Compliments of the author.

THE SURGICAL TREATMENT

OF

INGUINAL HERNIA.

—*MARCY.*

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INGUINAL HERNIA.

BY

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THE SURGICAL TREATMENT OF INGUINAL HERNIA.

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October 9, 1894.

In order that we may the better understand the varying conditions presented in operative cases of inguinal hernia, I shall first ask you to review with me the anatomical structures in their normal development, and, for this purpose, I consider myself fortunate in being able to exhibit to you upon the screen photographic reproductions of the splendid illustrations from many of the distinguished masters of surgery,—Camper, Cooper, Scarpa, Cloquet, Langenbeck, Bourgery, and others. From this series we are taught, that which is daily demonstrated in the dissecting room, that the anatomical plan of construction of the parts in the transmission of the spermatic cord and vessels through the abdominal wall, is by a line so oblique that the intra-abdominal pressure is normally placed at or near a right angle to the axis of the inguinal canal. However singular it may seem, I do not remember to have found a single reference made to this anatomical disposition of the structures in its possible application to the cure of hernia. This is, very probably, because the reconstruction of the parts to their normal anatomical relationship was impossible without the use of buried sutures.

In the upright position, the weight of the abdominal contents is deflected forward by the promontory of the sacrum, in a way to lessen greatly the gravity pressure upon the pelvic organs. The recti muscles form a strong supporting column with their basic anterior pubic attachment. Muscular strain, brought to bear with any degree of violence upon the abdominal wall, causes a deflection of the compression force in nearly equal degree from the promontory of the sacrum, upon either side, to the aponeurotic attachment of the mus-

cles to the pelvic bones. Thus it will be seen that, when the normal conditions pertain, this force must ever act in right lines to the inguinal canals. Were it not for this, it would be difficult to understand why the normal condition of man,

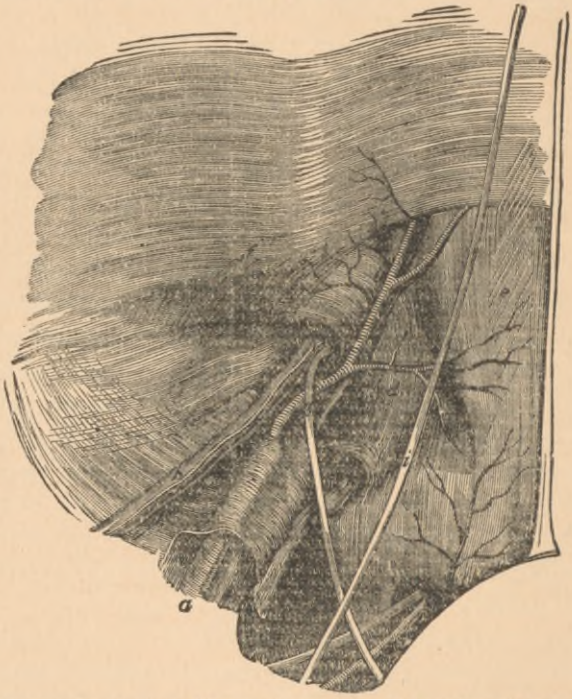

FIG. 1.—Dissection of internal inguinal and femoral rings from internal surface, the peritonaeum having been removed. *a*, external iliac artery; *b*, epigastric artery, branch of *a*; *d*, deep circumflex iliac, lying in Hesselbach's triangle; *e*. rectus muscle; *f*, fascia transversalis; *g*, vas deferens or spermatic duct; *h*, spermatic duct; *h*, spermatic flexus of veins with artery and nerves; *i*, obliterated cord of hypegastric artery; *k*, lymphatic glands. At the external ring may be seen subperitoneal fascia l enveloping the cord *h*.

as an upright animal, should not be that of a hernial protrusion of the abdominal contents along the lines of a necessarily open inguinal canal.

The reproduction of the wonderful dissections which we have been considering demonstrates these facts, but perhaps we are more deeply indebted to Sir Astley Cooper than to any other for pointing out this remarkable provision of

nature for the production and maintenance of this normal equilibrium of function and retaining force. He demonstrated that the transversalis fascia lying immediately beneath the peritonaeum was normally so reënforced and strengthened as to form a strong posterior wall to the inguinal canal, and that it also, by the dissemination of its fibres about the cord, made a firm boundary to the internal ring, thus producing a fixation point of definite character for the exit of the cord from the abdominal cavity.

