

A probationary essay on the obturator artery, its varieties and surgical relations ; submitted ... to the examination of the Royal College of Surgeons of Edinburgh ... / by Henry B. Macfarlane.

Contributors

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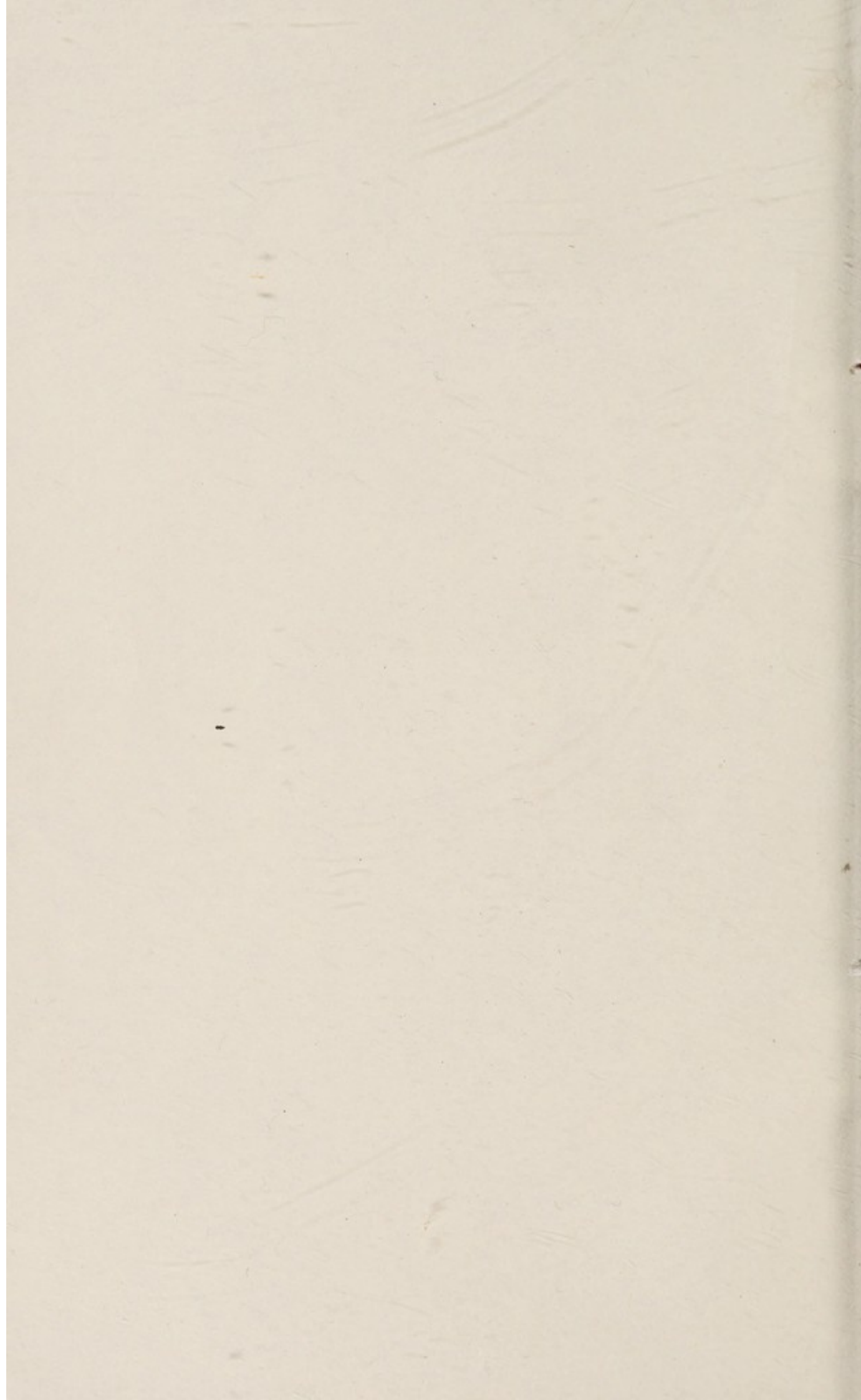
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MACFARLANE



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PROBATIONARY ESSAY

ON THE

OBTURATRIX ARTERY, &c.

PROBATIONARY ESSAY

ON THE

ORTHOGRAHY AND

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A
PROBATIONARY ESSAY
ON THE
OBTURATRIX ARTERY,
ITS VARIETIES AND SURGICAL RELATIONS;
SUBMITTED,
BY AUTHORITY OF THE PRESIDENT AND HIS COUNCIL,
TO
THE EXAMINATION
OF THE
Royal College of Surgeons of Edinburgh,
WHEN CANDIDATE
FOR ADMISSION INTO THEIR BODY,
IN CONFORMITY TO THEIR REGULATIONS RESPECTING THE
ADMISSION OF ORDINARY FELLOWS.

BY
HENRY B. MACFARLANE,
SURGEON.

EDINBURGH:
PRINTED BY P. NEILL.

SEPTEMBER 1829.

THE NATURAL HISTORY

OF THE ANIMALS

OF THE ISLANDS OF THE WEST INDIES

BY

JOHN L. SMITH, ESQ.

OF THE UNIVERSITY OF CAMBRIDGE

IN TWO VOLUMES

THE FIRST OF WHICH IS

OF THE MAMMALS

AND THE SECOND OF THE BIRDS

AND THE THIRD OF THE REPTILES

AND THE FOURTH OF THE FISHES

AND THE FIFTH OF THE INSECTS

AND THE SIXTH OF THE PLANTS

AND THE SEVENTH OF THE MINERAL

AND THE EIGHTH OF THE METALS

AND THE NINTH OF THE

HB Macfarlane?

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TO

ROBERT KNOX, Esq.

LECTURER ON ANATOMY,

EDINBURGH;

THIS ESSAY IS DEDICATED,

AS A SMALL TRIBUTE OF RESPECT AND ESTEEM,

BY HIS FRIEND AND PUPIL,

THE AUTHOR.

TO

ROBERT KNOX, Esq.

LECTURE ON ANATOMY

EDINBURGH:

THIS ESSAY IS DEDICATED

AS A TESTIMONY OF RESPECT AND AFFECTION

BY HIS PUPILS AND FRIENDS

THE AUTHOR.

TO

JAMES MACFARLANE, M. D.

PERTH ;

THIS ESSAY IS RESPECTFULLY DEDICATED,

BY HIS AFFECTIONATE SON

HENRY BUTTER MACFARLANE.



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ON THE
OBTURATRIX ARTERY,

ITS VARIETIES AND SURGICAL RELATIONS.

VARIETIES in the Arteries naturally divide themselves into two kinds,—as they affect either the physiological condition of an organ, or the surgical relations of the parts to which they are distributed. For the proper development and due exercise of the functions of any organ, it is of immaterial consequence whether an artery be regular or irregular in its origin, course, and distribution, large or small, or even actually existing; for, should an artery, by primary conformation*, injury, disease, or any other

* The partial or even complete non-development of the brain in the acephalous or anencephalous monsters, may appear to some an exception to this law; but, in fact, although it be proved, and which indeed we should expect *a priori* to be the case, viz. that the internal carotids in such abnormal or irregular productions, are either remarkably deficient as to strength, or even obliterated or wanting, and that no other vessels supply their place; it must, notwithstanding, be obvious

accidental cause, be either weakened in its propelling power, diminished in size, or totally obliterated, the supply of blood necessary for the nourishment of the organ to which the vessel is distributed, will be amply supported by the adjacent branches. Many operations in surgery bear witness to the truth of this general law,—a law, the necessary consequence, and one of the most brilliant results, of the discovery of the circulation of the blood, by the application of which, many diseases, holding, in earlier times, a most formidable rank, are now reduced to a lower and much more fortunate level. The rapid strides with which Surgery has advanced in late years, and the comparative ease with which affections formerly deemed irremediable, are now often successfully cured, may be attributed in a great measure to the more particular attention which has latterly been paid to the bloodvessels, without a correct and minute knowledge of which, in their irregular as well as regular distribution, the practice (of at least the practical part) of our profession, will be as hazardous to the patient as unsatisfactory to the surgeon.

to those who reflect on this matter, that we know not sufficiently well the laws regulating original deviations from the regular organic structure; neither can we say which is cause and which effect, and that such cases, consequently, are excluded from the consideration in the text, which holds in view only regular structure as to the development of the organs or viscera of the body.

To the physiologist an *abstract* inquiry into the varieties of the arteries, with reference to the laws of organic life, may be a matter of the highest importance. To the surgeon, investigations of this *general* nature are of little use. With him a minute and careful knowledge of all the known variations in the origin and course of an artery, should be the object of his most anxious inquiry. How, in such a case, and under what particular circumstances, a vessel arising here or there, and following this or that course, may affect the relative anatomical situation of parts, and if, at any time, likely to be involved in operation, by what means, and in what manner, he may avoid the danger of wounding it?

In every thing connected with varieties in the arteries, it should always be held in remembrance, that, however widely a vessel may differ from its regular origin and in part of its course, it will invariably, previous to its ultimate distribution, regain its usual and regular channel. Of the general application of this, as far as I am acquainted, universal law, the Obturatrix affords one of the most complete and satisfactory illustrations. In every instance, whether arising regularly from the internal iliac, or irregularly, it is always found making every exer-

tion, overcoming every impediment, involving itself occasionally in a very singular, and, to the surgeon, interesting manner, with the pathological condition of parts, and taking the most circuitous routes, that it may enter the pelvis, to pass out of it again, previous to its ultimate distribution.

VESALIUS*, enumerating the arteries arising from the internal iliac, in the only notice he takes of the obturatrix, describes the variety produced by the union of two branches, one from the internal iliac, another from the external iliac, as its regular, and, indeed, only origin: “Hæc namque non minus quam vena ipsi attensa, pubis ossis foramen petit, priusquam vero id transit, propaginem assumit ab externo trunci magnæ supra os sacrum factæ divisionis ramo, ubi is iam in crus est prolapsurus †.” If, by this passage, VESALIUS infers, that the obturatrix was composed of two branches, one from the hypogastric, and the other from the external iliac, *by a distinct and separate trunk proper to itself*, he has described a variety in its origin that has never since been observed. It is more probable

* GALEN, EUSTACHIUS, WINSLOW, and many of the older anatomists, were acquainted with the origin, course, and distribution of the obturatrix artery.

