

*To Do White*  
*with the red lines held as guides*  
Blackman (Geo. C.)

---

Blackman

ON THE REDUCTION

OF

STRANGULATED HERNIA IN MASS.

---

16 (acknowledged) (p. 16.)

# REDUCTION

OF

## STRANGULATED HERNIA IN MASS.

BY

GEORGE C. BLACKMAN, M. D.,

FELLOW OF THE ROYAL MEDICAL AND CHIRURGICAL SOCIETY  
OF LONDON.

[FROM THE NEW-YORK JOURNAL OF MEDICINE.]

NEW-YORK:

JOHN F. TROW, PRINTER, 49, 51, & 53 ANN-STREET.

1851.



## P R E F A C E .

---

THE substance of the following essay first appeared in the American Journal of the Medical Sciences for October, 1846. It has been entirely re-written, and its arrangement, as the author trusts, improved. The present collection is believed to contain *all* the recorded cases of the reduction of strangulated hernia *in mass*, and the writer feels assured that, by those at least who have been called upon to treat similar cases, it will not be regarded as a useless contribution to Surgery.

NEWBURGH, N. Y., *Jan. 1st*, 1851.

# REDUCTION

## STRANGULATED HERNIA IN MASS

The patient was a male, aged 45 years, who had long been afflicted with a hernia of the abdominal wall. The hernia was of the strangulated variety, and had been present for many years. It was situated in the right groin, and was of the size of a small child's head. The patient had long been unable to walk, and had been confined to his bed for many months. He had been treated by various means, but without any permanent benefit. He had been advised to wear a truss, but this had not been of any use. He had also been advised to use various remedies, but these had not been of any use either. He had been advised to have the hernia reduced, but this had not been done. He had been advised to have the hernia operated on, but this had not been done. He had been advised to have the hernia reduced, but this had not been done. He had been advised to have the hernia operated on, but this had not been done.

### History of the Case

The patient was first seen by me in the year 1845. He had been afflicted with a hernia of the abdominal wall for many years. The hernia was of the strangulated variety, and had been present for many years. It was situated in the right groin, and was of the size of a small child's head. The patient had long been unable to walk, and had been confined to his bed for many months. He had been treated by various means, but without any permanent benefit. He had been advised to wear a truss, but this had not been of any use. He had also been advised to use various remedies, but these had not been of any use either. He had been advised to have the hernia reduced, but this had not been done. He had been advised to have the hernia operated on, but this had not been done.

REDUCTION  
OF  
STRANGULATED HERNIA IN MASS.

---

CHAPTER I.

*Reduction of Strangulated Hernia in Mass.*

The terms, reduction *en masse*, or reduction *en bloc*, were first employed by the French, to designate that peculiar accident which sometimes follows the application of the taxis, or which occurs during the operation for strangulated hernia, when the sac, still embracing and strangulating its contents, is returned into the cavity of the abdomen. It has been found to take place under the following circumstances:—1st, reduction by the taxis; 2d, detachment and reduction of the sac during the operation, the sac having been mistaken for the intestine; 3d, spontaneous reduction.

*Reduction by the Taxis.*

The attention of surgeons seems first to have been called to this occurrence by Le Dran. In his *Observations de Chirurgie*, published in 1731, he states that his advice was solicited by the younger Arnaud, in a case where he had reduced a femoral hernia, but the symptoms of strangulation remained unabated. Le Dran was of the opinion, that the stricture existed at the neck of the sac, and that the whole tumor had ~~had~~ been returned *en masse*. The patient died, and the autopsy verified the accuracy of his diagnosis.

The report of this case gave rise to a violent controversy, respecting which Scarpa justly observes (*Traité des Herniés*, p. 59.), that,

as in most instances of the kind, both parties were determined to maintain the opinion which they had already adopted, rather than to appreciate the facts which were opposed to them ; and alluding to the illustrious secretary of the Academy of Surgery, he remarks, that M. Louis seems to have been incredulous, merely because the facts brought forward conflicted with doctrines which, with too much assurance, he had previously promulgated. Indeed, whoever will read the "Reflexions sur l'operation de la Hernié" of this surgeon, in the fourth volume of the Memoires de l'Academie de Chirurgie, will not be slow to retort upon *him* the very language which *he* employs towards Le Dran—"tel est l'empire des prejuges !" At page 299, M. Louis thus expresses himself :—"L'impossibilité physique de cette reduction me paroi si manifeste, qui je comprends a peine comment l'opinion contraire a pu passer dans la theorie, comme un resultat de faits des plus avérés par l'observation des Praticiens." And again at page 307—"Laisserons-nous dégrader l'Art le plus utile á l'humanité en tolerant des principes aussi defectueux !"

Richter defended Le Dran with much spirit and great ability in an essay entitled, "*Programma, in quo demonstratur herniam incarceratum una cum sacco reponi per annulum abdominalem posse, contra Chirurgum Gallum clar. Louis ;*" and his "*Abhandlung von der Bruchchen,*" pp. 153, 180, where he is describing the accidents which may follow the taxis (Zufallen nach der Taxis), he likewise most triumphantly refutes the objections of M. Louis, which, in his opinion, he does not hesitate to say, are characterized by great impudence!

After reading Le Dran's description of the case to which we have referred, corroborated as it is by the testimony of Arnaud himself, it seems difficult to account for the skepticism which is said to have prevailed among many members of the Academy. In this instance, the hernial sac, about three inches in length, and eight in circumference, was found within the abdomen, inclosing half an ell of the jejunum. Seizing the whole sac with his hand, Le Dran endeavored to draw out the intestine by pulling it at one end, but its mouth was so contracted that he could only succeed by dilating it with the scissors. Le Dran further observes, that the surgeon first in attendance informed him, that at the time of the reduction of the hernia he did not hear the gurgling noise which generally accompanies this act ; but that the whole tumor passed *in a heap* under the ligament, like a *tennis-ball*.

The comments of M. Louis upon the above case (p. 307) are

not without interest. "We know," says he, "that the parts cannot have been reduced, until they glide, so to speak, *en filant*, through the opening, which is the seat of strangulation. 'Tis to facilitate this passage that, by an operation, we are almost always compelled to divide the ring or the arch. When we are so fortunate as to secure their reduction without having recourse to this extreme measure, the intestine returns with a gurgling noise, which proves that, rid of its contents, which have been the first to pass, its volume has been so reduced as to permit its replacement. In the case supposed, we admit the return of half an ell of the intestine, with the prolongation of the peritoneum in which it was contained, beneath the crural arch, in a single mass, or, in their own language, *en bloc*, like a tennis-ball. It is difficult to understand *how* the Fallopian ligament could have become so stretched as to permit the passage of a tumor of such disproportionate size. But it was an *old hernia*, when, according to the accounts of all the cases which have been reported, the hernial sac has been found adhering to the surrounding parts. *How, at the moment of reduction, could its old adhesion have been broken up?* If, in this case, it had been necessary to operate, the fear of wounding the crural vessels would have prevented the dissection of the posterior face of the sac; yet, they pretend that this sac was reduced by the taxis with half an ell of the intestinum jejunum which it contained, forming, together, a tumor *three inches in length and eight in circumference!* Do we not require to know at what height this lump was found? Admit that the bottom of the sac rested immediately over the mouth of the crural canal; the portion which formed the strangulation, must then have been three inches at least above the crural arch. Now this could not have occurred without a detachment during the efforts at reduction of the peritoneum from the internal surface of the transversalis, and the psoas and iliac muscles, to an extent sufficient to permit this elevation of the reduced parts. Is it not evident that he must have been beside himself, not to perceive the absolute impossibility of this reduction, to say nothing of his presuming to predict, even before the body was opened, what we are assured was afterwards revealed?"

At another place (p. 31) he (M. Louis) declares that he has performed the operation for hernia at least fifty times, and in every instance the hernial sac was found connected with the adjacent parts; and in the numerous autopsies of those who had been the subjects of hernia which, during a connection of more than twenty-five years with different hospitals and schools, he had had an opportunity of

making, had proved to him, that the sac is *never* an isolated, unadherent part, and had prevented him from falling into so gross a blunder respecting its reduction. The origin of this *heresy* he thus explains:—A hernial tumor has been reduced, but the symptoms of strangulation still continuing, the surgeon, more intent on *explaining* the fact than *discerning the true cause*, asserts that the sac, with the intestines, must have been turned, and that the persistence of the symptoms is caused by a stricture at its neck. Having, in his opinion, thus solved the difficulty, in the same manner he *conceives* the phenomenon itself, and proclaims it as something *seen*, on the same principle that people give for a *positive* fact, that which they think they have seen. To guard against errors of this kind, and as applicable to the question before us, he quotes from the “Annotations Academiques” of Albinus the following philosophical reflections:—The first, “*Satis non est videre, sed præterea necesse est perspicere, quid sit id, quod videas,*” was suggested by some deceptive anatomical preparations which were intended to show the existence of blood-vessels in the epidermis which Ruisch had denied; whilst the second had its origin in the supposed discovery by Ruisch of nervous ganglia in the small intestines, and is thus laid down—“*Frequenter fit, ut homines videre se putent, quod non videat, præsertem si id, quod putant suæ opinioni.*”

We have presented somewhat in detail, the principal objections which were raised by M. Louis, against Le Dran’s account of the foregoing case, as they comprehend the substance of all the arguments which have ever been brought against the possibility of the reduction of hernia “*en masse,*” and as they were sufficient, notwithstanding the vehement remonstrance of M. Arnaud, to enlist many members of the Academy on his side. The force of these objections can be better appreciated after a careful consideration of the cases which are about to be related, and we trust that the facts which we propose to bring forward, will prove most conclusively the error of those who deny the possibility of this accident, and that they will also show that, as supposed by others, it is by no means confined to recent cases of hernia.

In his “Dissertations on Hernia,” (English Edition,) from page 370 to 408, Arnaud has recorded six cases; four inguinal and two of femoral hernia. Four of these occurred in his own practice, and three were the subject of operation. Two, occurred to Vacher, both of which were inguinal. One, a male, æt. 50, had his hernia reduced by the taxis, but is said to have died some six months after.

wards (?) from repeated attacks of colic, &c., &c. The sac was found behind the ring of the external oblique, its base inclined towards the bladder, and its mouth adherent to the ring. In the other, an operation was performed, the sac opened, and the ring incised, but the stricture at the neck of the sac was not divided. The patient died, and on dissection, the mouth of the sac was found situated upon the psoas muscle. The first case related by Arnaud was a femoral hernia, the size of a hen's egg; twelve hours after strangulation it was reduced, but returned during the two following days when the patient coughed, and sometimes it went up of itself with ease, and for several days it no longer descended. The patient died on the ninth day, and the tumor was discovered lying between the peritoneum and the insertion of Poupart's ligament. Arnaud's second patient was a male, æt. 40, with an inguinal hernia on the right side some seven or eight inches in length; although easily reduced by the taxis, the symptoms of strangulation did not subside. On plunging the finger into the ring, which was very wide, a hard tumor was felt, which by the patient being made to force downwards, was rendered more perceptible to the touch. The ring was exposed and incised "pretty deeply," and the sac opened within the abdomen. An attempt was made to drag down the tumor, but it was unsuccessful. Being unable to arrive at the neck of the sac, a further incision of the ring was made, when its mouth was reached and divided with a probe-pointed bistoury. In this case, the tumor ran along the rectus muscle as far as within two finger's breadth of the navel.

In another instance, Arnaud opened the sac, incised the ring, but the stricture at the neck was left undivided. The patient died, and the mouth of the sac was found situated upon the psoas muscle. The last case described by Arnaud was one of congenital hernia (inguinal). The patient was about eighteen years of age, and the tumor about the size of a turkey's egg. It was reduced with great ease, but immediately protruded again. It was made to disappear a second and a third time, but in each instance it again descended. The sac was now opened, the stricture formed by its neck divided, and the patient's life was saved.

Le Blanc, in his "*Nouvelle Méthode d'Opérer les Herniés,*" has also related a case which occurred in his practice, and in the "*Operations de Dionis,*" (ed. 5th, p. 324, note A.) De La Faye is said to have recorded an example of this accident which came under his observation. In this patient, the abdominal rings were so wide, that when the patient rose and coughed, the hernial tumor at once

descended. The subsequent history of the case we are unable to give, as we have had no opportunity of consulting the work of Dionis. In his "Principes de Chirurgie," published in Paris, 1744, we cannot find that M. De La Faye makes any allusion to the subject although he discusses the complication, &c. of hernia at some length.

Sabatier, in his *Médecin Opérateur*, whilst discussing the subject of internal strangulations, remarks, that the most common form depends upon the reduction of hernial tumors, in which the stricture is at the neck of the sac. He asserts that this occurs more frequently in inguinal than in any other form of hernia, and relates a case of congenital inguinal rupture which was reduced *en masse*, the reduction being unaccompanied by any gurgling noise. A bandage was applied, but the symptoms still continued. The abdomen was tense and painful, and the bowels were completely obstructed. The external ring was sufficiently large to admit two fingers. The patient having been made to cough, a round tumor was felt at a considerable distance from the surface. Being satisfied that there was an internal strangulation, and that an operation was indispensable, the patient was requested to rise and to move about in order to cause the tumor to reappear. This was accomplished, and the operation performed. The hernial sac was thickened and the stricture existed at its neck. The symptoms of strangulation soon subsided, and the patient recovered.

Scarpa, in his "Traité des Herniés, p. 57, referring to the disputes which had occurred respecting the possibility of this accident, thus expresses his opinion :

"Doubtless, in a recent inguinal hernia of small size, the intestine strangulated by the neck of the sac has been seen more than once to have been reduced by the taxis, whilst, at the same time, the sac has been dragged into the cavity of the abdomen. Observations not less authentic have taught us that after the operation for hernia, when the viscera could not be returned in consequence of their adhesions to the sac, notwithstanding these obstacles, the intestine has been seen, day after day, to gradually approach the ring, and at last with the hernial sac to enter the abdomen. Louis was wrong in denying the possibility of this occurrence; for myself, I regard the fact as well established, not only by my own, but by the experience of others. When an inguinal hernia is recent and small, the cellular tissue, of which we have spoken, retains all its elasticity, and permits the hernial sac and the spermatic cord to ascend readily towards the abdominal ring. This I have observed upon the dead body of a man

who had an incipient inguinal hernia. The small hernial sac could easily be pushed back into the ring, and from a careful examination of the parts both within and without the body, it appeared that the cellular tissue which united the sac to the spermatic cord and the cremaster muscle was disposed to yield equally from without inwards, and *vice versa*; that is to say, it made an equal resistance to the protrusion and the reduction of the hernial sac. Monteggia has seen a case precisely similar, although from his own statement (Instituz. Chirurg. t. iii. sec. 2, p. 249) the sac was not very small. It adhered loosely to the surrounding parts, and with the greatest ease could be reduced into the abdominal cavity."

Again, at page 122, in noticing some of the symptoms by which we may diagnose the seat of the strangulation when it exists at the neck of the sac, Scarpa continues: "In these cases the surgeon should be cautious in his employment of the taxis, and if the hernia cannot be readily reduced, he must proceed at once to the operation. If it be of small size and of recent date, as the ring offers but little resistance to the reduction of the parts, and the laxity of the cellular tissue permits the sac to ascend with the viscera, it may happen that injudicious attempts with the taxis may cause a complete reduction of the hernia, and yet the symptoms of strangulation, far from subsiding, will be materially aggravated, and the patient perish, if the surgeon fails to detect and promptly to remedy his error by resorting to the operation. I have lately seen a boy thirteen years old, who became the victim of such a mistake: the hernia had been completely reduced but he was not relieved. After his death, neither by sight nor touch, could the slightest appearance of a tumor be detected; but on opening his body, it was discovered that the intestine, still strangulated by the neck of the sac, had been thrust beyond the ring between the aponeurosis of the abdomen and the peritoneum, which was detached to a certain extent.