Tracing the developmental forces during the late foetal period, we note the interesting and remarkable process of extrusion of the testicle from the abdomen, and the carrying with it the peritonaeal covering investing its vessels and vas deferens, making up the so-called spermatic cord. Normally, the peritonaeum is so closed in, about these structures at its exit from the abdomen, that only by pulling upon the cord do we note the slight depression upon the peritonaeal surface which lines the abdomen at this point. Not seldom, however, in individuals who are not subjects of hernia, the transversalis fascia about the internal ring is more open than normally, and the peritonaeum, shutting in about it, is left in a considerable depression. Indeed, this condition exists so frequently that it has received the name of the Infundibular process of the peritonaeum. These are the conditions which are very commonly present as predisposing factors in all subjects of hernia.

Remembering the disposition of the intra-abdominal pressure as noted above, it is easy to understand that, when this condition exists, there is brought to bear upon the depression, in every movement of the body, a more or less powerful hydrostatic pressure upon this weak point, acting as a wedge, until at last the equilibrium of the forces is so disturbed that, little by little, the parts yield, the internal ring enlarges, the inguinal canal is by thus much shortened; until by some extra force the external structures suddenly give way and the man finds himself ruptured—that is, a portion of the abdominal contents has become displaced through an abdominal opening.

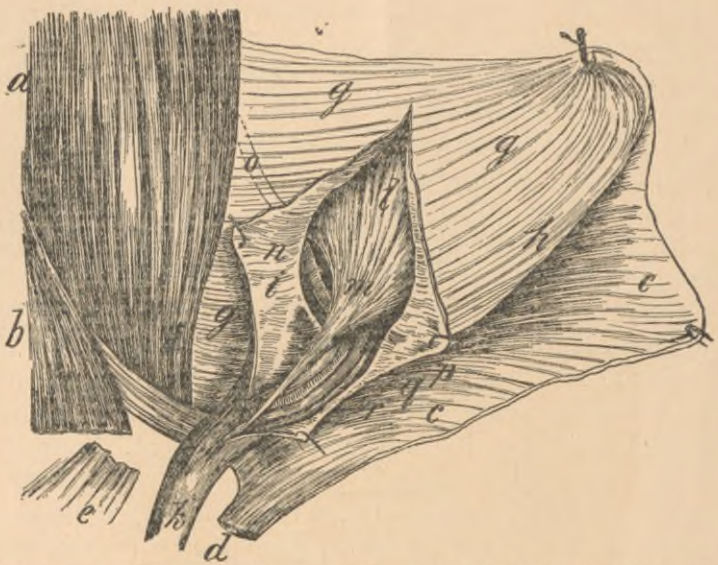

FIG. 2.—The prolongation of the peritonaeum; infundibular process, which sometimes extends in front of the spermatic cord.

a. The rectus abdominis muscle of the left side dissected.

b. The pyramidalis muscle.

cc. The tendonous aponeurosis of the external oblique muscle, dissected from its attachments, and reflected downwards upon the upper part of the thigh.

d. The internal and superior pillar of the external abdominal ring, cut from its connections with the body of the os pubis, and reflected downward with the rest of the aponeurosis of the external oblique muscle, of which it forms a part.

e. The corresponding portion of the internal and superior pillar of the external abdominal ring, occupying its natural position in front of the os pubis.

f. The outer border of the tendon of the rectus muscle, where it is continuous with the inner, or pubic, portion of the fascia transversalis.

ggggg. The fascia transversalis, where it lines the inguinal region.

h. The fascia transversalis blended with the posterior edge of Poupart's ligament, so as to form with it the floor of the inguinal canal. The fibres of the internal oblique and transversalis muscle have been dissected from their attachments to the iliac portion of the crural arch and wholly removed.

i. The funnel-shaped sheath of the transversalis fascia, laid open in front to display the compound structures of the spermatic cord, which it encloses.

k. The funnel-shaped sheath of the fascia transversalis, where it invests the spermatic cord, between the external abdominal ring and the testis; behind this portion of the cord are observed some oblique fibres, which constitute the triangular ligament of the inguinal canal.

l. *A portion of the great sac of the peritonaeum.*

m. A tubular process of the peritonaeum, which is frequently to be found as a fibro-cellular band in front of the rest of the structures composing the spermatic cord; it consists of the obliterated portion of the original processus vaginalis peritonaei.

n. The epigastric artery, as it passes deeply into the su serous cellular tissue between the fascia transversalis and the peritonaeum, and along the pubal side of the internal abdominal ring.

o. Dotted lines, which serve to indicate the course of the epigastric artery, as it ascends in an oblique direction behind the fascia transversalis in its way toward the umbilicus.

p. The spermatic veins. *q*. The spermatic artery. *r*. The vas deferens.

s. The triangular ligament of the inguinal canal.