† De Corporis Humani Fabrica, lib. ii. p. 492.

that he alludes to the not uncommon case, in which it springs from the internal iliac and epigastric, or trunk common to it and the obturatrix; the obturatrix thus arising *indirectly* from the external iliac, by means of the epigastric itself originating directly from the external iliac—a deviation in the origin of the obturatrix which has frequently been observed since his time. We may easily imagine this to have been VESALIUS's meaning, as, generally speaking, the anatomical descriptions of the older anatomists were not drawn up with any reference to the kind of anatomy, which we correctly, in modern times, term Surgical Anatomy; it being sufficient for their purpose, that they were anatomically correct in other respects, without any minute reference to mere position. It is somewhat surprising that the more usual origins of this vessel should have escaped the notice of this great man, and that the only description of this vessel given by him should be limited to a variety, admitted by all modern writers as of comparatively uncommon occurrence in the history of the obturatrix.

HALLER, in his learned treatise on the Arteries, has given an account of the origin, course, and distribution of the obturatrix, that has never yet been surpassed,—a description which not only embodies

a summary of all that was known before, but nearly all that has been described since of this vessel and its variations. The remarkable research and minute accuracy which reigns throughout his "*Icones Anatomicæ*," have left but little to be added by future observers, and rendered it a work of such sterling merit, that his successors have built upon it, as on a basis so sure and solid, that it might well bear the responsibility of their respective works.

In the prosecution of this subject, I shall, when necessary, refer to his work as to a sure and authentic source of information.

The obturatrix artery, in its regular origin, arises from the internal iliac, forming one of a leash of vessels into which this artery divides in the pelvis, shortly after leaving the common iliac. From this origin it proceeds horizontally forwards towards the thyroid foramen, under the peritoneum, and above the pelvic fascia, protected and supported by prolongations of cellular membrane, produced equally from both of these membranes. In this course, inclining a little downwards, it runs outwards and forwards immediately under the superior aperture of the pelvis, parallel and inferior to the external iliac artery and vein, and superior to the origin of

the levator ani muscle. On arriving at the thyroid foramen, in conjunction with the corresponding vein and nerve, which last accompanies it through its whole course, lying superior to it, it perforates the pelvic fascia, superior part of the levator ani, and obturator internus muscles, and passes into the thigh through an opening in the superior part of the thyroid membrane, not directly, but by means of a small tendinous canal, commencing in the levator ani and obturator internus muscles, and terminating on the outer side of the thyroid membrane and horizontal ramus of the pubis (os), in the lower part of which there is a small groove hollowed out for the better protection of the artery. This slanting direction of the canal, by which the artery passes out of the pelvis, must materially aid in preventing the frequent occurrence of a hernia in this situation. The obturatrix, after passing through the thyroid membrane, lies in the superior and inner part of the thigh, upon the obturator externus muscle, and divides into two branches,—a posterior or external, and an anterior or internal; the first of these, inclining backwards, proceeds to the obturatorius externus, adductor magnus, and quadratus femoris muscles, and finally terminates on the parts situated at the upper, inner, and posterior part

of the thigh ; while the second and larger of the two descends between the adductor brevis and longus, and is ultimately distributed to nearly the same parts as the posterior, sending some twigs farther down the inside of the thigh.

While in the pelvis this artery sends off some small branches to the urinary bladder, side of the pelvis, psoas muscle, and lymphatic glands, anastomosing with the arteries of the bladder and external iliac. Shortly before passing into the thigh it sends twigs upwards to inosculate with the epigastric, and downwards and inwards to the obturatorius internus and levator ani muscles, neck of the bladder ^a, and cellular membrane behind the pubes, where they meet with corresponding arteries from the opposite side. One very constant and distinct branch is prolonged behind the symphysis pubis, ramifying upon the periosteum, and inosculating

^a HALLER Icon. Anatom. Fasc. iv. p. 32., and LIEUTAUD, Essais Anatomiques, p. 435., describe the obturatrix as giving off the dorsal artery of the penis ; and HALLER mentions that COLUMBUS has stated this distribution as constant. This variety occurred also in the dissection of a male subject in Dr KNOX's rooms for Practical Anatomy, two winters ago ; and was demonstrated to the class. The branch from the obturatrix quitted that artery about half an inch after its origin from the hypogastric, gained the side of the bladder, close to the superior margin of the prostate gland, and, making its way underneath the arch of the pubes, became the dorsal artery of the penis of the right side ; no such vessel existed on the left side.

with a similar twig from the opposite obturatrix artery. In the thigh the two branches of this vessel anastomose freely with the external circumflex, profunda, and other branches of the femoral, and with the pudic, towards the perinæum and scrotum.

These free and numerous inosculations of the obturatrix with the branches of the femoral, remind us forcibly of what takes place among the arteries of the scapula, and must be of great service in renewing the circulation in the limb, when the external iliac is tied.

What I have said may be considered as a brief description of the regular origin, course, and distribution of the obturatrix artery; its varieties are numerous, and the surgical relations of some of them so important, that I have thought it better to speak of them regularly, from above downwards, advert- ing to the particular circumstances under which this artery happens to be connected with surgical operation, and referring occasionally to the works of those celebrated anatomists who have so carefully observed and described these points in its history.

All the varieties of the origin of this artery hitherto observed may be referred to the five following classes:—

To those originating from the pelvien branches of
the Internal Iliac.

from the External Iliac,

from the Epigastric or *common trunk* ^a

from the Femoral, and,

from two branches, one from the Internal
Iliac, the other from the Epigastric.

The very common occurrence of the obturatrix originating from the pelvien branches of the internal iliac, has been well described by HALLER ^b. “ In pelvi autem oritur vel ex trunco hypogastricæ, vel a ramo aliquo majori, iliaca imprimis majori aut ex ischiatica, aut ex ilio-lumbali” TREW ^c, and SÆMMERING ^d; and has been so frequently remarked, that almost all the older, and most of the

^a Though many authors have objected to the phrase, *from the epigastric*, as incorrect, and suggested the propriety of introducing instead, *common trunk*, or *trunk common to both*; yet, in point of fact, it is from the epigastric, and the epigastric alone, that the obturatrix arises: it has no direct connexion with the external iliac. The epigastric occupies its own proper place and origin, after a while, it gives off an unusual branch, which, on examination, proves to be the obturatrix, by the presence or absence of which, in its own proper course and distribution, it is little or nowise affected, save that the trunk by which it originates from the external iliac, may be somewhat larger. As the expression, *from a common trunk*, has been often used, I shall notwithstanding occasionally retain it.

^b Icon. Anatom. Fasc. iv. p. 32.

^c Com. Litt. Nor. 1734.

^d De Corporis Humani Fabrica, t. v. p. 272.

modern systematic writers, have taken notice of it. Many, convinced of the frequency of its origin, either from the anterior or posterior trunks of the hypogastric, or from the gluteal, ischiatic, ilio-lumbar or pelvien pudic branches, have described it as originating by no single regular trunk, but preferred considering it as arising generally from one or other of these arteries ; and perhaps with justice, since, from the frequency with which it springs from these branches, it may be questioned how far we are authorised in laying down its origin from the internal iliac as more constant or regular than from certain of its branches. In its regular description, would it not be more correct to say, from the internal iliac or certain of its pelvien branches ?

The obturatrix has been occasionally observed originating from all points of the external iliac, or at least as low as the origin of the epigastric. HALLER, in referring to the observation of LIEUTAUD, “ et cette dernière (obturatrice) naît quelquefois de l’iliaque près de l’épigastrique ^a, ” adds, “ quod parum a nostra observatione differt ^b, ” which would lead us to believe that he, too, had met with this variation ; but on a careful examination of his work,

^a Essais Anatomiques, p. 435 ; 1766.

^b Icon. Anatom. Fasc. iv. p. 32 ; 1756.

I cannot find any distinct statement of this; and suppose that he alludes to those cases in which it arises conjointly from the internal iliac and epigastric, (from the external iliac *indirectly* through the medium of the epigastric), particularly as he quotes VESALIUS in corroboration, “qualis omnino fabrica pingi videtur a VESALIO ^a,” who, as I mentioned before, has given this as the constant and sole origin of this artery. In the works of MAYER ^b, HILDEBRANDT ^c, SÆMMERING ^d, BURNS ^e, MONRO ^f, MECKEL ^g, and many others, we find examples of this variety detailed. J. CLOQUET ^h found, that out of 250 bodies, which he examined for this purpose, in six the obturatrix was given off directly from the external iliac. in two males and four females. HESSELBACH ⁱ has seen it in three out of thirty-two.

^a Icon. Anatom. Fasc. iv. p. 32; 1756.

^b Anatomische Beschreibung der Blutgefäße des menschlichen Körpers. Berlin, 1777, 1778, p. 159, 207.

^c a MECKEL, Anat. Gen. Descript. t. ii. p. 495.

^d De Corporis Humani Fabrica, 1800, t. v. p. 272.

^e Observations on the Heart and Large Arteries, p. 309; 1809.

^f Morbid Anatomy of the Gullet, &c. Edinburgh, p. 340; 1811.

^g Manuel d'Anatom. Descript. et Generale, t. ii. p. 450; 1825.

^h Recherches Anatomiques sur les Hernies de l'Abdomen. Paris, 1817, p. 72.

ⁱ Ueber den Ursprung und Verlauf der Unteren Bauchdecken—SCHLAGADER. Und der Hüftbeinlochs—SCHLAGADER. Bamberg und Würzburg, 1819, 4. 1.—Abbild.

TIEDEMANN ^a relates three cases ; one occurred in a boy on the right side, another in the left side of a man of thirty, in whom the same artery in the right side arose from the epigastric, and the third in both sides of an old woman ; and this author ^b, Sir A. COOPER ^c, and some others, have given drawings of this deviation, with or without hernia, as it happened or not to be present. In every case in which the obturatrix arises from the external iliac, it passes down over the superior aperture of the pelvis, close upon the bone, attached firmly to it by cellular membrane, emerging as usual from the pelvis into the thigh by the foramen obturatorium.

The length in the course and depth of curve in this variation of the artery, will depend upon the part of the external iliac from which it originates. The nearer the proximal extremity of the artery, the longer the course and smaller the curve ; the nearer the distal, the shorter the course and greater the curve.

Though I have described the variety in which the obturatrix arises by a distinct trunk from the external iliac, before that in which it originates from the epigastric or *common trunk*, it was merely for

^a Explicationes Tabul. Arter. Corporis Humani, 1822, Carlsruh, p. 289.

^b Tabulæ Arter. Corp. Humani, Tab. 30, Carlsruh.

