On
Disorders of the Vermiform Appendix
by
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Historical

Though the vermiform appendix has been known and recognized as an anatomical structure for some centuries (Berenger Garvi first described it in 1524 and Vincius gave it its distinctive name of vermiform in 1561), it was looked upon more as an anatomical curiosity than as an organ possessing an important pathological and great clinical significance of its own. Indeed, it was not until about the middle of the present century that any serious attention was paid to it. Even then, its clinical results in the way of abscess, peritonitis, etc., were described generally to periches of the cecum, and variously described under the names of typhilitis, perityphilitis, paratyphilitis, ileocecal phlegmon, cecal abscess, etc., etc.

[It shows how difficult it is to change a name, which, though incorrect, has been long in use, it is interesting to note that even as able a writer as Mr. Lewis, still clings to the old names typhilitis and perityphilitis, even while admitting that the periches is almost invariably appendicular in origin.]
Last decade the appendix has loomed largely upon the medical and surgical horizon. The pendulum has swung in the opposite direction and, instead of being ignored, the appendix is now credited with causing more deaths annually than any other acute purulent affection (vide Dr. Armstrong, J. Montreal, Brit. Med. Journ. Oct. 3, 1897). Books of writings have been taken up the subject and it has been discussed and written about almost ad nauseam. The result of all these observations has been to depose the appendix from its old position as principal offender, and in its place, put the vermiform appendix.

This satisfactory result has been brought about principally by the labours of ... amongst others. Drs. D'Arcy, Kilgour, H. C. Berry, and Farlow in England, Salmon, Dunn, Bichat, Ledlie, and Thomas in France, Bossi in Switzerland, with a Denmark, Krummel, I. and L. Rump, and Sommervogel in Germany and Fitz, M'Burney, Fowler and many others in America. Still, though the appendix has been depoosed from being the principal factor, it does not follow that the vermiform may not start from the appendix. As a matter of fact it is indisputable that it
Some few instances such is the case. But they are rare and altogether out of proportion to those cases in which the mischief starts in the appendix. Eichhorn (Munch. med. Wochen. 1891 pp. 121, 120) from an analysis of 18,000 examinations made at the Munich Pathological Institute finds that peritymphs of appendicular origin occurred in 91 per cent, while perforation of the cecum accounted for only 9 per cent. Mr. Burney is even more emphatic. He states that in 99 per cent the primary trouble is in the appendix. Yet, though the cecum has been proved to be rarely the actual seat of the mischief, it can play a prominent part in causing it. Thus, when the cecal mucous membrane is in a state of catarhal inflammation, it may block up the orifice of the appendix, or the catarh may extend into the appendix and set up the train of symptoms which will be fully discussed later on.

Anatomy.

The appendix is a narrow, round, tapering, hollow, blind tube, coming off from the inner and back part of the cecum. It is about as large as a large quill, some three to six inches long, and
lying generally behind the cecum, is directed, via its long axis, upward and inward. It is possessed of a mesentery, which is triangular in shape, and contains via its left or free border the small artery which supplies the appendix with blood. This mesentery, consisting of a double fold of serous membrane, is derived from the peritoneum forming the lower layer of the mesentery of the ileum, and to the right blends with the peritoneum covering the cecum. Its left border is free. It is somewhat shorter than the appendix and consequently produces via it a curled or coiled condition.

The orifice of the appendix is sufficiently large to admit of the introduction of a quill, and is occasionally guarded by a fold of mucous membrane, known as the valve of Gerlach. In shape, it is circular or slit-like, though occasionally it is distinctly funnel-shaped (vide Leguen, Bull. de la Soc. d'Anatomie 1891).
In structure the walls of the appendix closely resemble those of the esophagus. They differ, in that the muscular coats of the appendix are very ill-developed. Two layers of muscle, one circular, one longitudinal, can be traced, but they are very ill-developed and consist more of fibrous than of muscular tissue. The mucous membrane is well developed, and contains large quantities of lymphoid tissue and small tubular glands. This abundance of lymphoid tissue probably explains the great tendency to inflammation of the appendix during early life, and the formation in it of the concretions or calculi so often found there. In these three characteristics—abundance of lymphoid tissue, formation in it of concretions, and tendency to inflammation, it presents a very close analogy to the tonsil. Also, like the tonsil, it shows a special tendency to inflammation in persons subject to rheumatism. The appendix is an exceedingly variable structure in almost every particular, and a few of its most common variations will be briefly touched upon.

Length. It may be as short as 1 inch
or as long as 6 or 7 inches. Dr. Adam Ecles (Brit. Med. Journ., May 22nd, 1897) records a case in which the appendix was seven inches long. Occasionally it is said to be entirely absent. In these cases, however, the probability is, that it has been overlooked because of its being hidden by inflammatory adhesions, or has been partly or wholly destroyed by previous inflammation.

Lumen. Its usual size has already been stated. It may, however, be so small as to scarcely permit the introduc- tion of a pin. It is usually patent almost to the tip, though Fitz states that it frequently shows complete or partial obliteration. Again, there are probably the result of previous inflammation and elevation.

Position.

The most common is where the appendix lies to the inner side of the colon, covered by the ileum and extending obliquely upwards from right to left. This may be called the normal position, in so far as a structure which varies so greatly and so frequently, can be said to have a normal position.
is where it lies to the inner side of the 
coecum but passes downwards from 
right to left. In this case it may reach 
the brim of the pelvis or even enter it.  
It may lie to the outside of the coecum, 
extending upwards, backwards, and even 
reaching, and lying in front of, the right 
kidney. 
It may be found in any of the following 
situations:

1. Entirely underneath the coecum.
2. Herniated into one or other of the 
peritoneal pouches or fossae vjz. the 
ileo-ceolic, ileo-caecal or sub-cecal.
3. Passing directly across the sacrum 
parallel with the ileum.
4. Passing round the ileum and 
forming a constricting band.
5. Herniatiad in an ordinary right 
inguinal hernia, left inguinal 
May 322, 1897) or even scrotal hernia.
6. Adherent (as a result of previous rift-
amiation) to the bladder, rectum, 
female organs of generation, anterior 
abdominal wall or to Poupart's lig-
ament as recorded by Ritsuto (Amer.}
In appendicitis within the cecum as recorded by Dr. Wright and Tunbridge (Brit. Med. Jour. June 12th 1894) and by Dr. Conant (Brit. Med. Jour. Dec. 6th 1897). This form is very rare. A short note about it is appended at end of this.

The appendix extends normally about 2 inches in the length of the appendix (Gowers). It may be almost absent, or may extend even beyond the tip of the appendix (Klebs). Its left border is free, and along it runs the small artery, by which the appendix is supplied with blood. It is owing to this peculiarity of blood supply by a simple vessel, that the appendix owes its vascular instability and tendency to abscess during acute inflammations.

Peritoneal Tumors.

There are certain tumors found around the cecum, which acquire an importance from the fact that the appendix may become herniated in one or other of them. For full and detailed description of them see article by Lockwood and Rollston (Town Anatom and Physiol. Vol. XXVI p. 130). They are extremely variable in the most
constant being the sub-colic, lying directly beneath the cecum, and the ileo-cecal, lying behind the junction of the cecum and ileum.

Appendicitis.

Classification

The various forms of appendicitis have been classified from several standpoints — the pathologist, the physician and the surgeon. The simplest, and probably the best, is perhaps as follows:

1. Simple Appendicitis. This is also termed enteral or (Parietal of Salmor).

(a) Appendicitis with peri-appendicitis
(b) Appendicitis with peri-appendicitis and abscess formation without perforation

2. Perforating Appendicitis

(a) Perforating, fulminating appendicitis with general peritonitis.

(b) Perforating appendicitis with local parietal peritonitis and abscess formation

(c) Perforating appendicitis with extraperitoneal suppuration.

3. Recurrent or Relapsing Appendicitis.

(a) Chronic appendicitis.

(b) Appendicitis obliterans (Senni)

4. Tubercular Appendicitis.
(3) Typhoid Appendicitis
(4) Actinomycotic Appendicitis
(7) Rheumatic Appendicitis

Pathology

The mucous, sub-mucous and muscular coats.

The normal appendix is soft and flaccid, and only the most expert would detect it by palpation through the anterior abdominal wall. When inflamed, it becomes hard, turgid and cylindrical in form.

As has already been stated, the appendix is peculiarly subject to catarrh. Simple, uncomplicated catarrh is extremely common, but, as it gives rise to no clinical symptoms, it cannot be diagnosed. If such an appendix be laid open, the mucous lining will be found intensely congested, and swollen—so swollen as in many cases to almost entirely occlude the lumen of the canal. Recovery from such catarrh is of frequent occurrence and leaves no trace behind. On the other hand, if the inflammation is acute or long continued, morbid changes take place just as in other parts of the canal. The surface epithelium together
with that lining the crypts of Lieberkühn, refreshes, and is shed. On examining a section under the microscope, it will be found, that the crypts of Lieberkühn are filled with leucocytes, that the vascularity of the mucous and submucous layers is greatly increased, that the submucosa is infiltrated with leucocytes, and the whole much thickened. The muscular layer may remain normal. More often it is much thickened, and the muscular fibres are separated by inflammatory infiltration.

Such cataracts, Dr. continued, bring about various results. The watery discharge, containing parts of the alkalies in solution, may deposit these, giving rise to concretions or calculi, just as the same way that phosphates form in the nose and calculus in the boulders. Again, it may lead to chronic thickening of the mucous membrane, or it may, and often does, lead to ulceration. Such ulceration is brought about by the combined action of the mucus of leucocytes in the streams and the mucusing power of the leucocytes produced by the mucus of leucocytes, producing thrombus with blood. As the naked eye these ulcers are usually circular, with a greyish base, and pur-
- bounded by a zone of ecchymosis.

Usually there is one such ulcer situated at or near the tip of the appendix. Occasionally, the ulcer may be at or near the base of the appendix. Or again, the ulcer may be circular in form affecting the whole circumference of the appendix. When such ulcers heal, cicatrical contraction takes place, especially with the circular ulcers, and constrictions of the lumen are formed. These constrictions give rise to retention of fluid and cause dilatation (so-called cyclical dilatation). Should the ulcer not heal the peritoneum is invaded and perforation frequently takes place. When the ulcer is circular, the distal portion of the appendix may be separated and found lying free as a plough. If, however, previous to detachment, it has formed adhesions to some neighbouring tissue, it may derive its blood supply therefrom and still remain living tissue. (Roux, Rev. med. de la Soc. médic. de Paris, May 26, 1890, p. 96) Such ulcers as these latter need little if any necessity be preceded by catarrh. They may be due to irritation, produced by the presence of a calculus, or foreign body. Or again, without catarrh
without abscess, without foreign body, an ulcer may form in that case is due to direct microbic infection acting on a debilitated mucous membrane instead of leading to simple ulceration and perforation, if the inflammation is very acute, the whole of the vessels may become thrombosed, and the whole of the appendix become gangrenous, and slough off. In a less extensive form, the gangrene may affect only a large patch of appendix, or the tip, and not the whole of it. Occasionally it would seem as if mere mechanical obstruction, in the way of acute bending or twisting of the appendix, as interferes with the blood supply, as to produce gas-
-grene. As I have already said, if the ulcer heals, cicatricial contractions take place. This may be so extensive as to entirely include the lumen of the canal, or practically convert the appen-
dix into a fibrous cord. An app-
dex, taken from a case of relapsing appendicitis, may show any or all of the foregoing states of ulceration—pouches of ulceration, cicatricial contractions with or without intervening pockets containing suppurring or catarrhal products, or even
show partial obliteration, blocking up completely some portion of the canal. To prepare such an appendix, fill it first with alcohol (96%), and then immerse it for twenty-four hours in alcohol of the same strength. This method was first suggested by Abbé (Arch. Rec. July 5, 1897).

**Contents**

The normal contents of the appendix may be practically summed up in the one word—mucus. When inflamed, it is filled with fluid, which may be purulent, mucus-purulent, serosanguineous, bloody or sanguineous-purulent. In about 40% of cases, calculi are found. These calculi may be single or numerous, very small or of considerable size, round, ovoid or cylindrical in shape and if several have been present, factured. They consist, for the most part, of inorganic salts, principally phosphate of lime and magnesia, and carbonate of lime. Occasionally cholesterol may be found also. Together with these salts is also a variable proportion of fecal matter. Le Guern (Contribution à l'étude de l'appendicite par corps étrangers. Thesis de Paris 1893) found, in an examination of 171 such calculi, 103 into which stercoyal
matter entered more or less largely. The quantity of these calculi, to a certain extent, the softness or hardness, of these calculi - they may be soft and friable, may be of putty-like consistence or may be hard and flinty. On section, it will be seen that they are made up of concentric layers, as if they had been formed by accretions and in situ. Their formation and causes will be discussed later. To the naked eye they frequently simulate various natural objects, such as tomato and fig seeds, orange pips, grape seeds, and even cherry and date stones. A piece of grape skin may be exactly simulated by a layer of thick, glutinous, dark greenish purple mucous. Besides these concretions or calculi small pieces of hard incrustated feces are to be frequently found - these to various objects from the outside world may find a lodgment there. Such are - to name a few - pieces, remants, fragments of bone, or of nutshell, small shot, tooth brush bristles, splinters of wood, a human tooth and according to some authors cherry or other fruit stones. These latter are, however, probably calculi which
instantiate them. In support of this view 16.

