

**ABDOMINAL SURGERY WITHOUT DETACHED PADS
OR SPONGES.**

**A SIMPLE, CERTAIN AND UNIVERSALLY APPLICABLE METHOD OF
PREVENTING THE SERIOUS ACCIDENT OF LEAVING A
SPONGE IN THE ABDOMEN.**

BY

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(With six illustrations.)

A SPONGE left in the peritoneal cavity following an operation constitutes one of the most deplorable accidents of abdominal surgery. This is not a new subject. As you are well aware, much has been written upon it and many cases have been reported and many suggestions have been made as to preventive measures. But all such measures hitherto proposed have broken down under the varied circumstances and vicissitudes of surgical work, as evidenced by the records subsequently cited.

The continued occurrence of this fatal accident and the failure of the preventive methods in general use constitute sufficient reason for my calling attention to a method which I have used with much satisfaction for the past two years. This method gives entire security and at the same time is simple and inexpen-

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sive and is effective in all conditions of abdominal work—in the emergency operation in the country with unfamiliar assistants, as well as in the routine hospital work. Before taking up the details of this method, however, I wish to call attention to certain facts in regard to the accident it is designed to prevent, so as to bring out more clearly the seriousness of the accident and the difficulties encountered in its prevention.

1. Sponges are lost in the peritoneal cavity much more frequently than is generally supposed. The table given later shows 172 authenticated cases in which one or more sponges were lost in the cavity. And these reported cases represent only a small proportion of the recognized cases, for, naturally, the accident is not given publicity except where there is some special reason for doing so. In any large body of surgeons a little experience meeting, in which testimonies are freely given, will bring to light a number of unreported cases of this accident.

Furthermore, many cases are not even recognized. The patient dies with evidence of peritonitis; there is no suspicion of any foreign body having been left in the abdomen, no postmortem examination is made and the death is supposed to be due to ordinary peritonitis. The possibilities in this direction are indicated by the fact that in the series mentioned, in thirty-nine of the cases the accident was recognized only on postmortem examination, when the sponge was found, but would have remained unknown had there been no autopsy.

2. It is a most serious accident. In the large series of cases collected more than one-fourth of the patients died, and of those who recovered many went through weeks and months of suffering.

3. To persons outside the profession the accident seems absolutely inexcusable. They can understand how other complications may arise, such as hemorrhage or sepsis or kidney failure in spite of every precaution, but they can imagine no reasonable excuse for allowing a sponge to be lost in the patient's interior. To those not familiar with surgical work it seems past belief that the surgeon would carry into the peritoneal cavity anything the removal of which was not provided for with absolute certainty.

The growing cognizance of the public in regard to the occurrence of this accident and the feeling in regard to the responsibility for it are reflected in the increasing number of lawsuits connected therewith. In the latter part of this article is a list of lawsuits from this cause found in a partial search of literature. Within the last few months, two such lawsuits in a single State

have come to my notice. Last March the following newspaper notice concerning a suit in Des Moines, Ia., was sent to me by a St. Louis physician who was personally acquainted with the defendants. "Damages to the extent of \$1500 were awarded to Etta Reynolds by the jury this afternoon. Miss Reynolds sued Drs. Schooler and Smith for leaving a piece of gauze sixteen inches square in her abdomen after an operation."

In casually reading the St. Louis *Republic* for May 30, I happened to notice the following news item: "Davenport, Ia., May 29. After being out forty-eight hours, the jury in the \$50,000 damage case of Mrs. Annie Arp, against Dr. A. L. Hageboeck, Dr. J. T. Haller and Dr. J. H. Meyhaus, reported they were unable to agree and were discharged. The jury stood 11 to 1 in favor of awarding Mrs. Arp damages. The case was first tried a year ago, when the jury also disagreed and stood the same, 11 to 1 for the plaintiff. The defendant doctors are charged with having left a surgeon's sponge in the body of John Arp, husband of the plaintiff, at the time they performed an operation for appendicitis. This caused abscess which resulted in death."

4. There has hitherto been no sure preventive method which was applicable in all the circumstances of abdominal surgery. The list of preventive measures recorded later shows that much thought has been given to devising means for preventing this accident. Rules interminable have been proposed, and expensive and cumbersome racks and stands devised for the purpose. Not one of these devices, however, has proven absolutely safe, for the reason that, in their use, the certain removal of all sponges carried into the abdomen depends on the studied attention of the operator or on a system of attentive cooperation among assistants or nurses. While such attentive cooperation is entirely feasible under ideal conditions and with ideal persons, the fact remains that it is not secured and is not likely to be secured under the variable circumstances of abdominal work. The many emergencies which arise in the course of abdominal operations, the changing assistants and nurses, the hurried operations at night in the hospital with short help, the operations in private homes where the patient cannot be gotten to the hospital at all—all these conditions play havoc with safety arrangements depending upon a nicely-balanced system of rules and cooperation or on the use of cumbersome racks or stands.

There is not time here to take up in detail the various ways in which mistakes have occurred; suffice it to say that a review of

the cases where dependance was placed on counting shows an appalling list in which a sponge was left, because one was hastily torn in two and one-half forgotten, or an extra one was primarily included in the bundle and missed in the counting, or an extra one was secured for an emergency during the operation, or some loose piece of gauze, not intended for intraperitoneal use, slipped in while near the wound, or a mistake was made in the final count of the sponges removed. It is astonishing what a little slip, what a slight inattention, may lead to a sponge being left and the consequent death of the patient.

The method of attaching a tape to each sponge and then fastening a forceps to the tape and at the same time to the abdominal sheet, is the method probably in most general use. It has a record of many accidents—the tape pulled off the sponge, or there was failure to attach the forceps, or the forceps failed to hold well. In one case the sponge, tape and forceps were all lost in the cavity.

The difficulty of guarding absolutely against leaving a sponge in the abdomen is such that entire security against this fatal accident is counted one of the unsolved problems of abdominal work. Practically all writers on the subject state that there is no guaranty against its occurrence, even in routine hospital work and with all the rules of cooperation and the special apparatus designed to prevent it. Neugebauer, in a most exhaustive consideration of the subject, comes to the conclusion that the accident is, to a certain extent, unavoidable. Schachner, in an excellent paper, states, "So long as surgery continues an art, just so long will foreign bodies continue to be unintentionally left in the abdominal cavity." In an article published in August Findley states, "In former years, the abdominal surgeon was seriously disturbed by well-grounded fears of secondary hemorrhage and sepsis, but surgery has mastered these problems to a large degree and they are little feared and seldom experienced. Now it is the thoughts of the sponge that disturb the night's repose when the report comes that something has gone wrong with our patient. The operator can never rid himself of the feeling of uncertainty as to the possibility of leaving a sponge." This expresses very well the feeling of those who have given attention to this subject, and particularly of those who have personally experienced the accident and have thus been brought face to face with a concrete exemplification of the inadequacy of the usual methods.

The failure of the safety methods in general use is due to their dependence upon *sustained attention* concerning the sponges, which attention on the part of the surgeon cannot be given to the sponges, for it is required elsewhere. A method, to be effective under all circumstances, must be practically *automatic*. It must also be applicable in emergency work in the country as well as in hospital work and it should be fairly convenient. The method I have used for the past two years is such a one, insuring the removal of all gauze without particular attention on the part of anyone.

THE METHOD.

The underlying principle of this method is the elimination of all detached pads and sponges. In place of them I use long strips of gauze, each strip packed into a small bag in such a way that it may be drawn out a little at a time as needed. The method was described in detail last September and it was demonstrated before the St. Louis Medical Society in February of this year. It is from the latter description that the following quotations are made.

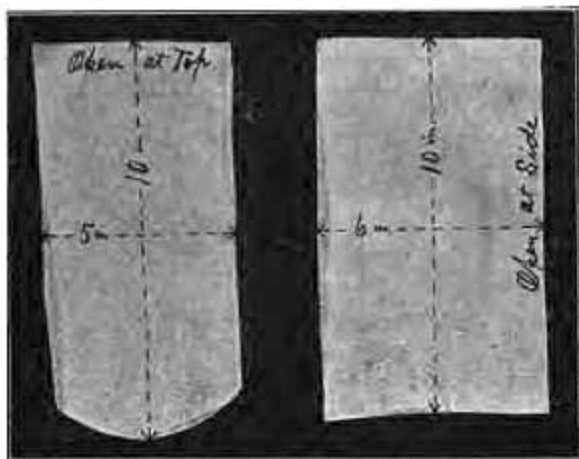
Following the usual technic, I operated for years without accident; but three years ago, I left a gauze pad in the abdomen. The case was one of diffuse pelvic suppuration requiring extensive drainage and, fortunately, the pad was discovered and extracted through the drainage opening about two weeks later. "The patient recovered without serious result from the accident, but the lesson was not lost. I determined to find some method that would really prevent such an accident—a method which would be entirely under the control of the operator and first assistant (a greater division of responsibility increases the danger) and one which would occasion no delay in the closing steps of the operation.

"There had to be taken into consideration the large pads for holding the intestines out of the way and the small pads and gauze pieces for sponging. In place of several large pads for packing back the intestines, I adopted the large roll of gauze, then in use by a number of operators, and found it satisfactory.

"The matter of the small pads and sponges, however, was not so easily disposed of. I felt that it was imperative to find some method that would do away entirely with dependence on the counting of the sponges at the close of the operation. As long as there was dependence on counting of the numerous small pads

and sponges there would be mistakes, and consequently sponges would occasionally be left in the cavity.

"To eliminate this hazardous dependence on counting and to provide a method that would make the leaving of a sponge in the abdomen practically impossible was not an easy task. I worked over the problem for the greater part of a year. I tried various methods in common use for keeping track of the small pads and sponges, such as clamping an artery forceps to a tape attached to each sponge, attaching a heavy ring to each tape before sterilization, clamping each tape or a corner of each sponge to the



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FIG. 1.—The Cloth Bags Empty. A. Bag for each Narrow Strip. It is five inches wide and ten inches deep, and is open at the top. It is made of extra heavy muslin and is sewed with French seams, so that there is no chance for any raveling to be pulled out with the gauze. B. Bag for the Wide Strip. It is six inches by ten inches, and is open at the side. This bag is the same as those for the narrow strip except that it is one inch wider and is open at the side instead of at the end.

sterile sheet about the wound and the like. But I found no such method that was practical under all circumstances and absolutely safe.

"It then became evident to me that if safety were to be secured, the detached pads and sponges must be eliminated entirely. In pursuance of that idea I devised the method here described. The principle of this method is that no detached piece of gauze shall enter the abdominal cavity. Each piece of gauze introduced for sponging is simply part of a very long piece, the greater part of which is always outside the cavity."

To make assurance doubly sure, I have recently put the large

roll of gauze above mentioned into a bag, similar to the bags for the narrow strips, except that it is open on the side. As now used, therefore, the set of gauze strips for abdominal section consists of four narrow strips for sponging and one wide strip for packing back the intestines. Each *narrow strip* consists



FIG. 2.—Packing the Narrow Strip into the bag. The end of the strip is caught with a forceps and carried to the bottom of the bag, where it is fastened securely by sewing through and through, and then successive portions are rapidly packed in with the forceps. When packed in thus, the gauze strip may be drawn out a little at a time as needed.

of a piece of gauze ten yards long and a half yard wide. This is folded lengthwise so as to make six thicknesses. The folded strip is approximately three inches wide and ten yards long, with raw edges turned in and the ends tacked with thread to keep it from unfolding. The bag for each narrow strip is five inches

wide and ten inches deep and is preferably made of extra heavy material and is sewed in such a way that there is no chance for a raveling to be pulled out with the gauze.

"Beginning with one end, the gauze strip is packed firmly, a little at a time, into the bag. When the end of the strip is introduced to the bottom of the bag, it is to be fastened there by stitching through and through, so that if by any possibility the whole strip should be packed into the abdomen (to



FIG. 3.—The Wide Strip folded and ready to put in the bag. One end of the strip is first introduced to the bottom of the bag and fastened there securely by sewing through and through. Then the whole strip, folded as shown, is placed in the bag. When the strip is folded in this way it will, when pulled upon, come out as a wide strip, suitable for packing back the intestines (see Fig. 6).

check a sudden severe hemorrhage or for other reason) the end would still remain securely fastened outside. When all the strip has been packed into the bag, the top of the bag is closed by folding over and a large safety-pin is attached to the bottom of the bag. This safety-pin is for use later to fasten the bottom of the bag to the abdominal sheet. It should be large, so that it will be strong and easily handled. Four of these filled bags belong in each abdominal-section set.