I have presumed to occupy thus much of your attention in the consideration of the normal anatomical relations and functions of the parts involved in inguinal hernia, because this knowledge is especially important to the surgeon who, by operative interference, expects to secure a permanent restoration of the weakened structures, rather than to qualify himself only for the relief and restoration of the abdominal organs in strangulation.

FIG. 3.—Dissection from the peritonaeal surface of the parts affected by an oblique rupture; peritonaeum, its fascia and the transversalis fascia are removed. The sack is cut off at its neck in the deep ring. The epigastric artery is seen below the neck, but has been removed at the inner side to show the conjoined tendon *h*.

The time at my disposal prevents a careful analytical discussion of the varying conditions which may be met with in the cases presenting themselves for operation, but assuming that we may favourably consider the subject of a hernia, who is otherwise healthy, a proper applicant for surgical relief, we will take first into consideration those cases coming to us in infancy and childhood, the larger number of which will

be of the congenital variety. Here it is well to remember that we have no hernial sac proper with which to deal; in other words, the scrotal pouch of the peritonaeum, containing the testicle, is in direct continuation, as an open canal, with the abdominal cavity. We find usually that the opening in the transversalis fascia is very large, and the surgical procedures are not unlike those recommended for the restoration of the obliquity of the inguinal canal in cases of acquired hernia, after the peritonaeal sac, containing the hernial contents, has been sutured and resected.

The dissection is commenced at a point a little above the internal ring, and is carried down sufficiently far on a line with the cord to expose clearly the internal ring. The structures over the cord are divided so that the latter can be elevated and clearly expose the border of the internal ring and the posterior wall of the cord. Either by finger, or some convenient instrument, an assistant holds the cord, freed from its attachments, towards the middle line with sufficient tension to define clearly its relationship with the deeper structures. This is done in order that a clear field may be had for the application of the sutures for the reënforcement and reconstruction of the posterior wall of the canal. For the accomplishment of this, it is absolutely essential to use sutures, which are buried in the structures and are, as a consequent, beyond the power of the surgeon for subsequent removal. By general consensus of opinion, silk, although it may be used as a buried suture, is not considered applicable for this purpose. For somewhat similar reasons silk-worm gut proves unsatisfactory, because both of these materials, not being absorbed, are liable as sutures to prove irritants, and, in the subsequent muscular strain of the parts, are thrown off as foreign bodies. Good chromicised sterile catgut may serve as a trustworthy material for suture, but for a considerable variety of reasons, which cannot be referred to here, it has proved far inferior as a buried suture to that of tendon, preferably that from the tail of the kangaroo.

The way in which the suture is applied for the reënforce-

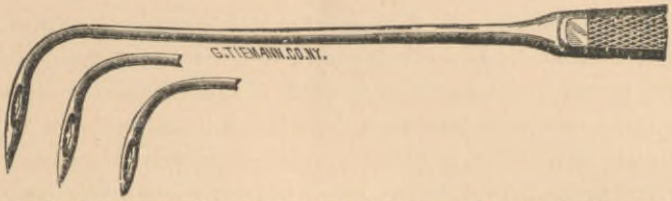

FIG. 4.—Dr. Marcy's needle, used in the application of the deep double continuous tendon suture. The eye is large and smooth, and a slot extends in both directions, so as to catch and hold the suture from slipping.
The point and inner side are rounded, to prevent cutting the tissues.

ment of the parts, and the structures to be included for this purpose, vary considerably. I have felt for a long time that a double continuous suture is to be preferred, and for this reason devised the method of sewing in which the suture is applied by the use of a curved needle with eye near the point. The first stitch is taken by entering the point of the needle through the lower border of the attachment of the conjoined tendon and the inferior posterior border of

