

A series of [XII] plates of the brain ... with references ... and descriptions.

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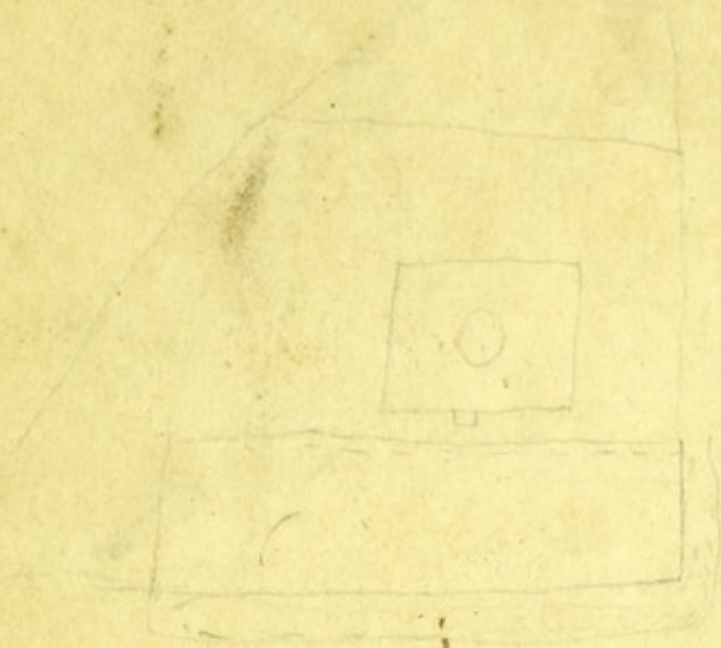
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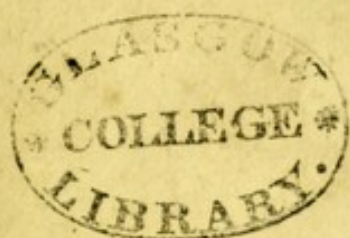
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DESCRIPTIONS
OF
PLATES OF THE BRAIN,



WITH
DIRECTIONS

FOR THE
DEVELOPEMENT OF THAT ORGAN BY DISSECTION;

TOGETHER WITH
OBSERVATIONS ON ITS VARIOUS PARTS.

BY
ALEXANDER RAMSAY, M. D.
LECTURER ON ANATOMY AND PHYSIOLOGY, EDINBURGH.

EDINBURGH :

Printed by George Ramsay & Company,
FOR ARCHIBALD CONSTABLE AND COMPANY, EDINBURGH :
AND LONGMAN, HURST, REES, ORME, AND BROWN,
LONDON.

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ADVERTISEMENT.

As the public is already in possession of so many elegant and correct works on the subject of the Brain, it may be proper to offer the reasons which have induced me to add this to the number of publications on that organ, and the objects aimed at in this attempt.

The elegance of the works alluded to, necessarily occasions such expence as precludes their usefulness to many industrious students justly claiming our care and attention.

The dissector seems merely to require a plan or map, with directions, on the subject of anatomy, such as I have attempted. Without dissections, such objects are never completely understood, even from the finest plates ; and it is presumed, that the figures annexed to the printed directions and descriptions, accompanying this work, though by no means laying claim to high execution, considered as engravings, may sufficiently convey a notion of the objects they are intended to represent. Their accuracy has been strictly attended to, by repeated dissections, for this immediate purpose ; and the few observations interspersed, are drawn from many years experience during my teaching practical anatomy, as the basis of physiology, at home and abroad, on an extensive scale.

The figures, and their appendages, are represented half the diameter of the human adult, that the student may easily annex a just notion of the relative dimension and situation of parts, without swelling the work into needless expence or size.

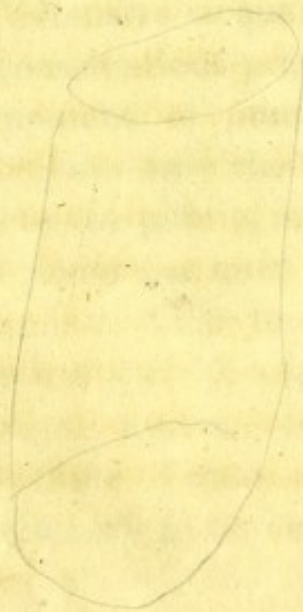
The figures are arranged in the order of each step to be followed in the developement of this complicated organ, by means of dissection; and general references are annexed to each plate in engraving, that the student may recognize the parts without having recourse to the letter-press descriptions, when he is dissecting, or impressing his memory with relative ideas. The letter-press is likewise bound up separate from the plates, that the eye may, with ease, take in at once the parts and their descriptions.

The advantage arising from this dissected manner of representing anatomical subjects, seems chiefly from its preserving the relative situations of numerous parts, as they come before us in dissection. The various parts being made to keep their place in successive plates, which, on removal, expose those which are subjacent or adjacent, and they can be lifted and returned, so as to engrave on the mind the absolute relation of one portion with another. Thus the corpus callosum is seen between the hemispheres in Plate V., and, by removing the left hemisphere of Plate V., the same corpus callosum answers the purposes intended by Plate VI. In the same manner, the corpus striatum, coming into view on removal of the ceiling of the ventricle, represented in Plate VI., which exposes to view Plate VII., this corpus striatum is recognized in its connections with the bodies represented in Plates VII. VIII. IX. and X.

This small essay is intended as a specimen of a dissected style of plates of the human system, already prepared for the hand of the engraver, where objects very much supply the

place of words, and which may be afterwards followed up, if the expence is not so great as to forbid perseverance in so arduous an undertaking. In the representations and connections of the bones, muscles, vessels, &c. in the work alluded to, of so much importance to the surgeon, the appearances are more persuasive and interesting than in this attempt of the Brain.

If this work facilitates the studies of the young anatomist; if it leads him, from a knowledge of the human brain acquired at schools, to its contemplation in private, and an attention to comparative anatomy, the great end of my labour is accomplished. The parts of the Brain, in different animals, differ very much, both in their dimensions and structure. These varieties, and similar varieties in the other vital organs, have their appropriate intentions, their causes, and their effects, and still hold out a wide and interesting field to the industry of the dissector, and the sagacity of the physiologist, and afford matter of admiration and instruction to the philosopher and divine.



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The author has endeavoured to present a new and original view of the Brain, and to show the various parts of it, and the manner in which they are connected together, and the manner in which they are connected with the other parts of the body. He has also endeavoured to show the manner in which the Brain is affected by various diseases, and the manner in which it is affected by various injuries. He has also endeavoured to show the manner in which the Brain is affected by various passions, and the manner in which it is affected by various habits. He has also endeavoured to show the manner in which the Brain is affected by various ages, and the manner in which it is affected by various sexes. He has also endeavoured to show the manner in which the Brain is affected by various climates, and the manner in which it is affected by various seasons. He has also endeavoured to show the manner in which the Brain is affected by various occupations, and the manner in which it is affected by various exercises. He has also endeavoured to show the manner in which the Brain is affected by various diseases, and the manner in which it is affected by various injuries. He has also endeavoured to show the manner in which the Brain is affected by various passions, and the manner in which it is affected by various habits. He has also endeavoured to show the manner in which the Brain is affected by various ages, and the manner in which it is affected by various sexes. He has also endeavoured to show the manner in which the Brain is affected by various climates, and the manner in which it is affected by various seasons. He has also endeavoured to show the manner in which the Brain is affected by various occupations, and the manner in which it is affected by various exercises.

INTRODUCTION.

It is to be feared, that those who only bestow a superficial attention to the Plates accompanying this small Treatise, may perhaps be disposed to object to the mode of their execution. I have been encouraged, however, to adopt this plan in preference to the usual method, by the approbation of men, whose high reputation and discernment give me reason to expect a favourable reception of this work.

A desire of originality has had no share in its production; it has been suggested by a conviction, that the manner which is followed is best suited to the capacity of the learner, and the natural method of investigating this complicated organ.

One object aimed at here is, to render general knowledge the basis of impressing the mind of the Student with that minute, distinct, and extensive acquaintance with this important organ, to which the conscientious practitioner must continually resort in the critical moment of practice. It would seem that general knowledge becomes only the more delusive to the Student, and hence ruinous to the public, in proportion as this knowledge has been acquired under the most illustrious teachers. The general impression of talent which he has been accustomed to receive, when unconnected with an application to those minutiae to which he is too commonly averse, render him, in the moment of danger, totally destitute of those parts of knowledge, for which general idea ought only to be valued as a guide.

The exact situation and peculiarity of each bone ought to be clearly understood; and its relative connection with others, as well as the nature of these connections; and their correspondence and connection with the contained organs, must never be lost sight of, in order that, by an arranged and well digested impression of these important minutiae, he may, from a discrimination or recollection of one department of the system, easily transfer this to others. I trust that this method, which is pursued in the work, shall evidence the efficacy of this plan of study. Thus, when the plates are described, we shall find that, by recognizing the internal parietes of the bones of the skull, Plate I. Fig. 2d, Plate XII. Fig. 1st, and the elongations of the Dura Mater, Plate XI, Fig. 2d, these correspond exactly to the vessels of the Dura Mater, the convolutions and surfaces of the Cerebral Hemispheres, Plate V. 'a d b e, Plate VII. 'f d d e, their lobes, Plate XIII. 'xz †, and the Cerebellum, Plate X. 'g, Plate XIII. §.

The Student ought to extend these relative ideas to external parts, when he becomes acquainted with the contents. Thus, Plate I. Fig. 1st, he will recognise the Eye beneath the arch, Plate I. Fig. 1st. 'p, and above it, is placed the Anterior Hemisphere of the Brain, and its lobe. The middle lobe has its course above the Zygoma 'r o, and by attending to Plate I. Fig. 2d, the outlines of the Falx and Tentorium will give him an idea of the relative place of the Cerebrum, Cerebellum, and Pons Varolii, &c. which he can transfer to external objects.

