swelling, tense and grey, about $\frac{1}{2}$ in. in diameter. This enlargement felt so tense that it seemed ready to burst, and great care was taken to prevent this. The distal end was now sought for, and was seen to be about an inch in length, extremely like a thin-walled vein, and dividing near its termination into three smaller vessels, which opened separately at the junction of the internal jugular with the subclavian vein. No fluid issued from this portion of the duct, but on passing a grooved director through it, and along one of the terminal branches into the innominate vein, blood flowed along the groove. On removing the director this bleeding ceased, thereby showing the action of the valves of the duct. This end of the duct was also ligatured, although at the time of operation no leakage appeared likely to occur. The remaining glands were now removed, the wound was stitched up by a continuous silkworm gut suture, and a glass drainage tube was inserted for forty-eight hours. On account of the risk of the rupture of the proximal end of the ligatured duct, the patient was kept on the lowest possible diet for a few days, and all unnecessary movements were interdicted, so as to diminish as much as possible the pressure and flow in the occluded duct pending the establishment of the collateral circulation. The dressings were inspected at frequent intervals in order to ascertain whether leakage had taken place through the drainage tube, in the event of which I proposed to open up the wound and again deal with the duct. The patient fortunately did not vomit after the operation, and made an uninterrupted recovery without any swelling or sign of leakage. She was weighed on the fourth day and each week for seven weeks. She lost 4 oz. during the first week, gained over 4 lb. the second, 7 lb. the third, nearly 2 lb. the fourth, under 1 lb. the fifth, 2 lb. the sixth, and practically nothing the seventh week, so that now she is nearly 1 st. heavier than when she was operated on. A blood count by Dr. Houston on the eighth day after the operation was as follows: Polymorphonuclear leucocytes, 72 per cent.; small lymphocytes, 23 per cent.; large lymphocytes, 4 per cent.; and eosinophiles, 1 per cent. It will be seen from this that there is very little deviation from the normal as regards the lymphocytes—the constituents of the blood perhaps most likely to be affected by the accident.

The history of this case would appear to show that if leakage from the duct can be prevented and rupture avoided after ligature, the collateral circulation becomes established without any difficulty. The previous operation on the right side of the neck does not seem to have interfered with this, although a good deal of damage must have been done to the lymphatic channels in connexion with the right lymphatic duct.

Cheyne and Burghard² have had to do with two cases of accidental wound of the thoracic duct; one occurred during the extirpation of tuberculous glands, and one during the removal of glands invaded by malignant disease. Recovery took place in both cases. They recommend that the skin should be closely stitched up and pressure maintained upon the part by a sponge incorporated with the dressings. The fact, however, that in both these cases, when the pressure was removed ten days after operation, swelling took place under the skin due to the escape of chyle, would seem to indicate that this method may not always be satisfactory. Besides, pressure is difficult to apply to the neck.

Priestley Leech³ mentions 21 cases collected by Benetau. In 8 the duct was wounded during the extirpation of tuberculous glands; in 3 during the removal of glands invaded by malignant disease; and once while ligaturing the subclavian artery for aneurysm. Deanesly,⁴ operating for tuberculous glands, divided the duct, which was then inserted into the internal jugular vein and sutured. There was some leakage, but this soon ceased, and the patient recovered. Bergmann⁵ quotes 7 cases under the care of the following surgeons respectively: Wilms, Schönborn, Schwinn, Brohl, Keen, Phelps, and Cheever, only 1 of which died as the result of the injury. In Schönborn's case cyanosis and collapse followed as the result of the entrance of air into the veins. The duct was tied at both ends and divided between the ligatures. Symptoms of air embolism persisted for two days, but the patient recovered. Quite recently Bucknall,⁶ of University College Hospital, recorded 2 cases. One occurred during the extirpation of tuberculous glands and one during the removal of glands infected from malignant disease of the breast. He draws attention to the extraordinary loss of strength and energy which occurs when the chyle is allowed to leak away, as happened for a few days in his first case. He found plugging ineffectual, and had to resort to ligature of both ends on the sixth day. Both cases recovered.

