Sands, (H. B.)

An Account of a Case in which Recovery took place after Laparotomy had been performed for Septic Peritonitis due to a Perforation of the Vermiform Appendix.

With Remarks upon this and Allied Diseases.

BY

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Washington
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AN ACCOUNT OF A CASE IN WHICH RECOVERY TOOK PLACE AFTER LAPAROTOMY HAD BEEN PERFORMED FOR SEPTIC PERITONITIS DUE TO A PERFORATION OF THE VERMIFORM APPENDIX.

*WITH REMARKS UPON THIS AND ALLIED DISEASES.**

By HENRY B. SANDS, M. D.,

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On the morning of Friday, December 30, 1887, I received a note from my friend, Dr. Simon Baruch, of this city, requesting me to meet him in consultation without delay. We met at noon, when I received the following account, which is here reproduced in Dr. Baruch's own words:

"I visited G. W., a boy eleven years old, at 8 A. M. on the 29th of December. He stated that he had been suffering pain in the lower abdominal region since the previous afternoon, but that during the night the pain had grown worse, and that he had vomited several times. His mother regarded it as an attack of acute indigestion. I found the right iliac region exquisitely tender to the touch, but the other portions of the abdomen, especially the left iliac region, only tender on deep pressure. Slight tympanites. Has not vomited since 4 A. M. Pulse, 120; respiration, 36; temperature, 102·4°.

* Read before the New York Surgical Society, February 8, 1888.

"*Diagnosis.*—Perityphlitis, and I gave the mother an unfavorable prognosis. Turpentine enema was ordered, and all food and drink withheld. Poultice to lower part of abdomen. Teaspoonful of U. S. P. solution of morphine every two hours if necessary for pain. At 1 P. M., pulse, 120; respiration, 30; temperature, 101·4. Has not required anodyne, pain being entirely relieved by poultice and emptying of lower bowel; ordered small quantities of beef-tea. At 8 P. M., temperature, 101·4°; pulse, 116; respiration, 30; comfortable.

"*December 30th.*—8 A. M., temperature, 101·6°; pulse, 130; respiration, 30. Has taken five ounces of beef-tea and two ounces and a half of milk, as there was neither nausea nor vomiting. Local tenderness not lessened, tympanites increased. Decided dullness on percussion over iliac region. Although there had been no pain, no vomiting, and patient expressed himself as decidedly more comfortable, the continuance of exquisite tenderness, together with the dullness over right iliac region, the increase of tympanites and pulse-rate, and the example of three previous fatal cases, induced me to believe that the time for action had arrived. I told the mother that as a surgical operation of serious nature might become necessary, I would like to have Dr. Sands to see patient at the earliest possible moment."

At the time of our first consultation the boy was quite ill with what was believed to be peritonitis. Pulse, 130; temperature, 101·6° F.; respiration, 32. Abdomen moderately distended and painful, the pain being most marked in the right iliac region, which was also exquisitely sensitive and slightly dull on percussion. Careful examination of this region failed to discover any tumor, nor could any swelling be felt when the forefinger was introduced into the rectum.

I diagnosticated the case as one of acute septic peritonitis, caused by perforation of the vermiform appendix, and advised an immediate resort to laparotomy. Dr. Baruch replied that, while he fully approved of my proposal, the family would be unwilling to consent to so serious an operation without further counsel, and it was accordingly agreed to make every necessary preparation for the procedure, and to ask Dr. Lange and Dr.

Bull to meet us in consultation at half-past three o'clock in the afternoon. Dr. Lange failed to come, but Dr. Bull saw the patient, and agreed with me as to the propriety of surgical intervention. He recommended at first an oblique incision above Poupart's ligament, such as is commonly made in opening perityphlitic abscesses. He felt inclined to evacuate the matter, if practicable, without laying open the general peritoneal cavity, which he said could be entered later, if necessary, by extending the incision, as he had recently done in a similar case. But I felt confident that the patient was suffering from septic perforative peritonitis, and that laparotomy would afford the only chance of cure; I therefore expressed my preference for opening the peritoneal cavity directly by means of a vertical incision through the abdominal wall, situated over the caput coli, because this would give easy access to the diseased parts, and allow more thorough work. Dr. Bull, after consideration, said that if I had made up my mind to perform laparotomy, the plan I had suggested would, he thought, be the best. Dr. Baruch also coincided with my proposal. At four o'clock in the afternoon, about forty-eight hours after the onset of the attack, with the assistance of Dr. Baruch and Dr. Hartley, and my pupil, Mr. Wiggins, I operated in the following manner:

Ether; vertical incision, four inches long, beginning at a point half an inch above and to the outer side of the middle of Poupart's ligament, and ending about the same distance below the level of the umbilicus. Incision afterward prolonged at its lower end three quarters of an inch inward parallel with Poupart's ligament. When the skin had been divided, the connective tissue was found œdematous, a fact which showed the intensity of the existing inflammation, and afforded a partial explanation of the dullness which had been noticed on percussion. The deeper layers, however, had a more natural appearance until the peritonæum was reached. This was thickened and opaque, and bulged into the wound like a piece of intestine. A hypodermic syringe inserted into it drew matter, whereupon the peritoneal cavity was laid open by a free incision. When a little air and about an ounce of fœtid pus had escaped, the diseased parts could be readily inspected. The parietal perito-

