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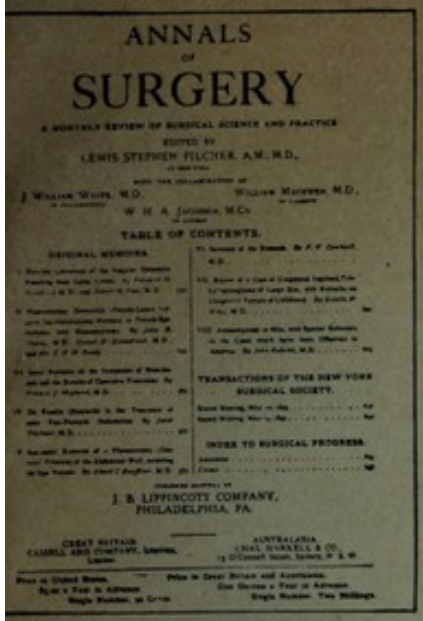
ANNALS
OF
SURGERY

A MONTHLY REVIEW OF SURGICAL SCIENCE AND PRACTICE

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Foreign Bodies accidentally Left in the Abdominal Cavity.

WITH REPORT OF ONE HUNDRED AND FIFTY-FIVE CASES.

BY AUGUST SCHACHNER, M.D.,

OF LOUISVILLE, KY.,

Professor of Surgery in the Louisville Medical College.

FOREIGN BODIES ACCIDENTALLY LEFT IN THE ABDOMINAL CAVITY.

WITH REPORT OF ONE HUNDRED AND FIFTY-FIVE CASES.[1]

By AUGUST SCHACHNER, M.D.,

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It is a surgical axiom that so long as surgery continues as an art, just so long will foreign substances continue to be unintentionally left in the abdominal cavity. While it may seem questionable to say that no amount of carefulness will entirely exclude all possibility of this accident, we have but to study closely the accidents herein recorded, and the manner of their occurrence, to be convinced of the correctness of this statement. In fact, if we study the subject fairly, and admitting that the accident occurs more frequently than the reports casually observed would lead us to believe, it is after all remarkable that they are of such comparatively rare occurrence.

Although the vast majority of operative procedures are deliberately planned and systematically executed, there are numerous occasions where the most carefully devised plans require almost instantaneous revision, testing to the utmost the coolness, clearness, and resourcefulness of the operator. For this reason it is surprising that during such rapid and radical change of plans accidents do not occur more frequently, and the necessity of a thorough organization along simple lines becomes singularly apparent.

The urgency for a more uniform understanding of the rules regulating this accident grows more imperative as we

[1] Read in abstract before the Louisville Surgical Society, June 10, 1901.

realize the frequency of its occurrence. Statistics, although supplying an astonishing number and variety of such accidents, by no means represent the true status of the question. In the preparation of this memoir, instances were observed where the truth was withheld, representing one source of fallacy. Another and greater source of fallacy is represented by the fact that a percentage of our deaths is due to this accident; and the fact is never realized, because the smallest number of deaths are followed by post-mortem investigations.

A careful digest of the appended cases reveals examples illustrating most beautifully the patience and resources of nature in satisfactorily dealing, unaided, with the most difficult problems in connection with the disposal of a foreign substance when left in the abdominal cavity.

In the collection of these cases a number of instances were noted where the presence of the foreign body was recognized directly after, or a very few hours after, the operation. These cases were intentionally withheld from the author's list as not being rightfully entitled to be mentioned as forgotten foreign bodies in the sense in which that expression is usually employed.

The recording of letters was also restricted to those containing the report of a case or some suggestion bearing upon the prevention of the occurrence of this accident. While instances were noted of the suppression of facts, the correspondence as a whole represented a display of courage and frankness that was indeed refreshing.

Pathological Changes. — In studying the pathological changes resulting from the presence of a foreign body in the abdominal cavity, it is interesting to review the experiments of von Bünger "On the Healing of Foreign Bodies under the Influence of Chemical and Microparasitic Irritation." (*Verhandlungen der deutschen Gesellschaft für Chirurgie,* XXIV Congress, 1895. Abstract in ANNALS OF SURGERY, xxiii, page 225.)

"*Experiments with Sponge soaked in Turpentine.*—Macroscopically the piece of sponge in the abdomen was found surrounded by a grayish-white capsule in from sixteen to twenty-four hours, fixing it to the peri-

toneum. In its immediate vicinity was a moderate degree of congestion, otherwise there was no change.

"Microscopically the piece of sponge was found encapsulated in numerous layers of fibrin, the holes in the sponge were filled with fibrin, which was especially richly developed near the circumference, and the meshes of which were strewn with small round cells.

"The peritoneum lying near the turpentine sponge looked swollen and injected, the connective-tissue fibres were separated apart from one another, the endothelial cells were broken loose from their places and shoved into the neighboring fibrin layers.

"The distended vessels of the surrounding tissue contained many leucocytes hugging the walls of the vessels and in process of emigration towards the foreign body.

"Within the foreign body most of the exudate cells were more or less degenerated, and presented cells in various states, from those which were intact and perfect to those which were in the last stage of disintegration. Between these were all varieties of intermediary stages. The destruction of the cells became more marked as the turpentine deposits were approached, and when the immediate neighborhood of the same was reached, most of the cells were of a pale gray color, with stainless nuclei, and were bestrewn with vacuoles and much shrunken.

"After two days the turpentine formed no more islands, but the exudate cells pressed in still greater masses towards the inside of the foreign body, and at the same time the fibrin penetrated farther towards the middle of the foreign body.

"The rich growth of young cells occurs not only on the surface of the foreign body, but also penetrates into the cortical portion of the same. By the third day the zone of purulent infiltration has advanced considerably towards the centre of the body, so that the periphery presents the appearance of a clear border. This becomes replaced by loose granulation tissue, which follows immediately after the leucocytes, while still farther towards the periphery older and firmer spindle-cell tissue is found.

"By the fourth day the leucocytes, containing remains of the turpentine and particles of chromatin, have travelled still farther towards the centre. On the periphery the formation of permanent tissue has continued to progress.

"The further development of the young granulation tissue from the fifth to the seventh day goes on in such a manner that the foreign body becomes gradually enclosed in a layer of spindle-cell granulation tissue; and from its periphery it becomes permeated by firm granulation tissue, which, without any sharp dividing line, merges into the neighboring tissue, on the one hand, and into the young loose granulation tissue within, on the other. In a sponge experiment, on the seventh day, the cavities of the foreign body were completely filled, and young, vascular granulation tissue had penetrated to the very interior."

Neugebauer considers the effects of foreign bodies left in the abdominal cavity under four headings, namely,—

(1) Aseptic: if the foreign body is not aseptic. These being of greatest danger to life.

(2) A chemical effect: which does not bear upon the foreign bodies left behind, such as instruments, sponges, etc., but only upon the leaving behind of sutures, iodoform, masses of hydrargyrum soluble (Crede), etc.

(3) A thermic effect: for instance, by the application of hot thermocautery, hot steam, etc.

(4) A pure mechanical: the consequence of which interests us the most when considering foreign bodies in the abdominal cavity, for instance, an artery clamp, a gauze sponge or sponges.

This classification can be simplified by excluding the first three, since the fourth, or mechanical, represents, practically, the whole subject. The experiments of von Büngner are in the main corroborated by clinical evidence. In Noble's case the sponge, after remaining in the cavity a number of weeks, was almost removed through phagocytic action. Another example is Case No. 56, Neugebauer list, where the sponge was disintegrated and the remaining particles discharged in instalments after the lapse of one and one-half years.

The effect of a foreign body in the abdominal cavity depends primarily upon its sterility. If it is not of an aseptic nature a general infection ensues, rapidly terminating the life of the individual. If the foreign body is practically aseptic in its nature, the tendency is, as von Büngner has shown, for it to become enveloped in a capsule of fibrous exudate interspersed with leucocytes. The isolation is still further carried out by adhesions between loops of intestine or between intestine and omentum, or, lastly, by both in conjunction with some other organ or the abdominal parietes. In this isolated state it may remain exposed to phagocytic influence until its final removal is accomplished.

On the other hand, its presence may become a source of irritation with or without attending suppuration. This irritation may terminate with the expulsion of the foreign substance externally through the site of the original operation. If, how-

ever, the wound becomes firmly united throughout, the foreign body commonly finds its way out by eventually forcing an entrance through the least resisting surface, which is usually some portion of the intestinal tract, or, as it has occurred in one instance, into the urinary bladder. If nature is not able

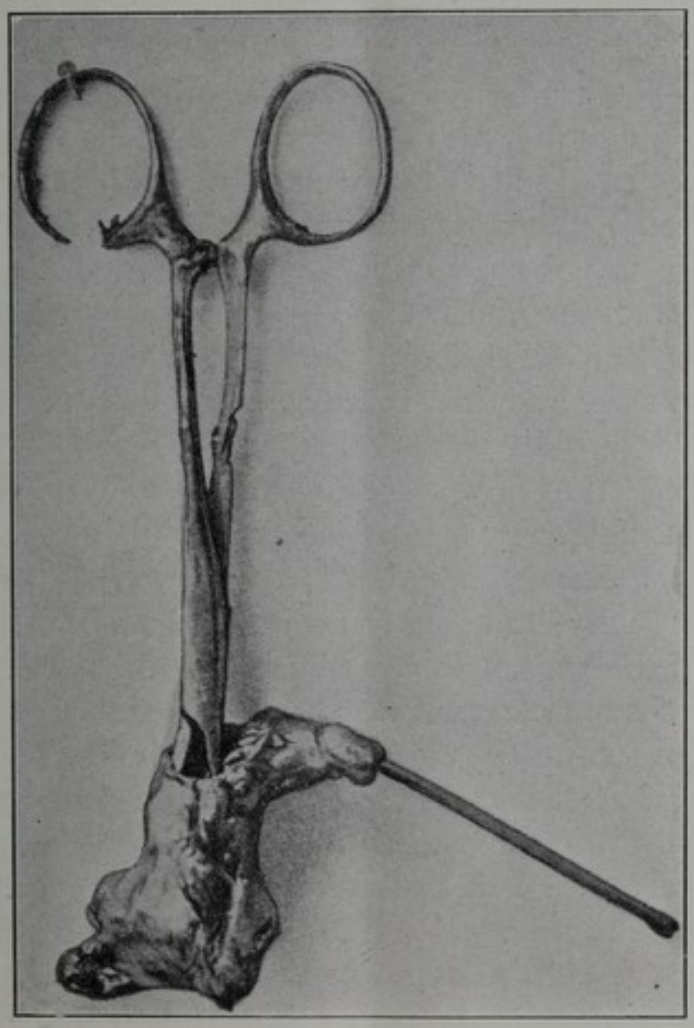

FIG. 1.—Photograph showing point of forceps resting in the dilated appendix vermiformis.

to cope with the foreign body in this manner, art eventually comes to the assistance.

The expulsion of the foreign body by unaided nature is usually accomplished in a gradual manner, but instances are recorded in which this was partially or entirely effected by some sudden movement. In the gradual expulsion, nature

seeks different avenues of exit, finally selecting, with her good judgment, the avenue of least resistance.

An entrance into the alimentary canal, in a gradual way, is accomplished by the foreign body provoking an irritation which terminates in ulceration and perforation of the intestine. The same irritation that is sufficient to excite at one point an ulcerative inflammation determines at other points an inflammation of less degree, resulting in the formation of adhesions about the perforation; so that at the same time that nature is gradually working her way through the intestinal wall she is wisely creating adhesions about the perforation.

In this way the perforation and, in fact, the entire field of operation remains under the control of the exciting forces. The method of entrance into the intestinal cavity can be explained, in some instances, by an ulcerative inflammation, pure and simple, in other instances, by atrophy and degeneration from the effects of pressure, or, what is more common, by the combined action of these two processes.

On the escape of the foreign body into the intestine, the remaining cavity drains itself into the intestinal tract, and the collapse of the walls, with the obliteration of the cavity, ensues, thus representing the usual steps in the spontaneous relief from the foreign substances and their attending evils. A study of the cases indicates that the escape of the foreign body does not always mark the termination of the trouble. The walls of the cavity, through a long-continued inflammatory action, may become more or less rigid and fail to collapse with the evacuation of the foreign substance. The opening in the intestine remaining patulous, fæcal matter finds its way into the cavity, representing another form of irritation. This continues until interference becomes necessary to relieve the fæcal and purulent accumulation, or for the cure of the fæcal fistula, then the accumulation partially empties itself.

Instead of the gradual method of eliminating the foreign substance, its expulsion may be partially or entirely effected through the agency of some accident that may drive the foreign body, such as a clamp or forceps, suddenly through the intestine or some other hollow organ.

When the expulsion is sudden, it is usually the result of some accident, by which force is suddenly applied and the foreign body driven violently against some organ, with the perforation of the same.

The most striking illustration of such an effect is in the case of Kosinski, where two hæmostats were left behind. Later on a second abdominal section was performed for the recovery of the forceps; although the forceps were not recovered, an improvement followed. Some time after the second operation, while in the act of looking after some baggage at the railway station, the patient was seized with great pains. which were followed some time thereafter by a third operation. which resulted in the death of the patient on the table and the finding of the forceps partly within the external iliac artery. (See complete report elsewhere.)

Symptomatology.—In considering the symptomatology of a foreign body in the abdominal cavity, it is well to remember that a foreign substance may remain quiescent in the cavity for years without creating the least disturbance. In fact, a careful study of the recorded cases, together with the well-known action of the phagocytes upon bodies not only in the abdominal cavity but elsewhere in the living organism, and of such a resisting character as ivory pegs, etc., teaches us that nature is able, under the proper conditions, to take care of many of the foreign substances.

