she was worse & the medical attendant called in a surgeon in consultation. The result of the consultation was that she was advised to come into hospital to have a laparotomy done. The surgeon, while not giving a positive opinion, suggested the appendix as the probable source of the trouble. As she lived in a country district it was almost 9 p.m. before she arrived at hospital. On admission (January 2nd) her condition was as follows: - The abdomen was distended tympanitic, the pulse was 120 per minute, she had no severe pain, her features were pinched, though she maintained a cheerful attitude. The temperature was 99.2° F. On opening the abdomen a gangrenous perforated appendix was discovered, there was general peritonitis with pus in the peritoneal cavity. The cavity was flushed out with normal saline, the wound closed, & a large drainage tube left in. She was very collapsed after
the operation, but by the free use of saline & by
judicious stimulation she rallied next morning
she appeared remarkably well. During the next
couple days, the pus drained well, she took her
nourishment, the temperature kept normal, her
expression was cheerful, but the pulse rate remained
high. About January 28th she began to complain
of pain round the left costal margin for
examination friction was heard along the line of
the left diaphragmatic pleura, there were some
fine expectorations at the left base. Otherwise there
was no alteration in her condition. The temperature
about this time began to swing a little. Though
she remained cheerful, she was losing ground little
getting weaker, but it was not until February 2nd
that any marked change took place. On that day
the temperature rose to a higher point than it had
ever been (102° F.), the pulse 148 per minute, &
a dull area was detected under the diaphragm on
the left side. An incision was made over that
region with the expectation of finding a
sub-diaphragmatic abscess, but only a little
serum escaped. The "abdominal puffs" were all
resolved, but no collection of pus was discovered &
there was no empyema. The intestines were seen
to be greatly inflamed and there was extensive pelvic peritonitis. She was perfectly cheerful and happy after the operation, but she got gradually weaker and she died in the early morning of February 4th. The result was most disappointing, as the patient had made such a heroic bid for life.

The mortality of appendicitis is increased by fatal cases in this group, but I am convinced that this is because cases are left too long before operative interference is undertaken. If operated on within 48 hours, as in the first two cases given in this group, before marked toxaemia has resulted, then such cases need not cause a high death rate under favourable circumstances. I do not think that cases in this group should be followed by any mortality at all. These cases constitute varieties in which I advocate interference during the acute stage, an operation being necessary to save the patient’s life.

Let me say a few words about a class of cases which Dr. Blair Bell has designated chronic appendicitis. In these there are constantly recurring attacks of pain,
which seem rather to be of the nature of a
gastric condition. In these Dr. Bell advocated
removal of the appendix. I do not wholly
agree with him in this. I agree with him
so far that many cases which have been
set down as chronic dyspepsias are really
cases of appendicitis; but I differ from him
somewhat as regards treatment. These
patients periodically suffer from attacks
of abdominal pain which commences in the
epigastric region, but which later tends to
become localized in the right iliac fossa. The
pain is generally slight and often not of
sufficient severity to make the patient
keep in bed. Abdominal examination will
reveal slight tenderness on deep palpation
over the right iliac region—over a very
limited area as a rule. There is no fever.
The pulse rate is not raised. The temperature
is normal. The bowels are invariably very
constipated. Now I am not at all convinced
of the necessity of operation in all these
cases. If the dieting is carefully attended to,
if the bowels are properly regulated, if the
patient will take healthy but not too violent
Exercise, if in fact he will lead a life under proper hygienic conditions, then I do not think there should be any necessity for operative interference. My remarks have been qualified by the word "if," and in that little word lies the secret of the treatment. In a later portion of the thesis, when I am discussing the question of prophylaxis, I shall again return to this subject and make some further remarks regarding it. Some one has said that it is a good thing for a person suffering from aneurism to be in good circumstances and not under the necessity of working hard for his daily bread; these remarks could equally well be applied to patients who are affected by this so-called chronic appendicitis. Provided a patient cannot undertake measures to keep ward off future attacks if he has these attacks frequently, I should not hesitate to advise appendicectomy in a quiescent interval. The following case will serve to illustrate this variety:

M.V. (Case No. 7) a domestic servant 22 years of age had suffered for over 2 years from attacks of this
nature. She had had at least 4 attacks, probably more, the attacks coming on at intervals of 4 or 5 months. They came on after her days' work when she was specially tired. Pain was first felt in the stomach region but within 24 hours it became localized in the lower half of the right abdomen. The attacks lasted 3 or 4 days but she never had to lie up. The bowels were always confined. She did not consult a medical man until the last attack in May 1904. After hearing the history of the case the doctor advised her to have her appendix removed. To this she consented and the operation was done a few days after the subsidence of the attack. The appendix walls were thickened, the lumen was narrowed there was a constriction about the middle of the organ. The wound healed by first intention and she was discharged in a month's time.

In many of these chronic cases there is also mucous colitis, which may either precede or succeed the appendicitis. Probably in many instances of mucous colitis the appendix is affected. In February of this year I saw a case of this nature, but I have not included it in my list.

S.D. a man 50 years of age had suffered from mucous colitis for years, but occasionally, he had
symptoms referable to appendix. As medical
treatment failed to relieve him, he consented to
have the operation of appendicostomy done. At the
operation the appendix was found much thickened
and was easily bent on itself. He experienced much
benefit as a result of the operation—whether the
improvement will be lasting time alone can prove.

At this point it will be convenient to take
into consideration two varieties which might really
be designated chronic appendicitis. I refer to
relapsing vs. recurrent appendicitis. I am aware
that Mr. Lackwood has vigorously condemned
the use of such terms, but nevertheless I think
that from a clinical point of view they are
most convenient terms. They constitute two
distinct varieties of appendicitis, they differ as
regards symptoms, prognosis, and treatment. While
I should take up the uncompromising attitude
of advocating operation in all cases of
relapsing appendicitis, I should not advise
such in all cases of recurrent appendicitis.

My reason for doing so is because in the
former the pathological process never settles
down, while in the latter it does. Let us just
for a moment take two such cases and compare them.
In the first (i.e. relapsing) the patient has an attack of appendicitis, perhaps of an acute nature, or it may be that from the first the attack is of a subacute character. Be that as it may, one finds that the acute symptoms gradually subside & the patient is able to get about again, as he will not lie in bed for an indefinite period when free from pain of an acute character. Now careful enquiry in these cases will elicit the information that the information that the patient has an aching pain in the region of the appendix & on examination one will probably be able to detect some thickening in the right iliac fossa, while deep pressure over that region will demonstrate the presence of a tender area. The temperature may be normal the pulse rate is not raised at all or only very slightly. If the appendix could be seen, it would be found to be in a state of inflammation, its mucous membrane thickened & red & very likely ulcerated. My argument is that such a patient is in a very precarious condition so long as this continues, therefore the appendix should be
removed in one of the quiescent intervals. In these relapsing cases there are acute exacerbations, and one of these may place the patient's life in jeopardy. So an acute attack should if possible be avoided over. By careful medical treatment, the patient's general condition improved as far as possible & appendectomy performed at a period when the inflammatory condition is in a state of comparative quiescence. These relapsing cases constitute a very dangerous class of cases. They are cases in which it is most important that the patient should rest & not indulge in violent exercises when the attack is subsiding. When the acuteness of the attack has gone, it is probably best to wait for about a fortnight before removing the appendix. In that time any bacteria at work outside the appendix will probably have died out & there will be little or no reason to fear peritoneal infection. Should a fresh attack of a very acute nature supervene while the patient is waiting, the operation should be proceeded with at once. It is not advisable to wait such
a patient to some outlying country district to recuperate, as one never knows when disaster may overtake him. Only a short time ago the following case of relapsing appendicitis came under my notice and it we have well exemplified my contention of the very dangerous nature of this variety.

L.W. (Case No. 80) a male child 9 years of age was admitted to Hospital on March 21st 1908 to have an appendectomy done. The following history was obtained:

Six weeks previously, she had an attack of appendicitis which was treated by medical means under which the acute symptoms subsided. She got up at the end of 3 weeks of a day or two later she started work. She did not suffer any acute pain, but she always had some uneasiness in the right ilie fossa and occasionally attacks of slight pain in that region. After being at work for a week acute symptoms again supervened, and she was treated as before. Her medical attendant strongly advised her to have her appendix removed. She consented, she was admitted to Hospital as stated above. She had been in bed for about 10 days before coming into Hospital, so that the acute attack had almost subsided. Her state on admission was as follows:— She complained of slight pain in the
appendix region: on palpation tenderness on pressure was elicited over this area & there was distinct thickening: the temperature was 99.0° & the pulse 88 (probably faster than usual). The bowels were very constipated. The patient was put on low diet, the action of the bowels solicited by means of enemas, & a mixture containing Sod: bicarb: gr; X infus: Thi: 3 1/2; tinct: belladonnae m to be given four hourly.

Ten days later or 3 weeks from the commencement of this second attack the operation was undertaken. The appendix was found to be inflamed, its walls were friable & ulcerated, when the surgeon was separating some adhesions the base of the appendix gave way & a minute opening was left in the cæcum. This was closed, the appendix removed, a small drain put in for 48 hours for safety. During the first 48 hours after operation she was given nothing but hot water, then for the next day she was given albumen water afterwards diluted milk etc. The bowels were opened on the fourth day after which she was allowed more solid food. Her progress afterwards was all that could be desired & she was discharged about 5 weeks after the operation.

Now the state of this appendix was serious for the patient at any time she might have
been placed in a very critical condition. At the point where the organ gave way, the ulceration had destroyed practically the whole thickness of the appendicular wall. Had this patient been going about, is it not possible that the appendix might have perforated at any moment? Case No. 74 (W.P.) was also a relapsing case, but the walls of the appendix were not soft & friable as in the Case of L.W. The pathological changes in Case No. 74 were ulceration & absorption, while the appendix was acutely bent on itself. If after an attack of appendicitis there remains a tender area in the right iliac region, then one may almost certainly conclude that there is some permanent pathological change in the appendix wall & that the organ should be removed at the first favourable opportunity.

Now let us turn to the cases of recurrent appendicitis. In these cases the patient has an attack, in 10 days' time he is apparently cured, that is to say, that at the end of that time he is quite
free from all symptoms of physical examination fails to demonstrate any abnormality. I am not prepared to say that the appendix in such a case would be found to be in a perfectly healthy state, but I do say that judged from a clinical standpoint the patient can be said to have completely recovered from the attack. In those cases I should certainly not advise operation after one attack except under certain special circumstances to be hereafter mentioned. If, however, attacks recur, even though they are longer or shorter intervals of perfect health, then I think the indication is undoubtedly for removal of the appendix unless one of the quiescent intervals, the constantly recurring attacks indicate that there is some abnormal condition in these appendixes. From the fact that the pain is often paroxysmal in character there may be found some constriction in the appendix or perhaps the caecal end may have become sealed up or it may be acutely bent on itself—some condition at any rate which interferes...
with the free blow in root the appendix.
As in the last variety there is always the
danger that the next attack may be of such a
nature that the patient's life may be lost, but
in my opinion that danger is much less in
recurrent cases, because in those cases which
I call recurrent there is but rarely ulceration
of the appendicular wall. Much discussion
has taken place as to how many attacks
of appendicitis a patient should be allowed
to have, before one should advocate removal
of the appendix. On the one hand many
surgeons would advise removal of the
appendix after one attack of appendicitis,
while on the other hand the majority of
general practitioners would probably not
advise such a course after one attack. Sir
William Banks at a meeting of the Liverpool
Medical Institution on February 14th, 1901
stated that he would let the patient have
3 attacks before removing the appendix.
Mr. Renton of Glasgow advises operation
in catarrhal cases after 2 attacks.
Rutherford Morrison in criticising a statement
by Mr. H. W. Carson to the effect that the
appendix should be removed in every case after a single attack. We do not hold this view, but await a second attack before operation. My opinion is that there are many points to be considered in deciding this question. If the patient were going for a long sea trip or were going to some place where medical aid could not easily be got, I should be inclined to strongly advise removal of the appendix after a first attack. If a person wishes to assure his life in a good insurance company, it is I believe imperative that he should have his appendix removed after an attack of appendicitis before a first class insurance company will accept him without extra premium. As a general rule the question of removal of the appendix is more urgent in children than in an adult, because the disease is more deadly in children, perhaps, owing to the peritoneal defence being less; because statistics prove that the mortality is higher in children; because children cannot be induced to adopt prophylactic measures, to say nothing of the cruelty in trying to
To enforce any such measures. After a second attack the question of surgical interference becomes more urgent if the second attack is of greater severity than the first. The advisability of such a course should be strongly impressed on the patient. In the event of the second attack being of less severity than the first it might be advisable to wait, as it would seem reasonable to conclude from such that the inflammatory reaction was less violent than the case might in time undergo spontaneous cure. As a general rule increased severity in a recurrent attack is a strong point in favour of operation, while decreased severity under such circumstances would rather indicate medical treatment. If the patient were in a position to and willing to undertake prophylactic measures such as will be afterwards discussed, then removal of the appendix need not be a matter of such urgency. I need hardly describe any cases to illustrate this variety, because the description would just be the clinical picture.
of cases of appendicitis of greater or less severity, which recover under medical treatment but in which recurrence takes place in 6 or 12 months or perhaps at a longer interval. I shall therefore content myself by saying that Cases Nos. 4, 26, 61, 60, 69 et al. come under this category. The pathological conditions found were singularly alike, i.e., the thickening of the mucous membrane, constrictions in the appendix, & in one or two some bending of the appendix itself.

In these two varieties of appendicitis (relapsing & recurrent) there may be considerable deterioration in the patient's general condition, both bodily & mentally. There is often marked anemia associated with these cases, & in some cases it is so severe as to almost contraindicate operation. The constant relapses may reduce the patient to a condition of a chronic invalid & render him unfit to follow any occupation, or the patient may be prevented from following a special employment unless he can consider himself free from the possibility of another attack. Also the constant annoyance...
worry of each recurrence or relapse are bound to exert a bad influence on their general health. In people of nervous temperament there is a possibility of these attacks, preying on their minds, this may in the long run lead to some mental aberration. So some people, harassed by frequent attacks, driven almost to despair, may give way and end their miserable existence.

Thus it may be that an occasional case may afford to the lay periodical which delight in sensation an opportunity of making the most of a jury's verdict. Suicide whilst of unsound mind? Personally, I have never seen this extreme picture illustrated, but in all the cases in this group which have come under my notice there has been deterioration in the general health. In most the constant worry has tended to upset somewhat their mental equilibration, shown either by increased irritability or by brooding melancholy.

There is a class of cases how to be considered in which abscesses form. These cases may begin acutely, but my experience has been that they
tend rather to run a subacute course. There is a rise of temperature, perhaps a swinging temperature, increase in the pulse rate, swelling in the right iliac fossa tenderness on pressure over that region. I am at present only referring to circumscribed abscess formation. In some cases there may be rigor, but though I have carefully enquired about such, I have not met with this symptom in any of my cases. A localized spot of extreme tenderness is a very significant sign of abscess formation; in pelvic appendicitis this spot may only be detected by rectal examination. The fact that there is swelling in the right iliac region must not be put down to pus formation without careful examination, for in many instances the swelling may be merely inflammatory. Injudicious interference may precipitate disaster. The general symptoms persist & local phenomena represented by swelling, dullness, induration and tenderness increase. The right thigh is prone to be drawn up, & pain in the right thigh is also or external genitals is more common than in non-suppurative cases. In case
No. 41 the boy was sent to Hospital with the diagnosis of psoas abscess. He complained of inability to flex the thigh, slight on the abdomen, he was lame when he walked. On examination a large fluctuating tumour was found in the lower quadrant of the right abdomen. The attack of appendicitis had evidently been a fortnight before, because on minute cross-examination I was able to get a history of indigestion + abdominal pain about 14 days previously. It had been so slight as hardly to attract notice.

The chief indications of pus formation are steady increase in the size of the mass, progressive rise in temperature, progressive rise in leucocytosis, increase of the pain + oedema of the abdominal wall. This oedema of the skin in the immediate vicinity is often a marked feature, + not so much relied upon as it might be.

Now as to treatment - it is a good rule + a safe rule that where there is pus let it out + these cases require operative treatment. I feel sure that very small abscesses may sometimes be absorbed, for in
making post-mortem examinations of cases which have died from other causes, I have found evidence suggestive of former suppurative mischief in the appendix region, and subsequently inquiring from the relatives I was always able to obtain histories which pointed to one or more attacks of appendicitis. Be that as it may it is always best to operate in cases where there is evidence of suppuration. I think in such cases it is better not to operate for some days, that is to say, to wait until the abscess has been walled off from the general peritoneal cavity, and unless the appendix is once present or is easily got at, its removal should be delayed to some subsequent date. In some its removal may not even be necessary. Mr. Gilbert Barling at a meeting of the Clinical Society of London in February 1902 reported 49 cases with abscess formation. In 49, the appendix was not removed of these 49 there was only one recurrence in 47–2 were not traced. Mr. James Berry at the same meeting pointed out that it was better not to hurry the removal of the appendix and certainly not to remove it in the
Acute stage. He gave statistics of 200 cases (medical and surgical) treated in St. Mary's Hospital, London. Where there was a mortality of 1 in 8 in the medical wards and 1 in 11 in the surgical wards. He stated that in the preceding 5 years he and his colleagues at the Royal Free Hospital, London waited for adhesions to form. Of 53 cases, 44 recovered, 14 died. He pointed out that those who operated early by free incision had a high mortality. M. Lucas Champonnier takes just the opposite view. He gives as his opinion that in appendicitis, it is necessary to suppress the centre of infection and remove the appendix or at least evacuate the inflammatory secretions as soon as possible. He does not believe that there is danger of causing diffusion of septic mischief by an operation. I have already said that abscess cases very often run a somewhat subacute course. There is one sign which should put one at once on guard. A case after 2 or 3 days with mild symptoms takes on an acute course; in such a case there is generally septic infection of the wall of the appendix from the first, which is going on before
perforation or gangrene of the appendix occurs.

