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ON APPENDICITIS AND PERICÆCAL INFLAMMATION. WITH NOTES OF CASES ILLUSTRATING UN- USUAL DIFFICULTIES IN DIAGNOSIS.

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No subject within the domain of abdominal surgery within recent years, has made such decided progress, or is at the present time, attracting more attention than that of operation for intestinal lesions, whether due to traumatism or disease.

The fact that perforation so frequently complicates perityphlitis, brings the question of the management of such cases prominently before us as surgeons, and requires that we should not only entertain decided convictions as regards the pathology of the affection, but also have well matured opinions as to the details of operating, and upon the time when such operation should be performed with the least risk to the patient, and with the prospect of the most successful result.

PART I.—ANATOMY, PATHOLOGY, AND DIAGNOSIS.

Appendicitis, simple or perforating, with resulting perityphlitic inflammation, or pericæcal abscess, is a comparatively common pathological accident; and its diagnosis and treatment belong both to medicine proper and to surgery. Almost invariably the case is first seen by a physician, and, as the records will prove, very much depends upon his ability to promptly diagnose the morbid condition, and to appreciate the importance, in certain cases, of early surgical operation for its relief, and on the other hand, the gravity of the responsibility assumed in delaying operative procedure until the patient is in a dying condition, or fast approaching it. Upon the physician also usually devolves the duty of acquainting the family of the patient, or the patient himself, of the peril he is in, and of con-

vincing them that delay is indeed dangerous when an abscess has formed adjacent to the appendix vermiformis, and peritonitis is threatening or is actually in progress. The surgeon is interested especially in the diagnosis and details of operation, and in any special dangers or difficulties attending it.

I have thought therefore that this would be an appropriate topic to bring before this section for discussion. Moreover, this subject is attracting a great deal of attention at the present time; so much so, indeed, that the American Surgical Association, and other societies have repeatedly had it up for consideration within the last few years, and it has more than once received contributions from our own proceedings. At its meeting in December, 1887, three papers were read before the County Medical Society of Philadelphia: One on the "Pathology of Pericæcal Inflammation," by Dr. John H. Musser; one upon "Diagnosis," by Dr. William Pepper; and one upon "Treatment," by myself, by invitation of the society. In my communication, the indications for the operation, its technique, and details of after-treatment, were clearly indicated. I may say now, more than three years later, that subsequent events have not lead me to abandon, but rather to confirm, the views then expressed as to diagnosis and treatment. I then presented a case which had been operated upon by me in the spring of 1887, in the manner prescribed in that paper, which made an excellent recovery after removal of an ulcerated and perforated appendix. I have reported a number of others since that time, showing the importance of early diagnosis, prompt operation, exploration of the abscess cavity and removal of the cause of the mischief. The case just referred to, I may say, was the first recovery on record, so far as I am aware, where the radical operation of amputation of the appendix was deliberately undertaken for the relief of pericæcal abscess. This alone is sufficient to show how recently the subject has claimed the attention of the profession.

This operation just referred to, has already become one of the established procedures of surgery. It is somewhat surprising, therefore, to learn that some surgeons still use the aspirating needle in the diagnosis of abscess, and do

not consider it of vital importance even to remove the appendix in the treatment. And yet this is what a western surgeon reports that he witnessed when on a recent visit to the Metropolis (*American Practitioner and News*, Louisville, Ky., Vol. x, page 380).

This, to say the least, betrays a deplorable want of agreement among surgeons and teachers of surgery as regards one of the most vital questions of operative treatment, and even the means of diagnosis.

I think that the present state of abdominal surgery will support me in stating that, as a rule, in any abscess of the ileo cæcal region, appendix disease should be suspected, and in such case the organ should always be sought for, in order to ascertain its condition; unless this is done the very first principles of correct treatment are violated. If a diseased appendix be permitted to remain it is liable to set up further mischief. In such a case, as the rule, the future welfare of the patient demands that it should be excised, unquestionably so if inflamed, perforated, or containing foreign bodies.

It seems surely as if enough had been said, with regard to the dangers of using the exploring needle, of its utter unreliability, and of its inability to afford information of any value in these cases, to cause its complete abandonment, especially by surgeons who occupy important and responsible positions as teachers and operators, and who aim to serve as guides for others.

A brief review of the pathology of appendicitis, I think, will make it clear to us all, that the life of the patient often depends upon the ability of the medical attendant to promptly recognize the cause of the disease, and to early institute the proper measures for its relief and very often its removal, as the only way to afford relief and permanent safety to the sufferer.

In taking up the systematic discussion of this subject it is perhaps better to very briefly recall the anatomical relations of this part of the body, and the position of the appendix in health and disease.

Anatomy.—From a number of dissections of bodies where death has been produced by disease not affecting this locality, made by me and under my direction at the Pennsylvania Hospital, and elsewhere, I can supplement the very meagre and often incorrect notices of the anatomy of the appendix usually contained in our text-books. In the first place the opening into the appendix from the cæcum is not patulous, as it is represented ordinarily; this opening is also occluded by any abrupt change of direction of the process by which it often becomes parallel with the bowel. This places a valvular fold of mucous membrane directly over the opening which usually closes it as effectually as the foramen ovale is closed in the heart during the first few days

after birth. Moreover, it is stated by good authority that the calibre of the appendix internally is about the size of a goose quill. I question very much the accuracy of this statement in any case, as I have never found it to be anything approaching this size in health; and rarely, if ever, is it distended throughout its course, by secretion to such an extent as this; ordinarily there is no cavity at all, as the walls are collapsed, and I have found that a good sized probe was as much as could freely pass through the canal.