Richerand (Dict. des Sciences Médicales), alluding to the changes which occur in cases of hernia of long standing and of large size, remarks that they are seldom free from adhesions, which exist either within the sac or the inguinal ring. If the former condition prevails, of course they can only be reduced *en masse*. He adds, that this accident does sometimes happen when the hernia is of small size, though adhesions have taken place between the sac and the surrounding parts. If, however, adhesions exist within the sac, he considers the reduction of the hernia almost impossible, as the sac itself is

*generally* so attached by numerous cellular and vascular bands to the adjacent parts, that without an extreme laxity of the cellular tissue, it cannot possibly be returned into the abdomen.

M. Cayol (Dict. des Sciences Médicales, art. Bubonocele, p. 374) has related a case which occurred in the practice of M. Viguerie, o Toulouse. The patient experienced no relief after the reduction of the hernia, and an effort was made to produce a re-descent of the tumor. The patient was requested to cough, &c., &c., but it could not be brought down again without an operation. The ring was incised and exposed by M. Viguerie, the sac forcibly drawn out, and the stricture at its neck divided. The result was most fortunate, the patient having completely recovered.

Dupuytren (Leçons Orales, vol. 1. p. 559), speaking of the great frequency of those cases in which the stricture is situated in the neck of the sac, observes: "Among the seats of strangulation, some are external, some internal. Of the latter I have observed fifteen cases, but we know that the resources of art, so effectual in those instances where the situation of the strangulation is external, are in the latter variety almost impotent. But there is another kind which may properly be called mixed, such as result from the reduction of hernia *en masse*. Some years since, the body of a female was brought into our amphitheatre; externally, nothing remarkable presented, but on opening the body, we discovered behind the crural arch a tumor formed by the intestine, half the size of one's fist; its color was of a livid red, and a portion of the omentum lay in the hernial sac. On examination, a fold of the contained intestine was found to be gangrenous. The stricture was in the neck of the sac. I learned that two days before this woman had had symptoms of strangulation, and that after some attempts at reduction, the hernia was returned, yet all the symptoms suddenly re-appeared, and the patient shortly after died.

Again, at p. 564 he remarks, that in more than forty cases he had seen the hernia returned *en masse*, the symptoms of strangulation remaining unabated. There is a striking discrepancy between this assertion of M. Dupuytren and that of M. Sanson, in the article Hernia of the Dict. de Med. et de Chir. Prat., where the latter, whilst referring to the former's experience, observes that he (Dupuytren) had witnessed six cases of this accident. We know not how to reconcile this difference of statement, and though from the case detailed in the first volume of the "Leçons Orales," we are forced to acknowledge that M. Dupuytren must have met with an unusual number, yet we cannot but believe that there is some mistake in his

declaration, *that he had seen upwards of forty!*\* We are also at a loss to understand how it is, that most of the writers on Hernia, who have noticed these cases, have referred to the *third* volume of the "Leçons Orales." We have been unable after a most diligent search of this volume, to find the slightest allusion to the subject, but in the first volume, (we quote from the edition of Bailliere, 1832,) under the head of "De l' étranglement au collet du sac herniaire," which forms the concluding chapter, and occupies the last thirty-five pages of the volume, the reader may find the whole matter pretty thoroughly discussed. At page 583 he relates a case of double inguinal hernia in a patient forty years of age: that on the left side having been of twelve, that on the right of only three years' standing. The first, for seven or eight years previously, had been retained by a truss, but the second had been abandoned to itself. One day whilst walking he heard the truss snap, when he applied his hand to the hernia on the left side, which caused him great pain, and which became increased in size. On his return he vainly endeavored to reduce it. The next day he took an emetic, and called upon a surgeon, who, after many attempts, finally succeeded in returning the hernia, but the symptoms still persisted, and on the fifth day of the strangulation, he entered the Hotel Dieu. At his visit on the next day, M. Dupuytren examined him with the greatest attention: the abdomen was tender, and there were hiccups, vomiting of fæcal matter, constipation, and the countenance was shrunk. There were all the symptoms of strangulation, but there was reason to fear peritonitis; the diagnosis was rendered more difficult, in consequence of the existence of hernia on both sides, which had been reduced, and from the fact that no hernia could be felt behind the ring. Indeed, there were no other indications of the previous existence of the hernial tumors, than the dilatations of the rings, and the contradictory accounts of the patient. On the seventh day, M. Dupuytren, being satisfied that his patient, if not soon relieved, must die, resolved to operate.

---

\* As is well known, Dupuytren was sometimes guilty of making, to say the least, very strange assertions. His statement in the text will doubtless recall to the minds of many, the want of harmony between his own account of the extraordinary success which followed his bilateral operations for lithotomy, and that of the editors of his posthumous work, MM. Sanson and Bégin. Dupuytren declared that of 26 successive cases not one proved fatal, and that out of 70 operations, he lost only six patients. His editors, however, inform us, that the rate of mortality was as high as one in four and a half. See "Operation de la Pierre d' après une méthode nouvelle par le Baron Dupuytren." Edited by MM. Sanson and Bégin, 1836.

As the right inguinal region appeared to be the seat of the greatest pain, the exploration was first made on that side. An incision was made according to the axis of the hernia, through the skin, beneath which was found a small tumor, which was for a moment mistaken for the spermatic cord, then, again, for the hernial sac, as on being opened it gave issue to a considerable quantity of serum. It proved to be a serous cyst, behind which was situated the true hernial sac. This, which was small, contained neither intestine nor omentum, but only a little serous fluid, in which floated some layers of albumen.— On introducing the finger within the abdomen, the intestines were found to be adherent, either among themselves or to the abdominal walls, sign not equivocal of peritoneal inflammation. The left side was then subjected to operation, the different layers carefully divided, and a sac opened, which contained a fatty mass resembling the omentum. The surgeon deliberated for a moment, but perceiving a fibrous band beneath, and which, after requesting the patient to cough, was seen to be raised up, he carefully divided it, together with the subjacent layers. Immediately a large quantity of bloody serum issued, and M. Dupuytren felt assured that he was on the side of the strangulation, this bloody serum being to him a satisfactory proof. In the sac he found a small, red, fatty mass, which was supposed to be the tumefied omentum. The finger introduced within the ring detected a circular band at a great height. The sac was then drawn downwards, and with it a small portion of red, distended intestine. Whilst an assistant held it firmly and separated the borders of the incised sac, a blunt-pointed bistoury was conducted along the finger and the stricture divided upwards and outwards. The pain produced by this step gave rise to violent expiratory efforts by which a large mass of intestine was protruded. The stricture was incised in different directions, and to prevent another reduction *en bloc*, the portion of the neck of the sac, which formed the stricture, was retained, while the intestine was returned. The patient continued to convalesce, and eventually recovered. Another patient, affected with double inguinal hernia, was admitted into the Hotel Dieu, but so desperate was his condition that he was unable to give a history of his case. M. Dupuytren was perplexed to decide whether it was a case of peritoneal inflammation or internal strangulation. The patient having been somewhat relieved by the venesection and enemas which had been prescribed, on the next day gave a clear account of the manner in which he had been attacked. Some eleven years before, both hernias had first occurred, there being an interval of only some six months between their appear-

ance. A bandage with two pads had been worn to retain the intestine, which, however, occasionally protruded, but was always readily reduced; the right especially, more easily than the left. These ruptures had never given him much trouble, until the evening before his admission, when he had made some unusual effort. Both tumors descended and became painful. He himself reduced the right, and a physician, on whom he called, returned the left and prescribed a dose of chamomile. The symptoms of strangulation increased, and he was brought to the hospital. The question now arose what course should be pursued, most of the symptoms of strangulation remained, but there was no vomiting of fecal matter, and the alvine evacuations were copious. The patient was made to walk, when the left hernial tumor descended, but it was soft and could readily be reduced.— There was therefore no indication for performing an operation upon that side. In the evening his condition was unaltered; there were frequent evacuations, but neither vomiting nor hiccups; abdomen soft, but tender on pressure, especially in the hypogastric and iliac regions. M. Dupuytren determined to operate upon the right side, because, according to the patient's account, the hernia here protruded more easily when he was well, than on the left side, and because it had not been made to re-appear by the movements of the patient. The integuments were divided to the extent of from two and a half to three inches in the direction of the rings; immediately a kind of cylindrical cord presented itself, which was cautiously opened, and a smooth sac entered, supposed to belong to the hernia. The finger introduced into its cavity encountered at its upper part a *cul de sac*, and a canulated sound carried in the same direction, penetrated the abdominal cavity and brought away a bloody serum. The opening in the sac was increased, it was drawn outwards, when its neck was discovered, furrowed and contracted, as if by a kind of cicatrix. This was incised, and the finger being thrust into the abdominal cavity could detect no other cause of strangulation. This patient also completely recovered. Sanson (*loc. cit.*) has furnished us with the details of several other cases which occurred in the practice of M. Dupuytren. In two of these the tumors were made again to descend, and the operation was without difficulty and successfully performed. In two he was unable to produce a return of the hernia from the cavity of the abdomen. A round, hard, and painful tumor was felt in the iliac fossa, not far from the superior orifice of the inguinal canal. Dupuytren performed the operation in the same manner as if a part or the whole of the tumor protruded. In one the sac was

drawn down with the forceps, laid open, and the stricture divided.— In another the volume of the hernia, and the narrowness of the inguinal canal, compelled him to expose the latter throughout its whole extent, before the seat of strangulation could be reached and overcome.

M. Jobert relates a case in his *Traité des Mal. Chir. du Can. Intest.* p. 492, vol. 1, which proved fatal, though an operation was performed by M. Dupuytren. The details are copied by M. Jobert, from the *Thèse Inaug* of M. Mannowry, p. 18. A man, age 55, had from his first year been affected with inguinal hernia on both sides. The tumors were about the size of a pigeon's egg, and had always been easily reduced; excepting the five years preceding his last attack, he had worn a truss. On the 28th Nov., 1817, at 2 o'clock, P. M., he was seized with symptoms of strangulation, and was admitted at the Hotel Dieu, Dec. 2, 4 P. M., with great pain in the right side of his abdomen, at its lower part. There was here a slight tumefaction, but no trace of hernia; rings greatly dilated.— Coughing caused the right hernia to protrude; it was soft, small, and not painful; The slightest pressure caused it to return. Next day both inguinal regions were very tender to the touch. No effort of the patient could cause any tumor to be felt on the left side. A few hours afterwards M. Dupuytren was called, and as there was then some tumefaction and great pain on the left side, the operation was here performed. The canal was freely exposed, and two feet of intestine drawn down, but no stricture was found. The finger was then passed toward the pubes, and moved from left to right. A tense tumor was felt, drawn out, and incised; it proved to be a cyst filled with serum; with great care the true sac was reached and opened. It contained but little serum, and this had a fœcal odor, and there were two inches of intestine of a deep red color, tightly embraced by the neck. This was divided, the bowel replaced, and the patient bled, &c.; but he died early the next morning with all the symptoms of peritonitis. The abdomen was filled with a sero-purulent fluid, and the portion of intestine contained in the hernia was of a violet-red color, and covered with pus. There was a slight indentation at the point where it had been strangulated, but no effusion of fœcal matter had taken place. A small portion of the neck of the hernial sac had escaped the knife, but it was loose and could not have maintained the strangulation. Mr. Teale, in the collection of cases in his "*Table (Treatise on Hernia, p. 157,)* exhibiting the leading features of several recorded cases of hernia reduced in mass," relates an instance of spontaneous cure, which occurred in the practice of M. Dupuytren.

He professes to have taken it from the 3rd vol. of the *Lecons Orales*, which, as we have already stated, makes no allusion to the subject.—The patient, a female, *æt.* 59, had suffered from hernia on the right side (femoral) for 12 years. It became strangulated and was reduced; but the symptoms continued. Inflammation took place in the parts where the hernia had been situated, which was followed by suppuration, infiltration of the cellular tissue, and ulceration of the skin. A fœcal fistula relieved the obstinate constipation, and the patient finally recovered.

In the *Théses* by Dr. Breschet, p. 104, are recorded the particulars of a case of femoral hernia, which terminated fatally, in consequence of the reduction of the tumor in mass. The patient a female, age 55, had been troubled with a hernia on the right side for several years, which, however, had always been easily reduced, and retained by a truss. Fifteen days before her admission into the *Hotel Dieu*, she had suffered from symptoms of indigestion; the hernia had become painful and irreducible, to which, a surgeon had applied emollient cataplasms. When admitted, the symptoms of strangulation were very decided, and projections could be traced at different points of the abdomen, formed by the distended small intestines. The hernial tumor, about the size of a hen's egg, was very tense and irreducible. It was but little tender to pressure. Shortly after, there was vomiting of fœcal matter, when the tension of the abdomen diminished, and the hernia was readily reduced. The patient died thirteen days after her admission. In addition to the evidences of peritoneal inflammations, a knuckle of intestine, one and a half inches in length was found strangulated by the neck of the sac, the stricture having been caused, not only by the thickening of the neck, but by the additional pressure produced by an adhesion of the omentum to its surface.

Sanson declares (*Dict. de Med. et de Chir*, p, 571), that he has himself met with this form of rupture in three cases. A man was brought into his wards who had been treated for an attack of peritonitis. The patient intimated that he had suffered symptoms of strangulation in a hernia with which he was afflicted, but which had been reduced by himself. He was in a moribund state when he arrived, and survived but a few hours. Before his death, Sanson endeavored, but in vain, to detect the presence of a tumor, which he thought must exist behind the internal ring. In the post mortem examination, he found the fundus of the sac which had been completely reduced between the pubis and the fundus of the bladder. He then makes the following inquiry. "Suppose that I had been called to this man

in time, how could I have distinguished the symptoms under which he was laboring, from those dependent on an internal strangulation coinciding with the reduction of a hernia free from strangulation?" He likewise relates another case to show the difficulties which sometimes attend the diagnosis of this accident. A soldier arrived at Paris in November, 1828; shortly after, he was seized with violent colic pains, accompanied with nausea, vomiting of matter, at first bilious, then stercoral, and obstinate constipation. Leeches were applied, and baths administered without benefit. During the five succeeding days, the symptoms became more aggravated, with tympanitis of the abdomen and great sensibility to pressure. Inquiries were made of the patient if he had been troubled with a rupture, to which he at first replied in the negative. He finally acknowledged, however, that for several years he had been thus affected, and that he himself had reduced it, though with difficulty, a few hours previously to the manifestation of his earliest symptoms. Although the inguinal region was examined with great care, no tumor could be felt. Indeed there was less pain and tumefaction in this than any other part of the abdomen. In passing the hand over its walls, the convolutions of the distended intestines could readily be perceived. Efforts were vainly made to produce a re-descent of the hernial tumor, and the situation of the patient became desperate. For thirteen days objections were made to the proposals for an operation, which was to consist in laying open the inguinal canal and seeking the hernia. Consent was finally given, and Sanson was about to operate, when, on examining the abdomen again, he discovered for the first time, among the projections formed by the intestinal convolutions, a kind of cylindrical column, which descended on the left side towards the iliac fossa, and was lost in the pelvis. Supposing this column to be formed by the descending colon, and that the obstruction might not be far distant from the anus, and, taking into consideration the fact, that the right inguinal region, the seat of the hernia, was the least tense and painful part of the abdomen, Sanson resolved on trying other means before he resorted to an operation attended with so much risk to the patient. The enemata previously administered, had returned as soon as given, without bringing away any fecal matter. Hoping to reach the obstruction, he attempted to introduce a large and long gum-elastic bougie. At first, he met with considerable resistance, and was convinced, from the sensation made upon the fingers, that the intestine was contracted upon itself at that point, so as not to permit the entrance of the

bougie. Proceeding with caution, however, and rotating it between the fingers, he succeeded in passing it the whole length. An injection of olive-oil was then administered, and it was thrown up with great force. This brought away a slight discharge, and he resolved to promote the tendency to the re-establishment of the passage, by the most active means. As the patient was vomiting almost incessantly, no purgative could be given by the mouth. Twenty-four grains of calomel were taken in the course of 24 hours, but it was soon rejected. For two days frictions of castor oil upon the abdomen, tobacco enemas, and the application of ice to the belly, were tried without success. Recourse was again had to the oleaginous injections, and as before they produced slight evacuations. These were repeated perseveringly, and blisters were applied to the inside of the thighs, on the surface of which were sprinkled a few drops of croton oil. A few hours after this application, the patient began to pass some stools, and for several days he continued to discharge an immense amount of fecal matter, after which, all the symptoms subsided. The hernia re-appeared spontaneously; it was soft, irreducible, but presented no sign of strangulation.