From a study of the recorded cases it would appear that the dangers of the accident are: (1) Entrance of air

into the veins of the neck (Schönborn's case); (2) rupture of the distended duct on the proximal side of the ligature; (3) inanition due to the draining away of the chyle; (4) possible dissemination of tubercle due to the entrance of organisms into the veins by way of the torn thoracic duct. Bucknall suggests that the subsequent history of his first patient, who died later of general miliary tuberculosis, may be so explained. In a similar way it is conceivable that malignant disease may be disseminated.

With regard to treatment, the first indication is to stop the flow from the injured duct. This can be effected most surely, and apparently quite safely, by ligature of both ends. If the wound is small it may be sutured without occluding the vessel, as in Keen's case. Packing is likely to be effective if the wound is small, but if the latter is large or the duct completely severed, as in my case, the more satisfactory method is ligature. Packing may fail, as in Bucknall's case, which leaked to the extent of two to three pints a day in spite of the plugging. Schwinn's case was treated by clamps, which came off on the third day, the patient making an excellent recovery. Finally, the patient ought to be kept quiet and on low diet, so as to limit the pressure in the obstructed duct.

The patient referred to in this article was examined on June 6th, 1906, ten months after the operation, and found to be quite well. There was no dissemination of tubercle and no recurrence.

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THE ETIOLOGY AND TREATMENT OF OBLIQUE INGUINAL HERNIA.

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THOUGH the presence of an inguinal hernia must be due to some weakness of the structures through which the abdominal contents escape, the question yet to be answered is, What are the chief factors which constitute this weakness and so determine the descent of the bowel? It is, I believe, generally admitted that in the great majority of such herniae which occur during infancy the local weakness is due to the presence of a preformed sac, an unobliterated portion of the processus vaginalis testis. In the ordinary hernia of adult life, however, the local weakness is not as a rule considered to be due to any such congenital defect, but to be confined to the muscular and aponeurotic structures of the abdominal wall, which permit the bowel to escape by pushing the parietal peritoneum in front of it.

This division of hernia into congenital and acquired has of recent years been severely criticized, more especially by Mr. R. Hamilton Russell of Melbourne, and I propose to adduce what evidence I can in favour of my belief that the presence of a congenital or preformed sac is the main factor in the causation of inguinal hernia during all periods of life.

Before offering any theoretical explanations concerning the conditions which predispose to the formation of a hernia, I would remind you of certain well-ascertained facts. Hernia may appear for the first time at any age, but the greatest number of herniae are developed during the most active period of life, and age lessens their frequency. In the first year of life a larger proportion of persons are ruptured than during any subsequent year. A large increase in the production of hernia occurs in males between the ages of 11 and 15, and in females between the ages of 16 and 20. Inguinal hernia occurs nearly six times as often as all other divisions taken together.

THE CONGENITAL AND THE ACQUIRED SAC.

It will be advisable before attempting to distinguish between the two forms of sac in the inguinal region, to study the formation and structure of a typical congenital and a typical acquired sac in order to compare them and clearly understand in what respect they resemble or differ one from the other.

For this purpose we will compare the sac of a hernia

which we know to have been acquired, with the sac of one which we know to have been preformed.

In the case of a ventral hernia, such as is occasionally seen after laparotomy, which beyond dispute is an acquired hernia, the weakened structures of the abdominal wall corresponding to the line of incision gradually yield, a general bulging takes place, and the parietal peritoneum protrudes, stretching the cicatrix over it. The coverings of such a hernia are scanty, consisting of attenuated skin and peritoneum. At the point where the bowel has escaped through the abdominal wall the muscles and aponeurosis are atrophied, the mouth of the sac is wide, and as it has no neck strangulation of its contents very seldom occurs.

When, on the other hand, the bowel or omentum passes through the internal abdominal ring into a sac formed by the processus vaginalis testis, such a hernia sac is obviously preformed, and of congenital origin. The skin, subcutaneous and other structures covering the hernia, have a perfectly normal appearance, forming a marked contrast to what pertains in an acquired hernia. The neck of the sac is long and narrow, which accounts for the frequency with which strangulation of the contents occurs.

Thus, apart from their indifference in origin, the distinction between a typical acquired and a typical congenital sac is abundantly clear.