"The *wide strip* consists of a piece of gauze five yards long and

one yard wide. This is folded lengthwise to make four thicknesses. The folded strip is approximately nine inches wide and five yards long. The bag for the wide strip is ten inches by six inches and open at the side instead of at the end. The end of the strip is then fastened securely in the bottom of the bag by stitching through and through, and the folded strip is placed in the bag in such a way that when pulled upon it will come out a little at a time as a wide strip. The open side of the bag is closed and pinned with two safety-pins, which are used later for pinning the corners of the bag to the abdominal sheet. One wide strip and four narrow strips constitute one set. The



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B

FIG. 4.—A Set of Gauze Strip Sponges. A, Four Narrow Strips. The safety-pin at the bottom of each bag is for fastening the bag to the abdominal sheet (see Fig. 6). B, Wide Strip. The two safety-pins closing the bag are used later for fastening the corners of the bag to the abdominal sheet (see Fig. 6).

narrow strip is used for sponging, for walling off small areas and for all purposes for which small pads and sponges are ordinarily used. The wide strip is used for packing back the intestines, walling off large areas and all purposes for which large pads are ordinarily used.

“At the operation, the lower end of a bag containing a narrow strip is pinned to the sterile sheet a sufficient distance away to bring the mouth of the bag conveniently near the wound, but not in the way. If desired, the upper end also may be pinned to the sheet. The gauze strip is used as a sponge by catching a small part of it with the fingers or with forceps and pulling it out of the bag as required and then sponging in the abdomen. After use, this part is dropped away from the wound and another

small part is drawn out and used. The used part is *not* cut off, but simply dropped outside the operative field and, as more and more of a strip is used, this soiled part falls off the table and out of the way. Thus the greater part of the strip is always outside the abdominal cavity. No detached pieces of gauze are used in the cavity, and hence none can be left here.



FIG. 5.—Method of Using the Gauze Strips. Just before the incision is made, a bag containing a Na row Strip is fastened at the side of the abdomen by pinning the bottom of the bag to the sterile sheet. If desired, the top of the bag may be pinned in like manner. The mouth of the bag lies conveniently near the wound, but not in the way. The end of the gauze strip is caught with the forceps or fingers and pulled out as needed for sponging, as here indicated. In a case where but little sponging is required, one bag will be sufficient. In a case where more sponging is likely to be required, it is well to fasten a bag on each side of the abdomen at the beginning of the operation. [For photographing, the checked toweling was used instead of the usual white abdominal sheet so as to show the white bag and strip better by contrast.]

Usually two strips, one placed on each side at the beginning of the operation, are used in the course of an ordinary abdominal section. In cases where there is but little sponging, only one strip is needed. In very extensive operations where an extra amount of sponging is required, three or four strips may be needed. In no case did I find it necessary to use more gauze than that contained in one set, though I always have an extra set sterilized

and ready for use. I tried different lengths and widths of strips, and prefer the size here given. When ready to pack back the intestines out of the operative field, the bag containing the wide strip is wrung out of hot saline solution, laid on the abdomen, two corners pinned to the abdominal sheet, and the



FIG. 6.—Method of Using the Gauze Strips. As fresh portions of the strip are drawn out for use the soiled portions are *not* cut off, but simply dropped down beside the bag and off the table. It is the *continuity* of the strip that insures safety, hence the strip should not be cut during the course of an operation. Troublesome accumulation of folds of the strip about the wound (with consequent tangling with instruments, may be prevented by always dropping the soiled portion outside the field close to the bag, as here shown. This photograph shows also the Wide Strip in place, ready to be used for packing back the intestines or walling-off a large area or any other purpose for which large pads are ordinarily used. The bag containing the wide strip is preferably wrung out of hot saline solution just before use. It is then laid on the abdomen, opened, two corners pinned to the abdominal sheet, as here shown, and the strip drawn out as required. No detached pads or other pieces of gauze are allowed about the operative field, hence none can be carried into the abdominal cavity to be left there.

wide strip is then drawn out as needed to push the intestines out of the way and wall-off the involved area."

I use these gauze strips exclusively in all my abdominal-section work from the time the skin is incised until the peritoneal cavity is closed. At first I anticipated considerable tangling of

the gauze strips about the forceps in the wound, but found that that could be easily avoided by always dropping the soiled portion of the strip *outside the field close to the bag*. This prevents the accumulation of loose folds about the wound, with which the instruments may become entangled.

So far as I know, the method is original, no description or use of such having come to my notice. The nearest approach to it that I have seen is the recommendation of some writers that a part of every abdominal pad and sponge should always be kept outside the cavity. For some years the large roll of gauze for packing back the intestines has been used by many operators, also gauze strips of various widths and lengths (including five-yard and ten-yard lengths) have been in general use in abdominal surgery for tamponade to check bleeding. But that is very different from the method here detailed of using long strips systematically so as to eliminate all detached pads and sponges.

It is the packing of each long strip into a bag that makes this use of strip-gauze practical and convenient—the small cloth bag confining the long strip in a small space so it is not in the way. Having used this method now for two years in various kinds of abdominal cases and under differing environment, I feel justified in recommending it as safe, practical and convenient. It simplifies the matter of pads and sponges for abdominal section and eliminates entirely the chance of leaving a piece of gauze in the abdomen.

Special Points.—It may be of interest to take up briefly some special points in regard to the use of the gauze-strip sponges and some possible criticisms that have been brought out in my study of the subject and in questions asked me by surgeons contemplating the use of the method. Most of these points were considered when the method was demonstrated before our local society, and much that is here given in regard to them is from that report.

In the first place, the object of this method is not convenience, but *safety*. Its existence depends solely upon the desire to eliminate every chance of leaving a piece of gauze in the abdomen. Incidentally, the method has been developed in such a way that it is convenient—in some particulars more convenient than the ordinary detached sponges. But this convenience is only incidental. I call particular attention to this point for the reason that the simplicity of the method and its convenience in certain particulars (ease of preparation, compactness, sponge

always within reach of both operator and assistant) have caused some to jump to the conclusion that its simplicity and convenience constitute the reason for its promulgation. That is a mistake. The time and study required for the development of this method were given only because of the pressing necessity of finding some universally applicable method that would make practically impossible the serious accident of leaving a sponge in the peritoneal cavity. The pads and sponges commonly used in abdominal work are fairly convenient. On that score no decided objection can be laid against them—certainly none of sufficient weight to justify the radical change here contemplated from the long-tried and generally employed technic of abdominal surgery. The fatal drawback to the ordinary pads and sponges is the danger of one being left behind.

"Do not the methods in general use give practical safety?"—The facts previously mentioned and the table of cases subsequently given answer that question to a large extent. Hitherto there has not been a method, practically applicable in all the vicissitudes of abdominal surgery, which would entirely prevent this accident. Practically all authorities state that it is to a certain extent unavoidable. Notwithstanding all the methods hitherto proposed, many lives are still being sacrificed to this accident. In spite of widespread interest in the subject in recent years and of much study and investigation of it and several excellent papers by different authorities, there has been no signal advance. Ten years ago operators were using the same preventive measures now commonly employed. The sponges were counted, tapes were attached to the sponges that were counted, forceps were attached to the tapes that were attached to the sponges that were counted, etc., etc. Yet with all these complicated precautions, many sponges were left in the cavity, as the records show.

Of course, where a surgeon always operates in the same hospital with the same assistants and to a large extent with the same nurses month after month, the danger is reduced to a minimum because of the establishment of a routine from which there is almost no departure. Even under these circumstances, however, the danger is not entirely eliminated. And what of the great bulk of surgical work, where the operator works at different hospitals, with different nurses and in some cases with changing assistants! Furthermore, the progress of the operation is not always smooth and regular. Abdominal surgery is notably full of uncertainties, unlooked-for developments and trying situa-

tions, that break the routine of the best regulated institutions and tax to the utmost the ability and steadiness and attention of all concerned in the operation. And, still further, think of the emergency work, in unsuitable environment and with untrained assistants! In estimating the possibility of this accident, all these conditions must be taken into consideration. Likewise, all these conditions had to be considered in devising a method for preventing the accident. To be suitable for general use, the method must be absolutely safe under all these varied conditions.

There are several methods that would be fairly safe under ideal conditions and when everything progressed smoothly. But it is only a fractional part of abdominal surgery that is conducted under ideal conditions—with assistants, nurses, material and routine all perfectly adapted to the work in hand and to each other. As far as I have been able to ascertain, every method previously proposed has broken down absolutely under the vicissitudes of abdominal surgery under usual conditions. And this failure has not been due to inexcusable carelessness and lack of common judgment, but to the fact that under the emergencies of actual work, it is impossible to watch everything and to follow all the details of the nice routine required by these methods. The racks for receiving sponges or the hooks on the walls (where there is a hook for every sponge and at the end must be a sponge for every hook) or the permanent attachment of a heavy ring to a tape on each sponge or other complicated methods may work very well in a perfectly arranged institution, but they will never permeate the bulk of abdominal surgical work.

The method which has received the most general adoption, of attaching a tape to each sponge and an artery forceps to each tape and perhaps clamping tape to the sterile sheet, depends too much on attention to details and watchfulness on the part of the surgeon and assistants to be safe. If we could always depend on everyone doing their full duty and on the "tracers," as the tapes are sometimes called, never pulling off of a sponge, very well. But abdominal surgery is not a smooth and easy form of work, and surgeons and assistants and nurses are not perfect human beings. Any method that is built on the supposition that the operation will always go along without any great emergency and without mistakes, is bound to fail sooner or later. With the use of tapes and forceps, many sponges have been left in the abdomen. We must deal with facts, not simply with nice theories.

"Is the gauze strip method absolutely safe under adverse conditions?"—Yes, it is practically automatic. I am convinced that we have a really safe and practical method in the simple one here detailed. I did not arrive at this conclusion hastily, but tried the method a full year before recommending it. I have used it now for two years in various classes of abdominal-section work and in differing environment, and the longer I use it the better I like it. Even if it were decidedly less convenient than the regular pads and sponges, I should consider its use imperative because of its safety. The greater part of the strip is always outside the abdomen and if, by any possibility, the whole strip, ten yards in length, should be hastily packed into the abdomen to check oozing, the end would still remain out, for it is fastened securely to the bag and the bag to the sterile sheet. I do not see how there is any practical possibility of a piece of gauze being left in the abdomen, even in the most trying case and with wholly untrained assistants. The hazardous dependence on the final counting or on watching what goes in and what comes out of the cavity is entirely eliminated.

The great value of this method is in the *automatic* feature. In clearing the wound for suturing, every particle of gauze is necessarily removed from the cavity without particular attention on the part of anyone. It largely eliminates the human equation, and it is in that direction that safety lies.

"Is not the strip of gauze extending from the forceps to the bag inconvenient and in the way when sponging?"—Sometimes it is in the way to a slight extent, but not as much as would at first appear. Any new method seems somewhat awkward at first, and this is no exception to the rule. However, in my experience so far, I have not found any situation in which there was serious interference with satisfactory sponging or with any other operative manipulation. Like any other important step in technic, it should be studied until it is clearly understood before an attempt is made to use it. There are two particular points that may be mentioned. To prevent the accumulation of loose folds of gauze in the vicinity of the wound, with consequent entangling of the instruments, the used portion of the strip should always be dropped outside the field, but close to the bag. Again, when taking hold of a fold, to sponge with, draw it out of the bag for some distance, so that it can be introduced into the abdomen as far as desired freely and without tension.

"Is not the size of the opening reduced to a troublesome extent

by the wide gauze strip?"—The wide strip extends out of the upper angle of the wound after the intestines are walled off and takes up but little room. In my experience it has not been troublesome. I can understand that with a very small opening it might be in the way. But in the opening of ordinary size, which gives free access to the structures involved and admits of accurate and unhampered work, the strip causes no particular inconvenience.

A very small incision seems attractive to some surgeons, but the more abdominal work I do and the more I see of intra-abdominal conditions, the more firmly convinced I am that it is a serious mistake to attempt to deal with such lesions through a small incision, that will not admit of accurate investigation by sight as well as touch. The scar should, of course, be as small as is consistent with effective work. The object of the operation, however, is not a pretty scar, but restoration to health by the accurate, safe and thorough treatment of the serious lesion within.