næum, and that covering the commencement of the large and the adjacent coils of the small intestine, were covered with pus and recent lymph. The peritonitis was not general, but there were no limiting adhesions between the intestinal convolutions, which separated spontaneously from one another and rolled out through the wound. The inflammation was evidently recent, spreading, and severe. When the iliac fossa was examined, a nearly spherical fæcal concretion, about a quarter of an inch in diameter, was found lying free in the peritoneal cavity, just below the cæcum. A similar concretion had partly escaped from an opening seen at the base or commencement of the vermiform appendix, the remainder of which, not gangrenous, lay upon the back part of the cæcum. The length of the appendix was about an inch and a half. When the fæcal concretion just referred to had been picked out with a forceps, another one escaped in a similar manner from the opening in the appendix, the margins of which were not gangrenous.* These were very slightly trimmed off with scissors, and then brought together with three interrupted silk sutures, both ends of each suture being cut off close to the knot. As the coats of the intestine were thick and rigid at the seat of perforation, and the serous membrane was covered with inflammatory exudation, I did not attempt to employ Lembert's suture, but united the edges by means of threads passed through the entire thickness of the gut. The diseased parts were next irrigated with warm water (at about 105° F.), and afterward syringed out with half a pint of a solution of mercuric bichloride, 1 to 1,000. Upper part of wound closed for an inch and a half by three silver sutures, embracing all the layers of the abdominal wall; the remainder lightly dusted with iodoform, and packed with iodoform gauze (50 per cent.), a piece of which was inserted between the parts sutured above and the coils of the small intestine, which were covered with lymph, and inclined to protrude. A few layers of moist bichloride gauze, a pad of borated cotton, and a gauze

* One of the concretions was saved and examined by Dr. Hartley, who found it to consist of ordinary fæcal matter containing what appeared to be disintegrated fruit-seeds.

bandage completed the dressing, which was left undisturbed for two days.

Immediate improvement followed the operation, the temperature fell to 98·5° within an hour, and no unfavorable symptoms occurred to interrupt convalescence. The pulse and temperature fell within a few hours to almost the normal standard, and the pain and vomiting disappeared. The iodoform gauze was all removed by the fifth day, but the dressings were renewed daily for three weeks, after which they were changed less often. The temperature rose on two occasions to 100°; at other times it was below 99°. The bowels were cleared out by a laxative on the eighth day, and afterward acted regularly. The sutured intestine remained closed, and the large wound, which scarcely suppurated at all, is now nearly healed, and there seems to be no tendency to hernia. The patient is shown to the society at the present meeting, because he is about to leave New York for his home in North Carolina.

NOTE.—A letter, dated February 20th, has been received from the patient, stating that the wound had entirely closed.

As the members are aware, laparotomy for peritonitis due to non-traumatic perforation of the stomach or intestine is a modern operation, the first one having been done by Mikulicz, who performed the operation in 1880,* and reported it in 1885. Weir, in 1887,† was able to collect only fifteen cases in which the operation had been performed for perforative lesions of the intestine not due to traumatic causes. More recently I have known or read of similar cases, but, as my present communication is not intended to be statistical, I do not report them. It may be well to state, however, that out of nine of the fifteen cases reported by Weir, the vermiform appendix was the seat of either perforation or gangrene, and of these, in four instances the disease of the appendix was not found until after death. A

* "Sammlung klinischer Vorträge," No. 262.

† "Med. Record," xxxi, 652.

case is also reported in which there existed a perforation of the cæcum. This was also unrecognized during life. In the remaining five cases the diseased appendix was found and removed at the time of operation. All the patients died except Hall's,* in whom, during an operation for a supposed strangulated hernia, the hernial sac was found to contain an appendix vermiformis which was the seat of a perforation caused by tubercular disease. The appendix was tied and cut off, the peritoneal cavity was exposed freely by extending the incision upward, and then thoroughly cleansed. The wound was drained by a rubber tube and filled with iodoform gauze, and the patient recovered. Hall's management of this case was judicious and skillful, and he certainly rescued his patient's life. But his discovery of the perforated appendix was accidental, and I am acquainted with no case like mine in which a perforative peritonitis, due to disease of the appendix, has been diagnosticated, and treated by laparotomy with a favorable result.

I avail myself of the present opportunity to discuss the surgical treatment of certain inflammatory affections originating in the right iliac fossa—namely, those which proceed from disease of the cæcum or its appendix. The subject is one of growing importance, and the surgical treatment of the diseases mentioned has been greatly improved in recent times. Nevertheless, there are some current notions concerning their morbid anatomy and treatment which appear to me to be erroneous, and which I am anxious to correct. My studies in this direction began early, and antedate the time when Parker performed his well-known operation for perityphlitis in 1866. Before this was done I made, at his request, a number of dissections in order to ascertain how the cæcum and appendix could be approached with the least danger of wounding the peritonæum, and found, as would

* "N. Y. Med. Jour.," vol. xliii, p. 662.

naturally be imagined, that these parts could be most safely reached by raising the peritoneal bag from the iliac fascia, as is usually done before tying the iliac arteries. But, for reasons I shall presently give, this plan was not adopted by him in his operations. In common with other surgeons, I have for many years past followed the method which he recommended, and have had reason to be satisfied with it while endeavoring to open perityphlitic abscesses at the usual period, when they have reached a certain size and position. But if very early operations—that is to say, within the first two or three days—are undertaken, I should think it would be preferable to proceed in the manner I have above mentioned, which I will try later to describe.

In 1880 * I published an article on perityphlitis which gave the views I then entertained respecting that disease, and which contained an account of twenty-six cases I had either treated myself or had seen in consultation. Since that time my experience in this class of affections has been much larger than before, but how large I am unable to say, for I have been busy, and have neglected to keep a record of what I have observed. I regret this more especially because I have always found my own experience to be far more serviceable to me than that of others. I do not mean that it is of greater value intrinsically, but it is more valuable to me as a means of arriving at the truth. I freely admit the importance of statistics when accurately compiled, but I have so often found them misleading, if not absurd, that I am apt to regard them with suspicion. They are too often gathered by persons who have had only a very limited personal experience in the subject about which they write, and who fall into the easy error of putting under the same heading things so essentially different from one another that

* "Notes on Perityphlitis," "Annals of the Anat. and Surg. Soc.," Brooklyn, vol. ii, p. 249.

they are entirely unfit for purposes of comparison. Their numbers seem tempting, and not infrequently deceive both the author and the reader; but the conclusions reached, though at first sight convincing, are ascertained, when the statistics are carefully examined, to have a foundation which is insecure. Although, for the reasons I have given, I have no figures to present, having none of my own and not feeling competent to deal with the figures of others, I venture to express some views which I have been led to adopt after considerable study and experience, and which I believe to be in accordance with our present state of knowledge concerning a topic which is still involved in some obscurity.