In case No. 55 the girl had complained of some pain in the right iliac fossa for 4 days, but the pain was not severe enough to prevent her going about. On the fourth day she was seized with much more acute pain, was sick and faint. The medical man who had been called in ordered her to be put to bed, that hot water bags applied to the abdomen, next morning he found her worse ordered her removal to hospital. On admission (August 18th 1907) she was found to have a high temperature, rapid pulse, anxious, drawn face, prostrated state, sweating, tenderness extending over the appendiceal region. At the operation a small abscess was opened & gangrenous appendix was found floating in the pus.

Such cases have to be treated surgically at once — if one meets with a case with a mild prodromal stage, followed by an acute exacerbation with high temperature & signs of septic intoxication then one may expect to find an abscess & an appendix, with some serious pathological change, necessitating prompt operative measures. These are the cases in which the peritoneal defence is liable to be broken down, & speedy relief of the pain is required to prevent widespread
general peritonitis. Under ordinary circumstances, abscess cases are not so serious. Cases 29, 47, 56, 57, 68 etc. are examples of cases in which abscesses formed.

Apart altogether from the character of the attack the individual symptoms may give one a clear indication as to whether an operation is required or not to consideration of the leading symptoms in this respect may now be taken.

**Mode of Onset.**

This is very important. As a general rule the more sudden the onset the more severe the pain the greater the need for immediate operation, although I have seen cases in which the onset has been abrupt, acute, outside recovery under medical treatment. Collapse means as a rule that perforation has already taken place. Moullin^27^ says that whether there is collapse or not a sudden violent onset must be taken as indicating that the wall of the appendix is very seriously affected that if an operation is not performed at once, it will have to be performed later, very likely under much more disadvantageous circumstances.

I think this is put rather strongly. A sudden acute onset undoubtedly indicates a severe
lesion, provided symptoms remain acute then probably operative interference will be necessary.

The Pulse

This gives the most important indication of all yet it is sometimes misleading, because I have seen a case (No. 30) in which there was general peritonitis & the pulse rate was only 80. A quick pulse always betoken danger. If at the end of 24 hours from the beginning of an attack, while the patient is lying quietly in bed, the pulse taken on more than one occasion amounts to as much as 100 in the minute, or if without its having reached that figure it is steadily increasing in frequency, it is better to operate than to trust to chance, even if none of the other symptoms point to any degree of severity. This is the opinion of Mr. Moulton & certainly the statement fairly accurately indicates the reliability of the pulse as a guide in this matter. One allowance must of course be made for age & sex, for the character of the patient, whether he is highly nervous or not. The character of the pulse may also
help. With a failing pulse everything is to be
hoped for, with a failing pulse the worst is to be
feared. At the beginning of an attack the
pulse is full and bounding, if it early shows
signs of failing it is a sign of grave import.
As time goes on the pulse is bound to become
somewhat more feeble and this in itself is not of
much significance; but if this enfeeblement
is steadily progressive, if it is associated
with marked increase in the pulse rate, so that
the pulse is characterised as "running in
shreds," then the outlook is bad. A decrease
in the pulse rate can generally be taken as an
indication that the inflammation is subsiding.
The hard wiry pulse of peritonitis is
characteristic, it is always an ominous
feature in a case. In the later stages of
shock, as a result of peritonitis the pulse
fails, may be imperceptible for some hours
before death (vide infra Case No.79). It may be
well to sound a note of warning in acute
perforative cases, for in such the initial
stimulus given to the peritoneum at the
moment of perforation causes such profound
shock that the patient is thought to be dying.
Restoratives are applied the rallied; his pulse returns; his colour improves; the merely complains of a bad stomach ache. If left untreated, the patient becomes rapidly worse & his pulse again fails. Thus there are 3 stages: which I might call the collapse stage, the rallying stage & the toxicemic stage. In such a case the time for operation is the second stage, where the pulse has improved & the patient's general condition is fairly good.

Pain.

Next to the pulse rate the severity of the pain is a good indication as to whether an exploratory laparotomy should be performed or not. Pain when it comes on early becomes more & more severe means that the wall of the appendix is seriously involved. Healing believes that pain acute at first, increasing & uncontrollable by opiates may mean spreading peritonitis; while pain diffuse in the beginning, later becoming localized to the caecal region indicates local peritonitis. Pain as one of the cardinal sequel of inflammation will always be present in appendicitis if the intensity of the pain is progressive, then one may
conclude that the inflammation is also progressive. Any sudden increase in the severity of the pain at any time in the course of the disease is a bad sign, as it probably indicates that the appendix has perforated, a condition which calls for prompt surgical interference. Progressive decrease in the severity of the pain is a sign which can generally be relied upon to indicate subsidence of the inflammatory changes. Such a favourable progress is good prognosis. How to this symptom is a good criterion of the inflammatory process. Is it not most unwise to treat the pain itself instead of the administration of narcotics? For by so doing one allows the inflammatory process to continue, the patient becomes worse, one has concealed a most important guide. Any sudden diminution in the severity of the pain, or sudden disappearance of the pain must be looked upon with suspicion, as such often accompanies commencing gangrene of the appendix, which is unfavorable, which necessitates surgical treatment at the earliest possible moment.
Repiration.

This may be said to be always increased, if carefully watched the breathing will be seen to be more thoracic than abdominal, and there will be distinct loss of movement over the right iliac area and perhaps over the whole lower abdomen. In the worst cases, however, where there is obstruction it may be that abdominal respirations are as free as in health. In cases complicated by pleurisy a peculiar jerky respirations is often seen.

Meteorism

Abdominal distension is one of the gravest signs in a case of acute inflammation of the appendix. It always means that the peritoneum has sustained some damage: when it begins in the right iliac fossa and spreads thence over the rest of the abdomen it may be taken as only too probable that the wall of the appendix is either on the verge of gangrene or has already given way. Meteorism alone is not proof of septic peritonitis. If the distension is only slight, if it is not attended by much pain or tenderness, above all if the abdominal muscles are not rigid it
Certain amount of stool can be passed, it may be merely due to paresis of the intestinal wall with consequent distension, which is not uncommon after abdominal operations or injuries. Its significance lies in the fact that the intestinal function is not being properly carried out and it is only when it persists that one thinks of it as a grave symptom.

**Tenderness on Pressure**

This must be distinguished from pain from hyperesthesia of the skin, definite cutaneous hyperesthesia over the region of the caecum frequently denotes an inflamed & distended appendix & may when present be a useful guide. Tenderness on pressure is usually associated with muscular rigidity & is always present in the right iliac fossa. In many instances the whole abdomen is more or less tender at the beginning of the attack; but if the case is going to end well, the tenderness begins to localize itself before 36 hours have gone. If it continues & especially if it grows worse, it is a sure sign that the irritation has spread to the general peritoneal
Cavity + that septic infection is imminent if it has not occurred already: therefore this constitutes a good reason for operation without delay. McBurney's point is not always to be felt; but when it is present it is associated with other symptoms referable to inflammation of the appendix. You may be sure that it is a clear indication that the wall of the appendix is involved + that there is a certain amount of inflammatory exudation which may end in organisation + the formation of adhesions or may lead to suppuration. The absence of McBurney's point proves nothing. It may be due to the appendix occupying some abnormal position or to the fact that the peritonitis is diffuse. The following is a good case in point.

C.C. (Case No. 31) a boy aged 17 years was seen as an outpatient about the beginning of February 1906, at which time he complained of pains in his stomach. He stated that his appetite was poor. An alkaline stomachic

mixture was prescribed. He did not present himself again until March 12, 1906, when his condition was so serious that he was as much as an inpatient. During the previous three weeks he had suffered from vague
abdominal pains, which were apparently not very severe, as he was able to play with other boys. On February 28th he was sick in the morning, the abdominal pains were more severe, but he was sent to school. He was sick again that evening & vomited, & he could not rest during the night. In the following morning he walked up to the hospital with difficulty; he was at once admitted. On his arrival he was in a very collapsed condition. The pulse was fast, the bleb could hardly be felt. The temperature was subnormal. The bowels had been very constipated & according to the statement of the mother he had had no action since February 26th. After the patient had been gasted his pulse improved, it was found to be regular & of fair volume. The temperature was 101°F. On examination the following conditions were noted — the tongue was furred & dirty, the breath foul smelling, hoarseness or vomiting took place. On inspection of the abdomen movement was found to be fairly good, there was no obvious fulness. He could not bear the abdomen to be touched, & attempts to palpate it were resisted. It was found to be resistant all over; if anything, more in the epigastric region & right side of abdomen (upper part). Percussion of the abdomen was painful —
no dull area could be detected. He complained of pain low down on the right side of the chest, especially along the line of the diaphragmatic pleura. On auscultation rhonchi were heard at the base of the right lung, but no friction could be detected. Hot fomentations were applied to the abdomen, & mustard leaf was applied to the lower part of the right side of the chest. Milk & lime water were given for nourishment. A simple enema was given with good result, the motion being constipated. He had a fairly good night, slept at intervals. On the following morning another enema was given with satisfactory result, a little mucus being passed in the stools. Abdominal examination was only a little more definite. There was certainly less movement on the right side - there was pain & tenderness, but it was rather higher than usual. The temperature remained about the same, but the pulse was faster & more feeble. After auscultation it was decided to operate because the boy's general condition was worse, because the pulse rate had increased. Opening the peritoneum the bowel appeared healthy, but on deeper exploration pus was found. The appendix was found lying upwards towards the diaphragm, was perforated &
adherent. Owing to the boy's critical condition it was not deemed advisable to attempt removal of the appendix. Convalescence was slow, but this was partly due to the fact that the boy was not an ideal patient, as he had a tendency to interfere with the dressings in other ways besides in a manner not conducive to speedy recovery.

This case was complicated by an attack of diaphragmatic pleurisy. One had to decide whether or not the abdominal pain was "referred" pain or otherwise. The aspect of the patient and the pulses were the chief points that suggested abdominal mischief.

In these obscure cases also where little or no tenderness can be elicited on pressure over the right iliac region a rectal examination should never be omitted. Practically all surgeons have written or spoken of this point its importance is now generally recognised. In many instances the tip of the finger will just be able to reach a spot where pressure causes marked tenderness. This spot generally indicates the tip of an acutely inflamed appendix which is lying in the pelvis. In this connection I
give the following illustrative case.

J. M. (Case No. 145) a man 37 years of age was
admitted to hospital on April 12th 1907. The medical man
had been treating him for an attack of appendicitis
for 4 days, but as progress was unfavourable he sent
him into hospital. On examination the following
state was noted. The man lay in bed with the legs
drawn up. He did not complain of any very severe
pain in the abdomen, the Kegs higher flexed on
his abdomen not so much because of pain but owing
to a feeling of tightness in the abdomen where the
legs were extended. There was no tenderness over
McBurney's point & very little resistance over the
right iliac fossa. The percussion note was dull over
the lower abdomen. The pulse was 104 & the
temperature 99.8°F. The facial expression was
normal all in keeping with the man's statement that
he felt almost well. A rectal examination
demonstrated the presence of a very tender spot
high up, & distinct fulness could be made out in
the pelvis. At the operation the appendix was found
to be acutely inflamed & perforated at its tip
there was peritonitis & pus in the peritoneal cavity.
For the free use of saline per rectum &
subsequently thy medical stimulation he was
ed over the acute period, after a prolonged convalescence he recovered.

Many a time has a medical man been lulled into a false sense of security by the comparative absence of pain and tenderness over the usual region; where had the rectum been examined the presence of this tender spot would have indicated more serious mischief than was apparent, and would have put him on his guard.

**Tumour.**

Wellness to sense of resistance due to tonic muscular contraction & persevering to some extent even when the patient is under an anaesthetic are usually present in the right iliac fossa from the first; but as a rule there is nothing sufficiently definite to be called a tumour until 4 or 5 days have passed. The tumour is made up of inflammatory exudation around the bowel, of distended uterine, of the swollen thickened uterine wall, and sometimes of omentum. When the appendix hang down into the pelvis it may be perceptible only through the rectum; in acute septic cases it is distinctly wanting. A
definitely circumcised lumens nearly always means suppuration past or present, that an operation will be required if not at once to open the abscess then later to remove the appendix. The high death rate recorded in some acute cases, operated on during the acute stage, is due to injudicious interference when this inflammatory material is there. All other things being favourable a tumour from this cause contra indicates operation for the time being.

**Rigidity of the abdominal wall.**

This is generally well marked in acute cases, but it may disappear in the worst cases, e.g. when gangrene or perforation has taken place. In cases in which opium has been given it is well to remember that while the patient may not complain of pain or tenderness on pressure, the abdominal muscles will be found on guard. Palpation is resisted by the muscles, though there is no actual pain. This was well illustrated in case No. 35.

Mr. F. J. Steward in the paper already referred to says "A rigid abdomen therefore is a definite indication of peritonitis, especially
"or opium or morphia has been given." In pleurisy one often finds that abdominal palpation is resisted and there is distinct abdominal rigidity, but this is jerkly in character and disappears if the palpating hand is allowed to remain. If there is appendicitis with the pleurisy the abdominal rigidity is felt afterwards.

**Region**

Region early indicate gangrene of the appendix, late septic absorption. They are thus bad signs and generally point to the necessity for prompt operation.

**Temperature**

This does not give much assistance if taken alone. It may be high at the beginning of an attack and falls to normal within 24 hours; or in the worst cases of all, in which collapse is a prominent feature it may be below normal from the first. If it continues high it almost always means that an operation will be required, but alone it gives no information as to whether an operation should be performed at once or whether it is safe to wait. A sudden rise of temperature in the course of an apparently mild attack or of a more severe one which is subsiding generally calls
For immediate operation, but even in this case the decision must be guided much more by the condition of the pulse, the severity of the pain and the other symptoms already mentioned. It is to be remembered that a sudden fall of temperature is to be regarded as a dangerous signal, if the temperature falls suddenly, say from 103° to 99° or lower than an operation will often be necessary, as this sudden drop is one of the commonest precursors of gangrene. A gradual fall is always good, for it almost invariably indicates improvement. A high temperature with remissions indicates septic absorption, peritonitis, etc. The like will generally mean that an operation will be required.

Ponitica

Too much reliance cannot be placed on this but as a late symptom it is an ominous one. As an initial symptom it occurs in a fair percentage of acute cases, but it rarely persists for more than 2 days in favourable cases. If it persists it is a sign of evil omen and generally indicates that there is considerable reaction in the wall of the Appendix. As a late symptom it is also to be regarded as bad, when it becomes faecal it
points to intestinal obstruction which necessitates operative interference & in which the prognosis is bad. Its absence may generally be regarded as a good sign & an indication that there is no very serious mischief. The Vomiting of blood (haematemesis) to be regarded as of grave significance. Byron Bramwell relates a case of a man aged 50, in whom appendicitis with Septic-peritonitis was accompanied by Vomiting of "coffee grounds" streaks of blood mixed with mucus. It simulated duodenal ulcer. The recurrence of Vomiting late in a case after its temporary cessation is a very important sign & may alone indicate very strongly the necessity of operation. After doing well for a few days a sudden attack of Vomiting. This almost certainly means perforation of the appendix or spread of peritonitis previously local & it is frequently the first sign of these conditions. Vomiting under these circumstances is then a most definite indication for immediate surgical interference.

Now this vomiting may be of various characters. At the commencement the Vomiting is merely the contents of the stomach. Later it may be duodenal or jejunal. In severe cases it may
become faecal. In these last cases there is generally some obstruction and these cases are of very grave prognosis. This faecal vomiting is a late symptom but indicates that a case has been left too long. The following Case will illustrate this point of the case to the worst I have ever seen.

W. T. (Case No. 79), a man 47 years of age, was admitted to Hospital on January 24th 1908. It appeared that his illness began on Monday January 20th with sickness vomiting, abdominal pain which later became localized in the right iliac region. After a day or so these acute symptoms apparently subsided. The bowels however, remained constipated and aperistaltic enemases were tried without avail. On the 26th vomiting again started, was frequent and finally became feculent in character. The abdomen became enormously distended. He was sent to Hospital about 10 am on January 24th. He was brought to the Hospital in a cab for the way he had been seized with severe abdominal pain. On admission he still complained of the pain (though not so severe), his pulse was imperceptible, his respirations were rapid, his face and extremities cold, he was covered with a cold clammy sweat. After being in bed for a little over
an hour he had improved somewhat. His pulse was 140 per minute, respiration were 30 per minute, the temperature was 97.0°. The tongue was furrowed & dirty, the mouth parched & the breath very foul. The abdomen was distended deep pan, he was bringing up mouthfuls of this foul vomit very frequently. After rallying the patient felt quite happy, the laughed & talked with his friends. He had not the slightest conception that he was dying. About 3.30 pm. the rally was thought to have reached its extreme, that the time for operation (if any was to be done) was near, the most favourable that one could expect. So the abdomen was opened & the condition found were dreadful. The appendix was gangrenous & there was also gangrene of about 3 inches of the cæcum. Close to the base of the appendix the cæcum had given way (probably in the morning when the patient was coming to hospital in the cab) & faeces were passing into the abdomen. There was enormous distension of the gut, but there was no actual general peritonitis. Resection of the gangrenous area plus anastomosis was out of the question owing to the patient's condition. Indeed, as soon as I got the patient sufficiently under the anaesthetic to allow the surgeon to proceed with the preliminary steps, I proceeded to dissect out the median basilic vein.
4 quarters of normal saline intravenously. The gangrenous portion was rapidly excised. The lude quickly adhered to the abdominal wall, after the fashion of a colostomy. The abdominal cavity was washed out with normal saline, drainage established, and the wound speedily closed. The patient soon recovered from the effects of the anaesthetic. He recognised his relations, maintained a happy attitude until 2 a.m., which came at 8.30 a.m.

