

sected back so as to expose the sheath of the rectus muscle. A similar dissection was made on the outer side over the external oblique.

Beginning at the upper angle, four silver-wire sutures were inserted from the peritoneum through the abdominal wall, one inch from the border of the incision on either side. The muscular tissues were closed by a continuous kangaroo-tendon suture, passing through all the subcutaneous tissues, as they could not be separated owing to the long-continued inflammatory and suppurative process. The skin was closed by a continuous suture of the same material. The deep sutures were drawn sufficiently tight to relieve the tension on the stitches through the muscles, and were retained by winding them around an ivory pencil. The patient was placed on a liquid, animal diet to prevent the distension of the viscera. The end wires were removed in ten and the remaining ones in fifteen days, and the patient was kept in bed three weeks, making an excellent recovery. The details of this case have been given somewhat fully to show that it was an exceptionally bad case for a good result. At the end of 2½ years he was photographed and there was no return of the hernia evident.

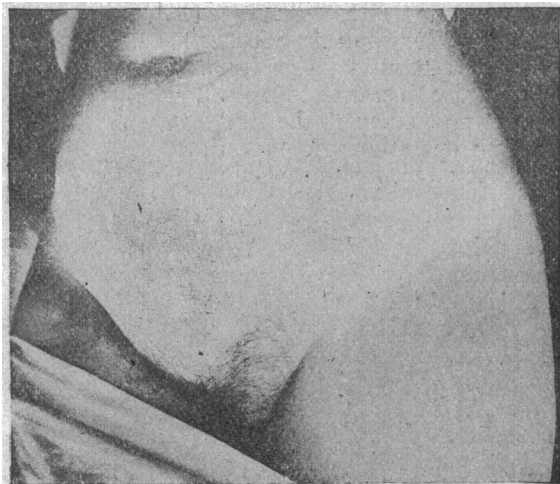


FIG. 6.

CASE 2.—A woman was operated on for the removal of a fibroid tumor of the uterus, Nov. 22, 1894. She was admitted to the St. Francis Hospital, where the operation for the radical cure of her ventral hernia was performed by the writer, Dec. 30, 1898. Fig. 5 illustrates the size of the rupture.

The usual elliptical incision was made, the tissues were dissected back on both sides so as to expose the sheath of the recti muscles, and silver-wire sutures were placed as previously described. The subcutaneous tissues were closed by the usual continuous suture passing through the sheath of the recti muscles. The skin was closed as usual and the deep silver wires were made sufficiently tight to relieve the tension. At the end of ten days the dressings were removed and primary union had taken place perfectly; two of the silver-wire sutures were removed and the rest of the wires five days later. At the end of three weeks she was discharged, fully recovered. Fig. 6 illustrates the condition one year four and a half months after the operation.

The reason for the unsatisfactory results, so frequently following the operations for the radical cure of ventral hernia, in the class of cases where a very long incision is made, thus depriving the rectus muscle of its nerve-supply, followed by a protracted period of supuration and drainage, attended by a considerable loss

of tissue, and a slow closure by granulation, is the strong tension necessary to bring the abdominal walls together, causing a giving way of the tissues before a proper union of the parts has been secured. The technique here described fully meets these requirements and has proved highly satisfactory in a series of these extreme cases.

THE ESSENTIAL FACTORS FOR THE CURE OF HERNIA IN THE MALE.*

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That hernia may be safely cured by surgical intervention is now recognized as one of the special triumphs of modern aseptic surgery. It is scarcely more than a decade since the profession in general discountenanced operation except under very restricted limitations, and the records of all our general hospitals are replete with long series of cases followed by dire disaster, owing to delay in operation for the relief of strangulated intestines in which now a speedy cure would ensue by prompt surgical intervention.

It is not the purpose of this paper to discuss the history of modern operations or the various methods of prominent surgeons, but rather that we may eliminate the non-essentials and emphasize the really important factors which must pertain in order to effect a cure. All forms of hernia except that of the inguinal in the male may be dismissed with the simple statement that they consist of openings through the strong retentive wall of the abdominal viscera, more or less direct, and that the proper closure of these openings is usually a simple procedure which should be followed by primary union and permanent cure.