"Does the cloth bag sufficiently protect the contained strip from contamination from external sources during the operation?"—There is no need of particular protection, for everything about the operative field is sterile—the abdominal sheet to which the bag is fastened, the operating gown, the rubber gloves on the hands—everything that comes in contact with the bag.

"What if the bag and its contents become contaminated with pus from within the abdomen?"—Proceed the same as when the ordinary detached pad became soiled,—namely, remove the soiled bag or cover it, and apply a fresh one. "Would not several partly filled bags be thus thrown away in the course of operation on a pus case?" I have not found that to be the case. Such contamination takes place, as a rule, but once during an operation. If it is a case where contamination takes place to some extent all through the operation, usually the bag, like the ordinary pads, is not changed until ready to clear the field for closing. The wound and surroundings are then cleansed and fresh towels and bag put in place for the final steps of the operation.

In asking the above question, it was suggested that possibly rubber bags or metal cases would be better than the canvas bags. But I do not think so. They could not entirely protect the contained strip from pus, for the end must be open, and they would be clumsy and expensive—increasing the cost

of the method without conferring any real advantage. With the simple materials I have used, the method is within the reach of anyone in any situation, and that is an important matter in any method that is recommended for general adoption.

"*Why not cut off the used portion of gauze?*"—There is a rule which should be most strictly observed, namely, never cut a gauze-strip sponge in the course of an operation. The temptation to cut the strip comes not infrequently, because in certain situations it makes the sponging somewhat more convenient. In some situations the cutting would, of course, not be dangerous, as when part of the strip outside is cut off and allowed to drop away. On the other hand, in other situations the cutting of the strip might lead to a portion being left, as when a part is used for temporary packing and then the strip is cut in order to sponge more conveniently with the remainder. Whenever a cut is made in one situation for any reason, the rule is broken, and then a cut is likely to be made on the spur of the moment in any other situation where it appears to increase the convenience, and thus absolutely security is lost. The only safe plan is to adhere strictly to the rule never to cut a strip during the course of an operation. Of course, if at the close of an operation it is desired to use part of a strip for permanent packing or drainage, that is a different matter.

Another question that has been put to me is as to the *size* of the strips. I experimented with different sizes. Those used at first were much narrower. When such a narrow strip is wet with blood it becomes like a ribbon—not enough substance in it to sponge well. Of the various sizes tried, I found ten-yard strips, half a yard wide, the most convenient. Folded as indicated, such a strip is narrow enough for use when a very small sponge is required; while, on the other hand, several folds caught in the forceps furnish the substance for a large sponge. Also, it can be easily spread out sufficiently to wall off an object with sheet gauze, as, for example, in surrounding the region of the appendix when that structure is to be removed. When the gauze used in making the strips is extraordinarily thin, the width should be doubled.

I have been asked about the *cost* of this method. Preventing, as it does, one of the most serious accidents of abdominal surgery, it is cheap at any price. Even though its use cost several times as much as the dangerous detached sponges, that would not constitute a valid objection. As a matter of fact, however, it costs

no more than the usual method; if any difference, the cost is somewhat less. In order to get definite information on this point, I ascertained the amount of gauze generally used in an ordinary abdominal section in each of four of our leading hospitals. Though the number and size of the pads and sponges differed greatly in the different institutions, there was a striking uniformity in the amount of gauze consumed in an ordinary abdominal section—averaging 20 to 25 yards in each institution. The amount ordinarily used in the method which I have detailed is 15 yards—the 5 yard roll for packing back the intestines and 10 yards in the two gauze strips in bags. In severe cases the third gauze strip is used. Even if the whole set were used, it would not run over the amount consumed by the usual method.

I have been asked if, in using this method, it is necessary to take one's own sponges to the different hospitals. Not at all. Where the operating-room nurse is not familiar with the method, she is given, a day or two before the operation, a slip containing definite directions for preparing the strips and bags.

Nurses, as a rule, welcome the method, stating that it is less troublesome than the sewing of the numerous small pads and sponges. The directions to the nurse are as follows:

GAUZE-STRIP SPONGES FOR ABDOMINAL SECTION.

Four narrow strips—10 yds. long, 3 in. wide—6 thicknesses.

One wide strip—5 yds. long, 9 in. wide—4 thicknesses.

Have another set (four narrow and one wide) in reserve

For the Narrow Strips, the yard-width of gauze is divided into two strips, and each of these when folded to six thicknesses, is about three inches wide. For the Wide Strip, the full yard-width of gauze is used—when folded to four thicknesses it is nine inches wide. Turn in all raw edges so that no raveling can be left in the abdominal cavity.

Pack each Narrow Strip into a separate small cloth bag, 5 in. wide and 10 in. deep, and attach a large safety-pin to the bottom of the bag. The safety-pin is to pin the bottom of the bag to the abdominal sheet at operation. Make the bag of extra heavy muslin or drilling and sew with French seams to avoid ravelings on the inside. The end of the strip first introduced to bottom of the bag should be fastened there securely by stitching through and through. Then pack the strip firmly into the bag in such a way that it will come out easily, a little at a time as needed. Four of these filled bags belong in each set.

For holding the Wide Strip, use a bag 6 in. by 10 in. and open on the side, instead of at the end. Fold the strip back and forth, thus forming a narrow pile about three inches wide (see Fig. 3). Fasten one end of the strip securely to the bottom of the bag by sewing through and through. Then place the folded strip in the bag in such a way that, when pulled upon it will come out, a little at a time, as a wide strip suitable for packing back the intestines. Fold over the open side of bag and pin with two large

safety-pins. The safety-pins are for fastening two corners of the bag to the abdominal sheet (Fig. 6).

One wide strip and four narrow strips constitute one set and are to be wrapped together in a cloth for sterilization in the usual way. Have also an extra sterilized set in reserve. At the operation the bag containing the wide strip is to be placed in hot normal saline solution. The narrow strips are to be used dry.

The above simple preparation provides all the pads and sponges required from abdominal section and, as used at the operation, the sponge is always within instant reach of the operator. The advantage of always having the sponge within instant reach will be particularly appreciated by those who have been obliged to handle serious and troublesome intra-abdominal conditions without trained assistants. The gauze strips may be used also for temporary packing to check hemorrhage or for any other purpose for which strip gauze may be required in the course of an operation.

(To be concluded.)

ABDOMINAL SURGERY WITHOUT DETACHED PADS
OR SPONGES.

A SIMPLE, CERTAIN AND UNIVERSALLY APPLICABLE METHOD OF
PREVENTING THE SERIOUS ACCIDENT OF LEAVING A
SPONGE IN THE ABDOMEN.

BY

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(With six illustrations.)

(Concluded from page 76.)

At the end of this paper is given a table including two hundred and forty reported cases of a foreign body lost in the abdominal cavity. The table includes only cases in which the abdominal cavity was involved. A number of cases given in other collections

of foreign bodies left after operation were excluded because the operation involved the breast, neck, hip, etc., instead of the abdominal cavity. Other cases were excluded because the sponge or forceps was found before the abdomen was closed. Still others were excluded because they were probably or possibly repeats. About thirty cases in all were thus excluded.

No particular effort was made to secure a large number of cases to date, by a prolonged search of literature nor by writing to surgeons for a list of personal cases. A few recorded cases, more or less, make little difference, for these recorded cases represent only a small proportion of the total number of such accidents. My object, therefore, is not so much to present a long list or a complete list as to present a quick survey of authenticated cases of such variety and number that the careful surgeon will be led to pause and think on this matter.

A sponge is the article most frequently left in the peritoneal cavity, but in about one-fourth of the recorded cases the article left was a forceps or piece of an instrument or other small object used about the wound. This calls attention forcibly to the fact that small instruments should not be allowed about an open abdominal wound. Neugebauer long ago called attention to this danger of small instruments, and urged the use of long instruments exclusively in abdominal work.

Many surgeons have adopted this safety measure, but there are many others who seem to give no thought to the matter, and continue to use numerous small instruments in this dangerous locality. It may not be possible at present to entirely prevent the accident of leaving some article of the surgical armamentarium in the abdomen, but it is possible to reduce the danger to a minimum by the use of long instruments exclusively, and it seems to me that all those who are engaged in abdominal surgery should be led by common prudence to adopt this simple expedient. The details, as carried out in my own work, were mentioned in a previous article as follows: "Every instrument used about the wound is long—so long that a portion of it is practically always outside the abdominal cavity. Again, if by accident such an instrument should slip entirely into the cavity, its length is such that it would almost certainly be felt when the hand is carried into the cavity for the final palpation before closing. All the artery-forceps, dissecting-forceps, tenaculum-forceps, pedicle needles, scissors and other instruments for internal work are from six and a half to eight inches long, the

shortest being the large dissecting scissors (six and one-half inches). The shortest instrument used anywhere about the wound is the scalpel (six inches), which is laid aside as soon as the peritoneal cavity is open. The needles and Murphy buttons are not brought near the wound, except when held with a forceps or with a suture attached. No Michel clamps (for holding rubber tissue or gauze along the wound margin) or other small unattached objects are allowed near the wound as long as the peritoneal cavity is open."

LEGAL COMPLICATIONS.

Lawsuit. Small gauze strip extracted from abdominal sinus.—In a case of retroflexion, Wiggin (18) did a vaginal fixation and also removed the left ovary. Suppuration followed, presumably from the stump. Later, laparotomy was performed for the removal of the ligatures. This was followed by an abscess in the abdominal wall and a persistent sinus. The patient then went to another institution, and later a small gauze strip was taken from the sinus. Suit was entered for \$10,000.

Dr. Wiggin contended that the gauze was not the kind he used in sponging, and that the small strip had probably been left in the sinus while the patient was being dressed at the other institution. Verdict for the defendant.

Lawsuit. Fragments of sea sponge discharged from abdominal sinus.—Patient was subjected to laparotomy by Roesger (21). The wound healed and the patient was discharged in eighteen days. Four weeks later a sinus developed in the scar. A silk thread was extracted from this, and it healed. Later, a second sinus developed near the location of the first. The patient was hysterical and impatient, and placed herself under the care of another practitioner. Five months afterward, the latter showed Roesger several particles of sponge which had come out of the second fistula. Suit was entered for 15,000 marks.

The decision rested entirely upon the question as to whether or not the retention of sponge fragments could have been avoided. Much expert testimony was introduced. The verdict was for the defendant, it being held that when a physician had taken all the precautions possible, the outcome was not in his hands and he could not be held accountable.

Criminal trial. Forceps found in abdominal cavity at autopsy.—A patient with a large fibroid was operated on by Lassalette (64).

Death occurred a few hours after the operation. Autopsy disclosed a forceps in the peritoneal cavity.

At the trial the operator was condemned to two months in prison, for homicide through negligence. The sentenced was served.

After serving the sentence, Lassallete put in a plea that the patient's death had not been caused by the retention of the instrument, but by nux vomica. The death occurred too soon to have been due to the presence of the instrument. It was proven that a midwife of bad reputation had a bottle of nux vomica in her hand at the house on the day of the death. This was an entirely new phase. The body was exhumed. Lassallete was acquitted.

Lawsuit. Small gauze sponge removed by secondary operation.—The patient was operated on for appendicitis at the Toledo Hospital, November 1, 1897, by Gillette (46). After the abdomen was open it was found that the trouble was tubal pregnancy. The appendix incision was closed and a median incision made and through that the operation was completed. About four days after the operation, the appendix incision began to discharge pus. Gillette treated this sinus persistently under the impression that it was kept up by unabsorbed kangaroo tendon, which might at any time be wholly absorbed and thus permit healing. After twelve months of this treatment, the patient went to another physician who, eighteen months after first operation, did a secondary operation and found a small gauze sponge, after which the patient recovered. Suit was entered for \$5000.

In the trial court, the verdict was for the defendant, on the ground that the cause of action, if any arose, was barred by the statute of limitation. The Circuit Court held that the trial court was in error and reversed the decision. Supreme Court was divided equally on the subject, hence the decision of the Circuit Court was allowed to stand—verdict for the plaintiff.