Two facts may be urged:—1. the difficulty of understanding how so large an object as a cherry stone could get into the appendix and (2) the more frequent frequency of appendicitis in fruit-eating countries, such as Switzerland, than it is elsewhere. 

Lumbrici have been found in the appendix as recorded by Flemisch (Bull. lecture on obscure abdominal diseases, p. 9) and by Blackadder (Edin. Med. and Surg. Jour., xxv, 1824 p. 18).—Baron Hirschfeld (Archiv. der Heilkunde 1871 p. 171) found hydatids lodged in the appendix.

These calculi are usually found lying free in the canal, though they may be buried in the walls and give rise to ulceration and perforation. The presence of a calculus, however, by no means necessitates appendicular mischief. They may lie there latent for years and cause no trouble of any kind. Blackadder (quoted by Trevor) found a concretion, as large as a thrush's egg, which had given rise to no symptoms during life and in like circumstances Lewis found in the appendix of an old man of 88, no less than 122 small shot=...
The Peritoneum.

Inflammation affecting the walls of the appendix is probably very rarely recognized until it invades the peritoneal coat. Then various results follow. Either there is a simple localized peritonitis, peritonitis with localized suppuration or lastly the formation of a general peritonitis.

Simple localized peritonitis.

This may simply be an infection and slight inflammation of the peritoneum. On examining such a patch it is seen to be red, cloudy, leucopenic, and especially the blood vessels will be seen enlarged and gorged, surrounded by escaped leucocytes or wandering cells together with proliferating connective tissue cells. On the surface will be found a thin layer of fibrinous exudate. This exudate causes adhesions to form with neighbouring structures. The adhesions thus formed, play a very important rôle, as, when pus forms, they tend to limit its spread— to localize it. Should the inflammation subside at this point, the adhesions so formed may be completely resorbed and leave no trace behind.

Inflammation of the peritoneum is rarely
strictly localized to the appendix but affect neighbouring structures, especially the eca reun.

Peritonitis with localized abscess.

This is generally the result of perforation. Such perforation, however, is not by any means absolutely essential as the pathogenic organisms can penetrate the walls of the appendix. This was proved experimentally by Rogers and Souté (Proc. Soc. Med. Sci. 1896 p. 79 so. 4). The quantity of pus found varies greatly. Thus it may be only a few drops or it may amount to a pint or more. As a rule it is very fetid; often fecal and may contain among the pus, the concretion (should one have been present and escaped) or even the slough of the appendix itself. The amount of abdominal distension is not in direct ratio to the amount of pus present. Terms Barling and others have all noted cases where the abdominal distension was great yet only a few drops of pus were found when the abscess was opened. Dr. Symonds (Brit. Med. Journ. Jan. 26th 1895) relates a case in which the swelling was enormous reaching well above the umbilicus, and
yet the amount of pus present was less than one drachm. The position occupied by the appendix has a great deal to do with the localizing or otherwise of an abscess. Thus, if it lies free to the inner side of the cecum, rapid infection (after perforation) of the general peritoneum is likely to take place. If, on the other hand, it lies to the outer side, or under the cecum, in a peritoneal pouch, or is adherent to some adjacent structure through previous inflammation, there is more probability of its being localized. Again, the position occupied by the appendix with regard to the cecum is important. Thus, if it lies in front of the cecum, the abscess becomes less frequent; the pus lies in front of the cecum and is reached directly by an incision made there. If, however, the appendix lies behind the cecum, the abscess becomes retro-cecal, it is necessary, when incising, to be very careful not to cut into the bowel which lies immediately below the abdominal wall and may be adherent to it. Again, should the cecum not occupy its usual position, (a condition of things more frequently found in children than in
adults), the abscess may appear in various positions. It may appear at the umbilicus; in front of or around the kidney; in the pelvis, where the abscess would be pelvic, and may discharge through the rectum, bladder, and vagina. If the appendix is herniated, the site of the abscess will vary with the nature of the hernia (femoral, inguinal). The abscess may, if not relieved by operation, burst and open in any direction—through the abdominal peritoneum, into neighbouring viscera, or into the general cavity of the peritoneum, in the last case producing general peritonitis.

**Appendicitis with general peritonitis.**

This may arise in three ways:

1. by perforation and rapid spread of the infection
2. by rupture of a periappendicular abscess into the general peritoneal cavity
3. by direct invasion of the peritoneum through the appendicular walls without perforation

The peritonitis may be purulent or non-purulent. In the vast majority of cases it is the former. The pus
may invade the whole abdominal cavity, without let or hindrance, or it may, even though the peritonitis is general, be divided into loculi by the adhesions which have formed among the coils of bowel.

**Bacteriology of the Appendix.**

The appendix of the fetus at birth is free from micro-organisms of any kind. Very soon after birth, and all through life, the whole intestinal tract from the mouth to the anus, affords a lodgment for various micro-organisms of which the bacterium coli communis is the most constant and the most abundant. During health this bacterium is perfectly innocuous. But if, from any cause, the tone of the intestinal mucous membrane is lowered sufficiently— as by long continued catarrh or strangulation or, especially in the appendix, by blunting up of the canal and consequent stagnation of its contents— then, the microbe has this peculiar property, that it acquires a greatly increased virulence. Besides the bacterium coli communis, streptococci, staphylococci, and pneumococci have been found. The bacterium plays a pro-
-minant part in the production of appendicitis. Two conditions are necessary, however, before it can become offensive. Firstly, increased virulence, and secondly, such a condition of the appendicular wall as will allow of its penetrating it and reaching the peritoneum. This has been abundantly proved by the writers - among others - Frankel (Wiener klin. Woch. Nov. 15-16, 1891), Barbanic (St. Finger-, mentale, Nov. 75, 1891), Welch (Amer. J. Ind. Sci. Nov. 1891), Macaigue (Le Mon. de Taxis, 1892), Fowler (New York med. Journ. Oct. 14-15, 1893), Hedenfjel (New York med. Journ. pp. 777-786, 1896).

-terium is present everywhere in the secretions, in the walls and in the inflammatory exudations around the appendix. M. Ch. Monod (Bull. et Mem. de la societ, de chirurg. Oct. 16, 1893) in an article "Examen bacteriologique du pus" found the pus extremely rich in microbes, principally bacterium coli and staphylococcus. Tavel and Lang, in 23 cases found the colon bacillus in 19 either alone or in combination with other pathogenic germs. In one instance the staphylococcus pyogenes aureus was the only microbe
Rodinay obtained similar results. Out of 27 cases, 25 showed the colon bacillus alone, one the bacillus coli ser. conjugation with streptococci and one our streptococci alone. In the adult the streptococcus has been often found in the healthy appendix. (Brevis). In preparing cultures from the appendix or its fluid, it is as well to make two sets one on agar and one on bouillon. The cultivations on the latter medium are much profuse and, indeed, if on a petri plate cultivations be attempted, the same fluid which gave no growth will now yield a culture.

Etiology.

 predisposing causes.

Age. Appendicitis is almost invariably a disease of youth and early middle life. It does, however, occur both in very young children and in old people, tho' it is rare after the age of 40 on 50 years. Clunton reports a case successfully operated on by Hayo Robson on Dec. 15, 1894, in a child 2½ years old and Villard (Le Journal de clair. et des chirurg. enfant. Apr. 22d 1897) a case with operation in a child aged four. Fifteen 228 cases had only 2 in aged persons.
1 between 60 and 70; and 1 between 70 and 80. The oldest person in whom I have seen appendicitis was a female aged 87. The reason of its being so much more prevalent during early life is because of the well-known tendency for lymphoid tissue to influence then. It has been stated already that the appendix is exceptionally rich in lymphoid tissue.

Sex. It is much more common in males than in females. No adequate reason for this has been discovered.

The following table shows extremely well the relation of sex and age to appendicitis:

<table>
<thead>
<tr>
<th>Age (in years)</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 - 20</td>
<td>75</td>
<td>62</td>
<td>137</td>
</tr>
<tr>
<td>20 - 30</td>
<td>188</td>
<td>41</td>
<td>229</td>
</tr>
<tr>
<td>30 - 40</td>
<td>69</td>
<td>13</td>
<td>82</td>
</tr>
<tr>
<td>40 - 50</td>
<td>28</td>
<td>10</td>
<td>38</td>
</tr>
<tr>
<td>50 - 60</td>
<td>7</td>
<td>9</td>
<td>16</td>
</tr>
<tr>
<td>60 - 70</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>70 +</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>340</td>
</tr>
</tbody>
</table>

The above table is taken from an analysis of 517 cases, by Dr Armstrong, Montreal.
From the table it will be seen that the proportion is 340 males to 174 females - a proportion of nearly 2 to 1. The table is also instructive as showing the rapidly increasing frequency of appendicitis up to the age of 35 and then a gradual declining.

Hereditvity. By this is meant, not that the disease or inflammation is hereditary, but that there is an especial tendency towards it, owing probably to some peculiar hereditary malformation (such as excessive length, etc.) of the appendix, or some constitutional taint such as phrenitic gout, etc. 

Tours states that heredity obtains in about 40% of cases. This is in my opinion placing the percentage much too high. Curiously enough as Mr. Truus has remarked 'the association of this affection in families is not so often that of parent and child as of brother and sister.' Mr. Taylor of Guildford records appendicular disease occurring in four members out of a family of five.

Constipation. Formerly, this was thought to be a very important cause
As a matter of fact, it is not, and people who suffer from chronic constipation are most particularly specialists, as victims for appendicitis. In a few cases, by putting up an entero-colic, the catastrophe then spreading to the appendix, it may be a first cause. It is certainly not a common etiological factor.

Excesses and indigestible foods.

Thus, together with insufficient evacuation, undoubtedly predispose towards appendicitis, by setting up intestinal irritation. Probably this explains the enormous frequency of the disease in America, where eating like everything else, is done in a hurry.

Previous attacks of appendicitis predispose towards the attacks.

Formation of the appendix—such as being bent upon itself, bound down by adhesions, excessive length, etc.

Season of the year. It is for some obscure reason more common in summer than in winter, and in hot-than in temperate or cold climates.

Various constitutional conditions such as gout, rheumatism, tuberculosis,
hypochondria and actinomycosis all predispose towards it. Acute illnesses such as pneumonia, influenza, scarlet fever are frequently associated, during convalescence, with appendicitis. Infractuation. It occasionally happens that an attack of appendicitis is coincident with the menstrual period; in such cases the menstrual flow may be suppressed for a few days. Excessive fatigue and violent exercises predispose towards appendicitis. They probably act by producing exhaustion and thus reducing the resisting power of the appendicular walls. Robinson (Med. Rec. Nov. 1896; p. 75-6) ascribes the frequency of appendicitis in communities where violent sports (football, baseball etc.) are indulged in to the direct action of the forms and visceral muscles upon the appendix.

**Determining Causes**

**Traumatism.** A blow on the abdomen, severe shaking or even dancing (M. Rendu, Bulletin de l'Académie 1897, p. 626) relates to cases of appendicitis occurring in young women.
after dancing). It is, however, probable that appendicitis, even a direct blow, only produces appendicitis in those individuals in whom the appendix already the subject of inflammation or containing a calculus presents weakened walls.

Calculi.

Gross organisms.

Calculi. The composition etc. of these calculi has already been noted. It now remains to be stated how it is these calculi are forced in the appendix. There are two theories. The first was advanced some years ago by Takason. He maintained that they were formed in the cecum and passed from there, by means of muscular contractions into the appendix and that in the passage thence they gave rise to acute pain, to which he gave the name 'appendicular colic'. He looked upon this process as being analogous to the passage of biliary renal or other calculi. This view, once so universally held, is now just as universally rejected, the undoubtedly thence is a passage from the cecum into the appendix, or how...
could foreign matters such as pins, bristles etc. enter. But some of the calculi found are of such size (as big as a marble or even a thimble egg) that it would be impossible for them to have entered the appendicular orifice. Further, the composition and conformation of these calculi are strong arguments against Salamon's theory. Thus they consist principally of inorganic salts, with only a relatively small proportion of fecal matter. Again, on section, they are almost invariably found to be made up of concentric layers, strong evidence of their having been formed in situ.

The second theory is that they are formed in situ, and this theory is the foundation of the two and the one now generally accepted. The appendicular nucleus is rich in salty constituents, and, if for any reason it becomes stagnated, then salt is forthwith forced to deposit. Any foreign material present—pin, brisk, brick, shard of wheat, fragment of nut shell, etc.—forms a suitable nucleus. This was proved experimentally by
Gervasee de Pouville (Louis. Anet. Nov. 7th 1896). He introduced into the appendix of a rabbit a small piece of metal, and when the rabbit was killed some time later the metal was found to be thickly covered with earthy salts. Further, these calculi or phleboliths are sometimes composed of nothing but hardened feces. In that case, instead of these hard masses as hard waters being introduced from without, the feces enter the appendix in a semi-fluid state, and stagnating there, the appendicular mucous membrane acting as an absorbing agency, absorbs the fluid portion and leaves only the more solid constituent behind.

How do these calculi cause appendicitis?