The opening into the appendix is visible upon the inner (left) side of the lower and posterior extremity of the cæcum; it is covered with the folds of mucous membrane and occluded by mucus under ordinary conditions. Were this not the case, and the opening patulous, as is so frequently figured (especially if the calibre were as large as some have represented), appendicitis would be a far more common affection than it is; and, indeed, few children would live to attain the age of adult existence. In length, the appendix varies from two to five, or even nine inches, as I found it in one case. It varies in normal position and direction; so that it can scarcely be said to have normal position; most frequently it is found upon the posterior and inner (or left) side of the cæcum and ascending colon, extending upward towards the liver or gall bladder, to which it may be adherent. The free extremity often points toward the spleen, but it may fall down into the pelvis, and become adherent to the broad ligament or right ovary, or it may become twisted around the small intestines, forming a loop which may cause obstruction or strangulation of the bowel, or finally it may become part of an inguinal or scrotal hernia. At its base the appendix joins the cæcum, obliquely, on the posterior and inner side, just below and on the same side as the ileo cæcal valve, but not at the lowest portion of the cæcum. The summit of the appendix or free extremity is rounded and imperforate. Upon splitting it open, longitudinally, you notice the comparatively great thickness of the walls, both the mucous coat and submucosa being well represented. The glands in the mucous membrane secrete a small amount of mucus, which, with the epithelial debris, is gradually discharged into the cæcum. Should the opening into the cæcum become impervious from any cause, these secretions may gradually accumulate and become inspissated, forming casts or round balls, resembling cherry stones, but consisting of sandy and organic matter. Such secretions are very common.¹ The follicles of Lieberkuhn are numerous

¹ In 13 consecutive post-mortems made by me in persons who died from other causes than intestinal disease, the appendix in every instance but one contained fecal concretions. In a number, the foreign bodies were quite soft, others were firm, some gritty, yellow or brown in color. The canal of the appendix in several was blocked for an inch or more by a series of such fecal masses, which resembled mice dung. Such material imprisoned may readily excite irritation, inflammation, ulceration and finally perforation and abscess.

in the appendix, and the agminated Peyerian glands are also well developed near the summit of the tube, according to the late Prof. Henry H. Smith, who was also inclined to think that a gland or two of Brunner might also be present. In the lower animals, especially among the rodentia, the appendix is much larger than in man and is so richly endowed with glands as to fulfil an important purpose in digestion. The canal of the appendix is also relatively, much larger in the infant than in the adult.² In the newly born infant the appendix frequently contains mæconium.

Dr. Formad, Coroner's Physician and Pathologist in the Philadelphia Hospital, confirms the above observation with regard to the presence of glands in the appendix, and states that he had frequently met with typhoid and tubercular ulcerations and catarrhal changes in the vermiform appendix as a part of a general disease of the mucous membranes of either the large or small intestines. He also has found "Fæcal matter and concretions exceedingly common in the vermiform appendix, surely much more common than is generally held."³ Authentic cases have been recorded by Morgani, John Hunter, Meckel, Haller and others, where the appendix was wanting in otherwise normal individuals. I think that as regards its functions nothing need be said. Whatever relation it may have to the act of digestion in some of the lower animals, in man it is merely a rudimentary organ, having no function, since it may be naturally absent without affecting the health of the individual, and after its removal by operation, the patient has perfect digestion and suffers no inconvenience from its loss. Speaking from a surgical standpoint, it would seem that the principle function of the appendix is to get inflamed and cause peri-typhlitic abscess.

PATHOLOGY.

The chief interest in the pathology of appendicitis lies in the relation existing between disease of the appendix and pericæcal inflammation and abscess; a relation which, in many cases, is very intimate and easily demonstrated. Pathologically as well as anatomically, the appendix is part of the cæcum; its structures are continuous, and inflammation or other morbid process may extend from one to the other, and yet as a matter of experience, it is generally found that the appendix may be the seat of inflammation, even perforation or gangrene, while the cæcum remains unaffected, or at the most is only affected

secondarily. As to the cause of appendicitis, it appears to be always traumatic, or at least the inflammation and ulceration is due to the presence of retained secretions, or of a concretion which acts as a foreign body, oftentimes the inflammation being excited by a blow or unusual physical effort. I repeat that irritation, inflammation, and perforation of the appendix is most frequently, if not invariably, caused by the presence of foreign bodies in the canal of the organ. Such substances are usually phosphatic, or fecal concretions or small objects aggregated which have gained entrance, or the ordinary secretions of the canal may be condensed into concretions made up of epithelial or other constituents. The retention of such material may be caused by stenosis of the cæcal opening, or by thickening of the mucous coat, or by any abrupt change in the position of the appendix which occurs when the organ becomes adherent to the cæcum, so that the outlet of the organ becomes more or less blocked. While it is popularly believed that such concretions are originally foreign bodies, such as grape seeds or cherry pips, this is rarely the case. In the great majority of cases the masses are more or less globular, others are shaped like small date stones, moulded to the interior of the canal, evidently a collection from mucous secretion which deposited phosphate and carbonate of lime upon a nucleus of fæcal origin. As previously intimated, some of the cases are due to occlusion of the canal, and are attributable to retained secretion. Many undoubted cases have been reported, however, in which foreign bodies, such as pins, needles, oyster shell, small seeds, etc., have entered the appendix from the bowel, and caused perforative appendicitis.

In default of a more satisfactory classification of cases of inflammation of the appendix and its results, I feel justified, after considerable experience, in recognizing three varieties or groups of the affection.

First group.—*Irritation or inflammation.* Cases of simple irritation or inflammation of the appendix during the first attack, cannot be positively recognized, but the recurrence of such an attack, establishes a strong probability of this diagnosis.

Every practitioner is familiar with ordinary appendicitis; the symptoms are quite characteristic; the disease is not infrequent and is generally soon recovered from. Recurring attacks also are very common, the intervals being variable, from a few weeks to several months, or, as in some cases, years may intervene. If the cause has been due to some irritating foreign body, and the organ has been able to discharge its contents into the cæcum, a permanent recovery may result, but such favorable termination rarely occurs. If the disease arose from retained secretions, which have been gotten rid of, atrophy of the appendix

² Prof. Leidy, under date of February 27, 1891, in a note to me says: "I have observed the appendix varying from about three to nearly six inches in length, but have never seen such a case in which it was absent. In the infant it appears to be less abruptly an extension of the cæcum, that is to say, from the subsequent greater proportionate enlargement of the latter, the appendix becomes a more abrupt extension."

³ Dr. Toft of Copenhagen, who, while prosecutor to the Royal Frederiks Hospital, found residua of appendicitis in the form of adhesions in 35 per cent. of all post-mortem examinations made.

may follow on the subsidence of the inflammation and the organ become a cord-like body, no longer liable to internal disturbance. If the appendicitis be due to minute solid bodies, attack after attack is likely to occur, and as these increase in size, the probability of ulceration of the mucous membrane from pressure is likely to increase as time goes on.