The inguinal variety in the male is by no means so simple, since here the abdominal opening usually follows the canal through which the spermatic cord and vessels pass. If this opening is normal, is it necessarily a source of weakness? If so, why are not all men subject to hernia? Statistics show that this variety is much more common than that of all others, so common, indeed, that by estimate one in every ten to fifteen male adults is the subject of hernia; over three millions of the inhabitants of the United States are thus, in a greater or less degree, sufferers and incapacitated for hard active service.

If this form of hernia is so universal, to ascertain its cause and the reason of its development is obviously of the first importance. It may be easier of solution to reverse the proposition and inquire why all men are not subject to hernia, or, in other words, what the normal anatomic and physiologic conditions which prevent the escape of portions of the abdominal contents through the inguinal canal are. Since I have reason to believe that this phase of the subject is comparatively little understood and has been rarely emphasized in its proper surgical importance in its relation to the restoration of the structures in order to effect a cure, I must be pardoned in dwelling a little in detail on certain of these factors.

In a way, it seems strange that the testicle should develop within the abdominal cavity, and that by a seeming change of plan, as if an afterthought, it should be extruded therefrom at a period when all the other organs are not alone permanently closed, but in a high degree have completed their development. Why not much better to have permitted their retention within the abdomen, as

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are the ovaries in woman? Far safer from seeming injury, and also in this way short circuit the deposition of their secretion within the vasa deferentia? Again, what a fruitful source of profit to the modern junior surgeon, who would very probably daily seek, by a laparotomy, to ascertain the exact condition of these important organs—of a value second only to their counterparts in women!

Having developed within the abdominal cavity, it becomes necessary in their change of abode that they carry before them a process, or pocket of the peritoneum, which, in the mature normal condition, becomes the tunica vaginalis testis. This necessarily lines the inguinal canal with a delicate intrafolded membrane, which becomes more or less fused with the vessels of the cord and also permits a certain amount of mobility as well as a normal variation of vascularity.

The peritoneal surface opposite to the internal ring, as it covers over the separated component parts of the cord, is described in normal anatomy as the infundibulum processus peritonei, in simple English, funnel-shaped. But, from repeated investigations, I am assured that this is a mistake, that normally there is no funnel-shaped depression, although it may be easily made to appear thus by traction on the cord. As far as I have been able to ascertain, this is traceable to the otherwise very valuable contribution on the subject of hernia, published by Cloquet in 1835.

This author reached his conclusions after dissecting more than five hundred subjects who had suffered from hernia, and it is not to be wondered at that, for this reason, he mistook a pathologic for a normal condition. I am myself assured that the real cause of hernia, in most instances at least, is a lack of the developmental process by the imperfect closure of the internal ring, although it may not show itself as a hernia until the later period of life. This is the more in evidence, since it is only possible by the closure of the internal ring to prevent a more or less constant hydrostatic pressure in the line of the already partially opened canal, the entering wedge ever forcing apart the readily yielding structures.

On the contrary, when the internal ring is closed firmly around the vessels, compressing them upon each other so that the entire abdominal parietes act upon a single plane, the intra-abdominal pressure acts laterally upon the walls of the canal. Note, for example, the extraordinary feats of strength of athletes when these muscles are called into special play. The only other instance in the body where nature avails herself of this mechanical principle is the passage of the ureter through the walls of the bladder, permitting the easy escape of the urine through the ureter, although the fuller the bladder the less the liability of reflux into the kidney. In pathologic conditions where this takes place, it is interesting to note the foreshortening of the ureter in its passage through the bladder wall.

Given a small infundibular process as the first factor in the problem, it is interesting to note that the internal ring, as a rule, enlarges by a depression of its lower border, since the internal abdominal pressure is first brought to bear upon these buttressing structures. These having yielded, little by little the force called into play is now exercised upon the structures of the anterior wall of the canal, but not until these give way is it usual for the patient to complain of inconvenience sufficient to have the attention of the surgeon called thereto. It is very easy for one to demonstrate by a careful examination a foreshortened, slightly dilated inguinal canal

brought about by these conditions, of which the subject has never made complaint. Here are conditions ready to become emphasized by some special strain which, instead of producing a valve-like closure of the canal, suddenly gives way because of its loss of obliquity, and the man finds himself "ruptured." In other words, there has been an escape through the dilated canal of a certain portion of the abdominal contents. Given these conditions, the forecast of the man's future is quite clearly in evidence—a retention apparatus, the ordinary truss-bearing individual; conditions becoming more pathologic, brought about by intra-abdominal pressure exercised in the line of its opening instead of at right angles to it, rendering instrumental supports of no avail; usually more or less complete invalidism, or an operation to effect its cure.