In an ordinary inguinal hernia, as seen in the adult, the general conformation of the sac very closely resembles that of a congenital hernia, yet curiously enough it is regarded by almost all surgeons who have written on this subject as having been acquired.

COMPARATIVE SURGERY.

When studying the etiology of abnormal or diseased conditions in man, it is often of great assistance to study similar or allied conditions as they occur in the lower animals. If inguinal hernia be considered from this point of view, new light may be thrown upon an old subject and some information obtained which may help us to answer the question we are now considering.

In the majority of mammals the testes pass out of the abdomen into the scrotum accompanied by a fold of peritoneum, the processus vaginalis testis, which remains patent throughout life. The anatomy of the muscular and aponeurotic structures forming the inguinal canal in scrotal mammalia is practically the same as in man.

There is apparently some relationship between the natural position of the animal's body, horizontal or vertical, and the patency or otherwise of the processus vaginalis testis. In quadrupeds this process invariably communicates with the general peritoneal cavity, and in rodents the channel of communication is so free as to allow the testes to pass periodically from the abdomen into the scrotum. In quadrumana, whose bodies are as frequently vertical as horizontal, the processus vaginalis is very narrow, offering a marked difference to what pertains in rodents, whilst in the higher apes the testes pass into the scrotum two or three days before birth and the processus vaginalis is normally completely obliterated.

I would particularly draw attention to the fact that in rodents the funicular process must be exceptionally wide to permit of the free passage of the testis, yet these animals do not suffer from inguinal hernia, pointing to the sphincter-like action of the muscles guarding the inguinal canal. Doubtless the high position of the inguinal canal in quadrupeds is the chief reason for the gut not entering it, and if rodents habitually adopted the practice of walking on their hind legs, a method of progression which you remember was invariably adopted by the White Rabbit in *Alice in Wonderland*, oblique inguinal hernia would probably become of such frequent occurrence as to threaten the extinction of the species.

Hernia is by no means uncommonly seen in domesticated animals such as the horse, the cow, the dog, and the ass, but, of all domesticated animals, the horse is the one which has received the greatest amount of attention at the hands of veterinary surgeons, who are unanimously of opinion that the bowel in an ordinary inguinal hernia invariably descends into a sac which is of congenital origin. Inguinal hernia in the horse would probably be met with much more frequently than it is, on account of the patency of the funicular process, were it not that the inguinal canal occupies a position less

exposed than is the case in man to the influence of gravity on the abdominal viscera. In this animal the great strength of the abdominal muscles and fascia which guard the inguinal opening also affords additional security in preventing the escape of the abdominal contents. Professor W. O. Williams, in his work on *Veterinary Surgery*, says:

Inguinal hernia is most frequently met with in stallions and young animals, and essentially consists in the passage of a fold of intestine into the inguinal canal through the internal abdominal ring. It is very frequently seen in India and on the Continent, but is uncommon in this country from the fact that stallions are not often used for working purposes. It is but rarely seen in the gelding, and scarcely ever in the mare, although it is possible that it may occur in both.

The importance of a patent funicular process in determining the occurrence of a hernia is well illustrated in the case of domesticated animals called upon to do work which in a sense is unnatural to them. We have seen that in India and on the Continent stallions are used for working purposes, and they frequently suffer from inguinal hernia. On the other hand, inguinal hernia is rarely seen in the gelding, and yet it is the gelding that as a rule does the hardest work. Further, the operation for radical cure of inguinal hernia in the stallion consists essentially in excision of the sac after applying a ligature to the neck of it. No attempt is made to narrow the inguinal canal by suturing. This operation is attended by most satisfactory results, except when the animal is an old one or the hernia exceptionally large.

I think, then, we may take it as an undoubted fact that in domesticated animals, such as the horse, the dog, and the cat, the sac of an inguinal hernia is of congenital origin and not acquired. The main factors in the causation of such a hernia are the presence of a patent funicular process, together with the want of power in the muscles guarding the internal abdominal ring. In the case of a stallion used for draught purposes the muscles guarding the internal abdominal ring may be at times unduly strained, and thus the bowel is allowed to pass into the scrotum.

In the case of the dog I would suggest that the hernia appears because the muscles are deficient in tone, owing to the unnatural and indolent life many of these animals lead.

