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OF THE

GROIN.

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MEMOIR
ON THE
FORMATION AND CONNEXIONS
OF THE
CRURAL ARCH,
AND
OTHER PARTS CONCERNED IN INGUINAL AND FEMORAL HERNIA.

BY **ROBERT LISTON,**

MEMBER OF THE ROYAL COLLEGES OF SURGEONS OF LONDON AND EDINBURGH ;
LECTURER ON ANATOMY AND SURGERY, &c. &c. &c.

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1819.



MEMOIR

FORMATION AND CONNECTIONS

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CHURCHMAN

BY ROBERT FARSTON

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OF SCOTTISH ANTIQUARIES, &c. &c.

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MEMOIR, &c.

THE Anatomy of the parts concerned in Hernia has, of late years, engaged the attention of the most eminent Surgeons and Anatomists in this as well as in other countries. Much light has, of course, been thrown on the subject, and many useful practical inferences drawn from a more accurate knowledge of the structure: still great variety exists in the descriptions of different authors, and, consequently, much difficulty is thrown in the way of the Student anxious to make himself master of the subject. Many parts have a variety of names affixed to them, and many again are divided and subdivided, each of their separate parts receiving distinct appellations.

Several years ago, far from being satisfied with the demonstration of the parts concerned in Femoral Hernia, as given by the most eminent Anatomists, and finding, on more accurate investigation made on a number of subjects, that their descriptions did not correspond with the structure of the parts, I continued to inquire into the matter, and last year demonstrated to my Class of Anatomy the views which I had been led to take of the formation of the Crural Arch, and parts connected with it. I then began to perceive, from the simplicity of the de-

monstration, that my pupils understood exactly the appearance, connexion, and uses of parts, which before they had heard enough about, but could never understand.

It is well known, that the anatomy of this situation is considered by Students one of the most difficult; and that very few can, without much labour, form any just idea of the structure. I therefore conceive, that if I can throw any light on the subject, or smooth at all the difficulties of attaining a true and accurate knowledge of it, I shall do a service, at least, to the younger members of the profession. If so, I shall completely attain my object. In order to make the description more easily understood, and that no ambiguity with regard to terms may exist, I have added three plates of the anatomy from very beautiful and accurate sketches, for which I am indebted to my friend, Staff Surgeon SCHEUKY, who unites to the freedom of a master in the use of the pencil, the truth and accuracy of a skilful anatomist. The drawings were made from my own dissections for the purpose, and not before a very great number of similar ones had been examined.

It must appear quite unnecessary for me to enter on a description of the abdominal muscles; these are well known, and their situation and connexions accurately enough laid down in the common manuals of anatomy. It is chiefly that part known under the name of the ligament of Poupart that I have to notice. This part, though named a ligament, and certainly composed partly of parallel fibres, running from the anterior superior spinous process of the ilium, to the tuberosity of the pubis, cannot be separated from the tendon of the external oblique muscle of the abdomen, of which it forms the lower

boundary. It has been described by all anatomists and surgeons as reflected upon itself, forming a round thick edge externally; and internally again presenting a kind of sharp grooved appearance.* It is also said to send a process to be attached to the spine or crest of the pubis, forming a lunated edge, generally known under the name of the ligament of Gimbernat.† It is this lunated edge that very frequently forms the stricture in Femoral Hernia, and which requires to be divided in the operation. It has been proposed also to divide the ligament of Poupart, in order to remove the strangulation of this species of rupture; but what effect this would have in relieving it, will immediately be seen by an examination of the anatomical structure.

It is one of my objects, in this paper, to shew that the ligament of Gimbernat is totally unconnected with that of Poupart; that this part, or, what is the same thing, the inferior pillar of the external ring, instead of being turned down from its attachment to the tuberosity of the pubis, to be fixed to its crest, frequently sends fibres, in a curved direction upwards, to strengthen the conjoined tendon of the internal oblique and transversalis. The ligament of Poupart has also been named the Crural Arch; and the different fasciæ, in this situation, have been described by some as attached to its upper or lower

* This reflection is but very slight, and that only close to the tuberosity, and is produced by the insertion of the more descending fibres into the straight and parallel ones.