Under such circumstances, a disturbance may never ensue, since the removal of the foreign body may be accomplished in a molecular way through phagocytic action. As an illustration of the presence of a foreign body without creating disturbance for a long time, we might refer to Case 97 (Neugebauer), where a sponge passed spontaneously after the lapse of twelve years, and Case No. 45, where forceps wandered about the abdomen for four years, and finally passed spontaneously. Numerous other instances of a similar nature but of a shorter period of time are recorded. The disturbance created by a foreign body in the abdominal cavity is dependent upon various factors: (*a*) The sterility of the foreign substance. (*b*) The

size. (*c*) The character, *e.g.*, regularity of outline, presence of sharp or pointed surfaces. (*d*) Density. (*e*) Point of location. (*f*) Individual tolerance of the peritoneum. (*g*) Behavior of the individual.

The importance of the sterility of the object has been fully considered in the foregoing lines. The influence of the size of the foreign body is fully realized when we consider that in most abdominal operations some foreign substance is left behind in the form of ligature material, and this with a feeling of confidence that the peritoneum is amply able to care for the same.

The regularity and density apply especially to such foreign substances as instruments, etc. Here we are again forced to review the classical case of Kosinski, where the hæmostats by a sudden movement were violently driven into the iliac artery, causing the death of the subject. The foregoing case likewise illustrates in the most graphic manner the relation of the location of the foreign substance to the extent of damage it is capable of creating.

The difference in the tolerance of the peritoneum in different individuals is too well established to require any further corroboration. And the importance of the rôle that quiet or the opposite conditions may have in preventing or precipitating trouble while a foreign agent occupies the abdominal cavity may be clearly seen.

The symptoms of the presence of a foreign substance may vary from *nil* to those representing the most violent intra-abdominal disturbance.

Pain usually localized in character and of a fairly constant nature. Disturbance of the intestinal peristalsis. Perhaps the presence of a tumor, not infrequently, very movable in its behavior and with outlines characteristic of the missing object.

The recognition of the object has been accomplished by palpation through the rectum, vagina, and even through the abdominal wall. The symptoms of an ileus frequently represent the clinical picture which the case presents. A violent sepsis may promptly ensue, or the case may drag along with

symptoms of more or less pain or a sense of uneasiness, elevation of temperature, emaciation, sweats, and, in fact, the usual course of a mild but protracted form of sepsis.

If we consider, however, the frequency with which symptoms simulate other conditions than those of foreign substances, we can appreciate the difficulty in establishing a clear clinical picture pointing to the presence of a foreign body. This very fact furnishes the most cogent reason for an investigation of any abdominal section presenting obscure symptoms and threatening the existence of the individual. The case of Kosinski also illustrates in the most emphatic manner the disproportion that may exist between the presenting symptoms and the existing condition; since in this case the patient, after showing evidence of an intra-abdominal disturbance and being subjected to a second abdominal section, improved, notwithstanding the fact that the forceps remained hidden in the abdomen.

At the time of her accident all symptoms of the presence of a foreign body had practically disappeared. Interest in the case was revived when the forceps had not only violently forced an entrance into the left external iliac artery, but also occasioned a rupture of the large intestine. Even in the face of this extensive damage, the patient for about two days continued more or less upon her feet.

Although the radiograph did not yield the desired result in Kosinski's case, the difficulty being due to a defective arrangement, much assistance can be expected by resorting to it in these cases.

Prevention.—After reviewing the formidable list of accidents herein tabulated, the truth of the opening lines of this paper must be singularly apparent.

The fallacies attending statistics upon this question have already been pointed out, and to this it is but necessary to add, it is human nature to report some of our accidents that have recovered after an extraordinary course and to withhold those that have terminated unfavorably.

The more closely one is associated with surgery the easier

it is to understand the occurrence of these accidents, and *vice versa*. Of the numerous letters received by the writer, but one correspondent expressed himself as not being able to see why the accident should ever occur.

This accident is like many another thing that we seem unable to understand until some extraordinary circumstance brings about its development, and then, looking backward, instead of forward, it is an easy matter to comprehend its occurrence.

A strong factor favoring the repetition of the accident is that we are frequently obliged to operate not only under various conditions, but we are confronted by circumstances and occasionally by an extraordinary complication, any or all of which factors would tend to a disastrous influence upon any definite system that might have been adopted, and upon the watchfulness that the case should have received.

The writer's own case illustrates this very clearly. The operation was, of necessity, performed in an improvised room; secondly, it was of an unusual nature. Owing to the first circumstance, the usual systematic course was to a certain extent disturbed. Thirdly, when the instruments were returned to the cabinet where they belonged the absence of the clamp was noted, but the patient being without any special symptoms, the subject was dismissed with the idea that it was lost in one of the several buckets of bloody fluid.

The use of hæmostats within the abdominal cavity, which the writer, together with the majority of operators, condemns, were employed in his case out of compulsion. The bleeding points were so numerous that the clamps were insufficient in number to equal the demand. All, together with a loose spacious cavity that remained after a very trying operation, combined to favor the occurrence of the accident.

Among the commonest of the safeguards that have been recommended might be mentioned,—

Special count before and at the close of the operation by a special nurse or assistant, or special count by two nurses or a nurse and assistant.

Tapes or threads attached to pads and instruments within the cavity and with another forceps on the tape or thread external to the cavity.

The avoidance of small sponges, pads, or hæmostats.

The preference for large pads instead of small ones. Suturing of drainage tubes to the wound and the tying together of gauze strips where a number are employed. (Weir.)

The use of the smallest number of sponges, pads, and instruments.

Storing of pads in packages, each package to contain a specific number of the pads.

The use of duplicate glass checks as recommended by Fowler.

The use of a muslin wrapper as suggested by Baldwin.

While the counting and recounting of sponges and pads before and after an operation by one or more individuals should and always will be a most important feature in the avoidance of this accident, yet the cases are numerous where the accident occurred notwithstanding this count by one and even two nurses or assistants.

When the count is made, the individual doing the counting should not point at the sponges and enumerate in a silent manner, but should pick up and put aside each sponge, at the same time calling out its number in a clear, distinct, and audible tone.

The plan of attaching tapes or threads to pads and instruments and using them as "tracers" has received the recommendation of a great number of surgeons. But the fallibility of this scheme is as clearly proven as the former. Not only were the pads lost, but also the tape and the attached forceps.

While many object to this arrangement on the ground of the inconvenience that the tape and forceps create, it will claim many advocates even in the face of this objection and its fallibility.

The force of the suggestion regarding small sponges and pads is apparent. The smaller the object the easier it is to be overlooked, and the more difficult it is to be recovered when

lost. Not only this, but where a large number of intestinal loops are to be held back, this is better accomplished by one large pad than by several small ones. Nevertheless, small pads will never be entirely discarded. It is the opinion of the writer that the tendency towards the use of many small sponges is greater on this side of the Atlantic than on the other, where there seems to be a decided leaning towards the use of a few large sponges.

The suturing of the drainage tube and the tying together of the several gauze strips where many are employed, as is recommended by Weir, is a very practical suggestion, especially if we note the number of times that accidents have attended the use of drainage tubes and gauze drains in the recorded cases.

In restricting ourselves to the smallest number of pads, sponges, and instruments, we adopt a system of simplicity that must appeal to all as one of the most important elements in the avoidance of this accident.

It is to be deplored that in many hospitals where nurses and assistants are plentiful that everything seems to be conducted in the most complex manner, which at once creates the effect of complexity rather than that of simplicity.

The development of surgery should carry with it the idea of simplicity, and the closer we conduct our operations along simple lines, the fewer accidents, infections, and complications will be met.

The storing of sponges in packages of a definite number, the glass checks as recommended by Fowler, or the wrapper as suggested by Baldwin, contribute in a way to the safety of the method, but will hardly meet with any general adoption.

Dr. Howard A. Kelly, "Foreign Bodies in the Abdomen after Operations" (*New York Medical Journal,* March 24, 1900), suggests a rack for the reception of soiled sponges and pads. See accompanying figure.

After all, we are forced to the conclusion that the real factor in the avoidance of this accident is the recognition of system, simplicity, and watchfulness to the most exacting degree.

At the bottom of most of these accidents we find a diverted attention, a defective system, or a dangerous degree of complexity.

It is true that one or more of these defects might exist, and with ample excuse for this existence, but we can only hope to reduce these accidents by the observance of the highest degree of simplicity, system, and watchfulness; and while every operator will work out a method that appeals especially to his judgment, that method will be most effectual, provided

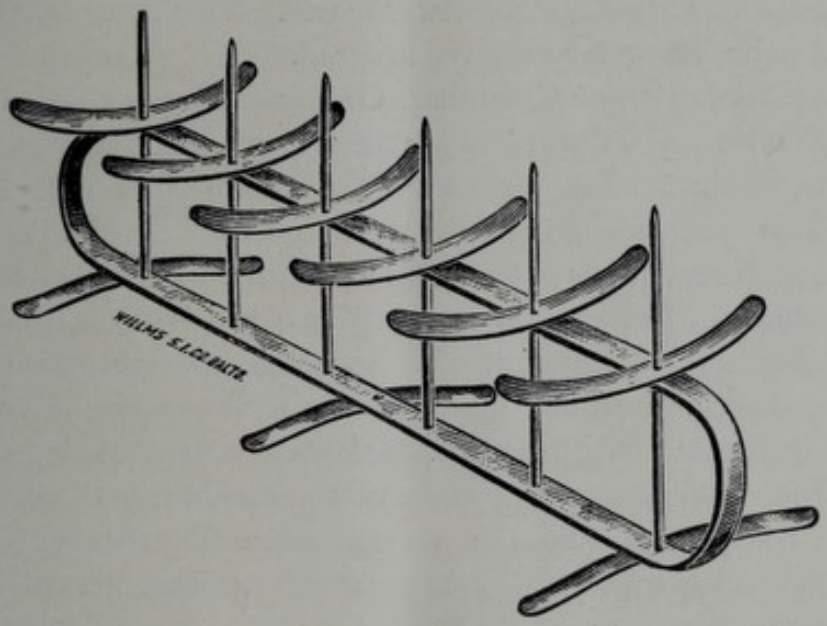

FIG. 2.—Rack for gauze and sponges discarded during an operation. The gauze is hung over the flat horizontal strips and the sponges are spiked on the points. There is room for twelve pieces of gauze and six sponges. (H. A. Kelly.)

the cardinal elements underlying that method are those just enumerated.

It is the hope of the writer to further this end by exposing the frequency of this accident by the following imperfect lists, and thereby to create a degree of vigilance that shall beget a more uniform standard of accuracy against this accident.

Medicolegal.—One of the most interesting phases of this subject is fixing the responsibility upon the proper person, if there is any responsibility to be fixed. A number of suits have been instituted in different parts of the world against the oper-

ator as the responsible person for the occurrence of this accident. So far as the writer has been able to learn, all suits resulted in the acquittal of the accused. In the United States, one or two suits against the surgeon have been withdrawn and a new suit filed against the institution in which the operation was performed.

Perhaps the most notable case of this kind is the oft referred to case of Kosinski, a brief report of which is appended. In this suit both the operator and the owner of the Infirmary, who was likewise a surgeon, were sued. This suit, as others, ended in a victory for both the accused.

Dr. Baldwin, of Columbus, Ohio, was made a defendant in such a suit, which was finally withdrawn and another entered against the hospital on account of the failure of all past efforts that have been directed against the surgeon.

Dr. Baldwin has made a fairly comprehensive canvass of the opinions of other surgeons of the question regulating the responsibility of the count of sponges in surgical operations. The consensus of these opinions was uniformly in favor of holding the nurse responsible. It was the expressed opinion that if the surgeon, at the close of the operation, asked for a count of sponges, and this was made, and assurance given him that all sponges and pads were present, that his responsibility ceased.

It was neither prudent nor fair that he should leave his, the most important, post in order to do duty that justly belonged to the nurse. That such a course would be far more disastrous in the long run than that of trusting to the nurse or assistant, as has been the method in the past.

There might be a tendency by some to hold the surgeon responsible for everything about the operation, in keeping with well-recognized rules of holding the principal responsible for his agent's acts. While in a way the surgeon is somewhat responsible for the conduct of the whole operation, and especially so where he operates in an environment created by himself and controlled by him, yet his responsibility has a limit.

To make a sweeping statement that the operator must

hold himself, and no one else, responsible for what occurs during the operation is using an expression that is lacking in reason and equity. We are all at times obliged to operate in an environment totally unsuited for any operative procedure, and to accept assistance that we know is manifestly incompetent. But we have no choice to do otherwise, or, more properly, to do nothing because the conditions are not as they should be would be sacrificing chances that justly belong to every human being, and would more likely terminate in disaster than to make the best of the confronting difficulties.

However we may feel, we are obliged to conclude that to a certain extent the surgeon is responsible, and after that the responsibility must rest elsewhere, and not with the operator. It will be impossible to formulate hard and fast rules regulating all cases. Each case will be required to be decided upon its own merits, and the responsibility fixed accordingly.

The making of the sweeping statement already referred to cannot possibly fail to incriminate in its meshes some innocent victim. Perhaps the most reasonable expression is that of Sanger, of Leipzig (see Neugebauer's list), who declared that there were risks that the patient had to assume, and could not rightfully look to any one else.