Criminal trial. Two artery forceps found in abdomen at secondary operation.—The patient was operated on for ovarian cyst, Dec. 22, 1897, by Prof. Kosinski (23) and Dr. Solman, in the latter's private hospital. After a few days there appeared fever and a mass, which continued. In the meantime two artery forceps had been missed, and it was thought they might be in the abdomen. The disturbance persisted and, six weeks after the operation, the abdomen was reopened and the mass of exudate investigated, but

neither forceps nor pus was found. The patient was better afterward and went home, but did not get well. Later a hard mass developed near the umbilicus. Kosinski still thought the forceps might be in the abdomen and insisted on another operation and offered to perform it gratis. But the sons would not hear to this, and the patient was taken to several other physicians, one after another, hoping to be cured without operation. Finally, six months after the primary operation, the symptoms became acute and threatening and the physician who was called in, insisted that the patient be taken to Kosinski at once that he might perform the operation which had then become imperative. This the family refused to do and called in another physician, who operated. On opening into the mass at the pelvic brim, he found a cavity in which lay the two artery forceps. Both forceps had forced an entrance into the external iliac artery. The removal of the forceps was attended with a furious hemorrhage, from which the patient died on the table.

Legal action was entered against Kosinski and there was an extensive trial, with an imposing array of legal and medical talent. Six experts were appointed to testify in the case—Przewoski and Troichij to consider the pathologico-anatomical features, Krajewski to describe a modern laparotomy, Maksimow to criticise the operation as performed in this case, Pawlow to consider the various complications and mistakes that may occur in a laparotomy, and Neugebauer to supply the statistics which might be required in the trial. It was for use in this trial that Neugebauer compiled the list of cases that he published the following year (1900), which publication has done so much to enlighten the profession on this subject.

The trial resulted in the acquittal of the accused as far as causing the death of the patient was concerned—it having been shown that he strongly insisted on a line of treatment which would probably have prevented the patient's death, had the treatment not been peremptorily rejected by the family.

A curious clinical feature of this case was that, during the patient's illness, a number of radiographs of the suspicious area were made, but not one of them showed the forceps—the failure being due doubtless to defective technic.

Lawsuit. Sponge left in abdomen.—Baldwin (37) was made defendant in a suit, and a question that assumed much importance in the case was as to whether the responsibility for the count of the sponges lay with the surgeon or with the nurse.

The suit against the surgeon was finally withdrawn, and legal action was begun against the hospital where the operation occurred.

Lawsuit. Gauze compress left in abdominal cavity.—Patient was operated on for pyosalpinx by Everke (35). The disease was chronic and severe and the operation was long and difficult. A gauze compress was left in the abdominal cavity. Later this was recovered without any lasting injury to the patient. She was relieved of the suffering which she had endured for years before the operation and her health was completely restored. But from mercenary motives, suit was instituted against Everke. Later the suit was withdrawn.

Lawsuit. Sponge left in the cavity.—"Prof. Krasowski was legally proceeded against for having left a sponge in the abdominal cavity. The suit resulted in an acquittal" (23).

Lawsuit. Sponge left in the abdominal cavity.—In a personal communication to Neugebauer, Prof. Ahfeld (43) reported that he had been made defendant in suit on account of leaving a sponge in the abdomen. Termination of case not given.

Lawsuit. Artery forceps extracted from a sinus. The patient was subjected to operation for a sarcomatous growth in the abdominal wall, by Dollinger (53). The patient was three months pregnant at the time of the operation. She recovered from the operation and was delivered at term without any special disturbance. She became pregnant again. Her health was excellent and she was able to do all her housework. In the latter part of the pregnancy there appeared in the operative scar a swelling, which opened and discharged much offensive pus. The abscess was still further opened by the family physician. Within a few days she was delivered. A few days after the delivery, an artery forceps was discovered in the abscess wall. The patient was sent to the hospital and the forceps removed by operation. The patient died two days later.

The husband of the patient demanded money of Dollinger, which demand was refused. He then went to the public prosecutor and endeavored to have a criminal prosecution brought against the surgeon. The prosecutor asked Dollinger for a written statement of the case, which was given. The prosecutor saw no evidence to warrant criminal proceedings, and dropped the matter.

The husband then brought civil suit and for thirteen months Dollinger spent all his time defending himself. Sensational re-

ports appeared in the public press and it is said that the comic papers made capital of it and pamphlets on the subject were sold at the cigar stands. Though acquitted, Dollinger suffered irreparable damage from the sensational newspaper reports and the consequent notoriety. He urges strongly that some means should be provided by which reputable physicians may protect themselves from this species of blackmail and newspaper persecution.

Criminal trial. Piece of an instrument left in abdomen.—A Paris surgeon lost part of a broken instrument in the abdominal cavity. The patient died. The surgeon was put on trial for manslaughter due to negligence. Result of trial not stated.

Lawsuit. Pair of spectacles found in abdominal cavity.—The patient had three operations—the first in America, the second in Germany and the third in France. The French surgeon found a pair of spectacles in the abdomen. The patient sought redress in the courts.

The outcome of the trial is not given, neither is it stated definitely who was sued. Neugebauer, who cites the case, blames the German surgeon—noting that he either left the spectacles himself or missed finding them if left by the previous operator.

Lawsuit. Sponge removed at secondary operation.—The patient was operated on for an abdominal tumor by Thorne (53). Several months later a secondary operation was performed by another surgeon and a sponge was found in the abdominal cavity. The patient recovered. Legal proceedings were begun against the first operator (Miss May Thorne), on the ground that she was guilty of negligence in not personally counting the sponges used in the course of the operation, before the wound was closed.

The defendant denied negligence and held that the leaving of a sponge was an accident that could not always be avoided. She further said that, like a large number of other operating surgeons, she left the counting of the sponges to a responsible nurse—considering that it was the duty of the surgeon to keep his or her eyes continually upon the patient until the wound had been closed.

The judge, in summing up the case, said there was no doubt that the defendant was a skillful surgeon, but the question in this case was not as to her skill, but whether she had been guilty of want of reasonable care. The points for the jury were: (1) whether the defendant was guilty of want of reasonable care in counting or superintending the counting of the sponges; (2) whether the nurse was employed by the defendant and under her

control during the operation; (3) whether the nurse was guilty of negligence in counting the sponges; and (4) whether the counting of the sponges was a vital part of the operation which the defendant undertook to see properly performed.

After lengthy consideration, the jury returned a verdict for the plaintiff.

Criminal trial. Sponge found at autopsy.—The patient was subjected to exploratory laparotomy by d'Antona (53). A carcinoma of the liver was found, and an unfavorable prognosis given. The patient recovered from the immediate effects of the operation, but died after a month. At the autopsy, a gauze pad, 70 by 40 cm. was found and also two liters of pus. The physicians who made the postmortem examination gave out a statement to the effect that the death was due to the presence of the sponge and the peritonitis and secondary pleuritis resulting therefrom. The public prosecutor then had d'Antona indicted and placed on trial for criminal negligence.

The verdict was that the patient would have died from the other causes present. The prosecutor then claimed that the hospital records had been falsified, hence a new trial was granted. In the second trial ten experts were called and they all testified that there was sufficient cause for death outside of any influence which the sponge within the abdomen might have had. The trial was then discontinued, because of the absence of prosecuting evidence.

This case was reported by Prof. Pio Foa, who stated that if the autopsy had been conducted by competent pathologists, such an erroneous report would not have been made, and the unfortunate trials would not have occurred.

Lawsuit. Sponge left in abdomen.—The patient was subjected to abdominal section by Schooler (56). Later developments indicated that a sponge, sixteen inches square, had been left in the abdomen. Suit was entered for \$1500. Verdict for the plaintiff.

Lawsuit. Sponge left in abdomen.—The husband of the plaintiff was operated on for appendicitis by Hageboeck (56). It was charged that a surgeon's sponge had been left in the abdomen and that this caused an abscess which resulted in death. Suit was entered for \$50,000.

In two trials, the jury disagreed. It was reported that in each trial the jurors stood 11 to 1 in favor of the plaintiff. The case was to come up for a third trial the latter part of the year (1908).

Lawsuit threatened. Gauze strip discharged per vaginam.—The

patient was subjected to vaginal section, for pelvic suppuration, by MacLaren(51). It was a very severe case. There was persistent bleeding requiring packing, and there were two secondary hemorrhages requiring repeated packing. The patient recovered. Two months afterward a very offensive discharge appeared and the patient extracted a twelve-inch strip of iodoform gauze from the vagina.

Suit was threatened and, on the advice of his attorney, MacLaren paid the patient a considerable sum to avoid further proceedings.

Lawsuit threatened. Gauze compress discharged per rectum.—

The patient had uterine fibroids which Borysowicz (23) removed by abdominal operation. Three weeks later, a gauze compress was passed per rectum. Evidently the compress had been left in the peritoneal cavity at the time of the operation. The patient recovered and thanked the operator most gratefully for his services and left him her photograph. Six years later he received a number of letters from the patient's husband, threatening prosecution for malpractice if he did not at once pay a certain sum. The husband had no doubt heard of a lawsuit (Kosinski's?) then on at Warsaw, and thought it an easy way to obtain some money from Borysowicz. Apparently nothing came of the effort.

*Lawsuit threatened. Forceps alleged to have been passed per rectum.—*The patient was operated on for a suppurating ovarian cyst by Tuholske (14). It was an extremely severe case, but the patient recovered and regained her health rapidly. Twenty months later she wrote that she had given birth to a fine baby and felt well. Labor had been uncomplicated. The account continues: "Some five or six months after that (more than two years after the operation) the husband called on me and stated that for two or three months his wife had had some rectal trouble, supposed to be piles, and that a week ago, under considerable suffering, she had passed a forceps at stool. He brought it to me; it was a forceps such as is usually carried as dressing forceps in a pocket-case, not hemostat. I did not claim ownership. At any rate, if that forcep had been in the pelvis for two and a half years, during pregnancy and labor, without giving rise to a symptom or modifying labor, it was a remarkable occurrence. Three months after this episode the patient was reported well." In a later reference to the case, Tuholske stated that several demands were made for money, accompanied by threats of a suit. No attention was paid to the demands and finally they ceased.

He expressed the opinion that it was an attempt to obtain money by blackmail.

The Question of Deception, Intentional or Otherwise.—The repeated occurrence of this accident in the past and the possibility of its occurrence at any time gives an opportunity for designing persons to obtain money under false pretenses. Neugebauer calls attention to this fact, and remarks that, following the newspaper publicity given the Kosinski trial, a number of damage suits, alleging the accident, were filed, and that in most instances they were cases of blackmail or extortion.

A case has been reported of a patient who, following convalescence from an abdominal operation, expelled pieces of gauze or other cloth from the mouth. The patient claimed that the expelled pieces were vomited sponges which had worked their way into the stomach from the peritoneal cavity. Suit was threatened. The matter was dropped, however, when the practical impossibility of the occurrence, as detailed, was explained to the patient.

When discussing the subject of foreign bodies left in the abdominal cavity, a physician related to me some of the details of a case in which he had been involved. He performed an abdominal operation and, some time following the convalescence, the patient came to him and exhibited a surgical needle and stated that the needle had been passed per rectum. The patient's statement was confirmed by a physician who claimed to have treated him at the time the needle was passed. Suit was threatened. On examination of the needle, the operator found it was not the kind he used at the operation, and he became convinced that the alleged occurrence was an attempt at blackmail.

The matter dragged along for some time. The operator accumulated all the information he could concerning the subject and concerning the parties involved, and finally confronted them in such a way that they were forced to make a written statement acknowledging that the needle had not been passed per rectum, as alleged. The needle exhibited had been obtained elsewhere for the purpose of threatening suit and extorting money.

Porter (74) gives an account of a peculiar case bearing on this subject. The operation was for a parovarian cyst and hydrosalpinx and chronic appendicitis. The convalescence was normal and the patient left the hospital twenty-two days after the operation, feeling well. Eight days later, Porter received a telephone message from the patient's family physician, stating that he had removed several pieces of gauze from her vagina.

Quoting from the report, "On inquiry from him, I learned that the pieces did not tear off, but came away, or rather were removed with forceps, in the shape of rolls about the length and size of a lead-pencil, and after all presenting were removed others would present in a few hours, requiring that he visit her two or three times a day to take them away. The doctor thought that the pieces came from the pelvic cavity through an opening in the right side of the vagina about the size of a lead-pencil.

"On the next day but one after learning of the matter, I visited the patient at her home with her doctor, and found the patient on a cot apparently suffering some pain, which she said was due to more pieces 'coming down.' She did not look sick. In reply to my question she said she felt well until she got a jolt on the car on her way home and that since then she had been having pain, which was worse at times, and had not been so severe since the pieces began to come away. The first knowledge the doctor had of the nature of the trouble came through the patient's husband, who told him that there was a piece of gauze protruding from the vagina. I asked to see what had been removed and was shown a large number of pieces of different texture, whereupon I remarked that the goods were not such as I had used as sponges, that there were more pieces than had been used all told in the operation, and that consequently they had not been left in the woman's belly by me. It was averred that they could get into her belly only through the wound made by me and at the time it was made, because it had been closed, healed by first intention, and was still closed. The patient facetiously remarked that she 'supposed she swallowed 'em.' 'No,' I replied, 'had you swallowed them they would not come out through the vagina.'