The reader may be apt to find himself embarrassed as he proceeds in the descriptions of the plates, unless great attention is bestowed on his part, in adverting to the exact plate or figure mentioned, as several views must be resorted to, in rendering this method instructive in so complicated a subject as the Brain and its surrounding parts. We must occasionally refer to Plates I. II. XI. XII. and XIII. to recognize clearly one single object; an inconvenience inseparable from representations of this nature, but highly useful to the Student, as a lesson of close attention so necessary

to recognizing plans of this nature readily, which requires habit and practice.

In an organ, composed of so numerous parts as that of the Brain, we are often anxious to recur to such objects individually. I have therefore accompanied the leading parts with side-notes, to facilitate the easy selection of any particular appendage of the Brain ; and such notions as are not immediately connected with the plates, I have thrown into notes at the bottom of the page, that the reader may not be interrupted in his pursuit of the chain of demonstration.

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The bones of the Cranium are eight in number. Four of these are single bones, the other four are in pairs.

DESCRIPTIONS OF THE PLATES.

1st and 2d, which form the Sinciput; 3dly, The Os Ethmoides; 4thly, The Os Sphenoides; 5thly, The Os Occipitale; 6thly, The Os Temporalis; 7thly, The Os Frontalis; 8thly, The Os Nasale. These four bones, and the anterior curved process joining that of the Os Sphenoides, completes the middle of the Basal Cranium. These four bones lie in the longitudinal curvature of the Cranium.

PLATE I.

THE Diagrams of this plate are intended to convey an idea of the Cranium and Face. General Notion of the Cranium.

The external appearances are represented Fig. 1st. The internal are conveyed by Fig. 2d.

In Europe, the human skull assumes in general an oviform aspect, the great end posterior, as exhibited in Plates I. and II. Though I may notice, that even in Europe, many varieties are observable; and, in ancient burial-places attached to monasteries, I have met with many specimens of Crania which presented a completely globular appearance. I have had also in my possession those of the savage hordes of the Russian empire, assuming a cylindrical shape.

The varieties of the figures of this organ in Asia, Africa, and America, so peculiarly diversified in their cranial and facial departments, become equally interesting to the physiologist; but

1 It is necessary, that a distinction should be made between the Bones of the Cranium and those of the Face. Therefore, while those of the Cranium are finished by the engraver, and each Bone distinguished by its particular colouring,—those of the Face are only marked in outline.

In the Cranium, we shall see the Arteries passing by their Foramina from the Heart to the Brain, the Veins returning from the Brain to the Heart, and the Nerves (by their Foramina,) transmitted to their various destinations.

these seem not connected with the consideration of the present subject¹.

Eight Bones of
the Cranium.

The bones of the Cranium are eight in number. Four of these are single bones, the other four are in pairs.

The four single bones are, 1st, The Os Frontis, Plate I. Fig. 1st and 2d, 'k, which forms the Sinciput; 2dly, The Os Ethmoides, p, ' ; 3dly, The Os Sphenoides ' o, which composes the anterior Sinus of the Temple, and the centre of the Basi Cranii; 4thly, The Os Occipitis, ' m, the posterior sphere of which forms the Occiput, and its anterior cuneiform process joining that of the Os Sphenoides, completes the middle of the Basi Cranii. These four bones lie in the longitudinal curvature of the Cranium.

The two pair are, 1st, The Ossa Parietalia, ' l, which compose the vertex and superior sphere of the Temples; 2dly, The Ossa Temporum, ' n, which form the centre of the Temples, and the oblique lateral portions of the Basi Cranii. These four bones lie in the transverse direction of the Cranium.

Recapitulation.

The three superior bones, Plate I. Fig. 1st, viz. The Ossa Frontis and Parietalia, answer principally the purposes of containing and defending the Brain. The five inferior, viz. The Os Ethmoides, ' p, Sphenoides, ' o, Ossa Temporum, ' n, and Os Occipitis, mb, are adapted, from their situation and construction, to be-

1 I hope I shall be excused in noticing, that varieties in this department of the system are not solitary instances, where the human species differ from each other in their organs.

By an attention to different countries, and the influence of local causes of climate, civilization, government, laws, morals, and religion, we recognize the various organs of men liable not only to varieties of shape, but likewise maladies peculiar to each organ, deducible from these simple principles.

When, therefore, anatomical structure, and those leading causes which influence living bodies, are more minutely investigated, it is probable that the solitary and delusive reasons, hitherto too frequently assigned for the variety in human figure, genius, and maladies, shall cease to operate; and their true causes respecting disease being recognized, their effects may be palliated or eradicated with the more certainty.

2 Only the Cribriform plate, Plate I. Fig. 2d. ' a, of this bone, distinguished by the green colouring, is connected with the Brain; the rest of the bone ranks properly among those of the Face or Nostrils.

come receptacles and defenders of this organ, and likewise for accommodating the admission of its Arteries, and the transmission of its Nerves and Veins.

The junction of these bones are named Sutures; those most obnoxious to external violence are three, viz. 1st, The Coronal Suture 'k; 2dly, The Sagittal 'l', 3dly, The Lambdoidal m. The lateral Sutures are two; 1st, The Temporal Suture of the sphenoidal bone 'o; 2dly, The Squamose Suture of the parietal and temporal bones 'n. The junction 'q, is named Addittamenta Squamosæ; the junction 'b, Addittamenta Lambdoidalis. The Sutures, though serrated externally, are almost linear internally.

Sutures of the
Cranium.

The Os Frontis, in some cases, especially feeble subjects, 'as always in the Fœtus,' continues as two distinct portions, its Suture being traced from the Sagittal to the Ossa Nasi, and when present has the name of Frontal Suture. The young Anatomist should recollect, likewise, that in the early periods of ossification, the Vasa Propria of the bones often deposit partial defined rudiments of osseous matter, not only in the membranes of the Lambdoidal Suture, but occasionally in all those regions which have extensive membranes in the Fœtus. These small bones are named Ossa Triquetra, are distinguished from their connection with Sutures, and have their own proper Sutures in the adult, which may be mistaken for fracture².

The bones enumerated are not only lined with a membrane named Dura Mater, which becomes their internal periosteum, represented Plate IV. 'a d b c, but this membrane is reflected from these bones as septæ of parts of the Brain³. It is reflected from the Crista Galli, Plate I. Fig. 2d, 'a, the Os Frontis 'k, the junction

The Dura Ma-
ter and its Elongations.

¹ Seen more distinctly, Plate II. e, Plate XI. Fig. 2. l.

² Where such appearances occur in the course of Sutures, this structure ought to be recollected.

³ Dura Meninx—Meninges. This membrane is reflected in different directions from these bones, and as they separate parts of the Brain, are named Septæ Duræ Matris.

of the Ossa Parietalia '1', and the superior Fossa of the Os Occipitis 'd'. This elongation, from its shape, has received the name of Falciform Process². Its greater superior convexity attached to the course mentioned, named Superior Longitudinal Sinus, is delineated by the outline Plate I. Fig. 2d, 'a k l f', and its inferior concavity, named Inferior Longitudinal Sinus, is pointed out by the references 'a k a m'. Its attachment to the Tentorium³ is represented by the line 'a † b f', in nearly the angle it forms, as the Septum of the Cerebral and Cerebellic parts of the Brain to be mentioned. The Tentorium is sent down in a conical direction from the Falx, and is attached at its base to the transverse Fossa, Plate I. Fig. 2d, 'f', of the Os Occipitis, the triangular Fossa⁴, of the Os Parietale⁴, and is continued along the ridge of the Pars Petrosa 'rra', of the Os Temporis of this same figure, Plate I. Fig. 2d, till it reaches the posterior Clinoid process 's', of the Os Sphenoides. From the middle of the lower margin of the Tentorium, a small Falciform reflection of the Dura Mater is continued to the Foramen Magnum Occipitale, Plate I. Fig. 2d, 't'. This process is represented in situ, Plate XII. Fig. 1. 'g'. The Carotic Sinus of the Os Sphenoides, Plate XI. Fig. 2d, 'r', has the Dura Mater stretched over its cavity. This forms what is named the Cavernous Sinus of the Dura Mater⁶.

1 This junction is best seen Plate II. e, Plate XI. Fig. 2d, 'l', where the Sutures are represented which unite the bones.

2 Septum Superior—Falx Duræ Matris, exhibited in situ, Plate XI. Fig. 2d, 'h a d e'.

3 Septum Medium—Tentorium Cerebelli super extensum, Septum Occipitale Majus, exhibited in situ, Plate XI. Fig. 2d, 'e f b g r'.

4 See Plate XI. Fig. 2d, 'f b g r', in situ, and in its attachments to the Occipital, Parietal, and Petrous bones, Plate XII. hh.

5 Septum Inferior—Septum Cerebelli—Occipital Falx—Septum Occipitale Minus.

6 All the Sinuses of the Dura Mater assume a species of this structure, though this has been more attended to in consequence of Anatomists tracing the Nerves here. This cavernous appearance seems to arise from Frænulæ stretched from the Vaginulæ of the Nerves, which pass through the Sinus. Analogous bridles may be seen in the Longitudinal Sinus, Plate VI. 'o'.

The opening of the Foramen Lacerum, Plate XI. Fig. 2d, 'c, likewise has a similar production, composing the Ophthalmic Sinus.

We have seen the internal Parietes of the eight bones composing the Cranium, Plate I. Fig. 2d. We have pointed out the Elongations of the Dura Mater, Plate XI. Fig. 2d, viz. the Falx and Tentorium, and the Occipital Falx, Plate XII. Fig. 1st, 'g. We shall recognise these as corresponding to the Hemispheres and Lobes of the Cerebrum, Plates V. VII. and XIII. The Cone and Lobes of the Cerebellum, and the Pons Varolii, Plates X. and XIII. to be next more particularly described.