^c On Crural Hernia, &c.

the sake of convenience and arrangement, proceeding from above downwards, not because the former is more frequently met with than the latter,—the reverse is the case; the proportion of instances in which this artery arises from the epigastric far *out-numbering* those in which it originates from the external iliac. Anatomists of all countries have taken notice of this deviation in the origin of the obturator. HALLER has seen it nine times, “Non tamen perpetuum est eam arteriam a pelvis truncis nasci, cum novies viderim ex epigastrica ortam, secundum os pubis descendisse, atque per solitum canalem ad femur ivisse ^a.” CLOQUET ^b has met with it in 84, ALLAN BURNS ^c in upwards of 30, J. K. HESSELBACH ^d in 32, and BECKERS ^e in 3 examples; and, besides these authors, who have enumerated the number of times in which they have seen this deviation, SCÆMMERING ^f, BICHAT,

^a Icon. Anatom. Fasc. iv. p. 32. 1756.

^b Recherches Anat. sur les Hernies de l'Abdomen, p. 72. 1817.

^c Ed. Med. and Surgical Journal, vol. ii. p. 272. 1806.

^d Ueber den Ursprung und Verlauf der Unteren Bauchdecken.—SCHLAGADER. Und der Hüftbeinlochs.—SCHLAGADER. Bamberg und Würzburg, 1819, 4. 1. Abbild.—a TIEDEMANN. Explicat. Tab. p. 295.

^e Diss. de Hernia Inguinali, Paris, 1813.

^f De Corp. Hum. Fabrica, t. v. p. 272. 1800.

PORTAL^a, BOYER^b, MECKEL^c, SABATIER^d, MONRO^e, WARDROP^f, COOPER^g, TIEDEMANN^h, and many others, bear overwhelming testimony, if any more were wanted, to the frequency of the origin of this artery from the epigastric. LIEUTAUDⁱ, though he describes the obturatrix arising from the external iliac near the epigastric, never seems to have met with a case of this far more common variety. MAYER^k makes a casual observation, that the obturatrix occasionally originates from the external iliac or epigastric. HILDEBRANDT^l seems not to have been aware that the obturatrix ever arose from the epigastric; and MURRAY^m, of Upsal, only mentions those cases in which it springs from the internal iliac and

^a Cours d'Anatomie, t. iii. p. 302.

^b Traité d'Anatomie, t. iii. p. 134. 1820.

^c Traité d'Anatomie Descript. et Generale, t. ii. p. 450. 1825.

^d Traite d'Anatomie, t. iii. p. 188. 1781. et Medecine Operatoire, t. 3. p. 582.

^e Morbid Anat. of Gullet, &c. p. 429.

^f Ed. Med. and Surg. Journal, vol. ii. p. 203. 1806.

^g On Crural and Umbilical Hernia.

^h Tabulae Arter. Corp. Humani, tab. xxx. et Explicationes, p. 295. 1822.

ⁱ Essais Anatomiques, p. 435. 1766. par LIEUTAUD.

^k Anatomische Beschreibung der Blutgefäße des menschlichen Körpers. Berlin, 1777, 1778, p. 159-207.

^l a MECKEL, Anat. t. ii. p. 449.

^m Description of the Arteries, p. 113. 1718.

epigastric. I am informed by Dr KNOX, that, on examining the distribution of the vessels in seven subjects at one and the same time in his rooms for Practical Anatomy, in five the obturatrix artery arose from the epigastric either on one or both sides. He thinks that sex does not influence these varieties in any way. The *common trunk* of the obturatrix and epigastric, by which these arteries communicate with the external iliac, varies in length from two lines to an inch and a half; and this difference in the extent of the *common trunk* seems to decide the relation which the obturatrix bears to the surrounding parts. If short, the artery proceeds directly downwards, lying upon the horizontal ramus of the pubis, to the foramen obturatorium, turning over the superior aperture of the pelvis; if long, it is more curved, and brought in its course to the pelvis either upon, or close to, the portion of the fascia transversalis, which doubles the ligament of Gimbernath posteriorly or internally. But I shall consider the relation which this artery, under its different circumstances, will have to the surrounding parts, and more particularly to the sac in crural hernia, more at large, when I have briefly taken notice of the two remaining varieties in its origin.

Before quitting this part of the subject, I may

take notice of a variation in the origin of the epigastric, in which this artery is said to arise from the obturatrix. Among all the authors I have consulted, to satisfy myself on this point, I have been able to find only three who have either described or met with this most uncommon deviation, F. C. HESSELBACH, Dr MONRO, and BECKER. To constitute this irregularity, the obturatrix ought positively to arise from the internal iliac, and follow its usual and regular course to the thyroid membrane; and the epigastric must originate from it in the pelvis, ascend over the iliac vessels, and thence to its distribution. But in HESSELBACH's case, which I shall transcribe *verbatim*, from its importance in another view, as showing a very extraordinary deviation in the course of the epigastric, a *common trunk* arose from the external iliac, about an inch above Poupart's ligament, which, dividing into two branches, one proceeded to the rectus muscle, and the other to the foramen obturatorium and muscles of the thigh, thus resolving the case of this pretended extraordinary deviation in the course of these arteries into the sufficiently common variety of both arteries arising by a common trunk. That the common trunk is really the *epigastric*, must be obvious to all who reflect a moment on the usual origin of these arteries.

HESSELBACH ^a, after previously stating that the epigastric “interdum ex arteria obturatoria dimidii pollicis spatio ab arteria crurali remota nascitur,” observes further, that when it is separated but half an inch from the external iliac, it suffers little variation in its course; but, when more than this, an inch for instance, it is liable to be very seriously affected; and goes on, “Quem casum rarissimum unica tantum vice in cadavere foeminea, in quo hernia labialis interna simul praesens erat, observavi; in hoc cadavere arteria obturatoria ex latere arteriae cruralis interno, altitudine dimidium pollicem superante, a ligamentoinguinali interno remota nascebatur, uniusque pollicis longitudine oblique deorsum introrsumque trans venam cruralem decurrens confestim super ramo ossis pubis horizontali foramen obturatorium versus valdopere inflectebatur; ex inflexione arteria epigastrica inferior orta super ramo ossis pubis horizontali ex transverso introrsum post sacci hernalis collum prodibat, neque minus ad latus colli internum pone musculus rectum abdominis recta ascendebat.” An attentive perusal of this case is sufficient to prove, that the only peculiarity in its history, is the *course*, not the *origin*, of the epigastric, which, instead of following its usual course, al-

^a De ortu et progressu herniarum inguinalium et cruralium. Wirceburg 1816.

together unconnected with crural hernia, lay behind, and on the internal side of the neck of the sac, passing over Gimbernat's ligament. Its origin is regular, that of the obturatrix irregular. In a paper in the *Journal des Progres des Sciences*, &c.^a, there is a still more startling observation concerning the epigastric, made by Mr ROBERTS: "L'artère épigastrique est sujette elle-même à varier beaucoup; elle naît ordinairement de l'iliaque externe, mais on l'a encore vu provenir de l'obturatrice, de l'ischiatique, de la fessière, comme l'ont observé MONRO, HESSELBACH," &c. Dr MONRO^b observes, that "he has seen a case in which the epigastric takes its rise from the obturatrix, and passes upwards and inwards to the rectus muscle."

As HESSELBACH mistook his own observation, and this mistake, with a reference to that individual case, has been repeated, by quotation from HESSELBACH, in the *Journal des Progres*, it would be extremely desirable to have a more particular account of the individual case alluded to by Dr MONRO on his own authority, since it is quite obvious that the possible occurrence of such a variety

^a *Journal des Progres des Sciences*, article Anatomie Chirurgicale, par Mr ROBERTS, t. viii. p. 192. 1829.

^b *Morbid Anatomy of the Gullet*, &c. p. 427.

now rests on the authority of BECKER and of Dr MONRO.

When the obturatrix originates from the epigastric, HALLER^a and SÆMMERING^b describe the co-existence of another branch arising from the internal iliac, and following the usual and regular course of the proper obturatrix; they seem to consider this as a necessary consequence. “Tunc autem ramus aliquis hypogastricæ minorem surculum emittit, qui cum epigastricæ ramo conjunctus eam obturatoriam producat;” and SÆMMERING, “ac sæpius (obturatrix) ex epigastrica oritur, tumque minor arteriæ hypogastricæ surculus ex parte radix ipsi esse solet.” HALLER observes, that this circumstance was known to JACQUES DE LA BOIS, and appears surprised that he should have remarked it at a time when anatomical research was not very minute. The learned PORTAL has also described such a disposition. “Très-souvent l’artère épigastrique fournit l’artère obturatrice; mais alors quelquefois il y a deux artères obturatrices, dont l’une vient de l’hypogastrique, comme cela a lieu ordinairement, et l’autre est formée par l’épigastrique. J’ai vu ces deux artères s’anastomoser tronc à tronc avant de sortir

^a Icon. Anatomic. fasc. x. p. 32.

^b De Corporis Humani Fabrica, t. v. p. 272.

du bassin, et je les ai vues ne s'anastomoser que par quelques-uns de leurs rameaux, après avoir passé par l'échancrure ovale ^a." This variation in the origin of the obturatrix, though by no means uncommon, is nevertheless not so frequent as these authors would lead us to believe. "*Rarissime ramus aliquis arteriæ hypogastricæ cum magno ramo arteriæ epigastricæ conjunctus, arteriam obturatoriam producit* ^b." M. MICHELET ^c met with a case of this deviation in a woman who died of phthisis, in whom there existed this farther peculiarity, that the epigastric, before reaching the internal inguinal ring, divided into two branches, "l'une dirigée en haut, et suivant le cours ordinaire de l'épigastrique, l'autre sortant de l'abdomen au-dessous de l'anneau crural." M. MICHELET adds, that this last branch was the size of a crow-quill, and passed out of the crural canal above the pectineus and adductor longus muscles, "et s'enfonçait ensuite à travers le premier de ces muscles, au-dessus duquel elle prenait le cours de l'artère circunflexe interne, qui manquait entière-

a Cours d'Anatomie, t. iii. p. 322.

b Explicationes Tab. Arteriarum Corp. Hum., TIEDEMANN, p. 295.

c Th. in 4to., Paris, 1827. No. 59, p. 58. in Journal des Progres des Sciences, vol. viii. Monographie par M. ROBERTS, de l'influence des Variétés Anatomiques sur les Operations Chirurgicales, p. 193.

ment." He further observes, that if a crural hernia had existed here, this unusual branch of the epigastric would have had the same relation to the neck of the sac in crural hernia, as the obturatrix has, when the common trunk is long, or when it arises high up from the epigastric. In the Barclayan preparation of the obturatrix partially surrounding the neck of the sac, there is a smaller branch arising from the internal iliac, and following the course of the proper obturatrix, but it stops short in the sac, and does not communicate with the epigastric obturatrix. The probability is, that it had originally inosculated with this latter vessel; but, from some accidental cause or other, had either not been fully filled with injection, or had been separated in dissection, and afterwards had adhered to the hernial sac in drying. HESSELBACH^a relates three examples of this variety, and MECKEL^b takes notice of it. In the course of several winters' dissection, I have very often met with the obturatrix arising from the epigastric, but very seldom seen it attended with the accompanying proper, though smaller, obturatrix.