"Dr. F. now asked the patient if she thought more 'pieces were down,' being answered in the affirmative, he introduced a speculum and found that she was right. I removed the speculum and introducing my finger came upon a small wad of something which upon removal proved to be a piece of ordinary white muslin about three inches wide by seven inches long, twisted into a rope, doubled upon itself so as to make a small ball or wad. It was perfectly clean and was so saturated with what looked and smelled like urine that on squeezing between the fingers several drops were squeezed out. I examined the vagina with my finger, assuring myself that there were no more 'pieces' there, that there was no hole leading into the pelvic cavity and that, in fact, it was a

perfectly healthy vagina and in nowise unusual except its cleanliness, for which, of course, the frequent wipings it received were accountable.

"In the presence of the patient, her mother-in-law and the doctor, I said, pointing my finger at the patient, 'Doctor, I don't know where those rags came from, but that woman knows — well, and could tell if she would.' The mother-in-law objected to my statement rather forcibly, but the patient said nothing. I then took the doctor outside, told him that the woman was a malingerer and that we would give her a chance to put some more rags in for removal. We received one more piece before we left. Before leaving I insisted upon both the doctor and myself making a thorough inspection of the vagina with the eye and the finger as well. This was done, but no abnormality was found. It should be stated that some of the 'pieces' were tinged with blood, but none of those removed during my visit were so tinged."

Dr. Porter exhibited ten pieces of different size, shape and texture, then continued: "Eight days after my visit, Dr. Fisher reported 'no more exhibits.' So far as I know, no threat was made of a suit for damages nor did the patient or her mother seem out of humor with me. The husband was at work and not present during my visit, although he presumably knew the day before that I was to be there, as I had sent word that I was coming."

In regard to the possible cause for the deception, Dr. Porter mentioned: 1. desire for money, 2. desire for sympathy, 3. desire to avoid work, 4. sexual perversity. He stated that during the patient's stay in the hospital nothing pointing to a neurotic condition was noted. Indeed, she was regarded as an unusually nice and agreeable patient.

Schaefer (43) gives the details of a case which emphasizes the fact that when a piece of gauze is found in the abdominal cavity it does not necessarily follow that it was left there in a previous operation. The case occurred in the practice of Pryce Jones. Jones was called to see a woman with an abdominal swelling. This proved to be an abscess, which was opened and discharged a piece of cloth.

There had been no previous operation. The woman was insane and had been in the habit of tearing up pieces of cloth and swallowing them. The swallowed cloth had evidently caused ulceration of the stomach wall with subsequent perforation into the peritoneal cavity.

The noted intestinal "hair-balls," requiring operation, con-

stitute another class of foreign bodies in the abdomen which were not left there by the surgeon.

Again, the professional "knife swallows" and "glass eaters" and their amateur imitators must be kept in mind. Fortunately, the menu of these persons is limited, as a rule, to household articles. However, some such "actor," who has been relieved of his accumulated load by surgical art, might, from the intimate acquaintance, acquire a taste for surgical forceps instead of the usual nails and pocket-knives. In that case a condition might easily develop that would make it very uncomfortable for the previous operator, though wholly without fault on his part.

PREVENTATIVE METHODS.

Counting the Sponges.—Simple counting of the sponges before and after operation, combined with "watching what goes into and what comes out of the cavity," was probably the earliest method employed to prevent the leaving of a sponge in the abdomen. But in the course of time it was found that the counting did not give the expected security, and special measures were employed to increase the accuracy of the count, such as separate counting by two individuals (double counting), putting numbers on the sponges or having racks for their reception.

As early as 1884, "double counting" was in use in the London hospitals. The continued occurrence of the accident caused surgeons to seek further means for preventing a mistake in the counting. Very small sponges were discarded, except for use in sponge-holders, and the larger sponges were limited in number so as to lessen the chance of mistake. Only a specified number of sponges were prepared for operation and these were put up in bundles, each containing a certain number. The counting before and after was to be in the hands of only thoroughly responsible assistants or nurses.

As the accident still continued to occur, various additional expedients were devised for increasing the accuracy of the accounting. One European surgeon of note used a special stand with separate compartments, each compartment to contain a certain number of sponges. On the other side of the operating table was a similar stand with compartments to receive the soiled sponges. Still another surgeon had hooks on the wall—"a hook for every sponge"—and at the close of the operation there had to be "a sponge for every hook." In this country Kelly (31)

devised, some years ago, a special rack to receive the soiled sponges and increase the accuracy of counting. Kreutzmann (53) marked each of his compresses with indelible ink, and each bundle of twelve was marked differently—for example in one bundle the compresses would be marked 1, 2, 3, 4, etc., in another bundle I, II, III, etc., in another bundle a, b, c, d, etc., and in still another bundle, A, B, C, etc. Thus no two sponges were marked alike. At the close of the operation the sponges were spread out on the floor and the operator could glance at them and assure himself that they were all there.

In addition to these special expedients, there was always enjoined careful general watchfulness on the part of the surgeon and also close attention to "what goes into and what comes out of the cavity." In order to increase the efficiency of this watchfulness, it was suggested that the surgeon think out loud, so to speak, so that the sponges put in and taken out might be noted or checked. Neugebauer mentions particularly the precaution to state definitely, as each sponge was drawn out of the abdomen, "One sponge returned from cavity" or "Two sponges returned from cavity," and the fact to be recorded by an assistant or nurse who responds, "Noted."

In all the methods above mentioned the sponges are allowed to go free in the cavity, and their recovery depends for the certainty of its completeness upon the accuracy of the accounting.

Attaching a Tape to Each Sponge.—The danger of the dependence on counting having been impressed by disastrous experiences, it was hoped to find security by attaching a tape to each sponge, the end of the tape to remain outside. This method has many variations. The tapes vary in length from nine inches to six feet and more ("two meters," "several meters"). Some surgeons leave the outer end of the tape free, others fasten it to the laparotomy sheet with a forceps, and still others attach to it a heavy object which is to remain outside the operative field. A forceps is the object most commonly attached to the tape. A number of surgeons use the colored glass beads or small balls recommended by Mikulicz. Bircher, and also Russell, attach a lead seal to the end of each tape. Carson has for several years used harness rings for this purpose. Fowler designed a system of duplicate checks. In the preparation of the sponges, two checks are attached to each tape. When the pad is passed to the operator one check is removed and placed in the basin from

which the pad was taken. At the close of the operation the checks must balance each other.

Wachsberg devised a large metal box, the bottom of which was perforated with a hole for each tape. The end of each tape was passed through its appointed hole and securely knotted on the other side, so that there was no possibility of its getting away. The desperation engendered by experience with this accident and failure of ordinary methods of prevention is shown by the practice of Calman, who had a long tape attached to each sponge and whenever a sponge was passed into the abdomen, someone caught the other end of the tape and tied it around the leg of the table. But even this is not so absolutely safe as might at first appear. To be sure, there is no probability of the table being drawn into the abdomen and lost, but there is the possibility of the tape tearing off the sponge, which accident has happened more than once with tapes attached to sponges.

The method of attaching tapes to sponges and artery forceps to the tapes, in combination with the counting of sponges, has long been on trial. In 1897 Tuholske (14) mentions its routine use by himself, and records a case in which in spite of it, a sponge escaped him. This is the method probably in most general use to-day. It has a record of many failures.

Fisher (75) attaches all the sponges used to one tape. The tape is three to four feet long and armed with a dull needle. As each pad is put into the abdomen, one end is threaded on the tape, and thus they are all fastened together. Wedershake (77) adopted a method of keeping four to eight sponges fastened together. A large piece of gauze was cut at four to eight places, the cuts extending from the margin toward the center, but not quite to the center. Thus all the sponges made from that piece were fastened together by the uncut part at the center.

Realizing the insecurity of the tape method in common use, many surgeons now have their sponges made two or three feet long, instead of square, with the idea of keeping one end outside. This reduces the danger, but does not eliminate it. It is very easy for these ends to slip in unnoticed. This is not a mere theoretical danger. Neither is the occurrence of the accident confined to emergency operations nor to inexperienced operators. It has happened to some of the best operators and in the best hospitals. Even the large roll of gauze for holding back the intestines is not exempt. In a hospital which has the deserved reputation of being one of the most careful and systematic in the

world, the long five-foot roll, for packing back the intestines, was lost in the cavity, necessitating a secondary operation some time later for its removal.

Elimination of Detached Sponges.—This is accomplished by the use of ten-yard and five-yard gauze strips in the practical manner previously explained in this paper. This is a radical departure in preventative methods, in that it strikes at the root of the trouble by entire elimination of the dangerous detached pads and sponges. Furthermore, it is automatic in action. It does not require special attention on the part of the operator or assistants or nurses. Neither does it require cumbersome apparatus nor special materials. The strips and bags may be prepared anywhere by anyone from common materials. They are compact, simple and inexpensive.

When familiar with the use of this method, the apparent inconvenience largely disappears. However, the question is not one of perfect convenience, but of safety for the patient and for the surgeon. In spite of the natural opposition to any radical change in long-established technic, the profession will, I think, necessarily adopt some such safety method sooner or later—perhaps not just in the form here presented, but in some form embodying these principles of automatic action, simplicity of preparation and materials, inexpensiveness, convenience in use, universal applicability and absolute security under the varied circumstances of abdominal work.

**REPORTED CASES OF A FOREIGN BODY LOST IN THE ABDOMINAL CAVITY.
ABDOMINAL SECTION. SPONGE- LEFT**

No.	Date of Report	Operator*	Character of Operation	Article Lost	When and How Removed	Result
1	1859	Fehr. (1)	?	Sea sponge.	Details not given. Mentioned by Fehr and quoted by Ols-hausen. c.	?
2	1877	?	?	Sea sponge.	Found at secondary operation by G. Braun. c.	?
3	1881	Lawson Tait. (3)	?	Sponge.	Sponge missed. Four hours later wound was reopened and sponge recovered. a.	?
4	1884	H. P. Wilson. (4)	Ovarian cyst and preg-nancy.	Pieces of sea sponge.	Five months after operation, pieces passed through sinus in scar. a.	Recovery
5	1884	T. G. Thomas. (4)	Carcinoma of spleen.	Pieces of sea sponge.	Found at autopsy. Patient died four days after opera-tion. Carcinoma inoperable. a.	Death.
6	1884	Howitz. (4).	Uterine necrosis.	Sponge.	Found at autopsy. Details not given. Cited by Wilson. a.	Death.
7	1884	"London surgeon." (4)	?	Sponge.	Found at autopsy.† Cited by W. T. Howard and also by Wilson. a.	Death.
8	1889	Bridden. (5)	Myomectomy.	Sea sponge, 7 cm. wide.	Found at autopsy. Patient died sixth day of peritonitis. c.	Death.
9	1892	Pilate. (6)	Hysterectomy.	Compress, 8 inches long.	Passed per rectum, nine months after operation. a.	Recovery
10	1892	Salin. (7)	Ovarian tumor.	Gauze napkin.	One year later, gauze removed through an abscess sinus, with subsequent fecal fistula which healed. a.	Recovery
11	1892	"French surgeon." (8)	Salpingitis.	Two strips of gauze.	Eight months later, 35 cm. strip of gauze extracted per vaginam, still later intestine resected and 10 cm. strip found within. a.	Recovery
12	1892	"French surgeon." (8)	Uterine fibroid.	Compress, 26 cm. long.	Eight months later passed per rectum, without alarming symptoms at any time. a.	Recovery
13	1892	"French surgeon." (8)	Myomectomy.	Sponge.	A few hours after operation abdomen was reopened and sponge located and removed. a.	Recovery
14	1892	Quinn. (6)	Pyosalpinx.	Napkin.	Found at autopsy. Was suspected. Death on third day with symptoms of severe dysentery. a.	Death.