† The insertion of the parallel fibres under the descending ones into the tuberosity of the pubis, is named, by some Surgeons, the ligament of Gimbernat; but the whole lunated attachment to the spine of that bone, is, by all writers with whom I am acquainted, so denominated.

edge ; by others, as arising from it. It will, however, appear, that the Crural Arch is formed by a union of the fasciæ, under the ligament of Poupart ; and this we shall proceed to shew.

In the dissection of the parts in the groin, the first fascia which presents itself, is that strong expansion covering the lower part of the tendon of the external oblique, and extending down along the spermatic chord in the male.* This fascia is described as attached to the edge of Poupart's ligament, and afterwards continued over the fore and upper part of the thigh containing the glands of the groin ; and, in this situation, named the loose Cellular Fascia of the thigh. The very name carries a contradiction in the face of it. In the healthy state of the parts, there is, in this situation, nothing but a loose cellular substance, containing a quantity of adipose matter, enveloping the glands. In cases, again, where Hernia has existed for some time, there is formed a very firm and dense covering, then, to be sure, deserving the name of fascia.† The Superficial

* This fascia, in Inguinal Hernia, forms a layer above the tendon of the cremaster. In ventro-inguinal Hernia, it is of course the only proper covering under the common integuments. In a case of this kind, it formed so dense a layer, as at first to be mistaken for the Hernial Sac, covering a quantity of fat doughy substance, resembling omentum. On examination, this fat was perceived to be deposited on the true Hernial Sac, which was thus rendered three-fourths of an inch thick.

† It is from this part being described as a fascia, that the opposers of the new doctrines, with regard to the anatomy of this situation, draw their arguments, and say, that the cellular substance and fat may be sliced, like a cucumber, into as many layers as the dissector pleases. That some anatomists have carried the rage for the discovery of fasciæ too far, is no reason why those parts which are distinct, and which evidently alter and modify the appearances of hernial tumors, should be described, as formed by the knife, and not existing in nature. The translator of Scarpa's splendid work on

Abdominal Fascia is totally unconnected with this fatty layer on the fore part of the thigh; neither is it attached to Poupart's ligament; but, on the outer or iliac side, it is firmly united to the combined fasciæ at this part, and forms one continuous expansion with the external layer of the falciform process of the fascia lata of the thigh. On the inner or pubal side, it has a slight union with that part of this fascia which covers the pectineus and adductor longus, and is, as mentioned before, continued over the spermatic chord, or round ligament.

The Fascia Lata of the thigh, at its upper part, has been most accurately described as separating into two portions, thus forming an opening for the passage of the vena saphena, and indeed of the blood vessels, nerves, and absorbents, passing out of, or entering the abdomen. The inner or pubal portion, that which covers the pectineus and head of the adductor longus, passes under the vessels, over the brim of the pelvis, and forms one continuous expansion with the fascia iliaca. The outer or iliac portion, with its falciform process,* lying on the anterior part of

Hernia has made a very bold assertion regarding the fasciæ of the groin, and has brought in the names of two celebrated anatomists to corroborate his opinions. "They have repeatedly complained," says he, "that they had less trouble in demonstrating the natural structure of these parts in the manner of Scarpa, than in manufacturing new forms with the knife, to explain to their pupils what is meant by these fasciæ." Notwithstanding the high authority with which this opinion is supported, no doubt can exist in the mind of any person, who will carefully examine the parts for himself, after the method to be described.

* This part was first described by the late Mr A. Burns under this name, who also called the edge of what is generally considered as Gimbernat's ligament, the crescentic portion. These names, as being more accurate, I propose to retain, omitting altogether the name of Gimbernat's ligament, as, by different authors, it is attached to very different parts. Some anatomists have confounded the two names of falciform process and crescentic edge, and used them indiscriminately. This must of course be guarded against.

the vessels, is divided into two layers. In many subjects this division is quite distinct without much dissection; on all it can easily be demonstrated. Many anatomists describe the falciform edge as altogether artificial, and, in a great measure, formed by the knife of the dissector; and before I completely understood the connexion of these fasciæ, I was, I confess, somewhat of this opinion. If the integuments of the abdomen, along with the superficial fascia, be reflected over the thigh, the chance is, that the external layer of the falciform process, which is most distinct, will be dissected off, leaving only its internal layer. This I have often seen happen; and then the question may be put, where is the falciform process? The want of it does not arise from any imperfect formation, but rather from the awkwardness with which the dissection has been conducted. The attachment of the superficial fascia to the external layer of the fascia lata, ought not to be divided, and then, on removing the fat and glands at the upper part of the thigh, the falciform process will easily be brought into view. The falciform process of the fascia lata is twisted at its inner part, under the ligament of Poupart, and this twisted portion is, by Mr Hey, named the femoral ligament. It turns in thus to form the anterior layer* of the crescentic part of the Crural Arch. On removing the superficial abdominal fascia, and the external layer of the falciform process along with it, the internal layer