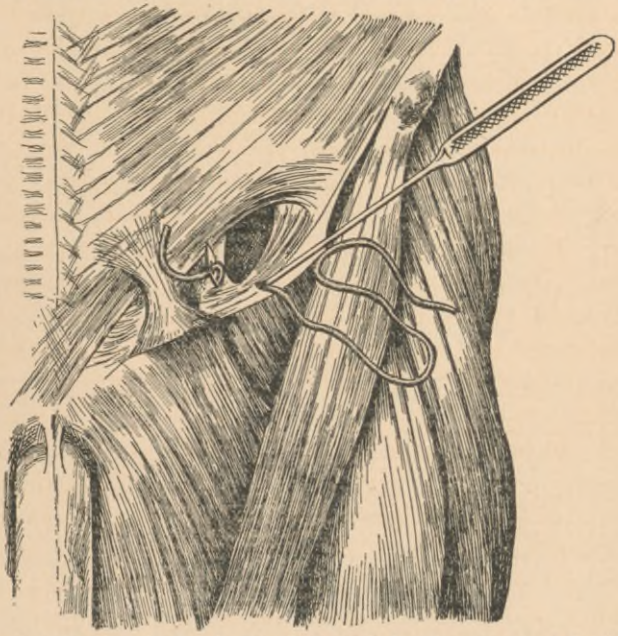

FIG. 5.—Inguinal hernia showing the first stitch for the closure of the internal ring from below upward, in order to reform the inguinal canal.

Poupart's ligament. The needle is unthreaded, the suture centered and tied in a half knot, the needle rethreaded with the opposite end of the suture and withdrawn through the opening made at its entrance. Continuous sutures to the number of three or four are applied in this way, until the last stitch closes firmly the inferior border of the internal ring quite upon the cord at its exit from the abdomen. The last

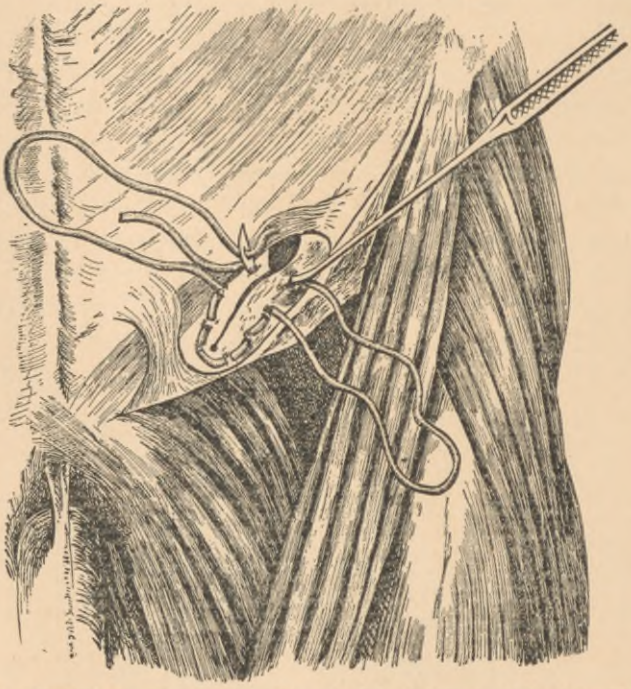

FIG. 6.—Inguinal hernia, showing the manner of closure of the internal ring, with the double continuous tendon suture. The needle is re-threaded for withdrawal.

stitch taken, the suture is tied upon the side and the ends cut short. It must ever be remembered that the object of the suturing is to hold the structures in even approximation without tension, and the chief danger from suturing lies in an *undue constriction* of the tissues. When properly applied, it will be observed that the transversalis fascia has been reënforced by the attachment of the posterior border of

Poupart's ligament to the posterior border of the conjoined tendon, thus forming a new strong wall of the inguinal canal. Into this slit the cord is replaced and the external structures are joined so as to make a firm, strong closure of the parts over the cord. For this purpose buried tendon sutures are equally desirable. These may be applied, as already described, by a line of double continuous suturing, reforming the external ring by bringing together the outer border of Poupart's ligament and the conjoined tendon.

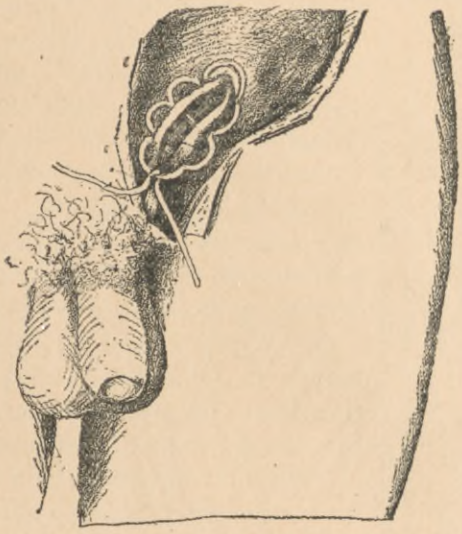

FIG. 7.—Represents the line of external sutures loosely taken, uniting Poupart's ligament to the conjoined tendon.
The spermatic cord is seen beneath the sutures, escaping externally below the knot.