This is an extreme case, one that will rarely now be seen, but it well illustrates the danger of leaving cases. It also the grave character of recurrent vomiting which becomes fecal.

In keeping to the medical practitioner in attendance, I may say that he twice advised the patient to come to hospital without success, so that the blame was almost entirely the patient's. Travis states that he has never been vomited matter become offensive or semifeculent except in severe cases which were exhibiting septicemic symptoms.

State of the bowels.

The bowels are generally constipated. Many hold that this is an important pathological factor in the disease. Should the constipation...
be absolute, then it is of greater significance — I mean that if an enema be given and that is retained it rather makes one believe that there is some obstruction from paresis of the gut. (vide Case 19 just described). In other cases there may be diarrhoea, a factor of little significance. It may be regarded as bad, but it may also be looked upon as a good sign, because it shows that the intestine can still pass on its contents and therefore there is no marked obstruction. All things being equal, the tendency to looseness of the bowels is more common in supplicative cases and usually indicates a severe attack.

**General aspect of the patient**

This may afford much help in arriving at a positive or a negative opinion regarding operative interference. With acute abdominal diseases one associates what has been termed the "abdominal facies." At the onset of the illness the face is generally flushed and there may be dark lines under the eyes. Later the features become more contracted and the patient has a pinched look, a typical picture of acute suffering. Now in the course of 24 hours or so a marked change may take place, and correct interpretation of any change
is of the greatest importance. Should the patient sink into a dull, unresponsive state, the outlook is grave. Generally, the indication is that there is serious mischief, e.g., gangrene of the appendix. The patient feels placid, in bed, and will solemnly maintain that he is better and all he desires is not to be disturbed. This state of apathy and apparent contentment is simply due to inertia and dulled sensation, resulting from increasing sepsis and intoxication. Contrast with this other cases which begin in the same way, but instead of sinking into this lethargic state, the patient becomes more alert, answers questions quickly, and later on loses the abdominal facies altogether.

They then take interest in their surroundings, become very sharp indeed, and any anxiety they may have is probably due to nervousness about the performance of any operation. As the inflammatory changes about the appendix begin to clear up, the toxæmia gradually disappears, the patient becomes more alert, and returns to his normal mental status. Sir W. S. Bennett has described cases illustrating these points, the clinical pictures were mirrored in Cases Nos. 72 and 10 respectively. In the former prompt operation is
required, while in the latter medical treatment will hide over the attack, the question of operation in the quiescent interval can be afterwards discussed. Still speaking of the general aspect of the patient, we often meet with patients suffering from marked septic intussusception, in whom the aspect is of great help. The aspect differs somewhat from those I have just described. To the uninitiated the aspect appears all that can be desired, mistakes may be made. The eyes are bright, the mind is alert. The patient often feels happy, the will laugh, talks of his symptoms, says that he is much better. He has no conception that he is about to die. Such a series of symptoms is always to be looked upon with suspicion, because these symptoms always betoken grave mischief and severe tachyacemia. One generally finds that there is gangrene or perforation or suppuration. This picture is illustrated by Case No. 79 to a less extent by Case No. 77. Such cases generally indicate a mistake on some one's part that a case has been left too long. This aspect occurs late in the course of cases of appendicitis and the prognosis is very bad.
The examination of the blood.

A blood examination (especially a leucocyte count) is of paramount importance in health, affords valuable assistance in determining for or against operation. At the outset it may be laid down that it is not advisable to divorce the examination of the blood from the clinical condition of the patient; that is, to say, that the examination should only be undertaken as an additional aid.

In appendicitis the leucocyte count is of most importance, although in many instances, the enumeration of the red blood corpuscles and the estimation of the percentage of haemoglobin are useful adjuncts. In the estimation of leucocytosis a positive result is more valuable than a negative. In practically all cases of appendicitis there is an increase in the number of leucocytes. Speaking generally, it may be laid down that the greater the increase the more severe the lesion and the graver the prognosis.

In cases of fulminating appendicitis where the parents are overwhelmed by the toxins, in cases where there is marked asthenia there may be little or no leucocytosis, although such cases are of very grave import. In cases of catarrhal appendicitis where the disease runs an acute course for a day
or two and then gradually subsides there is often a slight leukocytosis, the return to normal being coincident with the subsidence of the inflammatory changes. As a general rule the number of leucocytes rarely exceeds 15,000 per cemm. in these simple catarrhal cases. If, instead of subsiding the cases go on to abscess formation, then the leukocytosis is much more marked, the increase is progressive, the acne is reached first before the abscess is evacuated, if there is a rapid decrease in the leukocytosis as soon as the pus is let out.

J. V. da Costa Junior who has done so much work in this connection has found that moderate leukocytosis may occur both in the presence or absence of abscess or its consequences so that it accompanies about 30 per cent non-purulent and 90 per cent purulent cases. Leucocyte counts varying between 10,000 and 15,000 or even 17,000 cannot be depended upon to reflect the nature of the local lesion, as this may be found both in mild catarrhal and purulent cases. Counts of 20,000 or more indicate the presence of pus, gangrene or general sepsis or one or all. In a series of 45 non-purulent cases he found the leukocytosis higher than 15,000 in 5, the average count was 9,988.
In one it reached 17,100. This leucocytosis be attributed to local peritonitis or to conditions other than appendicitis. In 94 purulent cases he obtained an average count of 17,955. Cabot reports 4 cases of general peritonitis in which there was no leucocytosis +2 with slight leucocytosis (14,800 +16,000) long ridge from an investigation of 36 cases obtained the following results: In 22 acute cases the leucocyte count averaged 27,990, the polymorphonuclear percentage was 84.9 + the eosinophiles were .4 per cent. In 14 subacute + chronic cases the leucocyte count averaged 10,614, the polymorphonuclear percentage was 63.1, the eosinophiles were 2.1 per cent. Feuer has obtained very similar results. The average count in purulent + gangrenous appendicitis is higher than the maximum count in the catarhal forms.

In those cases with abscess formation it is essential that the leucocyte count should be taken daily, as the comparison of the daily records will assist in the prognosis + treatment. The absolute height of the leucocytosis is not so important as the gradual rise, as one can be more safely guided by the
Curve of the number of leucocytes than by a single record. Sonnenburg & Federman at the German Surgical Congress 1903 gave as their opinion that when an operation was in prospect the leucocyte curve ought to receive as much attention as the pulse & temperature curves. In favourable cases the leucocyte curve fell rapidly, but when it remained high for a considerable period the prognosis was serious.

If the leucocytosis is not progressive in a case where from the clinical signs there is obviously abscess formation, then it may be concluded that the abscess is circumscribed. Many surgeons maintain that this is an indication for temporizing, because of the greater safety with which such an abscess can be opened at the end of 5 or 7 days when it has been shut off by adhesions from the general peritoneal cavity. If, however, there is a steady increase in the leucocytosis then the indication is for immediate operation as the disease is spreading & may at any time lead to general peritonitis. After the abscess is evacuated the number of leucocytes soon becomes normal & any subsequent increase indicates fresh infection; or persistence of
Leucocytosis after the 3rd or 4th day following operation may be attributed to undrained pockets of pus, or general peritonitis or both. Absence of leucocytosis in clinically severe cases is a sign of intense infection the prognosis of which is more grave than favourable. High leucocytosis does not necessarily mean good prognosis, but simply represents an intense affection coupled with a normally active resisting power on the part of the patient (da Costa) Barling in a paper read before the Clinical Society of London in 1902 found in a series of 21 cases that leucocytosis was absent in only 2, that in every case where there was a high leucocytosis pus was present. Gowing writes “In following the course of appendicitis the daily examination of the blood may bring to light some important considerations. A steadily increasing leucocytosis usually indicates an extending local process. After an abscess has been formed the leucocytosis commonly fluctuates between distinctly high limits, rising abruptly if peritonitis develops. As an abscess becomes walled the leucocytosis slowly diminishes and when pus is evacuated a favourable course is indicated by a rapid decrease of leucocytosis.”
I am of opinion that the leucocyte count is, generally speaking, of most value in those cases of appendicitis where there are small deep-seated abscesses, as in such cases it is often impossible to determine by physical examination whether or not there is a collection of pus. In appendicitis where perforation or gangrene of the appendix occurs, where there are necrotic changes, the rule is that leucocytosis is very marked and associated with these cases a minute abscess (often not amounting to more than a few drops of pus) is quite commonly found. The abscesses, though small, are generally very virulent, provided that the patient is not overwhelmed by the toxic products, the leucocyte increase is enormous. When one realizes that the clinical symptoms in such cases are often misleading it is easily understood why an examination of the blood is so valuable in determining for or against operation. The following is a good case in point.

Mrs P (Case No 63) age 41 was admitted to hospital on Oct. 3rd 1907. The history was that two days previously she was seized with abdominal pain, etc. The symptoms point to an attack of acute appendicitis. The medical man called in ordered sulphate of magnesia, but the
administration of this the bowels moved well. On admission
she complained of pain (not very severe) over the appendix
region. There was slight tenderness on pressure, with some
resistance on palpation over that region. The pulse rate was 100
and the temperature 99.2°F. No morphia had been given. The
clinical symptoms did not give one the impression of any
very serious mischief, only her facial expression was not
quite in accord with a mild attack. It was decided to
wait until next day when the interval a leucocyte count
was taken & this registered 37,400 leucocytes per cu.mm.
At the operation the appendix was found perforated &
there was a small abscess (about half a teaspoonful of pus).
Convalescence was interfered with by an attack of 'other
pneumonia'; but so far as the appendix condition was
concerned, her recovery was quite unimpeached & she
was discharged 5 weeks after her operation.

Bleed good says: "In chronic cases without
active formation of pus the leucocytes are generally
subnormal." I have not found this so in ordinary
chronic cases; in these I always obtained a leucocyte
count above normal (taking 6,000 per cu.mm as normal),
though never very high. In chronic tubercular cases
(any statistics regarding leucocytosis in which I
have not come across) I have obtained a low
leucocyte count. In the 3 cases in my series
which I think were undoubtedly tubercular the counts registered were 4,500, 5,000, 6,900. In the last one the leucocyteia of 9,200 was obtained during an acute exacerbation. It may be that the tubercle bacillus exerts an inimical influence on the leucocyte reaction. One cannot of course draw any definite conclusions from 3 cases, but if it is true that in tubercular cases the leucocytes are subnormal then one will have a valuable guide in diagnosing the variety of appendicitis, & once the diagnosis is established, in giving a prognosis & advising treatment (vide infra). For the present I should be inclined to say that chronic cases in which a subnormal leucocyte count is registered are probably tubercular & as such I should recommend operation.

Up to the present I have only spoken of the increase in the number of leucocytes, but of no less importance is the differential count. The outstanding features of such a count are the great increase in the percentage of polymorphonuclear leucocytes & the decrease in the percentage of lymphocytes & eosinophiles. Longridge in the paper already referred to illustrates these points.

Some more recent observers in this field
of study. Sondern & Gibson has placed on record some interesting facts. Sondern says "Leucocytes is largely dependent on body resistance towards infection and therefore the degree of increase can be no guide to the intensity of the pathological process. Good resistance will produce pronounced leucocytes even in slight infection, poor resistance but little leucocytes in slight infection & possibly none at all in grave infection. No adequate clinical method exists by which this body resistance can be determined with sufficient accuracy to apply it as a factor to the leucocyte count; this is the key to the disappointment encountered by the European in utilising these counts in diagnosis." Gibson has it that leucocytes in inflammation is an index of reaction rather than of the absolute severity of the particular kind of infection. Speaking generally, one may say that it is the rise in the percentage of polymorphs which is a fair index of the severity of the process. Gibson takes 75 per cent as the normal polymorph percentage, while Sondern takes it as 60%. Sondern says that with 94.5 polymerh percentage the case is always fatal, and also "In adult, a febrile—
Exudation or a gangrenous process is decidedly uncommon with less than 80 per cent of polymorph cells, the probability of their presence increases with their percentage. Gibson writes "the relative disproportion of the polymorph percentage to the total leucocyte tissue is the important point." He graphically represents this by what he calls a standard chart. This chart is divided into units of one cm. The left-hand side of the chart is taken to register the leucocyte counts and the right-hand side for the purpose of indicating the polymorph percentages. To start with a dot is placed on the left-hand side to correspond with a leucocytosis of 10,000 and a dot on the right-hand side to correspond with a polymorph percentage of 75. For the purpose of convenience these two dots are connected by a straight line, called the base line. These two points are taken as the starting points of the pathological leucocytosis and polymorph percentage respectively. Variations in these proportions are indicated by making a dot at the proper level of the left-hand or leucocyte side of the chart, while a similar dot is made on the right or polymorph side to record variations there. We shall have a horizontal line if the leucocyte has 10,000 and the
poly morph percentage 77 per cent. But if the
former be 12,000 & the latter 88 per cent then we have a rising line. He assumes that in inflammations
that are well resisted the polymorphonuclear cells are increased
approximately by 1 per cent for every 1000 leucocytes

| 40,000 |
| 35,000 |
| 30,000 |
| 25,000 |
| 20,000 |
| 15,000 |
| 10,000 |

leucocyte side

Figure I.

above the normal. By such a chart fluctuations are
noted & comparisons drawn. If the line be almost
horizontal the lesion whether severe or not is well borne.
Lines running up from the leucocyte side to the
polymorph side indicate rather severer lesions & less
resistance. A falling line indicates a mild case,
the leucocyte count being higher than the
Corresponding percentage of polymorphs. In appendix
he found all the severer lesions such as gangrene of
the appendix or progressive peritonitis showed a rising
line, while mild cases showed a falling line. In one or two cases in which I tried this after making this paper I obtained results confirming his statement.

If experience proves that such are uniformly correct we can be relied upon then we shall obtain valuable assistance in giving diagnosis and advising treatment. In a case of tubercular appendicitis in which I tried this method I obtained a low leucocyte count, but a fairly high polymorphonuclear percentage. This would lend colour to the experience of most practitioners that such cases are unsatisfactory to treat and are of unfavourable prognosis.

Recently Dr. Nochren has published a short paper based on 72 cases of acute appendicitis and its sequelae in which a blood examination was made just previous to operation, so that the result of the examination could be compared with the actual condition present. As this probably represents the most recent work in America in this field of study, I give his conclusions.

I. Blood examination in cases of acute appendicitis is of great value in determining the severity of the condition and therefore deciding whether or not immediate operative interference is indicated.

II. The degree of leucocytosis, formerly considered
an important diagnostic aid, is too variable to be of any practical value.

III. The relative disproportion between the percentage of poly nuclears and the degree of leucocytosis is reliable in a majority of cases, but the number of exceptions is so great that its practical value in determining immediate operation becomes very small.

IV. The estimation of the percentage of poly nuclears alone is more reliable than either of the preceding methods; therefore, together with the fact that it is one of the most easily made, the method to be recommended.

V. A poly nuclear percentage of 90 per cent or more indicates a severe process that needs immediate operative interference; a percentage below 75 per cent means a safe or mild process; a percentage between the two extremes speaks for the one condition or the other according as it approaches the one extreme or the other.

I have previously mentioned that an enumeration of the red cells and an estimation of the percentage of haemoglobin may also be of assistance. Before I had begun to look up literature on the subject, before I had read Ba Costa's work, I had noticed that in many cases of
appendicitis there was anæmia. Out of curiosity I had enumerated the red blood corpuscles in one or two cases. I was at that time inclined to put down the anæmia as a pre-existing condition in the patient. In case I of my series I was so struck with the marked anæmia with the patient's emaciation that I examined his chest on several occasions to see if I could detect any seque of pulmonary tuberculosis.

Da Costa found that in about 1 case in 6 the red blood cells were diminished more than 1,000,000. He analysed 139 of Dr. Beaver's cases and found the average loss of haemoglobin amounted to 25 per cent and the average diminution of erythrocytes to about 15 per cent of the normal standard. The anæmia which may be attributed to the effect of sepsis is most frequent and marked in long standing cases of appendicitis abscess in which type of disease the haemoglobin may fall to between 30 to 40 per cent, the red corpuscles to between 2,000,000 to 3,000,000. Occasionally the anæmia is so great that it appears to constitute in itself a serious complication, to raise doubt as to the wiser ness of surgical interference. Anæmia of a more moderate
grade may also occur in Catarhal cases but
individual instances may react as high as in
purulent cases. The blood impoverishment
in such instances depends probably on a
debilitated state of the patient, apart from the
appendic inflammation. Qualitative Changes
are not important nor common & occur only in
cases of decided anaemia. There are simply
departures of shape & size. & rubro-bleeds
apparently do not occur. My observations in this
respect have been made chiefly in simple cases.
In cases Nos. 77 & 79 no estimation of the red cell
was made, but the patients were markedly
anaemic in appearance, & in most of my cases
in which there were large abscesses the patients
were pale & anaemic looking. Now in these cases
there was marked anaemia or septic absorption
which might quite well account for the anaemia
present. But what about the mild cases? How
is the anaemia to be explained in them?
Probably in the great majority of cases there is
bacterial infection, but that by itself does not seem
to me to sufficiently account for the production
of anaemia in many cases. Sir Andrew Clarke
has suggested that in the production of anaemia
(Chronic) constipation is an important pathological factor, COPD being resulting from absorption of poisons from the large bowel. If there be any truth in that theory, might we not apply it to the condition under consideration, because in the majority of cases there is constipation? Be the cause what it may, the presence of anaemia in many cases is undoubted and during convalescence this symptom may require treatment.