In speaking of inflammatory affections occupying the iliac fossa, I desire to restrict my remarks to those morbid conditions which are dependent on disease of the cæcum or its appendix. Those who desire to obtain information of a more general character would do well to read an admirable essay entitled "Iliac Phlegmons," written by Matas, and published in the "New Orleans Medical and Surgical Journal" for 1886. Unfortunately, inflammatory diseases originating in the cæcum or the vermiform appendix are both common and dangerous. Furthermore, it has been well established that perforations of the cæcum are extremely rare as compared with those of the appendix.

I shall use the word perityphlitis in its broader sense, including under that designation all inflammatory processes starting from the cæcum or vermiform appendix which lead to the development of a circumscribed tumor. Cases in which ulceration or gangrene causes a slowly spreading septic peritonitis, as well as those in which acute peritonitis is set up by the direct entrance of fæces into the peritoneal cavity, belong to a separate category, and should be considered by themselves. Indeed, the latter are described by most writers as constituting a distinct class, and are termed

cases of perforative peritonitis. The words typhlitis, paratyphlitis, and perityphlitis (when the latter is employed, as recommended by Virchow, to denote an inflammation of the serous membrane covering the cæcum) have, perhaps, an etymological and pathological importance, but I have never found them to possess much clinical value, and have therefore ceased to employ them. In practice I have learned to distinguish four varieties of allied disorders, which I will now endeavor to describe.

First, there is a kind of perityphlitis which is characterized by the fact that the inflammatory tumor disappears by resolution. Pain in the abdomen, usually most marked on he right side, the presence of a tender, deep-seated lump in the right iliac fossa, fever, and sometimes nausea and vomiting, are the common symptoms. The tumor may become large, and may perhaps be felt through the rectum. Sometimes the tumor extends downward into the true pelvis, at other times it is situated considerably above Poupart's ligament; sometimes it lies in the track of the cæcum, at other times to the inner or outer side of it; its usual situation corresponds with that of the cæcum itself, which is generally resonant on percussion, and can be appreciated as lying in front of it. In rare cases the tumor can be made out to actually involve the cæcum, when the resonance just mentioned is occasionally absent. Cases thus characterized by their termination in resolution often present mild symptoms, but the latter are frequently acute, especially during the first few days after the onset. Under suitable treatment the disease generally disappears after the lapse of a week, but now and then resolution is much longer delayed. I have recorded a case in which such a tumor persisted for a period of five months, and then subsided apparently by resolution.

Respecting the pathology of this class of cases we are

obliged for the most part to speculate, because, unless the patient dies from some other cause during the course of the malady, we can learn little or nothing about it by examination post mortem. Nevertheless, our speculations may not be unprofitable, as there are some well-established facts to guide us.

It will, perhaps, be useful to consider first those rare examples of the disease in which perityphlitis is due to fæcal impaction, or to the presence of foreign bodies, or of irritating substances in the caput coli. Generally an accumulation of fæces in the cæcum gives rise to no inflammatory action, as every surgeon knows who has seen many persons suffering from chronic stricture of the rectum or colon. Often in these instances both the large and the small intestine may be distended with fæces without causing any but mechanical symptoms due to pressure. Simple fæcal impaction of the cæcum has been so extremely rare in my experience that for a long time I made the mistake of doubting its existence. It may be sometimes diagnosticated by the doughy resistance of the tumor, and by the absence of the resonance usually present in the early stage of the other varieties of perityphlitis, or by the persistence of a tumor after the inflammatory symptoms have subsided. For this condition, as well as for the morbid state in which irritating matters of whatever nature reside in the cæcum, a cathartic is said to be the proper remedy, and this is perhaps true. But, when the diagnosis is at all doubtful, I believe it is a better plan to defer the administration of laxatives until the inflammation has subsided under the use of opium and local applications. This will probably happen if the disease is owing to impaction, while, as we all know, mischief often results from giving cathartics when no real impaction exists.

But, as I have stated, inflammatory tumors of the class

referred to are seldom due to fæcal impaction of the cæcum, and some other cause must be invoked to explain their formation. And here I am inclined to view the appendix, rather than the cæcum itself, as the source of the trouble. We know that the appendix is far more commonly diseased than was formerly believed, and Toft declares that this organ is found to be unhealthy in thirty-six per cent. of all persons examined after death. A strong argument in favor of the frequent origin of mild cases of perityphlitis in the appendix is afforded by the familiar instances in which the disease is several times repeated at intervals of months or years and finally excites an abscess, from which one or more fæcal concretions, evidently derived from the appendix, are discharged. Such cases must have been seen by nearly every surgeon, and one can not avoid the conclusion that the successive attacks are identical in origin, and have all been caused by the irritation of one or more concretions in the appendix, which, having set up repeated mild processes of inflammation, at last gave rise to suppuration. Such an explanation would appear to be more rational than the view which has been advanced that cæcal irritations cause non-suppurative inflammations, while diseases of the appendix cause abscess.

Another circumstance indicating the frequent origin of this variety of perityphlitis in the appendix is the locality of the inflammatory tumor. As has been observed, this is usually situated behind the cæcum, but it varies considerably in position, being sometimes below this division of the intestine, even within the pelvic cavity, and at other times on one side of it, either the inner or the outer. Occasionally I have found the tumor high up and toward the median line. Now, these variations in the situation of the perityphlitic swelling correspond closely with the anatomical variations which have been ascertained to affect the ap-

pendix itself. As a rule, it springs from the lower and back part of the cæcum, behind which it lies curled upward, its length usually being in the adult from three to five inches; but it has been found as short as one inch and as long as nine inches. Moreover, it may arise from the inner or the outer side of the cæcum, and, instead of running behind the latter, may occupy a lateral position. Finally, it may be directed downward toward or even beyond the brim of the pelvis. Now, the correspondence between the several positions of perityphlitic swellings and the anatomical variations in the situation of the appendix is certainly remarkable, and suggests that the relationship described may be intimate and causative.