* The division of this part of the Crural Arch into distinct layers, I first observed and demonstrated in 1815, at which time I filled the situation of House Surgeon to the Royal Infirmary in Edinburgh, and in which capacity I embraced eagerly the great opportunities which it afforded of examining both the sound and diseased appearances. I find that Cloquet, a late French writer on Hernia, has noticed the division of what he calls the ligament of Gimbernat into two layers, but still he considers it as a part of the ligament of Poupart, or the reflection of the tendon of the external oblique upon the crest of the pubis.

of that process will be found to be continuous with the fascia transversalis.

This Fascia Transversalis, first described by Mr Cooper, is generally considered as attached to the inner edge of Poupart's ligament, along the crest of the ilium, firmly united with the fascia iliaca; and it is this connexion (which is easily seen even to the middle space, between the spinous process of the ilium and tuberosity of the pubis), which prevents the protrusion of the bowels betwixt the ligament of Poupart and the psoas and iliacus muscles. The fascia iliaca, after leaving the muscles, passes under the vessels, as said before, to meet with the pubal portion of the fascia lata. A kind of oval space is thus left for the vessels, &c. bounded behind by the bone covered by the fasciæ, on the inner side by the crescentic portion of the Crural Arch, before by the Crural Arch, and on the outer side by the meeting of the iliac and transversalis fasciæ. This space is by many Surgeons named the Crural Ring. The fascia transversalis then passes upwards under the muscle of that name, gradually getting thinner as it ascends. Its extent and strength varies in different subjects; but it can at all times be easily demonstrated, forming an opening for the passage of the spermatic chord, or round ligament of the uterus, with a superior semilunar edge, and provided with distinct pillars. The inferior pillar, where it joins with the fascia iliaca, and inner layer of the iliac portion of the fascia lata, is by much the strongest, and is composed of distinct fibres running in the direction of those of the ligament of Poupart. I have little doubt that this has by many been considered as the folding in of the lower border of the external oblique upon itself. The internal or superior pillar is chiefly formed of the tendon of the transversalis,

which passes down to be inserted into the crest of the pubis. From the opening for the passage of the chord through the fascia transversalis, a production of this membrane is continued under the cremaster muscle, forming that layer in Inguinal Hernia which is next the Sac. Thus the opening is not truly a ring, but merely the mouth of a funnel; and it is only after this covering of the chord is removed, that any thing like a defined edge is presented. This, as far as I know, was first described by Cloquet, and is very distinctly expressed in Plate II. That the fasciæ are unconnected with Poupart's ligament, and that they are all conjoined under it, can easily be demonstrated. If, after dissecting off the superficial abdominal fascia from the external oblique, leaving it attached to the falciform process, and raising the external and internal oblique muscles, so as to expose the lower border of the transversalis, and the passage of the chord through the fascia transversalis,—an incision be cautiously made through the tendon of the external oblique, and through its inferior border, or Poupart's ligament, at its middle part, it will be found very easy to separate the fibres, merely with the forceps, towards the attachments of the ligament to the ilium and pubis. This may be done without any laceration of the fibres; and thus the true connexion of the fasciæ underneath, totally unconnected with this ligament, will be immediately perceived. It will then also be found, that some of the fibres of Poupart's ligament, are, after being attached to the tuberosity of the pubis, reflected under the chord upon that part of the tendon of the internal oblique and transversalis, which is opposite the external ring; thus forming a security against the occurrence of ventro-inguinal Hernia. Not a single fibre goes to be inserted into the crest of the pubis, which is situated at least

half an inch above the attachment of this ligament to the tuberosity of that bone. It thus appears, that the lower border of the external oblique lies in the angle of union of the superficial fascia with the fascia lata and transversalis, and is connected to them only by cellular substance.