15	1893	Terrier. (9)	?	Sponge.	Found at autopsy. Death on third day from peritonitis. a.	Death.	
16	1893	?	(10)	Hysterectomy.	Compress.	Secondary operation by Michaux for painful abdominal mass. Compress found within intestine. a.	Death.
17	1895	Elaner. (12)		Fibroid and ovarian cyst	Pad, 7x8 inches.	Six months later, passed per rectum. Progress of mass noted along course of colon in last month. a.	Recovery
18	1896	MacLaren. (12)		Ovarian cyst and retroversion.	Gauze sponge 6x6 inches	Ten days after operation, expelled from rectum. Secondary operation three months later for adhesions. a.	Recovery
19	1896	?	(12)	?	Sea sponge.	Details not given. Two cases were observed by MacLaren at autopsy in New York Woman's Hospital.	Death.
20	1896	?	(12)	?	Sea sponge.	See preceding note.	Death.
21	1896	Severeano. (13)		Ovarian sarcoma.	Two compresses, each 130x30 cm.	After some months, one compress was extracted from a persistent sinus, and three weeks later, the other. a.	Recovery
22	1897	Tuholske. (14)		?	Sponge.	One hour after operation, sponge missed. Abdomen reopened and sponge found and removed.	Recovery
23	1897	?	(15)	?	Sponge.	Details not given. H. C. Coe states that in autopsy work he found a sponge in five cases. Death by sepsis in each. a.	Death.
24	1897	?	(15)	?	Sponge.	See preceding note. a.	Death.
25	1897	?	(15)	?	Sponge.	See preceding note. a.	Death.
26	1897	?	(15)	?	Sponge.	See preceding note. a.	Death.
27	1897	?	(15)	?	Sponge.	See preceding note. a.	Death.
28	1897	?	(16)	?	Sponge.	Twelve years later, passed per rectum. Reported by Hefting. a.	Recovery
29	1897	Linquist. (17)		Tubal pregnancy.	Gauze compress.	Two months later, passed per rectum. a.	?
30	1897	McMurtry. (14)		Ovarian cyst.	Flat sponge.	Sponge missed before patient recovered from anesthetic. Sutures clipped and sponge removed.	Recovery
31	1897	R. B. Hall. (14)		Appendicitis.	Sponge.	Four hours later, sponge missed. Abdomen reopened and sponge removed.	Recovery
32	1898	Wiggin. (18)		Secondary operation for silk ligature.	Gauze strip.	Some weeks after operation, gauze strip was removed from a persistent sinus. Lawsuit. c.	Recovery

REPORTED CASES OF A FOREIGN BODY LOST IN THE ABDOMINAL CAVITY.—CONTINUED.
ABDOMINAL SECTION. SPONGES LEFT.

No.	Date of Report	Operator*	Character of Operation	Article Lost	When and How Removed	Result
33	1898	Schramm. (19)	Hysterectomy.	Compress.	Four weeks later, operated for a mass, which proved to be the compress. <i>a.</i>	Recovery
34	1898	Leopold. (19)	?	Compress.	Removed by secondary operation. Was near liver. <i>a.</i>	Recovery
35	1898	? (20)	Cesarean section.	Compress.	Found at autopsy by Olsbhausen. Caused fatal peritonitis. <i>a.</i>	Death.
36	1898	Brosin. (19)	Bicornuate uterus.	Compress. 20 cm. long.	Six months later, expelled from a persistent sinus. <i>a.</i>	Recovery
37	1898	Roesger. (21)	Uterine fibroid.	Fragments of sea sponge.	After six months, particles discharged through a persistent sinus. <i>a.</i>	Recovery
38	1898	Bolt. (22)	Hysterectomy for fibroid	Gauze sponge.	Several months later, secondary operation. Sponge found in intestine. Resection. Death from shock. <i>a.</i>	Death.
39	1898	Schroeder. (23)	Oophorectomy.	Gauze sponge.	Secondary operation some months later for an abdominal mass. Sponge in mass. <i>a.</i>	?
40	1898	? (19)	?	Sponge.	Found at autopsy by Thiersch. <i>a.</i>	Death.
41	1898	? (22)	?	Sponge.	Boldt stated in 1898 that he knew of five unpublished cases (among colleagues) of foreign bodies left in abdomen. <i>a.</i>	?
42	1898	? (21)	?	Sponge.	See preceding note of five cases (count three sponges, and two forceps). <i>a.</i>	?
43	1898	? (22)	?	Sponge.	See preceding note. <i>a.</i>	?
44	1898	? (22)	?	Sponge.	Boldt states that pathologist in New York Hospital found foreign body at autopsy in two cases (1 sponge, 1 forceps). <i>a.</i>	Death.
45	1898	? (22)	?	Sponge.	Boldt cites two cases in which abdomen was immediately opened, and forgotten article removed (1 sponge, 1 forceps). <i>a.</i>	?
46	1898	Eckstein. (24)	Ovarian cyst, twisted pedicle.	Sponge 20x40 cm.	First weeks later extracted from sinus in scar. Count of sponges after operation, stated "correct." <i>a.</i>	Recovery

47	1899	Buschbeck. (25)	Tubal pregnancy.	Large compress.	Two and one-half years later removed from sinus in scar. a.	Recovery
48	1899	Meinert. (25)	?	Mull compress.	Three weeks later, secondary operation for mass in right lower abdomen. Proved to be compress. a.	Recovery
49	1899	Rahn. (26)	Pyosalpinx.	Compress, 2 m. square.	Four months later secondary operation. Compress found within intestine. Resection of 40 cm. a.	Recovery
50	1899	Kader. (27)	Salpingitis.	Compress, size of handkerchief.	Sinus present for six months. Later the compress passed per rectum. Death from peritonitis. c.	Death.
51	1899	Busch. (28)	Uterine fibroid.	Mull compress.	Two months later, passed per rectum, after much trouble. c.	Recovery
52	1899	Fritsch. (29)	?	Sponge.	One year later removed by secondary operation. Cited by Kayser. c.	Recovery
53	1899	Fritsch. (29)	?	Sponge.	No details given. Cited by Kayser. c.	?
54	1899	Fritsch. (29)	?	Sponge.	Two years later removed by secondary operation. Cited by Kayser. c.	Recovery
55	1899	Gillette. (46)	Tubal pregnancy.	Sponge.	Eighteen months later, removed by secondary operation. Lawsuit.	Recovery
56	1900	Meritens. (30)	Pelvic suppuration.	Compress.	Five months later, operation for abdominal mass. Compress within intestine. Resection of intestine. a.	Recovery
57	1900	Wunderlich. (30)	Ovarian cyst.	Compress, 2x100 cm.	Three months later, compress was passed per rectum. c.	Recovery
58	1900	Wunderlich. (30)	Cystectomy.	Linen cloth.	Found at autopsy. Death on third day. No evidence of peritonitis. d.	Death.
59	1900	H. A. Kelly. (31)	Pelvic suppuration.	Marine sponge.	Some days later, wound was reopened because of disturbance. Sponge found and removed. c.	Recovery
60	1900	Kelly. (31)	Ovarian cyst.	Large gauze pad.	Two and a half months later, operation for abdominal mass. Mass contained sponge and abscess. c.	Recovery
61	1900	Kelly. (31)	Ovarian cyst and appendicitis.	Gauze pad.	Five days later, operation for fever and a mass. In mass was sponge and abscess. c.	Death.
62	1900	Assistant to Kelly. (31)	Fibroid of abdominal wall.	Gauze, 360 gm. weight.	One month later, secondary operation for mass in abdomen. Contained sponge and abscess. c.	Recovery
63	1900	? (23)	?	Sponge.	Reeves Jackson described two cases in which a sponge was found at autopsy. a.	Death.

REPORTED CASES OF A FOREIGN BODY LOST IN THE ABDOMINAL CAVITY.—CONTINUED.
 ABDOMINAL SECTION. SPONGES LEFT.

No.	Date of Report	Operator*	Character of Operation	Article Lost	When and How Removed	Result
64	1900	? (23)	?	Sponge.	See preceding not a.	Death.
65	1900	Spencer Wells. (23)	?	Sponge.	Sponge missed. Abdomen reopened next day and sponge found. a.	Recovery
66	1900	Winkle. (23)	Myomectomy.	Sponge.	Found at autopsy. Details not given. a.	Death.
67	1900	? (23)	Wound of omentum.	Sponge.	Two weeks later, sponge was extracted from an abdominal sinus. a.	?
68	1900	? (23)	?	Gauze napkin.	Found at autopsy by Kijwecki. Details not given. a.	Death.
69	1900	? (23)	?	Gauze.	Przewoicki found gauze in cavity at three autopsies following abdominal section. a.	Death.
70	1900	? (23)	?	Gauze.	See preceding note. a.	Death.
71	1900	? (23)	?	Gauze.	See preceding note. a.	Death.
72	1900	Krasowski. (23)	?	Sponge.	Prof. Krasowski was legally proceeded against for leaving a sponge in the abdomen. a.	?
73	1900	Frankenhauser. (23)	Myomectomy.	Sponge.	Removed by secondary operation. Details not stated. a.	Recovery
74	1900	Bier. (23)	Tubal pregnancy.	Mull compress, 1x1½ m.	Six months later, secondary operation. Compress found within intestine. c.	Recovery
75	1900	Bier. (23)	Pelvic tuberculosis.	Gauze strip.	Long time afterward, gauze passed per rectum. c.	Recovery
76	1900	?	Two laparotomies, pyosalpinx	Iodoform gauze, 5x44 cm.	Secondary operation for intestinal obstruction by Chaput. Gauze found within intestine. Intestine incised. c.	Recovery
77	1900	Atlee. (23)	Ovariectomy.	Sponge.	Found at autopsy. At operation a sponge was torn in two by an assistant. a.	Death.
78	1900	Borysowicz. (23)	Uterine fibroid.	Gauze sponge.	Three weeks later, sponge was passed per rectum. Law-suit threatened. a.	?

79	1900	Karl Braun. (23)	?	Sponge.	Found at autopsy. <i>a.</i>	Death.
80	1900	? (23)	?	Sponge.	Found at autopsy. Reported by W. T. Bull. <i>a.</i>	Death.
81	1900	? (23)	?	Gauze napkin.	Found in a secondary labarotomy by Dmochosky. <i>a.</i>	?
82	1900	George J. Englemann. (23)	Ovarian cyst.	Small sponge.	Sponge missed at operation. Searched for carefully but not found. Found at autopsy four days later. <i>a.</i>	Death.
83	1901	Beck. (34)	Fibroid and pyosalpinx.	Sponge.	One month later, sponge was extracted from an abscess in scar.	Recovery
84	1901	? (34)	?	Sponge.	Sponge finally passed per rectum. Cited by Beck, who was called to see patient by Leusman.	?
85	1901	Everke. (35)	Pyosalpinx.	Gauze compress.	Later recovered by secondary operation. Details not given. Lawsuit. <i>c.</i>	Recovery
86	1901	Everke. (35)	Cesarean section.	Napkin.	Found at autopsy. Death on fifth day from splanchnic irritation. No sepsis. <i>c.</i>	Death.
87	1901	Le Conte. (36)	Tubercular peritonitis.	Gauze strip. 1 yd. wide and 5 ft. long.	Year later, strip removed from a persistent focal fistula. Suggestion made that accident was beneficial to patient. <i>b. c.</i>	Recovery
88	1901	M. D. Mann. (37)	?	Flat sponge.	Removed next day. No harm resulted. <i>b. c.</i>	Recovery
89	1901	? (37)	?	Gauze pad.	Cited by M. D. Mann. <i>b. c.</i>	Death.
90	1901	? (37)	?	Gauze pad.	Cited by M. D. Mann in his letter to Schachner. <i>b. c.</i>	Death.
91	1901	? (37)	?	Gauze pad.	Some months later, pad was discharged through sinus in scar. Cited by M. D. Mann. <i>b. c.</i>	Recovery
92	1901	H. C. Coe. (37)	?	Large gauze pad.	Four weeks later, pad was felt under scar, and removed. <i>b. c.</i>	Recovery
93	1901	Coe. (37)	?	Gauze sponge.	Particulars not given. <i>b. c.</i>	Recovery
94	1901	Coe. (37)	?	Gauze pad.	Particulars not given. <i>b. c.</i>	Recovery
95	1901	Roberts. (37)	Hysterectomy.	Sponge.	One week later, sponge was extracted from an abscess in the wound. <i>b. c.</i>	Recovery
96	1901	Roberts. (37)	Pelvic inflammation.	Pad.	Found at autopsy, by Irwin Abell. Death 78 hours after operation, with symptoms of ileus. <i>b. c.</i>	Death.
97	1901	P. W. Samuel. (37)	Fibroid and pyosalpinx.	Flat sponge.	Found at autopsy. Death the third day, with symptoms of nephritis. <i>b. c.</i>	Death.