For one who does not possess a needle as above described, the single continuous suture, applied with a curved Hagedorn needle, answers very well. The first stitch should be fixed by a reef knot, and the needle is then inserted at a more or less considerable distance from the line of the division, but taken deeply through the aponeurotic structures on a line *parallel* to the incision. The needle is then introduced exactly opposite its former emergence through the structures upon the other side of the parts to be approximated, and in

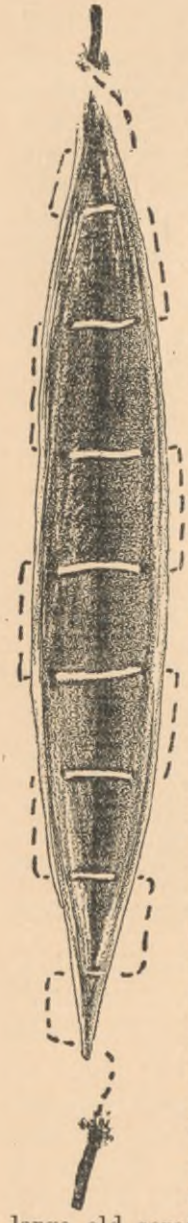

Fig. 8.—Fine continuous tendon suture taken evenly through the deep layer of the skin only, as a blind running stitch, which upon tension evenly coapts the skin by buried sutures.

this way one stitch follows another to the end of the wound. It will be noted that tension upon the suture evenly intrafolds the edges, the suture itself, buried in the tissues, crossing the line of division only at right angles. In this way the line of union is very much deepened, and may be easily more than doubled, greatly reenforcing the structures adjacent to the canal. Another layer of sutures, similarly applied, approximates the soft parts, and a line of running sutures, taken through the deep layer of the skin only, closes the wound. This is dried and sealed with iodoform collodion. No subsequent dressing or bandage is applied. The tunica vaginalis testis is thus reformed, and the peritonaeum closed securely about the internal ring so as to leave no depression.

The opposite extreme, the old large herniae in the adult, requires little deviation from the method described, except that the sac is first dissected free from its attachments, opened, to be assured of its contents—which may be disposed of as judged best, and then, quite within the ring, the sac is freed from adhesions and made tense by an assistant. The base is sewed across with a double continuous suture in a line with the axis of the wound, and the sac is resected. The retraction should be quite sufficient to place it out of the way in the subsequent steps of the operation, which are as above described in infantile hernia.

For teaching purposes, I like best the large old scrotal herniae, where trusses have proved inad-

equate for the retention of the abdominal contents, since the various steps of the operation can be made more easily apparent.

Inguinal hernia in the male has ever been considered the most difficult of treatment, since the opening in the abdomen must be closed in a way to permit the passage of important structures, which, at the best, can add nothing to the support of the parts. In the seventeenth century it was found an easy matter to cure inguinal hernia, by first removing the cord, and great numbers of hernia patients were deliberately castrated as a means to this end. More recently, before an open dissection wound was considered permissible, a great variety of ingenious subcutaneous devices were applied for the purpose of cure, but were usually followed by failure. Since it has been possible to make and maintain wounds in a non-infectious condition, the advance towards the permanent cure of hernia has been rapid, until, in the very recent years, new methods of cure are being constantly brought before the profession. However great in variety of detail, they must all be based upon a very few fundamental principles, and in order the better to emphasise these, I have occupied so much of the time with the consideration of the normal anatomy of the parts involved.

Of course the *ideal* method is to restore the parts to the normal standard of construction; pathological deformed structures having been removed,—*e. g.*, sac and contents. To do this, it is necessary to restore the obliquity of the inguinal canal by the reconstruction of the internal ring, and to reënforce the posterior wall. To effect this, a free dissection must be made, and buried sutures must be used. It was for this very purpose, so far as the records of surgery show, that buried sutures were first employed. I had just returned from Europe and the instruction of Mr. Lister, and was familiar with the use of the buried animal ligature for the closure of arteries. It seemed a proper application of the principle that sutures might, in like manner and with like result, be buried in the tissues. For this purpose I first

used catgut in 1870, which, prepared in various ways, I continued to use until 1880, when I made an extended search for some better material of like histological structure. These investigations resulted in finding the exceptionally valuable tendon suture material from the tail of the kangaroo. I demonstrated, histologically, that aseptic connective tissue, buried in healthy animals, is at first surrounded by leucocytes, that the foreign material is invaded by them, that little by little new connective tissue of a permanent character replaces the implanted suture. Since then I have used tendon sutures almost exclusively.