The effect of mechanical supports is obvious. By pressure exerted from without inward force is brought to bear almost wholly on the structures external to the inguinal canal. The internal ring is acted on only through this pressure and the deeper structures can not be supported in a way to effect their restoration. Indeed, the more common result of truss pressure is that which pertains to undue pressure in any other part of the body, a weakening of the parts involved, owing to impaired nutrition. It is on this account that it is often unwise to advise a patient to have recourse to a truss, and prompt remedial operative intervention may effect an easy cure and save many of the complications which oftentimes render operation on old herniæ really difficult and formidable, even to surgeons of large experience.

Although to some this may seem elementary, student-teaching, its importance is generally overlooked and scarcely referred to by many authors. So important is it that I regard it as the very key to the possible surgical intervention for effecting cure. Further in our investigation, when an infundibulum pertains, we are to ascertain the structures that are defective. Here again we have recourse to anatomic study. The inguinal canal is rendered oblique in its passage through the abdominal wall by the firm retentive structures which enter into the formation of the lower border of the internal ring and the posterior wall of the canal. This may be described as a direct, slightly elliptical opening through the firm sheath of the transversalis. Its muscular fibers, as they descend toward their pubic attachment, are replaced by a double tendinous interweaving of exceptional strength. Oftentimes the opening through the transversalis is through the lower border of the muscle rather than its tendinous expansion, to-wit, a careful anatomic examination will demonstrate muscular fibers about and below the lower border of the internal ring, and then it may be described as a direct opening through the transversalis muscle. This is not, however, the more common condition, and when found I do not consider that it possesses any material advantage. As far as I am able to learn, the first of the great anatomists who pointed out this extraordinary development of the transversalis fascia and emphasized its physiologic importance was Sir Astley Cooper. So valuable was it considered by his contemporaries that, for a considerable period, it was called the transversalis fascia Cooperi.

It will readily appear that the proper development of these parts is the great bulwark for maintaining the obliquity of the canal and, as a consequence, its defect is the almost universal cause of inguinal hernia in the male. Singularly enough, this has not been pointed out as of special importance in relation to the operation for

the cure of hernia, but on careful reflection, it must be recognized as the first important stable factor in the reconstruction of the inguinal canal to its normal obliquity, by which only is it possible to effect a rational means for permanent cure.

The history of operative measures for the cure of hernia has also an important bearing on this phase of the question. From the time of the Roman surgeons, through the centuries, attempts, by a great variety of operative procedures, were made for the cure of hernia. The open dissection methods finally resolved themselves into two distinct classes. The first was to leave the wound open, packed with charpie or lint smeared with some kind of ointment, and for the most part, that which gave the better result, soaked in spirits of wine, which alcohol we should now class as an antiseptic. This permitted slow granulation and produced a more or less firm cicatrix, a result deliberately aimed at in this later period by Dr. McBurney, of New York.

The other method, and by far the most successful one, was the removal of the testicle and cord, which gave a wound subject to a possible primary closure with far less loss of the firm supporting structures, even if a suppurating wound. Notwithstanding the suffering from large wounds thus made without anesthetics, and the mortality due to infection, this method became so very common that it was at last checked by royal edict, lest the country suffer from the lack of population.

Both these methods, as we readily see, dealt with the deeper supporting tissues of the transversalis.

The earlier procedures of a considerable number of operators, more or less masters in the antiseptic technic, consisted in making an open wound and closing the refreshed structures down to the anterior wall of the inguinal canal. A very important paper by Dr. Bull, of New York, reviewing the history of a large number of cases which came under his observation, following this method of operation, pointed out very correctly that a large majority became recurrent, without making an analytical showing of the cause. The influence of this contribution was so great that it for a time produced a decided reaction against all methods of surgical intervention. At the present time, however, no man is a more earnest advocate of the surgical cure of hernia, and there is none whose experience exhibits a better showing of results than Dr. Bull.