If the case involved details that made it impossible for the attendants to cope with it, it is clear to see the injustice of expecting the operator to assume responsibility that rightfully belonged to the assistants, or that happened to be the misfortune of the individual.

In other vocations it is reasonable to assume that, unless properly prepared, one should not act; in surgery one is occasionally compelled to act, even though it is known that he is not prepared, and in these conditions to adopt any other course than that would be attended with the loss of more lives than if he did not make the best of the circumstances.

Epitome of the Suit against Professor Kosinski and Dr. Solomon. Translated from an extended German account.

A suit was brought against Professor Kosinski and Dr. Solomon for leaving two artery clamps in the abdominal cavity, in consequence of which the patient died in several months' time.

The case was as follows: On the 22d of December, 1897, Professor Kosinski performed an abdominal section in the private clinic of Dr. Solomon upon a patient fifty years of age for an ovarian cystoma with a twisted pedicle. Kosinski had known and treated the patient two years. Dr. Zembrzuski administered chloroform and Wawrowski took charge of the instruments and sponges. The operation was very difficult on account of the numerous adhesions and an interrupted narcosis. A great many ligatures were necessary, as the other ovary had degenerated and its removal became necessary.

After the first few days an elevation of temperature occurred, accompanied with abdominal pains and pains in one leg. An inflammatory infiltrate was felt. By this time it was discovered that two artery clamps were missing from the instrument cabinet. It was thought that the artery clamps might have been taken by Dr. Solomon, as he left shortly after this operation to perform another in one of the provinces. Nevertheless the coincidence of an inflammatory infiltrate, and the absence of artery clamps aroused the suspicion of Dr. Kosinski that perhaps the missing clamps had been left in the abdomen.

Consequently, six weeks after the abdominal section, he re-opened the abdomen to investigate the infiltrate, but found neither pus nor the missing clamps. His suspicions were not allayed. However, he concluded to wait for further developments. The condition of the patient considerably improved after the second abdominal section, although there remained a fistula, which finally closed.

The patient left the hospital and was treated by Dr. Zembrzuski. Several weeks passed, but as the convalescence seemed to be retarded, Dr. Kosinski was again called for a more thorough examination. On this occasion he felt a hard resistance in the region of the umbilicus. Per rectum and per vaginam there was nothing to be felt. His former suspicions were renewed, and he expressed his suspicion through Dr. Solomon to the family that perhaps the hæmostats that were missing from the cabinet were left in the abdominal cavity.

Professor Kosinski insisted that another operation be undertaken and offered to perform the same gratis. The patient had agreed, and a room was prepared for her, but she failed to appear. The family physician had informed her two sons of the nature of the operation, to which they failed to give their consent, as they stated they had lost all confidence in Professor Kosinski. This was in the beginning of May. The sons of the patient called in another surgeon, Dr. Sawicki, without informing him of the suspicion of Professor Kosinski. Dr. Sawicki found an inflammatory infiltrate, but not knowing of the possible presence of the forceps saw no reason to perform an operation, and Professor Wassiljew and Dr. Krajewski, who were called to consultation, were of the same opinion.

Dr. Krajewski felt an infiltrate in the left parametrium and advised the patient to remain for further observation. He also suggested, in case of an operation, to consult Professor Kosinski, who had operated upon the patient before. Dr. Sawicki demanded a consultation with Professor Kosinski, to which the sons would not agree.

The patient was sent to the health resort Ciechocinek with the view of promoting the absorption of the inflammatory exudate. She improved to such an extent that when her sons told her of the suspicion of Dr. Kosinski, she would not believe it and ridiculed the idea.

On the evening of 24th of June, 1898, the patient arrived at Warsaw from Ciechocinek. Before the arrival at the station she reached up to get some baggage, and at the same moment she felt herself suddenly becoming faint. The momentary shock soon passed, and on reaching home she entertained her sons until late at night. On the following morning she felt extremely weak, and Dr. Frankel was called in, who demanded immediate operation by Professor Kosinski, and told her sons that no time should be lost. They refused to call Dr. Kosinski, but called in Professor Wassiljew. The latter saw the exhausted patient about midday and was told of the suspicion of Dr. Kosinski. In spite of the fact that the patient had passed in all a vessel full of blood-clots, the professor suggested that a radiograph be prepared, and the patient was removed in a *droski* to the infirmary of Dr. Bychowski, where she was led up three steps and remained several hours. Several radiographs were made, but with negative results. The exhausted patient was taken to her home late at night and the following morning Dr. Wassiljew assisted by Dr. Krejewski performed the abdominal section in the private infirmary of Dr. Wawelberg. Partial narcosis followed. The patient became almost pulseless. The Douglas pouch was found covered by inflammatory bands. A second oblique incision was made above Poupart's ligament, hoping to reach the seat of disturbance extraperitoneally. A large cavity was opened in which both hæmostats were discovered lying parallel and just above the pelvic brim. Both forceps had forced an entrance into the left external iliac artery. The removal of the forceps was attended with a furious hæmorrhage, which the operator endeavored to control by compressing the aorta. The cavity was tamponed. The patient died upon the table.

The ends of the forceps had punctured the left external iliac artery when the patient reached up to get her baggage at the railway station. A false traumatic aneurism ensued as the autopsy showed. The lower end of the forceps perforated the large intestine, and this accounted for the blood passing from the injured artery by way of the rectum. Had the operation been performed when the patient left the railway carriage, or even on the following morning as the family physician had requested, perhaps there would have been a recovery.

The patient, who was suffering from an injured artery, was driven in a carriage to her home; from there to an infirmary, then marched up three steps to have a radioskopic examination made with unsatisfactory result: as it appears owing to imperfections in connection with the outfit. After this unsuccessful attempt another twenty hours had elapsed before the operation was performed.

The trial lasted four days. There were six experts, two to judge the pathological-anatomical side, Professor Przewoski and Troickij, who had made the post-mortem examination.

Dr. Krajewski undertook the description of a modern laparotomy.

Dr. Maksimow undertook the criticism of the latter as it was performed in this case.

Neugebauer supplied the statistics that were liable to be called upon in the controversy. Professor Pawlow, of St. Petersburg, undertook to depict what is called a cœliotomy and the complications and mistakes that are liable to occur.

Summary.—The direct cause of death in this case was the perforation of the artery by means of the foreign body. The indirect cause, the refusal of the sons to comply with the request for another abdominal section by Dr. Kosinski; and the loss of time that arose from the trip to Ciechocinek.

The trial ended in the acquittal of the accused.

For the purpose of securing as full information as possible on the subject under study, I wrote to a large number of surgeons whose opportunities for observation in abdominal surgery were known to be large, asking for reports of any such accidents known to them, and for any special suggestions that might tend to aid as safeguards against such accidents in the future. From the replies to my letters, I have selected for publication the following, as of special value.

I.—In 765 laparotomies, I have left a piece of gauze twice and 1orceps once. All three of these patients recovered. In the last case I was operating upon a suppurative appendicitis, a pus cavity was opened in the pelvis, and at the same moment the free peritoneal cavity was opened; a small gauze sponge was left in the bottom of this abscess cavity, and the perforated appendix was removed. The wound was partly closed. After a stormy convalescence the sponge worked its way to the surface and was removed from the drainage tract three weeks after the operation.

ARCHIBALD MACLAREN.

II.—I had only once the misfortune of leaving a foreign body in the abdominal cavity after laparotomy. It was a small iodoform packing, that slipped away during a rather stormy colotomy for inoperable cancer, made so by an extremely unsatisfactory anæsthesia, and remained in the abdomen. As there had been much fever before the operation, and the local symptoms caused by the foreign body were not very distinct, the cause of the slow peritonitis remained unexplained till the autopsy revealed the actual facts.

ARPAD G. GERSTER.

III.—In very nearly 2000 laparotomies, I have had but two such instances. In one I left a hæmostat, but discovered it within an hour, and took it out before the patient had entirely come out from the anæsthetic. The other instance—quite recently—was one in which I left a large flat sponge over night, and took it out the next morning without doing the patient any harm.

I know of three cases in Buffalo where gauze pads had been left in. Two of the patients died, though I cannot say that they died from the effects of the gauze pad; while in the other it was discharged through the abdominal wall at the site of the primary incision, some months after the operation, the patient recovering.

MATTHEW D. MANN.

IV.—With regard to your inquiry relating to foreign bodies in the abdominal cavity after operation, I can furnish you with the report of one case. The accident occurred last winter after an operation for a large fibroid. When the abdominal incision was being sutured I placed a medium-sized gauze sponge over the intestine to facilitate the introduction of the sutures and press the bowels back. I do not know how it happened, but the sponge was not removed. The patient did very well, with very little temperature. The sutures were removed on the tenth day. The union was perfect. About the fourteenth day a swelling occurred in a localized portion of the incision which was opened; suppuration continuing, I directed my assistant to enlarge the opening with a view to better drainage and treatment, after doing which he noticed the sponge, which he removed. The patient recovered, but suppuration continued for two weeks longer. If I have ever left any foreign body in the abdomen I do not know, as the cases upon which autopsies were held did not show it.

E. LEWIS.

V.—I know of only two cases in which materials were allowed to remain in the peritoneal cavity after operation. In one there were two laparotomy sponges allowed to remain, and in the other there was left a large fragment of gauze. I know of two other cases in operating on the neck where two small pieces of gauze were left, and still another in an amputation of the breast, the latter in the practice of your humble servant. It was used for compression over a small vein, the suturing continued and the gauze overlooked. Putting a considerable string of tape on the sponges and also using forceps on them, I think, lessens the liability of leaving them in the peritoneal cavity. The great danger is in the use of small sponges because of their number, but fortunately they are not much used in the peritoneal cavity. Counting the sponges has saved me on one or two occasions, as I felt certain the sponge was not in the abdominal cavity; but the count showed that it was absent, and after a thorough search it was located.

J. B. MURPHY.

VI.—I have never left any foreign body in the abdominal cavity. Twice my assistants have left portions of iodoform gauze in the pelvis after vaginal operation, and once the same thing happened to me. I try to avoid leaving in pads, etc., by having a long string attached to the smaller ones; *and I never allow any one but myself to either introduce or remove foreign bodies, such as pads and instruments.*

WM. R. PRYOR.

VII.—In upward of 1300 abdominal sections, so far as I know, there has been but one foreign body left in the peritoneal cavity. This was a sea-sponge, which was left in the uterovesical pouch. The patient made an uncomplicated recovery from the operation and returned home. Some weeks later she developed inflammatory symptoms, and had what was supposed to be an abscess anterior to the uterus. The abdomen was reopened, and the cause of the inflammation was found to be a sponge. The leucocytes had almost entirely disintegrated the sponge, very little of which remained. I am quite sure, had nothing been done, that the entire sponge would have been absorbed, and the patient would have made a permanent recovery.

It is my custom to make one of the assistants responsible for the sponge and gauze count. This is his responsibility and not mine. I believe this to be the best practice, as in the hurry of operating in the graver cases I feel certain that the surgeon would be more apt to make mistakes than is the assistant, who has not the responsibility of the operation on his mind.

CHARLES NOBLE.

VIII.—I have had but one experience in leaving foreign bodies in the abdominal cavity. It was in the first abdominal section which I ever performed, some fifteen years ago. I was assisted by an older surgeon, who, during the operation, tore one of the sponges in half and tucked a half between the bladder and uterus without saying anything to me about it. The woman died of shock, and the sponge was removed at the post-mortem, much to my surprise, as a count of the sponges gave the number with which we had begun. This was in the days before the use of gauze pads. This experience early in my career has made me, I think, more careful than I might have been, and I am glad to say I have not had another such experience since.

B. C. HIRST.

IX.—In answer to your letter, I know of a case occurring in a hospital with which I was connected where not only a gauze pad but a clamp attached to it was left in the abdominal cavity.

Personally I have had no cases, and I probably have avoided having a case because I know every pad placed in the abdomen in my cases. To me no device can equal one's own attention to this detail of the operation.

FRANK HARTLEY.

X.—I have had two unfortunate experiences in regard to foreign bodies remaining in the abdominal cavity, one occurring a few years ago when using the old-fashioned sponges, the patient dying from general peritonitis. One occurred about three years ago, in a case of extensive carcinoma of the uterus, and in which a small gauze sponge was left, the patient making a good recovery; but on a reappearance of the disease a year after, the sponge was found on exploration. This is an accident greatly to be regretted. I have always been fortunate in reference to

forceps and instruments, and the first case to which I have referred I had trusted entirely to my assistant, who assured me all the sponges were accounted for. After the death of the patient, and on making an autopsy, you can imagine my sorrow and chagrin in finding a small sponge in the abdominal cavity. Had I relied upon looking after the sponges myself, or trusted to my operating-room nurse, it is not at all likely the accident would have happened. In the second case I do not think we were so much at fault, for the growth was very adherent; the operation was a severe one, much bleeding, and a good deal of sponging necessary; but here again I was deceived by the report of my operating-room nurse.