But, however we may explain the pathology of this class of cases, it is certain that they are of frequent occurrence. I was once told by an eminent surgeon that he had never met with a case of perityphlitis which terminated by resolution. I am unable to reconcile his experience with my own, and think that his must have been either small or exceptional, for I have seen almost as many examples of this kind as of any other. Furthermore, I have often sought for information on this point from busy medical practitioners, many of whom have testified that such cases were, in their experience, the rule, suppuration being the exception. All, however, acknowledged that they were common. Unfortunately, we are unable to distinguish this class of cases from those that are destined to go on to suppuration, but the recognition of them is surely important when the question of very early operation presents itself for consideration. As bearing on this point, it is well to remember that, although cases of perityphlitis which afterward end in resolution usually pursue a mild course, they are often attended with acute and threatening symptoms during the first two or three days—a fact which may be

fairly ascribed to the existence of a localized adhesive peritonitis.

The second group of cases I have observed in practice are those which issue in the formation of a circumscribed abscess. I am unacquainted with any means short of mechanical exploration by which we can at an early period discriminate these cases from the ones belonging to the first class. According to my experience, the lapse of a week is generally required before the diagnosis in this respect begins to clear up. After that time has passed I am accustomed to see matters growing either better or worse, and in the latter case I suspect an abscess has formed. Such abscesses, I have taught for many years, are extra-peritoneal. I have so fully dwelt upon this topic elsewhere that I should avoid allusion to it on the present occasion if I were not convinced of the high importance of holding correct anatomical views in the event of resorting to what are termed early operations. But, inasmuch as the question has a practical side, and since it has been maintained in this society * that, as a rule, perityphlitic abscesses are intraperitoneal, I must endeavor to show that such is not the case. Whether, in the very beginning, such abscesses are sometimes intraperitoneal is a point I do not wish to consider, as it is irrelevant to the present discussion. But I contend that what we all recognize as a perityphlitic abscess is situated outside of the peritonæum. Neither do I mean to assert that circumscribed peritoneal abscesses are unknown, for I have seen such purulent collections, and they have been carefully described by Grisolle and other writers. What I wish to say is that they are rare. The usual course

* Weir, "A Plea for Earlier Operations in Perityphlitic Abscesses," etc., "Med. Record," vol. xxxi, p. 653. Weir seems to base his opinion on two authors, namely, With and Fitz. I have examined carefully the writings of both, but have failed to discover any evidence.

taken by the pus formed in a perityphlitic abscess is as follows: It is found at an early stage in the lax connective tissue that lies between the iliac fascia and the peritonæum adjacent to the cæcum and appendix. Meanwhile the peritoneal cavity is shut off and defended by adhesions which have taken place between the cæcum and appendix on the one hand and the peritonæum lining the iliac fascia on the other. Were it not for this, general septic peritonitis would certainly ensue. Supposing the matter to occupy at first the situation mentioned, its subsequent progress is easily understood when we keep in mind the relations of the loose connective tissue above mentioned. As the pus increases in quantity it generally descends along the iliac fossa and strips up the peritonæum, which is here very loosely attached to the iliac fascia. The serous membrane is thus made to cover the front and sides of the advancing abscess, and it plays an important part by protecting from infection the general peritoneal cavity. Should the abscess continue to increase after it has reached the level of Poupart's ligament, it will usually be prevented from passing down upon the thigh by the firm union which exists between the fascia iliaca with the fascia transversalis, and will, if the abscess points, most likely come to the surface above Poupart's ligament, the matter being situated, as will be noticed, between the fascia transversalis in front and the peritonæum behind. Often, as we know, the course taken by the pus is not that which has been described. It may pass down into the pelvis toward the rectum or across toward the opposite side of the body, or upward toward the kidney. Sometimes it reaches the diaphragm, which it may perforate, thereby entering the chest, and occasionally it ascends behind along the psoas muscle. These remote extensions of the abscess are often seen in neglected cases. Now, it should be observed in this connection that the burrowing is

favored, and the course taken by the matter is often determined according to well-established anatomical peculiarities, the retroperitoneal tissue being lax and abundant, and therefore easily invaded. But in no one of these cases does the peritonæum give way. When it does, and the contents of the abscess enter the serous cavity, death from acute septic peritonitis is almost inevitable. But such an accident is more often spoken of than seen, and it has never yet occurred to me in the course of my practice. Time will not allow me to discuss this question further, and this is perhaps unnecessary, because I feel sure that my views are accurate, having often had occasion to verify them at post-mortem examinations. To render my explanation clear, I have caused to be prepared the accompanying diagrams, and I append, for the instruction of any who may be in doubt upon this point, a list of works in which conclusive evidence can be obtained. The question is not one of opinion merely, but has been settled by anatomical demonstration.*

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* In the discussion which followed the reading of the paper, Dr. Bull, who argued that perityphlitic abscesses were situated within the peritonæum, remarked that my references would probably only show how an erroneous opinion was apt to be handed down and copied without discrimination. It may be proper to state, therefore, that twelve of the authorities given offer evidence obtained by examinations made after death. Moreover, Dr. Bull will be found among the authors I have cited as holding the same view as the one I have advocated as correct.

1. Dupuytren, "Leçons orales," Paris, 1833, tome iii, p. 341.
2. Burne, "Med.-chir. Transact.," London, 1837, vol. xx, p. 222.
3. Grisolle, "Archives générales," 1839, tome 49, p. 162.
4. Sands, "Med. Record," vol. xiii, p. 56.
5. Hun, "N. Y. Med. Journal," vol. viii, p. 630.
6. Otis, *ibid.*, vol. xxvii, p. 527.
7. Wynkoop, "Trans. of the N. Y. Path. Soc.," vol. ii, p. 40.
8. Wakeman, *ibid.*, p. 66.

I have insisted upon the extraperitoneal situation of these abscesses, because if the fact is ignored or denied the dangerous mistake of cutting into the peritoneal cavity when they are incised will be of frequent occurrence. Prudent surgeons take scrupulous care to avoid this error.