The essentials of operative procedures for the cure of inguinal hernia in the male, regardless of its degree of pathologic deviation, may be classed as follows: First, a wound sufficiently large to bring into easy observation all the factors pertaining to it. This necessitates the removal of the cord from the canal, usually best carried upward and inward, and the free separation of the hernial sac—the opening of the same in order to deal intelligently with its contents. These properly disposed of, the separation of the peritoneum is carried quite within the internal ring, and the sac is closed off at its base and resected. This is best effected by means of a suture, rather than a ligature, since it can not then slip from the enclosing suture. If closed with three or four continuous sutures, the enclosed structures are safely held at rest with only sufficient force to produce approximation, and these should be taken obliquely upward in the line of the reformed canal. If by ligature, the constriction must be much greater in order to prevent slipping, which necessarily lessens the vitality of the parts. I have myself known of one fatal case in which a surgeon of repute closed the sac in this way by a ligature which included an arterial branch not usually found

in this locality. The autopsy showed that death was caused by the slipping of the ligature and hemorrhage within the peritoneum.

Next follows in sequence, but already pointed out as fundamental in importance, the reconstruction of the posterior wall of the canal. The structures which should enter into it are best studied by introducing the finger into the abdominal cavity before the closing of the peritoneal sac. In many cases it may be sufficient to suture, from below upward, the transversalis fascia and reform the internal ring by closing the structures closely beneath the uplifted vessels. In large, old, deformed herniæ this will usually be insufficient, and many expedients are resorted to for the reinforcement of these structures. It has been urged by some operators to place all the strong structures of the abdominal wall posterior to the cord, covering it only for external protection by the subcutaneous, non-resistant structures. Theoretically this is at fault, since it substitutes in place of the hernia a direct, although small, opening through the entire resisting parts of the abdominal wall, which opening is in the line of the intra-abdominal pressure, and the cord thus disposed lacks its normal protection, impairing the nutrition and normal function of the testicle. Experience has shown the correctness of this criticism. I have operated a number of times for the cure of recurrent herniæ in which failure had followed this method of operation. The hernial opening was directly through the new internal ring above the cord, and the inguinal canal in its true anatomic sense was wanting.

A very considerable number of ingenious devices have been instituted for the reinforcement of the posterior wall of the canal where atrophy of the parts, incident to old pathologic changes, has supervened, e. g., the transplantation of the pyramidalis, the imbrication of the lateral walls of the canal, the interweaving of the peritoneal folds of the sac with the strong, tendinous fibers of the conjoined tendon with Poupart's ligament, etc. These may all, in certain rare conditions, have a proper place and usefulness in the reinforcement of the parts.

In recent hernia, in which the tendon of the transversalis is of normal development, the intrafolding of the yielding part and suturing quite upon the cord from below upward, in order to reform the internal ring, is sufficient. This may be effected by any method of suturing or variety of suture material, but it is of obvious advantage that an absorbable suture material be used, as the suture must be buried. The intrafolded reinforcement is much more neatly effected and the parts held at rest in easy, unconstricted approximation with much less amount of suture material by the use of a double line of continuous suture where only one knot is requisite.

When, owing to long-continued truss-pressure or other causes, there is great relaxation and defect of structures, I have found it by far the simpler and better way to evert the edges of the conjoined tendon and Poupart's ligament, and with a double continuous suture coaptate their posterior borders and close the parts quite upon the cord from below upward to aid in the reconstruction of the internal ring. This not alone re-enforces the parts with firm resisting structures, but the edges of the tendinous structures thus coapted are everted and aid in forming the lateral walls of the reconstructed canal. Thus the parts are firmly buttressed posteriorly and upon either side, while the canal is restored to its full length, thus insuring its normal obliquity.