A. VANDERVEER.

XI.—I have one case to add to your list, one which I have already somewhere reported, possibly in connection with a similar request. I do not think that I have myself separately published it. This must have been about twenty years ago. It was a sponge about the size of a small hen's egg lost in the abdominal cavity, and due to the kind assistance of a visiting surgeon. A prominent operator from one of the large Eastern cities being present, I asked him to assist me, as was then so frequently the custom, and, in order to give him a good opportunity of witnessing the operation, placed him, as my chief assistant, opposite me. The operation for one of the large old-time ovarian cysts was very bloody, one with many adhesions, and many vessels were ligated, much sponging was necessary; his hands were frequently in the abdominal cavity. I did not feel at liberty to speak to him quite as I should have done to my usual assistant. Before closing the wound, the customary sponge count was called for and showed one missing; a thorough search of the room failed to reveal it. I then searched the abdominal cavity, as *I thought, most thoroughly;* in the mean time every assistant, and there were many, as was then the custom, expressed his views, and it was decided that this was the sponge which had been dropped during the process of cleaning, the passing of it into a tub which one of the sisters had emptied into the waste. The incident was recalled by several, and seemed confirmed by my vain search of the abdominal cavity. Peritonitis promptly followed, not altogether unusual at that time, and the post-mortem four days later revealed the sponge thoroughly concealed in the upper part of the cavity, a little below the transverse colon.

GEO. J. ENGELMAN.

XII.—I have left three gauze pads in the cavity, and all the cases have been reported in the *Transactions of the New York Obstetrical Society.* I have now adopted the stringent rule to allow no pad to be placed in the cavity unless it has a tape secured by a pair of forceps. Pads are sterilized in bundles of a dozen, and each set is accounted for while the next one is being used. The operating-room nurse keeps watch of every pad as it is introduced and withdrawn, and counts and recounts the whole number at the close of the operation. Personally I believe that the only way to avoid this accident is to use only two or three large pads

to hold back the intestines, and under no circumstance to allow others to remain within the pelvis even for a minute, unless held in the hand or a sponge-holder.

My patients all recovered after removal of pads through abdominal wound.

H. C. Coe.

XIII.—Personally, I can contribute one case of suppurating appendicitis in which I forgot a strip of iodoform gauze pack, which remained buried in the granulations and was finally covered over entirely, and would never have been removed had not the patient returned six months after with a suppurating sinus in the wound, which upon exploration led to the discovery of the gauze. The sinus, of course, healed up immediately after the removal of the gauze.

R. Matas.

XIV.—In over 3000 abdominal operations, I have had the misfortune to leave behind in the peritoneal cavity a gauze pad upon three occasions. This was due to a miscount on the part of the operating-room nursing force. In the first two cases the count was made by but one nurse. I endeavored to prevent this by making two nurses responsible for the count. Under this plan it again occurred, after which a third nurse was added to those who made the count. Since this was done I have not met with the accident. The pads are placed in packages of six each, and these packages are checked off by two nurses in addition to the one who makes up the original packages. After sterilization, the sponge-nurse counts the pads as the packages are supplied to her, and this constitutes an additional check.

I have designed a system of glass checks with numbers on them. Both checks are attached to the pad by a tape, and when the pad is passed to the operator one check is removed and placed in the basin from which the pad is taken, the other remaining attached to the pad. At the end of the operation the checks must balance each other. The only objection to this is the delay which it entails in passing sponges and the expense of the glass checks, which will have to be made in separate moulds on account of the numbers, or else engraved, if but one mould is used.

G. R. Fowler.

XV.—I have three times left foreign bodies in the abdominal cavity. One was a sponge and the other two gauze pads. The first resulted fatally, whether from the sponge alone or from the general peritonitis of appendicular origin which demanded the operation, I cannot say. The other two patients recovered from the mishap, one five days after the operation, the other five months afterwards, showing again the comparative innocuousness of sterilized pads. These all occurred prior to 1898, up to which time I, in common with many others, relied on the counting of sponges and pads before and after the operation. In my fatal case, the sponges were counted, as just stated, by my assistant, who was then a sur-

geon in St. Luke's Hospital. In the other cases, the counting was relied upon at the hands of men who have since become distinguished in their profession. Since, however, I attach clamps, or, latterly, halter rings, to all pads going into the abdomen, and limit such to a given number, six, a dozen, or two dozen, I have had no mishap. I have had to take out sponges in two cases of emergency and in the absence of one well-known surgeon attendant. Each terminated fatally. I consider it almost impossible to guard against this contingency absolutely. We can only by great care reduce them to a minimum. In the use of gauze drains, if multiple, I prefer always to tie them together, also to suture drainage tubes to the edge of the wound, etc.

ROBERT E. WEIR.

XVI.—I have never had the misfortune to leave a foreign body in the abdominal cavity. I have studiously avoided commenting on such an accident for fear that it might happen to me at any time. It is a thing so easily done. I have once been called to a case in which a gauze sponge was left in the cavity. The operator in this case was very much hurried on account of the bad effects of anæsthesia, and relying upon his nurse, who counted out his sponges, closed the abdomen with a sponge in it. For the first ten days after the operation the patient did well; then a localized peritonitis developed, and a swelling occurred near the umbilicus, and, finally, an abscess ruptured there. It was discovered that this abscess connected with the intestine, and a fæcal fistula was the consequence. The woman's health declined so rapidly that it was deemed necessary to repair the fistula. I undertook this, and found an extremely large opening in the small intestine, involving more than half the circumference of the gut. A rapid end-to-end anastomosis was made with the Murphy button and the abdomen closed, the fistulous tract having been dissected out. I was convinced that a foreign body had been left in the abdomen, and, getting no history of its expulsion, I made a digital examination of the rectum and found a large gauze pad and extracted it. This patient died from exhaustion a few days after the operation.

GEORGE BEN JOHNSON.

XVII.—I have had but one experience of a foreign body left in the abdominal cavity after an abdominal operation, and that was after the enucleation of a large sarcoma of the kidney by lateral laparotomy. The tumor projected through the left anterior abdominal wall, hence I chose this site for operation. Both appendages and uterus had been removed for fibroids of the latter several years before. The pedicle ligature slipped, the tissue being diseased; and while I turned to grasp a clamp to check the profuse hæmorrhage, at the same time compressing the pedicle with my left hand, my assistant, unknown to me, crowded a large towel, one by two feet, into the deep pocket left after the enucleation of the kidney. I again tied off the pedicle, mopped out the cavity of the wound without noticing the towel, which my assistant forgot to mention, and not until some four weeks later did I discover the towel

during an examination made by me personally to ascertain why the wound did not close. All dressings since the operation had been made by the house surgeon. I removed the towel, which was perfectly fresh and sweet, and the wound then healed rapidly.

PAUL F. MUNDE.

XVIII.—I have always been in fear of leaving a foreign substance in the abdomen, but so far I have escaped such mishap. Professor von Nussbaum left a pair of scissors in the abdomen; his patient recovered, and the foreign substance caused no symptoms until months later he experienced pain in the region of the umbilicus when dancing. An incision was made later and the scissors removed. No further difficulty.

N. SENN.

XIX.—Twice I have left a gauze pad. I recovered these before the patient recovered from the anæsthetic. Both patients did well. I have put in hundreds of gauze coffer-dams and gauze packs, and as yet no accidents have resulted. I have prevented accidents by adopting the highest degree of simplicity, but few assistants and but few nurses, the operator, assistants, and nurse counting and knowing just what was to be used in each operation. The count was repeated before closing wounds. The operating-room should not be a storage-room for all operative materials, instruments, and surgical supplies.

JOSEPH PRICE.

XX.—I so far have but one case of foreign body left in the abdominal cavity at operation to report; this was a sponge, ten years ago. It came about through dividing a large sponge in order to get two small pieces, and at the final count the nurse failed to remember the division. The only suggestion that I can make is a rigid registration by two people—the nurse and the first assistant—of the instruments and sponges, the nurse recording the sponges, and the first assistant the instruments, both to be checked by careful inquiry upon the part of the operator just before the abdominal wound is closed.

WM. K. POLK.

NEUGEBAUER'S COLLECTION OF CASES.

THE following 101 cases have been translated from the article on "Foreign Bodies accidentally left in the Abdominal Cavity," by Franz Neugebauer, *Monatsschrift für Geburt. und Gynäkol.*

(1) A French physician, signed "Anonymous," cites in the "Revue des Maladies des Femmes," 1892, the following cases as examples of the great toleration of the abdominal cavity for foreign bodies. A patient, eight months after a myomotomy, passed, during a defecation, a twenty-

six centimetres long gauze napkin four times doubled. Of this she had made complaint only since four months. The perforation of the napkin into the intestines was without any alarming symptom.

(2) A young lady suffering from salpingitis had a cœliotomy performed. Some time later a four times doubled thirty-five centimetres long gauze strip was extracted per vaginam. Soon after the same complaints again appeared. The abdomen was opened. In the attempt to loosen a loop of adherent intestine, one of the intestinal loops tore, and through the intestinal wall a large, long gauze strip was pulled. A ten centimetres long piece of intestine was resected, and the patient finally recovered after the two pieces of forgotten gauze strips had been removed.

Two extra operations had been performed, one of which, the hysterectomy, as it seemed, unnecessarily. After the last operation there remained for a long time an abscess, which finally healed.

(3) The same physician cites a case where immediately a second operation was performed and the abdomen opened to remove a forgotten pincette.

(4) The same physician cites a similar case of again opening the abdomen to remove a forgotten sponge.

(5) John Atlee, Sr., lost a patient the fifth day after the operation of ovariotomy. An autopsy was held, and a piece of sponge was found in the abdominal cavity. One of the assistants had torn one of the sponges in two pieces during the operation.

(6) Bode (*Centralblatt für Gynäkologie,* 1898, No. 18, page 277). In an abdominal section for tuberculosis a drain was employed in the lower angle of the abdominal wound. As the patient left the bed a few days later, the drain slipped into the abdominal cavity, and Bode had to open the abdomen a second time in order to remove it.

(7) Hermann J. Boldt ("Foreign Bodies accidentally left in the Abdominal Cavity during the Course of Cœliotomy," *American Gynæcological and Obstetrical Journal,* 1898). Boldt had removed the uterus together with the appendages for carcinoma. Operation by the abdominal route. He inserted a gauze drain into the vagina. He ordered that the gauze drain be removed after the third day per vaginam, which was obeyed. The doctor inserted, without the knowledge of Boldt, another strip of gauze, and forgot to take it out. The patient left the hospital. The incision closed with a scar and the gauze remained within. Some weeks later the patient experienced severe abdominal pains and stubborn constipation. Finally, two months after the operation, the patient passed the forgotten piece of gauze and then recovered.

(8) Boldt (*Ibidem*) performed a hysterectomy by the abdominal method for fibroids, in the early part of 1897. The convalescence progressed very slowly. An abscess occurred accompanied by phlebitis. After the abscess had healed, the patient left the hospital, but was constantly troubled with pains between the epigastrium and umbilicus. In October, 1897, Boldt saw her again, and diagnosed a tumor that he held to be an inflamed loop of intestine. On the 3d of November he again resorted to an abdominal section, but, on account of a collapse of the

patient, closed the wound. In consequence thereof there appeared a fæcal fistula in the scar. In January, 1898, another abdominal section. The extended adhesions formed great obstacles to the operation, which was very complicated. The intestine was injured in five places. Suspicion was aroused on seeing one of the intestinal sections unusually thick and swollen. There was found in this intestinal section a piece of gauze embedded in fæcal matter. The damaged intestinal section was resected; the exhausted patient died, however, after a few hours. In course of time this piece of gauze would no doubt have appeared spontaneously per annum, as it had already entered the intestine.

(9–13) Boldt further cites, out of the practice of his colleagues in New York, five cases never before published, where, after abdominal section, on post-mortem, foreign bodies were found that had been forgotten by the operators.

(14, 15) A pathologist of one of the hospitals in New York confessed to Boldt that he had found, during autopsies following abdominal sections, at one time a pincette, and at another a sponge in the abdominal cavity.

(16, 17) Boldt further cites two cases of the immediate opening of the abdomen on account of a pincette being left in the abdomen in one case, and a sponge being left in the other.

(18) Borysowicz six years ago removed a subserous fibroid from a patient by the abdominal method. After three weeks the patient, in defecating, passed a gauze sponge that had accidentally been forgotten in the abdominal cavity.

(19) Gustav Braun found in a section after a laparotomy a pair of bulldog forceps in the abdominal cavity that had been forgotten.

(20) Karl von Braun found in a section after a laparotomy a sponge in the abdominal cavity that had been forgotten.

(21) Brosin (*Centralblatt für Gynäkologie,* 1898, No. 18) amputated a uterus bicornis with hæmatometra in one horn, and had, on account of the difficulty of stopping the profuse bleeding, to suture the stump in the abdominal wound. The wound healed in six months, after a piece of gauze twenty centimetres in length had escaped during the suppuration.

(22) W. T. Bull ("Report on Operative Surgery in New York Hospital," page 8). During a necropsy following cœliotomy a sponge was found in the abdominal cavity.

(23–27) Henry C. Coe (*The New York Polyclinic,* 1897) has found five cases where, in a necropsy after an abdominal section, a sponge was found in the abdominal cavity. Death by sepsis.

(28) Henry C. Coe also mentions a case where thirty-six hours after a vaginal hysterectomy a sponge was missed that seemed to have remained behind in the abdominal cavity. An incision was made, and after a long search the sponge was found under the liver.

(29) Cushing lost during an abdominal section a seal ring. After some years he again recovered the same through an incision in the fundus of the vagina.

(30) Dmochowski found in a section after a cœliotomy that was per-

formed in the Infant Jesus Hospital in Warsaw a gauze napkin in the abdominal cavity.

(31) Elsner (Syracuse) (State Medical Society of New York, *American Gynæcological and Obstetrical Journal,* 1895) describes the following cases. After an abdominal hysterectomy, the patient remained the same as before, suffering, and in course of time became constipated to such a degree that an ileus seemed evident. An operation was thought of, but on the passing of flatus the operation was postponed. That was in July. On November 26, the patient suddenly discharged a gauze tampon in an action six months after the operation. She was definitely relieved.