Recapitulation connected with the Parietes of the Cranium and Elongations of the Dura Mater.

The Brain, viewed in a general light, may be divided into three departments, all of which would seem to have offices peculiar to themselves, from the symptoms connected with their diseases, or injuries inflicted on them'. The three divisions alluded to are, 1st, The Cerebrum*, or greater portion of the Brain, Plate V. Plate VII. and Plate XIII.; 2dly, The Cere-

General Description of the Brain.

1 The Brain is an organ composed of numerous parts, on the nature of which comparative anatomy seems to throw some light. The reader will forgive me in warning him against viewing this or any other animal organ as complicated. However this notion may rise out of a superficial view of the subject, we cannot discover in any organ superfluity or deficiency in its apparatus. The Brain, correctly investigated, consists of the parts enumerated, its nerves and vessels, which perform the simple office of composing an organ, by which the mind is informed respecting external objects, through the medium of its nerves implanted in the external organs of sense.

Although varieties may be detected in the structure of nerves, yet these do not seem to produce varieties of sensation, which seem rather to depend on the organs with which these nerves communicate. Thus the Radial and Ulnar Nerves, on the anterior and posterior parts of the arm and wrist, the hand and palm, phalanges and tips of the fingers, though the same nervous elongations, communicate varied sensations, depending on the structure of their integuments. In every department of an animal body we discover the fewest agents possible employed; hence the unvarying consequences which result.

2 In man, this department of the system is larger, in proportion to the other parts of the Brain to be mentioned, than in other animals. I find it liable to collections of pus, gangrene, sphacelus, and schirrous appearances.

bellum ¹, or smaller portion, Plate X. Plate XIII.; and the Pons Varolii ², situate in the middle of this organ, Plate XIII. The Cerebrum seems peculiarly connected with the operations of mind; notwithstanding which, it often suffers great violence, and even loss of substance, without any perceptible alteration taking place in the vital organs. On the contrary, injuries of the Cerebellum are supposed by some, so intimately connected with vitality, as to occasion immediate dissolution ³. The Pons Varolii seems seldom diseased. There are internal appendages of the Brain to be afterwards understood, named Ventricles, which are exhibited Plates X. and XI. Similar structures are observed in other parts of the Brain in some animals, which would denote that they answer some peculiar office. The 4th ventricle of some Mammalia reaches to the Cauda Equina, &c.

But a more minute acquaintance with even general principles connected with the bones and Dura Mater, conveys a complete notion of the aspect of the various parts of the external surfaces of the Brain, which I shall here enumerate in a general manner, as a means of the more ready recognizance of the parts in the various plates.

¹ This part of the Brain is larger in other animals than in man, in proportion to their size.

² In some animals this seems very large.

³ I can say, from experience and dissections, that however sudden injuries of the Cerebellum may affect life, slow and insidious disease seems occasionally carried on for a great space of time, even in this organ, as I have repeatedly found it highly diseased, and partly destroyed, without symptoms betraying themselves during life, which led to the least suspicion of any derangement. The Brain is a double organ, and the peculiar functions of the Cerebellum might in such cases be carried on by some analogous power it possesses, or some principle may be inherent in this organ, which renders it capable of accommodating itself to gradual alterations. We have reason to believe, that wherever functions are carried on, notwithstanding the derangement, the destruction, or absence of organs, that these organs have analogous agents which have assumed their peculiar office, and that thus the Heart, Lungs, Brain, &c. from the analogy and catenation of their various offices, seem to derange and mutually relieve each other.

The Cerebrum may be divided into two superior and three inferior portions, viz. The two superior Hemispheres, composed of their convex superior surfaces, Plate V. 'a d b, Plate VII. 'f d. These correspond with the concavities of the Ossa Frontis, Plate I. Fig. 2d, 'k, Parietalia 'l, and superior region of the Os Occipitis 'd, and are distinctly defined in Plate IV. where the lacerations of the Dura Mater 'd n n f, connected with the Sutures, distinguish the situation of the four bones mentioned. From the superior internal margins of these hemispherical portions, they are continued in a vertical direction, Plate V. 'e c, Plate VII. 'd e; between these the Falx, Plate VI. 'h i k o, is interposed, but which last does not reach to their bottom, as may be seen Plate VI. a portion of the vertical wall being uncovered by the Falx. The hemispheres of the Cerebrum then correspond to the concavities of the Ossa Frontis, Parietalia, Occipitis, and the vertical Falx. 2dly, The inferior surfaces of the Brain may be divided into six portions or lobes, *i. e.* three on each side, viz. 1st, The anterior lobes, Plate XIII. Fig. 1st and 2d, 'x. These rest on the orbital plates of the Os Frontis, Plate I. Fig. 2d, Plate XII. Fig. 1st, 'x, and the little wings of Ingrassius, 'v. These lobes are seen in a separate state, Plate XIII. 'c; this fissure is occupied by the anterior portion of the Falx, Plate XI. Fig. 2d, 'h; 2dly, The middle lobes, Plate XIII. 'z q n s, are sustained by the great wings of Ingrassius and the concavities of the Os Temporis, Plate I. Fig. 2d, '† n z a r n, Plate XII. Fig. 2d, 'k l z n. The fissura Magna Sylvii, Plate XIII. Fig. 1st and 2d, 'y, correspond to the protrusion of the little wings of Ingrassius; and the fissura posterior, '‡, Plate XIII. Fig. 2d, takes place in consequence of the angle of the Pars Petrosa, Plate I. Fig. 2d, 's a r r *, Plate XII. 'h h, which separates the posterior lobe of the Cerebrum and the anterior portions of the Cerebellum; 3dly, The posterior lobes of the Cerebrum rest upon the Tentorium Cerebelli super Expansum, an outline of which is

Divisions of
the Cerebrum.

Divisions of
the Cerebellum.

The Four Ventricles
of the Brain.

represented Plate I. Fig. 2d, 'a + b f; and its conical aspect, Plate XI. Fig. 2d, 'e f b g r; these lobes are represented Plate XIII. Fig. 2d, b, and are separated by the posterior portion of the Falx, Plate XI. Fig. 2d, 'm e. The base of the Cerebrum therefore is composed of six lobes, which correspond to the portions of the Os Frontis, Sphenoides, Temporis, and Tentorium, enumerated.

Divisions of
the Cerebellum.

The Cerebellum may be divided into three parts, viz. its superior Cone and inferior lobes; 1st, The superior Cone, Plate X. 'g h i, is covered by, and corresponds to the Cone of the Tentorium, Plate XI. Fig. 2d; 2dly, The two inferior lobes, Plate XIII. Fig. 1st and 2d, 'a § v w *, are received by the inferior region of the Os Occipitis, Plate I. Fig. 2d, ∞, Plate XII. Fig. 1st, ∞, and the fissure observable between its lobes is occasioned by the Occipital Falx, Plate XII. Fig. 1st, 'g.

The Pons Va-
rolii and Me-
dulla Spinalis.

The Tuber Annulare¹, Plate XIII. 'm n o, is a protuberance connected to the Cerebrum by its Crura², 'u, and the Cerebellum by its Crura 'w,³. This body is seen connected with the spinal marrow, 'k l. The Pons Varolii rests on the cuneiform portions of the Os Sphenoides and Occipitis, Plate I. Fig. 2d, 't, Plate XII. Fig. 2d, 'l m n o, and the Medulla Spinalis, Plate XIII. 'i k l, is continued from the Tuber to the Spinal Canal of the Vertebrae.

We have seen that the hemispheres of the Cerebrum, Plate V. Plate VII. correspond to the bones, Plate I. Fig. 2d, 'k l d, and the Falx, Plate XI. 'h a d m e. The anterior lobes of the Cerebrum, Plate XIII. occupy the Os Frontis, Plate XI. Fig. 2d, 'h k, and the Os Sphenoides, 'b o. The middle lobes occupying the Ossa Sphenoides and Temporum, 'n c r g, the

1 The transverse protuberance, Medullæ Oblongatæ, Processus Annularis, Corpus Annulare.

2 Crura Anteriora Medullæ Oblongatæ, Pedunculi Cerebri.

3 The small or posterior branches, Pedunculi Cerebelli, Crura Posteriora Medullæ Oblongatæ.

posterior lobes occupying the Tentorium, 'e f b g, of this same figure. The Pons Varolii occupies the Ossa Cuneiforme and adjacent temporal bones, Plate I. 't u s, which is analogous to the space 'c, bounded by the Foramen Ovale, Duræ Matris, Plate XI. 'c. The Pons Varolii, Plate XIII. 'm n o, transmits its Crura 'u, over the margin of the Tentorium, Plate XI. 'c, to join the Cerebrum.

The parts composing the Cerebrum, Cerebellum, Pons Varolii, &c. and their relation to the bones of the Cranium and the Septæ of the Dura Mater, may now be easily recollected, viz.

The Hemispheres of the Cerebrum correspond to the superior Sphere of the Skull and the Falx; its lobes correspond to the base of the Cranium and the Tentorium. The Cerebellum corresponds to the Tentorium and inferior Fossæ of the Os Occipitis. The Pons Varolii occupies the middle of the base of the Skull, and transmits its Peduncles over the margins of the Foramen Ovale Duræ Matris, to join the Cerebrum. The Medulla Spinalis is continued from the Pons Varolii to escape, as the great corporeal Nerve, by the Foramen Magnum Occipitale.

PLATE II.

THIS plate represents the appearances taking place on the removal of the integuments of the Head; this brings into view the four bones, a section of which is made in sawing the Skull previous to examination of the Brain. When the Brain is examined, (with a view of replacing the contents and bones) in morbid cases, a section of the hairy scalp ought to be made transversely from the one ear to the other, the integuments removed forward to the lower margin of the Os Frontis, and backward to the Occiput, a little above its transverse ridge, which admits of the replacement of the bones and integuments by ligature, after examination. The Coronal, Sagittal, and upper half of the Lamb-

Removal of the
Integuments.

moidal Suture, are in this plate brought into view. The Parietal Foramina 'g, are delineated, usually found in the posterior third of the bone, so often deluging the operator in wounds and operations, by the blood passing from the integuments and longitudinal sinus, Plate IV. 'n'. Even in apoplectic cases, the congestion of the veins of the integuments often occasion great effusion when their section is made.