The obturatrix originating from the femoral,

^a Ueber der Ursprung und Verlauf, &c. a TIEDEMANN.

^b Traité d'Anatomie Descriptive, t. ii. p. 450.

constitutes by far the most uncommon of all its variations, and the only other which has been observed by authors. ALLAN BURNS ^a refers to two cases, in which the obturatrix arose from the femoral, two inches below Poupart's ligament. Dr MONRO ^b has seen similar examples; OTTO ^c takes notice of it; and TIEDEMANN ^d has observed it once in a woman. These names, though sufficiently, and, beyond a doubt, establishing this variety, are yet, from their slender number, in comparison with the crowd of authorities verifying the frequency of its other origins, strikingly illustrative of its uncommon occurrence. CLOQUET, out of 250 bodies, never once met with it, which fact alone, independent of all others, is enough to satisfy us, that, though it has been observed, the frequency of its occurrence bears no ratio to the far more common varieties previously mentioned. From this origin, the artery, though at its commencement separated but an inch or so from the parts to which its branches are ultimately distributed, prefers, instead of dipping down at once under the pectineus, to ascend upon its surface, enter the pelvis by the crural aperture, and pass down in-

^a Diseases of the Heart, &c. p. 359.

^b Morbid Anatomy of Stomach, &c. p. 430.

^c Seltene Wahrnehmungen, p. 102.

^d Explicat. Tabular. Arteriar, p. 289.

to the pelvis proper, to emerge again into the thigh by the foramen obturatorium, choosing rather to take this circuitous route than the shorter, and much more direct, road to its termination ; thus affording a beautiful illustration of the constant effort Nature makes to confine, her deviations even, as much as possible within the limits of the usual and regular distribution which their original conformation imposed upon them.

Having now enumerated all the known variations in the origin and course of this artery, I shall proceed to consider the particular circumstances under which the Obturatrix comes to be connected with different herniæ ; and although one or two rare cases have occurred, in which, originating from the hypogastric, from certain of its branches, or from the external iliac by a distinct trunk ^a, it has become involved with a hernial tumour, such instances are so uncommon, that they bear no ratio to the frequency of its connexion with the sac in crural hernia, when it originates from the epigastric. The more common origin of the obturatrix from the epigastric, and

^a This latter observation of the obturatrix, when it originates by a *distinct trunk*, from the external iliac, becoming involved with the neck of the sac in crural hernia, is given on the authority of Dr MONRO.

the greater frequency of crural than thyroideal or ischiatic herniæ, sufficiently explain this fact.

The canal between the thyroid membrane and the horizontal ramus of the os pubis, by which the obturatrix artery and nerve pass out of the pelvis, is, in some cases, so imperfectly filled by its contents, as to permit of the passage of a piece of gut or omentum. When this protrusion occurs, the artery will lie behind, and a little to the inner side of the sac. In a case of Thyroideal Hernia, detailed by Sir ASTLEY COOPER ^a, and of which he has given a drawing, the artery held this situation. He directs the stricture to be relieved by cutting inwards,—a process that would suit perfectly, were the artery always regular and constant in its origin. But is there no danger of wounding it, when it arises from the epigastric? which very circumstance happened in the following case:—A thyroideal hernia existed in an old woman, of sixty-five, in which a piece of the small intestine was pushed through the foramen ovale. On dissection, the obturatrix was found arising from the epigastric, and lying, first on the internal, and then on the anterior, part of the neck of the sac ^b. Examples of this kind of hernia may be

^a On Crural and Umbilical Hernia.

^b Repertorio di Med. Chir. &c. Torino Luglio, 1826.

found in the works of ARNAUD^b, DUVERNEY^c, GARENGEOT^d, HOMMEL^e, CAMPER^f, LAWRENCE^g, and CLOQUET^h. ARNAUD and GARENGEOT aver, that they have reduced and kept up with bandages several cases of thyroideal hernia, though, according to the opinion of most writers on this subject, during the life of the individual, this variety of hernia can very seldom indeed be discovered.

Sir ASTLEY COOPER, in his work on Crural Hernia, has mentioned an example of the occurrence of ischiatic hernia. A portion of ilium had descended into the pelvis, on the right side, and a small fold been protruded into a sac, which passed out of the pelvis at the sciatic notch: "Here the orifice of the sac was placed anterior to the internal iliac artery and vein, below the obturatrix artery, and above its corresponding vein; its neck was situated anteriorly to the sciatic nerve, and its fundus, which was on the outer part of the pelvis, was covered by the gluteus maximus. Anterior to, but a little below, the fundus of the sac, was situated the sciatic nerve, be-

^b Memoires de l'Acad. de Chirurg., tom. i. p. 711.

^c Ibid. p. 714.

^d Ibid. p. 709-716.

^e Ibid. p. 716.

^f Demonst. Anatomico-Patholog., lib. ii. p. 17.

^g On Ruptures, p. 557.

^h Journal de CORVISART, tom. xxv. Bulletin de la Faculte de Medecine, p. 194.

hind it, the gluteal artery, above, it was placed near to the bone, and, below, appeared the muscles and ligaments of the pelvis^a." Prior to this instance of ischiatic hernia, examples had been seen by PAPPEN^b, CAMPER^c, BOSE^d; two are related by VERDIER^e, as having occurred to BERTRANDI; SCHREGGER^f, BEZOLD^g, and MONRO^h, have met with them in later times; but we do not find that they have ever been certainly discovered before death. From the depth of the parts, and the very important organs with which this species of hernia is involved, an operation, if ever necessary, would be hazardous indeed. In relieving the strangulated gut, we are directed to cut directly forwards.

When the obturatrix arises from the external iliac by a distinct trunk, to pass to the foramen obturatorium, it must necessarily lie upon the ilial side, and behind the sac in crural hernia. The course

a On Crural Hernia, part. ii. p. 73.

b Epist. de Stupenda Hernia Dorsali, in HALLER's Disp. Chir., tom. iii.

c Demonst. Anatomico-Patholog., lib. ii. p. 17.

d Programma de Enterocoele Iochiastica. Lips. 1772.

e Mem. de l'Acad. de Chirurg., t. ii. p. 2.

f B. G. SCHREGGER, Chirurgische Versuche, 2ter. b. 8vo. Nurnberg, 1818.

g In SIEBOLD's Samml. Chir. Beob. 3. b. 5293. tab. 3.

h Morbid Anatomy of the Gullet, p. 380.

which it follows is more or less oblique, according to its proximity to the proximal, or distal extremity of the external iliac. When it originates near the proximal extremity, it is far removed from, and has no connexion with, the neck of the sac. When near the distal, it runs in as direct a line as possible over the superior aperture of the pelvis to the thyroid foramen, partly on the iliac, and partly on the pelvic fascia, connected and firmly bound down to both by cellular membrane, lying in its whole course, between its origin and where it crosses the linea-ileo-pectinea, under the neck of the sac. Dr MONRO, in his remarks on Morbid Anatomy, observes, that when the epigastric and obturatrix arteries arise by separate trunks from the external iliac, “ the obturatrix passes around that part of the crural arch called Gimbernats Ligament, and is attached to it by cellular membrane ; and that, when this happens, the obturatrix artery, by a descent of a portion of the intestine through the crural canal, is pressed upon the very part of the crural arch divided by GIMBERNAT in his operation for crural hernia.” This statement is, however, decidedly at variance with the anatomy of the parts ; neither do I rightly comprehend the possible occurrence of such a case. If we reflect,

even for a moment, on the relation which the thyroid foramen bears to the external iliac artery, it will strike us as strange, indeed, that the obturatrix should make a bend from its direct road, sufficient to enable it to cross the crural aperture, and lie upon Gimbernat's ligament, previous to its dipping down into the pelvis; and, besides, when we recollect that the very reason why it gets upon Gimbernat's ligament, when it arises from the external iliac by a trunk common to it and the epigastric, *essentially* depends upon the *length* of this common trunk; or, in other words, upon its *distance* from the external iliac; we cannot easily reconcile the supposition of its following a similar course, when it originates *directly* from the external iliac. The obturatrix, in the first case, lies upon the ligament of Gimbernat, because this membrane is in its direct road to the thyroid foramen. But there is no such reason, if I may be allowed the phrase, for its following a similar course, when the obturatrix happens to arise directly from the external iliac; and if this deviation has actually occurred, which, of course, may readily be decided on, by a reference to the preparation, we can only regard it as very extraordinary, and as forming an exception to a well established law. I know of no case, nor have I been able to find any

detailed, where a crural hernia, having the obturatrix arising from the external iliac *directly*, and situated *as above*, has been observed, though instances of this artery originating from the external iliac are not very uncommon, as was shewn in a previous part of this paper. It has even happened, that this variety in the origin of the obturatrix, viz. when it originates directly from the external iliac, has interfered, according to the opinion of some excellent surgeons, with the result of operations on the external iliac itself. A case is quoted by Mr ROUX, in his “*Parallele de la Chirurgie Angloise et Francoise*,” p. 278,–279, in which a ligature was put on the external iliac for femoral aneurism. Hæmorrhage supervened, which, I presume, proved fatal, since the cause of this hæmorrhage is stated to have been in the immediate vicinity of the obturatrix, arising, in this case, from the external iliac, and preventing the formation of a clot; which fact could only have been ascertained by a post-mortem examination.