In commenting upon the above, M. Sanson properly observes, that we should carefully weigh all the circumstances calculated to throw doubt on the existence of a hernia, of its strangulation, and of its reduction *en masse*, before we resort to an operation which, in suitable cases, will be attended with the happiest results, while, under other conditions, it cannot fail to aggravate the situation of the patient.

M. Jobert, in his *Traité de Mal. Chir. du Canal. Intest.*, p. 489, describing the different forms of internal strangulation, arranges them under three different heads, the first of which consists in the reduction of the hernial sac by the taxis, with its contents still strangulated, &c. Cases of this kind, he observes, are numerous, and the multitude of them cited by authors, he continues, should henceforth "faire autorité dans la science." In addition to the cases of Le Dran, Dupuytren, &c., which we have mentioned; he remarks, that similar facts have also been described by Peyronie and Cruveilhier.

In the *Lond. Med. Gazette*, vol. i., p. 484, is published the account of a case of scrotal hernia, which was brought to the Middlesex Hospital, and placed under the care of Sir Charles Bell. The patient, a male, æt. 47, had been subject to hernia for twenty years; five years previously to his admission, there had been some difficulty in reducing it. After that time he wore a truss, but continued the

use of it for a short time only. On the 7th February, his rupture descended: he felt sick and took a black-draught, which was vomited. Next day he sent for a chemist, who made several attempts to reduce the hernia, but without success. Another surgeon, who accompanied him to the hospital, succeeded in reducing it, so that the tumor disappeared, and he could even push the point of his finger into the external abdominal ring. After this operation the patient expressed himself greatly relieved. There had been no evacuation from his bowels, however, from the time that the hernia came down till he was brought to the hospital. Cathartics and enemas had been administered, and he had been bled to the extent of twenty ounces. When admitted he had constant vomiting, his abdomen was tympanitic and exquisitely tender to the touch, especially at its lower part, on the right side, the seat of the rupture. The pulse was small, quick, and almost fluttering, and his features were sunken and pallid. The house surgeon ordered a dose of castor oil with laudanum and a clyster. This produced three motions, and he expressed himself as being a great deal better, and quite easy. His pulse was fuller, and during the greater part of the day he continued to feel easier than he had hitherto been, but about 6 o'clock in the evening it was found that his extremities were cold and damp; he was restless, and complained of pain in his abdomen. The hernia came down repeatedly during the day, and was each time reduced with great facility. He died that night. On examination, the hernia was found in the scrotum, having come down shortly before death. The small intestines were highly inflamed, distended to their utmost, and in some parts loaded with dark fluid contents. The portion of gut included in the hernial sac was a knuckle of the *intestinum ileum*, very near to its termination in the *cæcum*. A large duplicature of the transverse arch, with a thickened mass of omentum attached to it, appeared, from its form and the old adhesion that united it, to be the portion which had been reduced five years before, when the rupture had descended. On examining the contents of the hernial sac, it was found to contain a portion of distended and mortified intestine. At the seat of the stricture, viz., the neck of the sac, the gut appeared soft, as if it were about to ulcerate, and there hung a fold of peritoneum upon the inside, which was loose, resembling an empty bag. Upon squeezing the strangulated portion of intestine, and evacuating some of the air which distended it, the intestine could very easily and effectually be pushed through the external abdominal ring, so as to be hid from the sight. On looking to the inside, however, it was

seen that the portion of gut had carried the neck of the sac before it into the abdominal cavity, and that the duplicature of the peritoneum, which has been described, being unfolded, has formed a new sac for including the knuckle of intestine on the inside of the abdominal muscles. Thus, the fold of intestine was pushed through the external abdominal ring, through the spermatic canal, and through that part which is described to be the internal ring, and was reduced within the abdominal muscles, but not within the abdominal cavity. The neck of the sac had been torn off from the internal ring in the efforts at reduction, but continued to grasp the included portion of gut.

After noticing the liability of the pressure of a truss to produce a thickening of the neck of the sac, he proceeds to relate the following: "A patient was brought into the hospital, moribund, and died. He had been operated on by the taxis, and the surgeon was convinced that he had done every thing required of him. A tumor was discovered quite within the muscular walls of the abdomen, which proved to be strangulated intestine within the peritoneal sac: so that the surgeon had reduced the sac and the intestine within it, and the stricture which produced the strangulation being in the mouth of the sac, there was no relief, and the patient died." Here, then, is the first thing you will reflect upon when this question is agitated, regarding the propriety of opening the sac. Always remember, that in certain circumstances "*the stricture is in the neck of the sac itself.*" At a meeting of the London Medical Society, in Nov. 1829, Mr. Stephens, the author of a well known treatise on "Obstructed and Inflamed Hernia," detailed a case of ventral hernia, which occasioned a very mild form of obstruction of the bowels, not leading, at first, to any suspicion of hernia as the cause, the tumor being so easily reducible, that the integuments covering the hernia could be pushed, almost together, through the opening, leaving behind an indentation, instead of a swelling; but the hernia returned when the fingers were removed. After more than a week from the commencement of the symptoms, Mr. S., believing that the hernia was the cause of the obstruction, persuaded the patient to submit to an operation. A small portion of discolored intestine was found adhering to the sac, the other part being entirely loose: the opening into the abdomen was large, and allowed the fingers to pass freely by the side of the intestine. The adhesion was separated, and the bowel passed readily into the abdomen, without any stricture being found or divided. The patient recovered.—(Lond. Lancet, 1829.) Mr. S. also stated, that a case

very similar had occurred to him, but as no hernia could be detected, the patient was not subjected to operation, and died. The autopsy revealed an adhesion like that which existed in the former case. The cases reported by Bransby Cooper, in Guy's Hosp. Reports for Oct. 1839, show in a striking manner, the difficulties which may occasionally be encountered in the treatment of strangulated hernia; and as it is our object to collect the more important symptoms by which the variety under consideration may be diagnosed, we venture to offer a brief analysis of his report. April 26th, 1839, Mr. Toulman visited Mr. L., æt. 68, who was suffering much pain in his bowels, and at the pit of his stomach, attended with much vomiting. Bowels had been moved twice during the day. Mr. T. saw him at 10 p. m. Being aware that his patient was the subject of rupture, Mr. T. inquired whether it was up, and was told that it was "all right." Rhubarb and magnesia were prescribed to relieve his *supposed* indigestion. This was rejected, and the patient passed a restless night. Next day at noon Mr. T. was told that a well-formed motion had been passed. In the evening, symptoms became more urgent. On examination, the right inguinal region, for many years the seat of hernia, to which a truss had been applied, appeared unusually flat, especially when compared with the opposite side. This was supposed to arise from the absorption of fat, from the continued application of the truss. The fulness on the left side, however, did not depend wholly on the accumulation of fat, as a small hernia protruded through the external ring, which returned under the act of its examination. Still, there was greater fulness on the left than on the right side. On the 28th, symptoms remaining much the same, Mr. T. with his son again examined for outward signs of intestinal obstruction, but nothing could be discovered. On the 29th, notwithstanding the administration of calomel, opium, effervescent draughts, and turpentine enemas, the constipation continued obstinate. There were stercoral vomiting and hiccough. Pain of the abdomen somewhat abated; and pulse intermitting, although this was not unusual with him in good health. Owing to the greater fulness on the left side, it was suspected that this was the seat of the obstruction, though the hernia on that was reduced as readily by the taxis as the one on the other side. The propriety of an operation being now discussed, Mr. Cooper was requested to examine the patient. This was on the afternoon of the 29th. To him the fulness on the left side had not the appearance of a circumscribed tumor like hernia, but of a natural disposition of fat, the absorption from the pressure of the truss on the

right side having given rise to the inequality of size. Upon manipulation, however, a somewhat unnatural sensation was communicated as well as that of fulness, in the left inguinal canal. No protrusion could be felt on the right side, but upon desiring the patient to cough, the hernia immediately descended, but could be reduced again by the most gentle pressure. The forefinger was passed into the inguinal canal by pushing the loose skin through the external ring, and the patient was desired to cough, when complete evidence was afforded of the absence of any descent through the internal ring. The left side was therefore suspected of being the probable seat of mischief. The inguinal canal was opened, and a small empty sac alone found; neither was any light thrown upon the nature of the disease. The patient died at 10 o'clock, A. M., on the 30th April. The autopsy proved the correctness of the opinion formed during the exploration of the previous day, that on the left side there was no existing cause for the symptoms which had proved destructive to life. The anterior parietes of the abdomen were then turned down, and the position of the intestines carefully investigated. On examining the region of the old reducible hernia, a portion of intestine was discovered in the sac, which proved as easily reducible as it had been during life; but on drawing the intestine out of the situation of the internal ring, it resisted displacement as if some adhesions had retained it there. Looking for the cause of this retention, it was found that a portion of intestine had become strangulated in a small hernial sac, which was situated anteriorly to the larger one, conjoining the reducible hernia. This portion of intestine and its sac, which strangulated it, were situated within the cavity of the abdomen, and could not have been relieved even if the exploration had been performed on the right side, unless the dissection had been made on the hernial tumor while protruding into the scrotum.

In another case of Mr. Cooper's, the patient, a healthy looking man, had been the subject of inguinal hernia, on the right side, for thirty years. No difficulty had been experienced in its reduction till Nov. 18th, 1834. While at stool, in the morning, his rupture descended, and he immediately became sick. Being unable to reduce the hernia, he applied for admission to the hospital. He was then suffering from constant sickness: pulse soft and compressible; tongue dry and furred; skin cool but clammy; countenance rather anxious. The hernia had descended into the scrotum; but was not tender, even on pressure. The reduction having been attempted without success, he was ordered into a warm bath, and subjected to its influence for half

an hour, when he became faint, and a further application of the taxis proved apparently successful, for the hernia was returned into the cavity of the abdomen. He expressed himself relieved, and at his request, the truss was again applied. An enema was given but returned immediately, without producing any evacuation. The urgent symptoms soon returned, his pulse became quicker; and he passed a restless night, with occasional vomiting, and the bowels continued obstinately constipated. On the 19th there was vomiting of fœcal matter, and at one o'clock P. M. Mr. C. made another careful examination, but neither in the seat of the old hernia, nor in any other situation of such protrusions, could he discover any thing which would lead him to explore any outlet from the abdomen. The patient died at half past six o'clock that afternoon. The autopsy revealed the following: peritoneum generally inflamed; in the lower third of the small intestines, a knuckle of the intestine, to the extent of about two inches, was found strangulated in a distinct sac, lying between the right linea ileo-pectinea and the bladder, being placed in the natural pouch of the peritoneum leading to the internal abdominal ring, and which usually forms the sac of an inguinal hernia. The sac, as seen within the abdomen, seemed about the size of a large walnut; its aperture, which formed the stricture, was of considerable size, although the stricture around the intestine was pretty firm. The sac itself was not much discolored, but the intestine within it was of a dark greenish hue. A firm and reddish margin of omentum adhered to the front of the sac very firmly, and some bridles of adhesive matter confined the cœcum in the iliac fossa. About three inches of the ileum below the stricture showed evidence of former constriction, the middle part of this portion being slightly dilated, thickened, opaque, and injected; whilst the two extremities were marked by an irregular patch or flake, as if cicatrization had been the result of some former physical compression.

From the remarks of Mr. Cooper, with regard to the treatment which we should adopt in similar cases, we infer that he must have been unacquainted with the brilliant results which had been attained by Arnaud, Sabatier and Dupuytren, for when he suggests the propriety of exposing the inguinal canal and laying open the sac, he does not even refer to the successful practice of those distinguished surgeons.

Indeed, although the report of a case, already noticed, which occurred at the Middlesex Hospital, under the care of Sir Charles Bell, was published in the London Medical Gazette for March, 1828, and although it subsequently formed the subject of a clinical lecture by

that gentleman, yet to Mr. James Luke, one of the surgeons to the London and St. Luke's Hospital, belongs the credit of having first presented this matter to the profession, in a manner commensurate with its importance. This truly excellent surgeon boasts of an experience in these cases, almost equal to that of Dupuytren, a circumstance to be explained by the fact, that the number of cases of accidents of all kinds admitted to the London Hospital exceeds that of any other in that great metropolis. During the winter of 1846-7, the writer had the honor of forming Mr. Luke's acquaintance, and received from his own lips many of the details of the cases below inserted. For a complete summary of Mr. Luke's experience we would refer to the 26th vol. of the Medico-Chirurgical Transactions, where may be found a valuable paper by this gentleman, which was read before the Royal Medical and Chirurgical Society on the 25th April, 1843, and to the London Medical Gazette for\*— and Feb. 1849, for the reports of cases, in which he endeavors to show, that the reduction of strangulated hernia *en masse*, although rare, is by no means so infrequent as is generally supposed, "and that it should be held constantly in view as an occurrence within the range of ordinary probabilities, and as requiring only favoring circumstances for its developments." He was led to the above conclusion by the occurrence of seven cases of reduction *en masse* under his own notice; "a conclusion the more desirable to be adopted," he remarks, "as an error of omission during the actual existence of such reduction, will prevent the only means likely to be available to the safety of the patient."

His first case was a male, æt. 50, with an inguinal hernia on the right side, of thirty years' duration. He had all the symptoms of strangulation, but the hernia was quickly reduced by the dressers, and the patient was relieved. In about a fortnight it again descended, and became strangulated, but was reduced by himself. He grew worse, however, and died some days afterwards, immediately subsequent to an effort made to force an evacuation from his bowels. Two other cases were not seen by Mr. Luke till after the patient's death, and he remarks that a great similarity of circumstances appears to have attended the whole of these cases. In each, the hernia was oblique inguinal, and reduced by the patient's own efforts. In each the precise nature of the case was unknown during life, and no at-

---

\* In his report of his last case, he mentions that he had reported another some time since in the Gazette, but after some search we have been unable to find it; and as at present we have not the London Medical Gazette at our command, we are compelled to omit its details.

tempt was made to afford relief by operation, and in each the autopsy revealed a hernial tumor in the vicinity of the internal ring, reduced through the abdominal parietes, but lying exteriorly to their general peritoneal investment. When opened, the fundus of the tumor was found to lie below the level of the ring, towards the cavity of the pelvis, the contents being found in a state of sphacelus, and strictured by the neck of the sac, in which they were inclosed.