PLATE III.

Internal View
of the Calva-
ria.

THIS plate represents the bones removed from their inner membranes or Dura Mater of Plate IV. These convey an idea of the exact impressions of the convolutions of the Brain, Plates V. and VII. which lie beneath the Dura Mater, and communicate their shape to the bones, as well as the protrusions or inequalities of the Brain, as 'h, Plate IV. which occur occasionally in all parts of the Brain, as well as the portions connected with the Ossa Parietalia and Frontis, so teasing in the moment of operation, the bones, in many instances, being diaphenous, and thin-

1 I hope it may not appear improper to mention here, that the dexterous management of the instruments is of great importance to the practitioner; verbal directions, however, cannot well convey minutiae. The hand ought to observe the semiprone attitude, and never turn, whatever direction incisions require. The scalpel only ought to be turned; this is easily accomplished, by sustaining the knife on the mid-finger, on which its handle may be rolled by the index or thumb, in a complete circle, so as to present a cutting edge in all directions, the hand observing its graceful and firm attitude. Every incision ought to be planned, and carried to its full extent by one decisive step; in removal of the integuments from the Pericranium, the edge of the knife ought to move from the Cranium in an oblique direction toward the integuments, which last should be held on the stretch; this insures rapidity and graceful action in this step of the operation. The saw, in the commencement, is to be slightly passed over the intended line to be pursued, and kept in its place by the thumb of the left hand, directed above the teeth, till a line of incision is established. The saw ought to be moved rapidly in a straight line, and rather supported than pressed upon the bones, as the operation of sawing is performed by laceration by the instrument, which is impeded by bearing hard upon the saw.

ner than a wafer, occasionally where the convolutions protrude, and very thick in the adjacent portions, where the bone follows the depression of the convolutions. The arborescent grooves 'i, are likewise seen, corresponding to the pulsating arteries of the Dura Mater, Plate IV. 'i k l m'. The numerous arterial foramina tinged with blood, observable on the surfaces of the inner tables of the bones, when recently removed, point out the entry of the extreme branches of the vessels of the Dura Mater, which anastomose in the diploe, with the Frontal, Temporal, and Occipital ramifications of the external Carotid Artery, which are diffused as the vessels of the Pericranium, muscles, and integuments of the Head.

The Sutures are observed to be very little serrated internally.

The anterior Spine 'm, the lateral Spine 'n, and posterior Spine 'c, exhibit those portions of the bones which require considerable labour in sawing the Cranium, though there are great varieties in this respect in different subjects, as well as in the thickness of the general walls of the Skull.

1 It may appear mysterious to the young Anatomist, how hard bones should be impressed by soft and yielding substances, as the Brain and Arteries of the Dura Mater. But this seems easily explained. Osseous materials are perfectly fluid when deposited by their Vasa Propria and become equally so when effete, and carried off by their corresponding lymphatics. The arteries of the Brain and Dura Mater are in incessant action, carrying on their appropriate functions. The substance of the Brain is formed and carried on by four large vessels, the Carotids and Vertebrales, in a very undisturbed manner. These vessels build up the various parts of the ventricles, Plate X. and convolutions, &c. Plates V. VII. and VIII. actuated by fixed laws. The arteries of the Dura Mater, Plate IV. 'i k l m, are likewise active primary organs, the pulsations of which are very considerable: since these convolutions and arterial trunks continually present protruding surfaces, so much more active than the passive powers of the extreme rami of the arteries of the Dura Mater, which effuse the fluid osseous materials, the internal parietes of the Bones seem to assume the impressions of the parts in contact. The Sinuses of the Ossa Frontis, Parietalia, Occipitis, and Temporum, Plate I. Fig. 2d, are the consequences of the continued plenum of the sanguineous cavities; these contents, though fluid and passive in their circulation, impede the effusions of the Vasa Propria; and where the effusions are not impeded, the bones are thicker in the vicinity of such hollows.

PLATE IV.

The Calvaria
removed, and
the Dura Ma-
ter exposed,
&c.

THIS plate affords a view of the external surfaces of the Dura Mater, 'a b c, entire on the left side. The lacerations of the Dura Mater in the course of the Sutures of the four bones already mentioned, point out the original situation of these bones, and the relative situation of their vessels. I trust that the vessels are represented nearly in their place; on examining many specimens, I could not find room for any alteration in their representations, as varieties are numerous; but they seem often to answer the general site of this plate; and the Coronal Suture, the middle and posterior portions of parietal bone, lead us to the general plan of the larger arterial trunks, so far as this region of the Cranium is concerned.

The Dura Mater externally assumes a bluish tint; its external surface is completely villous, arising from the congeries of vessels passing from this membrane into the substance of the inner tables and cancelli, as their Vasa Propria or Nutritiæ; in young subjects, these vessels are so numerous and powerful, that the bones

1 Whatever part of the system we investigate, membranes enter universally into the composition of organs. These are more or less elastic, and, in a state of health, are always insensible, though indeed insensibility is a state we notice in almost the whole system in this state, except the muscles of volition; even the Brain is perfectly insensible during health, and the heart is more so than any vital organ; and the bowels themselves convey no sensation to the ~~heal~~ subject. Bones, cartilages, ligaments, &c. convey no sensations during health; but, in disease, all these parts assume the most acute and painful sensations. Anatomy proves to us, that the vessels in such cases are much dilated from their muscles being much enfeebled; morbid action seems explained, therefore, on principles of debility in general. The elasticity of membranes admits of motions on passive principles; they possess a passive or physical state of contraction, which they will always observe till forced to yield by a superior elongating cause, which, when withdrawn, they reassume their physical state. Does this universal organization of passive elasticity and introduction of insensibility, prove to us the danger to which life is exposed by too much recognizance of mind by means of sensation? Does comparative anatomy lead to the observation, that life is the less vulnerable, in proportion as the Brain is small, and the blood of a low temperature?

are raised by the operator with great difficulty ; on the contrary, in old subjects, where the vessels are few and comparatively feeble, the bones are elevated with ease. The longitudinal Sinus, ' n n, is seen in great part of its extent as connected with the Spine or groove of the Os Frontis, Plate I. Fig. 2d, ' k, the semi-hollows of the Ossa Parietalia, ' l, and the superior Sinus, ' d, of the Os Occipitis'. The Dura Mater has no openings externally in this Sinus, except at the superior, ' n, where the veins of the Cranial Integuments enter the Sinus, and where the Sinus may occasionally empty its contents into these veins².

The Dura Mater is composed of two laminæ ; the external lamina is the nidus of the arteries (or periosteum,) of the internal system of the bones of the Head ; the arterial rami have their chief determination toward these bones. The most material branches are derived from the internal Maxillary artery, the root of which lies nearly an inch within the anterior portion of the hinge of the lower jaw, Plate I. Fig. 1st, ' v. This great or middle meningeal artery, having entered the Spinal Foramen of the Os Sphenoides³, spreads into the lower or posterior artery and its rami, Plate I. Fig. 2d, ' m, Plate IV. Plate XII. ' m, which is often situate as Plate I. Fig. 2d, ' m, sometimes lower, passing on the root of the Pars Squamosa, as represented Plate XII. Fig. 1st, ' m. The superior or anterior branch and its rami, Plate I. Fig. 2d, ' k, Plate IV. Plate XII. ' k, after reaching the spinous process or anterior inferior angle of the Os Parietale,

Laminæ of the
Dura Mater.

1 See Plate I. Fig. 2d, ' a l d, Plate III. where the bones and its course are understood as passing along the middle of the Cranium, ' m h e c, Plate VI. ' k, Plate XI. Fig. 2d, ' k l m.

2 These venous openings are not always present ; if present, would a section of these, in apoplectic cases, become serviceable ? The local distress in this region is often tragically tormenting. In fever and apoplectic cases, patients are liable to distressed sensations when lying on the back. Does this arise from the blood in the veins of the Brain receiving an increased resistance by meeting the column in the longitudinal sinus ? May night-mare, &c. depend on this ?

3 Plate XII. Fig. 2d, ' x, Plate XII. Fig. 1st, ' k l m.

Plate I. Figs. 1st and 2d, '†, it often passes an inch in an osseous groove', and commonly is here bent obliquely backward, after which it soon observes a direction more or less parallel to the Coronal Suture, as represented Plate IV. 'k, from which another, Plates I. IV. and XII. is usually sent off. The anterior arteries are usually from the external carotid, the trunk entering by the external opening of the Foramen Lacerum, Plate I. Fig. 2d, 'i, Plate IV. 'i, Plate XII. Fig. 1st, 'i. The posterior arteries of the Dura Mater, which enter by the orifices of the various venous Foramina of the Ossa Parietalia, the Foramen Lacerum Posterius, and other auxiliary openings, are very small. The veins of the Dura Mater are sometimes double, one placed on each side of the artery, though I meet with them single and larger; they sometimes escape, partly by the Spinal Foramen, but more commonly communicate with adjacent sinuses to be mentioned. The internal lamina of the Dura Mater, Plate IV. 'o, not only has a different office, but a different structure and aspect from the external; it is smooth and of a splendid silvery tint, becoming the investing membrane of the Brain and nerves.

Tunica Arachnoidea.

Beneath the Dura Mater another investing membrane is discovered, named Tunica Arachnoidea², Plate IV. 'p; it is transparent, and no vessels have hitherto been traced on its surface; this membrane, on the superior surface of the Brain, is detected by means of inflation only; but it is commonly conspicuous between the Pons Varolii and the Medulla Spinalis, without any art being used; and here it assumes a loose appearance, and a more dense texture.