When we consider the accuracy and remarkable minuteness of many of the older anatomists, we are surprised that the circumstance of the obturatrix artery running round the neck, and lying upon the pubal side of the sac in crural hernia, had never been noticed by them: it must have occasionally

happened then as well as now ; yet, though most of them had seen the epigastric give off the obturatrix, the peculiar course of this latter round the sac does not appear ever to have been observed by them. The determination of this relative situation of the artery, and the importance of its connexion with crural hernia, is a discovery of later days. In 1807, when Sir ASTLEY COOPER was preparing for the press his magnificent work on Hernia, he was so unprepared for this unexpected and unlooked for stumbling block in the way of operation for crural hernia, that, with truly laudable motives, he declined publishing the assertion communicated to him by Dr BARCLAY, that the obturatrix occasionally encircled and lay upon the pubal side of the neck of the sac, until he had satisfied himself of this then extraordinary and anomalous occurrence, by an actual examination of the preparation. Through the kindness of Dr BARCLAY, though unique at that time, and of the highest value, it was sent up to London, and, on its return, was placed in his own extensive museum. It is now preserved in the Barclayan department of the Museum of the Royal College of Surgeons of Edinburgh, remarkable as being the first annunciation of an important fact in surgical anatomy, and certainly the

more valuable, that it was at the same time combined with actual proof of its truth ^a.

From all I have been able to gather from the different authors I have consulted on this point, the length of the *common trunk* of the obturatrix and epigastric seems to determine the existence of the former on the *pubal* or *ilial* side of the neck of the sac, and that these circumstances are perhaps related to each other as cause and effect. If the *common trunk* be short, the obturatrix will run across the *ilial* margin of the crural aperture ; and, if a hernia be present, will lie between the sac and horizontal ramus of the pubis ; if long, the artery will traverse the crural aperture or Gimbernats's ligament ; the nearer the pubis the longer the common trunk, and, if a sac exists, it will encircle the anterior surface of the neck, and lie upon the posterior layer of Gimbernats's ligament, on the *pubal* side of the neck of the sac, and directly in the way of operation. When the obturatrix embraces and lies upon the pubal side of the neck of the sac, it is situated through the whole of its course between the peritoneum and fascia transversalis ; a portion of this last aponeuro-

^a This preparation was procured from a subject which Dr BARCLAY was publicly demonstrating in his class, and dissected by Mr J. DICKSON, now of Tripoli, his assistant. Dr BARCLAY has given a particular description of this preparation in his work on the Arteries.

sis forming the *posterior layer* of Gimbernath's ligament^a. In the first part of its course, it lies up-

^a This ligament was described by GIMBERNATH, in a work which he published at Madrid, in 1793, entitled, "Nuevo Metodo de Operar en la Hernia Crurale," and has since been generally known by his name.

The external oblique muscle, besides being fixed into the spine and symphysis pubis, sends a prolongation backwards, to be inserted into the commencement of the linea-ileo-pectinea, or that oblique ridge extending backwards from the spine of the pubes. It is of a triangular shape, and varies in length from ten to twelve lines. Its base is thin, firm, and slightly concave, looking towards the iliac vessels, but separated from them by the crural aperture: its superior edge is united to the crural arch, or that part of the external oblique which is inserted into the spine of the pubes; its inferior is fixed into the oblique ridge of the pubes, and its apex is the meeting of the superior and inferior edges on the spine of the pubes. This ligament is composed of two layers, an anterior and posterior, quite distinct, and easily separable above, but uniting or coming so close together below, that they cannot be disunited. The anterior I have already described as GIMBERNATH'S proper ligament, or third insertion of the external oblique; the posterior is formed by a prolongation of fascia transversalis (inner portion of Sir A. COOPER), extending from the portion of this same fascia, covering the transversalis muscle and tendon of the rectus, over Gimbernath's ligament, to be inserted along with it into the crest of the pubes, coalescing with the pelvic fascia on the brim of the pelvis, and sending a prolongation over the crescentic margin of the ligament, to unite with the pelvic fascia in forming the infundibuliform sheath of the femoral vessels. These two portions, forming Gimbernath's ligament, are so far separated above by cellular membrane, that the handle of a scalpel may with ease be pushed in between them. In the straight position of the body, this ligament is *nearly* horizontal, and fills up the space between the pubis and crural arch. It is not to be considered as a distinct portion, but as continuous with, and forming part of, the insertions of the external oblique into the pubis, though following an opposite direction from the other two. Near its crescentic margin it is pierced by many small holes, for the passage of lymphatics from the thigh into the pelvis. From this view of Gimbernath's ligament, the obturator, when it surrounds

on the anterior portion of the neck of the sac ; and as it approaches the upper and inner angle of the

the neck of the sac, lies between the peritoneum and fascia transversalis ; and, on descending upon Gimbernat's ligament, is placed upon its posterior layer (or portion of fascia transversalis), united to it by cellular membrane.

Many authors, in accounting for the greater frequency of crural hernia in females than males, have laid much of the blame upon Gimbernat's ligament, which they consider as occupying less space in females than in males, and thereby increasing the aperture of the crural canal in the former ; but this assertion is far from being either unexceptionable, or general, or even true. In many women quite the reverse is the case, the ligament is both broader and stronger ; in many others no perceptible difference can be observed ; and in others, of both sexes, it sometimes degenerates into little better than cellular membrane, and, in some rare cases, fails entirely. Dr KNOX informs me, that, in his lectures, he has been in the habit of objecting to this supposed explanation of the greater frequency of crural hernia in females, since, in them, he never could discover that Gimbernat's ligament was, as a general law, either shorter or weaker than in males. In a male adult, on which he lectured last winter, a crural hernia existed in both sides, and yet these ligaments were remarkably strong and broad ; and, in another male subject brought into his rooms two winters ago, there existed a strangulated crural hernia of the right side, which had not been operated on, and had carried off the patient. In this subject, the width of the pelvis was greater than is usual in males, and the ligament of Gimbernat more developed than is usually met with. *The space left, then, on the iliac side of Gimbernat's ligament, into which the bowel protrudes in crural hernia, bears no relation to the development of the ligament itself, and may be large when the ligament is large, and vice versa.* A more rational explanation may be found in the superior width of the female over the male pelvis ; and surely a female's muscles, nerves, arteries and veins, are not so much larger than a male's, that they will make up for the very demonstrable difference in the comparative width of this portion of the pelvis. Besides, there are many other reasons, independent of the very powerful one, that it is now generally understood that the disproportion between the existence of crural hernia in females and males, is by no means so great as was formerly supposed, that may account for this, without the necessity of finding a de-

ligament of Gimbernat, it is in general farther removed from this membrane than in the succeeding part of its course, where it crosses and lies upon its margin. Sir A. COOPER, to relieve the gut, when strangulated, directs the incision to be made upwards and inwards, as the obturatrix is farther removed from the ligament of Gimbernat at this point than at any other; and, in the Barclayan preparation, from which Sir A. COOPER has drawn his method, the artery is certainly at a greater distance here than elsewhere, being nearly two lines removed from the ligament at its upper margin; but, in a similar preparation in Dr KNOX's Museum, the artery is firmly and closely tied down by cellular membrane to this ligament, at this very point, thus forming an exception to Sir A. COOPER's general rule.

Shortly after the enunciation of the existence of Dr BARCLAY's preparation, Mr J. WARDROP^a published a case of a similar nature. Dr MONRO^b refers to three examples. It has been noticed by

deficiency in Gimbernat's ligament, which we now know to be nearly theoretical. Child-bearing, want of exercise, and many other debilitating causes, must have a tendency, by relaxing the natural vigour of the parts, to predispose to this disease.

^a Ed. Med. and Surg. Journal, vol. ii. p. 203. 1806.

^b Morbid Anatomy of the Gullet, &c. p. 485.

HESSELBACH^a and BURNS^b. Dr BRESCHET^c mentions another case, which was observed by M. DUCROS of Marseilles. Another is quoted by SCARPA^d, from LEBERECHT. CLOQUET^e speaks of having met with it; and Mr WISHART^f, in the Appendix to his translation of SCARPA's work on Hernia, observes, that "Dr THOMSON of Edinburgh had found such a distribution of the obturatrix artery in six out of ten preparations of hernia he had examined."

In the preparation^g already alluded to in Dr KNOX's Museum, this variation in the course of the obturatrix exists combined with an omental hernia. The artery, as usual, arises by a long common trunk, passes over the anterior surface of the sac, and crosses the ligament of Gimbernat, lying upon the pubal side of the neck of the sac, firmly bound down to this ligament by cellular membrane at its up-

^a L. c.

^b Ed. Med. and Surg. Journal, vol. ii. p. 272. 1806.

^c Concours, &c. Obs. xxviii. p. 153.

^d Supplément, p. 83. *from* Leberecht. Diss. de Extensionis in solvendis Herniis cruralibus incarceratis, præ incisione præstantia. Berlin, 1816.

^e Recherches Anatomiques, p. 86.

^f Translation of SCARPA's Hernia, Appendix, p. 490.

^g Through the kindness of Dr KNOX, I have been enabled to add to this Probationary Essay a drawing (Plate II. fig. 1.) of this valuable preparation.

per as well as at its lower part. This case, in conjunction with the Barclayian, form the only two existing preparations shewing this course of the artery, combined with a hernial sac, with which I am acquainted. Most surgeons who have examined this preparation, admit, that even the instrument so ingeniously contrived by Mr WEISS could scarcely have protected the artery in this case, had the operation for strangulation become necessary. SCARPA, in a case related by Mr HEY of Leeds ^a, in which this latter gentleman operated for crural hernia, by cutting upwards and inwards, and which was followed by a copious hæmorrhage, is of opinion that the obturatrix artery had been opened. Mr HEY concluded, that he had wounded the epigastric. The bleeding was stopped by the application of sponges. MURSINNA, ^b in an operation for crural hernia, followed by death, from hæmorrhage, found that he had wounded the obturatrix, which arose from the epigastric, and lay upon the pubal side of the sac. Mr LAWRENCE ^c, referring to the uncommon occurrence of this vessel occupying the situation indicated above, quotes as a proof that Sir A. COOPER had

^a HEY's Surgery, p. 160. 1814.

^b Journal des Progres des Sciences,—in a paper already alluded to ; by M. ROBERTS, p. 193. 1824.

^c On Ruptures, p. 407. 1824.

never observed it, and I do not find from an examination of his own work, that he has ever met with it in his own practice. SABATIER^a mentions, that, in the examination of sixty-three cases of crural hernia, in not one did the obturatrix, originating from the epigastric, lie upon the *pubal* side of the neck of the sac.