According to Salamon, all appendicitis is due to calculi. But calculi are not by any means invariably present. He deduced only six from 30 to 40 per cent are calculi found. Various authors give different percentages—thus Blank put it at about 40%; Rattnerstock 53%; Leques 40%; Félix 47%; and Krafft 54%—the calcui act in two different ways. They may
fill up the canal and thus cause a blocking up of the secretions. These stagnant secretions contain microbes in abundance, and when so shut in, the microbes acquire a greatly increased virulence, so much so as to be able to attack the appendicular walls causing ulceration and even perforation. Or they may themselves invade the wall, and passing through it, attack the peritoneum and cause peritonitis. (Vide du Bois' Études sur la virulence du colé-bacille Ann. de l'Institut Pasteur, Vol. 15, p. 710-736.)

On the other hand, the calculi may become embedded in the appendicular walls, and by continuous pressure cause gradual weakening and ulceration of the walls. Still, the presence of a calculus in the appendix does not, by any means, so long as it does not entirely obliterate the lumen of the canal, necessitate an attack of appendicitis. Rare instances have been recorded where even large calculi have been found in the appendix after death, which have given rise to no symptoms during life.
What part do the pathogenic microbes play in the production of appendicitis? They are the real determining cause in every case, without them there would practically be no appendicitis. It has already been stated that they are always present in the appendix, and that when shut in and protected from any cause, they acquire an increased virulence. This has been proved experimentally by various investigators. Roger and Jooss (Bull. et mem. de la soc. med. des hop. 1894, p. 99, 1896) performed the following experiment: They injected into the appendix of a rabbit four drops of a virulent culture of the colon bacillus. The appendix was ligatured at its base. In 15 days the animal died, and a suppurating appendicitis with peri-appendicitis was found. In a second series of experiments, they ligatured the appendix at its base. Three months later they killed the animal and found the appendix converted into a cyst, filled with thick pus loaded with the colon bacillus. In another series of experiments conducted by Jaques, et conjunts.
...in with M. Domenech, it was found that microbic injected into the urine could bring about an inflammation of the appendicular walls. This was especially so when the wall of the appendix had previously been wounded. Gervais de Rouville (Proc. medicale 1876 p. 231 et soc. Anatomique 1876 p. 589) performed some similar experiments. In two rabbits the appendix was ligatured aseptically at its base. One died on the 1st day from purulent peritonitis, and showed a periappendicular abscess together with a perforation near to the ligation. The 2nd animal was killed on the 18th day although there was no peritonitis, the appendix was distended, filled with fluid - purulent - and loaded with E. coli bacillus. The virulence of this fluid was proved by injecting a small quantity (1 c.c.) into a rabbit. It killed it in a few hours. From the foregoing experiments it is seen that if the appendix become blocked from any cause - calculus, herniation of the mucous membrane, cicatricial contractions, auto-blooding it - we have the ground prepared for the formation of an appendicitis.
Thus, our juvenile bodies rely on...

I fail to see...

on...automatic programming commencing during our youth. After some period or another, our...automatic programming ceases to function.

In some cases, this can lead to...

with much enthusiasm. Does your tutor...

and this is much like...your own manner.

Then, how were our observations in this era...

the same can only...

...your own ...our own...

Observation of...automatic programming.

Again, considering if ...

either the automatic programming (or otherwise)...

rather, for our own objective...

...our own...automatic programming...our own...automatic programming...in our own manner...our own...

...our automatic...

...our own manner...for our own...automatic programming...our own...

...from our own...automatic programming...our own...

...our own manner...for our own...automatic programming...our own...automatic programming...our own...automatic...
Etiology and Symptoms.

Simple Appendicitis.

The onset is, as a rule, sharp, sudden and characteristic. The patient may be apparently in the enjoyment of good health, though there is generally a previous history of gastrointestinal disturbances.

Pain. This is sharp and colicky, at first ill-defined and described as being all over the abdomen. During the first few hours the point of greatest irritability is generally (in about 70 per cent of cases) just a little above the umbilicus—practically just over the superior anastomotic pleura. In a few cases it may be referred from the first to the right iliac region. Further, the pain may be referred to the back, to the right testicle which is often retracted, to the right leg, the movements of which may be restricted. If the patient be lying down, the right leg is often drawn up so as to relax the abdominal walls. Especially is this so when an abscess has formed. The pain is increased on palpation, and after the first collapse, if any, can generally be shown to be most intense at one particular
Attention was first drawn to this fact by Dr. Burney (New York Medical Journal Dec. 21st, 1889, p. 678) who thus describes it: "I believe that in every case the seat of greatest pain, determined by the pressure of one finger, has been very exact—between an inch and a half, and two inches from the anterior superior spine of the ilium, in a straight line drawn from that process to the umbilicus. This point indicates the situation of the base of the appendix, where it arises from the cecum, but does not by any means demonstrate, as one might expect, that the chief point of disease is there." Writing on the same subject some two years later (Annals of Surgery XIII, 1891 p. 236), Dr. Burney further insists upon the importance of this region. "In the first hours of an attack of appendicitis it is not enough to compress with the whole hand the region of the iliac fossa. Such pressure will often elicit no more complaint from the patient than pressure of a similar kind made at other parts of the abdomen. But if firm pressure is made with the finger tips, and especially if the patient—
be made to cough while such pressure is being exerted, it is invariably easy to determine that the most sensitive point is a definite one in most cases. This point is very accurately in the adult— from 1 1/2 to 2 inches inside of the right anterior superior spineous process of the ilium on a line drawn from the umbilicus. In children it is in proportion to their size, so much less distant from the spineous process. Occasionally this most sensitive spot will be found a half inch or so nearer the pubes, and sometimes this sensitive area will be larger than usual, but from the first hours up to the end of several days, this sign may be clearly made out in every case. No other acute disease presents this feature. This point of especial tenderness is undoubtedly of considerable diagnostic value, and can generally be elicited— so far as my experience goes, I find that it cannot be elicited during the first few hours nor as a rule after the third day— because it is not by any means infallible. As Gibson has pointed out (New York Med. Times. April 1891) point pressure on stretched and
inflamed muscle, produces pain, especially if this is marked at the junction of tendon and muscle. Again, the position of the appendix is variable. Thus Fowler (Annals of Surgery xxviii, 1896, page 283) records a case in which he found the appendix lying to the left of the median line, about an inch above the root of the umbilicus, and fixed in this position by an exceedingly short meso-appendix. After the general abdominal pain has persisted for some hours, it gradually subsides, and localizes itself especially in the right iliac fossa. This again is not invariably. Thus Dr. Hare Wilson (quoted by Mr. Darlington; Med. Times. May 20, 1896) records a case in which, after the wide spread pain had subsided, it localized itself in the left iliac fossa. Duvalray has drawn attention to the fact that, besides the deep seated pain there is frequently a well marked local cutaneous hyperaesthesia on the right iliac region. This hyperaesthesia may extend well down the right leg. (Trens) — to this sudden acute pain at the onset, which may
least any time from an hour up to thirty six hours, the term 'appendicular colic' has been applied by Salmon. This term - implying an analogy between appendicular colic and renal or biliary colic, is in many cases a misnomer. It implies violent contractions of the appendicular wall in its endeavour to resist the entrance of a calculus, or to expel its contents by the mucous, calculus or foreign body of any kind. The amount of muscle contained in the appendicular wall is so small and fickle - often hardly traceable - that violent contractions caused by it are not to be thought of. But for want of a better term, appendicular colic has been retained as best describing the symptoms. (The term is much more closely descriptive of those cases of recurrent appendicitis in which the attacks are exceedingly mild and last but a few hours).

So what is the pain due? Here all is theory and nothing proved. Towne describes it to 'the moment when the peritoneum is invaded by the microbes' Banfield (Engelby's lecture on Appendicitis, May 9th 1895) attributes it to
a more spread reflex, spreading through the sympathetic plexuses in the abdomen and excited by the severe inflammation in the resisting and inelastic walls of the appendix.

Trous (who altogether refutes the term appendicular colic) attributes the pain to the distension of the appendix by its retained peristalsis, and consequent stretching of the peritoneum which covers it. Valorous theory: impaction of a calculus or stercoral to altogether sur- tenable. In the first place, in a large number of cases of appendicitis no calculus or stercoral is present; in the second place, such calculi, when present, are formed in the appendix, and not in the cecum; and in the third place, the anatomical relationship existing between the cecum and appendix, differing altogether from that of ureter and kidney pelvis, does not favour the theory. A stercoral under muscular peristalsis would be infinitely more likely to pass into the ascending colon than into the appendix.

Pain, before, during and after, never suggests to a noticeable symptom
in some cases, especially in those in which the appendix lies within, or on the surface of the pelvis. The explanation of this pain lies in the fact that the inflammation spreads to the peritoneal coat of the bladder, when the bladder is distended during the process of being emptied, contracts, the inflammation peritonitis is disturbed and pain results.

Swelling or Inflammation.

At the first onset the abdominal muscles will be rigid and contracted. In the course of twenty or forty hours some general swelling of the whole abdomen will be seen, which in the course of from thirty to forty eight hours is especially emphasized in the right iliac region. This localized swelling is often credited with being present when such is not the case. The muscles are irritable, and, under examination, contract, giving the sensation of true affection. Still, in many cases, there is undoubted swelling. On deep palpation — under anesthesia — the appendix itself may be felt, either as a sharply-defined foreign-like tumour or it lies in front of the
esceum or as an ill-defined mass if its lies behind the esceum or is surrounded by much fat. Editors (Ann. Journ. med. Sci. May 1894), states "that it is possible as a rule to palpate the appendix either in health or disease. In health the appendix is felt as a flat ribbon-like structure, and is non-sensitive. When inflamed it is firm, dense, more or less rounded and sensitive." Such has not been my experience. In children and thin subjects the appendix can certainly be palpated. But in fat patients, I have never been able to palpate it except when inflamed, possibly from lack of that tactus eruditus, as necessary for such an operation. Occasionally when the inflamed appendix cannot be palpated from the front, owing to its being deep-seated retinal or vaginal examination will reveal it: this means of diagnosis should never be neglected as it is very valuable in those cases in which the appendix lies within the brim of the pelvis. On percussion the tumour may be dull or resonant depending on the position occupied.
by the appendix and the amount of...13
exudation— or later peri- peritonitis. Should
it however occupy a retro-cecal
position and the bowel lying in
front of it be distended with flatus,
or if the abscess cavity contain gas,
the percussion note will be a
resonant one or resonant on places
and dull on places.

Temperature.— Almost always at the
outset after the initial collapse has
passed off, it is elevated and within
twenty-four hours it may rise as
high as 102° or 103°. In mild, favor-
able cases it then usually begins
to decline and about the third or
fourth day reaches the normal.
If now there is too vigorous an action
of the bowel induced or too early
movement allowed, it will rise
again. In some cases the temper-
ature rises to 102° or higher and
remains so for several days, then
falls suddenly. The explanation
of such is probably that an
abscess had formed or has emptied
itself into the bowel. The temper-
ature is considerably influenced
by the state of the bowel of the bowels.
act early or if, as in some cases, it is found safe to keep them open by gentle enemata, the temperature chart shows a much lower range than in cases where the patient has been dosed with opium and the constipation is well marked. This is well shown in the following charts taken from two cases.

If abscess formation is taking place the temperature will show an evening rise with morning remission as ulcer formation in other parts of the body. Taking it all round however the temperature is an unsafe guide as it is not in direct ratio with the pulse or with the local manifestations. A falling temperature with a quick
sensing pulse would not indicate improvement. On the other hand a persistent high temperature would make one suspect the formation of pus or the further invasion of the peritoneum. Again, the local swelling may subside and the temperature remain high; or there may be increased swelling and yet the temperature remain low. In fact, very little reliance can be laid on the temperature as an aid to diagnosis, except when taken in conjunction with other symptoms.

Pulse.

At first, the pulse is much quickened - 100 to 110 or more. If the case is a mild one and resolution takes place it will slow down to normal in three or four days or earlier. If however, the pulse rate remains high and tends to increase to 120 or more then one is inclined to suspect abscess formation. It is not a sure sign, as many cases have been recorded in which both temperature and pulse remained high and yet resolution takes place without abscess formation. In character, it is generally soft and easily compressible.
though it may take on the hand, why the character supposed to be characteristic of, and so often found in, peritonitis. With regard to pulse and temperature, H. P. Fowler (in 'A Treatise on Appendicitis') states that 'a lowering temperature and lessening pulse rate are not inconsistent with impending ulceration, perforation of the appendix into an unprotected peritoneal cavity, complete gangrene of the organ or rupture of an appendicular abscess into the cavity of the peritoneum.' So that neither pulse nor temperature nor both taken together can be relied upon absolutely as indicating the progress of the case.

Vomiting and diarrhea are almost invariably present, but do not persist as in general peritonitis, - generally subsiding within a few hours of the first onset. The vomit is rarely offensive or feculent, and is generally absent altogether when the bowels are acting. It consists of the contents of the stomach mixed with, or followed by, a quantity of bilious matter. For this reason
patients, will often tell you, that they began with a hot bilious attack, and undoubtedly many mild cases of appendicitis, with early resolution, are looked upon merely as bilious attacks. Should the vomit be persistent and dark brown or stercoraceous, the prognosis is decidedly grave, and perforation, if it have not already occurred, is imminent.