Second Group:—*Inflammation, ulceration, or perforation.* Any case of mild appendicitis belonging to the first group of cases may pass to the second. As a result of attacks of appendicitis of a more or less severe type, lymph exudation is thrown out, not only about the appendix, but upon and around the neighboring structures. If upon the intestines, such exudation may occasion bowel paralysis, or bands of lymph may involve the intestine subsequently in absolute destruction. So, likewise, lymph may be exuded in sufficient amount in all directions on the peritoneal surfaces, and form a barrier more or less complete, sufficient to protect the general peritoneal cavity from septic contamination, when abscess forms in the pericæcal region. In other cases the exudation forms a distinct abscess wall completely encysting the appendix, and constitutes the distinct tumor, so often observed in such cases; it is usually well defined, immovable, more or less dense, and painful to pressure. Although it may contain pus, as a result of perforation of the appendix, there is no fluctuation until the tumor increases in size; as it approaches the surface, the superimposed tissues become œdematous. Such abscesses may open through the abdominal wall, and so establish a fistula between the bowel, the abscess cavity and the external abdominal surface, or at any other point where the abscess should tend.

This lymph exudation which surrounds the appendix when ulceration and perforation is imminent, may appear very quickly; the results of perforation are thus emptied into the lymph mass, and are held absolutely encysted. As the pus increases in the interior of the tumor, the exudation of lymph may increase, or the wall of the abscess may become thinner, and so the abscess may burst into the peritoneal cavity, or into the superimposed cellular tissue. The formation of pus due to a perforated appendix is announced by most characteristic symptoms if the pus come in contact with the peritoneum; but when the appendix perforates into a lymph tumor, the peritoneum is guarded, and the symptoms of pus formation are not so marked; indeed there are frequently no symptoms whatever which would indicate such an accident.

Third Group:—*Ulceration and Perforation,* with insufficient lymph protective walls.

Many of the reported cases belong to this class. The symptoms appear suddenly, and present

the gravest characters. Now, and then especially in children, the disease advances with intense rapidity, the patient early entering a condition bordering on collapse; such cases I have seen terminate fatally in forty-eight hours, or even less time. Careful inquiry revealed in every case, the fact of a former attack of appendicitis. In such cases when perforation happens, there is either no lymph protection to the peritoneum when the accident occurs, or else the exudation has been insufficient, so that when sloughing or perforation takes place, the contents of the appendix and the sloughing tissue are at once brought into contact with the general peritoneum. Such cases are early associated with symptoms of unusual depression, and often profound collapse.

DIAGNOSIS.

First Group of Cases:—Pain is usually the earliest and most common symptom of appendicitis. It may come on suddenly or the reverse, be slight, resembling colic, or severe in character; it is usually increased by pressure. There may be nausea and vomiting, and a coated tongue and constipation are commonly present. There is generally some acceleration of pulse, and a slightly elevated temperature. The ileo cæcal region is generally tympanitic. Sooner or later all these symptoms may disappear and convalescence apparently be established. As I have in former papers pointed out, the occurrence of symptoms such as above detailed, especially if there has been a relapse or recurrence, are serious enough to give rise to grave apprehensions for the future, for in a patient with a diseased appendix, a blow, slight local injury, undue exercise, straining, constipation, or even an attack of indigestion, may provoke a recurrence of irritation in the already diseased organ which may lead to inflammation, ulceration, and perforation. Such cases as I have detailed, which do not proceed to ulceration and perforation, are of very common occurrence; under appropriate treatment they go on to apparent recovery. I believe, however, in all cases of pericæcal irritation or inflammation (or, at least, in by far the great majority of such), the appendix is the source of, and responsible for this condition; the danger is therefore not overcome by the subsidence of the symptoms even if such are ever so mild. The subject of such an attack or attacks, may recover by discharge of the contents of the appendix into the cæcum; or through atrophy of the organ or adhesion to the cæcum with more or less complete obliteration of its calibre. But such a favorable result must be very exceptional, and its occurrence in any given case cannot be depended upon.

Second Group:—Incident to the inflammation, consequent upon repeated attacks of appendicitis, adhesions may take place, which involve not on-

ly the adjacent intestine, which may cause more or less obstruction, but as a result of such attacks, lymph exudation takes place, often in large amount, which may completely envelop the appendix.

It is this exudation which forms the tumor in such cases, so that when perforation occurs, the pus does not gain access to the general abdominal cavity, but remains encysted; if this protection did not frequently exist, perforated appendicitis would be a much more fatal affection. This tumor wall is often quite dense and thick; when its contents increase the sac distends proportionately, or if more or less thin, the abscess may open and discharge its contents, either into the peritoneal cavity or into the superimposed tissues and reach the surface, or in some cases, by attachment and perforation, be emptied into intestine, bladder, or other organ. Such abscesses are far less serious than those which are found in the third group, where the appendix has no encasing lymph wall. In the former, or second group, although as already stated, pus has formed, it is completely encysted in a tumor, similar to such formations in the ovary or tube, with no special early symptoms necessarily indicating pus formation.

Third Group.—When in addition to the symptoms of appendicitis, those of a far graver nature appear suddenly, viz.; intense local, afterwards general, abdominal pain, marked tympanites, a fluctuating temperature, reaching 102° or even higher, with slight or decided rigors, moderate or profuse sweatings and prostration, there can be no question of the advent of acute perforation and abscess formation in close contiguity to peritoneal surfaces. In such cases where the patient, who has been apparently in perfect health, is suddenly stricken with such grave symptoms, indicating perforation—and I have seen a number of such—careful questioning always reveals the fact that the patient has had one or more attacks of appendicitis, but often so trivial as to be almost forgotten. The history of the former attacks, however slight, therefore, would clear the way for establishing a positive diagnosis.

Although it may be possible for inflammation and abscess to occur quite independent of the appendix in the pericæcal region, yet such instances must be exceedingly unusual. Several years ago (in 1886), I opened a supposed uncomplicated pericæcal abscess of large size; apparently there was no communication with the appendix or cæcum, the walls of the abscess seemed to involve only the connective tissues. The patient recovered, but subsequently suffered from attacks of pain in the same locality, which were then judged to be from a diseased appendix; suddenly, and nearly two years afterwards, the symptoms of perforative appendicitis and peritonitis appeared; there was no tumor, the ileo cæcal region

being markedly tympanitic; section was promptly made, which discovered an abscess and commencing general peritonitis. The lymph exudation was recent, the original abscess walls had been absorbed, so that there was no protection to the general abdominal cavity. The appendix was found enormously enlarged and perforated; it was excised, and the patient has since married and has continued in perfect health. Had the second abscess not formed, the case would have been judged to be a simple pericæcal abscess. While there is every reason to believe that all acute abscesses in the appendix region are due to some lesion of this organ, there is no special reason for the occurrence of simple typhlitic abscess.