Several authors have recorded cases of hernial tumors in which the obturatrix originated from the epigastric, and in its way to the pelvis lay upon the *ilial* side of the sac. Sir A. COOPER,^b HESSELBACH,^c MONRO,^d CLOQUET,^e and some others, have observed this disposition of the artery. SABATIER, out of the sixty-three examples mentioned above, saw twelve in which the obturatrix followed this course. I have myself seen one case of a similar nature^f. In all the instances in which this distribution exists, the artery is unconnected with the fascia transversalis; it lies between the peritoneum forming the sac, and the pelvic or iliac fascia, at a

a *Medecine Operatoire*, t. iii. p. 583.

b *Crural and Umbilical Hernia*, l. c.

c *L. c.*

d *L. c.*

e *Recherches Anat.* l. c.

f Plate II. Fig. 2. exhibits a sketch of this case. The preparation is in Dr KNOX's Museum, who has kindly allowed me to insert a drawing of it here.

distance from the part divided in relieving the strangulated intestine, and therefore is in no danger of being implicated.

When the obturatrix arises from the femoral below Poupart's ligament, it ascends over the pectineus muscle, enters the pelvis through the crural canal, and passes over the superior aperture to the thyroid foramen. If a hernia happen to be present with this variation in the course of the artery, the vessel will lie behind the sac between the horizontal ramus of the pubis and posterior surface of the sac. I know of no example where such a coincidence has taken place.

In the remaining variety, when the obturatrix is composed of the two branches already described, the epigastric trunk will have the same relations to the sac as already pointed out, under the section in which this deviation has been described; and the hypogastric branch will be connected with thyroideal or ischiatic herniæ, should they be present.

From an attentive consideration of the cases I have found detailed by authors, and an examination of those I have myself seen, there seems to be such an evident connexion between the situation of the obturatrix artery on the pubal or ilial side of a hernial tumor, and the relative length of the common

trunk, that the existence of the one appears almost to necessitate the presence of the other. Since in every case in which the obturatrix has lain on the pubal side of the neck of the sac, it has been proved, by dissection, to have arisen by a *long common trunk*, or high up from the epigastric. And, as on the contrary, in all those examples in which it has been situated on the ilial side of the sac, it has been shewn also by dissection to have originated, without even an exception, from a *short common trunk*, or low down from the epigastric; it may almost be laid down as a principle, at least till refuted by after observation, that, if the *common trunk* be *long*, the artery will lie on the pubal, if *short*, on the ilial, side of the sac. I say almost, because, as there is no fixed limit dividing a *long* from a *short common trunk*, it may be an easy enough matter to force circumstances to meet the particular views of the inquirer: and I can readily imagine the obturatrix so situated, (originating just so high up from the epigastric, as will bring it directly across the crural aperture), that it will depend entirely upon chance, should the gut protrude, whether the artery will lie on the pubal or ilial side of the sac. As the data can hardly ever be fixed, reasoning on this subject must always be undecided. It is important, how-

ever, to know that, in every case in which the obturatrix has been situated on the pubal side of the sac, the *common trunk* has been *long*, and *vice versa*. This observation is as yet universally applicable. The determination of this question is more a matter of curiosity than of practical utility, as it never can be known to the surgeon till the mischief is completed; for, as it is as impossible to say *à priori*, that the obturatrix arises from the epigastric, as that it has a *long* or *short trunk*, it is equally impossible for him even to guess that it is situated upon the ligament of Gimbernat. A flow of blood is the first intimation he receives of such a variation from the regular origin and course of the artery.

Having now enumerated all the different varieties of the obturatrix, and described their individual origin, course, and distribution, with the surgical relations of each, I shall conclude these observations, by endeavouring to ascertain, from the statements of different authors, the comparative number of times in which it arises from the internal iliac, or its pelvien branches, the external iliac, epigastric and femoral arteries—whether these deviations are more commonly met with in both sides

at once, or only in one—and if, from an enumeration of the cases where herniæ have existed, and the obturatrix and epigastric have arisen by *common trunks* from the external iliac, we can draw any likely conclusion as to the *probable number of times* in which the obturatrix will lie on the *pubal* side of the sac.

Though HALLER, SÆMMERING, PORTAL, BOYER, SABATIER, BARCLAY, TIEDEMANN, BURNS, and many others, have all borne ample testimony, as I have shewn above, to the frequent variations in the origin of this artery, none of those authors have drawn their assertions from a given number of bodies, or have endeavoured to establish the ratio in which they occur, but merely stated the circumstances as they met with them in their investigations. J. CLOQUET, by limiting himself to a particular number, and noting the different origins as they appeared, has endeavoured, in the following Table, to shew the ratio in which these origins occur. He has drawn his conclusions from an examination of 250 bodies, 125 males and 125 females; and, as it forms the only existing record of a similar nature with which I am acquainted, I have taken the liberty to transcribe it.

The Obturatrix arose from the	Hypogastric of both sides, in 160	{	87 males. 73 females.
	Epigastric of both sides, 56	{	21 males. 35 females.
	Hypogastric of one side and Epigastric of other side, } 28	{	15 males. 13 females.
	Crural, 6	{	2 males. 4 females.
Total,		250	{ 125 males. 125 females.

As M. J. CLOQUET examined the arteries in both sides, by making due allowance we find the comparative frequency of the different origins to be,

In 500 cases from the	Hypogastric,	348 times	{	289 males. 159 females.
	Epigastric,	140	{	57 males. 83 females.
	Crural, .	12	{	4 males. 8 females.
Total,		500		500

From this last Table, the ratio of the origin of the obturatrix from the epigastric is to that from the internal iliac as 140 to 348, or nearly 1 in 3 cases.

The ratio of its origin from the external iliac to that from the hypogastric and epigastric, is, in the former, as 12 to 348, and in the latter, as 12 to 140, or 1 in

29, and nearly 1 in 12 cases ; or to the whole, as 12 to 488, or 1 in 40 examples. Thus, the varieties alluded to above bear the ratio of 1 in nearly 3, and 1 in 40 to the more frequent internal iliac origin. The other varieties in the origin of this artery so rarely occur, that it is needless to bring them into account.

HESSELBACH, out of 32 bodies, found the obturatrix arising from the external iliac thrice, and the same author, out of the same number of subjects, observed it originating from the epigastric 19 times ; 9 times in the right, and 10 times in the left side, giving a proportion much higher than CLOQUET's, but not to be so much relied upon, from the small number of bodies examined. MECKEL states the ratio between the artery arising from the external iliac and the epigastric to be as 1 to 16, a proportion rather lower than CLOQUET's, who gives it as 1 in 12.

From an inspection of the above Tables, we also discover, that, when a variation does occur in the origin, &c. of the obturatrix, it generally exists in both sides of the same body ; for, as the obturatrix arises from the internal iliac of both sides in 160, from the epigastric of both in 140, and from the crural of both sides in 6 cases, and only 28 times

from the hypogastric of one side and epigastric of the other, out of 250 it gives a proportion of 222 to 28, or nearly 8 to 1. When it originates from the epigastric of one side only, Mr MECKEL * thinks it arises more frequently from the left than the right, and states the ratio to be as 10 to 1. He does not consider this to be at all influenced by sex.

It may be here asked, Do these deviations occur more frequently in the female than male? M. CLOQUET's Table satisfies us that the frequency of its deviations are oftener met with in the former than the latter; but the difference is so trifling, that no ratio between the comparative frequency can be drawn. Out of 500, the obturatrix arose in males from the hypogastric in 189, in females 159; from the epigastric in males 57, in females 83; and from the external iliac 4 times in males, and 8 times in females. In these calculations the principal difference is in the origin from the epigastric, which in females is much oftener than in males, and must render the probability of this artery being on the *pubal* side of the sac more likely to happen in the former than in the latter.

I shall now endeavour to calculate the propor-

* *Traité d'Anatomie*, t. ii. p. 450.

tional number of times in which we may expect to find this artery lying upon the *pubal* side of the neck of the sac. If we reason upon the table given above, the accuracy and correctness of which can hardly be doubted, from the known zeal and acuteness of its industrious author, the obturatrix arises from the epigastric in about 1 in 3 cases, or nearly so. But from this origin, it does not always run upon the *pubal* side of the sac, but far more frequently on the *ilial*; and if we take the cases in which it runs upon the *pubal* as 1 in 20, it may be supposed to occupy this situation, or run upon Gimbernats's ligament in 1 out of 50 or 60 cases. Mr LAWRENCE, establishing this proportion, and proceeding also upon the data afforded by M. CLOQUET's schedule, has underrated the proportional number of times in which the obturatrix arises from the epigastric. He first states it as between 1 in 3 or 4, and afterwards goes on to calculate on the supposition that the ratio is 1 in 4 times; and as the obturatrix lies on the *pubal* side of the sac when it originates from the epigastric 1 in 20 times, he multiplies this by 4, and gives 1 in 80 as the proportion in which this artery will be found on the ligament of Gimbernats. But as the obturatrix

arises from the epigastric once in nearly 3, and not once in 4 times, the more correct ratio is, as already stated, once in 50 or 60, not once in 80, the conclusion come to by Mr LAWRENCE,—a slight error in calculation, important only in an anatomical point of view.

24th August 1829.