CLINICAL EXPERIENCE.

During the last few years I have operated upon a number of infants and older children for the radical cure of inguinal hernia, and the experience thus obtained has greatly shaken my faith in the orthodox surgical belief respecting the etiology of this complaint.

I have found that in the child and even in the infant the sac in the vast majority of cases is entirely separate from the tunica vaginalis, and, apart from its delicacy in structure, exactly resembles that found in the ordinary hernia of the adult.

After some experience in operating for oblique inguinal hernia in infants, older children and adults, I have been greatly struck by the marked resemblance as regards shape, general appearance and relationship of the sac. I have been quite unable to distinguish between the congenital and the so-called acquired inguinal sac, for the very good reason, I believe, that they are one and the same thing.

It is generally agreed that in infants the sac of an inguinal hernia is preformed, and if my observations and those of others are correct, namely, that in adult life exactly the same kind of sac as that seen in the infant is the one usually met with, the inference is obvious: both have a common origin. One of the strongest arguments in favour of a congenital sac being the essential cause of inguinal hernia is the fact that during infancy and early childhood a radical cure can with something approaching certainty be obtained by merely excising the sac after applying a ligature to the neck of it.

In a person born with a perfectly formed abdominal wall I believe it to be impossible for a hernia to occur.

POST-MORTEM OBSERVATIONS.

We have seen that in the lower animals the funicular process is patent, and yet under normal conditions hernia does not occur; and if in man the imperfect obliteration of this process of peritoneum really explains the formation of the sac of an ordinary hernia, then we would expect to find evidence in the *post-mortem* room of the

patency of this process in a fair proportion of persons who during life never suffered from hernia.

Owing to the kind interest taken in the matter by my friends Dr. Nathan Raw and the resident medical officers at the Mill Road Infirmary, I have obtained some most interesting and valuable information. In 100 consecutive and in no way selected *post-mortem* examinations made at the Mill Road Infirmary, upon persons in whom during life there was no history or evidence of hernia, a potential hernia sac was discovered in 21 cases. In most of the cases the unobliterated portion of the processus vaginalis testis was about 1 in. in length, and the opening at the internal abdominal ring was so narrow as barely to admit a large probe. In others the opening was sufficiently large to admit the little finger, and in three of the cases the sac contained a small piece of omentum, which was not adherent and was readily withdrawn. In 7 instances more than one sac was found, and in 1 case four potential hernia sacs were present, an inguinal and a femoral sac on either side.

Though the number of cases is far too small to furnish any accurate information respecting the relative frequency with which a potential hernia sac may occur among persons in whom during life there is no evidence of a hernia (the proportion in this series being probably exceptionally high), still these cases certainly go a long way to prove the truth of my contention that in all ordinary inguinal herniae the sac is preformed and of congenital origin.

THE CAUSE OF INGUINAL HERNIA.

Granted the existence of a potential hernia sac, I would suggest that the occurrence or not of hernia largely depends upon two factors—the size of the opening at the internal abdominal ring and the strength of the muscles guarding it.

It is unnecessary for me to enter into anatomical details as to the obliquity of the inguinal canal and the attachment of the internal oblique and transversalis muscles, which, together with Poupart's ligament, form a sphincter-like structure guarding the canal. When the processus vaginalis is unobliterated, provided the opening at the internal abdominal ring is small and the muscles guarding it (which, with some justice, might be called the inguinal sphincter) powerful, then the probabilities of a hernia occurring are slight. If, on the other hand, the opening is large and the inguinal sphincter weak, the probability of a hernia occurring is considerable. The frequent occurrence of inguinal hernia in infants would thus be explained.

The frequency with which hernia first appears about the age of puberty I would account for by the increased amount of exercise usually indulged in at this period, so that the muscles which under ordinary conditions are able to guard the internal opening are suddenly overtaxed and the bowel escapes. This will, of course, largely depend upon the size of the internal opening.

In the case of hernia appearing later in life the same reasoning would hold good. Though the processus vaginalis has been to some extent patent since birth, no hernia has appeared, because the internal opening was never large and the sphincter well able to guard it, but with declining years and weakened muscles the sphincter at some critical moment—it may be at the second or third attempt to get out of a bunker whilst playing golf—fails and the bowel or omentum passes through.