(32) George J. Engleman, of St. Louis, found in a section after an abdominal operation a sponge in the abdominal cavity.

(33) Hegar (Hegar und Kaltenbach, "Operative Gynäkologie," third edition, 1886, page 283) missed a sponge during an ovariotomy, and had to search over a quarter of an hour in the abdominal cavity before he finally found it encased in the mesenterium of the flexura sigmoidis.

(34) Herczel (Kongress der deutschen Gesellschaft für Chirurgie, siehe *La Semaine Médicale,* 1898, No. 17, page 132) mentions a case where a clamp remained a year and a half after an abdominal section, and only then began to create trouble.

(35) William T. Howard, Baltimore. After an operation performed by another surgeon, a sponge was found in the abdominal cavity at the autopsy. (See Wilson, L. C.)

(36) Howitz found during an autopsy a sponge that had been accidentally left in the abdominal cavity.

(37) Kader (*La Semaine Médicale,* 1898, No. 17, page 132). In the case of a patient whose recovery from cœliotomy was delayed, and who complained of pronounced constipation and attacks resembling ileus, a year later there appeared at the opening in the large intestine the tip of a gauze tampon, which was forthwith extracted. The patient was operated *in extremis* for ileus, and during the examination an extensive adhesion among the small intestines was noted. A large linear scar was observed, which evidently represented the place where the gauze compress had entered the abdominal cavity.

(38) Kosinski. See description detailed on page 513.

(39, 40) A. MacLaren ("Contribution to the Statistics of Foreign Bodies in the Peritoneal Cavity," *Gynæcological Transactions,* 1896, xi, page 394; see Referat: "Revue de Gynécologie et de Chirurgie Abdominale," Tome i, 1897, p. 331) performed an ovariotomy with suspension. After the operation, the patient suffered much from constipation. An abdominal section was planned, when unexpectedly on the tenth day she had an action, and a gauze napkin was discharged that had entered the intestine, creating symptoms of a threatening ileus. In another case MacLaren performed a supravaginal amputation of the uterus on account of a large fibroid. From time to time the patient complained of fever and pains. Finally, after two years, MacLaren felt a hard, inflammatory infiltration on the right side, and opened the abdominal cavity. A hæmostatic forceps was found in the cæcum, the points of which had entered into

the processus vermiformis. At this point the omentum was adherent to the cæcum. The cæcum was opened, the forceps removed, and the processus vermiformis resected. The patient had a smooth convalescence. MacLaren declares that he knows of seven more cases where a foreign body remained in the abdominal cavity and was discharged spontaneously per annum without endangering the life of the patient; but, as he does not cite which cases he refers to, I do not count them, as they may be the identical ones already mentioned by me.

(41–43) Leopold has himself observed three strange cases. In one case he noticed just before the closing of the abdominal wound that a clamp was missing, and immediately searched for it. It lay in the Douglas pouch. In another case he was compelled to reopen the abdominal cavity to search for a missing gauze compress, and found it on the right side of the liver. It had reached this location through a peristaltic wave. In the third case, during a symphyseotomy, a sponge slipped into the prævesical space, and was not removed until twenty-one days after the operation.

(44) Lindquist (*Hygeia*, 1897, ii, p. 51). Two months after operation for a ruptured pregnant tube a forgotten gauze compress was discharged spontaneously per rectum. It had been left in the lower part of the abdomen.

(45) Michaux (Société de Chirurgie, April 13, 1892, p. 345, "Repertoire Universel d'Obstetrique et de Gynécologie," 1892, p. 345. "Penetration dans l'intestine d'une meche de gaze iodoformée provenant d'un hysterectomie vaginale anterieure, laparotomie resection de l'intestine"). In September, 1891, an abdominal incision for diseased tubes was performed upon a young girl, a month later a vaginal hysterectomy. She still complained of trouble. On the left side of the pelvis appeared an inflammatory infiltration. An abdominal section was made, in which the intestine was injured and out of which a gauze compress was drawn. The intestine was resected.

(46) Morestin (*La Médecin Moderne*, 1898, No. 49, p. 388. Siehe Neugebauer's Referat, *Centralblatt für Gynäkologie*, "Martyrologie einer Operirten," 1898, No. 49, p. 1351). In August, 1894, an abdominal section was performed on a young woman twenty-nine years old for the removal of a double pyosalpinx and diseased adnexa. A few days after the operation an abscess appeared in the abdominal wall. There still remained a fistula that discharged when the patient, six weeks later, left the hospital. In December, 1894, the patient entered the chirurgical ward under the care of Dr. Le Dentu for the relief of a phlegmon in the left inguinal region. The abscess was opened and drained, everything going well. A new abscess formed in the cicatrix of the first operation. Pus burrowed and established a fæcal fistula. La Dentu drained the pelvic abscess through the vagina. A general improvement followed, and the patient was sent to the country, only to be returned to the hospital a few days later. Urine now began to flow through the vagina. Evidently a communication had been established between the bladder and the abscess. After some time the urinary flow from the vagina spontaneously ceased. The patient left

the hospital in August, 1896. In March, 1897, she again returned to the hospital, with urine flowing from the vagina. In April a new abscess in the right inguinal region was opened. Finally, the patient returned to the hospital, to declare she had at last recovered, since for six weeks all fistulas had closed. Fifteen days previously, during a movement, a pair of hæmostatic forceps, twelve centimetres in length, was passed. The forceps was very much rusted and black, as the result of wandering for four years in the abdominal cavity and intestines.

(47) Nussbaum forgot an artery-clamp in the abdominal cavity. It was found spontaneously in a defecation nine months after the operation.

(48) Nussbaum, according to Leopold (*Centralblatt für Gynäkologie,* 1898, No. 18), forgot a drainage tube in the abdominal cavity after an abdominal section. According to Olshausen, the patient herself, two months later, drew it out of an abdominal scar after spending the entire night in dancing.

(49) Olshausen (Hegar und Kaltenbach, "Operative Gynäkologie," iii, Auflage 1886, p. 283) mentions a case after an ovariotomy. A pincette was missed. Ten months later this foreign body was discharged spontaneously in a defecation after complaint had been made for two weeks.

(50) Olshausen (*Zeitschrift für Geburtshülfe und Gynäkologie,* xxv, Band ii, p. 539) found during an autopsy, four days after a Cæsarean operation had been performed, a gauze napkin in the abdominal cavity that had been forgotten by the operator.

(51) Pilate (Orleans). "Expulsion par l'intestin d'une compresse ayant sejourne huit mois dans la cavite peritoneale," Société de Chirurgie, 1892, 23 Mars. ("Repertoire Universel d'Obstetrique et de Gynécologie," 1892, p. 227.) By an abdominal section, a myomatous uterus was removed from a patient forty-two years old. The operation passed smoothly. Later, pains were felt in the right side of the lower abdomen and the occurrence of phlebitis. The patient seemed to enjoy perfect health for six months, when there very suddenly appeared pains in the region of the liver. Abdominal pains, with vomiting which persisted for six weeks, reducing the patient to a critical state, when a gauze compress, enclosed in a mass of fæcal matter, was passed by the anus, from which time all her symptoms disappeared and she rapidly recovered health.

(52) Quénu in the early part of 1891 forgot a compress in the abdominal cavity after an operation for an old pyosalpinx. Before the operation, the patient had been troubled with emphysema, mitral regurgitation, and hemiplegia. A severe collapse took place immediately after the abdomen was opened, so that artificial respiration had to be resorted to. During the excitement, the napkin must have disappeared in the abdominal cavity. For two days everything passed nicely, but on the third day the patient sank rapidly and died. During the autopsy the peritoneum was found smooth. The napkin was found at the same time wrapped around an intestinal section.

(53-55) Reeves Jackson describes three cases in which, after abdominal section, during an autopsy on one occasion, a pincette, and on two other occasions, a sponge were found in the abdominal cavity.

(56) Rehn (Frankfurt) ("Ueber bei Bauchschnitten in der Bauchhöhle vergessene Instrumenten und Verbandstoffe," XXVIII. Kongress der deutschen Gesellschaft für Chirurgie. Referat: *Monatsschrift für Geburtshülfe und Gynäkologie,* Mai, 1899, p. 684; auch, *La Semaine Médicale,* 1899, No. 17, p. 132) performed an abdominal section for ileus upon a patient on whom he had performed a former abdominal section for pyosalpinx and diffuse peritonitis. The narcosis was at that time so imperfect that the whole intestine was pressed out. The abdominal loop was wrapped in sterile compresses and thereby protected. The colon descendens was adherent to the pyosalpinx, which was removed in such a manner that a portion of the pus-tube was left on the intestine. After washing out the abdominal cavity with salt solution, the intestines were replaced and the Douglas pouch tamponed. The abdominal wound closed. Convalescence with the formation and the disappearance of fæcal fistula. The patient was dismissed in good condition on December 9, 1897. The patient was without complaint until the middle of April, 1898, when she suddenly, after partaking of red cabbage, experienced slight pains in the region of the stomach. Later, spasms accompanied the pains, at first not frequent, later every five minutes. The patient was removed to a hospital, where she begged to be operated upon, but without avail, whereupon she left and went to the city hospital, where she arrived on May 4, 1898. Tenderness was noticed in the epigastrium, together with a tumor in a transverse position measuring ten centimetres in length. This tumor seemed to have created the symptoms of an intestinal occlusion. Adhesions were suspected, because for three days neither fæcal matter nor flatus was evacuated. An abdominal section was performed May 18, 1898. The intestine at one point was in a condition of partial gangrene, and the loop above the gangrenous area distended, while that below was empty. A section forty centimetres in length was excised. Adhesions of an ancient character, but without significance, were observed. The resected portion of the intestine contained a large mull compress. Recovery without further complication.

(57) P. Roesger ("Ein Beitrag zur Kasuistik Moderner Haftpflicht; Ansprüche an der Operateur," *Monatsschrift für Geburtshülfe und Gynäkologie,* 1898, Band vii, p. 331) performed an abdominal section upon an unmarried woman, aged forty-five years, for a large intramural myoma of the uterus as well as a myoma of the ligamentum latum. In consideration of climacteria all attention was directed to an oophorectomy. The operation passed smoothly, but a complication followed through the slipping of the ligature from an artery (arteria spermatica interna). The artery was immediately ligated. The toilette of the Douglas pouch was very difficult, as the myoma had changed the latter into a small canal invisible to the eye and only reached by the finger or split sponge. The sponges on holders were all present after the operation. After-course without fever. The stitches were removed on the twelfth day, and on the fourteenth day the patient was up, and returned home on the eighteenth day. Then followed a fistula in the abdominal scar. A probe was entered six centimetres in the direction of the abdominal wall and struck a liga-

ture. In spite of the irrigation, pus continued. Roesger in October split the entire fistulous path, and found lying on the fascia a two-and-one-half-centimetres silk thread that must have been left there during the operation. The wounds healed, but there still remained a small fistula. The hysterical patient left the treatment of Dr. Roesger and consulted another physician, who some weeks after showed Dr. Roesger, to the latter's great astonishment, three pieces of sponge from pin-head size to the size of a mustard seed; these seemed to have been gradually washed out of the fistula. These discharges continued until September, 1894, after which the fistula closed. All the sponge particles taken together assumed the size of a peach-seed. The sponges had been prepared with kali hypermanganicum and sublimate; and it is easily understood that they became brittle from the process.

(58) Salin. "Bauchschnitt behufs Extraction eines bei der Koeliotomie in der Bauchhöhle vergessenen Gazestreifens" (*Hygeia,* 1891, p. 251; siehe Referat, "Repertoire Universel d'Obstetrique et de Gynécologie," 1893, p. 34). In Stockholm, on the 31st of October, 1890, an ovariotomy was performed upon a patient aged fifty-five years. On this occasion a gauze napkin was left behind in the abdominal cavity. On the 30th of December the patient left for home. On the 21st of November, 1891, more than a year after the operation, the patient noticed an abscess forming in the abdominal scar. This abscess burst, discharging a profuse quantity of bad-smelling pus, after which, on the 25th of November, 1891, a gauze napkin was pulled out of the fistulous opening. The wound was washed and drained, and upon the next day pus escaped out of the fistula, after which the wound became smaller from day to day, and finally healed.

(59) Schramm (Dresden) (*Centralblatt für Gynäkologie,* 1898, No. 18, p. 277) operated upon a young girl of the working class, aged eighteen years, for pyosalpinx duplex; as some difficulty was experienced in the vaginal extirpation of the tubes, the uterus was also removed. During this operation an assistant held the intestines up by means of a tampon in a holder. The tampon slipped out of the holder and could not be found, and in consequence thereof the vaginoperitoneal wound was left open, expecting the tampon to escape. The expectation was not realized, and the patient was up on the eighteenth day and left the institution eight weeks after. On examining the patient before leaving, a retrovesical tumor, the size of a fist, was felt, immovable and without pain. He hopes that the foreign body will escape in some way sooner or later.

(60) Schroeder, in a Therapeutic Congress at Bonn, November 11, 1898, exhibited a specimen which had been removed by an abdominal section. About a year and a half previously he performed an oophorectomy on the right side, with ventrofixation of the uterus. On primary union of the abdominal incision after the operation the patient still complained of pain in the right ovarian region. These pains increased in intensity, and were practically unbearable during the act of defecation. On bimanual examination a tumor was noticed to the right and above the movable uterus. The tumor was painful to touch, was fluctuating, and of

the shape of an egg. An abdominal section revealed adherent omentum and a tumor connected with the intestinal tract. In endeavoring to separate this tumor, the intestine was torn and discharged considerable pus. Closer examination revealed that the trouble was caused by a gauze sponge that had remained behind in a previous operation.