Such then are some of the points which should prove valuable guides in giving a prognosis or in determining treatment. I have not been able to observe a sufficient number of cases to be of any statistical value, but the few cases in which I have examined the blood have tended to confirm the observations of others. Taken in conjunction with the clinical symptoms, this examination is a most valuable aid, but taken by itself is of little use. In conclusion I shall quote Dr. Costa: “The surgeon who attempts to base the blood count in appendicitis as a definite pathognomonic symptom will soon run afoul of diagnostic disasters, but he who regards it only as a symptom to be invariably correlated with other equally, if not more important, clinical manifestations cannot
fail to find this method of inquiry of signal value in routine clinical surgery.

These are the leading symptoms — I have tried to show how far they can assist one in determining for or against operation. In the preceding pages I have endeavoured to analyse their value. They may be all present but perhaps I could say with greater truth they are rarely all present; certainly they are very rarely equally marked. The absence of one or more is not of much importance; it is a case in which negative evidence does not weigh anything. "One single important symptom," says Moulin, "if it is definitely getting worse is enough. It not only justifies but compels operation." Perhaps rather strongly put, but it would certainly be a safe rule. Might save many lives that are now lost through regrettable procrastination. Be it understood that this regards only to an important symptom, as such I agree with the statement because I believe that the progressive increase in severity of any important symptom points to some dangerous and severe lesion. Moulin when he
writes as follows is probably on less debatable ground. "The rule should be to operate at once, no matter how soon, if any one symptom leads you to think that your patient is in danger of being attacked by an almost uniformly fatal complication, whether this is diffuse septic peritonitis, portal pyemia, or general septicemia." These are sentiments which I think not even the most cautious and conservative practitioners could profitably take exception to. Carman 32 comes to the following conclusions concerning cases which are severe and require operation. (1) If the onset is severe, the attack will be severe; (2) the facial expression typical of a severe abdominal seizure may be present, but will not occur as often in adults as in children, in whom the dull, heavy look in the sunken eyes, the drawn features, very anemic lips, are so characteristic. (3) The tongue will be furled, but rarely dry unless peritonitis is present. (4) The temperature will rarely exceed 102°F. If, after an initial rise, it falls then rises again, an abscess is forming. (5) falling temperature with increasing pulse rate is a grave sign, it is an imperative indication for
Immediate operation; indeed, it is an indication that operation has been delayed too long. Severe gangrene may be associated with a subnormal temperature (5). A rapid pulse from the start is evidence of a severe attack. If steadily increasing in rapidity, it suggests peritonitis. (6) If diarrhoea occurs the attack is probably severe. (7) Vomiting at the start is common. If it cease or re-commence, suspect peritonitis. (8) If pain this appears then recur, an abscess is forming. If pain suddenly ceases while other sequel become more severe, gangrene is present. (9) If acute localized tenderness persists, or returns after a temporary cessation, an abscess is forming. If there is extreme cutaneous hyperaesthesia, suspect chest trouble, especially in children. If there is general tenderness persisting, suspect general peritonitis. (10) Rigidity of the abdominal walls, if persisting after 24 hours, is evidence of a severe attack. (11) If tumour persists or increases after 48 hours, an abscess is forming. (12) Abdominal distention, if occurring early and not yielding to enemata, is an indication of gangrenous appendicitis with peritonitis, so an urgent
indication for operation (3) a high leucocytosis
from the first is evidence of a severe attack.
In looking over my cases I am convinced that
the pulse rate, general aspect of the patient & the
leucocyte count are the most valuable & the
fattest guides at our disposal. The value of the last has only recently been recognised & even in some of the latest textbooks it is discussed in a few short sentences only.
The article by Dr. Otto Grünbaum is the fullest I have
noticed in any textbook. He points out that the
polymorph leucocytosis is the important sign. Physicians are singularly reticent on the matter. Gulland is one of the few whose opinions I have seen recorded. He says that a marked glycogen reaction in the urine indicates operation. He believes that in doubtful cases, we should be guided by the differential count & the glycogen reaction rather than by the amount of leucocytosis. It should never be forgotten that very severe toxaemic cases may show no leucocytosis, but have invariably a marked glycogen reaction, whether the polymorph percentage be increased or not. Further cases where repeated examination shows any sudden marked rise of the total leucocyte count, of the percentage of polymorphs or the appearance of any marked glycogen reaction, then the indication is the onset of further mischief & generally justifies intervention.
Before leaving this part of the thesis I should like to say a few words regarding appendicitis in the Services and tubercular appendicitis. As regards the first—"Should persons liable to attacks of appendicitis have their appendixes removed before entering the Services?" Lately some of our soldiers have been given the option of being operated on or of being discharged from the army. Mr. Bowlby has related the following case: "A soldier when near the North West Frontier of India was taken with a very violent attack of sickness which was believed to be due to peritonitis. He was desperately ill and remained in bed for two weeks. His recovery was tardy. He was then told "If you wish to remain in the Army you must get rid of your appendix." "No doubt a good deal might be said in favour of this, for, if liable to attacks of appendicitis, a soldier's life is not an ideal one for guarding against attacks in the future. He has violent exercise, long marches, damp sleeping quarters, food not always above suspicion, all of which may act as contributory causes towards an attack of appendicitis. Should he have any idiosyncrasy that way, the nearest approach to this class I have myself seen occurred..."
In case No. 9. In this case a young lad, aged 19, had a second attack when camping out with his volunteer company. The attack was a sharp one, but it subsided under medical treatment. He was advised to have the appendix removed, but though the lad himself was willing, the mother refused to give her consent. The rigorous methods of active service would not be very suitable for him, when summer camping out brought on an attack.

Remarks of a similar nature may be applied to sailors, those who spend their lives at sea. Johnson in a short paper on appendicitis at sea describes 2 cases on which he had successfully operated on. In one of them there had been a previous attack. Taking into consideration the increased risk of an operation under such circumstances one would reasonably advise removal of the appendix before embarking on a voyage.

Therefore I should always advise anyone about to enter the Services who has had a definite attack of appendicitis to have his appendix removed. If an attack supervenes in a soldier on the march or in a sailor or other person at sea, I should advise the sick bay over of the attack if possible by medical
Treatment was first favourable opportunity the removal of the appendix during a quiescent interval. I was surgeon to the Natal Direct Line for a few months at the end of 1905, while at sea I had two cases of appendicitis to treat. One, a very mild attack, occurred in a young lady passenger and was associated with constipation. The other (Case No. 27), a very sharp acute attack occurred none of the ship's firemen. I was sent for one day to see him; found him doubled up with severe abdominal pain which had come on quite suddenly. He was sick and vomited. I got him to his bunk and proceeded to make a more minute examination. His temperature was 102.2°F; pulse 92 per minute; great tenderness on pressure and resistance over right iliac region. Treatment consisted of hot fomentations locally and little chiefly mild water. A simple enema was given with good result. Next morning the temperature was 101.8°F; pulse 90; still very tender over appendix region. Previous treatment continued. Next morning he was distinctly better. Tenderness had evidently set in. Temperature 99.8°F; pulse 84; palpation hot followed by great tenderness or resistance.
The after history was uneventful. As we were
in the midst of a storm at the time it was there was
no other medical man on board, an operation
could only have been done under most
unfavourable circumstances.

**Tubercular Appendicitis**

This is a distinct variety of appendicitis which
calls for separate consideration. Possibly, many
of the cases described under the term chronic
appendicitis are tubercular in nature. That the
appendix alone may be the seat of tubercular
mischief is probable & I am convinced that,
associated with tubercular peritonitis, tubercular
appendicitis may occur, because in making
"post-mortem" or cases of tubercular peritonitis
I have sometimes found the appendix inflamed
thickened. Evidently, the seat of tubercular mischief
which is the primary condition I am not prepared
to say, but I think it may be sometimes the one,
sometimes the other. The attack is characterised
by extreme chronicity & there is generally
great thickening over the appendix region. The
symptoms are not as a rule of an acute
class character & constitutional symptoms such as
sweating, loss of weight etc are met with.
There is no leuco-lysis as a rule. How as regards treatment medical means are rarely satisfactory. It is doubtless true that by careful medical treatment the patient may be kept in comparative comfort, but every now and again there is some return of the sub acute symptoms. Sometimes the patient appears to be going rapidly downhill. That medical means may give temporary relief is well illustrated by the following case.

N. G. (Case No. 22) a little girl, aged 11 years, was admitted into hospital on June 12th, 1905, suffering from what appeared to be an acute attack of appendicitis. The history was as follows—Two days previously she was seized with violent abdominal pain. This pain at first was pretty general, but after a few hours it became localised to the right iliac fossa, a point mid way between the umbilicus and the anterior superior iliac spine was especially tender to the touch. She was sick and vomited. Her medical man ordered hot fomentations to the abdomen & a strict milk diet. On seeing her next he found her condition much the same, so he ordered her removal to hospital.

There was nothing in the family history of importance. Her home & social conditions were far from satisfactory. She lived in a small overcrowded room, her meals were irregular, the food was insufficient in quantity,
bad in quality. She had had no serious illness before.

On admission, she lay on her back, with the right knee slightly drawn up. Her face was pinched and sunken, looking three traces of much suffering. She was pale and anaemic-looking, with slight malar flushes. Her development was fairly good, but her muscularity poor. On examining the alimentary system, it was found that the tongue was very furry and red; the breath had a fetid odour. She felt sick, but had vomited only once. Her bowels were very constipated. On inspection of the abdomen, it was noted that it was held rigid, the breathing being entirely thoracic. The dorsal demutinous flexion of the right knee had already been mentioned. The right iliac region was somewhat fuller than the rest of the abdomen. On palpation, she shrank away from the slightest touch; the whole abdomen was very resistant, board-like, but was most markedly so in the right iliac region. In that region, a distinct localized swelling could be made out, very hard and indurated, with no sense of fluctuation. Tenderness, though general, was by far the greatest over McBurney's point. percussion showed a localized area of dulness on the right side, it was painful. There was no albumen in the urine. The pulse was rapid, weak, and the respirations were quickened. There were no sequel of the operation.
leucocytosis (9,200). The temperature was 103.2°F.

There was nothing note worthy in the other symptoms.

Treatment & progress - She was put on diluted milk in small quantities at frequent intervals. A soap suppository was ordered that ferments were applied to the abdomen. Next day her condition was much the same. The enema acted fairly well. She was given 24 grains of calomel that night 1 drachm of sulphate of sodium next morning that acted well. No much improvement was noticed for 3 days. The pain now gradually got less; in fact, it was only on palpation that it was elicited. The temperature was curious. It came down to almost normal towards morning, but rose to 100° or 101°F towards evening. Bezoar's food & beef tea were now added to the diet. After about 10 days the acute stage may be said to have passed off. There remained this circumscribed area of thickening in the right iliac region & a point of tenderness just over the appendix. Her bowels required constant attention. The alvine discharges were rather pale in colour & very offensive in odour. The tongue still continued furrowed & dirty. She was given calomel occasionally with sodium sulphate on the following morning, & regularly every 4 hours at first, then thrice daily, 3/4 of a mixture of one ounce of magnesium sulphate.
in 8 fl. oz. of peppermint water. Powders containing
Sod. bicarb. gr. V, pulv. thei gr. ii p, tabac gr. V,
were also given during daily. Locally the fomentations
were continued. She was now allowed milk, bread, and
fish. Convalescence was very slow. A month after her condition
was as follows: There still remained the
circumscribed area of hardness in the right iliac fossa
less than it was formerly, only on deep pressure could
again be elicited. She was now on practically
ordinary diet. She was very thin and emaciated, had
night sweats. The temperature still continued worse
by about 100° F at night, but was almost normal in
the morning. She had no cough or spits. A careful
systematic examination of the chest on several
occasions failed to reveal any sequel of pulmonary pnemonia.
Diagnosis: The question was: What was the nature
of this swelling? Was it tubercular, or was it simply
inflammatory thickening, or was it an abscess
around the appendix? My opinion is that the
case was one in which there had been a slow
and insidious onset of a localized tubercular peritonitis
that the acute attack of appendicitis drew the
patient's attention to it. Very probably the appendix
itself was the seat of tubercular mischief. If the
thickening had been simply inflammatory, the
Temperature would have fallen as soon as the acute attack passed off. Nor would one have found such evacuation & sweating associated with a simple inflammatory process. Coming to the question whether it was appendicitis with abscess formation, we should have expected rigor, but at no time, during the course of the case did these occur. The absence of marked leucocytosis is also a point against that. It is true that the tissues of very virulent may prevent leucocytosis, but in this case, though severe, at no time did it appear as if the patient might be overwhelmed by the toxins. The temperature did not give me the impression of a pyemic process going on. No doubt there was the irregular swing, but that irregularity was too regular, so to speak. The temperature in pyemia is generally higher & the rise & fall do not occur with such regularity. The sweating was not of much help in diagnosis. In pyemic conditions it is apt to occur irregularly & frequently; in this case it always took place at night. Lastly, if a pyemic process had been going on for weeks as suggested by the temperature, one would have expected to find a large fluctuating tumour in the right iliac fossa. Taking last of all, the
question of its being tubercular in nature, what do we
find in favour of that? The hard, brawny
induration which has been noticed from the very
first suggested that some chronic process had been
going on. The temperature was very suggestive. If a
medical man had been shown the temperature chart
then been asked to make a diagnosis from simply
looking at the patient, there was the slightest doubt
that he would have suggested that there was early
pulmonary tuercealoeia, as in every feature of the
patient's face was stamped the tubercular diathesis.
As already mentioned, no evidence of pulmonary
tubercele could be detected. The patient's emaciation
was attributed to more than simple inflammation.
Subsequent progress. After being six weeks in
bed there only remained some induration. The
luculentation had been discontinued, the part
painted with iodine on several occasions +
laterly, Ung. hydrag. Co. applied. During her
covalescence she was given half a teaspoonful
of the drop of the iodide of iron thice daily,
then Hommel's Haematuragen finally half a
cod liver oil. The temperature continued to rise
one or two degrees at night, therefore she was
being
kept up. After 2 months in Hospital it was

decided to let her up talla her to walk about the ground. Curiously enough, the temperature remained normal & did not rise again. When 3 days her progress towards recovery had been slow but sure, but after she got into the change was very marked indeed. Her general health improved greatly & she put on weight. She was discharged on September 11th 1905. A laparotomy was suggested by the mother, but it was flatly & blankly refused. The child was sent to the convalescent Home at Aden for 3 weeks on her discharge from Hospital, but she was taken from there by her mother after having been only a week at the Home. We also tried to get the child into a Mariner's Home at Bereq of Hein, but the mother refused to allow the child to go there. I have been unable to trace the case, as the mother & child left the district : but from what I saw of the matter I think the prognosis for the child would not be a favourable one.

My other two cases were Surgically treated: H.W. (Case No.36) a boy 11 years of age was admitted to hospital on May 25th 1906. He had suffered from vague abdominal pain for some time with an occasional more acute stage in the right
The patient had been steadily losing weight for months, sweated profusely at night, suffered from a dry, hard cough. Two days prior to admission he had an acute exacerbation of the symptoms which pointed definitely to mischief in the appendix. This attack subsided under careful medical treatment, but there remained a hardness in the right iliac fossa, the abdomen was distended. Subsequently an operation was done. The appendix was adherent, greatly thickened, and contracted about its middle—it was with difficulty removed. There was also tubercular peritonitis with fluid in the abdominal cavity. After the operation he markedly improved. He put on weight, the abdominal distension disappeared, the fluid became absorbed; the was much more active than formerly. No pulmonary condition was found to account for the general symptoms.

Case 68 (H.T.) was also of the tubercular type. A history of chronic pain (not very severe) over his appendix region, gradual loss of weight, loss of appetite constituted his complaint. At the operation an elongated, thickened appendix was found, there were enlarged mesenteric glands in the neighbourhood. The appendix and the enlarged
Glands were excised. The latter had caseous material in their centres. As in the preceding case marked improvement in general health followed operation. Before his discharge from Hospital (about 6 weeks after the operation) he had gained over a stone in weight. When I last saw him in March of this year about 14 months after the operation there had been a further gain in weight of 1 1/2 stones. The operation benefited him both physically and mentally. Time alone can prove whether the improvement will be permanent.

Case 76 (Mrs S--) was probably also tuberculosis in nature, but as I saw the case only once I cannot be certain about it. She had had 2 distinct attacks of appendicitis with a history of long standing slight abdominal pain. In the right iliac fossa there was left a distinct fullness readily appreciated by palpation. There were loss of weight, anorexia, occasional amenorrhoea, sweating at night etc. She had signs of active pulmonary tuberculosis at the left apex. She refused operative treatment. In these tubercular cases I think that operation affords the best means of treatment. If the appendix is alone diseased then
by excising the organ one might reasonably hope to bring about a cure. In cases where there is associated tubercular peritonitis the organ may be so bound down by adhesions that its removal is a matter of some difficulty and may perhaps be impossible. It would be a matter of much interest to ask whether a simple laparotomy might not be followed by cure as some cases of tubercular peritonitis undoubtedly are. For many years I was extremely sceptical about the curability of tubercular peritonitis by operation, but while resident in a children's Hospital in the South of England I saw remarkable results follow operation, and since then I have modified my opinion somewhat. One case especially impressed me.