I repeat, that it is very doubtful if those cases of perityphlitic inflammation, which under appropriate treatment, go on to convalescence, are cases of inflammation purely of the walls of the cæcum, and connective tissue; such a condition possibly may occur, but it is more probable that in every case the irritation arises in the appendix, with more or less a local peritoneal inflammation. Then again, in every case in which I have excised the appendix for perforative inflammation, there has been a history of former attacks, the symptoms of which corresponded with those which some clinicians describe as indicating typhlitis. In order to determine the presence of an abscess cavity in the ileo-cæcal region, if the symptoms detailed would not be considered sufficient, rectal examination might be made, but I have never been in the slightest degree aided by this procedure.

DIFFERENTIAL DIAGNOSIS.

It, probably, is impossible to differentiate disease of the cæcum from appendicitis at an early state of the malady, as their relations are so close and they both give rise to similar local disturbance. Both organs are covered by peritoneum through a variable portion of their extent; both are liable to irritation, inflammation and perforation.

Perforation of the appendix is a very common accident, while the reverse is true with regard to the cæcum. Even in those cases where cæcal perforation has occurred, it is most likely the result of previous appendix perforation or disease.

One such case occurred in Pennsylvania, under the care of Drs. Rich and Sailor Brown, of Williamsport. I saw the patient in consultation. On the second day after the removal of the gangrenous appendix, fæces came from the wound, and upon careful inspection, two gangrenous perforations were found involving the cæcum. At the time of the appendix removal, the cæcum and colon were markedly impacted and discolored; the violent inflammation about the appendix had extended to and involved the intestine. The resulting gangrene was due in part to con-

tiguous inflammation and in part to impaction. But if this abscess cavity had been simply opened and the appendix not reached, the subsequent appearance of fæces would apparently have established the diagnosis of simple cæcal perforation, while the lesion of the appendix would have been overlooked.

The history of previous attacks of pain in any given case would establish the diagnosis between perforative cæcitis and perforative appendicitis in favor of the latter; at any rate, the necessity for operation being the same in both, the final diagnosis can be left until section has been made.

From Acute Intestinal Obstruction:—The symptoms in intestinal obstruction advance very rapidly, even more so than in appendicitis. In volvulus there is usually more severe pain, which is referred to the umbilicus. Intussusception is accompanied by frequent desire to stool and discharges of mucus and blood; an examination by rectum will probably establish the diagnosis, which also can be said of impaction. Finally, obstruction may be simulated by the attending peritonitis owing to the paralyzing effect on the bowels.

Strangulation of the bowels, intussusception, peritonitis, volvulus, generally come on very suddenly. Impaction of fæces, psoas or iliac abscesses or tumors, come on gradually. Cæcitis and perforative ulcer of the cæcum are also more or less rapid in their course, and point superficially more quickly than does the abscess to which appendicitis gives rise.

From Spinal or Perinephritic Abscess:—Attention to the history of the case and to the local signs of the disorder will enable us to diagnosticate these forms of abscess. The treatment being almost identical, at least as far as laparotomy is concerned, we need not waste time in making refinements of diagnosis, although the differential diagnosis can generally be made.

In psoas abscess difficulty may be experienced at times in differentiating it from pericæcal inflammation. But in the former there is generally dorsal pain and gastric irritation, and a history of long continued ill-health. Abscess from Potts' disease generally points to the groin, either just above or below Poupart's ligament. It also is associated with ill-health and difficulty in walking. In abscess of the right ovary and tube, the history and digital examination of the case would usually establish the diagnosis. An abnormal pouch or diverticulum of the ilium occasionally is found in the right iliac region, and might complicate the diagnosis, which could only be cleared up after section.

Tumors, both malignant and non-malignant, may be found in this region, but as a rule little difficulty need be experienced in clearing up any doubt. Their physical characters and clinical history are usually sufficient.

When pericæcal abscess points in an anomalous situation, all available diagnostic skill will be required to affect a diagnosis. Unlooked-for complications also may arise, which the surgeon must expect, and which he must always be prepared for. Some of the difficulties which occasionally confront us in making a diagnosis are well illustrated in the following cases:

APPENDICITIS; LATERAL SECTION; OPERATION COMPLICATED BY AN ENLARGED, ELONGATED GALL BLADDER; APPENDIX AMPUTATED, AND THE STUMP INVERTED INTO THE CÆCAL CAVITY. RECOVERY.

Mrs. E. S., aged 46, came under my care January 5, 1891, with symptoms of appendicitis which had existed for a week. Pain had been a prominent symptom, with elevation of temperature, abdominal distention, constipation, furred tongue, and persistent vomiting. Directly over the ileo-cæcal region there was a tumor which was slightly movable and exceedingly painful upon pressure. There had been no previous attack of pain in this region, no chill and no sweating. The symptoms pointed to irritation or inflammation of the appendix or pericæcal region, but not to abscess; but the presence of the tumor was very puzzling, and its character could not be made out. These were the symptoms indicating a first attack of mild appendicitis, and yet a large circumscribed tumor, painful to pressure, was likewise present; but the fact that this tumor was somewhat movable led to the view that it could not be connected with the appendix; at all events, it seemed proper to open the abdominal cavity, explore it, and examine the appendix, and then to be guided by circumstances.

A lateral section was made on the eighth day. Upon entering the abdominal cavity, the tumor proved to be an immensely elongated and distended gall-bladder, which was about five inches in length, lying directly above the appendix region, and in size and shape resembling a small banana. A careful examination of the liver failed to show the presence of any gall stones. The appendix was found greatly thickened, but free from adhesions. It had an extensive mesentery, which was ligatured and removed with the appendix. The stump of the latter was inverted, and invaginated into the cæcal cavity. The peritoneum was then brought over the inverted tissues by five sutures. The wound was closed with deep and superficial interrupted sutures; drainage was not used.

An excellent recovery followed, and the gall-bladder has apparently resumed its normal size.

Dr. Morris Longstreth, who examined the appendix, reports: "Great hypertrophy and thickening, especially of the mucous coat, and ulceration in two places, which appeared to correspond with the enlarged solitary follicles."

GANGRENE OF THE APPENDIX VERMIFORMIS,
WITH NECROSIS OF MESENTERY AND ILIUM;
PERICÆCAL ABSCESS WITHOUT SPECIAL
SYMPTOMS. LAPAROTOMY. DEATH.