(61) Severeano (*Presa Medicala Romana,* 8, iii, 1896; siehe *L'Independence Médicale,* 15, iv, 1896, p. 126). After an operation for ovarian sarcoma the wound refused to heal. Notwithstanding the absence of fever, there still remained a stubborn fistula. After laminaria dilatation of the fistulous path, the operator discovered a string in the fistulous opening, and pulled out a gauze compress one hundred and thirty centimetres long and thirty centimetres broad. Twenty-two days later he again drew out of the same fistula another gauze compress the size of the previous one. Fortunately, the pus contained no virulent organisms.

(62-64) Spencer Wells had three cases. He does not care to speak of one of these cases, since it is still unexplained to him. One month after an ovariotomy an artery-clamp was found in the bladder (Case No. 917). In a second case, the assistant explained to him that a sponge had remained in the abdominal cavity; he, however, did not find the missing sponge, and the wound was closed. Six hours afterwards the nurse sent for Spencer Wells, and declared that a sponge was missing, and no doubt had remained behind in the abdominal cavity. What was he to do? Spencer Wells concluded to wait, as the patient seemed to be doing well. The following morning the patient was worse. He immediately removed two abdominal sutures, entered his two fingers into the abdominal cavity, and was fortunate enough to find the forgotten sponge. The patient recovered.

In the third case, Spencer Wells was informed by one of his friends, several hours after an operation, that a pair of hæmostatic forceps had remained behind in the abdominal cavity, but, as the patient felt momentarily well, he concluded to wait. On the following morning the patient was worse. He then removed two sutures and inserted two of his fingers into the abdominal cavity, and succeeded in removing a hæmostatic forceps. The omentum had entered into the opening of the handle of the forceps. The patient recovered.

(65) Lawson Tait ("Pathology and Treatment of Diseases of the Ovaries," Birmingham, 1883, p. 261) experienced the following accident. He performed an abdominal section, using twelve sponges, which were all present after the operation. Without the knowledge of Tait, an assistant had torn one sponge in half, and one of these halves remained behind in the abdominal cavity. After four hours the sponge was removed by Lawson Tait.

(66, 67) Terrier. Terrier on one occasion left a hæmostatic forceps in the abdominal cavity. After eight months, the foreign body was discharged in the region of the umbilicus. On another occasion Terrier forgot a sponge in the abdominal cavity after an ovariotomy. Death ensued, caused by septic peritonitis. Since then he never uses sponges, as he is convinced that there is no way to radically disinfect a sponge.

(68) Terillon forgot a hæmostatic forceps in the abdominal cavity.

(69) Thiersch (*Centralblatt für Gynäkologie,* 1898, No. 18) at an autopsy found a sponge in the abdominal cavity after abdominal section.

(70) Thomas Gillard (Wilson, L. C.) performed an exploratory section. The case proved inoperable. A few days later the patient died, and at the autopsy a piece of sponge was found that had evidently crumbled off the only sponge that was used.

(71) Williams (*Transactions of the Edinburgh Obstetrical Society,* 1890, p. 90, Vol. xv). In February, 1890, in a patient aged thirty-two years, mother of four children, a broken piece of a Southey's drain-tube, three by four inches, was found in the Douglas pouch close by the right ligament. The foreign body was surrounded with a peritoneum. The latter was of a brownish color. Between August and October, 1888, the patient was operated on several times for ascites. During one of these operations the Southey drain was used, and no doubt the piece broke off and gravitated to the bottom of the Douglas pouch.

(72) Wilson ("Foreign Bodies left in the Abdomen after Laparotomy," *Gynæcological Transactions,* 1884) forgot a sponge in the abdominal cavity after an operation for ovariotomy upon a pregnant patient. Abortion followed eighteen days after the operation, and an abdominal wall abscess followed later, out of which Dr. Hocking removed a piece of sponge. The patient recovered.

The sponge had remained five months in the abdominal cavity. The discharged sponge particles represented a mass the size of a hen's egg, and had broken off during the operation, as all the sponges were accounted for after the operation.

The patient, aged twenty-nine years, mother of three children, entered the hospital February 16, 1883. She was in the fifth month of pregnancy complicated with an ovarian cyst. On February 20 she was operated upon, and on March 9 she had an abortion. On March 16 a tumor was felt in the region of the umbilicus. An abscess ensued, which opened on the thirty-first day after the ovariotomy and fourteen days after the abortion. The abortion was caused by the abscess. On July 15 the first piece of sponge was discharged and on August 7 the wound had healed. The sponge had remained five months and eighteen days in the abdominal cavity. Wilson cited thirty cases of foreign bodies left in the abdominal cavity (*Annales de Gynécologie,* 1885, p. 149). He further states that he knew of twenty-one cases, six of which occurred in America and fifteen in Europe. Of the American cases, five were not published. He was the first to publish his case. Of the six American cases, in five instances a sponge remained, and in one a forceps. Two women died, four were saved. In one case a sponge was discovered missing just before the closure of the abdomen. It was recovered from its location among loops of intestines. In the others the wound was reopened to recover the missing sponge.

In a third case a sponge was missing after the postoperative count. In a fourth case a sponge was found during the autopsy. In a fifth case a pair of forceps was found at the autopsy. The sixth case is the one enumerated by Wilson.

In the thirty cases recorded by Wilson there are three cases reported by Spencer Wells, one by Lawson Tait, another by G. Braun, another by Carl v. Braun, three from Reeves Jackson, one from Thomas Gaillard, one from Howard, one from Atlee, one from Howitz, one from Engleman. In fifteen cases the facts are known without the knowledge of the names, and therefore we can consider these as Cases 72-86.

(87, 88) Von Winkel forgot a sponge in the abdominal cavity during a myomotomy, and the fact became known through an autopsy. In another case he forgot a forceps, which was later passed spontaneously in an abscess. (See Bode.)

(89) On another occasion, operator unknown, a Richelot clamp was left behind in the abdominal cavity.

(90) On the 9th of May, 1899, Neugebauer heard of an operation in Warsaw, on which occasion a gauze sponge was left in the abdominal cavity. The patient was brought in with an abdominal wound. The assistant had to perform an operation immediately with the help of the Sisters of Charity. The abdominal cavity was opened through the median line. The intestines were found unharmed, with the exception of the omentum. He resected the injured part of the omentum. After two weeks an abscess formed, and upon opening the same a gauze sponge was removed which one of the Sisters of Charity had forgotten.

(91) Kosinski forgot, on October 31, 1888, a hæmostatic forceps while performing an ovariotomy. Four months after operation artery clamps recovered from abdominal abscess. Recovery.

(92) Kijewski found a fragment of an irrigator in a woman who had died of nephritis that followed two weeks after an abdominal section. The irrigator, while being held at a considerable height, burst, and a fragment of the glass fell into the abdominal cavity without being observed.

(93) Kijewski found during an autopsy a gauze napkin in the abdominal cavity.

(94–96) Przewoski during autopsies on three occasions found pieces of gauze or a gauze napkin in the abdominal cavity after abdominal sections.

(97) Hefting (*Deutsche medicinische Zeitung*, March 5, 1897). A patient, sixty years of age, upon whom an abdominal section was performed twelve years previously, suffered from intestinal disturbances, especially constipation. She had not had a movement for four days. A movable tumor of the intestine with uneven surface was observed, and castor oil was administered. This was followed by the discharge per anum of a sponge that twelve years previously had been lost in the abdominal cavity.

(98) Marine (El Siglo Medico, December 18, 1880, p. 810, Schmidt's *Jahrbuch*, Band xxii, No. 6). An ovariotomy was performed upon a twenty-six-year-old patient. Eight days thereafter the drainage tube disappeared, and a week following its disappearance it was passed per anum.

(99) Rydygier (Pamixtnik 11, Zjazdu Chirurg., Polskich, 1898, p. 121). During a vaginal hysterectomy a sponge was lost in the abdominal cavity. A diligent search failed to reveal the sponge. After seven weeks

the sponge appeared in the vagina during an irrigation. The patient finally died of pyæmia, January 16, 1887.

(100) A celebrated German operator related to Neugebauer in the Eighth Congress of Gynæcologists that he had an occasion to perform an abdominal section upon a patient that had been previously operated for an apparently inoperable tumor. An artery forceps that the former operator had accidentally left behind was found in the abdominal cavity.

(101) Professor Krasowski was legally proceeded against for having left a sponge in the abdominal cavity. The suit resulted in an acquittal.

(102) Buschbeck ("Ueber Fremdenkorper in der Bauchhöhle," *Centralblatt für Gynäkologie,* 1899, No. 45, p. 1375). A patient, thirty-four years old, was brought to the Dresden Clinic with a suspected ruptured ectopic pregnancy. The abdominal section was performed by Dr. Buschbeck, who represented Dr. Leopold. The operation was uneventful. The burst left tube and ovary were removed. A great number of gauze compresses were used on account of troublesome intestinal loops. The patient made an easy recovery and was dismissed after four weeks. After two years of the most perfect health the woman again appeared, complaining of colic in the right side. A rough, irregular swelling the size of a fist was found on the right side of the uterus, which after some months had grown larger and nearer the abdominal wall. The patient was again examined January, 1899, when she had fever and severe pains. The abdominal scar had opened at the lower end. After enlarging the fistula, from which much pus flowed, a gauze cloth appeared that had evidently been left behind in the abdominal cavity during the laparotomy that had been performed two and a half years previously. This had entered the intestine, and was now ejecting itself by way of the perforation. Dr. Stelzner performed another laparotomy with resection of the intestine twenty centimetres in length. The woman recovered.

(103) In the discussion, Leopold cited a case upon which he had performed an autopsy. Death had ensued a few hours after the total extirpation of the cancerous uterus. A gauze cloth was found, but it could not be determined whether it had remained behind in the abdominal cavity or whether it was inserted into the vagina as a tamponade.

(104–106) Herr Meinert mentions in the discussion three similar cases, as follows:

(*a*) Three weeks after an afebrile laparotomy, painful resistance in the right abdominal half ensued. Incision. Removal of a mull compress that lay close under the peritoneum. The wound was tamponed. Recovery.

(*b*) A virgin, twenty years of age, with double-sided tuberculosis of the tubes. January, 1893, a pelvic abscess was opened through the vagina. In April of the same year ventral extirpation of the adnexa. Fever followed. On the ninth day a discharge of pus through the abdominal scar. Fever still continued. A through drain from the abdominal wound to the vagina, with daily irrigation. At the end of May, a tumor, the size of a hen's egg, was discovered to the left of the umbilicus. After a few days this changed its position to the left inguinal region, and finally disappeared in the depth of the pelvis. A foreign body was suspected. A

tupelo enlargement of the vaginal drainage opening, out of which a long iodoform gauze strip was removed on the 30th of May. This had been left behind from the first operation. Then followed a fistula, which after many relapses finally closed in 1895.

(*c*) 1896. A patient, upon whom a vaginal operation had been performed, referred to the frequent passage of gauze particles from the vagina. After eight days a small fistula formed on the right side of the vaginal wall. Through this a piece of gauze of an irregular form, the size of a woman's handkerchief, was removed.

(107) J. Merttens ("Ein Fall von Einwanderung einer bei Laparotomie zurückgelassenen Kompress in den Dünndarm," *Centralblatt für Gynäkologie,* 1900, No. 4, pp. 114–116). A peasant twenty-eight years of age. She had been pregnant twice and aborted once. A pelvic abscess followed the abortion. She was confined to her bed from October, 1895, until May, 1896, recovery being retarded. On March 18, 1897, the patient was placed in care of Dr. Merttens. The patient suffered from dysmenorrhœa, dysuria, and constipation, and looked very anæmic. The uterus was fixed in an inflammatory mass; the adnexa consequently could not be felt. After a protracted conservative treatment with ichthyol, iodine, glycerin tampons, Moorlaugenbader, hot douches, etc., an abdominal section was performed in March, 1899. Merttens advised her to have a radical operation. The operation was very difficult. After opening the abdominal cavity, the adnexa as much as possible were removed, the uterus remaining. In consequence of the discharge of flatus and fæcal matter, the operation was extremely difficult. The patient was removed to her home at the expiration of two months, but still having pains. Five months after this operation she again called upon Dr. Merttens, complaining of almost continual pains and looking more pitiable than ever. The abdominal section had healed well. Lower abdomen almost well and not painful to touch. Uterus normal but not very movable. The patient herself described her pains as being farther up. Merttens discovered, to his astonishment, a soft, movable mass the size of a fist, that had escaped his former examinations. He suspected that a foreign body had accidentally been left in the abdominal cavity. In view of this, as the pains continued and the patient could not retain anything, Dr. Merttens performed another abdominal section on the 29th of August, 1899. Abdominal section direct over the site of the tumor. The expected foreign body was not at once revealed, but a spindle-shaped swelling representing an intestinal loop was observed. Close to this loop the intestine was of a dark-blue color; it was movable upwards, but beneath the spindle-like swelling it entered the growth. On account of its dough-like substance, it was thought to be a fæcal impaction.