A. B. - a boy 8 years of age was admitted to hospital on April 27th, 1906. He had tubercular peritonitis and the abdomen was enormously distended and dull on percussion. He was very emaciated and general condition was about as bad as could be. A simple laparotomy was done. The peritoneum was covered with tubercles and the intestines were all matted together. A little
of the fluid escaped at the operation, but owing
in the very critical state of the boy the surgeon was
afraid to break down the adhesions to allow of
the free escape of the fluid. So that really all
that was done was to open the abdomen and then
close it. The whole operation lasting less than
a quarter of an hour. Short as it was, it was
quite enough for the boy. He had a hard struggle
to rally. He recovered from the effects of the
operation, the wounds healed by first intention,
the stitches were removed at the end of 10 days.
He was treated in an open air balcony, though
his general condition improved very slightly. His
abdominal condition remained in stasis. He
was discharged on May 19, 5, a very bad prognosis
being given to the parents. Nothing was heard of
him until the end of August when he came up
one day to the outpatient department to show
himself off. I never saw a greater change in
anyone, it was hard to imagine that he was
almost dying a few months before. He was stout
the had lost his anaemic look. He was able
to jump, play with other boys. I examined the
abdomen times found absolutely no trace of
fluid. All I could feel was a somewhat
indefinite thickening. The family then removed to London & I have not heard of him since. Had I not seen "cures" follow in some other similar cases I might have been inclined to put this down to coincidence. All cases are not successful - I think I have seen as many failures as successes. But operation appears to have a beneficial effect in a certain number of cases. A patient may be going rapidly downhill under medical treatment, this surgical treatment may afford relief to some. The matter can be frankly explained to the patient or to the parents in the case of a minor & they can decide as to whether they wish an operation or not. So far as I can judge the operation does no harm & there is only the temporary inconvenience for a day or two after the operation. In some it may effect a cure & this happy result is more likely to occur in children & young adults. Arising from these cases one might hope that in tubercular appendicitis where the appendix cannot be removed a simple laparotomy might lead to improvement. For the present I should be inclined to
advise such in tubercular cases where medical treatment is obviously not effectual. Now I have fully dealt with the question of operative or non-operative treatment while it will be seen that I totally disagree with the advanced surgeon, I am fully alive to the fact that surgical interference is the best treatment in the majority of cases. A leader in the British Medical Journal of Dec. 15th 1906 contains the following "The very obvious fact must not be ignored that in the majority of cases of appendicitis the person who saves life is the surgeon". Sentiments which I most heartily subscribe to. It is with those surgeons who say as soon as they see a case "that appendix must come out at once" that I am at variance. Under such circumstances there are appendices that will be removed unnecessarily, in spite of all that Canlic said to the contrary. I consider such is quite unjustifiable. Many surgeons say that lives are lost owing to cases being treated medically, but on the other hand I feel convinced that lives are lost because operative interference is undertaken at a wrong time. Berry's statistics quotes above support this view. Broca in
advising deferred intervention—operation à
froid—points out that he had a mortality of
33 per cent when he did the early operation and
only 13 per cent when he did the delayed operation.
My contention is that the 70 or 80 per cent of cases
which will recover with medical treatment should
be treated by such. Then the points for or against
operation in the crescent interval can be carefully
weighed. I feel sure that the mortality rate
could be lowered by this means. With our increased
diagnostic facilities it should not be impossible
to pick out those cases in which operation should
not be delayed. The art of surgery has reached
a degree of excellence our forefathers never
dreamed of till their enthusiasm some surgeons
are apt to forget the old surgical axiom “Primum
non nocere.” Cases of appendicitis are one
might say on the border line at the physician and
surgeon should work harmoniously together.
I cannot help quoting some words spoken by
Dr. Affleck some 15 years ago, but which in
my opinion can equally well be applied at
the present time. “It is much to be desired that
the surgeon should, when called for, avoid the
merely surgical attitude, I place himself in line
with the physician in deliberating upon the grave problems in the given cases, remembering as Talamon put it that "it is less his brooding than his judgment that we make appeal. But while this is true, it is equally important that the physician should let his mind enter into the surgical sphere tenderly and to make himself acquainted with the nature, extent, and possible difficulties of operative procedure on this important region of the body. It is only thus that he can take upon himself the responsibility—often rests with him as regards the final decision—of advising a means of treatment fraught with momentous interest to human life."

It has often seemed to me that the motto 'Union is strength' might well be applied here, for its adoption would demonstrate its truth, would be of undoubted benefit to our patients. Once again let me say that all cases merit close study and careful attention. It always reminds me of Heber's beautiful picture in which is depicted a child very ill with the doctor sitting by his face full of sympathy, this whole bearing indicative of his deep concern as to what will be best for his little patient. Here individual consideration
for each case, cooperation between physician
and surgeon, diagnosis on the part of the surgeon
before he thinks of operating, an open
mind by the physician who must be fully
alive to the "why" and "when" of surgical
interference—these are most important points.
By such methods one might reasonably hope
to establish the matter on a scientific basis
in doing so to further reduce the mortality rate.
It is often said that statistics may be made to
prove anything, but just for a moment consider
the matter as I have tried to lay it down. The
we have the 80 per cent (or more) of cases which
have recovered under medical treatment and the
majority of these were operated on in frequent
intervals there would be no mortality among them
or at most a mortality of ½ per cent. how the
remaining cases include fulminating cases,
cases with gangrene or perforation of the appendix
or pneumonic, cases with abscess formation.
In these as I have endeavored to show it is
the waiting too long that is the cause of the
appalling mortality, if general practitioners
could be educated to recognize this fact if
they would call the surgeon early in those
cases, then a very small death rate would be recorded. Fulminating cases if operated on within 24 hours would rarely prove fatal. Similarly cases with gas-peritone or perforation of the appendix if taken early would likewise give little or no death rate. Cases with general peritonitis to a certain extent cases in which abscesses have been allowed to form represent to my mind lost opportunities, if future generations of medical men would so exercise their diagnostic acumen as to avoid such cases, then the mortality now accruing to such would be a negligible quantity. To sum up — medical treatment wherever possible & subsequent operation in the quiescent interval when necessary, early recognition & prompt operation in the acute cases I have mentioned that seems to be a method of treatment on a sound scientific basis, a method of treatment which would result in a very small mortality, a method of treatment which would not subject patients to unnecessary operations.

Having discussed at considerable length the question of operative or non-operative measures, I shall now consider the medical treatment & from what I have already written it will be
Clear that I consider much can be done by the physician in such cases. The patient must of course be treated by rest in bed in acute cases and during the acute stage. In many books it is recommended that the patient should lie strictly on his back, but I cannot see that this is absolutely necessary. So long as the patient is not "actively" moved i.e. to say so long as he does not move about by his own efforts, I cannot see what harm there is in his being "passively" moved.

The dorsal decubitus has really nothing to recommend it - it is unsatisfactory, unnatural and not the normal position for sleeping. How many people do we find who in health sleep lying on their backs. This position is not anatomically sound because the bony skeleton is less thinned covered with tissues posteriorly. In females it is liable to cause cystitis. The patient himself shows he the best judge of the most comfortable position: if the patient wishes to be moved to one or other side I see no just cause or impediment why he should not. The important point is that the patient has to play a passive not an active part during these manoeuvres the Shores not himself endeavours to change his position. This Shores be done by the
nurse. If for any reason the dorsal decubitus is considered essential, a pillow should be placed under the knees (which should be slightly flexed), the knees gently rubbed from time to time with a soft shawl or pillow placed in the hollow of the back. DECUBITUS then is most important to the careful selection of the patient's position will add much to his comfort perhaps keep him free from pain.

The dieting is a most important factor. In nearly all cases food can be taken by the mouth. In a very few cases where for some reason or another, such as persistent vomiting, the nourishment cannot be given thus, it may be given by the rectum in the form of nutrient enemata. These enemata should be given from hourly during the day twice or twice during the night. What I consider better to be given at night are enemata of which two may be given. They are of convenient size, are easily given because the patient much less annoyance and disturbance than the enemata. They give us a means by which concentrated nourishment in small compass can be administered. They are easily assimilated. But as I have already said it is only in very exceptional cases that rectal
Feeding has here resorted to in appendicitis. In most cases the nourishment can be taken by the mouth. For the first few days the diet should be entirely fluid. It should consist chiefly of diluted milk. Both on account of the local inflammatory changes because there is probably some fever, the digestive power is weakened; the stomach is unable to digest anything solid. I am aware that many deprecate the use of milk, if they do not absolutely condemn its employment in this disease. They base their antagonism to its employment because of the fermentation liable to result. They advocate starvation for 24 or 48 hours. The giving of nothing but water or perhaps albumen water. Oehme believes that the treatment is essentially medical in character, but aims at preventing the diffusion of infection from the appendix by abolishing the peristalsis of the small intestine. This it is claimed can be effected by thoroughly emptying the stomach by then withholding all food, as far as possible even drink, by the mouth. It is claimed that by this method the inflammation can be induced in a large percentage of cases as a walled in abscess,
in the caecal region. It is even suggested that the pus of these abscesses may under favourable conditions be absorbed and no trace of the disease remain except a few adhesions. — Reutin. 31 Keeps his cases on soups, barley water (Starvation diet) + avoids milk. Many others support this principle. Against this method of treatment I must protest. I do not see that it does any good & I consider it unnecessary & the cause of much needless suffering. In strong healthy adults who are attacked by appendicitis probably Starvation for 48 hours will do no harm, but in young children & in old people I think such is to be condemned, as it is only too likely to undermine their strength, unfit them perhaps to successfully weather any future operative measure which may be necessary. At any rate I always recommend rectal feeding in those cases where feeding by mouth has been reduced to a minimum. In all the 80 cases which have come under my personal observation this Starvation treatment has never been adopted & so far as I have been able to judge no bad effects have resulted.
from the giving of milk. One aims at giving in
this disease a diet which while it supplies
plenty of nourishment does not need much
digestion, will cause a minimum of
peristalsis it will not tend towards the formation
of a hard solid residue or the formation of
gas in the intestine. Those who consider the
giving of milk bad do so because they
believe that lactic acid fermentation is apt
to be excessive to cause the formation of a
considerable quantity of gas. They also are of
opinion that milk tends to encourage all
kinds of bacterial growth in the intestines. If
milk be properly given I do not think these
conditions will arise. I think the great secret
lies in the fact that the milk must be well
diluted. The majority of people can take milk,
but there are a few who will say "Oh, I can't
take milk; it does not agree with me" but
it is generally possible to find out some way
in which it can be taken. Milk is an ideal
food if it would be a serious loss to the patient
not to be able to take it. Hutchinson who has
done so much in the realm of dietetics
gives the composition of milk as
Water 87-88.
Protein 3-3½.
Sugar 4-6.
Fat 3½-4½.

Mineral matter 7.

He also discusses various methods by which the milk may be made more digestible. When milk enters the stomach it sets into a solid clot owing to the action of rennin. This has been distinguished from the "curdling of milk." When milk "curdles" its casein is simply thrown down in the form of a precipitate without undergoing further change. When milk "clots" the casein undergoes profound internal alteration rendering it for practically a new salt with new characteristics. Buttermilk + lournina partly owe their greater digestibility than ordinary milk to the fact that "curdling" and "clotting" is the change through which they pass. If then we wish to lighten the labours of the stomach in the digestion of milk, we must endeavour so to arrange matters that the milk will not form a dense enough clot after it has been swallowed. Now it has been found that the density of the clot which milk
forms in the stomach depends on the one hand upon the amount of casein and lime salts which it contains and upon the other hand upon the degree of acidity of the gastric juice. The richer the milk is in casein and soluble lime salts, the more acid the gastric juice the tougher is the clot. Obviously, more dilution of milk with water lessens the proportion of lime salts to casein and will increase its digestibility. Dilution must be at least half thalf of any great benefit is to be obtained from it. Dilution with lime water is probably not more efficacious than dilution with ordinary water, although some people seem to be able to take it more easily when treated in this way. This does not prevent clotting, but it seems to prevent the clot from shrinking into a tough mass-doubtless due to the starch it contains and to the viscosity of the fluid.

Wright has shown that the coagulation of milk can be prevented by the addition of 1/50 part of its volume of a 25 per cent solution of citrate of soda, which acts by converting some of the soluble lime salts into insoluble calcium citrate. Personally, I have never used this
in such cases, but I can testify to the value of citrate of soda in persistent vomiting in infants. Many cases of intractable vomiting having reacted in a marvellous way to this treatment. Aeration is another important means of combating density of clotting. The clot forms rapidly, but is friable. The ease in degradability of milk + soda is due to dilution + aeration. The clot is denser the greater the acidity, probably lime water acts by its alkalinisity. Sodium bicarbonate is of little use owing to the rapidity with which it is neutralised. Another method is the mixing of milk with something that will go between the particles of casein acid + it will keep them apart, so that there is no tough mass but spongy clot. mucilaginous fluids, for example, barley water acts thus. Thickening milk with a little gruel or cornflour acts in the same way.

The majority of patients will be able to take the milk when well diluted, if not, one or other of the methods suggested above may be tried. If these fail then one may try the patient with pepbonised milk or it may be found that the stomach will be able to tolerate
the milk, when pre-digested, i.e. to say in the form of "milk-tart" or "curdled turkey". If for any reason milk cannot be taken a nutritious liquid of great value is albumen water. The whites of 2 or 3 eggs are whipped up in a pint of cold water flavoured with lemon or sugar. This is easily digested, is quite restorative and does not tend towards the formation of bacterial growth in the intestines. In addition to the milk, beef tea or chicken tea may be given. Another thing I have found very useful is Valentine's meat juice. A good way of giving the beef tea or chicken tea is to make a pint for the 24 hours. A third is given at dinner time, a third at bedtime and the remainder in the early hours of the morning. It must be remembered that beef tea, broth etc. are not foods in the same sense as milk is a food, they should be looked upon rather as stimulants.

Nourishment in the form of sugar might be more often employed. Gardner has shown that it is easily digested it is absorbed that it is readily stored up as glycogen, forming a reserve force producing material. It becomes completely oxidised without any waste.
leaving no residue. Grape sugar is probably best as it really requires no digestion at all and can be directly taken into the circulation and immediately available for energy. It may be given in the form of raisin tea which is made by pouring boiling water on to half its bulk of chopped raisins and stewing for 2 hours. It is then strained and may be given plain or with albumen water. Milk chocolate is another good way of giving it, in which form it is readily taken by patients, especially children. If parents object to very sweet things sugar may be given in the form of Saccharin lactis which is not so sweet.

It is not advisable to keep a patient too long on strictly fluid diet as this tends to cause flatulence, but it must be remembered that the giving too early of solid food is liable to produce dyspepsia, abdominal pain and revival of fever. After a day or two this strictly fluid diet may be staked out by the addition of Benger's food, plasma, chicken jelly, etc. In a few days light solis may be allowed such as milk puddings, cornflour, arrowroot. In the second week fish and meats
are added towards the end of the week
chicken trubbit. In the third week the patient
may have a chop. This is then gradually, and
cautiously, put on ordinary diet. In a
case which has progressed favourably, I always
expect the patient to be on ordinary food
within 1 week. I am speaking of treatment
generally. Each case must be judged on its
own merits. The rate of transition from one
stage to another will depend entirely on the
case under treatment. Cheyne & Bourghardt 59
recommend that no solid foods should be given
until the temperature has been normal for
some days. I think that the patient's inclination
to a better guide as to what it will be safe
to give him, for if he is disinclined for
certain foods he will be better without it. If
he feels hungry, it will probably be quite safe
to increase the diet. At any rate one cannot
be guided by the temperature in tubercular
cases, or the patient might have to be kept
on fluid diet for weeks or even months.

Napoleon the Great is said to have
stated, 'A soldier marches on his belly.' If
this be true then it is equally true that
a patient convalesces on such. It is often a very difficult matter to get a patient to eat and many little plans have to be devised to tempt his stagnant appetite. Among better class patients one may be at a loss for something to tempt their appetites with. For such a very attractive little cake can easily be made by a clever cook from the following formula.

8 ounces of ground rice
3 ounces of butter
4 ounces of castor sugar
One egg
One tablespoonful of milk
A little baking powder

Made: Rub butter into rice — Add the sugar
Mix with the egg and milk. Bake in small pans.

In the case of chronic invalids or of children who have lost all appetite for food these little cakes can be made even more appetising by adding a little vanilla as a flavouring. The question is often asked, ‘Should fruits be allowed?’ In the great majority of cases these may be allowed. There seems to be no truth in the assertion that fruits with seeds are harmful. Not only are fruits palatable &
relished by the patient but they are excellent agents in many cases for keeping the bowels regular. The question of alcohol has also to be considered. In most cases I do not think alcohol is necessary, but in some where the heart is feeble the pulse weak a little stimulant may be required. During convalescence a little old Madeira or Port is of the greatest value especially in those who have previously been abstemious with regard to alcoholic beverages.