The Pia Mater.

The Pia Mater³ is the membrane immediately in contact with every surface of the Brain, Plate IV. 'q, and seems destined to

1 When this portion of bone is present, and is removed by operation, in such instances, a fair section of the artery must be made, and will require two ligatures to check the hæmorrhage.

2 Membrana Arachnoidea.

3 Localis Membrana—Meninx Tenuis.

form the nidus of the arteries and veins of every part of the Brain, as will be afterwards noticed, in speaking of the convolutions and Ventricles. The Pia Mater being raised from the convolutions, it assumes the appearance of a villous web, sending its vascular branches into the substance of the Brain, and has on this account received the name of *Tomentum Cerebri*.

PLATE V.

To bring the hemisphere of the Brain into view, the Dura Mater ought to be removed along the margin of the bones; to avoid injuring the Brain, the Dura Mater may be drawn from its contact with that organ, by the forceps or tenaculum, the back of the scalpel directed toward the Brain, and the incision carried from it; the Dura Mater is then to be inverted, as represented Plate VI. The dissector ought to remark the adhesions which are usually observable at the upper margin of the hemisphere, Plate V. 'c, where the veins and *Glandulæ Pacchioni* approach the longitudinal Sinus, which last is represented Plate VI. 'k, and seen in this present view of Plate V. when lying in its place. The hemispheres we have already understood in their general shape. Their structure externally is here represented, and conveys an idea similar to all the surfaces of the Cerebrum, which is a congeries of convolutions, like intestinal elongations, which have distinct surfaces, dipping considerably into the substance of the Brain, each of which is covered by the Pia Mater or *Tomenta*; and these are even reflected inwards within the external convolutions. The direction of the Cerebellic system is different, as may be observed in the plates, they form irregular segments, which are however separated for a considerable depth, as may be seen Plate XI. Fig. 1st. The vertical walls 'e, lie partly in contact with the Falx, Plate VI. 'h. These vertical walls 'e, which are completely recognized by lifting Plate VI. or removing the

The Hemisphere and Corpus Callosum exposed to view.

Falx of Plate VI. are evidently unconnected with the Falx 'd e, about a quarter of an inch above the Corpus Callosum. This observation will be applied afterwards in a practical view. The veins of this, Plate V. 'd, entered the Sinus of the Plate VI. below, seen at 'h. The Glandulæ Pacchioni, 'c, are bodies often assuming a carnious or cineritious appearance, the offices of which seem still doubtful. The hand is introduced in this plate to exhibit the Corpus Callosum, the little finger presses back the Falx and right lobe, while the thumb displaces the left.

The Corpus Callosum is discovered about a quarter of an inch below the Falx 'h; and between the Falx and Corpus Callosum we discriminate the portion of the vertical wall, Plate VII. 'e d, which is unconnected with the Falx, and belongs to the notions of Plate VII. When the unexperienced Anatomist separates the hemispheres to examine the Corpus Callosum, he is apt to be deceived; for these portions of the vertical walls, 'd e, beneath and unconnected with the Falx, are apt to coalesce, by the vessels of their Pia Mater anastomosing, which form accretions; the lacerations of these walls are mistaken by the novice for the Corpus Callosum; but the dissector must continue his investigations till he discovers the regular defined body of the Corpus Callosum, 'f g, which is perfectly white, possessing two medullary lines on each side of a middle Raphe; and from these lines the transverse striæ are sent off to mingle with the hemispheres.

Where water is suspected in the ventricles, (to be afterwards understood,) the operator ought to be cautious in the manner of separating the hemispheres, as the Corpus Callosum is apt to lacerate; and where fissures take place in such cases, water is usually found in the cavities below; and when attention is not paid, the fluid is apt to be awkwardly spilt, and the quantity not duly ascertained.

1. Commensura Magna Cerebri.

PLATE VI.

THIS plate exhibits the removal of the hemisphere in the step toward examination of the ventricles; the hemisphere may be removed in a horizontal direction, half an inch above the level of the Corpus Callosum, as the ceiling 'r r g f, of the ventricle below, is often elevated a considerable way by disease. In this section we become acquainted with the two substances which always enter into the composition of every distinct body composing the Brain; viz. the cineritious matter 'a, which composes the external surface of the convolutions, and the Centrum Ovale 's s, or medullary matter 'b, which is continued into the convolutions as their inner substance. The name Cortical substance cannot apply in general to the Cinerea, as this matter is found internally in some bodies; this substance varies much in different subjects and diseases; in young and vigorous bodies, it seems more florid than in the aged or feeble. In apoplexy it is often chocolate coloured. We shall find every body composed of these two substances in one direction or another. I cannot, in our present state of ignorance, ascribe the intention of either of these substances, as they are always present in every organ connected with the Brain and Nerves; and phenomena do not furnish us, seemingly, with data of distinction respecting the operations of the one more than the other. I therefore at present wave tracing those parts, as well as the nerves, in their internal connections of the Brain, till leisure and numerous dissections enable me to recognize and furnish plates of their connections, and compare these with the late opinions of ingenious anatomists, who have laboured so laudably in this important and hitherto mysterious topic.

At 't we observe the Tomentum and its vessels, continued on each adjacent convolution, and here an inner reflection of the convolution is represented as turning within the external, vessels emerge from the Pia Mater, and ramify solitarily in the sub-

The Hemisphere removed, and Centrum Ovale shewn.

stance of the Medulla of the Brain ; and, in apoplexy, the veins corresponding to them are often in a state of rupture, when no injury is evinced in the large trunks of the veins, which are continued into the Dura Mater, to be more particularly described.

Some Anatomists recommend dissecting off the surrounding cineritious convolutions of the Brain in all directions, as represented by 's s, to exhibit the arched nucleus of medullary matter, named by Vieussens, Centrum Ovale ; but this seems less proper than the horizontal section, which displays the Oval Medulla continued into each convolution. The convolutions being removed, the whole Cerebrum corresponds to this idea, exhibiting a uniform medullary nucleus connected with the centre of the Brain. The attentive observer may often detect a middle medullary line, continued in the course of the Cinerea throughout the whole convolutions. The cineritious border 'r r, represents the lower margin of the hemisphere inverted, half an inch above the level of the Corpus Callosum ; from this portion, the continuous or incumbent vertical wall of the hemisphere has been removed, which was reflected from this, and rested on the Corpus Callosum 'f g, here exhibited.

Corpus
Callosum.

The Corpus Callosum, as well as other distinct portions of the Brain, is very varied in its shape and dimension in different subjects. This represents the medium appearance and size ; it is sometimes formed of a regular arch, and in other cases waved, broadest posteriorly, and hollowed where the Falx is reflected toward its anterior and posterior attachments. Previous to removal of the Falx, or hemisphere on the right, these connections of the Falx ought to be examined in their various relations.

The Superior
and Inferior
Longitudinal
Sinus, Falx,
&c.

The smooth internal surface of the Dura Mater 'p, is thrown up as continuous with 'k. The superior longitudinal Sinus, into which the great veins of the Brain enter, Plate VI. 'd, Plate VII. 'd ; the anterior veins seem to be inserted at right angles, but those behind penetrate nearly an inch in the Laminæ of the

Dura Mater, observing a direction obliquely forward, as represented Plate VII. 'h, Plate XI. Fig. 2d, 'd'. The Sinus is kept tense by tendinous bridles, Plate VI. 'o. The inferior longitudinal Sinus 'i, receives the blood from the adjacent parts, and transmits it to the Torcular Herophile, or middle Sinus of the Tentorium, Plate XI. Fig. 2d, 'e. The Falx is composed of a duplicature of the Dura Mater, having the superior Sinus as the convex side, which is a triangular cavity, possessing the bones mentioned, Plate I. Fig. 2d, Plate XI. Fig. 2d, as the base of the cavity, and the Falx as the apex. The lower concavity 'i, or inferior Sinus, is its lower boundary. The Falx, as well as the rest of the Dura Mater, has tendinous portions stretched over its surface, which keep the parts tense. This septum is very liable to have osseous matter deposited in its substance by its Vasa Propria, to which some have ascribed epilepsy; and I have seen masses upon the point of being disengaged from the membrane, and must have pricked the vertical walls of the Cerebrum; all the portions of the Dura Mater are obnoxious to this occurrence. In the case of an idiot I shall mention, the Falx was absorbed, and the vertical walls of the hemisphere completely grown together as one solid mass. In this subject the Cerebrum was denuded by local disease, and the Cerebral Arteries partially attached to the Dura Mater by the process of inflammation; these rami were depositing osseous spiculæ in that membrane, while the other branches deposited the materials of the Cerebrum, a seeming proof that vessels are actuated by the appropriate organs with which they are connected, clearly illustrated in this instance ¹.

1 The veins of the Brain have no valves in their cavities. This unsupported state of the column of the venous blood seems aggravated in the veins of the Brain, by the direction of their contents meeting resistance from the blood in the longitudinal Sinus, which observes a retrograde course towards the lateral Sinuses, Plate XI. Fig. 2d, 'f, Plate XII. Fig. 1st, 'b.

2 Not only do we find vessels which are spread on the membranes of bones deposit this osseous matter, but the vessels of all membranes, which are not connected with muscles of

The Ceiling of
the Ventricles.

The ceilings of the lateral ventricles are composed of equal parts of the Centrum Ovale and the Corpus Callosum. The dots Plate VI. 'r r, denote a distance in the Centrum Ovale, equal in breadth to the half of the Corpus Callosum, and parallel with it. When the Brain has been in health, the external margin of the ventricle is nearly on a level with the Corpus Callosum, and sometimes even beneath this level. The operator is to scratch with the edge of his scalpel, in the course of 'r r, till he discover a bluish appearance, which is the Pia Mater of the ceiling; and to exhibit this, without rupturing it, is always interesting, but peculiarly so when water is in the cavity, the fluctuation of which will be communicated to the Pia Mater.