On Tuesday, March 6, 1890, in response to a telegram from Dr. Phillips, of Trenton, N. J., Dr. DaCosta and I visited a patient with him in consultation. The message stated that the case was one of volvulus, and requested me to come prepared to perform laparotomy. The patient, who was about 42 years of age, had been apparently in robust health, had remained indoors on the preceding Saturday. He had been constipated, for which a laxative had been given, but no relief was obtained. All efforts during the succeeding four days to procure an opening of the bowels signally failed. During this period there was no special symptoms except nausea, and occasional vomiting. After a careful and thorough examination, we were unanimous in the opinion that a positive diagnosis could not be made at that time. It was stated that there had been little if any pain in the abdomen, which was not abnormally distended; the temperature had been normal; there had been no chills or rigors; no acceleration of pulse; the principal symptom being simply a refusal of the bowel to respond to cathartics and enemata. There seemed to be more of a bowel paralysis rather than obstruction from twist or invagination. There was no symptom of peritonitis or other grave lesion of any of the abdominal contents. On inquiry, it was stated positively that there had never been any previous attack of pain in the appendix region. After a most careful consideration of the case, we were unanimously of the opinion that the idea of an operation could not at that time be entertained, and was not justifiable, but agreed that calomel should be administered in fractional doses, $\frac{1}{10}$ of a grain every half hour, with an occasional dose of podophyllin, and as much nourishment as possible.

On separating it was understood that we should hear, promptly, if there was any unfavorable change. Early the next morning Dr. Phillips telegraphed: "Treatment agreed upon yesterday has been carried out; general distress and distention increasing; strength is less, temperature sub normal. I think, as does the patient, that the operation should not be deferred." Upon my second visit, I found the patient with marked hiccough, and an irregular feeble pulse with slight abdominal tension, and no marked pain. There had been no movement of the bowels. The belief that some grave lesion existed, was warranted by the prostration, the sub normal temperature, the weak pulse and the loss of strength, but there was no evidence of peritonitis, local or general. In other words, the symptoms were negative, and it was impossible to clear up the diagnosis even at this time. Al-

though the patient was in an exceedingly grave condition, I quite agreed with Dr. Phillips that an exploratory operation was justifiable. Ether was administered, a two inch incision was made in the median line, and an exploration was made with the finger. To the left of the umbilicus, and extending from just above to just below its level, was a mass of collapsed intestines, but nothing abnormal was found, except slight distention, in any portion of the abdomen until the exploring finger was carried deeply into the right iliac fossa, where it plunged into a very foul abscess, and pus flowed freely from the wound. The incision was then considerably enlarged. In this cavity was found an enormous appendix vermiformis, inflamed and gangrenous in places which was ligated and cut off. The boundaries of the pus cavity comprised the under surface of the cæcum and ascending colon, iliac fossa, mesentery and portions of the small intestine. The portion of the wall made up of mesentery, was necrotic for quite a distance at or very near its root, and the ilium was covered with lymph, and for some inches showed structural change. The sloughing portions separated as soon as touched and bled vigorously. The bleeding vessels were taken up by ligatures, in part individually, and in part *en masse*. Evisceration had been necessary to get at and tie off the appendix. The intestines were now, with some difficulty, returned and the abdominal cavity thoroughly washed out. A glass drain was carried deeply into the pelvis, and the parietal wound sutured.

It was expected that extensive necrosis of the intestine would occur, if it had not already started, because of the condition of the mesentery. No other operative resource seemed possible in this most desperate case.

The presence of such serious disease was a matter of profound surprise, and was totally unexpected, for none of the symptoms pointed to the existence of such a complication, and the diseased conditions could not possibly have been diagnosed by the symptoms. It is most extraordinary that such destructive changes could have existed without symptoms indicating such lesions, and I know of no instance, in my experience, where such disease existed without equally positive symptoms. The only symptoms which heralded the grave condition, subsequent to the visit of Dr. DaCosta and myself, were those already alluded to, viz.; the hiccough, irregular pulse, sub-normal temperature and failure of strength.

Subsequent to the operation there was a marked improvement in every respect; this was due to the removal of the purulent matter, and foul contents of the abscess cavity, while the fatal result which took place two days subsequently was due to exhaustion incident to the gangrene.

The question was raised at the time, whether or not, if the operation had been performed on the day Dr. DaCosta and I saw the patient, the result would have been different. To this I replied, that after the most careful consideration it was agreed that the safest course was to wait; that the diagnosis of volvulus and intussusception was abandoned, as well as peritonitis; of the latter, indeed, there was not a symptom present. Indeed, had laparotomy been performed twenty-four hours earlier we would have found almost precisely the same fatal conditions, for such extensive disorganization is of slow and not so rapid growth. Dr. DaCosta, having read this report, has written: "I have read the above and concur entirely; no earlier operation could have had a different result."

In reviewing the history of this case, I am at a loss to be able to see in what way a diagnosis of such a condition could be made; for it seems almost impossible that with inflammation, abscess, obstruction of the bowels, from lymph and gangrene, there should not have been some positive symptoms. On making further inquiries subsequent to the operation, it was stated by a member of the patient's family, that about two years before, the patient had a serious but brief attack of pain in the appendix region, which was not relieved until after the administration of a hypodermic of morphia; so that, unquestionably, the appendix had during this time been diseased, and was the cause of the fatal attack. Had the fact of a previous attack of pain in the ilio-cæcal region been known prior to the operation, it would have been sufficient to elect a lateral instead of a median section, but at the time we were called to the case, it would not have made any difference in the ultimate result.

PROBABLE PERFORATIVE APPENDICITIS; ABDOMINAL TUMOR SUPPOSED TO BE MALIGNANT; EXPLORATIVE LAPAROTOMY; DIAGNOSIS OF MALIGNANT DISEASE RE AFFIRMED; SUBSEQUENT DISCHARGE OF AN ABSCESS INTO THE URINARY BLADDER; CLOSURE OF FISTULA. RECOVERY.

On the 23d of last June, Mr. T. H. W., aged 33, from North Carolina, came under my care, as a private patient, in the Orthopædic Hospital, with the following history.