Constipation.

This is generally well marked from the very first, though occasionally the bowels may act once or twice at the commencement of the attack. In a few cases the bowels continue to act all through or there may be diarrhoea. Dr. Fawcett (quoted by others) in an analysis of 190 cases, reported 6 in which there was persistent diarrhoea and 8 in which there were loose stools. Tenesmus is occasionally present, though not often. The urine.

Revilliod (Rev. med. de la Socin Rom. Nov. 1891) states that urates are greatly increased in the affection and belongs to the region of the portal.
vein, whereas if it affects the regions tributary to the vena cava, such in-crease is not noticed. In perforating appendicitis, the urine is of high
colour, slightly albuminous and greatly diminished in quantity.
Indians is present in a few instances.
As the first onset of the attack there
may be, and often is, retention of
urine; the bladder may require
emptyping by catheter.

Rajons.

These in people appendicitis
are decidedly uncommon, though
occasionally met with. Should
the case go on to perforation
one or more may occur.

Accompany of the 2nd pulmonary
heart-pound in murmuring (But-
rave. I. un. kind. was 1854) draw
attention to this symptom. The
records 100 cases in a Dr. longe's clinic
in which this symptom was quite-
distinct. The cause is not known
as the symptom may be present
and yet a upward displacement
of the diaphragm due to ascites,
meteorism, etc., be absent. It is a
symptom of little value for diag-
nostic purposes.
Decubitis.

Almost invariably the patient lies on his back with the legs extended. The breathing loses its abdominal-thoracic character and becomes almost entirely thoracic. The belly walls are usually more or less rigid, and intolerant of much examination. The face at first is pcaused as with great pain especially in children. As the pain subsides the face becomes more restless. Should the case go on to general peritonitis the face then becomes flushed and hastily assumes the "facies hippocratica" type. Delirium is rarely present, practically never in the milder types and most common even in the more severe forms, except when the case is progressing badly to a bad end, or when there is general peritoneal poisoning. The appetite is in abeyance, the tongue foul and thirst as a rule will mark termination.

After three four or five days, all the symptoms subside, the pain almost entirely disappears, the bowels resume their functions, naturally or
they may require the aid of some a mild
apartment. At the end of few days or so,
all trace of pain and swelling will,
in favorable cases, have disappeared.
Cases of simple appendicitis may
last only a few hours, a day or two
or constitute a serious illness. In
highly nervous individuals, all the
characteristics are accentuated, and
frequently convalescence is tedious.
The simplest cases come under the
notice of every medical man, and,
truth to say, are more often diagnosed
as a bilious attack, a touch of indig-
estion, etc. than as appendicitis. One
of my patients is frequently the culprit
of such mild attacks. He is an iron
worker and, by the nature of his em-
ployment, subject to frequent and
sudden changes of temperature. Every
now and then he is laid off his work for
a day or so. His symptoms are a
feeling of uneasiness in the right-
iliac region amounting sometimes to
pain, with disinclination for food and
(3) some hours after the onset the passage
of a loose stool. He is never off work
more than one "shift" and is quite-
willing to take intervals.

Another case. In a young woman
age, 23. In February 1548 he had a severe attack of influenza. During convalescence he complained of pain in the belly. Temperature 99, pulse 100, no vomiting. Bowels continued. The pain located itself in the right iliac region but no tumour could be felt. On the third day temperature and pulse were both normal, the bowels acted on the fourth day, and by the end of the week all traces of appendicitis had disappeared.

Appendicitis in its initial stages does not differ from simple appendicitis. But instead of the temperature declining to normal and remaining so, there will be an evening rise (100° 4 to 102° 0) with morning remissions just as pus formation in other parts of the body. Should, however, the temperature fail to normal, and yet the pulse not diminish in frequency, it is still probable that suppuration is occurring. Pus may form as early as the third day but generally does not form until the fourth or fifth day. How do we know when pus is present? This is a question by no means easy to answer clearly.
showed a rigor occurs it is strong presumptive evidence. But these rigors are not by any means constant and their absence does not contra-indicate pus formation. The existence of a swelling or tumour in the right iliac region, painful on pressure and increasing in size, is strong evidence in favour of abscess. This, taken in conjunction with the temperature, (either intermittent or declining) and the pulse (always accelerated) under the diagnosis is almost certain. Thus, if the abscess is not relieved, either by incision or by opening spontaneously into the bowel or other sinuses, then signs of fluctuation, reddening of the skin, oedema, etc. — follow.

Fluctuation. This is often very difficult to obtain and when obtained is exceedingly fallacious. If the abscess be deep, in a bursal sac or other inaccessible place, fluctuation cannot be demonstrated. Again, if the bowel, lying just subjacent to the skin, be distended (partly) with gas it gives a feeling of fluctuation very closely simulated, simulating the feeling of fluctuation produced by the presence of fluid. As pus escapes an area of fluctuation can generally be mapped out.
But if the abscess be retro-cervical the "
abscess will be wholly or in part-
replaced by pus once.

Conclusion and Termination

Towards the tenth day the patient begins to look seriously ill, and
as soon as pus can be discharged it ought to be let out. Some surgeons
therefore advise delay, urging that the abscess walls and adhesions are
as yet very ill-developed, and if ut-
nerfered with may break down. Again,
Others say, that too early interference
should not be practiced as there
is a possibility of the pus being
absorbed. Such procrastination may
and undoubtedly does take place
occasionally. But it is altogether
too uncertain to depend on, and whilst
waiting for it, we are exposing the
patient to very grave danger. Delay of
one or two days can generally be allowed
with safety. If long delayed, the
abscess may penetrate the general
cavity of the peritoneum, and up an
acute peritoneal general peritonitis.
Or it may open into the coccyx, rectum,
bladder, vagina, or any neighbouring
vessels. Further, it may work its
way to the surface, and present as any
direction — the abdominal parietes, anterior or posterior, in the thigh or peritoneum, or burrow upwards along the ascending colon to the tendency stimulating peritoneal or abscess, or going still further, reach and penetrate the diaphragm and enter the pleural cavity, set up pleurisy, pneumonia.

If, however, the abscess is cut down upon, and the pus thus liberated there is generally a rapid emptying of its contents, followed by a speedy cure. Should however the abscess be localized, it may, instead of healing permanently, heal for a time, then break down, discharge the contents of another locusus, and so on until complete emptying.

After an abscess has formed around an appendix, and has been thoroughly evacuated, it is rarely followed by another attack of appendicitis. The appendix undergoes a sort of fibrous degeneration and obliteration, and grows more to little or no further trouble. Generally, however, in these cases, when the appendix can be reached, it is advisable to resect it, and in that way, make quite-secure
of obstructions further trouble from that source.

The course of
periappendicitis with abscess forma-
tion is usually acute and progres-
svive. Sometimes, however, after
several days illness, the symptoms
diminish in severity, and it looks
as if resolution is rapidly taking place.

Then, after a day or two, the symptoms
become acute again, reappearing either
spontaneously, or as the result of
injudicious movement or distress
of the patient. In such cases, the
greatest care should be observed,
as such recurrence is often fol-
lowed by general peritonitis, due to
rupture of a latent abscess into the
general peritoneal cavity.

Appendicitis with general peritonitis:

The peritonitis in such cases may
be peritonitis or more peritonitis. In the vast
majority of cases it is the former.
Such cases are caused by:

(a) Perforation of the appendix with
subsequent rapid fulmination gen-
eral inflammation.

(b) Opening of an appendicular
abscess into the general peritoneal
cavity.

(c) Rapid invasion of the general
peritonitis, without the formation of an abscess, or the occurrence of any perforation. Such cases are of rare occurrence, but it is only on such an hypothesis, that certain cases of peritonitis in which there is neither perforation nor abscess can be explained.

Perforation is not necessarily followed by general peritonitis. As has already been stated, such perforation is influenced greatly by the position of the appendix, adhesions previously formed, etc.

When due to rupture of a peri-appendicular abscess, it is marked by a sudden recurrence of the abdominal pain, which tends to spread all over the abdomen.

The symptoms in both cases are much the same. The abdominal pain is general, accompanied by persistent vomiting. Constipation is absolute. The temperature rises to 102° or higher; the pulse becomes rapid and feeble. The belly walls are distended, tight, hard and intolerable.

Examination. The pain is distributed all over, with often as maximum intensity over the point of
the original lesion. The tongue becomes hard, dry, and brown, the
lips first intense. The patient lies on his back, legs drawn up, hands
often placed above his head and very restless. The symptoms go
from bad to worse. The vomit persists, the belly remains distended
the face becomes drawn, pinched
and haggard, the pulse rate
increases to 150, 140 or even more;
may even become altogether un-
countable; the temperature rises
steadily and may remain elev-
ated until death ensues. In some
cases, however, towards the end it
 tends to fall and may even become
subnormal. Delirium, at first
wild and excited, then low and
muttering pets in; the extremities
become cold; then coma and
death. Just in the act of dying,
I have noticed in several cases,
a vomiting of dark, brown fluid.
In some cases of general periton-
itis there is from the first onset
almost, such a condition of general
peritoneal poisoning, that the sym-
ptoms are entirely altered. In such
the belly is flat, countenance retractil
and insensitiveness except in the region of the appendix and even here pain can rarely be elicited. There is little or no tumour in the right iliac. The tenderness is not as free as in the form just described and may be altogether absent. Constipation is replaced by diarrhoea. The temperature, at first raised, returns to normal or sub-normaL; the pulse is small, rapid, feeble; the breathing is very rapid. The face is not only drawn and haggard, but assumes a gray chalky appearance—thirst is extreme, and the tongue is coated and foul but frequently not at the tip and along the sides. The urine is scanty, and albuminuria or pyuria is entirely suppressed. Delirium rapidly passes, and the patient either dies apparently convulsed or subsides into low muttering delirium, coma, and death. Such cases run a very rapid course rarely lasting more than three or four days and occasionally prove fatal in so short a time as from twenty-four to forty-eight hours.

General septic peritonitis is rare.
to itself; practically always fatal. And, unfortunately, even when the abdomen is opened and irrigated and drained, the results are not much better; fatal issues being much more the rule than the exception as Roux graphically expresses it "résistent moins à la chirurgie qu’aux forces funestes".

The following case occurring in my practice three years ago is illustrative of how a mild appendicitis in which propulsion was taking place may be converted into an acute fulminating appendicitis with general peritonitis.

W. C. age 47 — a publican. On Dec. 23rd, 1894, he, apparently in the enjoyment of robust health, was seized with sudden acute abdominal pain and vomiting. When I saw him some three hours later, he was markedly collapsed. He had vomited twice, and complained of pain all over the abdomen, worse at any one point. The bowels had acted slightly. The temperature rapidly rose to 104°. The pulse was at first almost imperceptible but—
as the reaction set in became ex-
ceedingly rapid. He was put to
bed, packed with hot bricks and
blankets, given pips of hot milk
and linseed water, and by way of
medication 1/2 dr. morphia hypoder-
mically. The next day he seemed
much more comfortable. The temp-
erature was 102°; pulse 100; there had
been no return of the vomiting;
the pain was not acute as no
more morphia was given. It was
located in the right-iliac fossa
where there was a feeling of distention
but no actual swelling. He had
not passed water so I used the
catheter. The improvement continued
until the fifth day when the temp-
erature was 99°; pulse 90; abdom-
ninal tenderness slight; and every-
thing favorable for a rapid, quiet
deterioration. At this time, he was
much exercised about his bowels
which had not yet acted. I pro-
ounced him an exanem on the follow-
ing morning. During the night how-
ever he was so fidgety and persistent
in asking for some febrifuge and
ricin that his wife gave him some
castor oil—about 1/2 dr. This acted
acted rapidly, producing two expirations. But the result was disastrous. There was a sudden exacerbation of all the symptoms, pain all over the abdomen, persistent vomiting - in fact all the signs of an acute general peritonitis. At this point I suggested calling in a surgeon to have the abdomen opened. Such a course however did not commend itself either to the patient or his wife. The signs over his condition had worsened considerably - temperature 103°, pulse very rapid, weak, thready, breathing thoracic, rapid and very shallow, face very flushed and some delirium. The following morning Mr. Jones of Hanoverton was called in to operate, but although he saw him within thirty-six hours of the perforation, he refused to open the abdomen. The patient's condition was then as bad. He died about 3 p.m. the same day - some forty-four hours after the relapse. At the autopsy (which I had infinite difficulty in obtaining) I found the appendix lying at the right side and a little in front of the
excessively, rather over three inches in length, almost buried in soft inflammatory exudation and presenting a patch of gangrene with perforation at such and a half from the tip. In the general abdominal cavity there was a quantity of thick, very foul, rather fecal-looking fluid, about a pint in all. Although I searched carefully, I could find no corroboration of any kind. The coils of intestines in the region of the appendix were marked together and adherent, but the rest of the intestines presented no adhesions although they were coated with a thin, fibrinous exudate.

The following case is one of acute fulminating appendicitis with peritonitis - a case which was hopeless from the first. I will be brief with it. E. S., age 35.