It now remains only to replace the cord in the sulcus

thus formed, and close over it to its former relationship, the tendinous expansion of the internal and external oblique muscles. In doing this we again form a firm buttress over against the internal ring, which not alone supports it, but restores the valve-like function of the canal when undue pressure is exerted, which, as we have before stated, is the anatomic and physiologic reason why all men may not become easily ruptured. Here again, and for similar reason, we consider it of first importance to use the absorbable suture. A fine, subcuticular, continuous, buried animal suture closes the wound, which is sealed with iodoform-collodion, reinforced by a few fibers of absorbent cotton. This constitutes the only dressing, and the only restraint enjoined upon the young or old is that the movements of the body shall not bring special strain upon the parts involved.

During the process of repair suffering is so minimized that it may be called discomfort rather than pain. Sleep follows without opium; reading and writing are harmless. The enforced period of retention in bed often serves as a sort of rest cure to the overworked sufferer, who returns to his work at the end of his month of comparative restraint refreshed and invigorated rather than weakened by his sojourn in the hospital.

Primary restoration of the parts, when aseptic, well-vitalized structures are alone involved, without infection, is so assured that it is now accepted, if suppuration occurs, that there has been some fault in the technic. This may never be absolute, but in my own experience, extending over a number of years, 2 per cent. covers this defect.

By a general consensus of opinion, danger is hypothetical rather than real. My entire experience covers thirty years of active surgical practice, and includes about 500 operations on all forms of hernial cases. All have made seemingly easy recovery when the intestine was not involved, and as far as traceable quite 90 per cent. have remained cured. This may be an overestimate, since the relapsing cases are, for obvious reasons, the more difficult to trace.

All varieties of suture material have their advocates and, as a consequence, should be considered among the less essential factors. Some of us are greatly troubled in removing silk and wire buried by surgeons who advocate their use. Only the last week I operated on a patient, from a western state, in whom the defect was traceable to painful sinuses discharging for months, from which I removed large loops of thick silk. Not until the patient was on the operating-table did I learn that suit for \$15,000 had been entered against the surgeon who had buried them. This can never be charged as a result of a properly placed aseptic animal suture.

I think my introduction to the profession of the buried animal suture my best contribution to surgery. This was first published in 1871 and was first employed for the cure of hernia in 1870. I used catgut almost exclusively until 1880. For what I considered a good and sufficient reason, about 1875 I discarded silk as a buried suture. After a long search for a substitute for catgut, using the tendons from various animals, in 1882 I found the marvelously beautiful tendons from the tail of the smaller species of the kangaroo. These I have used continuously until the present, and am more than satisfied with their great superiority over other suture material. The collodion seal is a corollary to the buried suture. Not the least value of the suture is that it absolutely obviates the necessity for drainage, permitting the primary closure of the entire wound. The vitalized

serous effusions and leucocytic proliferation should be retained as Nature's "first aid to the wounded."

If our science, our theory and practice go for anything, the making and maintaining of an aseptic wound in aseptic and well-vitalized structures is the practical issue sought and to be attained. This effected, with coaptated like structures held at rest by buried aseptic, absorbable sutures, the only factor remaining to complete our ideal technique is a dressing for the purpose of preventing subsequent infection. This is secured so simply and easily by iodoform-collodion, strengthened by a few fibers of cotton, that this dressing reaches an ideal completion. It is fluid-proof in that no exudate can escape from beneath it, and as a consequence it is germ-proof in that it is by no means possible for any foreign material to enter the wound. Beyond this, it holds the approximated structures in even coaptation, at rest, with a certain fixity of support. Water does not loosen it, and it is detached from the vivified cutaneous cells beneath only by the slow separation of the exfoliated epithelium. If for any reason it is needful to remove it, this is easily effected by soaking in alcohol or ether. The late Dr. John P. Maynard, of Dedham, first made the discovery that the cellulose of cotton fiber was soluble in ether and alcohol, and more than forty years ago gave to the profession this very valuable substance called collodion. Early it was applied for the sealing of wounds, those of a slight character oftentimes healing by primary union, under its protection. It was popularly called "artificial cuticle," but naturally fell into disuse because, when it covered septic wounds it was in the highest degree harmful.

Iodoform is soluble in it and is not injurious to it, and ordinarily it is of little additional value. Under certain conditions I believe it to be inhibitory to the development of the micrococcus albus in the proliferating epithelium, and quite as valuable in this direction as the silver salts, which are much more difficult of application. To one who may doubt the efficacy of a potent agent seemingly locked up in a collodion film, we need only to cite the powerful vesiculating effect of the cantharidal collodion. A wound made and maintained aseptic in well-vitalized structures, held at rest in easy coaptation by buried tendon sutures, will be followed by non-inflammatory primary union.