About six months previously, or just before Christmas, in 1889, he first had pain in the lower abdominal region; more frequently at night, and was very constipated. The pain lasted about ten days, then gradually subsided, and during this time he was obliged to lean forward in walking, owing to a sense of drawing. About the 25th of April following, when in Scranton, Pa., after feeling poorly all day, he experienced a very severe attack of pain in the lower abdominal region, which lasted for many hours, and was only

relieved temporarily by opium and hot applications. Two days later, although very weak, he went South. On the journey he had a very severe chill, which was followed by fever and pain, the latter continuing all the time; his temperature ranging from 100° to 101°; at the end of ten days he was compelled to go to bed, blisters were applied on account of pain. A hardness and swelling now appeared somewhat to the right of the median line, but below the umbilicus. The diagnosis of local peritonitis was then made; mercurial ointment was applied (which subsequently caused salivation), and low diet ordered. His temperature ranged from 96° to 102°. His condition finally became so alarming that he concluded to come North. On the way up, he consulted Dr. Hunter McGuire, at Richmond, Va., who suspected an abscess and suggested the use of the exploring needle. This was declined, and he reached Philadelphia on June 16th. He was admitted to the Pennsylvania Hospital under the care of Dr. Ashhurst, who diagnosticated carcinoma of the omentum and bowel. After remaining a week in that institution, he placed himself under my care, as a private patient, and entered the Orthopædic Hospital.

At this time I found him emaciated, with great loss of strength, a temperature not much above 100°, but fluctuating. On examination I found marked hardness of the tissues in the anterior belly wall, a considerable tumor which extended from just below the umbilicus to the bladder region, situated over the right iliac region, but not completely. The tumor was hard, more or less irregular, and painful to deep pressure.

The history of the case was that of local peritonitis, and the symptoms pointed to deep abscess, yet as the more marked hardness and tumefaction was confined to the central abdominal region, the question as to the appendix being the source of the trouble was held in abeyance. Hot fomentations were applied, and large amount of milk, nutritious foods and stimulants were ordered.

A few days later I left the city for a trip to the Pacific Coast. During my absence the patient had another acute attack of pain, with marked fever; the only comfortable position he could secure was with the knees drawn up and his body bent forward. Dr. Agnew was called in, who confirmed the diagnosis of malignant disease. After a residence of three weeks in the hospital the patient went to Scranton, and was under Dr. Logan's charge. He subsequently got very weak, his temperature ran high, his pain was severe, and there was progressive loss of flesh. On August, 3 Dr. Mordecai Price visited the patient at his home, and an exploratory abdominal incision was made; the intestines and omentum, it is stated, were found matted together by what was pronounced to be carcinoma, and the opinion

was given that he would probably not live through the month. For a week the patient was in a bad condition, chiefly due to obstinate constipation, high temperature, severe pain. Three days after the operation he passed per urethram, what seemed like the "stem of a water lily," of a reddish black color (probably a blood clot). He had great burning at the end of micturition, and the urine had a foul odor and contained pus. At times, subsequently, the amount of pus was one-third of the urine passed; gradually the pus disappeared and the urine apparently became normal, of natural odor and color, and would so continue for periods varying from five days to two weeks, the latter being the longest interval. It was very noticeable that when the pus was not discharged from the bladder the patient's temperature increased and general symptoms were less favorable. He frequently passed in the urine, masses of brownish or slate colored tissues in a state of decomposition. This continued right along until early in December, although he gained some 15 pounds in weight, when I visited him at his home in Glenburg, near Scranton. He was then in bed and passing large amounts of pus with the urine; and then, for the first time, considerable gas escaped by the urethra, especially at the close of urination. On further examination, I found that subsequent to the exploratory laparotomy and the discharge of pus, that the tumor or hardness of the abdominal wall gradually lessened, and finally disappeared, with the exception of a slight hardness which led from the bladder region to the right iliac region. A careful survey convinced me that the patient was the subject of a fistula which had extended from the appendix, that this organ had been originally inflamed, had become surrounded by lymph, had subsequently perforated when abscess formed, that the adhesions had taken place with the abdominal wall, and finally the pus track led on to the bladder, into which an opening took place, through which the abscess contents, pus, foreign matters, and gas were discharged. The patient was placed on milk, with directions to increase the amount to three quarts daily, also extract of malt and as much nutritious food as could be digested. When his condition warranted, I advised that he should come to Philadelphia for a section and removal of the appendix. His condition after this improved rapidly, no further abscess appearing. He came again to the Orthopædic Hospital on December 27. From that time, however, he improved rapidly, gaining nearly a pound a day, and was soon able to walk out. The hospital record states: "The abdomen is neither scaphoid or prominent; below the cicatrix of operation and towards the pubes there is some slight but deep induration, but no tenderness." Urine was examined and found to be normal. It seemed reasonable that with the im-

provement of health the fistulous track might have closed naturally, so that on January 12, after a short residence in the hospital he was discharged apparently cured, with the understanding that should any further evidence of the trouble appear, the source of it should be investigated and eliminated by abdominal section. He is at this time apparently quite well.

The following case illustrates the grave danger which arises from bands of lymph adhesion, which are liable to be thrown around the appendix as a result of repeated attacks of appendicitis. Such adhesions may prevent the surgeon, at the time of the operation, finding the perforated organ, which not being removed, is likely to give rise to fæcal fistula; and I have seen several such cases.

PERICÆCAL ABSCESS; LAPAROTOMY; ADHESIONS; APPENDIX NOT DISCOVERED; RECOVERY WITH FÆCAL FISTULA; FIVE MONTHS LATER ABDOMEN RE-OPENED, FISTULA FOUND AND CLOSED; RECOVERY.

George I., aged 30, a patient of Dr. Benj. F. Butcher, of Philadelphia, was admitted into the Pennsylvania Hospital, May 12, 1890, in an exceedingly prostrated condition, with a history of former attacks of pericæcal inflammation, the last being followed by symptoms indicating perforation of the appendix and abscess.

The attack came on suddenly, with pain in the appendix region, which was greatly increased by pressure; there was nausea, fever and constipation; later on there was a sudden accession of intense pain with deep swelling, and general abdomen tenderness and tympany; a fluctuating temperature, chills and profuse sweatings. The skin over the ileo-cæcal region became discolored, somewhat oedematous, but no distinct tumor could at any time be felt, yet there was some hardness of the deep tissues.

Such was the condition in May, 1890. A lateral incision was made directly over the region of the appendix, which exposed a large abscess cavity containing foetid pus; careful search failed to discover the appendix, but the surroundings were so matted together by adhesions that further exploration was not deemed prudent. It was supposed that the entire appendix had sloughed from the violence of the inflammation, which had doubtless resulted in gangrene of the entire organ.

The abscess and abdominal cavity were thoroughly washed, and two drain tubes were inserted, one of glass to the bottom of the abdominal cavity, the other a rubber tube into the most dependent part of the abscess cavity. A rapid recovery followed, but a fistulous opening remained which now and then discharged excrementitious matter, showing that an opening existed into the intestine, which was probably at site of appendix.