There was a previous history of inflammation of the bowels some two years before and of occasionally bad bilious hiccough pains. On Feb. 16th 1896, after a hearty tea I found him in bed, he was seized with very sudden acute pain in the belly, with an intense desire to defecate. This he was unable...
to do, as at once took a dose of strichna
of phrenitis, which made him violently
vomit. When I saw him an hour
later, he was intensely collapsed, and
suffering agony. German morphis (N.)
and hot applications to obtained
some in about eight hours. From then
onwards it is just a tale of zephyr pois-
oning. The abdomen was swollen
but not particularly hot, the temp.
perature fell to 99° and did not rise
again, the pules was weak, thready,
and very rapid; the bowels were
absolutely constipated and the urine
shranked - only a few drops of very
dark urine being found in the bladder.
Almost from the first the patient
was only semi-conscious and in
sixteen hours was comatose. Twenty-
four hours from the commencement
of his illness, he died slightly con-
scious. On opening the abdomen
I found the whole of the appendice
gangrenous and ready to slough
off, the intestines gently inflamed
and a quantity of the poorest smelling
fluid imaginable - I did not measure
it. There were no adhesions of
any kind formed.

There are some few cases of appendi-
--dritis with localized abscesses, in which there exists also a condition closely simulating peritonitis, but which clears up at once as soon as the abscess is evacuated either spontaneously or by operation. Is this condition Gould has applied the name "appendicitis with peritonitis"?

**Peritonitis**. This term was first used by Gubler (Traum de Verap, 1877) to indicate the symptoms of shock attending serious lesions to the abdomen from any cause: perforation of an appendix, rupture of a pyo-salpingo, strangulation of a loop of intestine, passage of a gallstone, torsion of the pedicle of an ovarian cyst, rupture of a hydatid cyst, sudden peritonreal haemorrhage, etc., etc. It is characterized by acute general abdominal pain, profound exhaustion, extreme anxiety, pallor, pulse quiet, soft, cold extremities, shallow inspiration, vomiting, and a temperature normal or subnormal. Complications.

The most common complication of appendicitis is undoubtedly
abcess formation. They have already been referred to. Such abscesses are
according to the position in which they point received various names -
'peritoneal, pelvic, cerebral etc. Again, abscesses may form at a distance
from the appendix - in the abdomen -
- the wall, the liver, spleen, lung
or almost any organ in the body.
In this latter case the infection is
carried through the lymphatics
and such are generally found
only in chronic cases.
Abscess of the Liver

This, an important and gen-
erally fatal complication, is fort-
unately rare. Fitz records 11 instances
in 257 cases. Liver, however, has
the frequency of it - at - as low a
rate as 0.4 per cent. It may occur
in any form of appendicitis, but
is most frequently met with in
subacute cases, and the reported
cases have occurred for the most
part in young patients. The abscess
develops round some branch
or branches of the portal vein and
is due to an infective thrombosis
of the mesenteric and portal veins.
There may be one or more abscesses.
generally the latter. The symptoms are marked. During the progress of an appendicitis, when the symptoms have in part disappeared, there will be a sudden rise of temperature, following one or more rigors, there will be anorexia, nausea and vomiting. Any tongue, mucus red, containing wroth, bile or occasionally albumen; some ascites, conjunctivae yellow and more or less pain over the region of the liver. The liver increases in size, and may present distinct localized tumours when the pus is found on its surface. The pus, however, generally burrows into the liver substance forming multiple abscesses. Dr. Payne and others have shown that infective thrombosis may occur in cases of ulceration of the appendicular peritoneum membrane without any peritonitis. The treatment is to cut down upon, and cut free any collection of pus. Tenney, especially of the right side is a not uncommon complication. Tenney puts it down as about 1/40 cent. Welsch (Diss. mag. Berlin, 1891) asserts that pleurisy would be found in 36% of cases if
every case were carefully examined. 

Hoertlé (Klin. Woch. Nov 26 1887) reported
4 cases in 24 — the pleurisy may
be caused by infection carried through
the lymphatics or by the pus directly
invading the pleural cavity from the
diaphragm as Tancock (Ann. Town. Obst.
Dec. 1897), Gravitz (Beitr. Klin. Wochen-
zechr. Aug 12 1889) and Thacker

Pneumonia and Pulmonary Abscesses.

Generally affects the right side
may be due to direct invasion or by
infection carried through the veins
and lymphatics as in pyaemic
abscesses in other situations.

Pulmonary Embolesia

Tancock recorded one case
resulting from thrombosis of
the pelvic veins.

Thrombosis of the iliac veins on
the right side may occur.

Edema of the right leg may occur
due to pressure upon the vein of the
inflammatory exudation.

Hæmorrhage — One fatal case
has been recorded by Tancock: the
bleeding was from the deep circum-
flex and the iliac vessels.

Obstruction of the bowel due to conchi-
Obstruction of the bowel due to adhesions causing kinking or binding down of one or more coils of bowel usually the sigmoid. In such cases may be acute or may be more gradual. For example (Peri-appendicitis p. 52) mentions a case in which the obstruction had manifest itself for years, and was due to matted together of the coils of the small intestine.

Focal fistula. This may result after opening a periappendicitis abscess, usually found in the right-iliac region. In the fistulous canal may be between an abscess cavity and the colon, the rectum or the bladder. Case. A girl child at 5 years has had during the last two years three attacks of appendicitis. The first ran the ordinary acute course for nine days. When there was another remission of all symptoms and a quantity of pus was discharged per anum. Since then there has occasionally been noticed a little pus among the
faces. The two intermediate attacks were evidently due to closing of the fistulous opening and immediate relief was obtained as soon as the fuss again burned out. I advised an operation but the parents would not consent. The child was a delicate one, but during the intervals enjoyed comparatively good health. What the ultimate result would have been I cannot say, as the child died on April 12th of this year from pneumonia following influenza.

Inflammation of the parotid gland and acute epididymitis may occasionally complicate appendicitis.

Superficial sore leading to abscess may appear in any part of the body - brain, pericardium, spleen, parotid gland, abdominal walls, etc., etc. These may appear during or directly after an acute attack. On the other hand there may be a considerable interval between the appendicitis and the secondary abscess. Case. Miss D., age 27, had a mild attack of appendicitis in Dec., 1895 - it lasted ten days and apparently complete resolution took place - towards the end of February, 1896.
I was again called in to see her. She complained of a discharge from the mandibles and gave the following history. About six days previously she felt pain about one inch to the right of the mandibles. Gradually a swelling formed and thinking it was only a 'boil' she hunted it. Under this treatment, on the fifth day, pus began to run from the 'boil'. The abscess completely discharged itself in four days and there has been no further trouble.

**Inflammation of the Appendages.**

Delapénierie (Ann. de Gyne. et d'Abst. Soc. 1897) records five cases. The disease in the appendage is probably secondary to the inflammation of the appendages. In operation on such cases, both appendages and appendix must be removed. Diagnosis is by the usual symptoms of disease of the appendages; sudden attacks of pain in the right-iliac fossa not associated with the catamenia, together with general gastric intestinal disturbances, this complication must be suspected.

**Hypochondriasis.** This is occasionally seen with an patient.
usually men - who are the pulpit - of ulcers.

Glycosuria - Leidy (Philad. med. lew. Sept. 28th 1894) has recorded three cases of glycosuria complicating appendicitis. All three recovered.

Pregnancy. Inflammation of the appendix is not a common occurrence in pregnancy. Vinen (G. med. Jan 24th 1894) records 2 cases and refers to 28 others. In this series of 32 there were 10 deaths - a percentage of 31. Abrahams (Am. Tourn. Obstet. Feb. 1897) records 15 cases. In 9 cases which were operated on there was a maternal mortality of 40 per cent. Armstrong gives a very much lower percentage of mortality. In a series of 517 cases he had only 12.8 per cent mortality.

The principal complication in pregnancy with appendicitis is abortion, which occurs in about 40 per cent; due probably to the uterine-vascular sympathetic communications existing between the appendix and the uterine annexe.

**Differential Diagnosis.**

Appendicitis may be mimicked by and confused with, any of the following.
Hepatic Colic. In this the pain is somewhat higher than the ileum fossa, and radiates towards the shoulders. Also there is generally some slight jaundice. In some cases of hepaticolic the pain runs along the line of the ascending colon, and this certainly makes it more difficult to differentiate.

Refluxive Colic. In this the pain, acute and protracted, radiates invariably towards the kidney, groin, and bladder. The bladder is irritable, and the urine frequently contains blood. The testicle on that side may be retracted; there is no fever. Vomiting may be present but is not common. The pain generally ends suddenly, and tenderness on pressure is more marked on the dorsal than on the anterior aspect of the kidney. Also the history of previous attacks, if any, must be taken into consideration.

Indigestion accompanied by colic. This is little likely to be confounded with appendicitis except at the first onset, as the symptoms pass off quickly, whereas in appendicitis they tend to become more
apparance and to localize them —

— above in the right-iliac fossa.

Perforation of an ulcer of the stomach.

In this, there is the sudden acute abdominal pain followed by collapse and vomiting just as in acute perforative appendicitis. The pain is referred to the region above the umbilicus just as in some cases of appendicitis. But careful examination of the right-iliac fossa will fail to reveal any dullness or local mischief there.

"Typhoid Fever.

Occasionally appendicitis is mistaken for typhoid fever. Such may happen when the invasion is slow and hectic. Chief present giving the characteristic temperature. But in typhoid there is rarely any vomiting, little or no tenderness in the right-iliac region, great malaise, rose spots and the characteristic stools. On the other hand typhoid and appendicitis may coexist in the same patient.

Sir WT Broadway in Jauins's Dictionary of Medicine (Vol II 1876 edtn p. 1685) says that 'he has seen a case in which a patient suffering from
lymphoid together with perforation walked into the London Fever Hospital.

Enterocolitis. This very closely simulates suppurative appendicitis. Characterised by persistent attacks of pain over the region of the colon, vomiting and collapse, with passage of loose, mucous, shelly, or even bloody stools. Differs from appendicitis in that the pain is not sudden nor severe, no acute localised tenderness or distinct elevation of temperature. Intestinal obstruction.

In this, the pain is very acute, abdominal distension rapid, vomiting copious, persistent and rapidly becoming stercoraceous and (as intussusception) the tumour can be readily felt and is movable, the temperature rarely raised and is frequently subnormal, there is tenesmus almost constant and passage of blood stained stools or mucus. De Lanzovain (Rev. Ind. di la Scuria Rom. May 26, 1897) records a case of appendicitis more those of intestinal obstruction - the real cause of the trouble was not discovered until after the
Abdomen had been opened.
Salpingitis and ovaritis. These have already been referred to under the heading of inflammation of the appendix in the complications. Cancer of the Cæcum.

May cause abscess by perforation. The slow onset and previous history of the patient—ought to be sufficient.
Tuberculous Peritonitis.

This or chronic cases very closely resembles appendicitis. Truax records a case (Truax. Path. Path. p. 48) in which a lad was operated on for appendicular disease, and yet all whom a perfectly healthy appendix was found associated with localized tubercular peritonitis. The general history of such cases has to be taken into consideration.
Acute virulent poisoning. The sudden onset of appendicitis may occasionally suggest virulent poisoning, especially if this occurs after taking some unsanitary food of kind meat etc. — Albert Doane (Brit. Med. Journ. Mar. 5th 1898) records such a case. The course of the case however soon settles the matter on way on the other
Movable Kidney. Boser (Proc. and Proct. 76
of Med. 1892 p. 726) points out that
the abdominal pain, nausea and
collapse, and with six cases of movable
kidney, have been mistaken for attacks
of peritonitis.

Typhoid Fever.

Typhoid appendicitis in children
may closely simulate acute hip joint
Sci. 1881 XXXI p. 119) records several
cases in which the pain was very
marked indeed. There is acute pain
in the leg, extending down to the
foot, with hyperesthesia of the skin
—as much as that the patient will
not allow much examination. The
leg is kept semi-flexed, there is fever
and malaise. The diagnosis, however,
soon becomes apparent especially
when an abscess forms in the right-
iliac fossa.

Peritonitis. Terms records a
case in which an inflamed and
perforated appendix lodged in the
pouch of Douglas was not suspected
and treated accordingly.

Perinephritic Abscess. Where the
appendix occupies a retro-caval position
or where the pus has burrowed up
to and surrounds the kidney, a pain: appendicular abscess closely
simulates kidney mischief. Especially
so is this the case when the pus is
intra-peritoneal.

Special localities. When the pain
runs along the course of the last
dorsal nerve, it may be mistaken
for appendicitis.

Perineal Abscess. It is often extremely
difficult to differentiate this from
perineal appendicular abscess. The perineal
abscess may occupy the ischial fossa
and the appendicular abscess
occupies the posterior of the fossa.
But in the case of perineal abscess
there is associated rigidity and
deforrmity of the spine. Also the
onset is not sudden, no pronounced
abdominal pain or
intestinal troubles.

Sudden excessive local distension

There is a history of long standing constipation
occurring in fable aged persons—females
as a rule. There is little pain or constitutional
derangement. Relief of the bowels by an
copeint or enema soon removes all
doubt.
Prognosis.

About the prognosis of appendicitis there is a good deal of divergent opinion. Some surgeons look upon it as being habitually grave, while on the other hand, some physicians are apt to look upon it with much more hopeful eyes. The mortality statistics given by different observers vary considerably. Thus:

Gutmann (Hospital Ernstadt) out of 96 cases records 5 deaths — 5%.