Although the ligament of Poupart is removed, still the Cru-ral Arch remains not much weakened. That part of the arch attached to the spine of the pubis, which I have all along named its crescentic part, is also left ; and, on examination, will be found to be divided into three layers, between which the handle of the knife can be introduced down to the bone, and felt by the finger passed under the arch. The anterior or external layer of this ligament, I said before, will be found to be formed by the twisting in of the falciform process ; the internal layer, again, by the dipping down and attachment of that part of the fascia transversalis, which forms the inferior pillar of the internal ring, to the ligamentous substance covering the bone. The middle layer is formed by the attachment of the lower part of the combined tendon of the internal oblique and transversalis, to the crest of the pubis and the descending fibres, strengthened by a strong cross slip from the attachment of the rectus abdominis of the opposite side. The inner layer, formed by the fascia transversalis, is also thus rendered stronger. When the external and internal layer of the crescentic part of the arch are removed, the internal layer will be observed to form an acute angle with the ligament of Poupart, and the lunated appearance is produced by the filling up of the angle by the junction of the other two layers.

We may, in short, consider the fascia lata, at its upper part,

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as divided into two portions; the one the pubal portion covering the heads of the adductors of the thigh, and becoming continuous with the mesial part of the fascia iliaca; the other, the iliac portion, covering the vessels. The cellular substance, connecting these two portions with the vessels, on the anterior and posterior part, forms what has been named the crural sheath, or sheath of the vessels.* The iliac portion, forming the falciform process, is again divided into two layers; the one passing anteriorly to the abdominal muscles, and named the superficial abdominal fascia; the other, again, lining their inner surface, and passing betwixt the transversalis muscle and peritoneum, forming the fascia transversalis. The lower part of the abdominal muscles and Poupart's ligament thus lie in the angle of splitting, or union of all these fasciæ, and the Crural Arch is formed by this junction.

From this view of the parts, it will immediately be understood how the Crural Arch can be relaxed, and the reduction of Femoral Hernia, either before or during the operation, fa-

* The vessels in all parts of the body receive a strong sheath of cellular substance, which binds them together; but here they have been described as having two sheaths: this, however, is not the case. It has been disputed, whether or not the tumor of Crural Hernia passes in the sheath of the vessels, by which is meant that cellular connexion, anteriorly with the Crural Arch, posteriorly with the pubis and pubal portion of the fascia lata; as no force could possibly cause the insinuation of the sac into the true sheath. The Crural Hernia passes, on the inner side of the vein, generally through some of the foramina in that tough cellular substance, filling up that space which serves for the passage of the lymphatics. Part of the tumor is sometimes forced through some of the openings in the iliac portion of the fascia lata, through which the lymphatics perforate, and the indentations caused by the elongation of the membranous slips, which often cross these foramina, produce the appearance of the double Femoral Hernia.

cilitated, by the bending and rotation of the thigh inwards, or the carrying of the one limb across the other. This relaxation of the arch will account for the frequent occurrence of Femoral Hernia, in people falling under great weights; in which case the knees are commonly forced together. The ligament of Poupart cannot possibly be at all affected by the motions of the inferior extremity, as extending betwixt two immoveable points of bone. Whereas the tension of the Crural Arch, formed as has been described, is changed in every position. It will clearly appear, also, that the division of the ligament of Poupart alone, though it may slightly weaken the Crural Arch, cannot be trusted to as a means of relieving strangulation. The division of the falciform process, on the other hand, or its continuation, the femoral ligament, must immediately relax both the arch and its crescentic portion, and by attention to the position of the limb, it will seldom be found necessary to carry the edge of the knife against either of the two last-mentioned parts.

elicited by the pendulous rotation of the thigh towards or the
 carrying of the knee limb across the other. The relaxation of
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 clearly appear, also, that the division of the ligament of Pott
 part alone, though it may slightly weaken the Crucial Arch,
 cannot be trusted to as a means of relieving a luxation.
 The division of the taliform process, on the other hand, or its
 continuation, the femoral ligament, must immediately relax
 both the arch and its crescentic portion, and by attention to the
 position of the limb, it will seldom be found necessary to
 deny the edge of the knife against either of the two last men-
 tioned parts.

The division of the ligament of Pott, in the manner
 described, will not only relax the arch, but also the
 taliform process, and consequently the femoral ligament.
 The division of the femoral ligament, on the other hand,
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 both the arch and the femoral ligament.

PLATE I.



Drawn by John Abernethy Esq.

Engraved by W.D. Howland

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EXPLANATION OF THE PLATES.