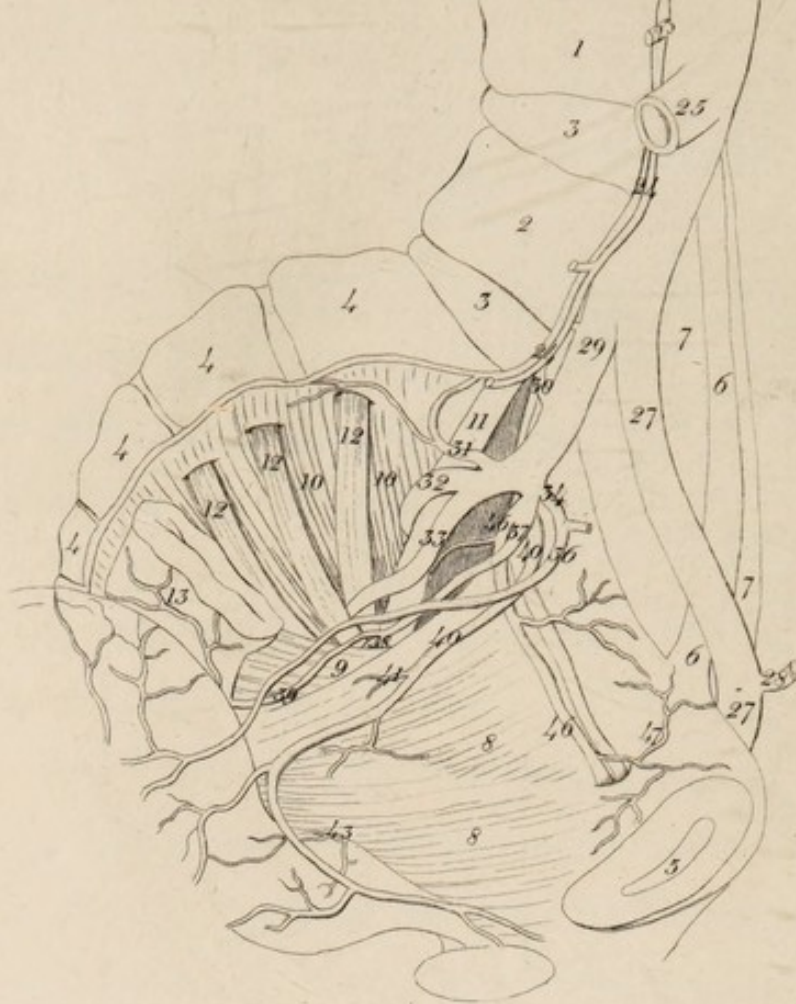
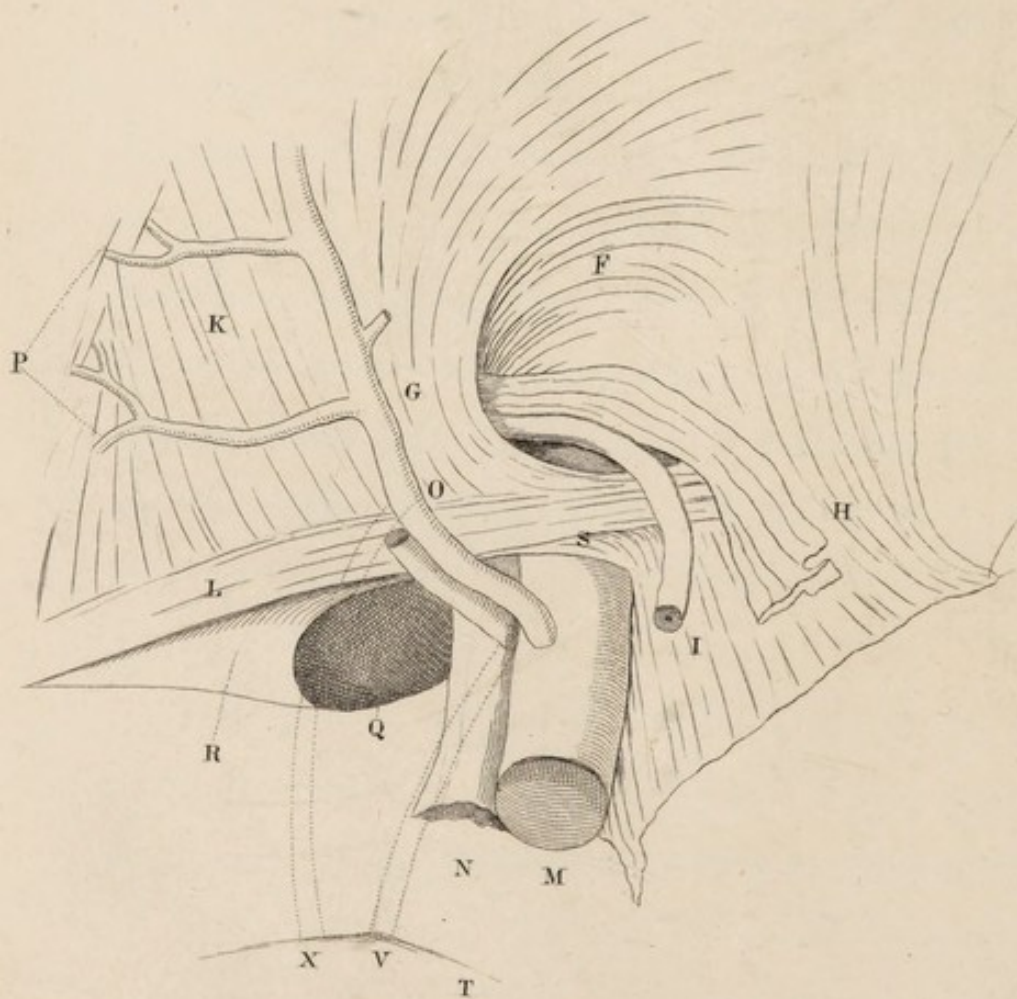


Fig. 2.



I HAVE thought it advisable, for the better understanding of the descriptive part of this Essay, to add the following Plates of the Arteries of the Pelvis, and of two preparations, in each of which a different variety of the origin of the Obturatrix exists, combined with a hernial tumor.

EXPLANATION OF PLATE I.

Fig. 1. represents a diagram of the Arteries of the Pelvis from TIEDEMANN, in which the Obturatrix Artery is seen arising from the Internal Iliac, and following its usual and regular course to the Foramen Obturatorium, accompanied by the Obturator Nerve, lying parallel and superior to it.

- 1 2 Fourth and fifth Lumbar Vertebrae.
- 3 3 3 Intervertebral Fibro-cartilages.
- 4 4 4 4 Os Sacrum.
- 5 Os Pubis.
- 6 6 Tendon of the Psoas minor Muscle.
- 7 7 Situation of the Psoas major.

- 8 8 Levator of the Anus on the surface of the Obturator internus, and arising by a membranous beginning from its tendinous covering.
- 9 Sacro-sciatic Ligament.
- 10 10 Origin of the Pyramidal Muscle.
- † † Nervous Obturatorius.
- 11 Fifth Lumbar Nerve.
- 12 12 12 Origins of the Sacro-sciatic Nerve.
- 13 Intestinum Rectum.
- 22 Aorta.
- 23 Fourth Lumbar Artery.
- 24 24 Middle Sacral Artery.
- 25 Right common Iliac Artery.
- 26 Left common Iliac Artery.
- 27 External Iliac.
- 28 Epigastric Artery.
- 29 Hypogastric Artery.
- 30 Ilio-lumbar Artery.
- 31 Lateral Sacral Artery.
- 32 Gluteal Artery.
- 33 Ischiatic Artery.
- 34 Umbilical Artery.
- 35 Portion of the Umbilical Artery changed into a Ligament.
- 36 Vesical Artery.
- 37 Common trunk of the Pudic and middle Hæmorrhoidal Arteries.
- 38 External Hæmorrhoidal Artery.
- 39 Middle Hæmorrhoidal Artery.

- 40 Artery of the Penis * following an unusual course to the Penis below the Symphysis Pubis.
- 41 Branches to the Levator Ani Muscle.
- 46 46 Obturatrix Artery.
- 47 Branch to the Os Pubis.

In Fig. 2. of this plate, I have endeavoured, by means of a diagram copied from Mr JULES CLOQUET's work on Abdominal Hernia, to convey to the reader some idea of the course which the obturatrix follows when it originates *high up*, or *low down*, from the epigastric, or when the *common trunk is long*. The dotted line x indicates the situation which the obturatrix occupies when the common trunk of the epigastric, O, is long. The artery, in its way to the foramen obturatorium T, traverses the crural aperture, and approaches nearer to the ligament of Gimbernat, R, the longer the *common trunk*. It is obvious, if a crural hernia existed, and the obturatrix held this *high* origin from the epigastric, that it must be situated on the pubal side of the neck of the sac, and lie upon Gimbernat's Ligament †. When the common trunk is short, the dotted line V represents the course

* This plate is remarkable as shewing a variation in the origin and course of the Artery of the Penis. VESALIUS, VALVERDUS, JACOBUS SYLVIUS, BAUHIN, WINSLOW, and many of the older anatomists, have described this disposition of the Dorsal Artery of the Penis and Clitoris, as constant and normal. BURNS (on Heart and Arteries, p. 350), has seen this irregularity four different times in males. TIEDEMANN, (Explicat. Arter. Corp. Humani, p. 285.) has met with it in three examples.

† Fig. 1. of the next plate, shews an example where such a coincidence has occurred.

which the obturatrix follows; and, if a hernia be present, the artery, as mentioned in a previous part of this paper, will lie on the ilial margin of the sac between it and the horizontal ramus of the pubis. M, external iliac artery. N, vein. L, Poupart's Ligament. P, branches of the epigastric running to the rectus abdominis muscle.