Förster (Hospital Friedrichsheim) out of 120 cases records 12 deaths — 10%.

Forlani (Friedrichsheim Hospital) out of 99 cases records 13 deaths — 13%.

Fenollosa, dealing with 264 cases finds the mortality down at 14% divided as follows:

<table>
<thead>
<tr>
<th>Type of Peritonitis</th>
<th>No. of Cases</th>
<th>Deaths</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suppurative local peritoniti</td>
<td>90</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Suppurative local peritoniti</td>
<td>28</td>
<td>10</td>
<td>26.3%</td>
</tr>
<tr>
<td>General Peritoniti</td>
<td>36</td>
<td>27</td>
<td>75.0%</td>
</tr>
<tr>
<td>Total</td>
<td>264</td>
<td>47</td>
<td>14.7%</td>
</tr>
</tbody>
</table>

Subli puts down the average at about 8%. It is exceedingly difficult to get any reliable statistics in cases treated medically and different authors give very varying percentages. Thus, for example, in cases treated medically
Mr. Burney estimates that 5.5 per cent recover, Fitz puts it at from 60 to 75 per cent, whereas Dr. Lawrence of Dublin says that fully 90 per cent recover.

But these medical statistics are unreliable. Cases of recurrences appendicitis especially cases of recurrences occur at long intervals are apt to be counted more than once as among the 'cures.' The prognosis depends very much on the form of the appendicitis. In simple cases, or cases of circumscribed periappendicitis, cure is generally rapid and pure. Hawtrey out of 190 cases does not record one death. When there is circumscribed abscess, cure may take place spontaneouly, either by resorption, or by the abscess pointing and opening through the skin or into one or other veins. If this does not take place, then the abscess opens into the general peritoneal cavity. If, however, the abscess has he cut down upon the pus let free, most excellent results are obtained, fully 75% to 80% of cases recovering when general peritonitis persists the prognosis is very bad. Such cases if left to themselves may be said to be invariably fatal, and they are almost as fatal when surgically treated. The
progression of appendicitis in children
is much more unfavorable than if
appendicitis in the adult. Especially
is this so in perforation cases. The
same remark applies to old people.
Death occurs on the first day or two
or only a small percentage of cases
appear according to Fitz, while
the highest death rate occurs from
the seventh to the eighth day. The
common causes of death after appendi-
citis are diffuse peritonitis, collapse,
leptospermia, exhaustion and trouble
arising from the abscess.

Treatment.

Preventive. Some enthusiasts
have proposed that, as the appendix
has apparently no useful function,
it should be systematically
removed, just as, by the bowel law,
the appendix is removed. Such a pro-
posal however is quite unreasonable.
Probably the only occasion when
removal of the appendix can be justi-
fiably is where laparotomy is being
performed for the relief of some other
condition. Such has been done by
W. J. Schultze (Frieska laksaresallsk
Handlungar Anp. Sep and Oct 1897) who
has removed the appendix during such operations as resection of the intestine for peritoneal acute, ovariotomy and operations for the relief of ischia. Such a practice has not however, so far as I am aware, been adopted in England; though it would be amply justified in such cases, as where there was a strong history of hereditary predisposition towards appendicular mischief, or where the appendix has already been the subject of one or more attacks of appendicitis.

Medical Treatment.

The aim and object of this treatment is to put the patient into such a condition as will favour the reabsorption of inflammatory exudates; as will favour the formation of adhesions to limit the spread of the inflammatory exudate and in this way prevent spreading of the inflammation. In other words we must try to obtain for the patient complete rest — physical and physiological. The physical rest is obtained by putting the patient to bed when he remains in the horizontal position.
not allowing him to put into his
food, in danger, to nutriment, or for
any other cause whatsoever. Physio-
logical rest is obtained by fasting him
on a low diet, and exhibiting opium
in one or other of its forms generally
morphia by hypodermically.

Until quite recently, it was the routine
practice to administer opium as early
as possible, and in full doses. Such
treatment, however, leads to many
mistakes by masking the symptoms,
and delaying surgical interference,
until it is too late to be of any avail.
How it is the practice to administer
opium or morphia in such doses
only as will control the pain and
no more. Further than this, if the
pains be mild, an opium or admin-
istered, assisted by an enema, may
be of signal benefit. It will frequently
cut short an attack. When the pain
is acute, an enema may be tried
— generally without avail — but on
no account must purgatives be
given. They only cause vomiting and
more active peristaltic movements
of the bowel and may precipitate
matters considerably.

The diet should consist entirely
of fluids, such as hot milk and
lemon water, beef tea and peptonised
milk. These should be given only in
small quantities, repeated often if
necessary. If, however, the vomiting
is severe or persistent, nourishment
should be administered per rectum.
Warm fomentations or poultices
applied to the abdomen give great
relief. It is not necessary to advis-
able to make use of active count-
terirritants, such as turpentine or
mustard. When the pain locali-
s itself in the iliac region, and there
is some swelling, the application
of a few leeches is often very soothing.
This treatment must be persisted
in for several days, and under
such treatment the majority of
Cases get well. After from four to
six days, it is as well, if everything
is progressing favorably, and the
bowels have not acted spontan-
eously, to administer a mild opera-
tive (Sod. sulph. 3½) and assist
its action by an enema. Then,
when the temperature has declined
to normal, the pain and swelling
have almost if not quite disap-
peared, and the tongue cleansed,
more polite diet can be allowed. First tea and toast, peptonized foods, and light-milk puddings, malted foods etc etc for a day or two, and then a gradual return to the ordinary diet. As soon as the bowels are acting freely, some intestinal antiseptic such as pelor or B-napthal should be given with meals and water. Further, the patient must be warned against too early movement. Pulses are very common and could, in many cases, be avoided if the patient had rested sufficiently. A fortnight is not too long, and in many cases much longer periods are required.

In those cases of appendicitis recurring in persons of a phlegmatic tendency, the administration of salicylates is attended by the happiest results. In such the administration of opium is contra-indicated as it checkers peristalsis, and hinders elimination. Indeed in my experience it is not required, the action of the salicylates being sufficiently rapid to act as a control to the pain—

Surgical Treatment =
When should an operation be advised? The most obvious answer to this would be "when there is pain persisting." To this, however, there must be made certain modifications. If the onset be mild and the case runs an ordinary course with rapid resolution, surgical interference is obviously unnecessary. Again, the onset may be acute, and yet the case end happily. The treatment must be medical at all events for a few days, except in such cases as where the temperature declines, and yet the pulse remains small and rapid. In such there is early possibility of perforation of the appendix and general peritonitis, and in such cases early interference may save much subsequent mischief. Again, when all the symptoms persist for say ten or twelve days, yet do not become alarming, and there is no swelling in the iliac region, is it necessary to operate? Here opinions are decidedly at variance. Some conservative cautious surgeons would say—wait—the bold surgeon must say—operate—and the sooner the better.
Such cases do frequently recover under medical treatment alone. On the other hand, they more frequently go on to abscess formation, so as the operation, with thorough antisepsis precautions, is not an absolutely dangerous one, I am inclined to think that in such cases surgical interference is called for. If, however, after the acute symptoms have passed away, the pupillary remains well marked and shows a tendency to increase in size, the indication for incision is clear. This is almost certain to be found and if not put free may burrow in any direction, or even open into the general peritoneal cavity. The question here is: when to incise? Unless he is allowed, the limiting adhesion will not be very firm and if the abscess is opened and there is much handling required, may break down and infect the general peritoneal cavity. On the other hand, if the interference is too long delayed there may be danger that, as has just been said, the abscess walls may break down and infect the peritoneal cavity, setting up an acute suppurative peritonitis.
undoubtedly, there is a risk of this, but experience has proved that such a catastrophe is exceptional. Dr. Bull has shown that in sixty-seven cases of abscess, the pus escaped in twenty-eight instances through the belly wall, and that in only eight did it burst into the peritoneal cavity. So thorough must waiting until the abscess has become a 'safe' one (i.e., the serum in which the abscess rupture cavity of the wound) it is advisable to keep the abscess dry for a day or two, provided the patient can be kept under close observation, and any urgent symptom attended to.

Should there be general peritonitis, the rule is to open the abdomen without delay, even in those cases which seem desparate. So urgent does the question become, that one writer (Willy Meyer, M.D. Rec. Feb 29th 1896) says: 'it is not a question of hours, it is a question of minutes.' However, fortunately, in some acutely suppurative cases, such interference is quite useless; the patient dies of septic poisoning, and autopsy do what you may. Still, brilliant results have been obtained, and laparotomy, as the last resource, should...
be tried, for though the acutely suppurative cases are disheartening, the peritonitis is not always of such a grave form, and without surgical interference, the patient is practically faced with certain death.

There is a last form to be considered, and that is when all the acute symptoms have passed off but the patient does not completely recover. The temperature remains a little elevated; the tongue coated, the liver pain, and swelling still present, (occasionally absent) and the patient gradually losing flesh. As Dr. Warburton expresses it, 'the case is not thriving.' There is some purulent matter persisting as the retention of a small focus of pus, a remaining dilatation of the appendix or something else equally obscure. In such cases, the best plan is to operate. If the operation is delayed, resolution may take place, but the chances of another attack supervening are infinitely greater - this is especially true with regard to working class patients, who cannot afford to rest for an indefinite period. Operations for relieving appendicitis will be
considered late).

"There is no doubt that many surgeons--especially American--have, of late years, interfered too eagerly. They are inclined to look upon all cases of appendicitis as surgical cases. Indeed as common has this operation become [in America] that Mr. William Keightley at the recent meeting of the British Medical Association at Montreal, made the following observation: "To anxious had people become of late, and so truly alive to the possible dangers from bursting of a local abscess, or from an extension of the inflammatory action etc., that it sometimes required a good deal of encouragement to induce a patient not to submit but to just submit to an operation, which, to many, seems to promise the only safeguard against danger and death." (Cited Brit. Med. Journ. Oct. 9th)

As instances of this over-eagerness for operation, Dr. Murphy of Chicago (lanc. news, May 1897), Dr. A. H. Ferguson, Dr. J. B. Deaver, all advocate retention of the appendix within twelve hours of the onset of the attack. Dr. Armstrong (Montreal) writes: "My working rule is to operate on all well marked cases at once. In the doubtful cases I advise operation, if at the least of doubt,
four or thirty-six hours, the condition of the patient is not undoubtedly sui-
pervening. As a contrast to this, W. T. Burns says, 'it may be laid down as a rou-
gh rule that the use of the knife will be scarcely called for before the fifth
day. Indeed, I would venture to think that surgical interference before
the fifth day should not be undertaken except in the presence of erythematous
symptoms. Indeed, the great majority of the Operations for purpura phlebitis are
performed after the first week' (Vide

T. Smith's p. 56)

Before opening such an abscess, spirit
antiseptic precautions should be taken.

It would hardly be necessary to mention
this, but for the fact that some persons
are satisfied if the existence of pus
or pleurisy fluid, appear to permit
themselves considerable laxity in the
details of asepsis, thinking that if the
presence of unlimited quantities of pesti-
organisms, the introduction of a few
additional ones is a matter of no great
consequence. In the case of abdominal
perforation, this is certainly a mistake,
for so many instances of this kind only
the bacillus coli is present, and then
introduction of staphylococci or strept.
- seen may be a fatal complication. Certainly, the presence of the former in the peritoneal cavity does not neces-
sarily prevent the primary union of the parietal wound, and if pur-
opurification occur in this, a mixed infection, original or added by the sur-
gyman, may be suspected.

Shortly put, these antiseptic precautions are as follows:

The skin over the abdomen should be well washed with soap and water,
then washed with spirit, and covered with a carbolic compress for four
hours if possible. Lauterer and Foner (Centralbl. fur. Chir. Bd. 1893) further
advise the application of formalin,
(1% solution) as being a gaseous dis-
infectorant, and thus destroying any
organisms in the cutaneous glands,
as well as those on the skin surface.

Ligatures cut out should be kept
in a solution of perchloride of mercury,
and dipped in chlorinated water before
using. Instruments should be
kept in a 1-20 solution of carbolic,
and dipped into a weaker solution
1 in 100 just before using. So also
the sponges, of which a careful count
should be kept.
also one or two other points of importance that may be noted here. The operating room should be warm, and the patient's body kept warm by means of blankets, hot bottles or covered by warm towels only sufficient space being left for the operation and no more. This precaution is especially necessary with regard to children.

The bladder should be emptied by catheter if necessary. All scars that may be from the abdominal parietes should be checked before opening the peritoneum.