Concerning the treatment of this class of cases, I wish to confine my present remarks to the consideration of a single inquiry, namely, When is the best time to operate? The question is not so simple as some are disposed to think, and I should say that no rule could be laid down which should be applied to all cases. Those who are vehement in their advocacy of surgical interference at a very early period *—that is to say, within the first two or three days of the disease—and who religiously obey the dogma "*Ubi pus ibi evacua*," seem to overlook the fact that by strictly carrying out one principle they may be violating another of equal importance. The question presents more than one aspect for consideration, and is worthy of deliberate examination.

In the first place, I ought to state that I have been un-

9. Kelsey, "Am. Jour. of the Med. Sci.," 1878, vol. ii, p. 85.

10. "Nouveau dict. de médecine," 1844, tome xxxvi, p. 467.

11. "Dict. encyclopédique," 1 série, tome xi, p. 476.

12. Oppolzer, "Wien. med. Wochenschrift," 1863, Band 13, S. 81.

13. Heineke, "Handbuch der Chirurgie," Pitha und Billroth, Bd. iii, Abt. ii, Lief. ii, S. 25.

14. Bull, "N. Y. Med. Jour.," vol. xviii, pp. 242, 248.

15. Gerster, "Aseptic and Antiseptic Surgery," New York, 1888, p. 247.

16. Bardenheuer, "Mittheilungen aus dem Kölner Bürger-Hospital," Köln, 1887, viertes Heft, S. 83.

17. Matas, *op. cit.*, p. 9.

18. Koenig, "Lehrbuch der speciellen Chirurgie," vierte Auflage, Band 2, S. 154.

19. Follin, "Pathologie externe," tome 5, p. 787.

20. Tillaux, "Traité d'anat. topog.," Paris, 1877, p. 760.

* Bull, "Med. Record," vol. xxix, p. 265; Weir, *op. cit.*

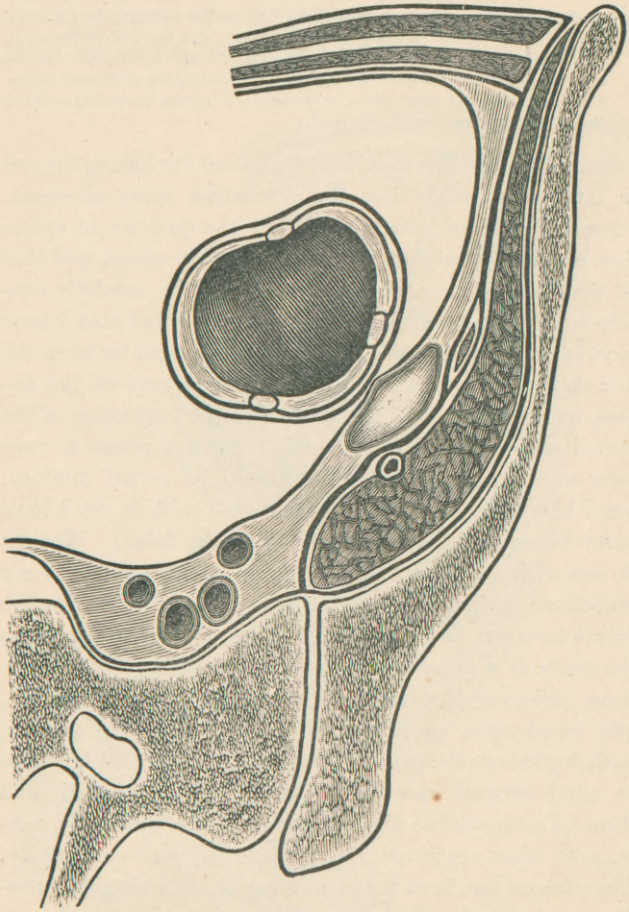

FIG. 1.

Each one of the figures represents a horizontal transverse section of th right side of the pelvis, including the cæcum. A drawing by Tillaux was employed as a model. I should have preferred a vertical section; nevertheless, the figures will convey my meaning. In Fig. 1 an incipient abscess is shown; Fig. 2 and Fig. 3 illustrate a more advanced stage of the disease, the

abscess having reached the anterior abdominal wall. In Fig. 2 the peritonæum is seen to have been pushed aside from the abscess; in Fig. 3 the abscess is represented as being covered in front by a layer of peritonæum, which is in contact with that lining the anterior abdominal wall. In the last case incision of the abscess would involve opening the peritoneal cavity, unless adhesion had taken place, or the pouch of serous membrane could be dissected away from the abscess-wall.

fortunately misunderstood and criticised for having argued in favor of a fixed time for evacuating these abscesses, whereas I have said distinctly "that the question of operation is one that can not be settled by time alone, and that all the circumstances of the case should be carefully considered."* In reviewing my experience, I find that I have most often opened such abscesses at some time between the first and second week after the commencement of the disease, and rather toward the end than the beginning of the period referred to. By those who advise a resort to very early exploration, such practice would be called dilatory, but I have good reason to be satisfied with it, for I have never known any harm to come from the delay. While I do not wish to put myself on record as unqualified in my objections against early operations, since these may in the future turn out to be expedient, I am obliged to deprecate the methods at present advocated of making early explorations, believing that they are premature, dangerous to life, and based upon an erroneous conception of the existing pathological conditions. A clear distinction should be borne in mind between cases of general septic peritonitis and those of perityphlitic abscess, which, as we well know, rarely, even when neglected, rupture into the peritoneal cavity. This danger has been urged in favor of early surgical interference, but it has been much exaggerated, and, as I have already remarked, such an accident has never come within my personal experience. Moreover, while it may readily

* "Annals Anat. and Surg. Soc.," Brooklyn, 1880, ii, 256.

be shown that perforation of the appendix often leads to fatal suppuration after the lapse of three or four days, this is not true unless the peritoneal cavity is directly invaded.