PLATE VII.

Ceiling of the
Ventricles re-
moved.

THIS plate exhibits the left ventricle. When the incision is made as is directed, the Corpus Striatum 'p, in its external margin, is brought into view, the ceiling being gently elevated by the flat edge of the knife, the external margin of this body will appear higher than the internal; it inclines obliquely downward where it approaches its fellow; this may be understood by Plate X. By elevating the ceiling of the ventricle, the dissector may discover it composed of the Centrum Ovale, Plate VI. 'r r, the Corpus Callosum, 'f g, the Septum Lucidum, Plate VII. 'k, the Fornix, Plate VII. 'l. All these bodies are in a state of continuity.

The Fornix is discovered as the lower triangular Septum of the ceiling; and, in a state of health, this department of the

volition, are liable to take on this process; such as the valves of the Heart, the inner membranes of the Aorta and its ramifications, the Pleura, even the Lungs, so very membranous, I have seen partly in a state of ossification, the Peritonæum, &c. In subjects predisposed to Anchylosis and Exostosis, even the cellular membrane of muscles has been discovered connected with osseous deposition.

Brain exhibits no character of ventricular appearances, but is really a series of various bodies in contact with each other, the lower portions sustaining the superior, and a limpid fluid lubricates their surfaces¹. This plate delineates the appearance taking place when the operator has made a vertical section of the Corpus Callosum,² 'i, leaving the Septum 'k entire; the parts I hope require little definition³; the Septum 'k is continuous with the Corpus Callosum 'i, and is continued into the substance of the Fornix 'l. Along the outer margin of the Fornix, the Plexus Choroides 'm⁴, has its course; the white strip 'n, discovered on the external margin of the Plexus, is part of the Thalamus Nervi Optici; the rest of this body is covered by the Fornix. The curvature 'o is the Tænia Striata⁵. The Corpus Striatum 'p, is a body similar in shape to the quarter of a pear, curved in its internal margin; its external margin is likewise curved in its vertical direction, being higher in the middle than at the anterior and posterior portions; the greater bulbous end is anterior, and the small posterior extremity diverges⁶; below the anterior

A series of the
Corpus Callosum

Foramen of
Monro.

1 In disease they become cavities containing water, blood, &c. I have met with them likewise in the state of large cavities perfectly dry, and in other cases dry, but not dilated, the Pia Mater of the floor and ceiling occasionally in a state of accretion, and sometimes the speck appearing in the inner membrane of the Aorta and Arteries, previous to ossific deposition, may be observed. Cartilaginous bodies likewise are sometimes found generated in the ventricles.

2 The vertical striated appearances of the Corpus Callosum is here represented.

3 The Student ought to aid his knowledge, and acquire the dexterous use of his instruments, by dissecting the brain of animals, which will assist in leading him to a recognizance of the human Brain.

4 The Plexus is usually of a dark colour, approaching to black, and seems a congeries of arteries and veins; but, occasionally, this is seen of a perfect white appearance, the vessels empty, assuming a congeries of empty thread-like bodies. Vesicles, analogous to Hydatids, are very frequently met with here.

5 Named likewise Centrum Semicirculare Geminum—Tænia Semicircularis. These are not always medullary lines, but in disease are bluish, and of a gelatinous consistence; this seems the consequence of disease. In vigorous and young subjects they often assume the appearance of two delicate white lines.

6 This body has its name from the structure of its parts; it is cineritious externally; when a vertical section is made, as in Plate X. Fig. 2d, 'y, an arborescent arrangement

margins 'q, of the Fornix, there is an aperture which communicates with the lateral ventricles, Plate X. and the Infundibulum, Plate XIII. 'y. This communication was first described as present in the human species, by the justly celebrated anatomist Dr Monro, under whom I had the honour and advantage of studying.

Arteries of the
Corpus Callo-
sum.

In this stage of the dissection, the operator may satisfy himself respecting the inferior artery 'd, of the hemispheres, and the superior artery 'e, which are the extremities of the anterior Cerebral arteries, Plate XIII. 'c; these pass upward by the anterior Cerebral fissure on each side of the Falx, and are diffused on each side of the Corpus Callosum, and the vertical walls as represented in this view. When the lower margin of the wall is elevated, where it joins the great vessel 'd, the Corpus Callosum on the right side will be discovered as a distinct surface, connected with the hemisphere on which the reflected margin of the wall rests. The outline 'z, points out the site of the Hippocampus Minor. '†, the Hippocampus Major. '*, the Digital Cavity, to be shewn in the next plate, of which this forms the ceiling, and which is to be dissected out as the next plate exhibits.

of medullary and cineritious matter seems observable, the root inferior, and the branches directed upward; the same observation may be applied to the portion on the outside of the Hippocampus Major.

1 The right hemisphere may be removed in the following manner, viz. Form a transverse incision in the middle of the hemisphere, about 'd, and continue this down to the Fornix '1; next carry a horizontal incision from the posterior or anterior portions, thus raising the anterior or posterior half of the ceiling of the ventricle; this affords an instructive view not only of the component parts of the hemisphere, but likewise the connections of the hemisphere, Corpus Callosum, and Septum, which last appears a double lamina; it assumes a pear shape, the bulb anterior, and is sometimes bluish in its tint; in other cases it appears white, and is occasionally the seat of dropsy, and has on this account by some been named the 5th ventricle, or Fossa Sylvii; when this view is taken, the other half of the hemisphere may be removed, as in the next plate.

PLATE VIII.

THIS plate exhibits the Fornix, which separates the Ventricles. The relicks of the Septum appear connected with its middle. The extremities of the Fornix may be traced as connected with the Corpus Callosum. The Fornix forms the lower and middle portions of the Vault, which is diffused over the middle of the ventricles; it is a double body, and may be divided into its anterior Crura 'w; its body 'h; and its posterior Crura 'x; which divaricate from each other. The posterior appendage 'z, is named Hippocampus Minor; the anterior and larger 'd, Hippocampus Major'. The lower termination of the Hippocampus is covered by the Plexus, which answers as a guide for tracing its place and extent². The posterior or digital Sinus '*, is often much enlarged, so as nearly to meet its fellow in some cases. This seems the consequence of disease, and is frequently empty, notwithstanding its enlargement. This distention posteriorly is often attended by the appearances of a second pes, which seems occasioned by the prolongation of the digital Sinus by contained water; it is placed by the outside of the great Hippocampus, and has no regular Plexus as the former. Previous to exposing the body beneath the Fornix, this last may be cut transversely, near the anterior Cornua, to exhibit its inferior surface, as represented Plate IX. 'd.

The Fornix
and its Ap-
pendages.

PLATE IX.

THE inverted Fornix 'd, exhibits the transverse lines 'g, distinguishing its lower surface, deriving the name of Psalterium or

The inverted
Fornix, Ve-
lum Interpo-
situm, &c

1 Pedes Hippocampi—Cornu Ammonis.

2 As the outline of the last plate exhibits. The Hippocampus Major has an inverted fimbriated margin, 'w, deriving its name from its structure, and indeed the Pes may be raised considerably from its floor without violence. This body penetrates obliquely to nearly the lower margin of the middle Cerebral lobe, Plate XIII 'z.

Lyra, from its supposed resemblance to the stringed instrument of the ancients. The Velum Interpositum 'i', is discovered by this section, formed of a duplicature of the Pia Mater derived from the adjacent lower surface of the posterior lobe of the Cerebrum and the superior cone of the Cerebellum; this composes at once the envelope of the vessels of the Velum, (and the Pia Mater which covers the ventricles); the arteries of the Plexus, Plate XIII. Fig. 2d, '||', are continued from the middle and posterior Cerebral arteries, 'd p'. The Vena Galeni 'k, unite into one common trunk, to be inserted into the Torcular Herophili 'c, represented likewise in its profile, Plate XI. 'e, receiving the Venæ Galeni 'i, into its cavity.

The Velum may be removed from its anterior adhesions to the ventricles, as represented in the next Plate X. This requires to be cautiously performed, as the third ventricle, Plate XI. Fig. 1st, 'x, is apt to be thrown open if the Velum is rudely elevated, and the Pineal Gland, Plate X. Fig. 1st and 2d, 'c, is liable to be torn from its situation, if this care is not observed, as numerous vessels pass from the Velum into its substance, which form a more powerful adhesion to the Velum than its peduncles do to the adjacent bodies, with which we shall find it connected.

PLATE X.

IN Fig. 1st the Tentorium is thrown up to expose 'g h i, the Cone or superior portion of the Cerebellum. The Velum is likewise thrown up, which may be traced as a continuation of the Pia Mater, from the inferior surface of the posterior Cerebral lobe 'z, and the Pia Mater of the Cerebellic Cone 'g. The tense and large receptacles of the venous blood are conspicuous, viz. The longitudinal Sinus¹ 'a; inferior longitudinal Sinus 'b, Torcular 'c, and lateral Sinus '*', to be more particularly describ-

1 Tela Choroidea.

2 Seen Plate IX.

ed. The superior arteries of the Cerebellum 'h, are here represented, which are the extremities of the superior Cerebellic arteries, Plate XIII. Fig. 2d, 'o, and their corresponding veins 'i, are discovered entering the lateral Sinus *.

The Velum being removed, the bodies composing the lower region of the ventricles are exposed, and are referred to by the outline, Fig. 2d, viz. 't m n. The Corpora Striata, forming somewhat of a pear shape, cineritious externally, internally formed of an arborescence of medullary and cineritious matter, in the vertical section 'y, recommended, in cutting down to the Hippocampus, Plate X. 'd; but the careful observer will discover the same arborescence on the outer side 'z of the pes.