While attempting to draw out the movable intestinal loop, the intestine tore to the mesenterium, just at the edge of the spindle-shaped swelling; out of this swelling a gauze compress was projecting which was covered with fæcal matter. Gauze compresses were arranged to protect the abdominal cavity, the intestine being resected. Drainage by iodoformized gauze strips was practised. The following day the patient had a collapse accompanied with cold extremities and profuse perspiration. Camphor,

ether, and narcotics profusely applied finally brought the patient around. On the third day a discharge of flatus. On the tenth day a gradual removal of the gauze, which was completely removed on the twenty-first day without any fistula remaining. After fourteen days she partook of food per os, and after four weeks the patient left the bed. Recovered. The compress which had remained behind had broken into the intestine.

(109) Professor Frankenhauser removed by means of an abdominal section a sponge that had been left behind during an abdominal myomotomy. Recovery.

Author's Analysis of Neugebauer's Résumé.

Of these 109 cases forty-three resulted in death, one result unknown.

The following cases in which foreign bodies were left behind recovered.

On thirty-one occasions a sponge, Nos. 4, 5, 9, 17, 20, 22, 23, 24, 25, 26, 27, 28, 32, 33, 35, 36, 52, 53, 56, 61, 63, 64, 66, 68, 69, 71, 72, 73, 87, 101, 109.

On thirty-three occasions a gauze sponge, napkin, or mull compress, Nos. 1, 2, 7, 8, 18, 21, 30, 31, 37, 39, 42, 43, 44, 49, 50, 51, 55, 57, 58, 59, 60, 90, 93, 94 95, 96, 97, 99, 102, 104, 105, 106, 107.

Unaided nature successfully dealt with the complication in the following cases:

On four occasions a drain-tube, Nos. 6, 47, 70, 98.

On one occasion a Richelot clamp, No. 89.

On nineteen occasions an artery-clamp, Nos. 3, 10, 16, 19, 34, 38, 40, 41, 45, 46, 48, 54, 62, 65, 67, 75, 88, 91, 100.

On one occasion a seal-ring, No. 29.

On seventeen occasions there is no mention made of what kind of foreign body had entered the abdomen.

On one occasion a glass splinter from a burst irrigator, No. 92.

In three cases two foreign bodies were left behind: Two artery-clamps in No. 38; two gauze napkins in No. 2 (the one was spontaneously discharged per anum, the second was removed by abdominal section out of the intestine), and No. 60 (both gauze napkins protruded out of an abdominal wall abscess).

The fate of the patients where an artery-clamp had remained behind: nineteen cases.

In seven cases death ensued after the operation. In six cases death ensued immediately after the operation from sepsis

(Nos. 10, 19, 54, 67, 75, 100), and once (in No. 38) after a second operation several months after injury to artery.

In three cases the artery-clamp was discharged spontaneously per anum: No. 45 (after four years), No. 46 (after nine months), No. 48 (after ten months).

On one occasion the artery-clamp entered the bladder in a manner that has remained unknown (No. 62).

On two occasions the artery-clamp was removed from the abdominal abscess: No. 65 (after eight months), No. 88.

On one occasion the clamp was immediately missed before the closing of the wound, and when searched for was found in the cul-de-sac of Douglas, No. 41.

On two occasions the abdomen was reopened to search for the missing clamp and found, Nos. 3, 16.

On four occasions an abdominal section was made later: No. 34 (after one and one-half years), No. 38 (after several months), No. 40 (after two years), No. 91 (after three and one-half months).

Fate of the patients in which sponges were left behind, twenty-nine:

On twenty-one occasions the sponge was discovered at the autopsy. On two occasions the sponge was missed just before the closing of the wound, was searched for and found, Nos. 33, 73.

On three occasions the sutured abdomen was reopened in view of a missing sponge, Nos. 17, 28, 72.

On three occasions an abdominal section had to be performed: No. 61 (after twenty-four hours), No. 63 (after twenty-four hours), No. 64 (after four days).

On one occasion the sponge appeared at the orifice of an abdominal abscess: No. 71 (after five months and eighteen days).

On one occasion sponge particles were gradually discharged from an abdominal fistula: No. 56 (after more than one and one-half years).

Fate of the patients in which drainage tubes remained behind; four cases:

No. 6. An abdominal section four days later to remove a drain tube that had slipped into the wound.

No. 47. The drain tube was discharged from the vagina while dancing, a long time after the operation.

No. 47. A drain tube that had been lost during a paracentesis two years prior (Southey's drain) was recovered in the pouch of Douglas during an autopsy.

No. 98. The tube was discharged per anum after two weeks.

The following cases have been collected by Schachner as an addition to those gathered by Neugebauer.

(1) W. O. Roberts. After an abdominal hysterectomy a small gauze sponge was left behind. Suppuration with its attending symptoms ensued. A week later the wound opened and the sponge was recovered. The patient made a good recovery.

(2) Operator unknown. Louis Frank was called to see a young woman upon whom a vaginal operation had some time previously been performed by another surgeon. The woman presented symptoms of some inflammatory pelvic condition, and for the relief of this was subjected to an abdominal section. Dr. Frank found a pus-tube on one side and a sponge close by that had been left by the other surgeon. The tube and sponge were removed, and the patient after a tardy convalescence recovered.

(3) Operator unknown. Irvin Abell, while interne in the Louisville City Hospital, assisted in an autopsy upon a woman who had been operated upon by the abdominal method. The history of the case was as follows: A woman, aged twenty-six years, white, had her uterus, tubes, and ovaries removed by the vaginal method. This operation had been performed three years previously. On entrance in the hospital she presented a mass in the left side of the pelvis, for which an abdominal section was performed. A large ovary and hydrosalpinx were found and removed. The patient died seventy-eight hours after the operation with symptoms of intestinal obstruction. At the autopsy a flat sponge was found.

(4) Howard A. Kelly, "Foreign Bodies in the Abdomen after Operation," *New York Medical Journal,* March 24, 1900) reports an exceedingly difficult hysteromyomectomy in which he used drainage. A day or so later he found a hard body in his drainage tract, which proved to be an artery-forceps. This is the only time he has known an instrument to be left in the abdomen in his practice. The patient died as a result of a frightful hæmorrhage from the left uterine artery during operation.

(5) Howard A. Kelly reports another experience in the case of a woman with pelvic abscesses on both sides. He was obliged to leave town soon after operating upon her, and upon returning was informed that she was doing badly. On opening up the wound he was fortunate enough to discover a foul marine sponge just under the abdominal wall. This was removed, a drain was left in, and she recovered.

(6-8) The following three cases are extracted *verbatim* from the above-named article by Howard A. Kelly:

(*a*) "Operation by my first assistant; median abdominal incision. The tumor was found to be a large fibrous growth springing from the transversalis fascia. The abdominal cavity and the pelvis were not involved. The mass was excised, after much difficulty, from the densely adherent surrounding tissues of the right abdominal wall, and several centimetres of the underlying peritoneum were removed with the tumor. The hæmorrhage was excessive, but finally perfectly controlled, and the wound closed with silkworm-gut and catgut sutures.

"*Convalescence.*—For ten days after operation the patient's general condition appeared fairly satisfactory. The first dressing was made at this time and healing *per primam* had taken place. The temperature rose to 101° F. on the evening of the second day, but after twelve hours fell to 100.4° F. For the next seven days the temperature ranged between 98.5° and 100.5° F., and the pulse between 90 and 110, varying its rate with the height of the temperature. On the eleventh day the temperature rose to 102.5° F. and the pulse to 120, and both remained elevated afterwards, but with marked diurnal variations, suggesting sepsis. The general condition of the patient was fair; little pain or discomfort was complained of.

"On December 5, twenty-eight days after operation for the first time, a smooth, boggy, movable mass was detected, extending from the median line to the left flank.

"Second operation, twenty-eight days after the first. Under chloroform anæsthesia an incision was made over the swelling, and a piece of gauze weighing 360 grammes was removed from a cavity apparently completely walled off from the general peritoneal cavity. Much thick, greenish pus was evacuated and the abscess cavity sponged and irrigated. A counterincision was made in the left flank and iodoform gauze placed in the bottom of the cavity and brought out of the lateral opening. The wound was then closed.

"After this operation the temperature soon became normal. The wound was irrigated and dressed daily. The purulent discharge gradually subsided and the drain-tract granulated vigorously.

"Third operation, on the forty-third day. Suddenly, during irrigation of the wound with 50 per cent. boric acid solution, the patient cried out with pain, and her condition became alarming, the face anxious and livid, lips blue, hands and feet cold, the pulse from 130 to 140. The abdomen was negative on examination. As the condition of the patient did not improve after three hours, an exploratory cœliotomy was made, opening the cavity of the abdomen; several hundred cubic centimetres of bloody fluid were found, evidently introduced through the drain-tract at the time of the irrigation. But few intestinal adhesions were met with, and the peritoneal surfaces were for the most part smooth. Several pieces of iodoform gauze were introduced into the pelvis, the ends being brought out at the lower angle of the abdominal wound. This was followed by an uninterrupted recovery; the drainage was gradually removed, and her temperature and pulse were normal during the last three weeks of her stay in the hospital. She was discharged 'well' on January 16, 1899."

(*b*) The next accident of this sort occurred in a woman, aged forty-

five years, from whom a multilocular ovarian cyst, having dimensions twenty-five by twenty-nine by eight-tenths centimetres, was removed. The operation presented no unusual difficulties. She was simply profoundly exhausted on returning to the ward, but responded to treatment and gained slowly in strength. The wound, dressed on the tenth day, was found to have healed *per primam*.

From the ninth day after operation there was some irregularity of temperature, which, before normal, now ranged daily from 97° to 99.5° F. After the twenty-second day these variations became more marked. The pulse remained rapid throughout, and the general condition did not improve. She had a slight attack of pleurisy in the sixth week, followed by an irritating persistent cough. Some sordes collected in the mouth, yielding slowly to treatment. She was restless at night and extremely nervous, and had a capricious appetite; but there was nothing to suggest an abdominal complication until two months after operation, when a slight prominence in the abdominal wall was noticed. The elevation was six centimetres in diameter, and lay six centimetres median to and above the anterior superior iliac spine. Distinct fluctuation was detected at the summit.

Second operation. On the seventy-fifth day after the cystectomy, under chloroform anæsthesia, a free incision was made over the prominence and an abscess cavity entered, completely walled off from this peritoneal cavity, and a large gauze pad removed. A considerable quantity of purulent material was evacuated and the wound washed out and packed with iodoform gauze. Almost immediately afterwards the temperature fell to normal, and did not rise subsequently above 99.4° F. The improvement from this time, though slow at first, was steady, the appetite increased, and she gained steadily in weight and strength.

She was discharged "well" on March 9, 1899, a hundred and twenty-nine days after admission. Seen recently, about a year after operation, she was found to be in the best of health and about fifty pounds heavier.

(*c*) The operation, a simple cystectomy, with the removal of an adherent vermiform appendix, proceeded in an entirely satisfactory manner, and at the end of the operation, upon inquiring of a trusted assistant of large experience whether any gauze was left, he counted carefully and assured me all had been removed.

The patient had suffered for years with severe headache and pain in the left lower abdomen, thought by her physician to be due to sciatica.

For three days after the uncomplicated operation the patient's condition was fairly satisfactory. She was nauseated following the ether anæsthesia, but had a good night, with a pulse ranging from 87 to 104. On the second day she became somewhat restless, and there was frequency of micturition, followed by involuntary voiding. There was no marked abdominal pain.

The temperature during these three days rose once to 100.5° F.; the pulse was of good volume, varying in rate from 87 to 110. Nourishment was well taken, and the bowels were easily opened. The restlessness persisted, however, and a severe burning pain was complained of in the abdomen.

On the fourth day she became more nervous, and the abdominal distress increased when she began menstruating. About noon considerable intestinal distention was noticed, the tongue became parched, and there was some nausea. These symptoms seemed to abate under palliative treatment, but that night, the fourth day after operation, the temperature rose to 103.4° F., the pulse to 118, and she became evidently weaker. Urine and fæces were then passed involuntarily and the abdominal pain increased.

The next day the abdomen was opened under chloroform anæsthesia. The intestines were found distended, reddened, and covered with lymph. On the right side of the abdominal cavity a large piece of gauze, adherent to bowel and surrounded with pus, was discovered and removed. The pelvis contained several ounces of bloody serum.

After this second operation the temperature reached 105.2° F.; the pulse was weak, 110 to 124 a minute. There was marked asthenia, and she did not respond to vigorous stimulation; the incontinence of urine and fæces continued. The temperature rose to 106° F. and pulse to 140, weak and running, and she died quietly at 6 P.M.

(9) F. W. Samuel, March 5, 1899. Patient aged thirty-eight years. Uterine fibroid and double pyosalpinx. Abdominal operation. Death third day following. Only sixteen ounces of urine in the first twenty-four hours after operation, and a few drachms afterwards. This showed albumen, abundant hyaline and granular casts. Urinary examination previous to operation showed nothing abnormal. Autopsy was made, during which a flat sponge was recovered from the abdominal cavity. Kidney sections showed acute cloudy swelling.

(10) Horace Grant. A man was brought into the City Hospital suffering from a gunshot injury of the abdomen. A laparotomy was performed for the relief of this condition. The man lived a number of hours after the operation, and at the autopsy two gauze sponges were found matted together.