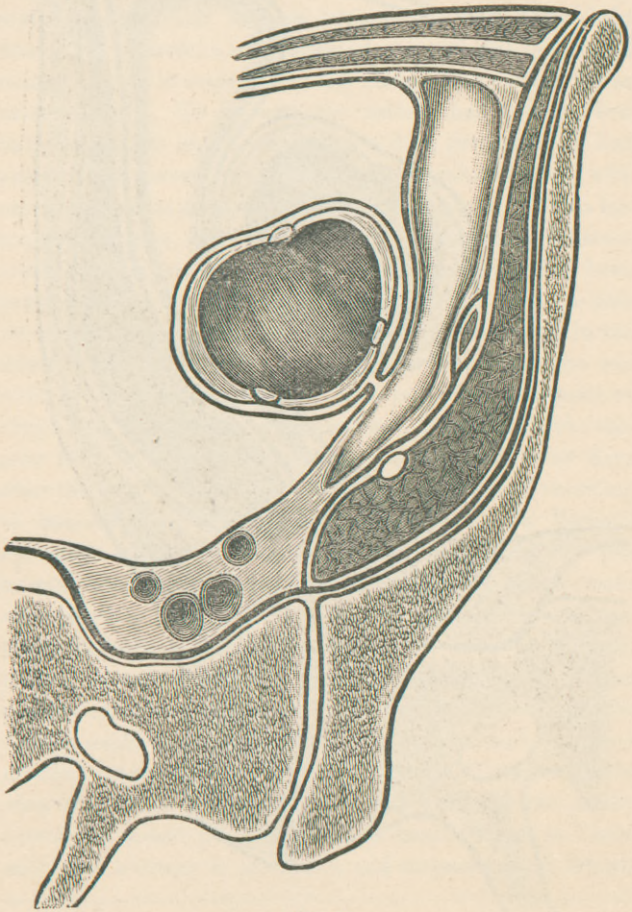

Fig. 2.

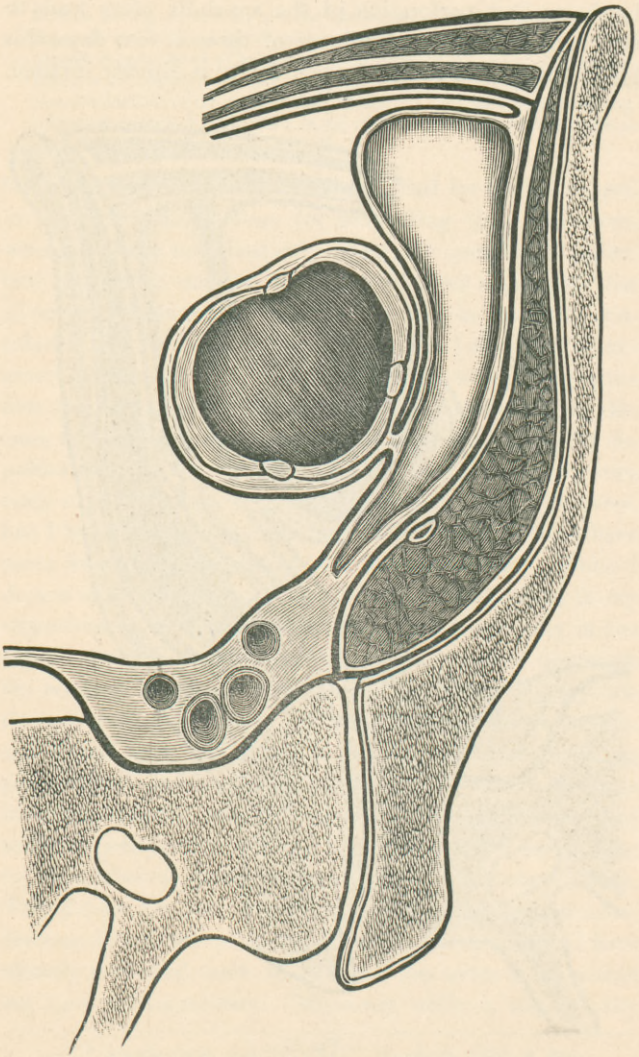

FIG. 3.

In cases of perityphlitic or retroperitoneal abscess I have never known one of large size to form in less than ten days, and usually a much longer time is required. Bull * has reported a case in which he maintains that he opened a deep-seated perityphlitic abscess within the first forty-eight hours, but a careful examination of the patient's history, as related, makes it evident that the disease had existed for at least ten days. To be sure, the patient had been in bed only forty-eight hours, but "for ten days previously he had experienced a steady dull pain in the inguinal region, with occasional paroxysms which were more severe." This latter circumstance, when coupled with the subsequent discovery of an abscess, makes it clear that the disease had been going on all this time unrecognized. The fact that the man during this period had been able to travel and be up in the day-time is not unusual, and does not prove that he was well. If what I believe to be true regarding the mode of origin and progress of these abscesses is admitted, the reasons for postponing mechanical procedures for some days after the commencement of the disease, instead of resorting to immediate operation, must be obvious. In Parker's operation, which is the one generally performed, the pus is evacuated by cutting through the fascia transversalis and the parts superficial to it a short distance above Poupart's ligament. Now, this can not be done at an early period, because at that time the peritonæum, being neither pushed aside nor adherent, would be wounded before the abscess could be opened; and such an accident is always avoided by careful operators. Of course, if we adopt the view that these abscesses are situated within the peritonæum, we should proceed with less caution; but, as I have said, such a theory is untenable, and surgeons, with few ex-

* Bull, *op. cit.*, p. 265.

ceptions, regard intraperitoneal incisions as unsafe. What difficulties may be encountered when operations are carelessly performed may be illustrated by an account of a case which occurred last summer in one of the largest hospitals in New York. It does not appear in the history-book, but a credible eye-witness of the operation has been good enough to furnish me with the following narrative: A male patient was admitted suffering with abdominal pain, nausea, and vomiting. The right iliac region was tender, and in it was detected a small indurated swelling, very deeply situated. The swelling became more distinct and larger by the fifth day, when, upon introducing an aspirating needle above Poupart's ligament, fœtid pus was discovered at the depth of four inches. An incision was then made over the tumor, and when the sac of the abscess was thought to be reached the needle was withdrawn. But when the supposed abscess was cut into, it turned out to be a piece of intestine which overlay the abscess, and which had been transfixed by the needle. An artificial anus was established and the abscess was opened and drained alongside the wounded intestine, but the patient died five days afterward with symptoms of peritonitis. There was no autopsy.