The fear, the anxiety, the constant supervision and watchfulness of nurse and attendant are entirely obviated. Wound supervision is finished before the patient leaves the surgery. Subsequent dressing is of no avail except to keep the parts from extraneous injury. The work of the surgeon for good or ill has its finality at the single period of manipulative intervention.

The surgeon freely profits by the vast contributions of those who have preceded him. It should be his inspiration to contribute as he may be able to this storehouse of knowledge. The individual counts for little, but fundamental principles are enduring. For more than a quarter of a century I have endeavored to emphasize with greater or less clearness the anatomic and physiologic foundations upon which it is alone possible to reconstruct the parts involved in inguinal hernia in the male. These may be epitomized essentially as follows: 1. Free dissection of the parts under aseptic conditions. 2. The proper disposition of the hernial contents. 3. Suture and resection of the sac. 4. The reconstruction of the inguinal canal to its normal obliquity. 5. The buried animal suture, preferably tendon, is absolutely essential in order to effect this. 6.

The closure of the wound without drainage. 7. Protecting the wound with iodoform-collodion seal, and the application of no other dressing.

DISCUSSION ON PAPERS OF DRS. OCHSNER, JOHNSON AND MARCY.

DR. W. B. DEGARMO, New York City—I consider the first paper a very important one. Children are certainly entitled to a cure, but the question still remains under discussion as to how. I think the author has gone over the subject thoroughly. An important predisposing cause of hernia in children is the persistence of communication between the cavity and the cavity of the abdomen, which Dr. Marcy so clearly pointed out years ago. I think it is a predisposing cause not only in infancy, but rather late in life, and I have seen what we call congenital hernia occurring as late as 21 years. Many of us carry the defect through life. As to the immediate causes, I have developed views which are at variance with the text-books, for in my opinion the most important immediate cause at all ages is constipation. This may not be borne out by the experience of others, but it is certainly true so far as my observation goes. I endorse the list of operative cases as formulated by Dr. Coley, but I hesitate to operate on children under 5 years of age, as I think 95 per cent. of them may be cured by a truss. There is no reason why we should not operate on them, except our natural feeling against operative measures on infants. I can not endorse the treatment of hernia in children by confinement to bed, as they depreciate in health so soon as they are placed there. There are very few cases that can not be treated with the truss and the child be allowed to play around.

As to operative treatment, the method I prefer is Bassini's. The subject of ventral hernia, it seems to me, has been very thoroughly covered. We should stitch up the normal layers of the muscular walls separately in all cases if possible. I think all of us find the relaxation suture necessary, at least in large abdomens, and I usually prefer silkworm gut to any other suture, removed in ten or twelve days.

Dr. Marcy's paper may be disposed of promptly, as I do not wish to criticize it. He was the first man to point out the importance of restoring the obliquity of the inguinal canal, and he was then many years ahead of the times. No man living has pointed out the true anatomical relations as graphically as Dr. Marcy, and we are also indebted to him for kangaroo tendon as a valuable buried suture.

DR. A. H. FERGUSON, Chicago—The subject of inguinal hernia is a very interesting one, and it is the only portion of this discussion to which I will devote a few minutes. Whatever honor belongs to the radical cure of oblique inguinal hernia by the Bassini and Halsted methods is due primarily to Dr. Marcy, but I must say, however, that I am compelled to take variance with all these operative procedures in the vast majority of cases; in fact I characterize all these operations as shot-gun prescriptions because they do not take into consideration all of the etiological factors. It is true that the rotundity of the peritoneum is restored by tying off the sac, and that the inguinal canal is also restored, but what about the other structures. These are only passive structures and the next in front of the internal ring and canal is the internal oblique muscle, which is the only active muscular protection that the internal ring has. Physiologically it is beautifully protected by this muscle as it runs across to the conjoined tendon from its origin at Poupart's ligament. The normal origin of the internal oblique at Poupart's ligament in the male is a little more than one-half of this ligament, while in the female it arises from two-thirds. This is no doubt one reason why oblique inguinal hernia is more frequent in the male than in the female. When there is a deficient origin of the internal oblique muscle at Poupart's ligament, the active protection of the internal ring is gone and there is an angle. Sometimes this deficiency extends to the anterior superior spine. In 95 per cent. of inguinal oblique hernia there is a deficient origin of the internal oblique muscle at Poupart's ligament. When the intra-abdominal pressure exerts itself and distends the peritoneum and the internal ring, which is composed of the transversalis fascia, then the protecting muscle being absent the hernia protrusion meets with nothing more until it reaches the