Hernia not infrequently makes its first appearance during convalescence from a long illness, and under these conditions it appears to me more reasonable to explain such an occurrence in the way I suggest than to suppose it to be acquired.

TREATMENT.

We will now see how far this view of the etiology of inguinal hernia should influence our methods of treatment. For this purpose let us consider hernia as it occurs in the infant, the child, the young adult, and in older persons.

The Infant.

The essential object of our treatment should be to bring about the extreme narrowing, or, better still, the complete obliteration of the funicular process. Given a case of inguinal hernia in an infant, provided the protrusion is not large and can be efficiently controlled by a truss, a cure in the ordinary acceptance of the term may

be brought about if the truss is worn continuously for, say, about two years. The truss effects a cure by preventing the bowel from entering the inguinal canal, maintaining the patency of the funicular process, and stretching the inguinal sphincter. The funicular process may thus become so narrowed as to make it extremely difficult for the bowel to again enter it, but I do not believe that a funicular process patent at birth ever in this way becomes completely obliterated.

The evidence obtained from the *post-mortem* room strongly supports this view, for in the majority of cases in which it was found to be patent the persons had passed middle life, and many of them were considerably older. As the funicular process narrows so the inguinal sphincter contracts, and the contraction of the sphincter will safeguard the person from hernia throughout the rest of his life.

It must be the experience of many medical men who have been in practice for twenty to thirty years, that cases of inguinal hernia during infancy have been thus cured by means of a truss. At the same time, I know of no means whereby one can with certainty say to what degree security has thus been obtained. Such an individual will always have that very undesirable possession, a potential hernial sac, and under some sudden muscular effort, or perhaps after a long illness resulting in a loss of muscular tone, the sphincter may be overcome and the bowel descend once more. Should such an accident take place, the hernia is likely to become strangulated owing to the long neck of the sac and the narrowness of the aperture through which the gut has suddenly entered. It is thus clear that the security obtained by means of a truss must always be of a doubtful nature, and if greater security is desired an operation will have to be performed. However, before recommending operation during infancy one must clearly understand what the immediate risks of the operation are, and what prospect there is of thus obtaining a permanent cure.

The excellent work done in this field of surgery by Russell, Stiles, Carmichael, and others, has now established the fact that in competent hands the operation for the radical cure of hernia during infancy can be performed with no more risk than attends such an operation during any other period of life.

As regards the permanency of the cure, the records published by the surgeons I have mentioned prove the results to be in every way highly satisfactory, and the operation when performed during infancy can rightly be considered a radical cure. My own experience of sixty operations for the cure of inguinal hernia upon children varying in age from 2 months to 5 years entirely supports this view, and I have every confidence in strongly recommending an operation being performed during early life, more especially in the case of the children of the labouring class; for, apart from the uncertainty of the cure by means of a truss, the frequent renewal of the instrument is an expense to the parents, and in after-life the bowel is more apt to descend again in the case of a labouring man, than in persons who are not engaged in manual labour.

In deciding at what age the operation should be performed, one has to consider the general health of the child, as well as the local trouble from which he is suffering. If the child is bottle-fed, and the other conditions are favourable, I would select to operate about the third month. If, on the other hand, the child is breast-fed, it is as a general rule better not to run the risk of depriving him of his natural source of nourishment, and to postpone the operation until he is 8 months old, and in the meantime to order a truss to be worn continuously.

The operation I am in the habit of performing consists merely in excision of the sac, after transfixing and tying the neck of it at the level of the internal abdominal ring. The application of the ligature to the neck of the sac at the highest possible level is a matter of very great importance, and in order to emphasize this point I cannot do better than quote from a paper on the radical cure of hernia, by our old friend, Wm. Mitchell Banks, which was published in the *Medical Times* of July, 1884:

The movement of the bowels over the front of the abdominal wall is, so to speak, a liquid movement. It is the searching sweep of a great wave slowly rushing up the face of a breakwater. If the breakwater can only preserve a smooth surface, with every joint well cemented, then it will stand, although there may be more than one weak place in its backing. But the moment the surface gives way at any point there the water

persistently presses in and in till the stones around are undermined and a breach is made. Clearly, then, however we may strengthen our bulwark behind by stitching up the ring and applying a truss, the first thing to do is to keep its water surface—its peritoneal surface—free from any inviting pouch or depression.