The Thalami Nervorum Opticorum, 'o d q p, have their bulbs posterior; they fill up the space between the Corpora Striata, and compose inversions of the Corpora Striata. They are medullary externally, and internally cineritious. An anterior eminence 'p, and a posterior 'o, are very conspicuous; these are covered by the Fornix, and have the name of Corpus Geniculatum externum et internum. The junction of the Thalami has received the name of Commissura Mollis, though with no seeming propriety, as there is little continuity, if any. The Crura Fornicis anterior 'w, are bent forward to exhibit the anterior commissure of the Cerebrum 't, which has the appearance of a dense transverse white cord, and which unites the hemispheres; directly behind this the vulva 's, is discovered; this opening is the com-

Corpora Striata.

Thal. Nerv. Opticorum.

Anterior Commissure.

Vulva.

1 Foramen commune anterius; iter ad infundibulum; iter ad tertium ventriculum.

2 These four bodies composing the floor of the ventricles, as well as the Corpus Callosum and Septum, are very various in their dimensions in different subjects. And as the Brain is a premature organ in man, they soon acquire their full size. In an idiot I discovered them to be very small. She had Strabismus from infancy, had laboured under Hydrocephalus Internus, as the cavity of the ventricles originally contained half a pint of fluid, half an ounce only remaining. The Falx was completely absorbed, and the adjacent portion of the Tentorium, where a tumefaction of the Cerebellum appeared; the optic nerves were unusually slender. The spine of this woman was much distorted, the

The Infundibulum.

The Anus.

The Commissure.

The Pineal Gland.

The Nates.

The Testes.

munication leading from the ventricles to the Infundibulum, a cineritious, conical, or infundibuliform body, Plate XIII. 'q', inserted into the pituitary gland, Plate XII. Fig. 1st and 2d, 'i'. At the posterior portion of the ventricle, a similar opening may be observed, named Anus, Fig. 2d, 'r', which is shut up by the Velum, behind which a posterior transverse cord 'v', is situate, named Posterior Commissure of the Cerebrum. The pineal gland, 'c', is sustained partly by this last body, is partially attached to the nates by a slender peduncle; but the anterior one 'd', represented in the plate, is large and conspicuous, uniting itself to the Thalamus and anterior Crura Fornicis. The appearance of this body, as all the cineritious parts of the Brain, varies very much in different subjects; when healthy, it is cineritious externally, and medullary internally, and is rarely found free from gritty matter in the adult Brain. I meet with it much enlarged, and occasionally in a cartilaginous state. Des Cartes has supposed this body peculiarly connected with mind, but there seems no solid ground for this hypothesis. The Nates, 'e', are two bodies deriving their name from their resemblance to those bodies in the human subject; they are medullary externally, and cineritious internally. Beneath, and a little more posterior, are found two transverse bodies, likewise deriving their name from a resemblance to the Testes 'f'. The depending region of the ventricles * have received the name of anterior Sinus, and the posterior triangular cavity 'b', posterior or Digital Sinus. A section of the Commissura Mollis 'q', and the Quadrigemina, being form-

constitution puny, the mind very imbecile, the temper peevish and jealous, her appetite, (as many labouring under diseases of the Brain, for food,) was very voracious. Another ideot had similar small bodies composing the ventricles.

1 Foramen Commune Posterius.

2 Anterior eminences, anterior tubercles, larger in brutes than man; they seem more cineritious externally in some animals than man.

3 Posterior eminences—Posterior Tubercles. These four bodies have been named likewise Quadrigemina. The observations connected with Nates, seem to apply to these bodies.

ed, the ventricles represented Plate XI. Fig. 1st, are brought into view.

PLATE XI. FIG. 1st.

THE Anterior Crura Fornicis are laid back, to exhibit the sections of 'a, the anterior commissure of the Cerebrum. The Iter ad Infundibulum '†. The third ventricle 'x. Sections of the posterior commissure 'b. The pineal gland, and its peduncle 'e d. The Nates and Testes are cut through to exhibit the Iter ad Quartum Ventriculum '§, 'g the Valvula Vieussenii, 'h fourth ventricle, or Stylus Scriptorius', 'k Arbor Vitæ, springing from the Pedunculi Cerebelli '.

Third and Fourth Ventricles, &c.

Iter ad Quartum Ventriculum.

We have viewed the ceiling of the ventricles composed of the Centrum Ovale, Corpus Callosum, Septum Lucidum, and Fornix. In the lower region of the Ventricles are found the Velum Interpositum, Pineal Gland, the Vulva and Anus, Anterior and Posterior Commissures of the Cerebrum, Thalami Nervorum Opticorum, Tænia, Corpora Striata; behind are the Nates and Testes. Beneath the Commissura Mollis is the third Ventricle; its anterior cavity bends downward as the Iter ad Infundibulum, and posteriorly it terminates in the Iter ad Quartum Ventriculum.

Recapitulation.

PLATE XII.

IN this plate, Fig. 1st conveys a notion of the base of the Cranium, which receives the corresponding portions of the base

Base of the Cranium, the Nerves, Vessels, and Sinuses retained in situ.

1 This cavity is continued to the termination of the Medulla Spinalis in many of the Mammalia, but in the human subject it is shut up here by the Pia Mater.

2 The third and fourth ventricles seem real cavities even in health, and probably answer such purposes as we find in the brute tribes, in other bodies composing the ventricles; it is very remarkable, that these seem little affected in Hydrocephalus Internus, and other diseases of the Brain; they still assume nearly their usual and healthy capacity.

of the Brain, Plate XIII. Fig. 2d is an outline of the vessels and nerves. The vessels and nerves have the same references annexed to them in this figure as those of the Brain, Plate XIII. Fig. 2d. On the left side of Fig. 1st, the Dura Mater is retained with the nerves entering their Foramina, and the Sinuses are represented in their place; on the right, the bones are represented as stripped of the Dura Mater, that their site, parts, Foramina, and Osseous Fossæ or Sinuses, may be discriminated.

Fig. 1st, The receptacles of the Cerebral and Cerebellic lobes have the same references as those in Plate XIII. From this plate, with a few references to others, the sanguineous Sinuses of the Dura Mater will be understood.

Sinuses of the
Dura Mater.

The Superior
Longitudinal
Sinus.

The Inferior
Longitudinal
Sinus.

The Torcular
Herophili.

The blood of the Sinuses communicates with the veins of the face, the integuments of the head, and the jugular vein'. The superior longitudinal Sinus is readily distinguished by Plate I. Fig. 2d; its course may be easily traced from 'a, the Crista Galli, along 'k, the middle of the Os Frontis, 'l, the junction of the Ossa Parietalia, and 'd, the superior Fossa of the Os Occipitis, where it frequently communicates more with the right than the left lateral Sinus. The same idea is conveyed by adverting to Plate XI. Fig. 2d, where 'h k l m, point out the bones and course of the longitudinal Sinus 'd'. The course of the inferior longitudinal Sinus 'a, and Vena Magna Galeni 'i, which are inserted into the Torcular Herophili 'e'. The superior longitu-

1 In languid states of the system, the resistance experienced by the ocular veins in their entry to the cavernous Sinus, occasions the discolouration around the lower eyelid, so conspicuous in amenorrhœa, as well as often in those who labour under complaints in the head. In old age and apoplectic cases, these are so large as to promise relief by local bleeding.

2 In the dog and cat species, the blood of the Brain seems conveyed ultimately into sinuses of the bone. I confess I have not yet traced this circumstance so far as it seems to merit; neither have I been at leisure enough to examine other animals in this, and numerous other distributions and structure, which promise prominent illustrations in physiology.

3 This cavity 'e, is formed by the junction of the Falx with the Tentorium, and is triangular, its base being formed in the Apex of the Tentorium, and its Apex in the base or lower termination of the Falx; the angular line it forms in the cavity of the Cranium

dinal Sinus 'd, receives in its course the veins of the Parietal region, Plate II. Plate XI. 'g; (when they are present,) its posterior termination, the lower portion of the Torcular 'e, and the superior origins of the lateral Sinus unite at 'f; these lateral Sinuses divaricate', and in their course meet the superior Petrous Sinus, Plate XII. Fig. 1st, 'fh'. The lateral Sinus leaves the superior Petrous to be imbedded in the Os Petrosus³, and terminates in the Foramen Lacerum, Plate I. Fig. 1st, 'u, Plate XII. Fig. 2d, '*', on the right side, and 8 on the left; here the Sinus often receives veins from the integuments by the Foramen of the Os Temporis, Plate I. Fig. 1st, 'q. The superior Petrous Sinus, Plate XII. Fig. 2d, 's, is situate in the superior ridge of the Os Petrosus; and the inferior Petrous Sinus, Plate I. Fig. 2d, 'su, Plate XII. Fig. 2d, 'r, is situate in the adjacent sinosities of the Os Petrosus and Os Occipitale; it communicates with the Foramen Lacerum where the eighth nerve is seen passing to its destination. Plate XII. Fig. 2d, '8. Plate XI. Fig. 2d, 'c, represents the site of the Cavernous Sinus, in which 'c, the Carotid artery, passes in its route to the Brain; 'c likewise represents the site of the Foramen Lacerum of the Os Sphenoides; 'b the Ophthalmic artery, entering the Foramen Opticum of the Os Sphenoides. The Pituitary gland, Plate XII. Fig. 1st and 2d, 'i, is surrounded by the circular Sinus. These sanguineous cavities receive the ocular and facial veins; they communicate with the superior and inferior Petrous Sinuses of this figure, Plate I. Fig. 2d, 'g; and the superior and inferior Petrous Sinuses, Plate XII. Fig. 1st and 2d, 'rs, which anastomose with the lateral Sinus on each side. The Occipital Sinus

is seen Plate I. Fig. 2d, 'a + b f, giving an idea of the Cerebrum contained above the Tentorium 'a r a + b f, the Cerebellum and Pons Varolii beneath.