It has been demonstrated that other material may be used for sutures, and that it may be applied in quite a variety of ways. These variations in detail and technique have been called *methods*, and have been presented under different names,—*e. g.*, that of Bassini of Italy, perhaps, the best known. He uses an over-and-over continuous catgut suture, and places the coapted conjoined tendon and Poupart's ligament behind the cord. Potempski thinks it important to carry the internal ring to a higher point than normal. Fowler modifies this procedure by carrying the internal ring nearer to the median line, while Halsted thinks it wise to cut away a part of the veins in order to reduce the size of the cord, and, as a consequent, the size of the canal. It remains to be seen how much additional value comes from these modifications; if the liability of the return of the hernia is lessened, and if, by such extreme measures, the function of the reproductive organs is not impaired.

It is ever honourable and pleasant to associate the name of the individual with the contribution of real merit which he makes as an addition to the store of the world's knowledge. However, little by little, names given to operations, after the individual by whom they were established, sink into forgetfulness, and wisely so, that they may not overburden our literature, but the plain underlying principles must ever be kept in mind as the true foundation of all present and future improvement.

For the cure of hernia by a restoration of the structures to their normal anatomical standard and relationship,—and is it probable we shall find a better?—I introduced the use of buried animal sutures, which have been since widened in their application to all aseptic wounds. I demonstrated that a new oblique inguinal canal could be safely made and maintained; that the entire wound could be closed by buried sutures and sealed with collodion without drainage; and that primary repair ensued without pain or oedema. I also showed that ninety per cent. of my cases remained permanently cured; all this before any of the modifications as above referred to were published.

Whatever may be their advantages remains for others to determine. I know the reënforcement of the structures posterior to the canal is ample, if the inner border of the conjoined tendon and Poupart's ligament are joined to the relaxed, but strongly developed, transversalis fascia. This fascia is very much thicker in this region, as was pointed out by Sir Astley Cooper, and for a long time, on this account, called the *fascia Cooperi*.[1] Often its intrafolding is all that is requisite to give a firm and durable support.

The introduction of animal sutures, aseptically buried in the tissues for a very great variety of purposes, especially the possibility by their use of the closure of the peritonaeum and the reconstruction of the inguinal canal for the cure of hernia, I offer as a contribution to American surgery. It is with much satisfaction that I find these surgical measures are now so very generally adopted throughout the civilised world.

Before closing, there are a number of practical considerations which are offered for discussion. Of these perhaps the first in importance is, When shall we operate?

[1] Muscular fibres may be traced behind the cord, as if the canal entered through a slit in the transversalis muscle. "The transversalis muscle arise from Poupart's ligament and passes around the spermatic cord at the internal ring, so that the fibres of this muscle appear behind as well as before the spermatic cord, and thus the inguinal canal is rendered a muscular canal. This is a most important provision in preventing hernia; and when hernia exists, is often the cause and seat of stricture." *Sir Astley Cooper.*

At present I suppose there are few surgeons who would dissent from the proposition that, in strangulated cases, always at the first moment practicable. Any attempt at reduction should be made with exceeding care, and after such efforts have failed, immediate operation must be advised.

Operative measures for the relief of strangulated hernia vary essentially from those earlier advised, in that the dissection is a free one and is always under visual guidance; that blind surgery is bad surgery can nowhere receive greater emphasis than in the operation for the relief of strangulated hernia.

The hernial contents having been disposed of, few operators would now consider their work complete without closing the structures in some of the ways advised for the purpose of permanent cure. The earlier attempts made to utilise the sac for the reënforcement of the opening—as, for example, the Macewen method—are now very generally abandoned, since the reënforcement of the structures posterior to the cord, in a very much more satisfactory manner closes the weakened parts.

Hernia in children.—Until a moderately late period, nearly all this class of little sufferers have been relegated to the instrument makers. However, every surgeon is painfully familiar with the fact that it is exceptionally difficult to secure the proper wearing of a retention apparatus, and that, at the best, the cure of hernia by these means is tedious, painful, and unsatisfactory. The earlier attempts at cure of hernia by dissection and suturing were in large measure unsatisfactory, because of the use of the interrupted suture, which had to be removed, and the extreme difficulty of keeping the wound aseptic on account of the application of the drainage-tube. It is painful to recall the punishment of the little sufferers because of the multiple aseptic dressings, sometimes held in place even by plaster bandages. With all the care possible, the great majority of the wounds became infected, dangerous, and far from satisfactory in results.