In order to be sure that the ligature is applied at the level of the internal abdominal ring I always split up the fibres of the external oblique for $\frac{1}{4}$ to $\frac{1}{2}$ in., and have the sac pulled taut whilst the ligature is being tied. The sac, which in the vast majority of cases is entirely separate from the tunica vaginalis, is now cut across close to the ligature, and the stump disappears from view. The divided portion of the external oblique is united by overlapping the sides, which are retained in position by one or two mattress sutures, and the skin incision completely closed. The overlapping of the aponeurosis I believe to

Fig. 1.—A, internal, and B external, abdominal ring. To demonstrate how overlapping, after division of the aponeurosis, narrows and lengthens the inguinal canal.

be a point of considerable importance, for it not only narrows and lengthens the inguinal canal, but also restores its obliquity. In my earlier cases I had occasionally some difficulty in performing this apparently simple operation, for the sac of a hernia in an infant is extremely thin and the parts so small that the margin for error is very limited. However, after some practice the operation presents no real difficulties. As regards the healing of the wound, if ordinary precautions are taken there is very little danger from infection from without. The stitches should be removed on the seventh day, and the infant may be handed over to his mother on the tenth day.

Though it is quite true that, as a rule, an infant is not in the least upset by the operation, I must not omit to mention two cases in which death took place, possibly as an indirect result of the operation.

CASE I.—A child, aged 4 months, upon whom I operated for a right inguinal hernia in the summer of 1905, died a week later from choleraic diarrhoea.

CASE II.—I operated for double inguinal hernia on a child aged 3 months on October 10th, 1905, and he died suddenly two days later. The immediate cause of death we subsequently found to be due to a widely patent foramen ovale.

In neither instance was there any trouble with the wound, and the only satisfaction these cases afforded me was that when at the autopsy I examined the peritoneal surface of the inguinal region, there was no depression or dimpling at the level of the internal abdominal ring, the peritoneal surface here being perfectly flush.

In operating upon older children I adopt exactly the same method, and with equally satisfactory results.

With the exception of one case, an infant 4 months old, I have had no relapses. In this case the failure was entirely due to me, for I performed the operation very badly, the hernia reappearing within a month. However, I operated a second time three months later, and as eighteen months have elapsed since this second operation, and there is no sign of a hernia, the cure promises to be permanent.

The Adult.

In operating for the radical cure of inguinal hernia in the adult, I believe the same principles hold good as those I have already described when operating upon the child or infant.

The essential things to bear in mind are to remove the sac so completely as to avoid any semblance of a depression at the level of the internal abdominal ring, and at the same time to do nothing to impair the action of the already weak and stretched inguinal sphincter.

I do not propose to discuss the far too numerous methods of operating. The fault I have to find with most of them is that they are too meddlesome and too elaborate, devised with the intention of filling a gap rather than endeavouring to restore lost muscular power.

The primary cause of the hernia is the presence of a patent funicular process; the secondary cause is muscular weakness; and it is surely far better to endeavour to restore the weakened structures to their normal shape and functions rather than, by completely ignoring Nature's plan, to try by some elaborate operation to alter the mechanism of the part.

The operation most usually practised is probably that known by the name of Bassini, and it must be admitted that in competent hands most excellent results have been obtained. At the same time I cannot but believe that the chief reason for this success is that the aponeurosis of the external oblique is slit up and the ligature applied to the neck of the sac at the highest possible level. How far the uniting of the internal oblique and the conjoint tendon to Poupart's ligament really assists matters I do not know, but I doubt very much whether these structures remain permanently in the position in which we stitch them.

Clearness of purpose and simplicity of method should be our aim, and I am glad to see that so great a surgeon as Professor Kocher of Berne has for some time past recommended a most simple procedure. It consists essentially in the complete obliteration of sac, which he invaginates and transposes, the pillars of the external abdominal ring being at the same time brought together by several sutures. There is no sewing of the internal oblique or conjoint tendon to Poupart's ligament; the inguinal sphincter is left intact.