The bowels have to be well attended to. Some believe that chronic constipation plays an important part in the causation of appendicitis and that the dealing with the constipation is an important factor in the treatment. Others again ridicule the idea of constipation as an ethiological factor. 19 posts maintains that no attempt should be made to move the bowels until the 4
t or 5th day that until the 7th if an abscess is forming, when calomel or a saline aperient such as sodium phosphate may be given followed by an enema. Reuter does not try to get the bowels to move till the 6th day after which he gives a more generous diet. Taylor says that unless the rectum is
loaded he would leave the bowels alone until
the acute stage is past. With such I entirely
disagree. While not expressing an opinion for or
against constipation as an etiological factor
in appendicitis I cannot believe that it is a good
thing once an attack of appendicitis has
supervened to leave the large bowel loaded with
liquid bilthqueous accumulations. Our
friends of the waiting brigade say that we
break one of the primary rules in the treatment
of inflammation viz. rest the part: but to them
I would point out that a caecum loaded with
faeces is a splendid breeding place for bacteria,
the karishes of which would be likely to do
infinitely greater harm than the slight
movements due to peristalsis. Jangger is of
opinion that it is injudicious to let the contents
of the colon stagnate, as this hinders the proper
drainage of the appendix and offers the most
favorable condition for the increase of virulent
organisms such as bacillus coli. He advocates
the use of small enemata half a pint to a
pint in bulk at a temperature of between 60°
and 70° F, repeated once or twice at the onset +
and afterwards every 2 days.
Speaking generally, I think the bowels should be got to act in the best place by means of enemata, simple soap and water to which a little turpentine may be added if desired, because enemata cause less disturbance of the alimentary tract. If such are carefully administered there need be very little peristalsis, so the principle of rest is hardly violated, while the bacteria are deprived of a niche where in they may flourish & multiply. The bowels should be emptied at least every other day. I have mentioned enemata first, because I wish to emphasize the fact that I think it is best to begin with these. If one can be sure that the attack is a mild catarrhal one in any case when an attack has almost subsided an aperient could be safely given, but I think then an aperient which does not cause too much peristalsis should be chosen, so long as any symptoms of an acute nature are present. After the subsidence of the acute symptoms calomel may be given. My objection to calomel in the very acute stages so that the reckless use of it may cause disaster. For example, a case may just be on the point of perforating or an abscess may
The forming of col柬el is administered the violent peristalsis which results may precipitate perforation of the appendix or cause an abscess to burst, when the keeping of the part at comparative rest might have prevented such disasters. It may be urged that col柬el is quiescent in the very worst cases where there is general peritonitis, to which I would reply that in these circumstances it is quite a different matter, for the patient is in a very precarious condition, the gut is paralysed it is necessary in order to save the patient's life to start peristalsis to carry away the effete products which are poisoning the patient. The cases to which I refer come within quite a different category; I again repeat that there may be an acutely inflamed appendix trembling on the brink of perforation or there may be an abscess on the point of bursting resembling which sets up violent peristalsis may place a patient, who, though very ill, is not in danger, in a very critical condition. Therefore give enemata in the first place, give castor oil or saline aperients when the acute symptoms are less marked, give Col柬el when the acute symptoms have subsided. Five grains
of calomel may be given at night to be followed
next morning by a saline aperient such as
sulphate of sodium or sulphate of magnesia.
Some prefer to give the calomel in one grain
doses every hour until five grains have been
taken, followed as before by a saline. I have
given the calomel in both the ways mentioned,
but I cannot say that one is superior to
the other. One must always keep in mind the
fact that occasionally a full five grain dose
of calomel makes some people sick, even when
it cause no change in doses of one grain at a time.
One has also to remember that calomel must
be very cautiously prescribed in old people &
probably it is better avoided in them.

There is another class of cases in which I
think one should be careful about giving
calomel. I mean chronic tubercular cases in
infants & young children. Just for a moment
consider the state of affairs within the abdomen.
There has been a chronic inflammatory
condition going on for a long time that &
around the appendix adhesions have
formed; most probably there is tubercular
peritonitis as well. The intestines may be
found all matter together, as I have seen on more than one occasion. In such cases I think it is well to avoid experiments which cause marked peristalsis. Not only are the patients caused unnecessary pain, but worse consequences might arise. This recalls to my mind the case of a child suffering from tubercular peritonitis, in which the administration of calomel precipitated a fatal result. The child had been out of sorts for 3 months, had been losing weight etc. Three weeks prior to admission to hospital the child's abdomen began to swell. Three days before admission the child was sick; the bowels remained confined. On admission examination revealed a fairly typical picture of tubercular peritonitis. After an enema had been given without result the calomel was administered. This caused the bowels to move once. A few hours later I saw the child just before going out & I did not detect anything of an alarming nature. The child cried as if in pain, but the pulse was good. All things appeared as before. When I returned in less than 2 hours time the child was dead. Not long after I left the child
became collapsed with feeble pulse. Sweating 
& died in about half an hour. At the "post-
mortem" which was made on the following day
a rupture of the caecum was found, the tear
having occurred about half an inch from the
base of the appendix. The intestines were
simply riddled with tubercles & all matted
together, so that there was little hope that
the child would have got better, but I cannot
help thinking that the peristalsis following
the administration of the Calomel Caused the
caecum to rupture thus precipitating death.
The saline aperient treatment was
much in vogue at one time, but has not
how so regularly employed. Maylard 63 has
advocated the employment of saline aperients
in the early stages of acute appendicitis.
Cautious warm soap & water enemas are first
given & if they do not succeed, large doses
of sulphate of magnesia in warm water.
D'Arey Power 63 has endorsed this method of
treating simple appendicitis. Trench says
that on recovery again an attack has been
cut short by a promptly administered
aperient. O'Lea maintains that the use of
Saline purges early in the disease is a most injurious practice, but then Osler is one of those who believe there is no medical treatment for appendicitis. In mild cases which are associated with chronic dyspepsia and constipation, the aperient treatment is undoubtedly good. The experienced physician usually has little difficulty in distinguishing the cases in which an aperient may be given from those in which it would act injuriously.

After the bowels have been thoroughly moved their regular action should be encouraged. This may be accomplished by giving a drachm of sulphate of sodium every morning or night. One may employ the liquid extract of cascara sagrada 10 to 15 minims three daily. It acts as a tonic to the intestine in those cases and forms an excellent remedy for securing the regular action of the bowels. Among better class patients the health and regular action of the bowels may be got by their taking in the morning before breakfast an ounce glassful of aperient or some other aperient mineral water.

In some cases the stools are very offensive.
It is necessary to give some niter trial
antisephi. In case No. 15 the stools were
exceedingly offensive biscornu and pearsongy
in character such as one associates with
enteric fever. Salol qr thrice daily acted
like a charm in this case. Naphthaline qr iii
or naphtha may be given. Thymol qr i
is preferred by some. These drugs appear to act
in a certain extent as antisepic agents.

In cases in which there is a rheumatic
history salicylate of sodium, acetyl-salicilic
acid or other drugs of that class may be given
with benefit. Broadfoot recommends sodium
salicylate in rheumatic cases. Turner, M.D.
has described a case in which this drug
was successfully exhibited. I have prescribed
with much benefit acetyl salicylic acid alone in
two cases which were apparently influenzal in
nature. It may be given in powder or in
suspension in an acid diaphoretic mixture
during convalescence a tonic is very
beneficial. There is an endless variety of such.
Owing to the anaemia which is present in a greater
or less extent in most cases probably some form
of iron is the best remedy. The "Three Syrups"
form a useful combination or the following
formulae may be found useful.

*Rx*

Ferr. et. gum. cit. qv. v
Lig. Arsen. Hydrochlor.
Lig. Stroch. ad 3 f
Aq. Chloroformi ad 3 f

Sig. A tablespoonful three times daily in a
little water.

*Rx*

Fer. Sulphatis qv. vi
Acid. nitrosumat. kohl. m xxv
Mag. Sulphatis 3 f
Syr. Junci f. m xx
Aq. Chloroformi ad 3 f.

Sig. A tablespoonful twice a day.

In the latter prescription a good method is to
begin with one grain of sulphate of iron in each
dose and to add one grain to each dose
daily until ten grains are being taken
three times a day. In this way the iron
is gradually introduced into the system
and can be better tolerated by the patient.

If the patient’s appetite is poor one of the
Following may be given.

Acid. nitrohydrochlor. del. m xv
Reg. strychn. m iii
Ag. ad 3f.

Sig. A tablespoonful three times daily.

Sod. bicarb. qv x
Turp. ipec. vom. m x
Inf. Rhei conc. 2 f
Ag. Chloroformi ad 3f.

Sig. A tablespoonful three times a day.

A prescription with quassia, quinua or calomel tincture may be given. Bonnani experimenting on dogs found with bitters mentioned above an increased flow of gastric juice. The experiments demonstrated that the action of the bitters is due to their influence upon the nerves of taste. Bitters thencefore be given where there is loss of appetite before food.

Russell has drawn attention to lavage of the colon in the treatment of appendicitis. He does not think that lavage of the colon and calcium is dangerous. It may cause
either perforation or gangrene is in his opinion a mere arbitrary presumption than has foundation on fact. He mentions Professor Bouquet's monograph on the subject. Bouquet uses it in all cases of acute appendicitis and advises operation in quiescent intervals in selected cases. Twenty-three cases in his hospital practice from January 1901 to February 1902 were so treated without a death. There were some severe cases. Russell is satisfied with it in a few cases in which he has tried it. I have never seen a case treated by this method, but I think it might be of use in many of the simpler cases.

**Local Treatment**. Hot fomentations are excellent or weak antiseptic fomentations e.g. "the 60 carbolic" may be preferred. Evaporating lotions such as lotio plumbi or lotio plumbi cum opio may be used. If desired, these lotions may be applied warm, some green protective or tissue of that nature being placed on the hot to prevent evaporation. Yarger recommends that abdominal pain be relieved by the application of cotton wool saturated
with alcohol of 96 per cent strength covered
with gutta percha paper and removed every 8 or
12 hours. Cold is probably the best in quite
early stages. An ice bag or still better lettuce's
bodies with water running through them at a
temperature of 50° to 60° F. are very useful.

The ice bag is, I believe, used by many
practitioners who regard it not only as a
local sedative, but also as a useful diagnostic
accessory. In the cases that are going to
subside the application of cold almost
invariably soothes the pain, while in bad
cases — e.g., in those which go on to the formation
of pus — the ice bag has no such sedative
effect, but often makes the pain much
worse. Lees is a most enthusiastic
advocate of the ice bag in the treatment
of some acute visceral visceral inflammations. He
believes that rapid subsidence of the swelling
to the symptoms is often promptly effected
by an ice bag. With regard to the question he
writes as follows: — "Intermediate between
these two groups of cases (the very acute and the
subacute), clinically speaking, is a third
group, in which the symptoms are very
definite, but not so acute as to make it clear that immediate operation is required. There is usually a distinct local fullness, tenderness. The practitioner is in doubt whether pus has already formed, whether an incision ought to be made at once or delayed. In this difficulty, which is by no means rare, in which a correct decision is of the greatest importance, I have found that the application of an ice bag for 3 or 4 hours will often give the necessary guidance. If after 4 hours the ice had not given distinct relief, an operation should be performed without further delay. But if there be definite, even though slight, alleviation of symptoms, the operation may be postponed for a short time. Further trials made of the ice bag. In many cases after 24 hours the relief is so definite that no further question of immediate operation need be entertained. If the improvement continue, the ice bag should be kept in place persistently for 2 or 3 weeks, with absolute rest. Such cases must be carefully watched, for a small local abscess may remain, it may require decision at a later period. But the condition will then be much more favourable for operation than at first, the pus will be well localized and the surrounding inflammation quieted down.
On the other hand, if the early relief is not maintained, although the ice-bag has been applied persistently, it will usually become hot in delay operation any longer. Thus the ice-bag becomes a useful test by which we may decide the often difficult & anxious question as to whether or not an operation ought to be performed.

With “58 believes that the application of cold, although it lessens pain, protracts or prevents the formation of adhesions around the place of perforation. Leeching is recommended by some, but there is the objection that this renders the abdominal wall less suitable for future operative performance. Treves says “If as the case advances there be a distinct local swelling with definite dullness, of the local symptoms be prominent, the fever persists, 5 or 6 leeches may be applied over the right iliac region. This measure very often has a magical effect. The precise time at which leeches may be applied must depend on the individual case. I have used them with advantage at various periods between the third & ninth days. It is needless to say that when once suppuration has occurred they are useless.”
Good heat and still recommend for children one of the following:

üğü. Hydrarg. 3 i
Ext. Belladon. 3 i
Bl. Thuias 3 i

Seq. The application.

Kenes nightly, washed off gently in the morning.

or 5 per cent solution pleate of mercury.
Glycerine of belladonna either applied by itself or under a fomentation may be of use.
If the tumour disappears slowly the application of blisters or iodine is sometimes useful. Blistering in the chronic forms often acts in a marvellous manner by causing the disappearance of the pain. In the tubercular forms the application of "blue ointment" or mixture with oleum morrhuae may do good.

Having considered the general treatment of a case I shall now take a few symptoms which may call for special treatment.

Sickness + Vomiting. I have already pointed out that persistent vomiting is a bad sign t that vomiting in simple cases will cease
spontaneously within a few hours. If vomiting is not checked by simple means, then the prognosis is grave. As many cases of appendicitis follow diets of errors the vomiting may be due to the retention in the stomach of corrosive particles of food. A draught of half a pint of warm water with 15 to 20 grains of sodium bicarbonate, repeated in half an hour if necessary, may be given, as this will probably mechanically wash out the stomach; or the stomach may be washed out by means of the stomach tube, a somewhat disagreeable but very efficient method. After such, with any 

Pain. This is often very troublesome, if very severe much ingenuity has to be exercised in dealing with it. Doubtless much of the pain is a necessary follower of the inflammatory process, but there is some which is avoidable. Much pain might be avoided if attention is given to decubitus, the chief points regarding which I have dealt with above. Pain is often due to muscular
spasm & relaxation of the muscles will often cause disappearance of pain. Pain may result from some strain & the frequent alteration in position is to avoid this. The patient should make no voluntary efforts at bending etc. during the acute stage, in feeding the patient the nurse should place her arm behind his shoulders & gently raise him, for the voluntary effort of trying to raise even the shoulders put a strain on the abdominal muscles & may cause pain. Attention must be given to the bladder, for much pain often results from a distended bladder. In case No. 27 the ward sister reported that the girl was passing urine freely, but it was found to be only the dribbling from an overdistended bladder. Catheterisation was followed by relief of pain in this case. Attention to these points will do much to lessen the pain & add to the comfort of the patient. There may still remain some pain, how is this to be treated? In the majority of cases local treatment such as I have indicated above will suffice to ease the pain. And now I come to a question that will exercise the minds of many, that is, "Should opium
be given?" Personally, I am against the use of opium, although I have seen it used in some cases without bad result. There is by no means unanimity of opinion regarding its use, although now a days I believe that practically all surgeons are convinced that it should if possible be withheld. A number of physicians also endorse this view. Hood, in a little brochure already referred to strongly advocates opium in the early treatment of appendicitis. Taylor says "I do not hesitate to give opium to restrain the pain and to keep the intestines quiet." He does not believe that it masks the symptoms.

Cheyne & Burghard protest against the general use of opium. They believe that opium largely masks the symptoms that a patient under its influence may be so comfortable that it is impossible to judge properly as to the progress of the disease. They consider that beller or quinine will very often relieve the patient. These drugs do not possess the disadvantage that opium does. At a meeting of the Edinburgh Medical Chirurgical Society, in 1903, when the treatment of appendicitis was discussed, this question was raised & I now give the opinion
of those of the physicians who took part in the discussion. Dr. Russell believed that if
given at all it ought certainly to be limited in its use to the alleviation of intense suffering
as a temporary expedient. He thought that its continued use calls for operation. Dr. Ritchie
thought the use of opium was exaggerated and he was inclined to agree. Dr. Affleck thought
the ame the effect of cold might render unnecessary the use of opium to which there were many objections. Thomson milks 20
thinks that it ought to be withheld in the acute "waiting and watching" stage. Regarding the subject Burney says 79 writes as follows:

"If such a case be treated as many authorities direct an appendic in case to be treated opium be
freely given internally, the case will be made a contracted one, the tenden cy to obstruction
will be intensified, the general subfebrile condition will be aggravated instead of relieved.
The patient who might have been comparatively well in a few days, will very likely be ill for
weeks; for opium aggravates the paralytic of the intestinal walls (and we have seen its
administration pushed until an almost
in the alimentary tract has been reduced, it diminishes all the intestinal secretions, it increases the febrile state due to absorption of retained excrementitious substances."

He points out that there is no possible objection to the local application of opium which will often effectively relieve the pain. The weight of evidence is undoubtedly against the use of opium.

In this connection I always think of the case of a young boy whose life was thus lost, for opium whose case caused him to appear so much better that the surgeon delayed the operation with the result that when he did operate the chance of recovery was practically nil. The notes of this case are as follows:

They may well form a moral admonition.

C. H. (Case No. 38), a boy 5 years of age, was admitted to hospital on August 8th, 1905. The history was that he was seized with severe general abdominal pain early on the preceding day, the pain later becoming localized in the right abdomen. There was sickness, vomiting, the bowels were confined. A medical man who was called in ordered castor oil to be
followed by an injection: and he gave a hypodermic injection of morphia. On the next evening when he saw the case he decided to send him to hospital the again injected some morphia owing to the boy having severe peritoneal pain. On admission about 11.30 p.m.

the following was the state of affairs:—The boy lay on his back, but he appeared quite comfortable. He complained of no pain; there was no sickness or vomiting. On palpation the abdominal muscles were at once on guard, although the boy complained of no pain or tenderness even on deep pressure—in my opinion a bad sign. The pulse rate was 92, the temperature 98.0°. The face was suggestive but by no means typical of severe abdominal mischief. The surgeon in waiting saw the case, but decided not to operate that night. On the following day I went fora day's holiday, but left a 'locum' to do my work. When I returned late at night I was surprised to find the boy had not been operated on. It was reported home that the boy had had a fairly comfortable day, had taken his nourishment, and had been free from any acute symptoms. As he was asleep I did not waken him to make any examination. About 3 a.m., next morning (August 7th) the night sister came for me to see the case.
He had again severe pain, the pulse was small and rapid, his face drawn and anæmous, the temperature 98.8°F. He refused any examination. For the "chief" the came up operated about an hour later. There was found a gangrenous appendix which had kipped a loop of small intestine which was likewise gangrenous. There was also commencing peritonitis. The appendix was removed and the gangrenous gut resected. The boy however never rallied, but gradually sank and died at 6:30 p.m. the same evening.