The closure of the parts, as already described, with the

seal of collodion, renders further infection impossible, and primary union supervenes without pain or oedema, resulting almost invariably in permanent cure. It is pitiable in the extreme to send a boy, rich or poor, into the race of life suffering from hernia, handicapped with the necessary wearing of a truss.

Hernia in adults.—It may be considered an open question if active, vigorous men who are the sufferers from small herniae, easily retained by a truss, should be subjected to a surgical operation. The expense incident thereto, the loss of a number of weeks during which they must abstain from business, are set over against the inconvenience of wearing an instrument, the probability of the hernia continuing to grow more troublesome and pronounced, and the ever possible danger of strangulation. For my own part, I think the balance of account is usually in favour of operation, and I cannot question that the profession is each year becoming more and more of this opinion.

Hernia in the aged.—As at other periods, the problem must always be considered as one of individual character. This becomes more especially so in the later years of life. Assuming that the hernial subject is free from organic disease, age *per se* weighs far less seriously as an adverse consideration in aseptic surgery than was earlier supposed. Primary repair of the tissues is almost certain to ensue with remarkably little constitutional disturbance. The contrast between septic and aseptic wounds is much more marked in advanced life, and aseptic surgery wins, perhaps, its most brilliant victories in the operative wounds upon the aged. I have operated upon a very considerable number of patients between seventy and eighty, under the most unpromising conditions, and even upon several between eighty and eighty-five, and in each instance with seeming easy cure.

In illustration, I cite a recent interesting case, and exhibit the specimens.

Mr. M., aged 71, a hard drinker, had for a very long period suffered from an old irreducible scrotal hernia of the right side. It had recently

enlarged until the tumor extended quite one third to the knee and measured about eighteen inches in circumference. An inconsiderate truss vender had applied a strong-spring instrument upon the neck of the sac, and such inflammation had supervened that it was thought dangerous to permit delay in operation. The tissues were echymosed, and the sac was found to contain about a pint and a half of straw-coloured serum and a fatty omental tumor size of adult fist, with basic attachments. The omentum was sewed across, resected, and returned within the abdomen. Several pints of ascitic fluid escaped from the canal, which readily admitted three fingers. The sac was dissected, sutured, and removed. The wound was closed, as already advised, and sealed. The man was found to have chronic nephritis, albumen, and casts, jaundiced to a limited extent, which grew steadily more marked, and twenty-six days after the operation death took place.

The autopsy showed an interstitial hepatitis, liver reduced to half the normal size, with advanced disease of both kidneys. The union of the abdominal wound was primal, and I take pleasure in inviting your critical inspection of the specimens. The omental stump is smooth, and the cut ends of the tendon suture are apparently unchanged. The peritonaeum of the base of the sac is firm and glistening, showing only the slight wavy line of union. The reconstructed abdominal wall is noteworthy deep and strong, nearly one third thicker than upon the opposite side, owing to the intrafolding of the tissues. The skin wound is marked only by a linear cicatrix. The fatty tumor of the omentum is exceptional, seeming on section to bear no trace of intrafolded compressed omentum, of which it is doubtless composed; the thick, firm, leathery sac can even now be dilated to the size of a baby's head.

It will be noted that even in this aged man, dying from a complication of chronic diseases, the repair processes, under aseptic conditions, went on uninterruptedly, precisely as in a young, vigorous adult.

Multiple operations.—Individuals with hernia, suffering from various other conditions demanding surgical interference, may be, as a rule, safely operated on at the same time. It is usually advisable to operate upon both sides at once when the hernia is double, the repair processes going on equally well, with a marked saving of time and confinement. I have even operated upon double inguinal and umbilical herniae at the same time, with an equally easy convalescence and recovery. Multiple wounds, if aseptic, demand little more from the vital powers during the process of repair, and there is much positive gain to the patient in time, expense,

and confinement. Multiple operations have long been almost of daily occurrence in my surgical practice.

If operative measures are so generally advised for this disablement, it must be that the surgical procedures are attended with very little risk of life. Upon this subject the testimony is ample, and perhaps no other operation demonstrates more clearly the differences of result obtained under modern aseptic technique. Nearly twenty-five years ago, when I first commenced operation for the cure of hernia, it required persuasion to secure the presence even of physicians, because of the responsibility incident to personal attendance. So general was the belief—and, unfortunately, on altogether too good evidence—that an open dissection wound, made for the cure of hernia was always dangerous, that operation was not advised except in cases of strangulation.