During the last few years I have operated upon a number of young and middle-aged men for inguinal hernia, adopting exactly the same method which I have already described when operating upon infants and young children. The results have been highly satisfactory. Many of the patients are policemen and postmen, whose subsequent history is readily ascertained. I have at present in hospital, under my care for another complaint, a powerfully built man, a village blacksmith, upon whom I operated for inguinal hernia two years ago by the simple method I am now considering, and am glad to say his inguinal region is perfectly sound.

I feel sure that it is along these simple lines that the radical cure of inguinal hernia, at all ages, will in the future be performed, though it will probably be many years before the more elaborate operations will cease to have their advocates.

Large Herniae in Older Persons.

There still remains a class of hernia for which it is difficult to perform an operation which will result in a radical cure, in the sense that no mechanical support or truss will subsequently be required. I refer to a large scrotal hernia in an elderly man, a hernia which is either irreducible, or in which the neck of the sac is so wide as to render the efficient application of a truss impossible.

In such a case the inguinal sphincter has for years been so enormously stretched that it is unreasonable to hope it will ever again resume its normal size. If in these cases recurrence after operation is to be prevented, a truss or mechanical support of some kind must be worn.

Recognizing that patients of the labouring class are apt to discontinue wearing a truss owing to the expense and inconvenience, I have lately adopted a plan with which so far I am well pleased. I made a rubber pad of the size and shape shown in the diagram out of the best Para rubber. The rubber is sold in lamellated blocks, and a piece of the necessary thickness is easily peeled off and cut to shape. The large hole is for the transmission of the cord and its vessels, the smaller holes are to permit the soft tissues to grow into them, and so assist in retaining the pad in position.

Fig. 2.—To illustrate the rubber pad used in exceptionally large herniae in persons advanced in years.

The operation for the cure of the hernia is conducted in the ordinary manner, and after opening up the inguinal canal by division of the external oblique, the neck of the sac is sewn or ligatured at the highest possible point. The pad is now placed in position. The cord and its vessels are threaded into the large hole by opening the slit extending from the upper part of the hole to the margin of the pad. The edges of the pad are then placed beneath the internal oblique and conjoined tendon on the one side and Poupart's ligament on the other. It only remains to cover the cord and the pad with the cremaster muscle and sew together by overlapping the divided fibres of the external oblique. The pad lies on the transversalis fascia, and is devised to fill a gap and afford additional support at a very weak spot in the abdominal wall. The patient is thus provided with an internal truss, which I hope and believe will afford him a permanent and efficient support, for unless the whole pad is pushed bodily forwards I fail to see how the hernia can again appear. The procedure, however, is still in the experimental stage, for I have adopted it on five occasions only, the first operation being performed on September 5th, 1905.

The patients operated upon were all labouring men, and the herniae of such a size as to render a truss useless; the men were consequently unable to earn a livelihood. In 4 out of the 5 cases the results have so far been highly satisfactory, the men having resumed their former occupations. The rubber pad does not cause any inconvenience, nor should it interfere with the healing of the wound. The last case operated upon was the only one in which there was any bother in this respect. The wound had healed and the stitches had been removed, when on the tenth day some fullness was noticed and a collection of pus had to be let out. A small sinus persisted, and two months later I removed the pad. In this instance a pad of unusual thickness was used, and I now know there was some defect in the preparation of it.

Though, as a general rule, the introduction of foreign bodies into wounds should as far as possible be avoided, still I am satisfied that in the exceptional cases I have mentioned the principles of this providing an "adequate backing" is sound. In such operations as that of Bassini it seems to me the chief value of the deep stitching is that the buried sutures act as scaffolding, around which a firm fibrous mass is formed which serves as an adequate backing, so that after all in inserting a pad of rubber or other material there is really no alteration of principle: it is merely a question of degrees.

In a case of femoral hernia I recently adopted the same plan, but used gauze instead of rubber. After excising the sac I plugged the femoral canal with a piece of gauze which I left there. The case has been too recently operated upon to justify me in drawing any definite conclusion from it. The procedure is, however, extremely simple, and I am satisfied that it is sound in principle, and propose to give it a fair trial. In my next case of inguinal hernia, where the neck of the sac is exceptionally wide, I intend to insert gauze instead of rubber.