An error of judgment was committed in this case. Had the boy been operated on when admitted 28 hours previously, there would have been a good chance of a successful issue. In view of the fact that opium had twice been given, I think there was quite enough to indicate serious abdominal mischief to his life operation.

The cases which do well with opium are the simple cases where there is really no danger. The dangerous acute cases (e.g. gangrene) will progress in spite of opium if the symptoms are hidden by the effects of opium which may be disastrous for the patient.

From my experience in this rather abdominal
Conditions I have no hesitation in saying that it is bad policy to give opium. Morphia undoubtly masks the symptoms, gives a false sense of security to the doctor, the patient, friends and misleads the surgeon. It increases the tendency of paralysis of the gut, prevents the bowels being opened, thus promotes septic absorption from the gut, a condition from which many patients die. Altogether there is sufficient evidence to make one use it very cautiously. Belladonna relieves spasm but does not dull sensory centres. Take 5 to 15 minims of mixture of belladonna every 3 or 4 hours according to the age of the patient should be tried, or too too gr. of aspirine might be given by hypodermic injection occasionally. In cases with very severe pain, especially if there is much restlessness, morphia may be called for, but that should always be avoided if at all possible. When administered a small dose should be given, the minimum dose necessary to relieve the pain. An eighth of a grain of morphia will generally suffice.

Sleeplessness. Try simple means. A hot foot may induce sleep. See that the patient is in
a comfortable position. It is a great mistake  
to put too many restrictions on a patient.  
Comfort is of the utmost importance. Comfort  
means rest and no one doubts that rest both to  
muscle and nervous system and all the other parts  
of the body is what is desired. True rest apart  
from comfort cannot exist. If morphia has  
been given because of pain this will probably  
also act as a hypnotic. It is always best to  
do without drugs if possible, but it will not  
do hurt the patient be without sleep for days.  
By drug there is a large selection. Trional  
was useful in my experience it often acts  
well. Veronal has been much used in some  
quarters. Promural (gr. X) is useful for  
sleeplessness which is not associated with  
pain. Other sedatives may be considered more  
suited to the case under consideration.  
Thirst. In many severe cases there is liable  
to be a considerable loss of fluid to the  
tissues. Thirst is the physiological call for  
fluid on the part of the body, therefore if  
shown be indulged. I do not think the  
patient should be given ice water as that  
tends rather to aggravate the symptom.
instead of alleviating it. The patient may as a rule have plenty of fluids by the mouth if he 
takes care not to drink them too fast, he 
will probably retain them. But the best thing 
of all is normal saline by the rectum. In 
cases treated by medical means I have used 
physiological salt solution with much 
benefit. Some I have given the patient hot 
Saline to sip by the mouth. On account of the 
dryness of the mouth it is necessary to allow 
the patient to swallow the mouth broth hot 
water or hot-water with some soda bicar 
lite (the latter helps to dissolun any mucous 
which may accumulate in the buccal cavity). 
The nurse may have to frequently swab out 
the mouth with an antiseptic mouth wash. 
For example, saline borac, formalin 1 in 1000, 
etc.

Flatulence. In the early stages of the lower 
bowel has been well cleansed out at the 
beginning if the dieting be carefully attended 
by, there will not be trouble in this respect. 
If it does supervene a turpentine enema is 
best. Later it may be met with if fluid diet 
is continued too long or if movements have 
been too restricted. Castor oil or a saline
apparent may then be given. It is best treated by calomel after the acute stage is past. For mild flatulence peppermint water is an old fashionable remedy which often gives immediate relief. If morphia has been given one must be prepared to meet with some distension from paralysis of the gut. Marked distension obstruction from total paralysis of the gut are grave symptoms generally indicating the necessity of surgical intervention, so do not come under the medical treatment we are now considering.

Prophylaxis

In speaking of this part of the subject I deal with the prophylactic measures that may be adopted after one or more attacks of appendicitis have occurred where the patient is unwilling to submit to operation. I do not for a moment imagine that anyone on this earth would adopt prophylactic measures to try to avoid ever having appendicitis. It would be too much to hope to persuade a jovial country squire who delights in the pleasures of the table to modify his living with a view to preventing appendicitis. One would probably only be playfully committed
to some warmer region. Still a study of the prophylaxis in its limited sense is useful; there is a certain number of people who might be willing to adopt some of the measures recommended for avoiding future attacks.

Investigations made by M. Lucas Championnec have proved that before the appearance of influenza symptoms attributed to appendicitis were rare that the advent of appendicitis was subsequent to that of influenza. It was however in meat-eaters that appendicitis following influenza was most frequently met with. Among vegetarian populations appendicitis was extremely rare or altogether absent: it increased in proportion as the consumption of meat increased.

Interesting statistics on this point were supplied from Roumania, where among the vegetarian proportion of the population there was one case of appendicitis among 22,000 patients, while among the meat-eating portion of the population there was one case among 2,214 patients. The inmates of prisons and institutions in which the food was almost exclusively vegetable were almost exempt from appendicitis although they were exposed to influenza. Similar
results were shown in the experience of convent, educational establishments. From these facts it might be concluded that meat eating favours intestinal complaints and the occurrence of appendicitis after influenza, that a reduction in the consumption of animal food was advisable that purgation was a prophylactic against that class of diseases.

M. Metchnikoff at a meeting of Académie de Médicin. He dealing with prophylaxis recommends (1) in every case of suspected appendicitis examination of stools for eggs of nematodes (2) in every case where possible give a vermifuge (3) forbid persons suffering from appendicitis to eat raw vegetables, strawberries etc. or drink unboiled or unfiltered water (4) an excellent prophylactic measure is to forbid the ingestion of uncooked meat or impure water. (5) examine the stools from time to time, especially in children to administer anthelmintics. Now while it cannot be denied that probably the presence of nematodes will cause appendicitis, I am of opinion that during the treatment by anthelmintics the cases require the most careful watching, it is quite possible that in
a quiescent case the anthelmintic treatment might set up an acute attack e.g. by a round worm getting lodged in the appendix. Therefore while I should advise treatment by anthelmintics in cases which are under one's care, I should hesitate about advising such a course if the patient were far from medical assistance.

Of those in this country who believe in prevention there is no more enthusiastic advocate than Dr. Tyson. He believes in true prophylaxis i.e. today he advocates certain measures by which appendicitis might be prevented. While one cannot but admire his enthusiasm, it is difficult to see how such measures can ever be made to commend themselves to the public. Let us now examine some of the methods he suggests. He points out that it is a disease of civilisation the draws attention to constipation as an etiological factor in the condition. The condition of the teeth, faulty mastication, bolting of food, the kind of food eaten nowadays & improper methods of stooling are among other points he refers to. He records the interesting fact that he himself
has had two attacks of appendicitis at an interval of a twelve months, both attacks being referable to constipation. It is curious how averse some medical men are to having their appendices removed. At the last Hospital where I was resident, two of the visiting surgeons were troubled with their appendices. The one himself an energetic and fairly ad revered surgeon in appendicular surgery, had how to gain slight uneasiness in the right iliac fossa with tenderness on pressure over his appendix region lasting for 2 or 3 days - the attacks did not inconvenience him very much. The other, a more moderate surgeon thin clined to temporize, suffered periodically from definite attacks of appendicitis which did not make him lie up, but which caused him much inconvenience. Both gave the same reason for putting off operation, the reason being that they could not make up their minds to kneck off work for the 6 weeks or 3 months necessary for having the operation done. A medical man is probably one of those least able to adapt prophylactic measures, not so much from unwillingness as from inability, owing to the exigencies of
practice. He may preach the gospel of regular meals, slow and deliberate eating and proper mastication, yet after meals he often cannot. Would he not be the average person. Why do people practice what he preached? Is it not more likely that irregular meals, hurried meals, interrupted meals fill up his lot?

That constipation is associated with the condition is undoubtedly true. In looking over my cases I find that in all but two there was constipation (97.5 percent). Many of the factors noted by Dupoin directly or indirectly result in constipation. In referring to the present unscientific method of school he points out that the act of defecation performed in the squatting position is more conducive to the thorough emptying of the bowels. Therefore noxious and poisonous materials are less likely to be left behind. In suggesting exercises he says "The practice of kneeling down, bringing the buttocks in contact with the heels, the anterior chest wall in contact with the thighs, 3 or 4 times every morning, is a good therapeutic exercise, one which I have practiced myself for some time past and recommended to others."
He also suggests that drinking the waters at
some of the spas would act in many instances
as a preventive measure. In this connection
he says "in these days of strife and stress, living,
as most of us do in towns, our habits tend more
and more to be sedentary. The internal organs under
this mode of living are apt to get clogged and
work heavily, unless they get unloaded by
some means the system suffers. I can hardly
imagine anything more beneficial to the
economy of the body than a course of waters
suitable, taken at one of our bathing resorts.
I believe the regular washing out of the
digestive canal would do much to prevent a
large number of cases now known as colics, appendicitis, &c."

Harsha in speaking of this subject pointed
out that among the causes that might be influenced
by treatment, errors of diet were the most frequent,
that the disease occurred most frequently at the
age in the sex in which faulty habits of eating
errors of diet were the most common from 10
to 30 years. It was quite common to see attacks
follow an immediate meal or the ingestion
of indigestible articles of food. If one had
transgressed in either of these ways, felt the
approach of acute digestive disturbance, the
rational treatment was prompt evacuation of
the whole digestive tract. Keeping it empty,
urging strict recumbency.

While I am rather a sceptic as regards the
methods advocated by Tyson, I fully believe that
something might be done in the way of prophylaxis
after an attack has supervened. For this one must
of course have the intelligent co-operation of
the patient. If he does not take the matter seriously,
then any efforts on our part would be futile.
Nevertheless it would be our duty to point out
many of our patients who refused operation the
value of prophylactic measures urging them
do carefully carry these out.

Digestion above all things must be attended
to. If the teeth are defective then all deficiencies
must be made good. Curious teeth should be
attended to if beyond hope of repair should be
extracted. These curious teeth are not only often
of little use as masticators, but each one is a
cup with its quantum of septic material which
when churned up in mastication will taint the
most nutritious food: the mass with its
army of micro-organisms may reach the calIce
region may determine an attack of appendicitis. The patient should provide himself with a set of artificial teeth which not only act as more efficient masticators, but which also can be more readily kept sweet and clean. He must masticate his food well, as the bolting of ill-masticated food is a frequent exciting cause of appendicitis. Meals should be regular. Food should be eaten slowly. The patient should rest after his meals, as a few attacks in active business men can be ascribed to a hurried lunch which is eaten one day at one o'clock and the next day at three. Meal times should be devoted to the taking of food and not to reading etc. As well. Food must be carefully selected, should be simple and digestible, too rich a kind as to leave residue as possible in the intestine. Too much milk and animal food seldom appear to answer and these cases, but there is no pathological evidence to support the advice that the patient should specially avoid substances, such as strawberries, figs, currants which contain minute seeds. It is essential that he should avoid articles of food which are likely to remain undigested or be retained too
decompose in the bowels. Many people would be better to chew green vegetables, such as cabbages, greens etc. which are liable to produce flatusulent distension. As an old Scot told a lady who was pressing him to have a second helping of cabbage, "The cabbage is good, but it's very wudy," referring of course to its flatusulent property. Too many restrictions must not be placed on the diet or the patient will revolt. It is well to remember that one man's food may be another man's poison; each case has to be considered individually. If we lay down some general rules for the quiet cases of the patient, we can leave it to his common sense to avoid those things which disagree with him. After dieting the bowels must be carefully attended to. Everything should be done to encourage a normal action. A daily evacuation should be aimed at. If an aperient is necessary, some of the remedies I have previously suggested may be tried. I should first remark that one or two large poultices of aperic every morning before breakfast would probably ensure an after-breakfast evacuation. Massaging the abdomen appears...
In many cases where a very admirable effect. Moderate exercises in the open air should in every way be encouraged. Exercises "à la Tyson" might be suggested. Careful attention to dieting alone probably do away with constipation. In many instances I believe patients take too little fluid. This may to a certain extent aggravate the constipation. They may have been warned by their medical attendant about the harm of washing down their food at meal times, but sufficient fluid can be taken between meals. Tyson suggests the waters at one or other of our spas, but probably ordinary water would act as quite an efficient washer of the gastro-intestinal tract.

Salol or β-naphthol may be given kept 2 morning for a month at a time. These drugs certainly have some effect of arresting decomposing processes in the bowel. They should always be given in powder.

If a patient wishes to avoid another attack, he should abstain from violent exercises, such as hunting. He should avoid exposure to fatigue, damp and cold. In all properly-hygienic conditions should be secured to keep the vital resistance up to the vital point.
These measures have been suggested for adults. For children it would not be an easy matter to get prophylactic measures carried out. Reating suggests that in children liable to appendicitis violent bodily exercise, jumping the rope, gymnastics, children's games involving over-exertion, exposure to cold, cold baths, swimming etc. must all be avoided. In an otherwise healthy child I venture to doubt if such could be carried out. nor would be restriction of a boy's appetite be an easy matter. For children prophylaxis is unsuitable in view of the fact the danger in this disease is greater than in adults. The prognosis worse, it would be much better to advise appendectomy after one attack. The child has the whole of his life before him. The safest course for a child subject to attacks of appendicitis would be the removal of the appendix.

In bringing to a conclusion my remarks on the medical treatment of appendicitis I wish to bring forward a suggestion as regards treatment. I frankly admit that I have had no opportunity for trying this myself though the method (so far as I
have been able to learn from abstracts from the literature on the subject) has been used only in connection with surgical work, I do not see why it could not be utilised in other realms. In any case there will be little for thy remarks on the subject by first giving abstracts from the literature.

Emanuel 76 under the heading of "Artificial hyperleucocytosis and its use in infections" wrote as follows: "The injection of certain substances such as normal saline solution, horse serum, the various auto-toxins produces a greater or less leucocytosis. Certain other substances amongst which are nuclease acid and its derivatives produce a great leucocytosis without any harmful effect. This artificial hyperleucocytosis has been utilised where some form of infection had been expected to occur. Thus Macdonald has experimented with sodium nuclease in cases of street wounds that had become infected before their admission to hospital and the method was employed with distinct advantage. In the case of a girl of 11, in whom the rupture of a volvulus had given rise to a serious infective intra-abdominal condition, the method seemed to be life-saving. In general it could be employed wherever bacteria might be expected to find their
way to the site of our operation, as after the resection of the intestinal canal, or in operations about the mouth or the anus where infection was sure to occur. In Breslau the experience had been that it lessened the mortality. It had been suggested that it might be useful also in puerperal septicemia.

Mijake, working under the advice of the late Professor V. Mikulitz, found that nucleinomic acid was the substance best adapted to produce hyperleucocytosis. Intra peritoneal injections of the same gave rise to short initial hyperleucocytosis, which is immediately followed by an increase of leucocytosis which after 8 hours reach eight times its normal value. In the case of subcutaneous injection a similar result was obtained: in the blood the number of leucocytes is increased to the extent of eight times, in the peritoneum, on the other hand, only to two to half times their normal value.

It has been experimentally shown that nucleinomic acid increases the power of resistance of the peritoneum thirteen to twenty fold. Repeated intra peritoneal injections raised the resistance of the peritoneum to forty times the normal. It was observed furthermore that subcutaneous injections of
nucleinic acid, if given shortly after peritoneal infection, possesses an undeniable therapeutic value.

Mikulicz at the thirty-third surgical congress held in Berlin on April 8th, 1904, reported over 100 cases in which nucleinic acid was applied in operation cases, from which he concluded that such cases as were treated with nucleinic acid injections took a more favourable course than those in which no such injection was made; the favourable influence applied not only to the number of successful cases, but likewise to the course of recovery in each special case.

Renné, from observations on over 100 cases in Mikulicz's clinic in 1904, concluded that such injections were undoubtedly of value in augmenting the resisting power of the human peritoneum to bacterium coli and probably to other pathogenic bacteria. He had 94 cases with no injections with 29 deaths (mortality 31 percent) and 54 cases injected with 6 deaths (mortality 11 percent).

Hannele from observations on 51 cases of extinction of its uterus for carcinoma came to the conclusion that such prophylactic injections did good in the fatal cases, the febrile symptoms were much milder and more chronic than
with his previous technique.

Paul Kow, although he considers the number of his observations inadequate for basing a decision thereon as to whether the leucocytes existing during the operation really created more favourable conditions for the healing process, points out that theoretical considerations, as well as Miyake's experiments on animals, fully justify this assumption.

In a French publication which appeared in 1906, Faucon arrived on the strength of experiments with nucleinic injections on animals, at results similar to those obtained by Miyake.

Borchardt experimented on guinea pigs to determine the possibility of increased resistance of the body to peritoneal infection with bacillus coli. The agents used were nucleinic acid, horse serum, and normal saline. Subcutaneous injection of the two latter proved efficient to protect the animals against subsequent fatal doses of colon bacillus.