PLATE I.

Exhibits a Superficial View of the Parts in the Groin, upon the removal of the Common Integuments and Adipose Substance.

- A, The symphysis pubis, with the attachment of the suspensory ligament of the penis to it.
- B, The anterior and superior spinous process of the left ilium.
- C, The body of the penis, the integuments being reflected from it.
- D, The iliac portion of the fascia lata of the thigh.
- E, The pubal portion.
- F, The abdominal muscles; the superficial fascia being dissected from them, along with the integuments, and again separated both from them, and from the interposed cellular substance.
- aa, The cellular substance, containing a quantity of adipose matter, along with the lymphatic glands of the groin, reflected down over the thigh.
- b, The falciform process of the fascia lata, the division of which, or of,

- c, its twisted portion, named the femoral ligament, where it turns in to form the external layer of the crescentic portion of the Crural Arch, will in general remove the tension of the whole arch, and thus facilitate the reduction of femoral hernia. Between c and B, the ligament of Poupart is seen shining through the meeting of the superficial abdominal fascia, with the external layer of the falciform process.
- d, The vena saphæna major, passing up and seen entering the femoral vein at the lower part of the falciform process.
- e, One of those openings described, as frequently occurring, for the passage of lymphatics, and now and then admitting the hernial tumor.
- ff, The superficial abdominal fascia, evidently continuous with the external layer of the fascia lata of the thigh.
- g, That part of the superficial fascia which lies over the chord, concealing the cremaster muscle.