The first case which came under Mr. Luke's own *treatment*, was that of a short muscular stage-coachman, æt. 30, who, whilst driving, had a hernial protrusion through the left inguinal ring, which at the time was not attended with pain. Without descending from his seat, by pressure, he caused it quickly to disappear. In about an hour he began to feel pain in the bowels, and sickness. His symptoms becoming more aggravated, he was admitted into the hospital during the night of Aug. 30, 1839, nearly three days having elapsed from his first attack. As he was suffering all the symptoms of strangulation, inquiries were made as to the previous existence of a hernia, to which he replied that he had been the subject of a large rupture on the left side for many years, during the greater part of which he had worn a truss for its support. Suspecting that the tumor had been returned with its contents still suffering from strangulation, a careful examination of the inguinal rings and canal was made, with the hope of detecting some indication of a local character, by which the surgeon might be guided in his proceedings, but nothing was discovered.—The inguinal rings of both sides were entirely free from every appearance of tumor, and the canal was devoid of all external evidence, indicative of a hernial descent. There was no fulness of the abdomen in the vicinity of the ring, and the pain caused by pressure in that situation did not exceed that on the right side. Aug. 31st, a consultation was held, at which, in the absence of clearer indications, it was considered most prudent to abstain from any operative proceeding. Being unwilling to abandon the patient without making some effort for his relief, Mr. L. determined to perform an exploring operation, but on proposing this to the patient, the emphatic assurance which he gave, that at the time of his reducing the hernia he had employed but very little force, and that reduction was attended by no pain, led Mr. L. to relinquish the idea. Mr. L. was under the necessity of leaving London for a few days, but on his return, Sept. 4th, he found his patient still alive, with all his dangerous symptoms increased. A local indication had also now arisen, viz., a tumefaction along the course of the inguinal canal, which induced him instantly

to propose and perform the operation of exploration which he had before contemplated.

An incision was made over the seat of the swelling, from which a quantity of highly offensive, sanious fluid exuded, the infiltration of which into the cellular texture of the part had given rise to the tumefaction. Extending the incision towards the internal ring, a lustreless, greenish membrane presented itself, the tense and rounded surface of which reached beyond the limits of the opening made by the operation. This was at once recognized to be the sac of a hernia, and opened. It contained a large quantity of intestine, sphacelated and reduced to a pulpy condition, which gave way under the pressure of the finger, introduced for the purpose of ascertaining the seat of the stricture, which was reached with great difficulty, in consequence of its distance from the opening of the parietes. When reached, the finger was passed through it, but its withdrawal was followed by feculent discharges, rendering further division unnecessary. A free rent for the discharge was made, by enlarging the external wound, over which a poultice was applied, whilst stimulants were administered by the mouth. Copious discharges continued to flow from the wound for two days, at the end of which he died, being on the seventh day after his admission. The autopsy more fully exposed the large hernial sac, which occupied a considerable space just within the abdominal parietes, in the vicinity of the internal ring. The fundus of the sac lay a little below its level, towards the cavity of the pelvis, while the neck (still contracted, so as obviously to have been the original seat of stricture) lay in an upward direction towards the umbilicus, and between three and four inches distant from the situation of the internal ring. The whole sphacelated contents were empty, collapsed, and in a pulpy state.

The second case occurred in a baker, æt. 40, also a rather muscular man. He had a large inguinal hernia on the right side, of upwards of twenty years' standing, with a small hernia on the left side of about four years. At 7 o'clock, P. M., Jan. 6th, 1843, while removing some bread from the oven, he was suddenly seized by a severe pain, extending from the vicinity of the left inguinal ring across the abdomen. The hernia had protruded under the pad of his truss. Warm fomentations were applied to the tumor, and attempts made to reduce it: in these, the patient supposed he had succeeded, for the tumor had disappeared. The symptoms growing worse, Mr. L. was called in consultation, Jan. 7th, 9 P. M. On examining the groins, he found that the hernia of the right side descended into the

scrotum, which it filled to a considerable extent: it was not painful, and was easily reduced. There was no tumor on the left side perceptible to the sight, yet on making pressure, one was obscurely felt in the situation of the internal inguinal ring, somewhat rounded on its surface; but not well defined. When pressed it receded more deeply within the abdomen, and was slightly painful. Suspecting that the hernia had been reduced *en masse*, the patient was placed erect, and requested to cough and strain, hoping that it might thus be again protruded. These efforts having failed, Mr. L. suggested an exploring operation, but not wishing to precipitate an operation in so uncertain a case, it was deferred for a few hours, with a view to try the effect of medicine. It was arranged to meet at 9 o'clock the next morning, and then, if deemed advisable, to operate. In the interim, calomel and opium, with Epsom salts, were prescribed. In the morning the patient was better. The medicine had been retained, and the pain in the abdomen and vomiting had ceased. The tumor, before obscurely felt, had entirely disappeared, and there was no fulness in the part which it occupied. The pressure of the hand, however, produced a slight pain, but it was much less than when last examined. These favorable symptoms led Mr. L. to suspect that the conclusions of the previous night had been erroneous; still the constipation remained obstinate. At 12 o'clock, the vomiting had returned, and at 3 o'clock Mr. L. found the patient in every respect worse. The operation was then immediately performed. The integuments over the course of the inguinal canal were divided to the extent of three or four inches, and the tendon of the external oblique muscle, the external abdominal ring and spermatic cord were thus exposed. A finger was introduced into the ring, but no trace of a tumor could be discovered. The tendon of the external oblique was then divided, and the spermatic cord was found clear and unobscured by any superjacent stricture except a small lobule of fat which overlaid its upper part. Pursuing the examination towards the internal ring, some cellular membrane, lying on the inner aspect of the cord, appeared more condensed than usual in that situation; this proved to be a condensed capsule containing an empty cavity within it, sufficiently large to contain a small egg. This capsule was supposed to have formed an investment to the hernial sac, and its empty state was explained by the reduction which was presumed to have been effected. A finger passed along this cavity entered the internal ring, the large, firm borders of which were distinctly perceptible. A little more deeply, the rounded and tense surface of a

tumor was readily detected, which, after some little more exposure, was seen to be dark-colored. This was evidently the hernial sac, and the fact of a reduction *en masse* was made manifest. The stricture was found to be at a considerable depth from the internal ring, and probably upwards of two inches from the abdominal parietes. The margin of the internal ring was freely divided, and the hernial tumor easily drawn out into the inguinal canal, and opened without the risk which would have attended the proceeding, had it been attempted while it lay deeply within the parietes. The sac contained a small quantity of very dark-colored fluid and about six inches of small intestine, of a dusky-red color, with one small black spot on its surface, the whole being strictured by the neck of the sac. This was easily divided, after which the contents were readily returned within the general cavity of the peritoneum, and the wound closed. Jan. 16th, the patient had completely recovered.

The last case reported by Mr. Luke (Lond. Med. Gazette, Feb. 16, 1849,) proved fatal although the strangulation was relieved by an operation, and is particularly interesting as it bears upon the subject of diagnosis and treatment,—Mr. S., æt. 79, had been the subject of inguinal hernia on the right side, for thirty years. It was about the size of a hen's egg, rather hard and painful, had descended at noon on the day previous, but was readily reduced by Mr. Pape, the surgeon to whom he applied. Though greatly relieved, the pain did not wholly subside, and on his return home, began again to increase in severity, and to extend over the lower part of the abdomen. Towards evening vomiting supervened, and after a very disturbed night, the symptoms became much aggravated in the morning with a great increase of pain, and all the other signs of intestinal obstruction. In the right inguinal region was a very small and soft tumor at the ring, which disappeared on the application of very slight pressure, but re-appeared when the patient coughed. It was not painful, and was supposed clearly not to be a hernia in a state of strangulation, but was presumed to be a small portion of adherent omentum. The spermatic cord below it was distinct, and unobscured by any intervening structure between it and the integuments. Pressure excited severe pain, a little above the internal ring, from whence it shot across to the opposite side of the abdomen. By increasing the pressure at the same part a tumor could be very obscurely felt beneath the abdominal muscles, until by the pressure it receded so far that it could no longer be recognized. In view of all these facts it was concluded that the hernia had been reduced *en masse*, and that it was still in a state of strangulation.

An operation was proposed and performed by Mr. Luke, about twenty-five hours from the first descent of the hernia. A fold of integuments over the inguinal canal, external ring, and upper part of the spermatic cord, was transfixed and divided to the extent of about four inches. A little dissection brought the small tumor previously mentioned into view, which was then opened, and a very small portion of omentum was found so entirely adherent to its sac as to close all communication with the abdomen. The spermatic cord below the tumor was distinctly visible from within an inch of the external ring downwards, being uncovered by any superjacent hernial sac, a circumstance of importance to be noted, says Mr. L., since it is highly probable that this part had been covered by a sac previously to the reduction of the hernial tumor, which was about the size, as already stated, of a hen's egg, and this fact was to Mr. L. strong presumptive evidence that the sac had been reduced into the abdomen, together with its contents, which were supposed to be in a state of strangulation. On introducing the finger through the ring, no tumor could at first be detected, but when the adherent omentum and sac were drawn down, a rounded body was felt, which was evidently the hernial tumor, but so deeply seated as not to be freely exposed except by a greater division of the abdominal parietes than Mr. L. felt justified in making until other expedients had failed. Considerable traction of the omentum was now employed, the rounded body had slipped from under the finger and could no longer be felt. On continuing the traction, a portion of sac, or what appeared to be so, was brought into view, and held forcibly down whilst Mr. L. continued the dissection necessary for its division. When divided it was found to have been emptied of its contents, with the exception of some fluid which escaped. On passing the finger through the aperture made, it was found that at the distance of about two inches there existed a considerable contraction, forming a very narrow communication with the general cavity of the abdomen, with rigid margins, and an aperture not larger than sufficient to admit the point of the fore finger. The original seat of stricture and cause of obstruction was now supposed to be reached, from which it was thought the hernial contents had escaped during the manipulations used to bring the tumor into view. The sac being empty, and nothing within the influence of the stricture, Mr. L. believed that the operation had been carried sufficiently far, and that he had attained the object of liberating the strangulated hernial contents for which it was undertaken. The wound was therefore closed, and the patient, somewhat

exhausted, placed in bed after a little wine had been administered to him. The operation was performed on the 3d Nov., and the case proceeded favorably until the morning of the 9th, when considerable change in his condition took place, and exhaustion became so severe that he died on the 10th.

In the second volume of *Chelius' Surgery*, by South, p. 274, we are informed that in the Museum of the Royal College of Surgeons, there is an example of inguinal hernia, reduced in mass and pushed between the abdominal and iliac muscles and the peritoneum, part lying below the crural arch, and extending outwards nearly as far as the external iliac vessels. It forms a considerable swelling inwards towards the cavity of the belly, but is not perceptible externally. The rupture was an old one, and the patient having worn a truss, was not inconvenienced by it, nor ever had difficulty in returning it, till it became strangulated.

We are also informed that a case occurred under the care of Messrs. Green and Callaway, in 1836. The patient several years before, whilst in Spain, had symptoms of strangulation and a swelling in the scrotum, which, having been pushed up completely by a Spanish surgeon, after a time the symptoms subsided, and he was not farther troubled until the following attack. There was now a swelling on the left side of the scrotum, irreducible but transparent, and accompanied with symptoms of strangulation. No relief being obtained by medicine, the following operation was performed. A cut was made into the swelling, the fluid evacuated, when the finger could be readily passed in and turned freely about. The intestines were felt, as it seemed in the belly, and free from strangulation. Four days afterwards the patient died. The autopsy showed that the cavity opened in the scrotum did not, as supposed, permit the finger to pass directly into the general cavity of the peritoneum, but into a large sac lying between the iliac fascia and the m. iliacus, in which were contained intestines, strangulated in a small aperture at the upper and inner side of the sac, where was the communication with the cavity of the belly. The testicle lay behind the scrotal sac, just at the external abdominal ring. Mr. Green supposed that the rupture was congenital, and that when the patient was in Spain, the surgeon had violently thrust up the whole rupture and the testicle into the belly, the sac doubling on itself; but that the intestine had then partially or completely relieved itself, and that afterwards the sac had lengthened downward, forming the swelling filled with fluid, which existed in the scrotum, and had been cut into.

M. Laugiér has described in the *Bulletin Chirurgicale*, tom. 1. p. 363, a singular case, in which there was not only a reduction of the sac, but as in the case of Sir Chas. Bell, an arrachement of the neck. This had been detached by the attempts which had been made with the taxis, and had been returned within the abdomen, maintaining, however, its proper relations with the portion of the intestine which had protruded. The symptoms continued unabated, and the patient rapidly succumbed. On opening the abdomen, a fold of intestine about a foot in length was discovered in the hypogastric region, surrounded by a flat circular band, from three to five millimetres in length, but which at no point adhered to the intestine, which was strangulated. That which excited most surprise, however, was the discovery of something resembling the finger of a glove truncated at its summit, situated near the orifice of the inguinal canal; and it was easy to perceive, says M. Laugiér, that it arose from the peritoneum lining the abdominal walls in the vicinity of the ring, which had been drawn inwards by the intestine.

In the *Provincial Medical and Surgical Journal*, for Feb., 1843, is published the account of a case which occurred in the practice of Mr. Banner, of the Northern Hospital of Liverpool. The patient, a male, *æt.* 42, had been subject to inguinal hernia for many years, but had always been able to reduce the gut. Two days previously to his admission, the hernia had descended, when he was seized with great pain in the bowels and constant vomiting. Being unable to reduce it as usual, (the tumor had always descended into the scrotum,) he sent for a surgeon, who bled him, and by the taxis succeeded in returning the hernia, which was about the size of a hen's egg. The symptoms of strangulation continued; he was again carefully examined, but the ring could be clearly felt, and there was not the least indication of a tumor in the inguinal canal. He was therefore treated actively for inflammation, but the patient died on the second day after admission. On examination of the body, a small knuckle of intestine was found just within the inner ring, strangulated by the sac which had been returned with it. This portion of intestine was mortified, and the peritoneum was in a state of high inflammation.

Mr. Robert Wade has reported a case in the *London Lancet* for July, 1845, attended with considerable difficulty in the diagnosis, but in which an operation was performed with success. A man, *æt.* 75, had been afflicted with inguinal hernia on both sides for nearly thirty years. The tumors were sometimes as large as a good sized pear, and occasionally descended into the scrotum, but were always easily

reduced, and generally retained by a truss. Two days previous to Mr. Wade's visit, on getting out of bed, he experienced a slight momentary pain in the right inguinal region. In the afternoon, symptoms of strangulation became manifest, but not the slightest appearance of hernia could be detected on either side, nor was there any tenderness or very firm pressure over the inguinal canal, or any part of the abdomen. It was evident, however, that there was obstructions at some part of the intestinal canal, and the herniæ were strongly suspected of being its seat. The only reason for this suspicion, however, was the slight darting pain in the right inguinal region, felt on first getting out of bed. The spermatic cord was more distinctly felt on the right than on the left side, and from all the circumstances of the case, Mr. W. concluded that the right hernia, with its investing sac, had been reduced *en masse* by the patient, and that the obstruction existed in the neck of the sac on that side. The symptoms grew worse, although there was not the slightest tenderness on firm pressure in any part of the abdomen, nor could any tumor be felt in the vicinity of the rings. The patient was assisted out of bed, and made to cough, but although the rupture on the left side was forced down, there was no descent on the right. The attempt to bring down the tumor could not be persevered in, for he soon became so faint as to fall backwards on the bed, with a pulse scarcely to be felt. Although the symptoms indicated obstruction of the intestinal canal, rather than any serious mischief of the intestine itself, yet, taking into consideration the exceeding depressed state of the patient's nervous system, the extremely harassing sickness from which he had now for some length of time suffered, as well as his advanced age, it appeared highly desirable, says Mr. W., that some more efficient means should be adopted for his relief. An exploring operation was performed on the right side, the hernia having been made to protrude half an inch through the external ring, by placing the patient in the erect position and by employing pressure on the abdomen. The layers of fascia being divided, and the sac laid open, which was found thickened and closely embracing the intestine, about half a teaspoonful of a light brown serous fluid escaped, and a small knuckle of intestine, rather red from congestion, was observed. The finger was then passed within the sac, along the intestine, which, at the extent of about three inches, was found firmly embraced by a membranous band. This was divided, and the strangulated portion of intestine reduced. The bowels acted freely the next day, and the patient eventually, although slowly, recovered.