All three sufficed to augment the natural resistance so that two or three times the ordinary fatal dose of bacteria could be survived. He preferred the salt solution. The highest point of the resistance curve was about 48 hours after the injection was later than the highest leucocyte rise.
Now in commenting upon this work I should say that it appears theoretically sound, if experience proves it to be practical then we shall have a most valuable prophylactic measure. We have just seen that the cases for which such injections have been employed have been surgical, but I would ask "Could they not be employed as an aid to medical treatment?" It has been shown that the resisting power of the peritoneum can be enormously increased by these injections. How if the peritoneum is thus enhanced in its powers of resistance would it not be possible to cut short or to minimize the spread of bacterial infection in the worst cases of appendicitis? Under ordinary circumstances the bacterial infection brings about an increase in the number of leucocytes, this increase being presumably protective to fight against the organismal organismal products. If then the resistance is increased by this artificial leucocytosis
the patient will be better able to withstand the onslaught of the bacteria.
This increased resistance may be sufficient to completely prevail against the organismal attacks, if not sufficient it will nevertheless modify them. It seems to me therefore that in cases of appendicitis which tend to be severe, a prophylactic injection of one of these bodies (such as nucleinic acid) might be given. By such the severity of the attack might be lessened, or the attack might be so modified that surgical interference can be undertaken with every hope of a successful issue. This cases which at present have to be operated on might recover without operation; and cases which are now operated on with fatal results (despite of that because of the operation) might be successfully operated on.

With the purely surgical treatment I do not intend to deal. The size of the incision, the treatment of the appendix stump, the best method of closing the abdominal wound, etc.
are doubtless of much interest to the surgeon, but they do not come within the scope of a medical treatise. The surgeon in the course of his daily work is able to elaborate and perfect his technique. It seems to me that the physician, after he has decided the question of operation, should leave the decision as to the best method of operation to the surgeon who is the best judge. The aim of the physician should be to perfect himself in diagnosis, to promptly recognize those cases in which operation is necessary, to preserve all open minds as regards surgical interference.

In writing this thesis I have had constantly before my mind 'unnecessary operations are unjustifiable', and I have endeavoured to give an alternative policy to that of the advanced surgeon whose faith necessitates unnecessary operations. In my series of cases there were 4 deaths, a ratio of 1 in 20 or 5 per cent. The cases were practically all hospital cases.
over 90 per cent of which were admitted for acute attacks. This mortality of 5 per cent was to a certain extent unavoidable, it was largely due to delayed operation in ulcerative cases. Three of the cases in which a fatal termination supervened have been dealt with in the thesis. In Case No. 35 death I believe resulted from too great delay in operation owing to an error of judgment on the part of the surgeon. In Case No. 77 there was extensive general peritonitis of the patient only succumbed after a courageous fight for life. Case 179 was admitted on the 70th day of the illness, when he was practically moribund. A successful issue could hardly be expected. In Case No. 30, but previously referred to, much the same story has to be related. The boy was admitted on the 6th day of the illness. There were found at the operation a gangrenous appendix and extensive general peritonitis. The appendix was removed, the abdomen drained, but he died 36 hours later from septic intoxication. In all these cases delay in operation accounts for the mortality, the
Cases support my contention that the mortality is a preventable one, the secret of prevention resting in earlier recognition of the dangerous cases & prompter operation.

During the year September 1904 to September 1905 I was resident in a Hospital where the Visiting Staff represented the extreme Conservative School, & I was thus able to see what could be done by medical treatment on the lines I have suggested above. I then saw a number of very acute cases, but all recovered under careful medical treatment.

From a careful consideration of the subject I conclude that, while surgical intervention is necessary in many cases, there is scope for medical treatment & that there is little truth in the statement "there is no medical treatment in Appendicitis."
<table>
<thead>
<tr>
<th>Number</th>
<th>Initials</th>
<th>Sex</th>
<th>Age</th>
<th>Previous Attacks</th>
<th>Treatment or Surgery</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>G.E.</td>
<td>M</td>
<td>23</td>
<td>0</td>
<td>S</td>
<td>appendix removed after acute attack. Mucous membrane thickened. Lumen constricted.</td>
</tr>
<tr>
<td>3</td>
<td>A.M.K.</td>
<td>M</td>
<td>41</td>
<td>0</td>
<td>M</td>
<td>Parent developed double basal pneumonia when the attack was subsiding. Mucous membrane of appendix thickened, but not ulcerated. Appendicectomy in quiescent interval.</td>
</tr>
<tr>
<td>4</td>
<td>N.C.</td>
<td>F</td>
<td>41</td>
<td>S</td>
<td>S</td>
<td>Parent had a slight attack nine months later, but she would not consent to removal of her appendix. Appendix perforated - removed.</td>
</tr>
<tr>
<td>6</td>
<td>T.J.</td>
<td>F</td>
<td>22</td>
<td>S</td>
<td>S</td>
<td>C.</td>
</tr>
<tr>
<td>7</td>
<td>M.V.</td>
<td>F</td>
<td>26</td>
<td>S</td>
<td>S</td>
<td>C.</td>
</tr>
<tr>
<td>8</td>
<td>J.G.</td>
<td>M</td>
<td>19</td>
<td>S</td>
<td>S</td>
<td>C.</td>
</tr>
<tr>
<td>9</td>
<td>S.E.</td>
<td>M</td>
<td>23</td>
<td>S</td>
<td>S</td>
<td>C.</td>
</tr>
<tr>
<td>10</td>
<td>A.R.</td>
<td>M</td>
<td>28</td>
<td>S</td>
<td>S</td>
<td>R.</td>
</tr>
<tr>
<td>11</td>
<td>J.P.</td>
<td>M</td>
<td>28</td>
<td>S</td>
<td>S</td>
<td>R.</td>
</tr>
<tr>
<td>Number</td>
<td>Initials</td>
<td>Sex</td>
<td>Age</td>
<td>Precious Attacked</td>
<td>Remarks</td>
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</tr>
<tr>
<td>12</td>
<td>H.J.</td>
<td>M</td>
<td>24</td>
<td>S</td>
<td>Appendic thickened - constipated - Removed after acute attack over</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>O.D.</td>
<td>F</td>
<td>21</td>
<td>M</td>
<td>Operation advised but declined</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>J.D.</td>
<td>M</td>
<td>20</td>
<td>M</td>
<td>Tuberculosis. Mother refused operation.</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>R.H.</td>
<td>M</td>
<td>15</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>M.C.</td>
<td>F</td>
<td>15</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>J.C.</td>
<td>M</td>
<td>30</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>N.D.</td>
<td>F</td>
<td>25</td>
<td>M</td>
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<tr>
<td>20</td>
<td>J.H.</td>
<td>F</td>
<td>18</td>
<td>M</td>
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<tr>
<td>21</td>
<td>J.T.</td>
<td>F</td>
<td>11</td>
<td>M</td>
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<tr>
<td>22</td>
<td>N.G.</td>
<td>F</td>
<td>11</td>
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<td>M.H.</td>
<td>F</td>
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<tr>
<td>24</td>
<td>A.R.</td>
<td>F</td>
<td>12</td>
<td>M</td>
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<tr>
<td>26</td>
<td>C.W.</td>
<td>M</td>
<td>39</td>
<td>M</td>
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<tr>
<td>27</td>
<td>C.S.</td>
<td>M</td>
<td>27</td>
<td>M</td>
<td></td>
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</tr>
<tr>
<td>28</td>
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<td>F</td>
<td>6</td>
<td>S</td>
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</tr>
<tr>
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<td>M.L.</td>
<td>F</td>
<td>0</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number</td>
<td>Initials</td>
<td>Sex</td>
<td>Age</td>
<td>Previous Disease</td>
<td>Operation/Condition</td>
<td>Remarks</td>
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<tr>
<td>30</td>
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<td>M</td>
<td>9</td>
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<tr>
<td>31</td>
<td>C.C</td>
<td>M</td>
<td>11</td>
<td></td>
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</tr>
<tr>
<td>32</td>
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<td>8</td>
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<tr>
<td>33</td>
<td>A.J</td>
<td>M</td>
<td>6</td>
<td></td>
<td></td>
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<td>37</td>
<td>L.M</td>
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<tr>
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<td>M</td>
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<td>M</td>
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<td>L.G</td>
<td>F</td>
<td>21</td>
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<tr>
<td>43</td>
<td>C.G</td>
<td>M</td>
<td>42</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>44</td>
<td>C.M</td>
<td>M</td>
<td>9</td>
<td></td>
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</tr>
</tbody>
</table>

Appendix gangrenous - general peritonitis.
Appendix removed - abdomen drained.
Appendix perforated - abscess opened + drained.
Appendix not removed.

Appendix gangrenous - portion of small intestine gangrenous.
Appendix removed - portion of gut resected.

Tubercular - Appendic removed. Also tubercular peritonitis.

Abscess opened + drained. Appendix not removed.
<table>
<thead>
<tr>
<th>Number</th>
<th>Initials</th>
<th>Sex</th>
<th>Age</th>
<th>Previous Attacks</th>
<th>Treatment</th>
<th>Remarks</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>P.M.</td>
<td>M</td>
<td>37</td>
<td>0</td>
<td>S</td>
<td>Appendix acutely inflamed &amp; perforated at tip - pelvic abscess + peritonitis. Appendix removed. Abdomen drained. Abscess opened &amp; drained. Appendix not removed.</td>
<td>C</td>
</tr>
<tr>
<td>46</td>
<td>E.H.</td>
<td>F</td>
<td>23</td>
<td>0</td>
<td>M</td>
<td>Appendic adherent; mucous coat thickened; edema. No perforation. Removal after acute attack. Appendix thickened &amp; constructed. Removed in quiescent interval.</td>
<td>RR</td>
</tr>
<tr>
<td>48</td>
<td>H.M.</td>
<td>F</td>
<td>22</td>
<td>0</td>
<td>M</td>
<td></td>
<td>R</td>
</tr>
<tr>
<td>49</td>
<td>A.N.</td>
<td>F</td>
<td>27</td>
<td>0</td>
<td>M</td>
<td></td>
<td>R</td>
</tr>
<tr>
<td>50</td>
<td>J.B.</td>
<td>M</td>
<td>28</td>
<td>0</td>
<td>S</td>
<td></td>
<td>C</td>
</tr>
<tr>
<td>51</td>
<td>J.R.</td>
<td>M</td>
<td>18</td>
<td>1</td>
<td>S</td>
<td>Appendic perforated in two places - concretion. Small abscess. Appendix removed. Abscess drained.</td>
<td>C</td>
</tr>
<tr>
<td>52</td>
<td>H.M.</td>
<td>F</td>
<td>36</td>
<td>0</td>
<td>M</td>
<td></td>
<td>RR</td>
</tr>
<tr>
<td>53</td>
<td>N.S.</td>
<td>F</td>
<td>30</td>
<td>0</td>
<td>M</td>
<td></td>
<td>R</td>
</tr>
<tr>
<td>54</td>
<td>G.D.</td>
<td>M</td>
<td>23</td>
<td>0</td>
<td>S</td>
<td></td>
<td>C</td>
</tr>
<tr>
<td>Number</td>
<td>Initials</td>
<td>Sex</td>
<td>Age</td>
<td>Paroxysmal Attacks</td>
<td>Treatment</td>
<td>Remarks</td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>----------</td>
<td>-----</td>
<td>-----</td>
<td>--------------------</td>
<td>-----------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>D T</td>
<td>F</td>
<td>13</td>
<td>0</td>
<td>Abscess</td>
<td>Abscess - appendix lying in abscess - drained.</td>
<td></td>
</tr>
<tr>
<td>56</td>
<td>N R</td>
<td>F</td>
<td>16</td>
<td>0</td>
<td>Abscess</td>
<td>Abscess opened &amp; drained. Appendic removed at a subsequent date.</td>
<td></td>
</tr>
<tr>
<td>57</td>
<td>W R L</td>
<td>F</td>
<td>40</td>
<td>2</td>
<td>Appendic</td>
<td>Appendic thickened &amp; contracted. Removed in quiescent interval.</td>
<td></td>
</tr>
<tr>
<td>58</td>
<td>W R H</td>
<td>F</td>
<td>47</td>
<td>1</td>
<td>Operation</td>
<td>Operation refused.</td>
<td></td>
</tr>
<tr>
<td>59</td>
<td>H S M</td>
<td>F</td>
<td>42</td>
<td>0</td>
<td>Abscess</td>
<td>Abscess opened &amp; drained. Appendic not removed. As in No 67.</td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>E W</td>
<td>F</td>
<td>18</td>
<td>1</td>
<td>Appendic</td>
<td>Appendic gangrenous &amp; perforated. Small abscess. Removed.</td>
<td></td>
</tr>
<tr>
<td>61</td>
<td>F C</td>
<td>M</td>
<td>12</td>
<td>0</td>
<td>Appendic</td>
<td>Removed - abscess drained. Refused operation.</td>
<td></td>
</tr>
<tr>
<td>63</td>
<td>W R P</td>
<td>F</td>
<td>41</td>
<td>0</td>
<td>Appendic</td>
<td>Acutely bent on itself. Removed in quiescent interval.</td>
<td></td>
</tr>
<tr>
<td>64</td>
<td>W R K</td>
<td>F</td>
<td>56</td>
<td>1</td>
<td>Appendic</td>
<td>Removed - abscess drained.</td>
<td></td>
</tr>
</tbody>
</table>

Result: C.

C. C. R. C. R. C.
<table>
<thead>
<tr>
<th>Number</th>
<th>Initials</th>
<th>Sex</th>
<th>Age</th>
<th>Primary Affection</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>E.D.</td>
<td>F</td>
<td>13</td>
<td>S</td>
<td>Abscess opened &amp; drained - appendix not removed.</td>
</tr>
<tr>
<td>66</td>
<td>R.H.</td>
<td>F</td>
<td>19</td>
<td>M</td>
<td>Appendix inflamed - removed.</td>
</tr>
<tr>
<td>67</td>
<td>T.C.</td>
<td>M</td>
<td>46</td>
<td>I</td>
<td>Appendix elongated &amp; thickened - tubercular. Several caseating mesenteric glands - appendix &amp; glands excised.</td>
</tr>
<tr>
<td>68</td>
<td>H.T.</td>
<td>M</td>
<td>18</td>
<td>H</td>
<td>Appendix thickened &amp; congested - removed in quiescent interval.</td>
</tr>
<tr>
<td>69</td>
<td>L.C.</td>
<td>M</td>
<td>30</td>
<td>S</td>
<td>Abscess opened &amp; drained - appendix not removed.</td>
</tr>
<tr>
<td>70</td>
<td>T.W.</td>
<td>M</td>
<td>8</td>
<td>S</td>
<td>Appendix congested &amp; thickened - removed in quiescent interval.</td>
</tr>
<tr>
<td>71</td>
<td>T.J.</td>
<td>M</td>
<td>41</td>
<td>S</td>
<td>Appendix gangrene - abscess.</td>
</tr>
<tr>
<td>72</td>
<td>M.S.</td>
<td>F</td>
<td>32</td>
<td>S</td>
<td>Appendix removed - abscess drained.</td>
</tr>
<tr>
<td>73</td>
<td>C.B.</td>
<td>F</td>
<td>19</td>
<td>M</td>
<td>Appendix thickened tuberculated - removed in quiescent interval.</td>
</tr>
<tr>
<td>74</td>
<td>W.P.</td>
<td>M</td>
<td>20</td>
<td>S</td>
<td>Appendix thickened tuberculated - removed in quiescent interval.</td>
</tr>
<tr>
<td>Number</td>
<td>Initials</td>
<td>Sex</td>
<td>Age</td>
<td>Treatment</td>
<td>Remarks</td>
</tr>
<tr>
<td>--------</td>
<td>----------</td>
<td>-----</td>
<td>-----</td>
<td>-----------</td>
<td>---------</td>
</tr>
<tr>
<td>76</td>
<td>M.S.</td>
<td>F</td>
<td>31</td>
<td>M</td>
<td>Tubercular? Operation refused.</td>
</tr>
<tr>
<td>78</td>
<td>F.R.</td>
<td>F</td>
<td>24</td>
<td>M</td>
<td>Appendicitis perforation of calculus gangrenous. (See page.)</td>
</tr>
<tr>
<td>79</td>
<td>W.T.</td>
<td>M</td>
<td>47</td>
<td>S</td>
<td>Appendix adherent, ulcerated, friable. Removed in quiescent interval.</td>
</tr>
<tr>
<td>80</td>
<td>L.W.</td>
<td>F</td>
<td>21</td>
<td>S</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- Sex: F = female, M = male.
- Treatment: S = Surgical, M = Medical.
- Result: C = Cure, R = Recovery, D = Death.

Only those cases where the appendix was actually removed have been called cured.

For summary see next page.
Summary

Number of Cases 80
Medical Treatment 41
Surgical Treatment 39

Surgical Medical
Cure 28 0
Recovery 7 41
Death 4 0
39 41

Mortality 5 per cent.

22 required operation during the acute stage.
17 were operated on after the acute attack has subsided.
19 had had one or more previous attacks and of these 14 were operated on.

Females 43. Males 37.
Average age 23.5

Average age Females 23.48
Males 23.52.

John Allan
References.

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44. Cabot. Quoted by Ewing.
46. Bloodgood. Quoted by Ewing.
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57. Wright. Lancet July 22nd 1893.
64. Powner Ye. British Medical Journal 1894 Vol I.
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82. Faucon. Ditto.

These references are only by gentlemen whose opinions I have definitely given to. Of course, represent a mere fraction of the voluminous literature on the subject.