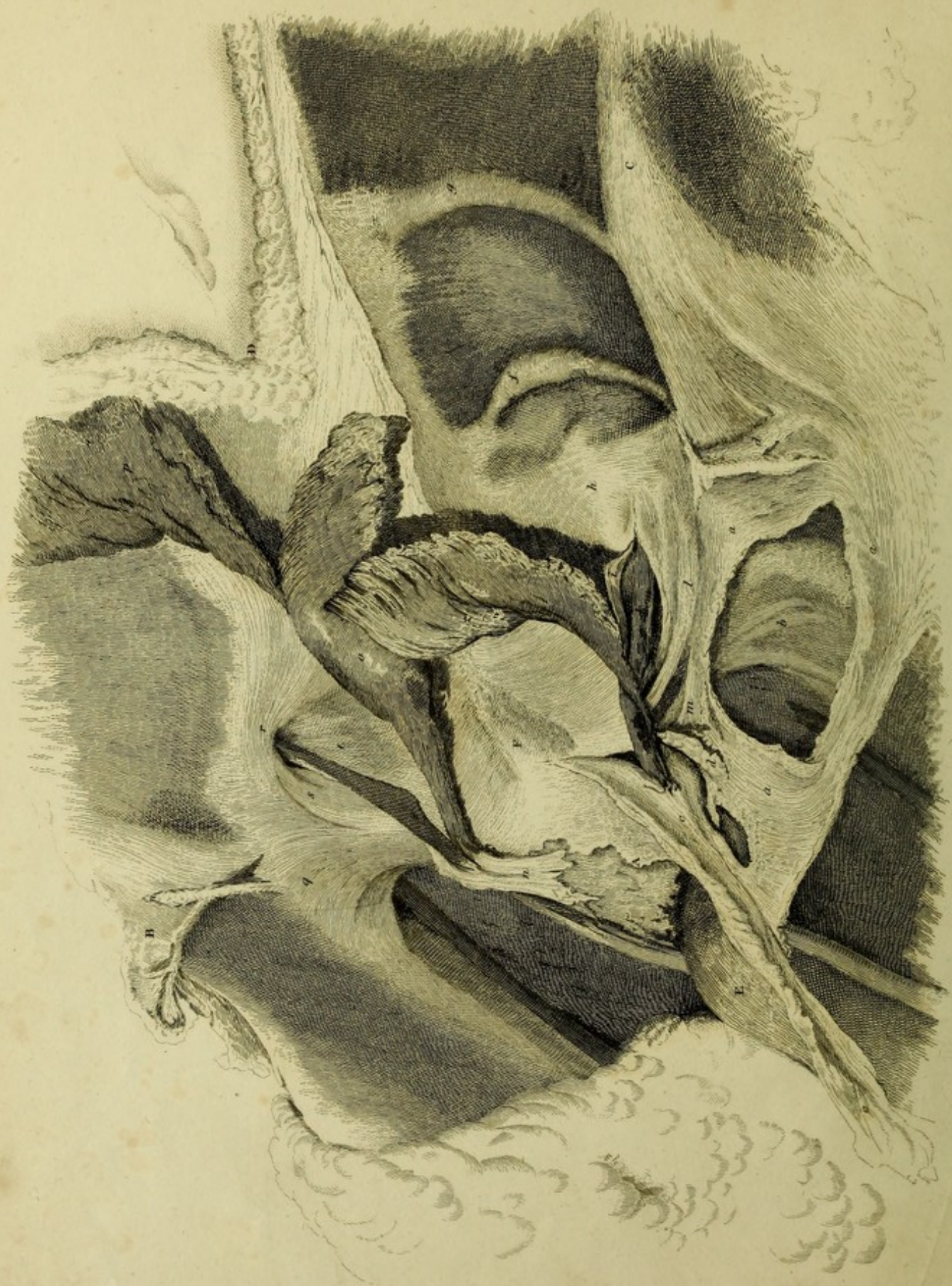


PLATE II.

Represents a deeper view taken from the same subject. The different Layers of Muscles are reflected so as to shew the Connexion of the Fasciæ, and the Formation of the Arch and its Appendages, independently of Poupart's Ligament, which is divided and separated towards its attachments, from the cellular substance connecting it to the Arch.

- A, The symphysis pubis.
- B, The anterior and superior spinous process of the right ilium.
- C, The crest of the left.
- D, the integuments divided a little below the umbilicus.
- E, The penis.
- F, The linea alba.
- aaa, The superficial abdominal fascia reflected over the thigh, with a perforation cut in it, in order to shew the situation of
- b, The falciform process of the fascia lata.
- cc, Part of the lower portion of the tendon of the external oblique, with the spermatic chord passing through it.
- dd, The reflected portions of Poupart's ligament.
- e, Part of the internal oblique, with the cremaster muscle covering the chord.
- f, The lower border of the transversalis turned a little up.
- g, The cut edge of the internal oblique.
- h, The fascia transversalis, giving the covering
- i, To the chord under the cremaster muscle. It is here slit up, shewing

- k, The vessels, &c. composing the chord.
- l, The junction of the fasciæ forming the Crural Arch.
- m, The splitting between the layers of the crescentic part of the arch.
- nn, The cut ends of Poupart's ligament on the right side.
- o, The internal oblique turned back.
- p, The transversalis muscle raised, so as to shew the fascia transversalis passing up under it.
- q, The continuity of the fascia transversalis, with the internal layer of the falciform process of the fascia lata, shewn by the removal of the superficial abdominal fascia, with its external layer.
- r, The opening in the fascia transversalis for the passage of the chord, which opening is named the internal ring.
The appearance is only presented after the removal of the production from the fascia, immediately covering the chord.
- s, The inferior pillar of the internal ring, formed by the fascia transversalis.
- t, Its superior or internal pillar, principally composed of the tendinous fibres of the transversalis and internal oblique muscles.