Similar objections may be raised against an early or indiscriminate resort to an aspirating needle when employed with the hope of detecting the presence of pus. I have elsewhere advocated the use of this instrument as a valuable means of diagnosis in doubtful cases, but I am always apprehensive when I introduce it deeply, and I never employ it in the early stage of perityphlitis, because I am afraid of infecting the peritonæum. This is a real danger, although its existence has been doubted. The risk is also much greater when large needles are inserted, as has been recommended.* Recently Roosevelt has reported an instance in

* Bull, *op. cit.*, p. 265.

which a competent surgeon caused fatal peritonitis by accidentally perforating the diaphragm with an aspirating needle used in a case of empyema.* And a similar risk undoubtedly exists of infecting the peritonæum in cases of perityphlitis if the exploring needle is employed at a very early period. It may be impossible to puncture the abscess without previously perforating the peritonæum or the intestine, and the former may be contaminated either by the contents of the abscess or of the intestine. A case in which death from the cause first mentioned took place has been related by Gerster,† who condemns the early use of the exploring needle in the disease under consideration. I am inclined to discourage such explorations, because I fear that they are becoming dangerously frequent. If it is taught with authority that they are absolutely safe, they will certainly be resorted to by many inexperienced practitioners, who may wish to make a quick and easy diagnosis. I was once called to see an eminent physician who had been punctured in the manner described, but, as no pus was found, he was treated with medicine and got well. Fortunately, no harm came from the exploration, which seems to me to have been unnecessary and reckless.

Even when the exploring needle is employed late the peritonæum may be wounded before the cavity of the abscess is reached, provided the puncture is made in front and in the usual situation. I have done this and have seen it done so often that I have ceased to regard the detection of pus with an aspirator as an indication that the abscess can be reached in the ordinary way without endangering the serous membrane. The old rule of keeping the needle *in situ* in order that it may serve as a guide to the knife

* "N. Y. Med. Jour.," xlvii, 49.

† Gerster, *op. cit.*, p. 248.

should be followed with great caution. In case the peritonæum is found and is non-adherent, the needle should be withdrawn, and, unless the serous membrane can be got out of the way, the opening of the abscess should be deferred until adhesions have taken place. If the peritonæum has been torn, as it sometimes is, in consequence of the movements of the needle, the rent should be carefully disinfected and closed by sutures, provided, of course, the abscess does not leak. The simultaneous incision into the peritoneal cavity and the cavity of the abscess would, in my judgment, be a blunder, as it would then be difficult to prevent the occurrence of septic peritonitis. Under the circumstances described I have repeatedly found that, if left without further operation, the abscess would subsequently burst into the wound. Within the past few months I have had two such cases, which may be cited by way of illustration. Last October I operated, in consultation with Dr. John B. McIntyre, of this city, upon a patient who had a large perityphlitic swelling. No needle was used, but, feeling certain that a large abscess existed, I made the usual incision, hoping to reach it with safety. But the peritonæum was found to be lying upon the wall of the abscess, over which it could be freely slid, whereupon I abandoned further operation, and, having stuffed the wound with iodoform gauze, directed the application of a carbolized flaxseed poultice. At the time of the operation the man was very ill, and I feared he might die unrelieved. Forty-three hours later, however, the abscess ruptured into the wound, and he afterward made a speedy recovery. Last December I operated in the same manner upon a woman I saw with Dr. Robert J. Devlin. In this case the abscess did not break into the wound until thirty-one days after the operation, and during this interval no opportunity was afforded of safely incising the abscess, which appeared to be deeply

seated. But no harm came from the delay beyond the postponement of the desired relief.

From what has been said it will be seen that I am opposed to explorations and incisions within the first two or three days, as these are recommended to be performed. My experience has taught me that often in cases of perityphlitis operations of any sort are unnecessary, and that even when an abscess has formed, some dangers may be avoided by deferring the operation of incision until it has made a certain progress and reached a situation where it can be readily opened. But I have no desire to dogmatize, and I am not at all confident that the practice I have thus far followed will finally prove to be the best. I admit that delay is attended with risk, although the latter has been, in my opinion, considerably magnified, and I should strenuously urge the immediate evacuation of a fæcal abscess situated in the vicinity of the peritoneal cavity if this could be done safely. If, without employing dangerous methods of diagnosis, we shall ever be able to determine with precision the presence of such an abscess, I believe it will be found expedient to open it forthwith. But, under these circumstances, I should perform an operation with the expectation of discovering the abscess somewhere behind the peritonæum, deep in the iliac fossa, and I should take particular pains to leave the serous cavity undisturbed. I would endeavor to raise the peritonæum from the iliac fossa and approach the cæcum on its posterior aspect, as I did in the above-mentioned experiments which I made in 1865 for Dr. Parker. This I have never done in the living subject, but I believe it to be feasible, and Bardenheuer states that he has operated successfully in this manner in cases of chronic perityphlitis.