In October, I made a second section, for the purpose of closing the fistula. The incision was made directly in line with that of the first operation; on reaching the cæcum it was found that all the adhesions which were present at the first operation had been absolutely and completely removed. The cæcum was now readily manipulated, and it was found open, as supposed, at the site of the appendix, which had unquestionably sloughed off; the fistula was of sufficient size to admit the end of the little finger. This was closed with nine Lembert sutures; recovery was rapid and perfect.

As a result of repeated attacks of appendicitis extensive adhesions may surround the intestines also and cause fatal obstruction, as illustrated in the following cases:

PERICÆCAL ABSCESS. OPERATION REFUSED.
PLASTIC PERITONITIS. DEATH.

In the spring of 1890 I saw, in consultation with Dr. Trautman, of Philadelphia, a young man of 28 years of age, who had been confined to bed for a week, with all the symptoms of violent appendicitis. There was no defined tumor, but indistinct local hardness and general tumefaction. Temperature slightly raised; there was constipation, and pain, which was marked, was increased on pressure. There was also a history of several, perhaps three, former attacks, but not so severe as this one. I advised a lateral section and removal of the appendix, which sooner or later, I judged, would perforate and probably excite general peritonitis. The patient declined the operation. He subsequently had two attacks, in May and July.

Early in the following fall, the patient sought admission into the German Hospital. It appears that he was then suffering from another attack similar to the one in which I saw him. The trouble was at first supposed to be a retro-peritoneal sarcoma; then it was taken to be chronic peritonitis. He died of exhaustion, with symptoms of obstruction. The autopsy revealed an extensive, adhesive, or plastic peritonitis. The intestines, stomach, liver, spleen and bladder were so united as to form one huge mass, which, when loosed along the vertebral column, was lifted out entire; the appendix, which was undoubtedly the source of the trouble, was found firmly adherent to neighboring loops of intestine, with much inflammatory tissue.

The following case occurred very recently:

OBSTRUCTION OF THE BOWELS, PERSISTENT VOMITING. PURULENT PERITONITIS; SECTION; EXTENSIVE ADHESIONS FROM PREVIOUS ATTACKS OF APPENDICITIS; GANGRENE WITHOUT PERFORATION OF THE APPENDIX; DEATH ON THIRD DAY.

Mr. J. E., 32 years of age, living in Philadelphia, on January 21, 1891, was awakened early in

the morning by violent pain in the abdomen, referred to umbilicus and right inguinal region, with persistent vomiting. Bowels constipated, but had a small passage on the 20th. He had a similar attack last October, while away on a hunting trip, by which he was confined to bed for seven days. He then returned to his home, and was confined to his bed for some time with similar symptoms, from which he gradually recovered. In December he had another attack. He stated, however, that he occasionally had pain in the appendix region, especially when stepping out of his carriage or when his body was jarred, impressing him with the fact that everything was not right. He had had a similar attack in 1887. I was called in on January 22, by Dr. Woodbury, who had first seen the case the day before and had given him a cathartic and large enemata, without succeeding in evacuating his bowels. (His family medical attendant, Dr. Hetzel, was present, and agreed with us as to the necessity of laparotomy.) The operation was performed the same afternoon, by lateral incision. Pus escaped from the peritoneal cavity, showing commencing general peritonitis. The appendix, which was firmly adherent its entire length to the cæcum, was found with some difficulty. It was gangrenous, and tore while being examined. A ligature was thrown around it near the cæcum, and the very large, swollen organ removed. It was the largest I have ever seen. A glass drainage tube was introduced deep into the pelvis, and small doses of calomel and soda given to check vomiting and move the bowels. There was so great prostration that further examination of the condition of the intestines could not be made. The pain and other symptoms of peritonitis immediately ceased and did not return, but the bowels could not be made to move. The patient vomited all nourishment, even water, and died exhausted on the evening of the 24th day of January.

The several attacks of peritonitis had resulted in general plastic exudation of the bowels, which caused the fatal obstruction—the final abscess, due to gangrene of the appendix, being only an incident in the final result. The operation should have been performed at an earlier period in the history of the attacks and before the occurrence of the extensive adhesions, when the disease was simply appendicular.

PART II.

TREATMENT AND TECHNIQUE OF OPERATION.

First Group: The treatment of the first group of cases, the irritative, catarrhal, or simple inflammatory disorders of the cæcum and its surrounding, or of the appendix, should consist in absolute rest in bed, the application of hot poultices or fomentations, perhaps local depletion, and possibly the hypodermic exhibition of morphine to control pain. The bowels should be kept open by the administration of calomel, or salines and enemas.

The diet should be restricted to nourishing liquids.

Second Group: In this variety of cases the disease is no longer simply irritative, catarrhal or inflammatory, but there is ulceration, with impending perforation, if the latter has not already occurred. Lymph, as a result of the violence of the disease, has been thrown out, which has either partially or completely enveloped the appendix, or this lymph exudation may have formed a wall sufficient to protect the general abdominal cavity when perforation and abscess have occurred. Perforation means pus and abscess; the diagnosis, therefore, of such a condition calls at once for abdominal section and removal of the appendix.

In a paper which I read more than a year ago, before the College of Physicians of Philadelphia, on inflammation of the vermiform appendix, I stated that "when the abdomen is believed to contain pus, whether intra- or extra-peritoneal, encysted or diffused, the rule of surgical procedure now is to make a section, remove the offending organs or the sloughing tissues of pus, thoroughly cleanse the surroundings and drain." This rule still holds good, and is being constantly followed with the happiest results.

The risks of operation at this time, are much less than those which threaten the patient. Early interference will save most if not all cases, while the danger of operation is slight as compared with that of general abdominal inflammation. The surgeon should never be satisfied in merely opening the abscess, which is simply a result, and not the cause of the trouble; if this only is done, the operation is incomplete, and at any time may have to be repeated.

Third Group: Here we have sudden perforation or sloughing of the appendix; in these cases there is no lymph wall separating the pericæcal surroundings from the general abdominal cavity, nor has the appendix been enclosed in lymph exudation—so that when the perforation occurs, the sloughing tissue, pus, and contents of the appendix are at once brought in contact with the general peritoneum.

The symptoms are at once profoundly grave, indicating general peritonitis and early collapse. Immediate section, removal of the appendix and cleansing of the abdominal cavity and contents, is demanded.

It is hardly necessary to say that the usual precaution in regard to cleanliness and rules of strict antisepsis should be observed. Generally, from the very nature of the case, there is but little time for any special preparatory treatment, prior to the operation.

OPERATION.