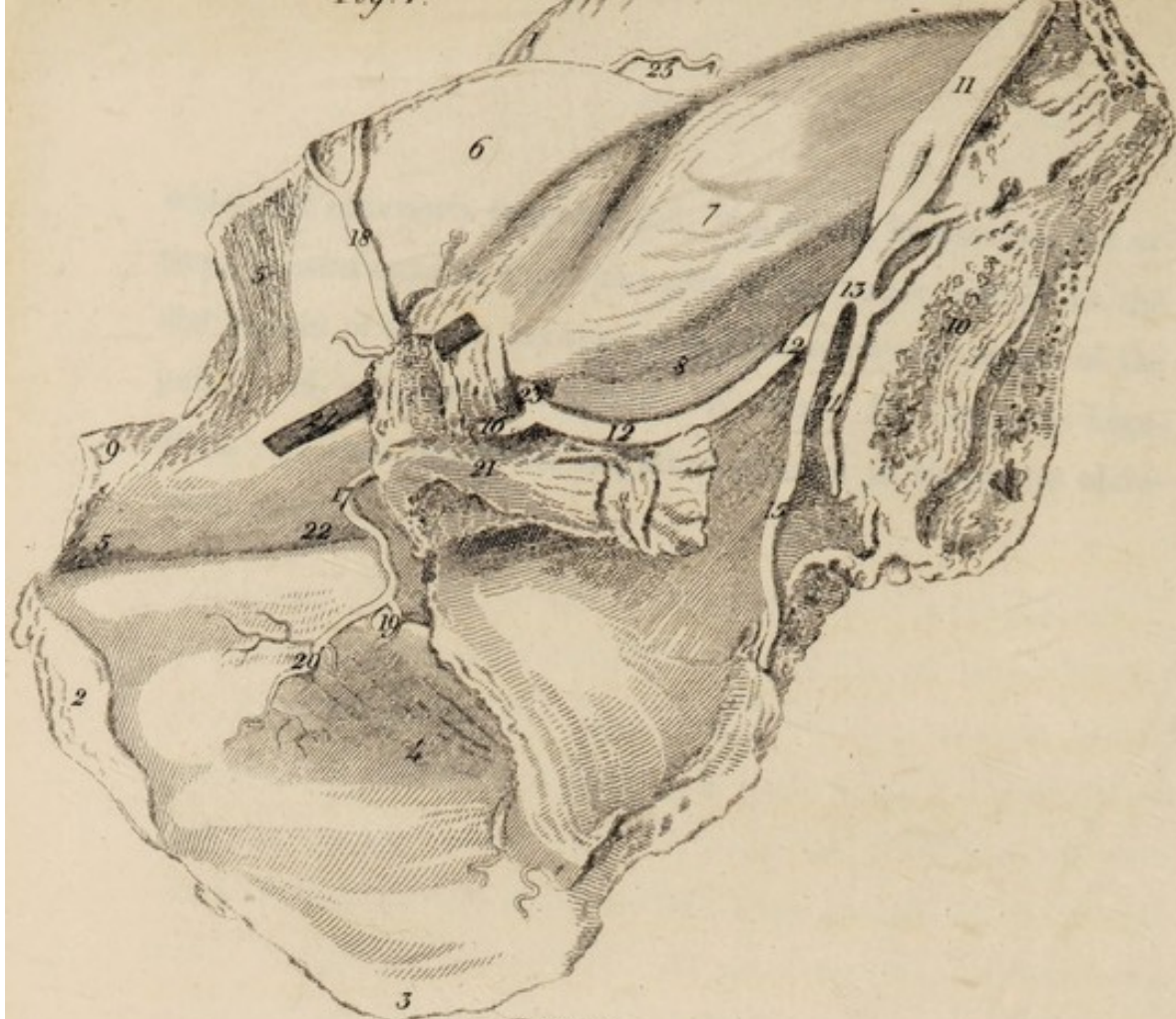
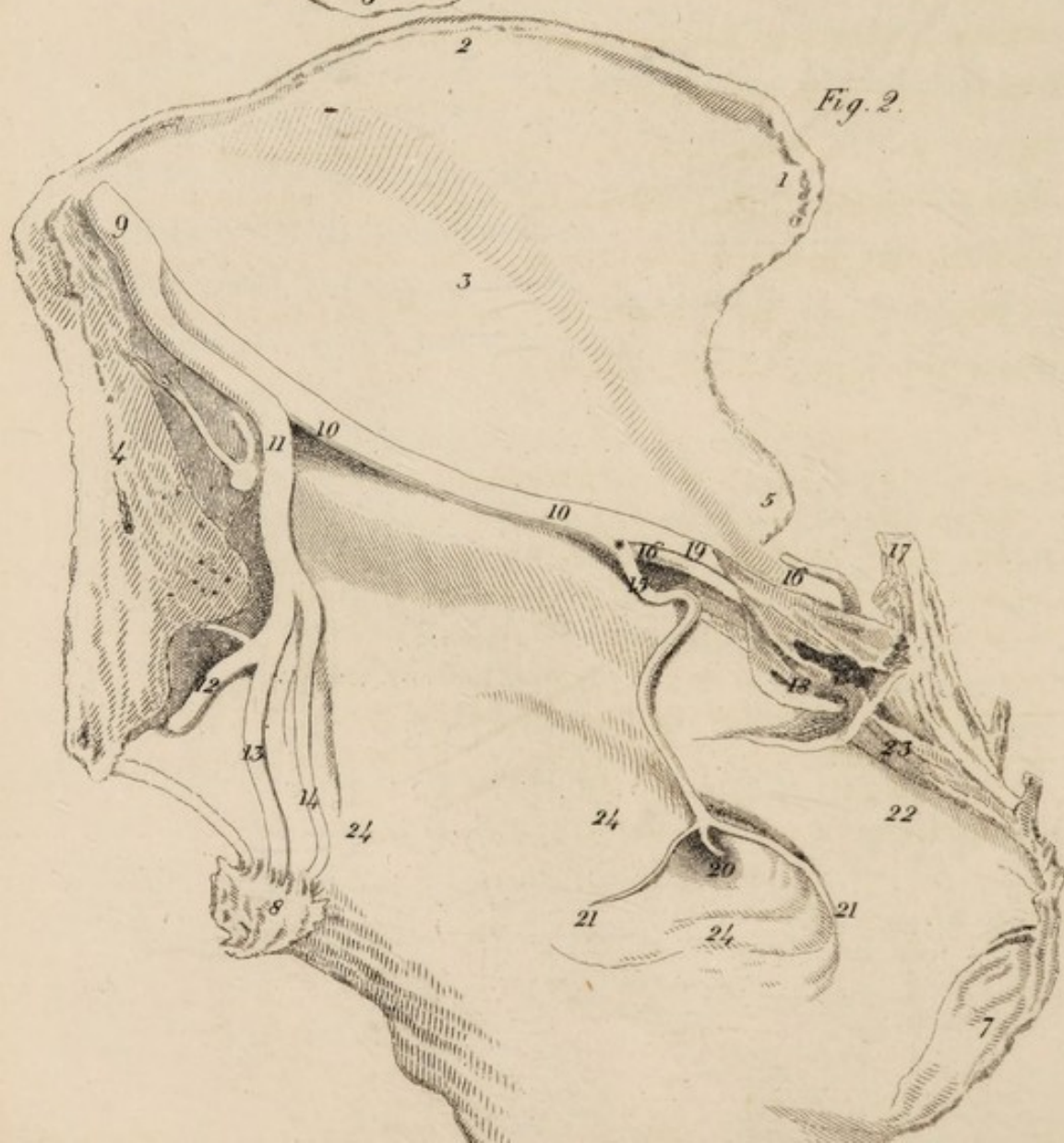


Fig. 2.



EXPLANATION OF PLATE II.

THE two figures composing the following Plate, which I have also taken the liberty of adding to this Probationary Essay, point out, in a most satisfactory manner, the relative situation which the Obturatrix holds to the neck of the sac in crural hernia, when it originates *high up or low down* from the Epigastric, or when the *common trunk* is *long or short*. In both a hernial sac is present.

Fig. 1, 16. represents the *common trunk* of the Obturator and Epigastric, its division into these arteries is hidden by a portion of the sac 21; 17. represents the Obturatrix lying upon Gimbernat's Ligament, and on the pubal side of the neck of the sac. It closely embraces the anterior and pubal side of the neck of the sac, and is firmly bound down to Gimbernat's Ligament by cellular membrane, especially at its *upper angle*, where it lies upon the very margin of this ligament; thus rendering the general rule of Sir ASTLEY COOPER, to relieve the stricture by cutting at this *upper angle*, of no avail*.

* This preparation was removed from the body of an aged female subject, brought into Dr KNOX's Dissecting Rooms. Previous to dissection, it was obvious that a small crural hernia of the right side was present, which, on dissection, proved to be an omental hernia. The peculiar situation of the Obturatrix artery, closely bound down to the margin of Gimbernat's Ligament, combined with the presence of a hernia, and so situated as scarcely to be avoided by the surgeon, should an operation for strangulated hernia have been required, attracted very general attention during the dissection of the parts. The portion of omentum within the sac adhered to its serous surface by two points not far from the neck of the sac.

Fig. 2. represents the course which the Obturatrix takes when the *common trunk* is short.—in this case, * points out the *common trunk* of the Obturatrix and Epigastric, which is so short that they may almost be said to arise at once from the external iliac; 15. is the Obturatrix running over the superior aperture of the pelvis to the foramen obturatorium, quite unconnected with the sac 18. of the hernia; 16, 16. shows the epigastric running parallel to the continuation of the external iliac 19, and appearing again between the fascia transversalis, which is here united to the surface of the hernial sac and the tendon of the abdominal muscles 17.

In this preparation, the two layers (already alluded to) forming the ligament of Gimbernat are most distinctly made out. The handle of a scalpel may with ease be introduced between them; but, from my anxiety to show the situation of the vessels in relation to the hernial sac, it was found impossible to exhibit this other important feature in the preparation.

Both these cases were found in bodies brought into Dr KNOX's Rooms of Practical Anatomy, who has obligingly permitted me to prefix these diagrams to this Essay.

FIG. I.

- 1 Anterior and superior spinous process of the Ilium.
- 2 Symphysis Pubis.
- 3 Tuberosity of the Ischium.
- 4 Obturatorius internus muscle and origin of Levator Ani
covered by the pelvic fascia.
- 5 5 Portion of rectus abdominis muscle.

- 6 Tendon of the transversalis muscle, covered by the transversalis fascia.
- 7 Iliacus internus, and,
- 8 Psoas major muscles.
- 9 Portion of the tendon of the external oblique.
- 10 Section of the os ilium.
- 11 Common iliac artery.
- 12 12 External ditto.
- 13 Internal ditto.
- 14 Gluteal artery.
- 15 Ischiatic artery.
- 16 Common trunk of the obturatrix and epigastric arteries.
- 17 Obturatrix lying upon Gimbernats Ligament, and on the pubal side of the neck of the sac.
- 18 Epigastric artery on its way to the rectus abdominis muscle.
- 19 Trunk of the obturatrix passing through the foramen obturatorium.
- 20 Branches of the obturatrix.
- 21 Hernial sac, which contained a portion of the omentum.
- 22 Ligament of Gimbernats.
- 23 Continuation of the external iliac artery, passing under Poupart's Ligament.
- 24 Probe placed so as to exhibit the epigastric artery more fully, when the preparation is examined from the other side.
- 25 Branch of the circumflex artery of the ilium.

FIG. II.

- 1 Anterior and superior spinous process of the ilium.
- 2 Crest of the ilium.
- 3 Internal surface of the ilium.
- 4 Section of ilium.
- 5 Anterior and inferior spinous process of the ilium.
- 6 Tuberosity of the ischium.
- 7 Symphysis pubis.
- 8 Spine of the ischium.
- 9 Common iliac artery.
- 10 10 External ditto.
- 11 Internal ditto.
- 12 Gluteal artery.
- 13 Ischiatic artery.
- 14 Pudic artery.
- * Common trunk of obturatrix and epigastric arteries arising from external iliac 10.
- 15 Obturatrix artery.
- 16 16 Epigastric artery.
- 17 Portion of the tendon of the external oblique muscle.
- 18 Hernial sac.
- 19 Continuation of the external iliac artery.
- 20 Obturatrix artery passing through the foramen obturatorium.
- 21 21 Branches of the obturatrix.
- 22 Crest of the pubis.
- 23 Gimbernats Ligament.
- 24 24 24 Situation of the obturatorius internus and levator ani muscles.