The third set of cases I have seen are of the kind exemplified by the subject of the present paper. Although

occasionally confounded with perityphlitis, they are not cases of perityphlitis at all, as we usually understand that word, but of perforative peritonitis, due to the direct escape of fæcal matters from the perforated appendix into the peritoneal cavity. They are familiar to every practitioner, and differ from perityphlitis in their pathological anatomy, symptoms, and treatment. The essential feature in their morbid anatomy is the immediate invasion of the serous cavity by fæcal matters, and the consequent occurrence of septic general peritonitis. The symptoms are usually characteristic. As a rule, the onset of the attack is sudden and severe, and signs of collapse frequently appear in the course of forty-eight hours. Without attempting to give a minute description of the disease, I will say that I recognize it chiefly by the presence of symptoms of acute peritonitis, starting from the right iliac fossa, not accompanied with a hard, circumscribed swelling, such as we expect to find in perityphlitis. As some one has pithily remarked, there is in these cases "tumefaction, but no tumor"; and, in forming an opinion, I depend upon the absence of a tumor in the cæcal region as the strongest point in diagnosis. Of course, the rectum should be explored in every doubtful case, because a retroperitoneal abscess sometimes forms within the true pelvis. It is proper also to bear in mind that in rare instances a perityphlitic swelling may be inaccessible to the touch, as it sometimes is when it lies near the kidney, or on the psoas magnus muscle. But, when the diagnosis of perforative peritonitis is established, an operation, such as I performed on the patient now exhibited, is clearly indicated. Nor can it be done too early, because life is generally lost through procrastination. It must be undertaken before the septic infection has spread throughout the peritonæum. I think that success in my case was due to a fortunate combination of circumstances.

The patient was seen early by a gentleman who appreciated the necessity of obtaining surgical advice without delay; the appendix was perforated in only one place, and was not gangrenous; and the operation was satisfactorily and expeditiously completed, without much handling or exposure of the intestine. But I fail to see anything in the case which ought to make us doubt that many like examples of recovery will soon be reported. I have witnessed many deaths from this disease, because its nature was not recognized soon enough to render it probable that the operation would be attended with any benefit. But, if surgical aid could be made available in time, many lives would surely be preserved.

The method of operation which I adopted seems to me deserving of recommendation. The vertical incision over the cæcum I believe to be the best, because it affords the easiest access to the parts presumed to be diseased. When the abdomen is opened in the median line, the cæcum and appendix are not so readily got at, and it has even happened during operations thus conducted that existing perforations of the appendix have been entirely overlooked, thus permitting the sufferer to die unrelieved. An oblique incision, running just above and parallel to Poupart's ligament, is, even when extended upward, highly objectionable in these cases. Such an incision will enable the operator to explore the iliac fossa and the back of the cæcum, and, when the appendix is situated in a retroperitoneal abscess cavity, to remove it, if necessary. But it affords only a scanty and imperfect access to the abdominal cavity, which, when opened at all, should be exposed by an incision that will facilitate the subsequent important steps of the operation. It is therefore very desirable that the surgeon should decide beforehand whether laparotomy is likely to be required, and not start on a voyage of discovery likely to end in disaster.

Hot water was used by me to clean out the peritoneal cavity, and disinfection was afterward undertaken with a moderate quantity of a strong solution of mercuric bichloride, 1 to 1,000. A small part only of the wound was closed with sutures, used to prevent the intestine from protruding; the remainder was lightly dusted with iodoform and stuffed with iodoform gauze. These details of practice are, perhaps, important.

Laparotomy, performed in the manner described, may be said to be the ideal method of exposing and dealing with the appendix; and, if subsequent experience should demonstrate the procedure to be free from danger, it may prove to be the best plan to do this operation early in all cases of disease here located. But, with our present limited knowledge, it would be presumptuous for me to express a definite opinion on this interesting point.

The fourth class of cases I have met with are characterized by their obscurity, the symptoms being indefinite and deceptive. The disease may come on slowly and insidiously, or the onset may be marked by a chill, vomiting and sharp pain. But the acute symptoms, when they occur, may subside, and the improvement which follows allays apprehension. The pain may be only moderate in degree, and may not radiate from the cæcal region. The latter may not be very tender, and there is no tumor. The temperature may remain normal, and the pulse may be only slightly accelerated. The bowels may act naturally, but are generally constipated. For a while the symptoms are obscure, and the diagnosis is difficult. But the improvement is of short duration. After a few days the patient's condition becomes serious and excites alarm. Comfort has been obtained, perhaps, by the use of opium, but gradually increasing abdominal tenderness and distension make us suspect general peritonitis. Stercoraceous vomiting occasionally occurs, sug-

gesting the possible existence of mechanical intestinal obstruction. At the end of a week or ten days the heart's action begins to fail rapidly, hiccough, cold sweating, and perhaps delirium set in, and the patient sinks into a state of fatal collapse.

When, in such cases, an opportunity is afforded of examining the body after death, the mischief is seen to have originated in the vermiform appendix, which is usually perforated in one or more places, and which is frequently more or less completely gangrenous. Adhesions often exist, but they have not proved conservative, and the morbid process has evidently been one of slowly advancing septic peritonitis, which usually affects, by the time death arrives, the entire serous membrane. No large, circumscribed abscess is present, but pus and often fæcal matter are found between the intestinal coils, which, particularly in the vicinity of the cæcum and appendix, are glued together, as if nature had made an unsuccessful attempt to prevent the spread of septic contagion.

Cases of this kind are very unsatisfactory, inasmuch as we can not avoid feeling that life has perhaps been unnecessarily sacrificed. Had an accurate diagnosis been made at the start, the offending appendix might have been sutured or removed, and general peritonitis thereby prevented. It is in this class of cases, as well as in cases of acute perforative peritonitis, that an early operation is desirable, if not imperative. But laparotomy is the only operation that holds out any prospect of a radical cure, and I should recommend it to be tried at a very early period in cases which belong to this last variety. Weir has proposed the use of the aspirating needle as a means of diagnosis in this form of disease, and his proposal is, I think, a good one.

Finally, it may be proper at this time to state emphatically that all the diseases to which I have referred are sur-

gical cases from their beginning, and that surgeons alone are competent to decide whether operations are expedient, and to perform them, when necessary, at the right time and in the right manner. A man who devotes his attention to internal medicine alone is generally ignorant of the resources of surgery, and is apt to put off sending for a surgeon until drugs have failed to cure. Then, when a consultation is held, the disease may already have done its fatal work. Opium is a remedy of unquestionable value, but it often serves only to comfort the patient, and to lull all parties concerned into a false security. In the course of my practice I have seen many an unfortunate human being dosed to death, when his life might have been saved by prompt and skillful surgical help.

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