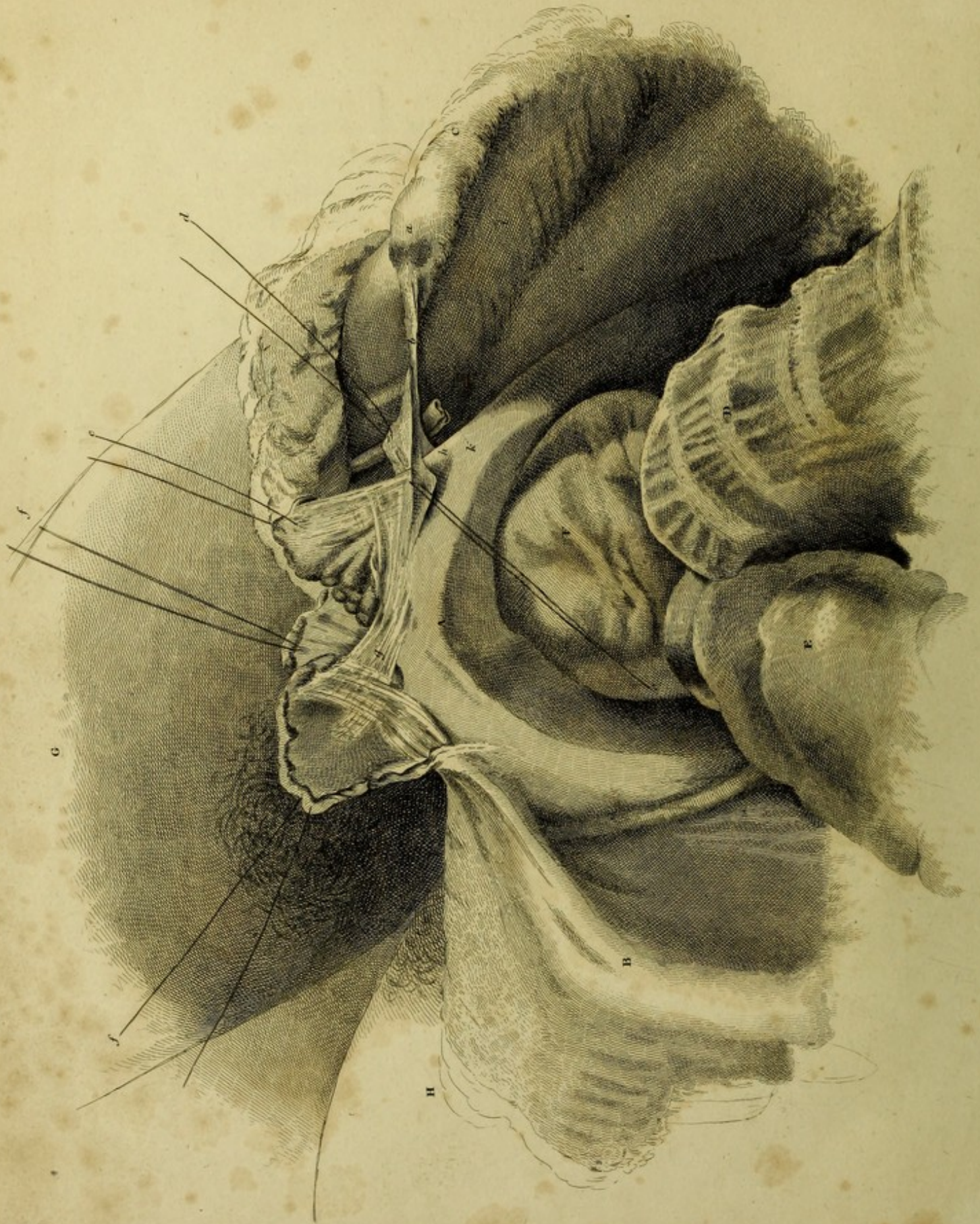


PLATE III.

Gives an Internal View of a Female Pelvis, and the Formation of the Crescentic Portion of the Arch in three Laminae.

- A, The symphysis pubis.
- B, The crest of the left ilium.
- C, The crest of the right.
- D, The bodies of the lumbar vertebræ.
- E, The sigmoid flexure of the colon.
- F, The bladder sunk into the pelvis.
- G, The right thigh.
- H, The left thigh.
- a, The anterior superior spinous process of the right ilium.
- b, The Crural Arch.
- c, A thread, holding up the lower part of the combined tendon of the transversalis and internal oblique muscles, which is inserted into the spine or crest of the pubis, and forms the middle layer of the crescentic part of the arch; it is seen shining through the internal layer, making, with the Crural Arch, an acute angle.
- d, The external layer, formed by the turning in of the falciform process of the fascia lata.
- e, The internal layer of the crescentic part of the arch, composed of the lower part of the fascia transversalis, which forms the inferior pillar of the internal ring.
- ff, Threads supporting the cut edges of the recti muscles.
- g, The crossing of their tendinous insertions; the fibres of the left side passing over to strengthen the middle and internal layers of the crescentic part of the arch of the right side.

- h, The lunated or crescentic edge, formed by the meeting of the external and internal layers.
- ii, The fascia iliaca, covering the iliacus internus and psoas muscles, and joined with the fascia transversalis, and iliac portion of the fascia lata, to the place where
- k, The vessels pass out over the brim of the pelvis. The fascia iliaca then passes under the vessels, and becomes continuous with the pubal portion of the fascia lata of the thigh.

The language of contracts is often affected by the meaning of the original and intended words.

The words used in contracts are often intended to be taken in their ordinary and usual sense, unless the context shows otherwise.

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THE END OF THE WORLD

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