In my papers on the treatment of pericæcal inflammation, read before the Philadelphia County Medical Society, in December, 1889, and again in January, 1890, before the College of

Physicians, I stated that the line of abdominal incision should be lateral, and not median. The reasons for this statement are very obvious and positive; for, if the median incision be made, the peritoneal cavity would often be needlessly opened, while the cæcum and appendix can not be well reached or dealt with through it. But if the lateral incision is done, it can be made of less size, more circumscribed, and all the necessary manipulations can be made upon the cæcum, appendix, and surrounding parts without necessarily opening the peritoneal cavity. Should the abscess have reached the cavity of the peritoneum, the intestines can just as well be examined and cleansed through a lateral as a median incision. The incision should ordinarily be from three and a half to five or six inches in length. Starting from about an inch or so above the middle of Poupart's ligament, and to the outer side of the right line a semi-lunaris, it should extend upward and outward and directly over the appendix region, and be continued down until peritoneum, cæcum, or pus cavity is reached. The normally placed appendix, as I first pointed out, can always be found immediately under a point two inches distant from the right anterior superior spinous process, on a horizontal line drawn from this process towards the median line of the body. In some cases where the peritoneum is reached, its discoloration shows that it covers a pus cavity; in others, after the peritoneum is opened, not only pus but a lymph tumor enclosing the appendix, is found; this mass must be opened before the organ be dealt with.

Occasionally, when the abscess is cleansed, the appendix will be seen loosely floating, but frequently it is more or less attached to the cæcum, sometimes firmly fastened to it and detached with difficulty. Now and then it has a mesentery of its own, which may extend its entire length; this must first be tied in sections and then cut away: the appendix is then ligatured with catgut, or silk, close to its cæcal attachment and cut off. There is no advantage in invaginating the stump; in most cases, indeed, this treatment would really be impossible on account of the swollen, infiltrated and unyielding condition of the organ. In such cases there is no reason why the ligatured stump should not be allowed to project from the cæcum. The abscess cavity must slowly fill up and close by granulations. If the general peritoneal cavity has not been involved, the abscess walls and surroundings need only be washed out with hot water (or with 1 to 2,000 mercuric solution). If the appendix has sloughed, or even simply is perforated, search should be made for any foreign body, and all sources of further trouble gotten rid of. A glass drain should be placed in the most dependent part and the wound closed with a few stitches. Very commonly, however, the peritoneum is

found invaded by pus, so that the whole abdominal cavity needs to be thoroughly drenched with hot distilled water (105° to 110°). In such a case even greater care should be taken to find any foreign body which may have escaped from the appendix.

When the general cavity has been involved, a glass drain must be carried to the bottom of the pelvis in the hollow of the sacrum, a large rubber drain should also be placed in the superficial or cæcal abscess cavity.

The post-operative treatment is simple; it consists in the hypodermic use of small doses of morphia to relieve pain, while the ordinary rules of abdominal surgery are to be observed. No food need be given, by mouth, for the first twenty-four hours, or even longer. Nutritive enemata of beef tea, with or without whisky, can be administered every three hours with advantage. The bowels should be opened as early as possible, and for this purpose, small doses of calomel, one-sixth or one-tenth of a grain should be given half hourly, with an occasional one-eighth or one-tenth grain dose of podophyllin. When the bowels have acted, they should be kept in a fairly soluble condition by salines; even threatening peritonitis should be met by saline purgation.

The drain tubes may be removed as soon as the discharges are perfectly sweet, and reduced to a minimum. After recovery, the site of operation should, for a time, be supported by a flat, thin buckskin pad, kept in position by a broad band around the body, in order to avoid the occurrence of hernia.

PROPHYLACTIC TREATMENT.

This paper would be very incomplete, and I should not do justice to the subject, if I close my remarks without referring to the mooted question of the removal of the appendix in the interval between acute attacks. In fact, I have long urged, indeed from my first writing on this subject, that recurring attacks of appendicitis should be an absolute indication for the removal of the appendix at this most convenient time. When we remember that the appendix, which has been the subject of former attacks of disease, is liable at any time to be involved in that most dangerous of acute affections, perforation of the organ and pericæcal abscess, and when such a seizure may take place where adequate medical skill cannot be had, it seems much safer to avoid the possibility of future trouble from this source, by getting rid of the appendix when its surroundings are free from active irritation. Objection is made, and very naturally, to such a radical operation as excision of the appendix, especially when the patient is in a favorable condition or has apparently recovered.

If, however, health has become impaired by one or more attacks of mild or serious seizures, and if these attacks have increased in fre-

quency, severity, or duration, the removal of the organ is clearly indicated. The premeditated operation permits the careful preparation of the patient. The incision should be made in the same line as previously described, but it need not be more than three inches in extent. All bleeding points should be ligatured with fine catgut, when the peritoneum is reached, and after the wound is quite free from blood or other fluid, the peritoneum is incised. The omentum or intestine will then present itself in the wound; rarely will the appendix be seen until the bowel is pressed aside to the right with the finger. It may be found partially or entirely attached to the cæcum or elsewhere; if so, the adhesion may be separated by the finger, and divided between double ligatures. The appendix may be quite free from mesentery, or, as I often observed, it may extend throughout its entire length; should this be the case, the meso-appendix is ligatured in portions and then cut through between the ligatures and the appendix; the latter is then cut off near its cæcal origin. If the stump be permitted to remain projecting from the cæcum, free it must be included in a ligature, and its extremity covered by peritoneum.

I originally, in 1889, called attention to the fact that the stump of the appendix could be readily inverted and completely invaginated into the cæcal cavity, hence all danger from it could be gotten rid of. The manipulation consists in grasping the stump with a forceps or probe, and pushing it into the cæcum; the peritoneum is then approximated over the inverted stump by four or five sutures, which retain it in the cæcum, and effectually prevent its subsequent prolapse. This having been accomplished, the peritoneum is then brought together by a row of interrupted deep sutures, and also the external muscle and skin. Drainage could only be required in very exceptional circumstances. The after treatment is simple; the bowels having been well opened before the operation, need not be disturbed for several days; the dressings may go untouched for a week or even longer, when the sutures should be removed.

IN CONCLUSION.

I have thus gone over, somewhat briefly, the subject of this paper, and have also presented some of the difficulties which I have experienced; such difficulties, however, can generally be overcome. The key to the situation is the diagnosis, which should lead the way to prompt surgical treatment; and finally, if I have not presented anything specially new or interesting, I hope at least that the discussion of such an important subject will prove to be not without some practical value.