In my recent work upon hernia,[1] I have collated over three thousand operative cases of hernia by various aseptic surgeons, who report less than one per cent. of deaths, and these explained by conditions in which the wound itself had no part. In my entire experience of over two hundred cases, I have never seen a patient approach the danger line following operation where the intestines were not involved.

He who is master of aseptic conditions may safely operate for the cure of hernia, if he is thoroughly conversant with the anatomy of the structures. *Aseptic sutures, aseptically applied in aseptic wounds*, and aseptically maintained. This is the *sine qua non*, or failure will ensue; otherwise buried sutures are not to be commended in any wound, and must ever be a source of danger.

In how large a percentage of cases may we expect permanent cure?

Upon this question there has been and still is a great variety of opinion, based upon the results, of course, obtained from the various methods of operation in use. We can well understand the opinion as given by Dr. Bull, of New York,

[1] The Anatomy and Surgical Treatment of Hernia. Illustrated. Quarto. D. Appleton & Co. 1892.

that relapses were the rule rather than the exception, when we remember that the results of the operations which came under his observation were due to methods which failed to secure the restoration of the obliquity of the canal, or the

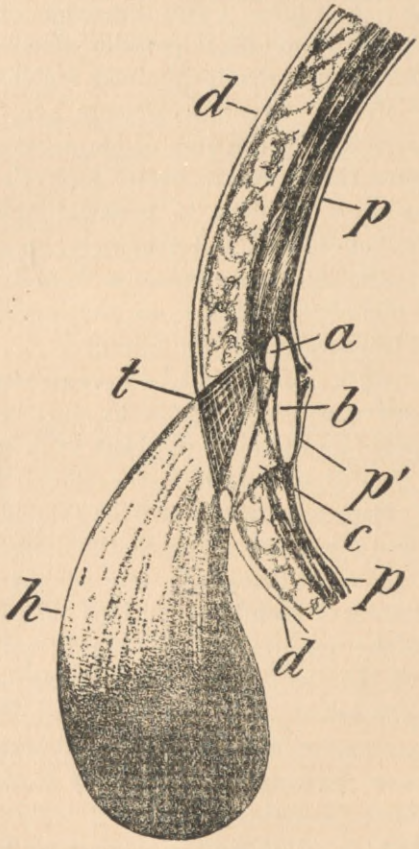

FIG. 9.—The light-colored funnel-shaped opening in the abdominal wall, is the part unclosed by surgical methods which do not reconstruct the obliquity of the inguinal canal.

a. Normal internal ring.
b. Enlarged internal ring.
c. Unclosed triangle.
d. Abdominal wall.
h. Hernial sac.
pp. Peritonaeum.
p^1. Resected at site of internal ring.
t. Triangle, reformed by closure of external pillars of the canal.

reënforcement of the deep structures. The removal of the sac and the suturing of Poupart's ligament to the conjoined tendon, without the reformation of the inguinal canal, necessarily left a large funicular opening in the abdominal wall, the very end of which only was closed at the external ring. Under such conditions, it is usually only a question of time before the hernia reappears. (See Fig. 9.)

In 1893 I read a paper before the American Medical Association, in which I gave the analysis of one hundred and thirty-three cases which I had been able to keep under observation; of these there were six recurrent herniae, four of which I have since operated upon. About one third of this number had been under observation for ten years and more.

Did time permit, I would gladly quote from the experience of some of the recent operators, of whom, perhaps, none are more enthusiastic at the present than Dr. Bull himself and Dr. Coley, of your city.[1]

Corroboration of the principles and position which I have advocated so long is now ample, and there is little question but that the more serious sufferers in the great army of truss-wearing individuals will early receive from the surgical profession easy and safe curative measures. In this field aseptic surgery has won one of the most brilliant victories of the present revolutionary period.

[1] From a recent letter by Dr. Wm. B. Coley of New York I quote. "I have used kangaroo tendon in 170 of my 183 cases of hernia, and have never had any trouble from it; and I believe my success was largely due to using it as a buried suture material. No other results, here or abroad (except, perhaps, your own), show such a percentage of immediate or final cures. Of my 140 cases where the cord was transplanted, I have had but one relapse—137 cases traced. In 170 cases where kangaroo tendon was used, suppuration occurred only four times,—and then superficial, outside the layer sutures of tendon."