aponeurosis of the external oblique muscle in front of the inguinal canal. The point I wish to impress on you is that there is a new etiological factor at work in hernia which has not been recognized, namely, the deficient origin of the internal oblique at Poupart's ligament. I divide the radical cure into two classes: 1, the typical operation, which restores all the structures from within outward and leaves them the same as they are in the normal inguinal region, and 2, plastic operations which are necessary to strengthen specially weak points in the hernial region, caused by congenital defects or by pressure of hernial contents or a truss. No young man should be allowed to go on wearing a truss until his abdominal wall has thinned out.

DR. W. J. MAYO, Rochester, Minn.—I think the author of the first paper called our attention to an important point when he said that by putting these children in bed, carefully correcting their diet, and relieving them of their constipation and any urinary disturbance, a large percentage would be quickly cured. The paper by Dr. Johnson is also an important one. It is not necessary to add anything to what has been said by Dr. Marcy, but there are one or two practical points I would like to mention connected with the cure of hernia. I have no idea of discussing the Bassini operation, but the most important point about it is that he divides the scar. Instead of being brought together in a single line it is divided into two lines. In the Johnson operation the first line of scar tissue is protected by Poupart's ligament, and the outside line by the oblique layers of muscular tissue. This method can be carried to other parts of the body and you can divide the scar in a ventral hernia in the same manner. Umbilical hernia is one of the most difficult that we have to deal with and usually occurs in fleshy people. If you put them on their back and ask them to rise up, you can easily determine where the recti muscles are, which may be separated several inches. If you make the incision down to one side of the sac you can examine the inside and the contents, and cut off the omentum at the base. The operation can be done either laterally or transversely.

DR. A. J. OSCHNER, closing—Theoretically it is always bad to put children in bed when they can be treated without. If treatment by means of a truss is as effective as treatment in bed then the latter is wrong. If you put the child in bed in the inverted position, you give the mesentery an opportunity to shorten, and at the same time take care of the intra-abdominal pressure, which is due, as Dr. DeGarmo has said, to constipation. It is also, however, due to the pressure necessary to overcome the gaseous distention. As a matter of fact, by overcoming these difficulties, the children improve so enormously that in my experience weak, emaciated children, whom you would consider in good condition to contract almost any disease, will build up wonderfully. I have not seen one single child which did not improve enormously while in bed, and consequently the objections which would suggest themselves to any one are eliminated. I would like to ask the members to try this form of treatment, as I have been greatly pleased with it. It consists simply in keeping the hernia sac empty, and in keeping away the abnormal intra-abdominal pressure.

DR. H. O. MARCY, closing—We will all agree with Dr. Ochsner that children are benefited by rest in bed, and I think that they are benefited also by early operation. Why should we have institutions for the young intended to prevent these children entering life handicapped by hernia if it is not safely a preventable condition? As to ventral hernia, it seems to me that this is a simple thing to avoid. In the last 1500 laparotomies I have had but one hernia; of course I speak of aseptic laparotomies. If you prevent ventral hernia you will save much subsequent suffering. If the cases are restored cured, the way to do it is to build it back to its normal anatomy, and reconstruction of the abdominal wall in layers will do this. I think the problem of hernia is practically settled. There were a few fundamental principles mentioned in the paper which I did not read, owing to lack of time. A man should be a thorough master of the technic of hernia and the operation should not be confined to a few men. We must remember that 3,000,000 people in this country wear trusses. The large ma-

jority of this great truss-bearing army are entitled to be cured.