Where to pierce. If the abscess is distinct and localized, pierce just where the tumour is most prominent. The indication clearly is, to reach the pus by the most direct route. Where no such indication exists, the incision should be an oblique one from above downward, and from without inwards crossing a line drawn from the anterior superior spine, to the umbilicus nearly at a right-angle, about an inch from the iliac spine, and as situated that it is above third liver above that line. Care should be taken so as to avoid wounding the deep epigastric
artery. As the appendix will require reconnecting, should it be easily found, the incision should be made of sufficient size to allow of this being done. Generally from three to four inches will be sufficient, but in very fat individuals, it may require to be longer. The skin and cellular tissue having been divided, the aponeurosis of the external oblique, must be divided in the same line. The transverse fibres of the external oblique, internal oblique, and transversalis can then be separated by means of a blunt instrument, and held back by retractors, or as his lordship suggests, silk ligatures. The fascia transversalis can then be divided in the same line exposing the peritoneum. This should be divided with great care, so as not to wound the bowel, which, lying immediately behind, may be adherent to the peritoneum. By thus carefully dissecting the abdominal wall, and avoiding cutting across any muscle fibres, the resulting cirrhotic is rendered firm and the liability to ventral hernias reduced to a minimum. Should the absence be a 'safe one' such dissection will hardly
be possible, as all the tissues will have become viscerified and massed together. In that case, the peritoneum will be divided almost before the surgeon is aware. But it is not of any great consequence, as the protective adhesions will be already formed and there will be very small risk of setting up a general peritonitis. When the peritoneum is not adherent, it is advisable, when feasible, to patch the anterior parietal peritoneum to the covering of the abscess. This will help to prevent fouling of the general peritoneal cavity. When such a proceeding is not feasible, the wound should be well packed with sponges and the pus drained out as rapidly as possible, the patient being meanwhile, turned well over on to the right side. The finger then being inserted, must gently search for the appendix and also for any conversion which may have escaped into the abscess cavity. If such conversion be left behind it will very likely lead to the formation of troublesome fistulae. The abscess being converted, the appendix must then be dealt with. It may be detached and
free, and is then easily removed. On 95 it may be still attached but freely mobile and in that case again removal is easy. Most frequently, however, it is adherent to the walls of the abdomen or buried in a mass of adhesions. An effort must be then made to detach it. This must be done carefully as rough handling may destroy the limiting adhesions, or traction on the appendix, if that be adherent to the intestine, may wound it (the intestine) and even cause perforation. If the appendix is not easily found extensive or protracted search for it, is to be avoided. Experience has proved that its re- removal is just absolutely essential to good recovery. To remove the appendix the quickest and best way is to make a circular incision round it, about an inch from the cecum, and, after stripping the peritoneum and parietal layer back to the cecum like the sleeve of a coat, to ligature the denuded appendix close to the cecum with fine silk. The appendix having been removed and the ends of the ligatures cut short, the peritoneal sleeve is drawn down and ligated.
over the pubis. The meso-appendix and its vessels are ligatured with a separate ligature. Various other elaborate methods of forming a peri-tonal cap to it, insinuating it etc. have been proposed, but as Mr. Lewis remarks, the bottom of a peptic abscess is just the best place for carrying out elaborate plastic operation. 

Sporada (Med. Mod. No. 71, 1897) at the Moscow International Congress, advised a lumbo-iliac incision along the external border of the psoas-lumbar mass of muscle, and extended forwards at the lower extremity parallel to, and at a distance of, about an inch and a quarter from the auroiliac spine. This incision is especially indicated in retro-cecal appendicular abscess, characterized by tenderness over the triangle of Petit's little or no tenderness at the Bumstead point, a marked fulness and contraction of resistance on the right flank, and a clear resonant percussion note over the right iliac fossa. He claims that this incision approaches the appendix by the most direct route, is less likely than the ordinary incisions to result in perforation of the
general peritoneal cavity, affords perfect drainage, avoids dissection—often tedious and dangerous—of any loops of small intestine as often found between the cecum and the anterior abdominal wall, and lastly there is less risk of subsequent hernia.

Washing out the cavity has been practiced by some surgeons, but it is unnecessary and fraught with very great danger of carrying the infected fluid into other parts of the peritoneum. Instead of washing it, the cavity should be carefully cleaned with sponges, swabbed out with iodine, emulsion, and drained.

Drainage. After emptying the cavity, it is usual to insert a large drainage tube reaching to the lowest part of the abscess. How long to leave the drainage tube in, is a moot point. The usual practice has been to leave it in for six or seven days. But this time may be considerably shortened, or indeed drainage altogether omitted, if the abscess be strictly localized and can be completely emptied. Dr. Barker (Brit. Med. Journ. May 26th, 1893) records four cases in which he rejected the
appendix, cleared out the abscess cavity, dried it and completely closed the abdominal wound. The result in all four cases was satisfactory. If, however, the abscess is a large one or diffuse, free drainage should be practiced. It is better to err on the safe side, and drain thoroughly. The advantage of dispensing with drainage is that you get earlier closure of the abdominal wound and thus cut off the possibility of further septic infection from without; that the abdominal wound is much sounder and consequently the probability of central hernia is much reduced.

The aspirating needle as a further means of diagnosis.

This has been largely used in America, but has not found favour with either British or Continental surgeons. Its use is not only unnecessary but dangerous and unscientific. If pus is present, it can generally be detected by other methods. Not only so, in introducing a needle and blindly poking about with it, there is great risk of penetrating the bowel wall which, already inflamed, may break down and ulcerate later.
such treatment. Or an appendicular cyst may be pierced, and a suppurative that did not previously exist be induced. Lastly an abscess may be present and yet the needle not enter it and thus fail to reveal it. When in doubt it is far better and more scientific to make use of an exploratory incision, using all antiseptic precautions, than to use an exploring needle.

After Treatment. The wound, if closed must be covered with a thin layer of antiseptic dressing, and well supported. Primary union may then be expected. If drainage is need the dressing should be plentiful and absorbent so as to soak up any discharge. After union has taken place the patient should remain in the horizontal position until the scar is quite firm. After this, it is necessary to wear a belt or abdominal support for some months and thus guard against ventral hernia.

Occasionally after abdominal section as above described, all seems to go well for a day or two and
Then the following class of symptoms sets in. There is great distention of the epigastric region, frequent vomiting, obstinate hiccough, no pain tenderness or board-like hardness of the abdominal muscles; no rise of temperature; the bowels respond to enemata and this affords temporary relief. But the dilatation of the colon, irritability of the stomach and hiccough persist. These symptoms may last several days, yet end in recovery and are due to a partial reflex paralysis of the bowel. Nothing answers so well in such cases as strychnine administered hypodermically.

When the inflammation is general, this treatment must be somewhat modified. The pain antiseptic and afterpercussions must be observed. Here the most useful incision will be in the middle line; below the umbilicus. Before opening the perito-

-omeum all bleeding should be checked. The peritoneum being opened, pus is generally reached at once. If not, the hand must be introduced and by gently moving the bowel, put free any "pockets" of pus. Any tendency for
the bowel to escape at the wound must be controlled by large flat sponges. The appendix must now be sought for, and, if it cannot be found, it will be necessary to allow its presence to be determined by easy manipulation, a second section over the appendix must be made and the appendix, though not removed, having allowed the pus to drain away, the cavity must then be gently irrigated, using some mild, sterile non-irritating fluid. The best fluid to use is a sterile 0.6 percent salt solution at blood heat. It must be introduced at a low pressure and the irrigating tube should be made of soft rubber and have a diameter of from ¼ to ¥ of an inch. The stream should be well regulated and gentle. The nozzle should be directed first into one region, then into another, the hand meanwhile gently moving about among the coils of intestine and thus allowing any contents of pus to be thoroughly washed out. Above all, the lumbar puncture must be emptied and cleansed. As the irrigating fluid becomes clear, the upper end of the operating table should
be gently raised, so that the upper part drains into the pelvis and then what fluid remains in the pelvis can be removed with sponges. Throughout the whole operation, the injected fluid must be kept at a constant temperature. If this be not attended to, pyrexia may occur. Tower (Rev. de Blau, 1892) has recorded such a case. Instead of using salt solutions, weak solutions of carbonic acid, salicylic acid, borax acid or corrosive sublimate may be used. Corrosive sublimate and carbonic acid are not however very suitable for abdominal work, as if used of germicidal strength they are apt to cause poisoning. Some surgeons—Lawson Tait—prefer to use simple boiled water. The choice of the irrigant is not a matter of vital importance so long as it is aseptic and non-irritating.

Drainage. This is the complement of irrigation, and can be carried out in various ways—by fenestrated rubber tubes, glass tubes, strips of iodine-soaked gauze. Recently it has been the custom of most surgeons to combine the methods and use—
both drainage tubes and strips of iodoform gauze. Drainage by iodoform gauze was first advocated by Bardenheuer and among the first to report fully on its use were Steinthal (German Surgical Congress 1878) and Falguieres (Bull et Mem de la Soc. de Chir. 1891 p.800).

Initiating developing the idea, utilized a tampon consisting of a bag of iodoform gauze containing strips of iodoform gauze, which strips were then extracted one by one, until only the outer bag was left, and this was then removed. It was a ponderous affair and is little used.

When tubes are used, three should be inserted— one into the pouch of Douglas, and one into either iliac fossa. Then strips of iodoform gauze are passed amidst amongst the coils of intestine.

The objections to the iodoform gauze are: risk of iodoform gauze especially in children, unless the discharge is free, they are apt to adhere to the bowel and be difficult— sometimes dangerous— of removal.

Before closing the abdominal wound, the bowel should be attended to. If it is much distended, and it frequently is, it should be relieved.
either by using a small trochar and 1.4 canula or inserting it and reclosing with a Lambert's purse. This procedure is in many cases of very great im-
portance. Bowel so distended becomes partially paralyzed. To this condition Holmansen has applied the term pseudo-ileus. The bowel being tightly the contents decomposed, septic matter is absorbed and seps-


Results:—The best results are un-
doubtedly obtained when the opera-
tion is done early. St. Hawkes (St. Thomas' Hospital reports) out of 37 cases records 27 deaths—a mortality of 73%.

Jalaguier (Bull et Mem. de la Soc. de Chir. July 31st 1893) had 4 successes out 22 cases, Lecron 12, Schwartz 12.

Legnini 6, W. Burney 14, 24 cases, Richardson 9, 32, Demonzec (Arch-

Ren de Mard. June 1894) 29 in 89 cases, Willy Berger (Arch. Rec. Feb 26th 1896) 3 in 9. Taking all these results together
we get an average mortality of about 105-66 per cent.

Relapsing Appendicitis.

After one attack of appendicitis the symptoms may all clear away and the patient be permanently cured. This, however, is very unusual except when the appendix is obliterated by abscess formation, or has been removed. In just what proportion of cases relapses occur, it is extremely difficult to say. Kautz found in an examination of 250 cases 46 per cent, relapses in 23.6 per cent. Krafft in 136 cases a proportion of 22 per cent. Barclay puts down the average at about 33 per cent and Fitz and Zues at about 44 per cent. It is difficult in getting at such an average, as that consulting physicians and surgeons are frequently unable to follow out their cases in hospital or private practice and the general practitioner has, as a rule, as few cases to deal with that they are entirely insufficient for statistical purposes. Consequently
any given percentage can at best be 106
but an approximation.

Causes of Relapses.

Our attacks predispose towards:
another by leaving behind it:
adhesions, binding down, twisting
or constraining the appendix, and causing
as a consequence, retention of pus or
pusuous. Again, the inflammatory
process may have resulted in ottenis
at on or more points of the canal, and
in this way cause retention. This
may have remained in pockets formed
by the adhesions, or the jaunprousship
of the appendix may be enclosed in
these adhesions like a bomb ready
for explosion (Trend). Again, the
presence of a concretion in the appendix
may be the cause of the relapses.
Lastly—micro-organisms. Rome
in 1896 was the first to advance
the theory that micro-organisms
remaining latent in the tissues of the
appendix, in its crevices, and its
adhesions, might be the cause of relapse.
That such organisms do actually remain
latent in the tissues has been proved
bacteriologically by several observers.
Ishida, Von Frayer (Rev. Med. de la Pucie 
Rome. Apr. 26 1897) who bacteriologically


examined numerous appendixes, removed during the quiescent period six or eight months or even so long after an attack as eight months, found bacteria in the thirteen serosa, lymphoid spaces, adhesions and in fact in all the tissues of the appendix. The bacterium coli was the microbe most prevalent.

Treatment.

During an attack the treatment already described must be followed. But in cases of relapsing appendicitis also need careful treatment in the interval between the attacks. The whole aim and object of such treatment is to place the patient under the best possible hygienic conditions both as regards his life and surroundings and his intestinal canal. In the first place it is of the utmost importance to avoid constipation. A daily evacuation of the bowels should be insisted upon and to obtain this, aperient medicines and even enemata must be employed if necessary. The digestion must be carefully attended to and any defective or unsound teeth either removed or made good, or if the teeth are absent artificial ones obtained. The food
should be carefully selected, easy of digestion and of such a nature as will leave little residue. Such foods as milk foods, well mixed meats, soups etc. are suitable. Vegetables and fruits should be forbidden. The meals should be taken slowly and at regular intervals, with a period of rest after each. Gentle exercise such as walking, cycling (not scorching) and moderate gymnastics generally are beneficial, but violent exercises of any kind such as hunting or weight-lifting etc. are to be avoided. Massage of the abdomen as advised by Trevor (Brit. Med. Journ., Jan. 1895) and Cohen (Soc. Medici du Hambourg 1895, p. 1151) seems in many cases to have a good effect. It must however be gentle, as rough massage has been more than once, the direct cause of a relapse. Intestinal antiseptics such as Salol or B-naphthal should be given night and morning for lengthened periods. They should be given in the form of tablets as when given in tabloids they frequently pass through the bowel unchanged.