REPORTED CASES OF A FOREIGN BODY LOST IN THE ABDOMINAL CAVITY.—CONTINUED.
ABDOMINAL SECTION. SPONGES LEFT.

No.	Date of Report	Operator*	Character of Operation	Article Lost	When and How Removed	Result
98	1901	H. Grant. (37)	Gunshot wound of abdomen.	Two sponges.	Found at autopsy. Patient died a few hours after operation. <i>b. c.</i>	Death.
99	1901	T. S. Bullock. (37)	Ventral hernia.	Gauze pad, 2x3 inches.	Eight days later, pad was extracted from a sinus in the wound. <i>b. c.</i>	Recovery
100	1901	? (37)	Appendicitis.	Gauze pad.	Three weeks later pad appeared at drainage wound and was extracted. <i>b. c.</i>	Recovery
101	1901	Weir. (37)	Appendicitis.	Sponge.	Details not given. <i>b. c.</i>	Death.
102	1901	Weir. (37)	?	Gauze pad.	Removed in five days. Details not given. <i>b. c.</i>	Recovery
103	1901	Weir. (37)	?	Gauze pad.	Five months later, pad was removed. Details not given. <i>b. c.</i>	Recovery
104	1901	? (37)	?	Sponge.	In his letter to Schnachner, Weir cites two cases in which he removed a sponge. <i>b.</i>	Death.
105	1901	? (37)	?	Sponge.	See preceding note. <i>b.</i>	Death.
106	1901	R. Matas. (37)	Appendicitis.	Iodoform-gauze strip.	Six months later, strip was extracted from a persistent sinus. <i>b. c.</i>	Recovery
107	1901	G. R. Fowler. (37)	?	Gauze pad.	In letter to Schnachner, Fowler mentions three cases. Details not given. <i>b. c.</i>	?
108	1901	Fowler. (37)	?	Gauze pad.	See preceding note. <i>b. c.</i>	?
109	1901	Fowler. (37)	?	Gauze pad.	See preceding note. <i>b. c.</i>	?
110	1901	Vander Veer. (37)	?	Sea sponge.	Patient died of peritonitis. <i>b. c.</i>	Death.
111	1901	Vander Veer. (37)	Carcinoma of uterus.	Sponge.	One year later, secondary operation for recurrence of carcinoma. Sponge found. <i>b. c.</i>	?
112	1901	C. P. Noble. (37)	?	Sea sponge.	Some weeks later, secondary operation and sponge found. <i>b. c.</i>	?

113	1901	?	(37)	?	Two sponges.	Cited by J. B. Murphy. Details not given. <i>b. c.</i>	?
114	1901	?	(37)	?	Piece of gauze.	Cited by J. B. Murphy. <i>b. c.</i>	?
115	1901	E. Lewis.	(37)	?	Sponge.	Fourteen days later, sponge extracted from sinus in scar. <i>b. c.</i>	Recovery
116	1901	A. MacLaren.	(37)	Appendicitis.	Piece of gauze.	Three weeks later, gauze was extracted from drainage tract. <i>b. c.</i>	Recovery
117	1901	Gerster.	(37)	Inoperable carcinoma.	Iodoform packing.	Found at autopsy Details not given. <i>b. c.</i>	Death.
118	1901	?	(37)	?	Gauze pad and attached clamp.	Cited by Frank Hartley. Details not given. <i>b. c.</i>	?
119	1901	B. C. Hirst.	(37)	?	Sponge.	Found at autopsy. Sponge torn in two by assistant. Sponges counted and reported "correct." <i>b. c.</i>	Death.
120	1901	?	(37)	?	Gauze pad.	After some weeks, secondary operation for fecal fistula. A few days later, the sponge was passed per rectum. <i>b. c.</i>	?
121	1901	W. M. Polk.	(37)	?	Half of a sponge.	Sponge torn in two at operation. Details not given. <i>b. c.</i>	?
122	1901	?	(37)	Ectopic pregnancy.	Pad.	Later extracted from a persistent sinus in scar. Observed by A. J. Boyd. <i>b. c.</i>	Recovery
123	1901	W. T. Bull.	(37)	Cholecystostomy.	Large flat sponge.	Five days later, discovered in drainage tract and removed. <i>b. c.</i>	Recovery
124	1901	Baldwin.	(37)	?	Sponge.	Baldwin, of Columbus, Ohio, was made defendant in a law suit because of ponge left in abdomen. <i>b.</i>	?
125	1901	Munde.	(37)	Sarcoma of kidney. Laparotomy.	Towel, 1x2 ft.	Four weeks later removed from a suppurating sinus. <i>b. c.</i>	Recovery
126	1901	Price.	(37)	?	Sponge.	Sponge missed soon after closing wound. Reopened and sponge removed. <i>b. c.</i>	Recovery
127	1901	Price.	(37)	?	Sponge.	Similar to preceding case Price cites two cases in his letter to Schnachner. <i>b. c.</i>	Recovery
128	1902	Russell.	(38)	Oophorectomy.	Lint sponge.	Six months later, secondary operation. Sponge removed from within intestine. <i>c.</i>	Recovery
129	1902	Lindfors.	(39)	Extrauterine pregnancy	Compress.	Later extracted from a pelvic abscess by vaginal incision. <i>c.</i>	Recovery
130	1903	Kayser.	(40)	Postoperative hernia.	Gauze roll.	Two and a half months later, secondary operation. Gauze roll within intestine. Resection. <i>c.</i>	Recovery

**REPORTED CASES OF A FOREIGN BODY LOST IN THE ABDOMINAL CAVITY.—CONTINUED.
ABDOMINAL SECTION. SPONGES LEFT.**

No.	Operator	Character of Operation	Article Lost	When and How Removed	Result
131 1903	Beckmann. (41)	?	Napkin.	Beckmann stated that he had three cases in which napkin was lost in abdominal cavity.	?
132 1903	Beckmann. (42)	?	Napkin.	See preceding note. No details given.	?
133 1903	Beckmann. (43)	?	Napkin.	See preceding note. No details given.	?
134 1903	Fick. (44)	Perityphlitis.	Cotton compress.	Secondary operation for fecal fistula. Sponge found within intestine. <i>c.</i>	Recovery
135 1903	Gruning. (45)	Uterine myoma.	Marley tampon.	Some weeks later, after pain in lower abdomen, tampon passed per rectum.	Recovery
136 1903	Schaefer. (46)	Myomectomy.	Gauze napkin.	Found at autopsy, two years later. Accompanied by intestinal necrosis. <i>c.</i>	Death.
137 1904	Ahfeld. (47)	?	Gauze sponge.	Prof. Ahfeld was subjected to a lawsuit in 1903, because of a sponge left in the abdomen. <i>c.</i>	?
138 1904	Corson. (48)	Ectopic pregnancy.	Sponge, 18x16 in.	Two and a half months later, sponge passed per rectum. <i>d.</i>	Recovery
139 1904	? (49)	Kidney operation. Laparotomy.	Sponge, 1 meter long.	Forty-six days later, secondary operation for painful mass and ileus. Sponge within intestine. Resection. <i>d.</i>	Recovery
140 1904	Reise. (50)	Extrauterine pregnancy	Sponge.	Ten months later, secondary operation for ovarian cyst and inflammation. Sponge found near sigmoid. <i>d.</i>	Recovery
141 1904	Thorne. (51)	Abdominal tumor?	Sponge.	After several months, secondary operation. Sponge found. Lawsuit. <i>d.</i>	Recovery
142 1904	Winter. (52)	Hysterectomy for fibroid	Sponge.	Found at autopsy. Death three weeks after operation, of embolus. <i>d.</i>	Death.
143 1906	Waldo. (53)	Hysterectomy for fibroid	Towel.	Some weeks later, extracted through sinus in scar. Sponges counted and "correct." <i>d.</i>	Recovery
144 1906	? (54)	Salpingectomy.	Iodoform-gauze strip.	Two years later, found at secondary operation. Cited by Waldo. <i>d.</i>	?

145	1906	Ward. (48)	?	Sponge.	Later discharged per vaginam.	Recovery
146	1906	Brothers. (48)	Ectopic pregnancy.	Pad.	Six weeks later, pad protruded from opening in lower part of scar.	?
147	1906	Grandin. (48)	?	Pad.	Two and a half years later, found encysted in the omentum.	Recovery
148	1906	Grandin. (48)	?	Towel, with hospital name on.	Three weeks later, secondary operation for mass under liver. Mass contained towel.	Recovery
149	1906	? (49)	?	Sponge.	One and a half years later, operation by Amann for supposed fibroid. Proved to be a sponge. <i>d.</i>	Recovery
150	1906	Landau. (50)	Ovariectomy.	Napkin.	Eighteen weeks later, secondary operation for fecal fistula. Sponge found. <i>d.</i>	Recovery
151	1907	MacLaren. (51)	Hysterectomy.	Sponge, 12 in. square.	Found at autopsy, up under the liver. Death on the fourth day.	Death.
152	1907	Crossen. (52)	Pelvic suppuration.	Gauze pad.	Two weeks later, appeared in drainage tract and was extracted.	Recovery
153	1907	d'Antona. (53)	Carcinoma of liver.	Gauze napkin 40x70 cm.	Found at autopsy. Death in one month from carcinoma, peritonitis and adjacent pleuritis. Two lawsuits. <i>d.</i>	Death.
154	1907	Dobrucki. (53)	Ovarian cyst.	Sponge.	Three weeks later extracted through sinus in scar. <i>d.</i>	Recovery
155	1907	Janczewski. (53)	Ovarian cyst and pyosalpinx.	Gauze napkin.	Twenty-one days later removed from abscess in wound. (Janczewski, assistant to Neugebauer.) <i>d.</i>	Recovery
156	1907	Poten. (53)	Myomectomy.	Sponge.	Found at autopsy. Death after six weeks from bronchitis. No peritonitis. <i>d.</i>	Death.
157	1907	Prochownick. (53)	?	Sponge.	Sponge missed. Wound immediately reopened and sponge found. <i>d.</i>	Recovery
158	1907	"Russian operator." (53)	?	Gauze compress.	No details. Reported by Neugebauer. Operator did not wish name given. <i>d.</i>	?
159	1907	"Polish operator." (53)	?	Gauze compress.	Details not given. Reported by Neugebauer. <i>d.</i>	?
160	1907	Sippel. (53)	Broad ligament tumor.	Iodoform-gauze pack.	Six weeks later, the gauze strip passed per rectum. <i>d.</i>	Recovery
161	1907	"Berlin operator." (54)	Adnexal mass.	Gauze strip.	Later extracted from the bladder by W. Stöckel. <i>d.</i>	?

REPORTED CASES OF A FOREIGN BODY LOST IN THE ABDOMINAL CAVITY.—CONTINUED.
 ABDOMINAL SECTION. SPONGES LEFT.

No.	Date of Report	Operator*	Character of Operation	Article Lost	When and How Removed	Result
162	1907	L. Meyer. (53)	Cesarean section.	Mull napkin.	Found at autopsy. Death on fourth day of peritonitis. Sponges counted and "correct." d.	Death.
163	1908	? (55)	?	Five foot roll of gauze.	Some months later removed by secondary operation, which was witnessed by J. C. Morfit.	?
164	1908	? (55)	Appendicitis.	Iodoform gauze, 1 sq. yd.	Found at secondary operation in Mount Sinai Hospital. Witnessed by M. G. Seelig.	Recovery
165	1908	? (55)	Appendicitis.	Piece of sea sponge.	Extracted from sinus at Mt. Sinai Hospital, in 1900, by M. G. Seelig.	Recovery
166	1908	Schooler. (56)	?	Pad, 16 in. square.	Details not stated. Patient awarded \$1500 damages by a jury.	Recovery
167	1908	Hageboeck. (56)	Appendicitis.	Sponge.	Abscess formation and death of patient. Three trials for \$50,000 damages.	Death.
168	1908	Findley. (57)	?	Strip of gauze, 5 ft. long.	Ten days later, found at secondary operation. Sponges counted and stated "correct," but one roll had been cut in two.	Recovery
169	1908	(58)	Ovarian cysts (bilateral).	Two gauze pads.	Removed by secondary operation, six weeks later. Followed by fecal fistula, which finally healed.	Recovery
170	1908	(58)	Pelvic tuberculosis.	Small sponge.	One year later, secondary operation for persistent sinus. Sponge found. Death from operation.	Death.
171	1908	(58)	Gallstone operation.	Small sponge.	Found at autopsy. Death after four days from peritonitis.	Death.
172	1908	Rieck. (59)	Extrauterine pregnancy.	Compress, 15x20 cm.	No symptoms. Four months after operation, compress passed per rectum.	Recovery

ABDOMINAL SECTION. FORCEPS AND OTHER ARTICLES LEFT.