(11) T. S. Bullock. In operating for ventral hernia following a former laparotomy a gauze pad was left in the abdominal cavity. The patient did nicely for three days. On the fourth day she developed a slight fever, and also complained of griping pains in the lower part of the abdomen. The wound was examined and found to have united, except at the lower angle, from which a profuse discharge of non-odorous serosanguineous fluid escaped. There was no distention of the abdomen and no tumor. This continued until the seventh day, when the discharge became offensive and the wound began to look bad. The stitches were taken out on the eighth day. At the lower angle a cavity was noticed from which a missing gauze pad was extracted. It measured seven inches in length and five inches in width, weighing 160 grains. After a tardy convalescence the wound entirely closed.

(12) Operator unknown. The following case was reported by Dr. Robert G. Le Conte. A patient had been operated upon for abdominal pains and swelling, which proved to be of a tubercular nature; as a result of this operation a sinus persisted, discharging from time to time small amounts of liquid fæces. At this time the patient came under Dr.

Le Conte's care. Her weight was sixty-five and one-half pounds, and she was a most miserable-looking object. In a few days the sinus began to enlarge. On February 10 something could be felt at the bottom of the sinus. A pair of forceps was introduced and a piece of gauze about five feet long and a yard wide was removed. The wound finally healed, and the patient left very much improved. (ANNALS OF SURGERY, Vol. xxxiii, p. 209.)

(13) Personal communication. Name withheld. A boy nine years of age was operated upon for an appendicitis of two weeks' duration; the abscess was a large one, extending to the liver, with gangrene of intestines. A counteropening was made in the loin and the abdomen packed with gauze. After the sutures were removed, he continued to discharge pus freely, and abscesses appeared at different parts of the body, evidently pyæmia. About three weeks after the operation a gauze pad appeared at the wound, and after its removal recovery promptly followed.

(14, 15, 16) Robert F. Weir. (See personal communication.) In three cases foreign bodies were left in the abdominal cavity, the one was a sponge and the other two gauze pads. The first resulted fatally; whether from the sponge alone, or from the general peritonitis of an appendical origin which demanded operation, I am unable to say; the other two recovered from the mishap, one in five days, the other in five months.

(17) R. Matas. (See personal communication.) On one occasion a strip of iodoform gauze pack remained buried in granulations, and was finally covered over entirely. The patient returned six months after with a suppurating sinus, the exploration of which led to the discovery of the gauze. The sinus healed with the removal of the foreign body.

(18, 19, 20) George R. Fowler. (See personal communication.) On three occasions gauze pads have been left in the abdominal cavity. Result not mentioned.

(21, 22) A. Vander Veer. (See personal communication.) On two occasions foreign bodies were left in the abdominal cavity. One instance occurred a few years ago when using old-fashioned sponges. The patient died from a general peritonitis. The other occurred three years ago in a case of extensive carcinoma of the uterus. A small sponge was left, the patient making a good recovery. On the reappearance of the disease a year later, an exploration was made, resulting in the finding of the sponge.

(23, 24) Operator unknown. Reported by William R. Pryor. (See personal communication.) On two occasions iodoform gauze was left in the pelvis after vaginal operation. No names or details given.

(25) Charles Noble. (See personal communication.) Sea-sponge was left in the uterovesical pouch. The patient made an uncomplicated recovery and returned home. Some weeks later she developed inflammatory symptoms, and had what was supposed to be an abscess anterior to the uterus. The abdomen was reopened, and the cause of the inflammation found to be a sponge. The leucocytes had almost disintegrated the sponge.

(26, 27) Operators unknown. Dr. J. B. Murphy (see personal communication) reported two cases, both occurring in the hands of other

operators,—in the one two laparotomy sponges were allowed to remain, and in the other, a large fragment of gauze. No names or further details given.

(28, 29) Matthew D. Mann. (See personal communication.) In two instances foreign bodies were allowed to remain in the abdominal cavity. In one, a hæmostat, which was removed within an hour after the operation, no harm following. In the other, a large flat sponge remained in the abdominal cavity over night, and was also removed without detriment to the patient.

(30, 31, 32) Operators unknown. Reported by Matthew D. Mann. (See personal communication.) In three instances in the practice of other surgeons, names not mentioned, gauze pads have been left behind in the abdominal cavity, two of the patients dying, whether from the effect of the pad is unknown. In the third instance, some months after the operation, the pad was discharged through the abdominal wall at the site of the incision. The patient recovered.

(33) E. Lewis. (See personal communication.) A medium-sized gauze sponge was introduced to press the intestines back while suturing. The sponge was forgotten. The patient did very well. Very little temperature. The sutures were removed on the tenth day. Union was perfect. About the fourteenth day a localized swelling occurred in the scar, which opened. In enlarging the opening, the sponge was noticed and withdrawn. The patient finally recovered.

(34) Archibald MacLaren. (See personal communication.) A piece of gauze was left in the abdominal cavity after an operation for suppurative appendicitis. The wound partly closed. After a stormy convalescence, the sponge worked its way to the surface and was removed from the drainage tract three weeks after the operation. This case is an additional one to two others by the same operator, both of which are reported in Neugebauer's list.

(35) Arpad G. Gerster. (See personal communication.) A small iodoform packing slipped away during a stormy cœliotomy for inoperable cancer. As there had been much fever before the operation, and the local symptoms caused by the foreign body not very distinct because of the slow peritonitis, the case remained unexplained until the autopsy revealed the actual facts.

(36) Operator unknown. Frank Hartley (see personal communication) referred to a case in the practice of another surgeon where not only a gauze pad but a clamp attached to it became lost in the peritoneal cavity. No names or other details.

(37) B. C. Hirst. (See personal communication.) During an abdominal section, the assistant, an older surgeon, tore one of the sponges in halves and tucked one half between the bladder and ureters, without mentioning the fact. The woman died of shock, and the sponge was removed at the autopsy, much to the surprise of every one, since the count at the close of the operation gave the correct number of sponges.

(38) Operator unknown. George Ben Johnson. (See personal communication.) During a hurried operation by another surgeon, who relied upon his nurse for the count, the abdomen was closed with a sponge

FIG. 3.—Showing tumors removed from the author's case.

remaining within. For the first ten days the patient did well, then a localized peritonitis developed, and a swelling occurred near the umbilicus. The abscess finally ruptured. A fæcal fistula resulted, and for this she consulted Dr. Johnson, who undertook to operate for the relief of this condition. An extremely large opening was found in the small intestine. A rapid end-to-end anastomosis was made with a Murphy button. Dr. Johnson was convinced that a foreign body was left in the abdomen, and, getting no history of its expulsion, a few days after operation made a digital examination of the rectum and found in it a large gauze pad.

(39) Wm. M. Polk. (See personal communication.) During an abdominal section performed ten years prior, one of the sponges was divided and one-half remained behind in the abdominal cavity. Result not mentioned.

(40) A. Schachner. (Original report.) Mrs. X., aged forty-three years, colored, occupation, laundress, was referred to me by Dr. George F. Simpson. At the time of examination the woman was and had been bedridden for weeks. She was a nullipara. Her menstrual history had the customary attacks of menorrhagia and metrorrhagia. Examination revealed a multiple fibroid condition of the uterus. By external and combined examinations, the conclusion was reached that the tumor was movable and devoid of any especially difficult attachments. She was operated upon before a limited number of members of the senior class of the Louisville Medical College, but not in the college clinic. An abdominal incision was made from the umbilicus to the pubes. The tumor consisted of four principal masses having the size of fœtal heads. The more superficial masses were readily delivered. The deeper ones were managed after most difficult and laborious efforts. The adhesions were dense, and the tumor had assumed such relations that when all the masses were delivered a portion of the aorta remained exposed. Many clamps and hæmostatic forceps were necessary to control the bleeding points. At one time during the operation the condition of affairs appeared truly hopeless, and it was believed that a really inoperable case had been attacked.

After the lapse of two months the woman was again upon her feet following her old occupation of laundress. During the postoperative course a urinary fistula developed in the wound, and after continuing for ten days ceased spontaneously. The wound entirely healed, the patient continuing free of any pain or discomfort for seven months after the operation. At that time I was again called by Dr. Simpson to see the patient, and found her suffering from intense abdominal pains. There was no elevation of temperature, but marked symptoms of intestinal obstruction. This onset was rather sudden and lasted for eight hours, when she was removed to the Louisville City Hospital. A second abdominal section was performed upon her at midnight. Numerous fibrous bands were encountered, together with a mass of small intestines. Upon manipulating these intestinal loops, two ring-like bodies were felt through the intestinal wall. The intestine was incised, and a pair of hæmostatic forceps removed which had been accidentally left behind from the former operation. The intestine was closed and the patient made an unbroken recovery.

(41) Operator unknown. Dr. John A. Wyeth, in a private communication, mentioned an instance where he had witnessed the removal of an artery-forceps at a post-mortem. The operation had been performed in a New York hospital, but the name of the operator was not given.

(42, 43) Operators unknown. Dr. Arthur J. Boyd, in a personal communication, reported two instances in which pads were left in the abdominal cavity. These cases occurred during Dr. Boyd's internship in a Louisville infirmary. The names of the operators were not given. A woman had been operated on for an ectopic pregnancy. A number of gauze sponges were used, and at the close of the operation it was supposed that all of the pads were removed. The patient did fairly well for a time, but later began to complain of pain, together with the formation of a fistula. She became emaciated and lost flesh. During one of the dressings some time after the operation a gauze pad presented itself at the fistulous opening and was removed. The removal of the pad was attended with a prompt recovery. Another patient had been operated upon for diseased adnexa. The operator was informed that one pad was missing. A search was made, but no pad was found, whereupon the operator insisted that none could have been overlooked, notwithstanding the fact that the assistant and sister both insisted that one must have remained behind. The patient lived about two days, during which time she complained of great pain in the region of the spleen. She became tympanitic, and died with symptoms of acute septic peritonitis. No post-mortem.

(44) Dr. Wm. T. Bull, in a personal communication, reported a case where a large flat sponge was left in an open cholecystotomy. It was recognized on the fifth day, when the gauze packing was removed. Recovery.

(45) Operator unknown. In a personal communication, Dr. Henry O. Marcy mentions an instance in the practice of one of his colleagues where a thick gauze pad was left. Result not mentioned. This same correspondent referred to a large diamond ring that had remained for six months in the abdomen of a woman. The name of the operator withheld. Several reports have been received concerning rings that have been left, which made it impossible for the author to determine whether these were different cases or whether they represented one case that had received uncommon notoriety.

(46) Operator not mentioned. Dr. Henry O. Marcy in the same communication referred to a sponge that one of his colleagues in Boston had left with fatal issue.

In closing, the writer begs to submit the following conclusions:

(1) So long as surgery continues an art, so long will foreign substances continue to be unintentionally left in the abdominal cavity.

(2) That the recorded cases are not representative of the true frequency of this accident.

(3) If the foreign body is of an aseptic character, nature endeavors to care for the same by encapsulating the foreign substance primarily in a fibrous exudate interspersed with leucocytes, and secondarily enclosing it by the contraction of adhesions between the different abdominal viscera or the viscera and abdominal wall.

(4) In the spontaneous expulsion of a foreign body from the abdominal cavity nature seeks exit through points of least resistance, which are either the alimentary tract or an imperfectly united wound, or less frequently through the reopening of an apparently well-organized cicatrix.

(5) A foreign substance may remain quiescent for years in the abdominal cavity.

(6) The disturbance which a foreign body creates in the abdominal cavity depends upon its sterility, size, character, *e.g.*, regularity of outline and presence of sharp or pointed surfaces; density, point of location, individual tolerance of the peritoneum, and behavior of the individual.

(7) The symptoms of a foreign body in the abdominal cavity may vary from *nil* to that of the most violent intra-abdominal disturbance.

(8) The symptoms not infrequently suggest a low and protracted form of sepsis or an ileus.

(9) Unexpected circumstances, unusual complications, and diverted attention explain many of these accidents.

(10) While the counting and recounting of sponges and pads before and after an operation by one or more individuals should and always will be a most important feature in the prevention of this accident, yet the cases are numerous where the accident occurred notwithstanding this count by one and even two nurses or assistants.

(11) The plan of attaching tapes or threads to pads and instruments has received the recommendation of many operators, but the fallibility of this is as clearly proven as the former.

(12) In restricting ourselves to the smallest number of pads, sponges, and instruments, we adopt a system of sim-

plicity that must appeal to all as one of the most important elements in the avoidance of this accident.

(13) We can only hope to reduce these accidents by the observance of the highest degree of simplicity, system, and watchfulness.

(14) If the surgeon at the close of the operation asks for a count of sponges, and this is made, and an assurance given that all sponges and pads are present, his responsibility upon this point ceases; for it is neither prudent nor fair that he should leave his, the most important, part to do duty that justly belongs to the nurse.

(15) The real factors in the avoidance of this accident are the recognition of system, simplicity, and watchfulness to the most exacting degree.

(16) At the bottom of most of these accidents we find a diverted attention, a defective system, or a dangerous degree of complexity.

(17) We are obliged to conclude that to a certain extent the surgeon is responsible for things about the operation, and after that the responsibility must rest elsewhere.

(18) No hard and fast rules can be made regulating the responsibility in every case, but each will be required to be decided upon its own merits, and the responsibility be fixed accordingly.

(19) There are risks that the patient must assume and that cannot rightfully be transferred to the operator. (Sanger, of Leipzig.)

(20) In other vocations it is reasonable to assume that, unless properly prepared, one should not act; but in surgery one is occasionally compelled to act, even though it is known that he is not prepared, and in these conditions to adopt any other course than that would be attended with the loss of more lives than if we did not make the best of the circumstances.

In closing, I beg to gratefully acknowledge the assistance of Dr. Howard A. Kelly, of Baltimore, who kindly supplied much important reference literature upon this subject.