**Operative Treatment:**

This operation, practiced during
the quiescent stage between two attacks was first proposed by Irwin in 1889. The first occasion on which appendicitis was treated surgically during a quiescent period was recorded by B. H. Symonds in the Obst. Rec. Transactions 1855. In 1883 he cut down upon and removed an appendicular calculus but did not remove the appendix.

Removal of the appendix, though occasionally resulting in death, is, taking it all in all, one of the most successful and satisfactory of surgical operations. When to operate. The best time is about three weeks after the commencement of an attack. If undertaken earlier there is apt to be a good deal of scarring from the still inflamed surface and if post off to a later period the adhesions will have become so firm as to make their division a matter of some difficulty, and possibly, danger. The operation. Many incisions have been proposed among others the following:—An almost vertical one a little to the outside of the linea alba. Another incision 6 to 8 the inner side of the semilunar line, opening the anterior
layer of the sheath of the rectus, pulling
the muscle upwards without division,
and then piercing the posterior layer
of the sheath. Volksvitch (Writhe
No. 5, 1893) advises incision straight-
through the rectus.

Burney (Brit. Med. Journ. Nov. 9, 1895)
makes an incision analagous to Biggi's
incision for iliac colotomy.

Burney (Annals of Surgery, July 1894)
makes an oblique incision crossing a
diagonal drawn from the anterior iliac
spine, to the umbilicus, nearly at a
right-angle, about one inch from the
iliac spine and so situated
that its upper third lies above that
line.

The dissection has already been
described.

To find the appendix, the surest way
is to follow one of the longitudinal
muscular bands on the cecum, the
anterior by preference. This will lead
you to the base of the appendix without
fail. Still, even with this to act as
guide, it is not always easy to recog-
nise the appendix. Routhier (loc. de
Chir. July 15, 1895) relates a case, in
which, the appendix was difficult
to find because it was adherent.
its length, to one of the muscular bands. Davis also records a case
in which a dilated uterus was
mistaken for an inflamed app-
 pendix.

The method of removing the appendix
has been described. It is well illustrated
in the following diagram.

![Diagram]

- Take of the peritoneal membrane drawn out of the stump
- Divide edge of the meso-appendix
- Swollen end of appendix.

After removing the appendix, the stumps
can be touched with a drop of pure
carbolic acid as advocated by Barling,
or merely dusted with iodiform and
bucked under the cecum. At L'Hotel
St. Antoine (Paris) it is customary to scrape
the stumps with a fine curette, and then
brush it with a thermo-cautery. If
now no pus has been discovered, and
the oozing from the broken down
adhesions is not excessive, the vein
Division may be completely closed. When pain has been found it is safer to err on the side of caution, and drain for a few hours or all event. When sewing up the wound, it is as well to put the punctures in two layers. Thus the lowest layer of punctures (interrupted) would include peritoneum, transversalis fascia and muscle; the second layer, the internal oblique muscle; the third layer, the external oblique muscle, and the fourth and last layer, which should be a continuous puncture, the skin only.

Under what circumstances should removal of the appendix be advised?

The answer to this will depend upon several factors (a) age (b) past position (c) number of attacks.

In children the tendency to perforate is far more frequent than in the adult, and therefore removal of the appendix should be advised after one really severe attack. In adults, removal may be advised after a second or third attack. It should certainly be strongly advised if the attacks have been numerous, if they are increasing in severity and frequency,
if the constantly recurring illnesses have reduced the patient to a condition of chronic invalidism, if the patient's mode of life necessitates hard work or exposure, or lastly where a patient has had one or more attacks and is going to some part of the world beyond the reach of good surgery.

Results.

These are decidedly encouraging. It is a successful operation, decidedly efficacious and in most cases truly radical.

Toux (Comptes français de chirurgie 1895) records 1 death in 85 cases.

Greeve (Brit. Med. Tourn. Dec. 1893) 1 in 88

Efferson Fowler (Annals of Surgery) 1 in 26


Kuemmel (quoted by Legueu) 1 in 5-1

Barling (Brit. Med. Tourn. Jan. 29th 1893) 23 cases all successful

Vandehey (quoted by Legueu) 3 in 181

Thus from the above statistics it will be seen that though, in the large majority of cases, success attends the operation, it occasionally results in death. Some areas, that removal
If the appendix during the interval, i.e., of all abdominal operations, the surest and the safest. That is all so. When relapse occurs, after such removal, it is due to a small collection of pus being left behind. This must be cut down upon and relieved as early as possible. Should the patient adjust to operation, there is the alternative of advising prolonged rest in the horizontal position for months if necessary—careful diet and suitable medication. Occasionally cases do seem to get permanently well under such treatment, but there is no certainty about it. The surgeon can say with certainty, that such or such a case will come under the 'rest treatment,' and to avoid unpleasantness, it is as well to make this quite clear to the patient and the patient's friends.

Then now remains the specific form of appendicitis to be considered. Tubercular Appendicitis.

Tubercular ulcers have been found in the appendix as a manifest
nation of a general infection. It differs from ordinary appendicular ulceration in that the ulcers are not confined to the appendix but affect the cecum and other portions of the bowel as well. It is a habitually chronic form of appendicitis. Perforation in such cases is uncommon. Treatment. Such cases must be treated on the general principles already laid down.

Typhoid Appendicitis.

Typhoid ulcers may appear on the appendix as in other parts of the bowel, and perforation may occur. Howard Brown (Trans. Path. Soc. Lond., XXXIV, 1883, p. 113) records 2 cases where such perforation was the direct cause of death. The proportion of appendicular perforations in typhoid fever is very small, probably not more than 3 per cent. Fitz in his paper "Intestinal Perforation in Typhoid Fever" only records 5 out of 157 cases of perforation.

Treatment. Here again the treatment must be based on the general principles already laid down.

Rheumatic Appendicitis.

During the last few years the
connection between these two complaints has been clearly recognized. The connection was first pointed out by Runney Geo (1894) although before that date several cases had been recorded by S. Als. Hajden in the name of 'gout of the intestines.' It is probably a more common cause of appendicitis than has hitherto been suspected. Dr. Hajden goes so far as to say that 'nearly all periappendicular cases' arise from this cause and if all cases were at once treated with salicylates, further trouble requiring surgical interference would be rare. Such a statement, however, is excessive. Appendicitis in connection with rheumatism does not show any different clinical features to ordinary appendicitis, except that it is generally associated with muscular rheumatism and boils (occasionally, though not often, with articular rheumatism) and that it is remarkably amenable to treatment by the salicylates. Open incision of such cases is contraindicated and is unnecessary.

Actinomycotic Appendicitis

This was first described in this
country by S. Randmore of Nottingham. The region of the cecum and appendix is the only part of the digestive tract where these fungi lodge. The cause is the ingestion of a grain of corn which contains the spores. Appendicitis due to actinomycosis is extremely difficult to diagnose. The symptoms are ill-defined and equivocal, there is pain of a persistent character and swelling, together with a somewhat intermittent type of temperature. Generally it is not diagnosed until the mycelium is found in the abscess contents. It is a rare form of appendicitis and but few cases have been recorded. Heipaire (Clin. de Lyon, Feb. 1897) records 20 cases. Bonnin (Rev. med. de la Suisse Rom. Mar. 20, 1897) 1 case, Otto Lang published notes of 2 cases in 1892, Pourus of 1 in 1890.

Treatment. If the cause is suspected iodide of potassium in large doses (30 grains per day) combined with arsenic must be given. When the abscess is evident it must be rinsed and the abscess cavity well swabbed out with a solution of iodine. Treatment in such cases has not been satisfactory.
Appendicitis Obliterans.

Sew, in a communication to the Town of the Amer. med. Assn., first drew attention to this form of appendicitis. It cannot, however, be described as a separate clinical form, being only a form of relapsing appendicitis.

It is characterized by progressive obliteration of the lumen of the appendix by the gradual disappearance of the epithelial lining and glandular tissue and production of granulation tissue from the submucous connective tissue which, by transformation into ectodermal tissue, frames out the remnant of glandular tissue and finally results in obliteration. 4. That the incipient pathological changes occur either in the submucous membrane of the appendix in the form of simple ulceration or as an interstitial process following lymphatic infection. 5. That the most constant symptoms which attend this form of appendicitis, are relapsing acute exacerbations of short duration, moderate swelling of the seat of disease and persistence of tenderness in the region of the appendix during the intervals.

6. That the process of obliteration may begin at the proximal or distal end,
or at any place between, or it may commence simultaneously or in succes- 
ion at different points. (5) That obliteration at the proxi-mal end gives 
rise to retention of jejunal material, which finds an outlet through the 
lymphatics, and gives rise to non-
suppurative lymphangitis, and 
lymphadenitis. (6) That circumnitted 
pleural peritonitis is an almost-
constant concomitant of appendicitis, 
obliterson (7) That complete obliteration 
of the appendix results in a sponta-
neous and permanent cure.

**Pyogenic Dilatation of the Appendix.**

This was first observed by Window 
who applied the name "colloid 
degeneration of the vermiform appendix." 
Window describes the pain condition as a "nuexcel. The cause of such dilatation is that a structure forms at 
some point of the canal, the pusous 
gradually collects behind it and caus-es dilatation. Instead of a stricture, a bending or twisting or bending down 
of the appendix by adhesions may be 
the cause. If the cavity is perfectly healthy, 
the pusous remains clear, or perhaps 
milky in appearance, and free from 
any marked odour. If, however, as
generally happens, the cavity is not healthy, the mucus becomes mucous and becomes distinctly ill-smelling. According to Virchow, this dilatation may attain the size of a man's hand. Brews (Lancet 7/4, 1889) states that it is not at all uncommon to find the free end of the appendix dilated. The cyst may be oval, cylindrical, or round. The walls are greatly thickened and frequently the distension is so great that it gives the appendix a stony hardness. On opening them the mucus membrane is frequently found to have been destroyed by ulceration. They are apt to burst and give rise to an attack of appendicitis. Frequently, however, they give rise to no symptoms and are only found out in the post-mortem room. On the other hand, they may give rise to frequent attacks of appendicular colic, as in the case reported by Jessup (Brit. Med. Journ. B. 1889, 873).

Intussusception of the Appendix.

So far as I have been able to discover, only two authentic cases of this condition have been recorded—the one by Ernest Wright and Reusch (Brit. Med. Journ., June 12, 1891) and the other by
Mr. McCraw of Detroit (Rev. Med. Times. Oct. 9th 1897) - Of course, other cases and plenty of them, must have occurred but up to last year the condition had been unsuspected.

The symptoms of intussusception are sudden, well marked attacks of colic, lasting from a few seconds to as long as thirty hours or more. The attacks come on at first every few days but as time goes on the intervals become shorter. During the intervals the health is usually unimpaired. During the attacks there may be the most pitiable, or the picture may be altogether absent. The abdominal muscles become hard and contracted, but there is little or no rise of temperature or other marked signs of constitutional disturbance. The bowels are not obstructed. In the interval, abdominal examination does not reveal any special tenderness, hardness or tension.

The intussusception could be felt as a distinct round tumour six inches Wright and Knowles' case but in Mr. McCraw's case no such tumour could be felt. Palpation was sufficient to bring on an attack of the colicky pain. Both cases recovered completely without operation. In the first case the intussusception being irreducible by
traction, an incision was made into the cecum, the finger introduced and pressure made from within. In the other case, reduction by any means seemed hopeless and was not attempted. The whole of the invaginated portion, both appendix and the part of the cecum involved, were removed.

In cases of such invagination it is difficult to fluid. Dr. Sears suggests that 'irregular and violent muscular contractions, changes in atmospheric pressure, and external forces may all take part.' The irregular contractions cause a disturbance of the atmospheric pressure inside the bowel, the weakest part of which then falls in, and owing to the continued muscular contractions, especially of the muscular fibres surrounding the neck of the invaginated portion, it is thus entwined.

Adhesions, resulting from inflammatory processes, then form and render the lumen exception irreducible. The intermittent colicky pain, Dr. Sears ascribes to the lodgment of faeces in the cecum, existing between the opposing surfaces of mucous membranes of the invaginated portion, producing irritation. Such explanation, however, is not very satisfactory, as the lodgment of faeces must be constant, and not of necessity exist.
Appendicular colic has already been treated of.

Appendicular New Growths.

As far as is known, the appendix is never the seat of primary new growths. It may, however, be affected secondarily as by parasites extending to it from the peritoneum. In any case, such are extremely rare, and possess little or no clinical importance, for either physician or surgeon.

Appendicitis and Insurance.

After an attack of any severity, the patient's health and expectation of life are somewhat depreciated. Even...
independent of definite relapses, there is a great tendency towards dyspeptic trouble, flatulence, constipation, etc. There are no doubt due to adhesions which have formed as a result of the appendicitis. With regard to recur - ence - a very important matter now - a days - subjects of appendicitis should not be accepted at the ordinary rate except under certain conditions. These are: a quiet interval of at least five years after a single attack, or of three years after the last attack; or patients subject to relapses, at a lapse of at least twelve months with no signs of the formation of a ventral hernia after the operation of appendicectomy.

FINIS