J. B. Demeaux (Op. Cit. p. 34) relates a case communicated to him by M. A. Berard. A clergyman had been troubled with crural hernia on the right side for several years, which, however, could be readily reduced or be made to reappear; whilst speaking the rupture descended, but the patient himself reduced it, when he was suddenly seized with all the symptoms of strangulation. The hernia was made to descend again from the abdomen, but he was not relieved. About the third day after the first reduction, the operation was performed. The crural ring was perfectly empty, although somewhat enlarged. On introducing the finger, a tumor was detected within the abdomen, which the surgeon attempted to draw down with the forceps, in which, however, he but partially succeeded. Discovering in this tumor a hernial sac, very much thickened, the operator incised it, when some bloody serum escaped; with the finger, the intestine itself was soon reached, and the discharge of a large quantity of fecal matter followed. The patient died in thirty-six hours. The autopsy revealed, 1st, the traces of a sub-acute peritoneal inflammation; 2nd, a hernial sac situated chiefly within the abdomen; 3rd, the neck of the sack adhering to a fold of the intestine, which was perforated on the side of the cavity of the sac. Demeaux also states that he has himself seen an instance of this kind, which occurred at the Hotel Dieu, under the care of M. Blandin, and in this instance the rupture was inguinal and of *large size*.

In the Provincial Medical and Surgical Journal, for January 1849, Mr. James Reid has reported a case of incomplete reduction *en masse*. The patient,  $\text{æ}t.$  75, had double inguinal hernia, which partly filled the scrotum. He had worn a truss for nearly 40 years. That on the right side was most recent and troublesome, having been once incarcerated for several days, with constipation and vomiting, and was finally reduced with difficulty. Unusual vomiting brought on his last attack, which commenced with severe pain in the abdomen with vomiting. The attempts that day to reduce the hernia were unsuccessful, next day the patient tried again, pressing with a hot tile. After some time, the swelling was reduced in size, but the symptoms continued unabated. A small swelling was left in the inguinal canal, which his physicians tried to reduce. Purgatives were now administered. Forty-eight hours after the attack, the patient had an anxious countenance, there were constipation and vomiting, with hiccough; the abdomen was distended, but not tender, except in the immediate vicinity of the right inguinal region. Here was a small diffused swelling, "a kind of fulness of the part," so ill

defined, however, that it was said at first, there was no protrusion, but by comparing the affected with the other side, or pressing with the fingers, the tumor was more readily detected. This pressure produced pain and caused it to recede, but when removed the swelling immediately returned. A lump, feeling like a loose sac containing omentum, occupied and extended from the external ring. The taxis, enemas, &c. producing no change, an incision was made opposite the internal ring directly over the swelling and continued parallel to the inguinal canal, through the coverings of the supposed hernia, when a tumor the size of a large walnut was exposed in the upper part of the canal. A portion of small intestine of a dark color, but of natural lustre, with a small quantity of dirty fluid, were found in the protruded sac, which, however, formed but a small part of the whole sac, the remainder extending so far within the abdomen that it required the full length of the index finger (a middle sized one) to reach the seat of stricture, viz., the neck of the sac. Before the stricture could be divided it was necessary to divide the lower edge of the abdominal muscles across their fibres, and to prevent the neck of the sac receding from the finger it had to be held by the divided edge. The nail of the fore finger was then with difficulty insinuated between the intestine and the stricture, and the latter divided. The return of the intestine, however, was opposed by some obstruction situated to the inner side of the neck of the sac, between which and the abdominal parietes the intestine was pressed, and could be felt passing towards the mesial line beyond the reach of the finger; it was dislodged from this situation and pushed back into the abdomen. Peritonitis destroyed the patient forty-eight hours after the operation, and on the post mortem examination, nearly a foot of the upper part of the ileum, the portion strangulated, was found to be dark-colored, almost black, and covered with patches of recently effused lymph. It was puckered up in the position it must have assumed in the sac, and deeply marked by the stricture, having also an additional depression partly encircling it below the indenture. The sac was of the form of a double pouch with a common neck and opening. A smaller pouch, about one-fifth of the whole, partly within the abdomen and partly protruding through the internal ring; a second and larger pouch, placed nearly at right angles to the former and extending from the inner side of the internal ring between the peritoneum and abdominal parietes. The cord of the obliterated hypogastric artery had been separated from its natural position on the inner side of the internal ring by the interposition of the larger

pouch. This formed the resisting band felt during the operation, and caused the second mark upon the strangulated intestine. The sac was readily drawn out from its double position, and then formed a simple bag. The outer side of the neck of the sac was only slightly separated from its connection with the abdominal parietes. The substance felt at the external ring proved to be a mass of fat, connected by a long pedicle extending up the inguinal canal to the exterior of the protruded portion of the sac. Mr. Reid was of the opinion that the obliterated hypogastric cord had some share in causing the small portion of the rupture to reappear when apparently reduced, and in preventing the complete reduction of the whole.

In Ranking's Abstract of the Medical Sciences, vol. 5, No. 9, is recorded the account of a successful operation by M. Homolle. It is copied from the *Union Médicale* and *Monthly Journal* for February, 1849. The hernia had been reduced by the patient, but as the symptoms of strangulation continued, M. Robert performed the operation. Finding all efforts, as coughing, &c., unsuccessful in causing a reprotusion of the hernia, the integuments were divided parallel to the ligament of Fallopius, for three and a half inches, the division extending just below the inguinal ring. The aponeurosis of the external oblique was then divided throughout the whole extent of the wound, and the finger passed into the abdomen behind the inguinal region, by pushing aside the fibres of the internal oblique and transversalis, and pressing back the peritoneum and loose cellular tissue, uniting it to the anterior abdominal parietes. M. Homolle hoped to find the sac (as twice before under similar circumstances) in the iliac fossa, immediately behind the superior orifice of the inguinal canal. After a long and painful search, he found it behind the external border of the rectus muscle, glistening in appearance, and very movable. Several attempts were made with the forceps to draw it out, but the loose cellular tissue covering it, either escaped from his hold, or was torn without being drawn down. At length, after fits of coughing, courageously kept up for some minutes, it was slightly inclosed between the lips of the wound. The sac was then divided, and was found to contain a little serous fluid, a large red knuckle of intestine, and a pretty large mass of omentum in front. The sac was now drawn out and freely opened with the scissors, guided by the index finger, until the seat of strangulation was reached and divided. The intestine was with difficulty returned, whilst the omentum, on account of inflammation, was left protruding. The patient recovered.

The following case occurred to the writer in the month of August,

1840, which he suspects to have been one of a similar character to those already related. True, he is unable to furnish positive proof upon this point, but when the symptoms are compared with those which have been detailed, in his opinion, it is rendered exceedingly probable. T. B., æt. 64, had been affected with inguinal hernia on the left side, upwards of thirty years. This, though large, had with but one exception given him little trouble, having always been easily reduced and retained by no other means than a leather strap. His general health, previous to his last attack, was good. On Saturday, about noon, whilst raking hay, he was suddenly seized with all the symptoms of strangulated hernia. At midnight, I was called, and on examining the rupture, I found to my surprise that it could readily be returned within the walls of the abdomen. The left inguinal region was tender, and he could not bear the slightest pressure. He was bled freely, which afforded only temporary relief. To overcome the constipation, which was obstinate, castor and croton oil were administered, these being followed by tobacco enemas. Believing that the hernia had been returned *en masse*, an exploring operation was proposed, but to this the patient would not consent. On Tuesday morning he died, being the fourth day from his attack. No means were left untried to obtain an examination of the body, but permission was not granted.

We are aware that cases have been recorded where inflammation existed previously to the reduction of a rupture. The effects not having subsided on the removal of the mechanical cause, Mr. Lawrence refers in a note (Treatise on Hernia, p. 148) to an example related by Camper, in his *Icones. Hern.* p. 3, in which death occurred from peritoneal inflammation where an inguinal hernia had been returned without delay. Other authors we might here quote to the same effect, but shall defer what further remarks we have to offer upon this point till we come to the subject of *diagnosis*.

Since the first appearance of the substance of this essay in the *American Journal of Medical Science* for October, 1846, the writer has been informed of the occurrence of other cases of this accident, and he is inclined to believe, that now the attention of surgeons has been awakened to this subject, the number will soon be greatly multiplied. During his recent visit to London he was informed by Mr. Fergusson, the distinguished Professor of Surgery at King's College Hospital, that he had been called a few days before to see a case some distance from London, which produced great perplexity in the minds of the attending surgeons. The author cannot recollect whe-

ther it was a case of femoral or inguinal hernia, but his impression is, that the patient was relieved by an operation.

Within the last eighteen months a case of the kind occurred to Dr. Cheeseman, of New-York, which proved fatal. The patient (Adamson) had been troubled with inguinal hernia for many years, which he himself had always been able readily to reduce. It was about the size of a hen's egg, and at length became strangulated. After much *pushing up* with his hand, Adamson finally succeeded in effecting its return into the abdominal cavity, but he was not relieved. Dr. C. was then called, but as there was no appearance of a tumor externally, it was not deemed expedient to operate, and the patient died about four days after his attack. For the particulars of this case I am indebted to my friend, Dr. Sayre, of New-York. Figure 1 in the plate is taken from a wax preparation of the parts now in the Museum of the College of Physicians and Surgeons of that city.

The only American author, so far as we know, who has alluded to the accident under consideration is Dr. Joseph Parish. In his *Practical Observations on Strangulated Hernia*, published at Philadelphia in 1836, pp. 37-38, &c., after urging the propriety of opening the sac in every operation for strangulated hernia, he states that the seat of stricture may be in the hernial sac itself, and if this be unopened, the incarcerated parts may be returned, the symptoms proceed without the slightest mitigation, and the real character of the case revealed only by a *post mortem*. He then relates a case in which he was concerned, with Dr. Joseph P. Nancrede, an account of which was given in the sixth volume of the *Eclectic Repertory*. The patient was a male, æt. 30, with a scrotal hernia on the right side, of five years duration. It became strangulated. The efforts to reduce the tumor were at first unsuccessful, but this was finally effected about twelve hours after his attack. The patient was only temporarily relieved, and died on the seventh day. A portion of the jejunum in a sphacelated state, was found confined in the inner portion of the abdominal ring, strictured by the hernial sac.

---

## CHAPTER II.

### *Reduction during Operation.*

THE *Observations de Chirurgie*, by Saviard, published in 1702, contain the earliest account of this accident, in which the hernial sac

has been mistaken for intestine, during the operation for strangulated hernia, and reduced, without affording relief to the patient. At page 90, it is thus described: "Ayant vu un autre chirurgien d'ailleurs assez habile, lequel s'étant obstiné à vouloir que cette poche que l'on découvre d'abord fût l'intestine même, la sépara tout autour, puis la réduisit en dedans. La malade étant morte quatre heures après, je fis l'ouverture du corps pour mon instruction, et je trouvai l'intestin étranglé dans l'anneau, après avoir ouvert cette poche qu'il avait fait rentrée dans le ventre."

Arnaud witnessed a case of femoral hernia in a female, in which an operation had been performed by another surgeon, without affording any relief. His assistance was requested some thirty-six hours afterwards, and he proceeded to search with his finger for the hernial tumor, which was at length discovered, hard and tense, deep within the wound. Not being able to make this descend, he thrust his finger up to the mouth of the sac, which lay at the depth of three inches within the abdominal muscles, towards the ileum, and divided the stricture with a probe-pointed bistoury. The patient recovered.

Richter, in his *Abhandlung von der Bruch*, p. 251, referring to the mistakes which the surgeon is liable to make in his efforts to expose the hernial sac, remarks, that Le Dran would seem to have witnessed a case similar to that described by Saviard. This, however, he only infers from the cautious manner which, in his *Treatise on Operations*, Le Dran recommends to be observed in reaching the sac when the hernia is recent. Now although this writer does allude to the liability of committing the mistake of supposing that the surgeon has arrived at the intestine when he has only exposed the hernial sac, we can find no mention whatever in his work of any such case in particular which has come under his observation.

Sabatier, *Med. Operat.* tom. 1, p. 75, refers to the embarrassment which sometimes attends that stage of the operation, in which the surgeon is endeavoring to expose the sac, and remarks, that those of the *greatest skill* have been at times exceedingly perplexed. Indeed, the cases which we are about to detail, afford but little support to the assertion of Scarpa (*Traité des Hernies*, p. 102), that these mistakes may be attributed to ignorance of the proper coverings of the sac; and they likewise condemn the rash conduct of Louis (*Mém. de l'Acad. Roy. de Chir.* t. iv. p. 453), who, in exposing the intestines, would make but two strokes of the bistoury; one, to incise the coverings of the sac, the second, to open the sac itself.

The candid confessions of Dr. Parrish respecting the difficulties of opening the hernial sac, cannot be too highly commended. In his *Practical Observations on Hernia*, p. 48, he remarks: "It is said that the bloodvessels of the intestine, and its smooth, polished surface, distinguish it from the hernial sac, which has not those bloodvessels, which is rather rough and cellular on its surface, and which is always connected with the surrounding parts. After some experience in this matter, I acknowledge myself unable to draw these nice distinctions in living structure, sometimes not inconsiderably altered by diseased action. Having often found difficulty in distinguishing between sac and intestine, and felt the vast importance of avoiding the danger of inflicting a wound on the latter, while opening the former, I am willing to communicate my experience on the subject." He then proceeds to relate a case in which the hernial sac was concealed by a coagulum of blood, and another in which the distinction between sac and intestine was confused by gangrene; whilst in a third, the sac was at first mistaken for intestine.

Sir Astley Cooper, in his *Treatise on Hernia*, p. 221, alluding to the mistakes which are sometimes made after the fascia propria is divided, when it is supposed that the sac is exposed, and the intestine laid bare, observes: "Following up this idea, the stricture is divided in the outer part of the sac, and the intestine, still strangulated, is pushed with the unopened sac into the cavity of the abdomen. I have given a plate from an excellent preparation now in my possession, of an undivided sac returned into the cavity of the abdomen, and containing the strangulated intestine."

The patient from whom the preparation referred to was taken, was a female, who had a crural hernia on the right side, on which the following operation was performed, four days after the commencement of the symptoms of strangulation. The incision was made to the fascial covering of the hernial sac; it was separated by the finger from the surrounding parts, and a cut being made into it, the hernial sac was supposed to have been opened, and the intestine exposed; but, as afterwards appeared by dissection, the sac remained undivided. The crural arch being next freely cut, the sac containing the intestine was pushed into the cavity of the abdomen with much difficulty; and its fascial covering was also passed through the same aperture. Four days afterwards she died, and upon cutting through the integument at the groin, the sac and its covering were found to be gone; but behind the crural arch appeared a large aperture, by which they had been returned into the abdomen. A small incision

being made into the cavity of the abdomen, the intestines, much inflated, pushed through the opening. They were reddened by inflammation, &c. Looking at the right groin from within the abdomen, the peritoneum was seen pushed upwards, to the extent of two inches, on the iliacus internus muscle; and, upon examining this part, I found the hernial sac included in its fascial covering, and containing the intestine, strangulated by a stricture at the mouth of the sac, and by the fascia covering it. This case, observes Sir Astley, strongly points out the necessity of being acquainted with the fascia propria.

Mr. Key remarks in a note, p. 221, that the mistake of returning a hernial sac unopened, now rarely occurs, since Sir A. has so particularly directed the attention of surgeons to the additional covering afforded by the fascia propria. He relates a case in which this accident had well nigh happened, but the surgeon, unable to return what he conceived to be intestine, discovered his error.