CONCLUSION.

I would submit that all the evidence we possess is in favour of the view that the main factor in the causation of oblique inguinal hernia at all periods of life is the presence of a preformed sac, a patent funicular process, and that whether the bowel will or will not enter this funicular process depends primarily upon the size of the opening at the internal abdominal ring, and secondarily upon the strength of the muscles guarding it.

As a general rule the only satisfactory way of treating a hernia is by means of an operation, and, other things being equal, the earlier in life the operation is performed the better.

The essential point in the operation is to so completely obliterate the sac as to render the peritoneal surface at this level free from any dimpling or depression. In order to ensure this the inguinal canal must be opened up and a ligature applied to the sac at the level of the internal abdominal ring. The divided aponeurosis of the external oblique should be subsequently united by overlapping, for the inguinal canal is thus narrowed, lengthened, and its original obliquity restored.

SOME COMPARISON OF PHTHISICAL WITH NON-TUBERCULOUS MALES,

CHIEFLY IN RESPECT OF HEALTHY HEIGHT-WEIGHT RATIO,
AND OF MOUTH BREATHING.

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In an earlier communication¹ it was noticed that various causes of mouth breathing seemed common amongst consumptives, especially in those few of their number who were physically well-built, corroboration² on the first point being found and adduced. Further observation left the impression that, although this selective incidence was not as marked as had been thought at first, it yet held good not only as regards mouth breathing but also for antecedent alcoholism. For the heavy, muscular patients seemed pretty sure to have some considerable nasal obstruction—which appeared unusual in view of the fact that mouth breathing is described as lowering the general nutrition—or to have been alcoholic; not infrequently the two conditions coincided. It was thought possible, then, taking mouth breathing to stand to pulmonary phthisis in much the same relation as alcoholism is credited with doing, to collect cases to show how hardly people who are well-built get consumption. To these observations, that is, made on about 150 cases of both sexes, and mostly from private sanatoriums, there was fitted some such hypothesis as this: That deficient physique is an important predisposing cause of pulmonary phthisis, tending on the whole towards an alternative incidence to some others, chief of which are mouth breathing and alcoholism.

To attempt something in the way of verification there was set on foot this inquiry. At the outset there seemed to be two immediate objects, first, to get some knowledge as to the occurrence of mouth breathing amongst the non-tuberculous, next in order to calculate what may be called physique incidence, to have a purely objective classification of physical development. The latter requisite was secured in the following way. Any physical measurements used had, of course, to be free from the possibility of being affected by disease; thus selected, the best seemed height, and (as given by the patient) greatest healthy weight. This dependence on lay statements involved taking only male cases, for women seldom know their weight, of which, too, their clothing forms a very variable proportion. Another reason was that there are available more complete anthropometrical data concerning men than concerning women. The ratio between the two measurements just noticed, compared with Roberts's standard height-weight ratios,³ which vary with age and social condition, gave a figure which had, at all events, some value as a comparative measure of physique. It was for this reason—namely, that any pretence to absolute mensuration was seen to be out of the question in the case of an investigation largely founded on lay statements and on thirty-year-old statistics—that less hesitation was felt in eking out arbitrarily these anthropometrical standards. There was a great need for this. For, while a convenient scale of ages was found, there were recorded the measurements of only two social groups—those, namely, of the upper classes and of urban artisans. Two intermediate values were got by the expedient of inserting two arithmetic means between the figures of corresponding ages. Thus, for each age four standard height-weight ratios were available, with one or other of which the social condition of each case could be fitted fairly closely.

A fresh series of male phthisical cases was then secured, and of each consumptive, as of each case in the non-tuberculous "control" series to be mentioned presently, were recorded the following particulars:

1. Age of falling ill (present age in controls).
2. Occupation and social condition.
3. Height.
4. Maximum healthy weight.
5. Presence or absence of conditions causing either habitual or abnormally frequent mouth breathing, or impairment of the action of the nasal or naso-pharyngeal mucous membrane on inspired air.
6. A "mother-father-brother-sister" history of pulmonary phthisis.

It was of course impossible, in the absence of continued