173	1880	Mariani. (60)	Ovariectomy.	Drainage tube.	Drainage tube slipped inside and was overlooked. One week later it passed per rectum. a.	?
174	1886	Olshausen. (61)	Ovariectomy.	Forceps.	Ten months later passed per rectum, after only two weeks disturbance. a.	Recovery
175	1892	"French surgeon." (8)	?	Forceps.	Immediately after the operation, the abdomen was reopened to recover a forceps. a.	?
176	1896	MacLaren. (12)	Hysterectomy.	Artery forceps.	Two years later, secondary operation. Found forceps perforating cecum, ileum, and appendix. a.	Recovery
177	1896	? (12)	?	Forceps.	Ferrier stated that one of his associates had recovered a forceps left in the abdomen.	?
178	1897	Morestin. (62)	Salpingitis.	Artery forceps.	Three years later, forceps were passed per rectum, after persistent suffering. a.	Recovery
179	1898	Herczel. (63)	?	Clamp.	One and a half years later, removed by secondary operation. a.	?
180	1898	? (22)	?	Forceps.	Boldt stated in 1898 that he knew of five cases among colleagues, in which a foreign body was left. (Count two forceps.) a.	?
181	1898	? (22)	?	Forceps.	See preceding note. a.	?
182	1898	? (22)	?	Forceps.	Boldt stated that a pathologist in a N. Y. hospital had found a foreign body at autopsy in two cases. (Count 1 forceps, 1 sponge.) a.	Death. Death.
183	1898.	? (22)	?	Forceps.	Boldt mentioned two cases in which abdomen was reopened to recover article left. (Count 1 forceps, 1 sponge.) a.	?
184	1898	Nussbaum. (19)	?	Drainage-tube.	Two months later, patient herself drew it out of an abdominal sinus, after a night of dancing. a.	Recovery
185	1898	Bode. (19)	?	Drainage-tube.	Tube slipped into wound and was forgotten. After a few days, wound was reopened and tube found. a.	?
186	1898	"American surgeon." (19)	?	Diamond ring.	Remained six months in the abdomen. Other details not given.	?
187	1899	Lassalette. (64)	Large fibroid.	Forceps.	Found at autopsy. Criminal trial. Operator sent to prison. (See Legal Complications.) c.	Death.

**REPORTED CASES OF A FOREIGN BODY LOST IN THE ABDOMINAL CAVITY.—CONTINUED.
ABDOMINAL SECTION. FORCEPS AND OTHER ARTICLES LEFT.**

No.	Date of Report	Operator*	Character of Operation	Article Lost	When and How Removed	Result
188	1900	H. A. Kelly. (37)	Hysterectomy.	Forceps.	Found in drainage tract after a few days. In operation to extract it, patient died from hemorrhage. <i>a.</i>	Death.
189	1900	G. Braun. (23)	?	Bulldog forceps.	Forceps found at autopsy. <i>a.</i>	Death.
190	1900	Sepp. (65)	Ovarian cyst.	Nelaton catheter.	Found in bladder with some silk ligatures, several months later. Catheter had been used to ligate pedicle. <i>a.</i>	Recovery
191	1900	Cushing. (23)	?	Seal ring.	Some years after the laparotomy the ring was recovered by incision in vaginal vault. <i>a.</i>	Recovery
192	1900	Nussbaum. (23)	?	Artery forceps.	Nine months later, passed per rectum. <i>a.</i>	?
193	1900	? (23)	?	Piece of glass irrigator.	Two weeks later found at autopsy by Kyewski. Patient died with symptoms of nephritis. <i>a.</i>	Death.
194	1900	? (23)	?	Forceps.	Reeves Jackson mentions a case in which autopsy revealed a forceps left in the cavity. <i>a.</i>	Death.
195	1900	Spencer Wells. (23)	Ovariectomy.	Artery clamp.	One month later, the clamp was found in the bladder. <i>a.</i>	?
196	1900	Spencer Wells. (23)	?	Artery clamp.	Clamp missed. Wound reopened next day and clamp found. <i>a.</i>	Recovery
197	1900	Terrier. (23)	?	Forceps.	Eight days later, forceps was discharged spontaneously from region of umbilicus. <i>a.</i>	?
198	900	Terillon. (23)	?	Forceps.	Neugebauer states that Terillon forgot a forceps in the abdominal cavity. <i>a.</i>	?
199	1900	Winkle. (23)	?	Forceps.	Later discharged spontaneously from an abscess. <i>a.</i>	?
200	1900	? (23)	?	Richelot clamp.	Details not given. Simply stated that clamp was left behind. <i>a.</i>	?
201	1900	Kosiński. (23)	Ovariectomy.	Artery forceps.	Four months later forceps extracted from an abdominal abscess. <i>a.</i>	Recovery

202	1900	Kosinski. (23)	Ovariectomy.	Two artery forceps.	Two secondary operations, in the second of which patient died of hemorrhage. Criminal trial. (See Legal Complic.) <i>a.</i>	Death.
203	1900	? (23)	Inoperable tumor.	Artery forceps.	Found at secondary operation by another operator, who related the case to Neugebauer. <i>a.</i>	?
204	1901	M. D. Mann. (37)	?	Hemostat.	Removed in one hour after operation. No trouble resulted. <i>b. c.</i>	Recovery
205	1901	Schnachner. (37)	Uterine fibroid.	Forceps.	Seven months later, secondary operation for ileus. Forceps found within intestine. Removed by incision. <i>b. c.</i>	Recovery
206	1901	? (37)	?	Forceps.	Removed at autopsy, after a laparotomy. Witnessed by J. A. Wyeth. <i>b. c.</i>	Death.
207	1901	? (66)	Strangulated hernia.	Forceps.	Eight and a half years later, part of forceps was extracted from an abdominal sinus. Cited by Ellison. <i>d.</i>	Recovery
208	1901	Nussbaum. (37)	?	Scissors.	Later, secondary operation. Scissors found. Cited by Senn in letter to Schachner. <i>b. c.</i>	Recovery
209	1904	Prochownick. (23)	?	Forceps.	Six months later half of forceps extracted from sinus in scar. <i>e.</i>	Recovery
210	1904	? (67)	Myomectomy.	Péan forceps.	Six years later, secondary operation for ileus. Forceps found. Patient died. Reported by Hedlund. <i>d.</i>	Death.
211	1906	? (68)	Ovarian cyst.	Forceps.	Seven years later, forceps felt through abdominal wall. Extracted by vaginal incision by Gruzews. <i>d.</i>	Recovery
212	1906	? (68)	?	Forceps.	Secondary operation later by Gruzews, and forceps found. <i>d.</i>	?
213	1906	? (69)	Ovariectomy.	Artery forceps.	Ten and a half years later, secondary operation. Forceps perforating bowel. Reported by Stewart. <i>d.</i>	Recovery
214	1906	? (70)	?	Artery forceps.	Six years later, death from intestinal necrosis. Forceps found at autopsy within bowel. Reported by LeGendre. <i>d.</i>	Death.
215	1906	? (53)	?	Forceps.	Doyen did a secondary operation, and found forceps within intestine. Resection. <i>d.</i>	?
216	1906	? (48)	?	Artery forceps.	Four months later, secondary operation by Ward for ileus. Forceps found.	?
217	1907	Dollinger. (53)	Sarcoma of abdominal wall.	Forceps.	Nearly three years later (after two successful pregnancies) trouble from forceps. Operation. Death. Lawsuit. <i>d.</i>	Death.

REPORTED CASES OF A FOREIGN BODY LOST IN THE ABDOMINAL CAVITY.—CONTINUED.
 ABDOMINAL SECTION. FORCEPS AND OTHER ARTICLES LEFT.

No.	Date of Report	Operator*	Character of Operation	Article Lost	When and How Removed	Result
218	1907	Kuestner. (53)	Cyst of pancreas.	Forceps.	Six weeks later, forceps appeared at angle of scar and was extracted. <i>d.</i>	Recovery
219	1907	(53)	?	Forceps.	Found at autopsy. Death soon after operation, of shock. <i>d.</i>	Death.
220	1907	? (53)	Ovarian carcinoma.	Forceps.	Found at autopsy. Death after six days, of ileus and peritonitis. <i>d.</i>	Death.
221	1907	"Paris surgeon." (53)	?	Piece of an instrument.	Details not given, except that piece was left in abdomen at operation. Criminal trial. <i>d.</i>	Death.
222	1907	? (53)	?	Pair of spectacles.	Three operations—in America, Germany, France. Frenchman found spectacles in abdomen. German was sued for damages. <i>d.</i>	Recovery

VAGINAL OPERATIONS. SPONGES AND OTHER ARTICLES LEFT.

223	1886	Veit. (71)	Vaginal hysterectomy.	Rubber drain.	Four months later, drain passed per rectum. <i>d.</i>	Recovery
224	1886	Veit. (71)	Vaginal hysterectomy.	Rubber drain.	Later expelled from the bladder. Details not given. <i>d.</i>	Recovery
225	1897	Friend of H. C. Coe.	Vaginal hysterectomy.	Gauze sponge.	Two days later, on removing clamps, one was found to be a sponge-holder minus the sponge. Laparotomy, found sponge under liver. <i>a.</i>	?
226	1898	Erlach. (19)	Vag. operation for fibroid.	Iodoform-gauze pack.	Nine days later, strip found in vaginal abscess. Nine months later, another strip removed from bladder. <i>c.</i>	Recovery
227	1898	Boldt. (22)	Vag. drainage after abdom. hysterectomy.	Gauze drain, inserted third day.	Drain forgotten. Two months later the gauze was passed per rectum. <i>a.</i>	Recovery
228	1898	Rydygier. (23)	Vaginal hysterectomy.	Sponge.	Seven weeks later, sponge was discharged from vaginal sinus. Patient finally died of pyemia. <i>a.</i>	Death.

229	1899	Meinert. (25)	Pelvic tuberculosis.	Iodoform-gauze strip.	Five months later, extracted from vaginal sinus. <i>a.</i>	Recovery
230	1899	? (25)	Adnexal trouble.	Compressa.	One year later, extracted from a vaginal sinus. Cited by Meinert. <i>a.</i>	Recovery
231	1899	Schramm. (72)	Pyosalpinx.	Tampon.	Ten weeks later, tampon came out while patient was dancing. <i>c.</i>	Recovery
232	1900	Hillmann. (30)	Pyosalpinx.	Gauze sponge.	Found later in bladder, accompanied by violent cystitis. <i>c.</i>	Recovery
233	1901	? (37)	Pelvic inflammation.	Sponge.	Later secondary operation (abdominal section) and sponge found in pelvis, by L. Frank. <i>b. c.</i>	Recovery
234	1901	Pryor. (37)	Vaginal operation.	Gauze.	Details not given. Cited by W. R. Pryor. <i>b. c.</i>	?
235	1901	Assistant to Pryor. (37)	Vag. operation.	Gauze.	Details not given. Cited by Pryor. <i>b. c.</i>	?
236	1901	Assistant to Pryor. (37)	Vag. operation.	Gauze.	Details not given. Cited by Pryor. <i>b. c.</i>	?
237	1902	?	Uterine tumor.	Tampon.	Four months later, tampon was extracted per vaginam. Reported by Gudbrod. <i>d.</i>	Recovery
238	1906	Brothers. (48)	Vaginal hysterectomy.	Gauze drain.	Several months later, drain was extracted through vaginal sinus.	Recovery
239	1907	MacLaren. (51)	Pelvic suppuration.	Iodoform-gauze strip.	Two months later, the patient extracted a twelve-inch strip of gauze from vagina.	Recovery
240	1908	Calmann. (59)	Vaginal hysterectomy.	Sponge, slipped from holder.	Extensive palpation per vaginam, extending to liver and kidneys. Not found. Removed later by laparotomy.	?

a. Cited by Neugebauer, 1900.

b. Additional cases, cited by Schachner, 1907.

c. Cited by Neugebauer, 1904.

d. Cited by Neugebauer, 1907.

*Supposed to be the operator. In some cases the record is not entirely clear on this point.

†In a few cases, reports obtained from different sources were contradictory, making it difficult to determine positively certain details, where the original report was not accessible.

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