Mr. Key also states that Mr. Lawrence has related a somewhat similar case, which came under his own observation. He then goes on to quote the particulars of the case from page 428 of Mr. Lawrence's Treatise. Now, on referring to this last named work, at the place designated, not the slightest allusion is made to such an accident. But at page 292, Mr. Lawrence expressly declares that these cases (the reduction en masse) are rare, and that he has seen no instance of the kind. Again, at page 94, referring to the trials of M. Cloquet, on the reduction of ruptures in the dead subject, Mr. L. observes, that he has never seen a rupture reduced in a mass in the living body, nor has he seen any example of such reduction in pathological collections.

At p. 504, Mr. L., in adverting to the mistakes which sometimes arise, when, after the division of the fascia propria, the surgeon supposes he has penetrated the true sac, and exposed the intestine when it is still covered by peritoneum, remarks, that a temporary confusion is not the worst consequence of such a mistake, but that in one instance it has been attended with a fatal termination. To illustrate this, he details the particulars of the case which we have already quoted from Sir Astley Cooper's Treatise.

Mr. Lawrence next relates the account of a case recorded by Mr. Key (Memoir, p. 121), who witnessed an operation for crural hernia, in which the operator attempted to return the tumor, having mistaken the sac for the intestine. Great force was used, and at length the tumor disappeared; but the symptoms of strangulation

were not relieved ; and on a post mortem examination, the sac, with its contents, was found doubled upon itself, and forced under the fascia transversalis.

The note, therefore, at p. 222 of the American edition of Sir Astley Cooper's Treatise, in which this very case is described as having occurred under Mr. Lawrence's observation, must be a mistake. Indeed, we were assured by Mr. Lawrence himself, during the winter of 1846-47, that he has never yet seen a case of hernia reduced *en masse*.

The cases recorded by Saviard, Arnaud, Sir Astley Cooper, and Mr. Key, are not the only ones in which, during the operation, the hernial sac has been detached from the adjacent parts and returned into the abdomen with the intestine which it contained. Errors of this kind, says Demeaux (*Recherches sur l'Evolution du Sac Herniaire*, p. 36), have been committed by surgeons of great renown ; and it is probable that many more would have been recorded, had not surgeons been anxious to conceal their mistakes.

This writer reports two cases, one of which was communicated to him by M. Denouvilliers ; the second occurred to M. Velpeau, an account of which was published in the *Gazette des Hôpitaux* for March, 1842.

The case on which M. Denouvilliers operated at the hospital St. Antoine, was one of crural hernia. In the first stage of the operation nothing unusual presented itself to his notice. Arriving at a greater depth, he discovered a tumor, which he supposed to be formed by a portion of intestine ; this was isolated from its surrounding parts, and its debridement accomplished, when it was reduced without difficulty. After the wound was dressed, the surgeon began to entertain some doubts as to the result of the operation. He conjectured that the hernial sac might not have been opened. A couple of days, however, were allowed to pass, when, the symptoms continuing unabated, he determined to finish the operation which he had commenced. With the forceps, he seized the sac and drew it to the surface, when the stricture which existed at its neck was divided.

The case of M. Velpeau was likewise one of crural hernia. When he arrived at the sac, he supposed he had reached the intestine, which was deprived, as he thought, of its peritoneal covering. The tumor was detached and reduced. The patient soon died, and it was discovered that the hernia had been returned *en masse*.

J. B. Demeaux (op. cit. p. 37) observes, that the particulars of a case have been communicated to him by M. Charles Fournice, *ancien*

*interne* of the Hotel Dieu, in which the sac was inverted at the time of its reduction. The surgeon supposing that he had exposed the intestine, isolated it from the surrounding parts, divided the ring and returned the tumor. The sac was not opened, but by the pressure applied it became inverted. As mortification had already commenced, death rapidly supervened in consequence of the effusion of fecal matter into the cavity of the abdomen. Velpeau (*Operative Surgery*, by Mott, vol. 3, p. 582), speaking of the caution necessary to be observed in dividing the different coverings of the sac, and the difficulty which sometimes exists in deciding whether we have reached the latter, observes, that he possesses the particulars of more than fifteen examples in which mistakes of this kind have occurred. He refers to the case of Saviard, already noticed, to the case related by Scarpa (*Traité des Hernies*, p. 68), and to one reported in the *Arch. Gen. de Med.*, t. 13, p. 453. To the above he adds those of M. M. Heller (*Journ. des Connais. Med.* t. 2, p. 346), and A. Andral (*Thèse*, No. 293, Paris, 1837). He also states, that M. Roux, in his presence, came near making the same mistake at the Hospital of Perfectionnement, and that even Boyer had been thus deceived. In a clinical lecture delivered at the Middlesex Hospital, and reported in the thirteenth volume of the *London Medical Gazette* (p. 923), Sir Charles Bell thus remarks: "But the next thing which I know you are discussing among yourselves, is the recommendation of removing the stricture without opening the sac. See then what took place here. I found upon cutting the crescentic edge of the little wing-like process which goes down to the sheath of the femoral vessels, and which is continued from the lower edge of Poupert's ligament, that the stricture was not taken off. You saw that I had considerable difficulty. I found that the stricture was not removed, that it was in the neck of the sac, and not in the tendon. Those of you who were near me must have seen with interest that the operation appeared to be finished—that the tumor disappeared—that the intestine was removed from the eye, but the case was not satisfactory to me; so that, after it must have been supposed by you that the operation was completed, you saw me draw the whole portion of intestine down again; that then the assistant took firm hold of the sac, pulling it down so as to be on the stretch; that I passed the director and bistoury again between the gut and the sac, and cut the stricture deep a full inch within the crescentic arch. That which I cut was the edge of the stricture of the proper sac."

Mr. Samuel Cooper (*First Lines*, by Parker, p. 202, vol. 2) observes,

that after laying open the fascia propria we sometimes meet with a quantity of fat, which, from the long pressure of trusses, assumes very much the appearance of indurated omentum, and gives rise to an erroneous suspicion that the hernial sac has been divided, followed by pernicious efforts to reduce the parts. In the winter of 1838-39, he operated on a woman, aged sixty, for a strangulated femoral hernia of long standing. The fascia propria having been opened, a portion of cyst, imbedded in fat and filled with fluid, presented itself, looking very much like a fold of intestine. On dissecting more deeply, another cyst of the same kind was met with, before the hernial sac was exposed.

The cases which we have detailed show, as Mr. Cooper justly remarks in connection with the above case, that circumstances of this kind, if the surgeon be not aware of their possibility, may create much embarrassment in the operation, and lead to the most untoward results.

---

### CHAPTER III.

#### *Spontaneous Reduction.*

UNDER this head, we have but one case to record, which occurred in the practice of M. Dupuytren, and is thus related by Dr. Breschet in his "*Considérations sur la Hernie Femorale :*" *Concours. Thèse. Obs. XX.* p. 101. P. M., aet. 61, had been the subject of crural hernia for 28 years. The tumor was about the size of a walnut, and the gentlest pressure or even the recumbent position was generally sufficient to effect its reduction. Dec. 1st, 1818, it became strangulated, but he did not enter the Hotel Dieu till the 5th December. The tumor was now the size of a hen's egg, and excessively tender. Previous to his admission he had, as before, made repeated efforts to reduce it, but without success. The hernia seemed to be strongly bound down by the crural arch, and any effort, such as coughing, caused it to appear still more prominent. The abdomen was tender on pressure, and, altogether, the symptoms were very unfavorable. He was placed in a bath, &c., and in the course of the day the tumor went up suddenly (*tout-à-coup et avec bruit*). For five days afterwards the symptoms continued to increase, there were vomiting of fecal matter, &c., &c. The abdomen was moderately tense, but no one point more painful or harder than another could be detected. The patient would not consent to an operation till the twelfth day. Two methods suggested themselves to M. Dupuytren; 1st, to make an inci-

sion through the anterior wall of the abdomen, above the crural arch, and opposite the supposed seat of strangulation, and to search for the stricture; 2d, to divide the layers opposite the crural arch, and to draw downwards the sac with its strangulated contents, placing it in the same condition as in ordinary cases of crural hernia. Owing to the long duration of the strangulation (some 15 days), it was deemed unsafe to attempt the former method, as it would be attended with too great a risk of breaking up the adhesions which might have formed, and thus remove the barriers to the effusion of fecal matter; the second was therefore adopted, and thus performed: An incision, perpendicular to the crural arch and about two inches in length, was made through the integuments and subjacent layers: the fascia superficialis was then divided, and the anterior opening of the canal exposed; the fascia lata was next divided, together with the crural arch. On introducing the finger, to the depth of two inches, a round elastic body was felt, to which the patient referred as the seat of his pain. By pulling at the cellular substance on its external surface, it was drawn outwards, this manœuvre being at the same time facilitated by the exertions of the patient, who was made to cough. Thus an irregular swelling of grayish-white color was brought below the crural arch. This was punctured, and a bloody fluid spirted out several inches. M. Dupuytren enlarged this opening by a crucial incision, and an intestinal convolution of a reddish-brown color was brought into view. The sac was now dragged some two inches below, and its neck brought on a level with the crural arch. With the scissors, the sac was divided in a vertical direction as far as the arch, and the latter also incised, outwards and upwards, to the extent of two or three lines, with a convex probe-pointed bistoury. The seat of stricture being thus exposed, was divided with the scissors. In five minutes the patient had discharges of flatus, and in twenty minutes a copious evacuation from the bowels. Sixteen days after the operation the patient left the Hospital, completely cured, and, as Mr. Lawrence in commenting on the above case has justly remarked, owed his recovery, under circumstances that would ordinarily have been deemed desperate, to the sagacity and judgment of M. Dupuytren.

#### *Resumé.*

*Reduction by the Taxis.*—We have thus collected (including our own supposed case) 46 examples of the reduction in mass which followed the application of the taxis. In the report of M. Homolle's case, mention is made of his having met with 2 other cases "under

similar circumstances," which would make our whole number 48, though we are unable to learn whether these other cases of M. Homolle were reduced by the taxis, or whether they occurred during the operation. Of these, 36 were inguinal, 4 femoral, 2 ventral, and in 6 cases the situation is not mentioned.

*Age.*—In 19 only is the patient's age recorded, and in these it was as follows:—50, 40, 18, 13, 40, 55, 47, 68, 50, 30, 40, 42, 75, 30, 55, 59, 61, 75, 79.

*Duration of Hernia.*—In 18 cases, it is said to have been of "many years;" in 3, "several years;" and 1 was described as being an "old one;" 1, congenital; and the rest as follows: 12, 11, 54, 20, 30, 20, 30, 5, 12, 30, 40 years.

*Sex.*—In 27 cases in which this is noticed, all but 4 were males.

*Size of Hernia.*—In 20 cases where it is mentioned 8 were "large;" 5, size of "hen's egg;" 1, "turkey's egg;" 1, "pigeon's egg;" 2, "large walnut;" 1, "good-sized pear;" 1, half the size of "one's fist;" 1, "not small;" 2, "small;" 1, "scrotal."

*Facility of Reduction.*—Of 26 cases in which the circumstances connected with the reduction are recorded, 13 are said to have been returned easily, quickly, "without difficulty," by the patient; whilst in 14 it was only effected "after some attempts," "after many attempts," "with difficulty," and after the use of "the warm bath and bleeding."

*Result of Operation.*—20 cases were subjected to operation, of which 11 recovered, 1 is supposed to have recovered, whilst 6 died from peritonitis, effusion of fecal matter, from gangrene, and in 2 cases the stricture was found undivided.

*Spontaneous Cure.*—This occurred in 1 case only.

*Reduction of Sac during Operation.*—Under this head my collection embraces but 9 cases, 7 femoral and 2 inguinal. Velpeau, it will be remembered, states, that he has become acquainted with 15 cases of this kind, but we give the number only of those which we ourselves have been enabled to collect.

*Result.*—5 proved fatal, 3 recovered, and 1 not stated.

*Spontaneous Reduction.*—Variety, crural; age 61; duration 28 years; size of hen's egg; operation successful.

## CHAPTER IV.

*Mechanism of this Accident.*

It seems to have been the opinion entertained by almost every writer on hernia, that, shortly after the protrusion of the hernial sac, it contracts such intimate connections with the surrounding parts, as to render its reduction impracticable. We have seen how obstinately M. Louis contended for the absolute impossibility of such an occurrence; and even Scarpa, who strongly reprobated the conduct of those who, like the Secretary of the Academy, displayed such unwarrantable skepticism in the face of the facts recorded by Le Dran and Arnaud, yet even *he* advocated the doctrine, that the reduction in mass could only occur in recent cases, and where the hernia is small. We are the more surprised at this, as the very case which he quotes, from Monteggia, goes to disprove his opinion, the hernial sac having been "not very small." His observations, perhaps, more properly apply to the empty hernial sac, although M. Cloquet speaks of having succeeded in his trials on the dead subject, in returning *empty* sacs. But in the majority of the cases under consideration, adhesions have been found to exist between the intestine or omentum contained within the sac, and, as we have seen, of 20 cases in our collection, in which the size of the hernia was noticed, *only 2 were small*. In most, if not all, the cases of strangulated hernia reduced in mass, the seat of stricture has been in the neck of the sac, and we believe that it is a point respecting which there is no dispute, that is is only in cases of long standing, that the neck of the sac has been found to have undergone the fibrous transformation necessary to give rise to a constriction of the intestine. Facts, therefore, lend no support to the assertion of Scarpa, that this accident can only occur in *recent* cases of hernia, and in those of *small* size. There can be no doubt, however, of the possibility of returning small hernial sacs into the abdomen, where no adhesions exist between the intestine and the sac, or even when the latter is empty, a fact which may be explained by the anatomy of the parts. Beneath the other coverings of the sac of an oblique inguinal hernia, for example, we find the sub-serous tissue of Bichat, or cellular substance, which binds the peritoneum of the abdominal parietes to its superjacent coverings, and which is exceedingly elastic, being capable of yielding in proportion to the development of the hernial tumor (that is, within certain limits), and of

again retracting upon itself. M. Louis could not conceive how the hernial sac could be reduced without the employment of sufficient force to lacerate its cellular adhesion, forgetting, as Richter (*Abhandlung von der Bruch*, pp. 160, 80,) and Scarpa (Op. Cit., p. 58,) have shown, that, under certain circumstances, this *sub-serous* tissue will admit of considerable elongation, and yet contract again to its original length. As a general rule, it may be stated that it is only in recent cases of hernia that it has undergone no change, and that it readily permits the reduction of the sac; for when the latter has been long protruded, and has become of considerable size, in the greater number of cases, though not in all, this elastic property seems to be greatly impaired, if not entirely destroyed. An admirable illustration of the preceding remarks is to be found in the case already quoted from Scarpa, viz., the examination of the body of a man, the subject of an incipient inguinal hernia: Scarpa observes that the cellular tissue, which united the sac to the spermatic cord and the cremaster muscle, was disposed to yield equally from without, inwards, and *vice versa*. In this case Scarpa refers also to the elastic properties of the spermatic cord, which we know is capable of being materially lengthened by the weight of hernial tumors, or of sarcoceles of large size, and, again, the weight being removed, of resuming its normal state. He states, that as soon as the hernial sac begins to protrude beneath the border of the transversalis, it finds itself united to the face of the spermatic cord, and, that this adhesion may be said to exist even before the appearance of the hernial protrusion, since it is formed by the layer of cellular tissue which covers the external face of the peritoneum, and which adheres to the spermatic cord in the same manner that it does to the abdominal parietes. We need but allude to the enormous elongation of the peritoneum which takes place in ascites, pregnancy, ovarian and other abdominal tumors, and the rapid diminution which occurs when these causes of distention are removed, to show that the observations which have been made respecting the *sub-serous tissue* and the spermatic cord, apply still more forcibly to this serous membrane. The experiments of Scarpa upon this point are too familiar to require a repetition here, and we will only add, that it is by this natural elasticity of the peritoneum that Scarpa, together with M. Cloquet, would explain certain instances of spontaneous reduction of the hernial sac. Thus, as is well known, in cases where an operation has been performed, the hernial sac has been not unfrequently observed gradually to approach the inguinal ring, and finally to enter the abdominal cavity.