DR. M. M. JOHNSON, closing—As regards restoring the normal layers if possible, I would say that in a large number of ventral herniæ following appendectomies there has been a long process of suppuration and drainage, often followed by a loss of tissue and atrophy, to the extent that all the lines of the normal layers are obliterated. It is in this class of cases that you must unite the parts *en masse*, as stated in my paper.

HYDRENCEPHALOCELE.*

CARL BECK, M.D.

NEW YORK CITY.

The prognosis of hydrencephalocele, formerly so extremely unfavorable, has become more promising under the auspices of asepsis, as well as under those of the Roentgen rays, which have but recently added a further element of better knowledge. As an illustration the following cases may serve:

CASE 1.—A boy of 5 weeks of age well nourished and otherwise normal, shows a spherical, non-pulsating tumor of the size of an orange, projecting from the nasofrontal region and sinking downward to the *alæ nasi*. (Fig. 1.) At birth the tumor was a trifle smaller. The family history shows nothing abnormal. The father is a German laborer, the mother was born in New York City. Both parents are anemic. The mother was a multipara—four previous children—and the confinement was normal. In connection with the question of injuries being etiological factors in the defects of development of early intrauterine life, it is interesting to note, that the mother fell from the fourth story of her residence eight months before confinement, escaping with a fracture of three ribs and of the olecranon and a contusion of the knee. Pleuritis followed the thoracic injury, but recovery took place three weeks afterward.

The walls of the tumor were thin and the integument appeared normal. Contractions of the tumor were observed, especially while the child was crying. During sleep the tumor appeared somewhat smaller. There was exquisite fluctuation and the contents could almost entirely be pressed within the skull, which procedure did not cause any reaction. Neither pulsation of the brain could be detected, nor could the border of the cranial opening be distinctly felt.

In view of these facts, especially of my inability to palpate so solid a mass with certainty, I diagnosticated meningocele, and thought of aspiration followed by the injection of a small quantity of iodoform-glycerin.

The Roentgen rays, however, modified my views. A skiagram (Fig. 2) showed behind the light shade, representing the fluid, a dark one, which had to be interpreted as a solid mass confined to the area of the large triangular bony opening. That this was cerebral substance could be verified by the subsequent operation.

The skiagram also showed that the nasal bones were shifted downward so that an interspace of the width of a man's thumb was left between it and the frontal bone. Now I dropped the idea of the treatment by injection and proceeded to excision, which was done without anesthesia. After constriction at the base of the tumor for the purpose of ascertaining whether cutting off the circulation and pressing upon the contents would produce any reaction, a prophylactic silk-suture was conducted around the whole circumference

of the tumor at its base, in order to be able to control any excessive hemorrhage by quickly pulling the suture-ends together. Now, an elliptic flap was dissected from the center of the tumor and the cavity opened laterally. After about one tablespoonful of normal cerebral fluid had escaped, further exposure of the sac revealed its lining, consisting of *dura mater*, partially protecting degenerated cerebral substance. Near the base, according to the darker shadow of the skiagraph, cerebral substance, covered by dark-red, velvety, succulent and easily-bleeding tissue, was protruded. After severing the protruding portion from its lateral connections, which were thinly spread over the walls, it was possible to reduce it into the cranial cavity. Two-thirds of the sac was removed and the remaining stump was freed from the frontal bone, including periosteum, until apposition without tension could be obtained. The edges were then united with thin formalin-catgut and supported by another row, consisting of the overlapping



Fig. 1.—Nasofrontal hydrencephalocele in a boy of five weeks of age.

soft tissues. Finally the skin edges were united with stout silk. Although the loss of blood was scant, the infant appeared very anemic after the operation and refused nursing until two hours afterward. No stimulants were administered. There was no reaction, and to-day, ten days after the operation, the wound is perfectly healed and child appears normal in every respect.

A skiagraph taken one week after the operation shows that the bony canal became somewhat smaller.

Another skiagraph (Fig. 3) taken six months later showed considerable narrowing of the bony canal, the nasal bones also having approached the *os frontis* in the meanwhile. The child has developed well and is normal in every respect. (December, 1900.)

CASE 2.—A boy, 7 weeks of age, whose family history reveals nothing abnormal. The parents immigrated from Polish-Russia several years ago. The mother is a multipara and is, like her husband, fairly well nourished.

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