“When elongated so as to form a hernial sac,” says M. Cloquet, in his *Recherches sur les Causes et l'Anatomie des Hernies Abdominales*, p. 73, “it (the peritoneum) still possesses its natural elasticity, which, coming into action when the distending force ceases to operate, sometimes produces slowly and insensibly this spontaneous reduction of the sac. The membrane, in such cases, takes a retrograde course; the portion lining the abdominal parietes in the neighborhood of the ring draws in all directions on the neck of the sac, which is thus distended, expanded, and at last effaced; the sac is in a manner unfolded, and again covers the parts in the vicinity of the aponeurotic ring. The neck, which is the part last formed, disappears first, whilst the restoration of the fundus is the last step in the process, and is accomplished with much difficulty, on which account this reduction is often incomplete.”

The slow and insensible contraction of the cellular texture exterior to the peritoneal covering, he remarks, is another cause of the spontaneous reduction of the sac. He admits that the other coverings may assist in producing this result; but their action is not so obvious.

“If the sac has not a thickened neck, and if it adheres loosely to the rings, the surrounding cellular tissue, contracting, may flatten and pucker the peritoneal process, push it into the abdomen, and prevent it from again descending through the aponeurotic opening. If it has a firm, fibrous neck, the cellular membrane contracted around it brings it into the appearance of a thick bag, uniform on its exterior, folded internally, and situated either without or within the aponeurotic opening. The folds of such a sac cannot be effaced without cutting the surrounding cellular texture, or inverting the sac, and flattening it with the fingers. I have observed this method of reduction only in internal inguinal and crural hernia.”

“The displacement which the peritoneum of the abdominal parietes experiences under various circumstances, leads to a third mode of reduction. I have seen this occurrence in two internal inguinal herniæ, where the peritoneum had been drawn upwards by the enlargement of the bladder, distended from retention of urine so as nearly to reach the navel. I have several times met with small hernial sacs, in the shape of conical cavities, connected to the sides of the bladder. They had evidently belonged to internal inguinal or crural herniæ, as I have ascertained by carefully examining the state of the corresponding openings. I found a small sac of an internal inguinal hernia reduced, and situated behind the superior ori-

fice of the crural canal. The fascia transversalis presented, near the outer margin of the rectus abdominis, a rounded opening, from which an empty cellular pouch was continued; this had contained the peritoneal sac before its reduction. Enlargement of the uterus by pregnancy, or under other circumstances, may cause a reduction of a hernial sac, by producing displacement of the peritoneum. The dragging of adherent intestine or omentum may return a hernial sac; and a similar effect may be brought about by the accumulation of fat between the peritoneum and the abdominal parietes. A hernial sac may be reduced by the formation of another rupture in its immediate neighborhood. This may occur in cases of double or triple ruptures on the same side, when the sac first formed is not intimately connected to the aponeurotic opening. Under such circumstances the newly formed sac, increasing in size, draws towards itself the peritoneum of the previous rupture. In the two latter modes of reduction, the hernial sac generally passes into the abdomen entire, and is found between the peritoneum and the parietes. This circumstance is explained by the thickness and firmness of the neck; if that part is less strong, it may be decomposed.

“A fourth mode of reduction is by the action of the cremaster muscle, the inverted arches of which, covering and supporting on all sides the testicle and the hernial sac, will draw these parts up towards the ring.

“When the neck of the sac does not adhere very strongly to the aponeurotic opening, and the latter is also somewhat dilated, which is not uncommon, by forcibly pressing the hernial tumor towards the abdomen, the cellular adhesions of the neck and of the aponeurotic ring lengthen and break: the two openings, which were near, become separated, the former sinking and passing inwards, whilst the latter retains its place. During the employment of the taxis, the cone above the neck of the sac on its abdominal side becomes very prominent and much lengthened, and is no longer formed, as in the other case (where the neck of the sac adhered closely to the aponeurotic opening), by the whole thickness of the abdominal wall, but merely by the peritoneum, raised and separated from the muscles by the sac which is forced between those parts. The sac re-enters successively, and by degrees, through the aponeurotic ring as it dilates; and towards the end of the effort it escapes suddenly, and gets behind this opening. It may then be readily felt through the abdominal walls, by placing the finger on the spot which the hernia had occupied, when it forms a large, hard, round, chestnut-like tumor, deeply

seated above the ring. The reduction here is complete, having returned in mass, and is situated between the abdominal peritoneum and the posterior surface of the aponeurotic ring. As soon as the sac has passed, the opening, by its elasticity, slightly contracts, and in a measure prevents the reappearance of the tumor externally. Sometimes this reduction in mass is followed by a slight rush, in consequence of the hasty passage of the fundus of the sac through the ring; but this does not occur when the ring is loose and wide, under which circumstances the tumor passes in and out with equal facility.

"I have accomplished reduction in mass in more than twenty instances, partly of hernia, either strangulated or otherwise irreducible, partly of empty hernial sacs. It is effected more easily in internal inguinal than in crural, and lastly in external (oblique) inguinal hernia. I have never succeeded in the umbilical ruptures of adults."

When the sac is large, and closely adherent to the surrounding parts, and, as is frequently the case in oblique inguinal hernia, the ring is small, he considers the reduction almost impossible, unless great force be employed. In cases when the protruded viscera adhere together and to the sac, the ring is large and short, &c., the reduction in mass is most easily effected. In a case of direct inguinal, and in one of crural rupture, he found that it could only be returned in mass, although the neck of the sac was not narrow, in consequence of the intimate adhesions between the protruded parts and the sac.

The evolution of the hernial sac has been most ably investigated by a recent writer, to whom we have already alluded, viz. J. B. De-meaux. The anatomical researches in which he has been engaged, have enabled him to determine with precision the adhesion of the sac and its neck with the adjacent parts. Referring to the organization of the neck, and the changes which take place not only on its serous but cellular surface, he remarks (*Recherches sur la l'évolution du Sac Herniaire*, pp. 10-22), "that the first thing which arrests the attention of the observer, is the diminution and almost entire disappearance of the adipose substance in the cellular tissue, even in subjects truly corpulent. Perhaps it would be more correct to call it the transformation of the cellular-adipose tissue into a *new* substance, which contains a large number of bloodvessels. Most frequently we perceive through the transparent peritoneum, around the circumference of the hernial opening, this rich vascular network, converging from every point towards the neck, and afterwards spreading itself over the upper part of the sac, so as to be insensibly lost in the cellular substance with which it is continuous. Independently

of these vessels, we may also detect a layer of filaments, the nature of which it is not easy to determine ; they cross each other in different directions, and I have compared them with the tissue of the *dartos*. Now this vascular transformation of the sub-peritoneal tissue on a level with the sac, does not extend over the whole surface of the hernial sac. Thus, whilst at the neck of the sac the peritoneum and the subjacent tissue are most intimately united, the two layers remain distinct at every other point. Besides the cellular tissue, we meet with a layer which I consider analogous to the fascia superficialis—it is the fascia propria of the peritoneum. The vascular tissue, on a level with the neck of the sac, is situated between this fascia and the peritoneum. On its external surface this fascia preserves its cellular aspect, and is united to the more superficial parts by a loose cellular tissue only, from which it may be easily detached. Thus, in every instance of the reduction *en masse*, the sac draws with it this sub-peritoneal tissue and the fascia propria. This membrane, thin in its normal state, becomes thickened when a hernia exists, and establishes a kind of demarcation between the sac and its external covering.”

These researches go to confirm the observation of Arnaud, one of the earliest and best writers on the subject of hernia, who, we believe, was the first to remark, that the adhesions between the sac and the surrounding parts are not so extensive as is generally supposed. The perusal of the numerous cases in which the accident under consideration has been now so well authenticated, is calculated to make us receive with some allowance the assertion of Mr. Lawrence, in his most valuable Treatise, that, after the protrusion of the peritoneum, adhesion takes place so quickly, that the sac is found universally connected to the contiguous parts, even in a rupture of two or three days' standing ; and that these connections become afterwards so strong and general, that we might suppose the hernial sac to have been originally formed in its unnatural situation.

Neither do the facts in our possession lend any support to the doctrine of M. Cloquet, that the reduction *en masse* is scarcely possible in external inguinal hernia. The majority of the cases reported are of this kind, and in a large proportion of these, as we have seen, the hernia was large in size. May not the fact of the close proximity of the rings in such cases remove one of the obstacles which, he supposed, tend to prevent the reduction of the sac ?

The following remarks of Mr. Luke, respecting the strength of the union between the sac and adjacent parts (*Med. Chir. Trans.*,

vol. 26, p. 175), are amply sustained by the cases which have been related :—"It is a circumstance worthy of remark, that the firmness of the adhesions of the parts in which it (the sac) is imbedded, bears no proportion to the duration of the hernial protrusion, as might *a priori* be expected; for in all the cases related, the hernia had been of some years' continuance, yet in each was reduced without the employment of much force." The latter observation, however, can only apply to the cases which he himself witnessed, for in many of those in our collection, as has been seen, considerable force was required to reduce the parts.

Respecting those cases which have been reduced in mass by the taxis, we may therefore assert, that it is by the combined agency of the elasticity of the sub-serous tissue, the spermatic cord, and the peritoneum itself, aided by the pressure employed in the efforts at the taxis, that this accident may be explained. We have seen, however, that, as in the case of spontaneous reduction which occurred to Dupuytren, the action of the former alone may be sufficient. In cases of inguinal hernia of long standing (and we have shown that it is only in cases of considerable standing that we can look for this accident), other circumstances may materially facilitate the reduction in mass, viz., the loose attachment to the hernial apertures of the thickened and contracted neck of the sac, and the inordinate size and approximation of these openings which is known to exist in such cases. The first of these conditions is produced by the long-continued pressure of the truss; the second, by the distending influence of the hernia as it becomes enlarged, and by the dragging which must result from such enlargement.

Although the majority of the cases on record are of inguinal hernia, still, when we recollect that the femoral canal is sometimes enormously enlarged, we can readily understand that it may become the seat of a similar accident. In the case already quoted from Le Dran, it is stated that the femoral opening would admit the introduction of four fingers at once, and though the hernial tumor (3 inches in length and 8 in circumference) was beyond the ordinary size, yet instances in which the hernial protrusion had attained a much greater magnitude have been seen, and subjected to operation with success. Mr. Teale, in his recent and valuable Treatise, informs us, that a few years ago he successfully operated on a patient where the hernia was as large as *two* fists; and Mr. Lawrence states that he has seen a case where the tumor measured 19 inches in length and 28 in circumference; while Mr. Thomson and Mr. Key refer to cases in which

it extended half-way down the thigh. Was it possible for the narrow opening of the femoral canal to produce an induration of the neck of the sac in recent cases of hernial protrusion, we might expect the more frequent occurrence of the reduction in mass in this variety of hernia—for, as Mr. Key has observed (Cooper on Hernia, Ed. by Key, p. 211), “in femoral hernia, the sac, if not large, adheres so loosely to the surrounding parts that it admits for a considerable time of being returned into the cavity of the abdomen; indeed, in dissection, a femoral hernial sac will often escape notice, in consequence of being drawn from the sheath, and lying loose at the femoral aperture on the outer side of the umbilical artery;” but, as in inguinal hernia, it is only in cases of considerable standing, and where a truss has been long worn, that we find the stricture seated within the neck of the sac.

Seven out of nine in our collection of cases of *reduction during operation*, are of *femoral hernia*, a disproportion which we will in the next place endeavor to explain. We have already adverted to the changes to which the sub-serous tissue of the hernial sac is liable. We have seen, that from the interstitial deposition of organizable lymph, or of fat, its density and opacity may be much increased. In dividing this membrane in the operation for strangulated hernia, it may give the impression of several distinct layers, or, if the adipose substance is abundant and indurated, it may be mistaken for omentum, and the operator, supposing that he has reached the intestine, endeavors to reduce the parts, when, as in the case related by M. Fourniér, in consequence of the adhesions within the sac, the whole will be reduced in mass, and if, as in the case referred to, adhesions exist between the intestine and fundus instead of the neck of the sac, with the reduction there may also be an inversion of the sac.

Mr. Key is of the opinion that since Sir Astley Cooper has particularly directed the attention of surgeons to the additional covering of the hernial sac afforded by the *fascia propria*, the sac is now rarely returned unopened; but Sir Astley himself asserts (Op. Cit. p. 224), that in very large hernia this fascia is sometimes inseparably united to the superficial fascia, so that the same incision divides them both; and even Mr. Key (p. 220) informs us, that he has placed in the Museum of Guy's Hospital a preparation taken from a subject brought into the dissecting-room, which most beautifully illustrates the striking resemblance which this fascia may bear to omentum, from the deposition of fat. Mr. South remarks (Chelius's Surgery, by South, vol. 2, p. 296), that he has again and again seen the sac opened

when the surgeon supposed he was far from having reached it, and we might continue our quotations *ad infinitum*, to prove that even with the most accurate knowledge of the proper coverings of the sac in their normal state, without taking the greatest precautions, we must commit the same mistakes which, as we have seen, have occurred in the hands of the most skilful operators. The coverings of the sac in a femoral hernia are much more liable to the various changes to which we have alluded, hence the greater frequency of the reduction in mass during operation in this variety of hernia. Mr. Teale has laid down a rule by which, he states, we may avoid the error of mistaking the deposition of fat already described for omentum—viz., we have only to observe, that the fatty substance in question is not immediately surrounded with any structure resembling serous membrane, but is closely connected on all sides to the surrounding parts by filamentous tissue, and by carefully separating these packets of fat, which in most instances are irregularly distributed, intervening portions of the sac itself may generally be exposed. Again, Mr. Teale observes (Op. Cit., p. 58), that ignorance of the possible existence of a double stricture, one produced by the femoral sheath, the other by the neck of the sac, may lead in some instances to the reduction of the hernial tumor in mass, as the surgeon may suppose, after the division of that which is first perceived, he has removed the sole cause of strangulation, and then direct his efforts to the returning of the parts.

The preceding observations apply more especially to the manner in which the reduction of strangulated hernia in mass occurs in femoral, direct inguinal, and external oblique inguinal herniæ. The cases detailed by Mr. Stephens of ventral hernia, which we have quoted in another place, are the only instances, which we have been able to find, where this accident has occurred in other than the varieties above mentioned. Perhaps, however, the propriety of arranging these cases under the head of the reduction of strangulated hernia in mass, may be questioned, since in neither was there a proper stricture of the intestine; still the adhesion by which the latter was attached to the sac was sufficient to prevent the peristaltic action of the gut, and in one of them, death. The facility with which the whole hernial tumor was reduced in his first patient, was likely to lead a less judicious surgeon to suppose that all had been done which lay in his power, and to have deterred him from performing the only operation proper in every form of this accident.

## CHAPTER V.

*Diagnosis.*

A VARIETY of circumstances may prevent the formation of a correct diagnosis in those cases where the symptoms of strangulation continue after the reduction of a hernial tumor. Thus, the intestine may be returned, and yet the stricture be maintained by the omentum, which forms a kind of sac inclosing the bowel, and of course the patient will experience no relief. Instances of the kind are said to have occurred to La Peyronie, Renoult, Arnaud, Callisen, Scarpa, &c., and the subject has not escaped the attention of Richter in his *Abhandlung von der Bruch*. But it is to Mr. Prescott Hewett, Lecturer on Anatomy at St. George's Hospital, London, that we are indebted for one of the most valuable essays which have appeared respecting this cause of strangulation. His paper, entitled "Observations on the Omental Sacs which are sometimes found in Strangulated Herniæ completely enveloping the intestine," may be found in the 27th vol. of the *Med. Chir. Transactions*, 1844, and, like every thing else which emanates from the pen of its accomplished author, will amply repay perusal. Mr. Hewett observes, that complete omental sacs were found in 4 cases out of 34 operations for strangulated hernia, performed at St. George's Hospital in 1842-43; of which 2 were femoral, 1 inguinal, and 1 umbilical. But we must refer the reader to the paper itself.

Again, as in the case described by M. Ritsch in the 4th vol. of the *Mem. de l'Acad. de Chirurgie*, p. 173, and the analogous ones elicited from M. Mertrud, M. Coutavos, and other members of the Academy, by the reading of M. Ritsch's Memoir, such indentations may have been formed upon the intestine as to prevent the passage of fecal matter, and the patient die with all the symptoms of complete obstruction of the alimentary canal. A similar case also occurred to Mr. Callaway, of Guy's Hospital, the details of which were related to the Lond. Med. Society, at one of its meetings in Nov., 1829. The report, together with the discussion to which it gave rise, may be found in the *Lond. Lancet* for Nov., 1829.

If the parts have been long incarcerated, likewise, though the taxis be finally successful, fatal consequences may follow the inflammation thus developed, and even in cases where the hernia has been returned without delay, as in the example related by Camper, death may occur from peritonitis.

Mr. T. Wilkinson King has written a valuable paper entitled "Some Observations on the Causes of Strangulation in Hernia, and on the Causes of Death," which is published in the 3d vol. of Guy's Hospital Reports, 1838. He states that he has the unpublished records of above forty fatal cases of hernia, and that the main uniform fact which he would deduce from these, relates to the extent and *irreparable* nature of the *peritoneal inflammation*. In eight cases, the *taxis* was the cause of death; six proved fatal from rupture of the intestines; one died from peritonitis, and one from reduction in mass. These cases, as Mr. King justly observes, constitute a powerful argument against the employment of *violent* force in our efforts with the *taxis*.

Mr. Travers, in his "Inquiry into the Process of Nature, in repairing Injuries of the Intestines," p. 230, maintains, that the fatal obstruction which sometimes continues notwithstanding the reduction of the intestine by the *taxis*, or by means of the operation, may be attributed to the torpor of the bowel recently released from strangulation, and that this paralysis may be the result of the duration and severity of the stricture. Acute inflammation of the œsophagus, the urinary bladder, &c., renders these organs unable to obey their natural stimuli, and as the tissue of the strangulated intestine is gorged with a preternatural quantity of blood, and that, too, unfitted by its stagnation for the maintenance of the vital functions, its failure to resume its muscular or peristaltic action may be thus explained. This is therefore a circumstance to be remembered in forming our diagnosis, when, after the reduction of a hernia, intestinal obstruction still persists. In the Lond. Med. Gazette, Oct. 1842 (we quote from Druitt's Surgery, Art. Ventral Hernia), mention is made of an adipose tumor situated between the peritoneum and abdominal muscles, and projecting through an aperture in the linea alba, through which it could be pushed back, so that it completely simulated a hernia. Such a case, as Mr. Druitt remarks, if complicated with peritonitis, might render the diagnosis very obscure, but an incision would clear up the mystery.

Mr. Robert Wade has given the following as some of the principal signs which denote the reduction *en masse*, viz.—the absence of that fulness of the ring and cord caused by the presence of the hernial sac; an unusual largeness of the aperture, through which the hernia has descended; a fixed circumscribed pain in the neighborhood of the ring; and in some cases a tumor, tender on pressure, in the same situation, deeply seated within the abdominal muscles. In his Obser-

vations on Surgery, written more than a century ago, Le Dran endeavored to point out the symptoms by which we may diagnose this accident. After remarking that the persistence of the symptoms of strangulation may depend upon an inflammation of the bowels, &c., &c., he goes on to say, that if this be the cause, the pain will be felt almost equally throughout the whole extent of the abdomen; but if they proceed from a volvulus, it will be more acute in one fixed and permanent point; and if the reduction of the hernial cyst be the cause, he declares that the surgeon cannot mistake, as he will feel a vacuity under the ligamentum Fallopiantum, or in the ring. Another point he notices of much importance, viz., when the parts are reduced, he will be insensible of the noise generally attending the reduction of a hernia, "the whole tumor passing in a lump, under the ligament, (if it be crural) like a tennis ball." This last sign was particularly insisted upon by Arnaud, but, as Mr. Lawrence has observed, the return of intestine, although frequently, is not necessarily accompanied by the peculiar rumbling or gurgling noise which is produced by the passage of air through the strictured part, and in ordinary cases it sometimes goes up all at once; so that we should not attach too much importance to the presence or absence of this sign, considered of so much moment by Arnaud and Le Dran. Dupuytren lays great stress upon the two following symptoms, viz., a fixed and circumscribed pain in the hypogastric region, behind the opening through which the hernia has protruded; and the existence of a tumor more or less perceptible in the same situation; but as we have seen in one of the cases related by Mr. Luke, on the fourth day after the reduction of the hernia, no tumor could be felt, while on the eighth day the infiltration of highly offensive sanious fluid had given rise to a tumefaction in the course of the inguinal canal. If present, of course it would materially aid our diagnosis, but in some of the cases in our collection, the fundus of the sac was found somewhat remote from the vicinity of the rings, although both Le Dran and Dupuytren asserted that it could not be far distant, as the sac itself is formed by a part of the peritoneum in the immediate neighborhood of the canal. Indeed, the closest examination of the patient can afford us but *probable* evidence of the occurrence of the reduction *in mass*, and if called to a case where, after the successful application of the taxis, the symptoms of strangulation still remain, we find the hernial aperture large and empty, the spermatic cord distinct and isolated, even though no tumor can be felt in the vicinity, and though there be no tenderness on pressure, we shall be perfectly justified in resorting to an explora-

ive operation. The value, however, of the indistinctness or obscurity of the spermatic cord, upon which Mr. Luke lays so much stress, as a sign of the presence of the hernial sac, is greatly impaired by the case reported by Mr. Reid, in which it will be remembered the existence of a mass of fat at the external ring, and which extended up the inguinal canal to the exterior of the protruded portion of sac, produced a "lump-like" feeling, not unlike that which might be supposed to arise from a sac containing omentum, proving that there may be an indistinctness of the cord even though the sac be returned; and this may be owing to several causes, as Mr. Reid observes, viz., to the deposition of fat, cysts of the cord, and varicocele, which it might be difficult to distinguish from the fulness occasioned by the empty or partially filled sac, and the perplexity arising from these circumstances would only afford additional reason for an exploratory operation.\*

---

## CHAPTER VI.

### *Treatment.*

DUPUYTREN has related an instance of spontaneous cure, in a case where circumstances seemed almost hopeless. The patient recovered, as we have seen, after the occurrence of inflammation, suppuration, and infiltration of the cellular tissue in the vicinity of the parts, and the obstinate constipation was relieved by a fecal fistula: yet the existence of this fact should not lead us to trust to so remarkable a display of the *vis medicatrix nature*. Our first efforts should be directed to produce, if possible, the reprotrusion of the hernial tumor. In some instances, the slightest exertion on the part of the patient may be sufficient, yet in others, as for example, when the peritoneum lining the abdominal walls has been thrust backwards, so as to permit the sac to lie between it and the aponeurotic layers, it is impossible by any efforts of his own to cause the hernia to redescend. In other cases, although the ring is sufficiently dilated to permit the passage of the sac and its contents under the influence of the pressure employed by the taxis, still it is incapable of allowing it, when once reduced, to repass.

---

\* Mr. Edward Cock has recorded an interesting case in Guy's Hospital Reports, for Oct. 1848, belonging to this class of obscure and difficult forms of hernia. In this instance, the supposed omentum proved to be nothing more than the adipose tissue surrounding the round ligament, which assumed a lobulated form, and was surrounded by a cellular cyst.

As Richter, in his *Abhandlung von der Bruch*, (*Zufallen nach der Taxis*, p. 159), has so admirably expressed it, the patient must "*auf die Füße treten, husten, niessen, springen, den othem an sich halten, den unterleib drucken,*" and if this coughing, sneezing, jumping, holding the breath, and squeezing the belly, do not succeed in bringing down the hernial tumor, it becomes our duty to lay open the inguinal canal, and with the finger or forceps drag the sac outwards, and to open it and divide the stricture which exists at its neck.\* The result of the operation has been by no means discouraging—thus, of 17 cases in which it has been performed, it is reported to have been successful in 10; 1, is supposed to have recovered, and 6 died, although in 2 of these, as the autopsy showed, the stricture had not been removed.

Mr. Luke directs that, after the neck of the sac has been divided, during the reduction of its contents caution should be used for the prevention of that of the sac also, an accident not at all unlikely to occur, in consequence of the breaking up of its adhesions to the surrounding parts. We may easily ascertain that the contents of the sac have been liberated by passing the finger through its neck.

We have already alluded to the fact that after a hernial tumor has been returned by the taxis, the patient may still perish with all the symptoms of strangulation, though the sac be empty. The peristaltic action of the intestines may be prevented by the inflammation which their incarceration has produced, or they may still be strangulated by the apertures of the omentum or mesentery through which they have protruded into the hernial sac, and which still embrace them, although reduced. If the exposure of the inguinal canal discovers the empty hernial sac adhering to the spermatic cord, we may reasonably conclude that the patient suffers from one of the causes mentioned; and if the parts affected cannot be reached by the finger, or made to redescend by the efforts of the patient, our only resource will be to make use of the means proper to subdue peritoneal inflammation, if it exists, and to restore the action of the intestinal canal.

The exploratory operation which we have described will, even from the exposure of the inguinal canal alone, remove many of the

---

\* Sometimes the reprotrusion of the hernia by the efforts of coughing, straining, &c., &c., may be prevented, as in the case reported by Mr. Reid, by the girding of the reduced portion by the hypogastric cord against the abdominal parietes, and the constriction in such cases will, by such efforts, be rendered only the more tense. As the hypogastric cord is sometimes pervious, its division in these cases might give rise to serious hemorrhage.

obscurities of the case. If, for example, as in one of the examples which occurred to Dupuytren, the patient is unable to give an account of himself, but is laboring under all the symptoms of intestinal obstruction, if the incision of the integuments brings into view an empty hernial sac, the non-existence of the reduction *en masse* will be at once established, and our treatment must then be modified according to the other circumstances of the case. The dependence of the symptoms upon some form of internal strangulation may perhaps be established by the character of the matter vomited, as has been noticed by Dupuytren. He declares that the vomiting of mucous or bilious matter may indicate an irritation, a gastritis or enteritis, as well as a strangulation, but if it be of a golden yellow color, having a stercoral odor and a *matière delayée*, there need be no doubt upon the subject. We have taken it for granted that, in our examination of the inguinal canal, if the hernial sac be found at all within it, it will be seen in *front* of the spermatic cord, but it will be well to bear in mind the deviations in this respect which sometimes take place, and which have been described and delineated by Camper, Scarpa, Sir Astley Cooper, Mr. Key, Mr. Lawrence, and others. These varieties in the course of the cord and its vessels, however, are so rare that they can hardly be expected to embarrass our proceedings.

We deem it unnecessary to extend our remarks to the modification of the treatment required in those cases where the reduction in mass has occurred, in consequence of the detachment of the sac during the operation for strangulated hernia. The perusal of the cases detailed in our collection under this head, is calculated to impress upon our minds the necessity of exercising the greatest caution in dividing the superjacent layers of the hernial sac, and if, notwithstanding our care, the accident should happen, the hernial tumor must be brought back, the sac opened, and its neck divided.

---

*List of Authors referred to in the foregoing Essay.—Arranged Alphabetically.*

- ARNAUD—Dissertations on Hernia. Eng. ed., pp. 370, 408.  
 BANNER, MR.—Prov. Med. and Surg. Journal. Feb., 1843.  
 BRESCHET—Considerations sur la Hern. Fem., Concours, &c. Obs. XX., p. 101.  
 BELL, SIR CHARLES—Lond. Med. Gazette. Vols. 1st and 13th.  
 CAYOL—Dict. des Sciences Medicales. Art. Bubonocèle, p. 374. (Case of M. Viguerie.)  
 CLOQUET, J.—Rech. sur les Causes et l'Anat. des Hern. Abdom. Paris, 1819.  
 CRUVEILHIER—Anat. Pathologique.

- COOPER, BRANSBY—Guy's Hosp. Reports. Vol. 4. 1839.
- COOPER, SIR ASTLEY—Treatise on Hernia. By C. Aston Key. Am. ed. Phil., 1846, p. 221.
- COOPER, SAMUEL—First Lines of Surgery. By Parker. Vol. 2d, p. 201. Also, Saml. Cooper's Surg. Dict. Art. Hernia.
- DE LA FAYE—Operations de Dionis. Ed. 5th, p. 324. Note A.
- DUPUYTREN—Lecons Orales. Vol. 1st. Ed. Baill. Paris, 1832.
- DEMEAUX, J. B.—Rech. sur l'Evolution du Sac Herniaire. Paris, 1842. Ou Annales de la Chirurgie. Tom. V. HOMOLLE. Ranking's Abstract. Vol. 5.
- JOBERT (DE LAMBALLE)—Traité des Mal. Chir. du Can. Intest. Vol. 1st, p. 492, &c.
- KEY, C. ASTON—Memoir on advantages of Dividing Stricture outside the Sac. Lond., 1833.
- KING, T. WILKINSON—Guy's Hosp. Reports. Vol. 3d, 1838.
- LAWRENCE, WILLIAM—Treatise on Hernia. 5th ed. London, 1838. LOUIS. Mem. de l'Acad. de Chirurg. Vol. 4, pp. 299, 309. Lancet. London, 1829.
- LAUGIER—Bulletin Chirurgicale. Tom. 1., p. 363.
- LUKE, JAMES—Med. Chir. Trans. Vol. 26. 1843. And Lond. Med Gazette. Feb., 1849.
- LE BLANC—Nouvelle Methode d'opérei les Hernies.
- LE DRAN—Observations in Surgery. 2d Eng. ed. 1746.
- PELLETAU—Clinique Chirurgicale. Tom. 3d.
- PARRISH, JOSEPH—Pract. Observations on Strangulated Hernia, &c. Phil., 1836. pp. 37, 38.
- RICHTER—Abhandlung von der Bruchen. Goth. ed., 1788. pp. 153, 180. Also, Programma, in quo demonstratur herniani incarcerationum una cum sacco reponi per anulum abdominale posse. contra Chirurg. Gall. clar. Louis.
- RICHERAND—Dict. des Sciences Medicales. REID. Ranking's Abstract. Vol. 4.
- SAVIARD—Observations de Chirurgie. 1702. p. 90.
- SCARPA—Traité des Hernies. French ed. By M. Cayol. 1812. pp. 57, 122, &c.
- SABATIER—Med. Operatoire. Ed. 2d. Tom. 2d. p. 342.
- SANSON—Dict. des Med. et de. Chir. Pratique. Art. Hernia.
- SOUTH AND CHELIUS—Vol. 2d. London. 1846.
- TEALE, THOMAS PRIDGIN—A Practical Treatise on Abdominal Hernia. Lond. 1846.
- TRAVERS, BENJAMIN—Inquiry into the Process of Nature in Repairing Injuries of the Intestines, &c., &c. Lond. 1812.
- VELPEAU, ALF. A. L. M.—New Elements of Operative Surgery. By Mott. N. Y. 1845-47. Vol. 5.
- WADE, ROBERT—Lond. Lancet. July. 1845.