1 Plate I. Fig. 2d, 'f * f u, Plate XII. Fig. 1st, 'f h.

2 Plate I. Fig. 2d, 'r r s.

3 Plate I. Fig. 2d, 'f u.

'g, Plate XII.', is sometimes so large as to become an auxiliary of the lateral Sinuses; it conveys its contents to the vertebral veins, or the lateral Sinus. The anterior Occipital Sinuses are rarely distinct, but have similar distributions.

Thus we discover a powerful connection between the Sinuses of the Dura Mater with each other, and the external veins of the Eye and Integuments; and affections of the Brain are often attended with congestion of the ocular veins, as a secondary consequence of the arterial state.

Base of the
Brain.

†Fig. 1st is meant to represent not only the base of the Brain, but a little of the rotundity of its hemispheres. Fig. 2d is its outline, with references to its various parts, arteries, and nerves. The anterior lobes 'x, are concave, corresponding to the bones on which they rest. The Fissura Magna Anterior, 'v, and posterior ‡, are understood. The middle Cerebral lobe, 'r u t q z; the posterior lobe '†; are easily recognised. The lobes of the Cerebellum, 'a §; the Pons Varolii 'm n o; its connections with the Crura Cerebri 'w; the Crura Cerebelli 'u; and Medulla Spinalis 'k l; with their arterial appendages, it is presumed, are sufficiently evident by an attention to the plate and references. The Infundibulum 'q, is the cineritious termination of the third ventricle, which was interwoven with the pituitary gland, Plate XII. Fig. 1st and 2d, 'i. The Corpora Albicantia, or Eminencia Mammillaris, 't, are lentiform bodies, medullary externally, and striated with cineria internally; behind these bodies, and between them, the cineritious substance which unites them and the Crura Cerebri, has the name of Pons Tarini. The Crura Cerebri, 'w, are composed of distinct medullary bundles externally, uniting the Cerebrum and Pons; their internal substance

1 This is contained in the lower Fossa of the Os Occipitis, and is sometimes very large, and in some cases double or bifurcated. I may here remark, that the Foramen Lacerum or Jugulare, is occasionally so small, that it seems a cause of apoplexy not hitherto sufficiently attended to

appearing darker in some instances than the rest of the cinerea, has received the appellation of *Locus Niger Crura Cerebri*; the same is observed of the *Crura Cerebelli* 'u; the Pons has numerous striated portions internally. The *Foramen Cæcum Anterior* 'r, and *Posterior* 's, situated before and behind the Pons, seem to become the anastomosing nidi of the external vessels and those of the ventricles. The *Medulla Spinalis* is composed of four pillars, which are medullary externally, and cineritious internally, viz. two columns 'v, named *Eminentia*, or *Corpora Pyramidalia*; and two lateral bodies, the *Eminentia*, or *Corpora Olivaria* 'w. Two other bodies have been described by authors, on the outside of the last, to which they have given the appellation of *Corpora Pyramidalia Lateralia*; but they are often indistinct, as well as the vermiform appendages of the *Cerebellum*, which are placed on the anterior and posterior portions of its lobes.

The arteries supplying the Eye, Nostril, Ear, and the Brain, are derived from the carotids and vertebrals. The internal carotids, which form the anterior vessels of the Brain, enter the syphon-shaped canal of the *Pars Petrosa*; after they escape from this situation, they pass obliquely upward, along the posterior Clinoid process of the *Os Sphenoides*, Plate XI. Fig. 2d, 'r; they emerge into the cavernous Sinus, 'rc; and, upon their leaving this to enter the cavity of the Cranium, they send off the Ophthalmic artery, Plate XI. Fig. 2d, 'b, Plate XII. Fig. 2d, 'b, Plate XIII. Fig. 2d, b. This artery passes from the anterior portion of the Carotid, enters the *Foramen Opticum* of the Sphenoidal bone, Plate XI. Plate XII. Fig. 2d, 'b, with the optic nerve, '2: after entering the orbit, it supplies the lachrymal gland, the eye, its muscles, the nostril by the anterior and posterior Ethmoidal Foramina, the Palpebræ and forehead. The lateral communicating artery, Plate XII. Fig. 1st and 2d, 'e, Plate XIII. Fig. 2d, 'e', passes backward to join the posterior

Particular Description of the Arteries within the Cavity of the Cranium.

1 I have met with a case where this artery was wanting.

Cerebral artery, Plate XIII. 'p. The anterior Cerebral artery, Plate XII. and Plate XIII. 'c, is inclined forward; at 'c there is found an anterior transverse communicating portion, which unites them, as the laterales do the carotids and vertebrals¹.

The middle Cerebral artery, Plate XII. Plate XIII. 'd, seems the continuation of the common trunk of the internal carotid; it enters the middle lobe of the Brain, Plate XIII. 'd, supplying its substance; this vessel, and the posterior Cerebral artery, 'p, send off the arteries of the Choroid Plexus '||, where they are discovered to anastomose with each other, and the external vessels of the Foramina Cæca, 'r s. The vertebral arteries, Plate XII. Plate XIII. Fig. 2d, 'i, after leaving their individual connection with the atlas, incline toward each other, meet in an angle at the Pons Varolii, and form one trunk 'm, named Basillary artery². The anterior or superior artery of the Cerebellum, 'o, surrounds the Tuber to reach the Cerebellic cone, Plate X. The last vessel of the Basillary is the posterior Cerebral 'p. The circle of Willis is formed by the anastomosis of the anterior Cerebral arteries with each other, by the transverse artery 'c, and the anastomosis of the middle and posterior Cerebral arteries, by the medium of 'e, the lateral communicans.

The nerves are sent off from the Basillary appendages of the Brain. They are white cord-like bodies in general, medullary externally, cineritious internally³.

1 These pass by the anterior fissure 'c of the Cerebral lobes on each side of the Falx, Plate XI. 'h a d, and become the arteries of the Corpus Callosum, Plate VII. 'd e; the posterior Spinal Arteries arise from the anterior Cerebral.

2 The anterior Spinal Arteries 'k, are seen passing from the vertebrals; they unite within the Skull, and are continued to the lumbar region, where the lumbar arteries take up their office. The inferior artery of the Cerebellum 'l, comes off from the Vertebral as seen here, or the beginning of the basillary artery. The auditory artery 'n, is often very large, and enters the foramen auditorum Internum, with its nerve.

3 The Brain is a double organ in all its parts, though the Cerebellum and Pons Varolii seem more of a connected texture than the rest of the system of this organ we have been describing; hence perhaps the deleterious effects, when these parts are injured, from an absence of

The Nervi Olfactorii, are observed emerging from the Brain at the posterior portions of the anterior Cerebral lobes. They appear somewhat cineritious where they become bulbous, and rest on the cribriform plate of the Os Ethmoides, Plate XII. Fig. 1st, '1, where they split into numerous more dense nervous filaments that escape by the foramina of this plate, to be diffused over the Schneiderian membrane of the Os Turbinatum Superius of the Os Ethmoides, Plate I. Fig. 1st, 'p. This bone, though composed of convoluted surfaces in the human subject, admitting an extensive surface in a small given space, yet, compared with other animals, the nostril distinguishes man as possessing very limited animal powers'; the Olfactory nerves seem not extended

The First Pair of Nerves, '1.

analogous agency. Except the Heart, Spine, Chylopoëtic Viscera, Urinary Bladder, Urethra, &c. most of the organs are in pairs, and the nerves are sent off in pairs; even the Spinal Marrow may be considered as double. I shall, however, in describing the fifth nerve, use the singular number, as the idea of complexity attached to the words first, and second, and third branch of the fifth pair of nerves seem to embarrass the Student. The dissector will observe, that the nine nerves issuing from the base of the Brain, are by no means very vascular; on the contrary, the Medulla Spinalis is highly so. The nerves mentioned, however, are accompanied by large vessels, which are profusely distributed on their external organs, as the Mediæ of the actions taking place in these organs; these actions being communicated by the living vessels to the Brain, through the medium of their nerves. We observe, that in many cases, the nostril, eye, ear, and tongue, perform their common animal functions in man, when intoxication, delirium, &c. have suspended their cognizance by the mental functions, (does this throw light on the structure and phenomena of the lower animals?) Maladies of an acute, chronic, and even of a mortal type, affecting these organs, rarely induce discomposure in the Brain. This notion may, in many cases, be extended to even the vital organs, which, though highly vascular, have small nerves, no voluntary action, and comparatively little muscular matter connected with their apparatus; on the contrary, the functions of the Brain suffer great derangement where disease or injuries of the trunk or limbs take place; where large masses of voluntary irritable muscle are affected, numerous membranes and vessels are concerned, and their actions are communicated through the medium of the Medulla Spinalis.

1 The Olfactory nerves are very large in some brutes; and the bones of the graminivori and carnivori, which receive these membranes and nerves, are not only so extended, but likewise diversified in their shape, as to suit them for their diversified offices. In the graminivori they form extensive scrolls; in the carnivori they are infinitely folded. Their fun-

to the inferior region of the nostril, composed of the Os Turbinatum Inferius¹. These nerves are so tender in man, that they are torn from the cribriform branches in raising the anterior lobe, unless great care is observed by the operator.

The Second Pair of Nerves, ' 2.

The Nervi Optici, are observed proceeding from the Brain, uniting with each other, and again divaricating toward the Foramina Optica, Plate XII. Fig. 2d, ' a, where it is accompanied by the Ophthalmic artery ' b, to become the organ of vision, in consequence of the hollow sphere of nervous matter, which receives impression in all directions, through the medium of the lenticular apparatus placed before it; this nerve can be distinctly traced to the ciliary circle of the Iris.

The Third Pair of Nerves, ' 3.

The Nervi Motores Oculorum, are seen passing from the Crura Cerebri near the Pons Varolii, between the ~~superior~~ ^{Posterior} Cerebral and superior Cerebellic arteries; they enter the cavernous Sinus, Plate XII. Fig. 1st and 2d, ' 3; here they are surrounded by the Dura Mater, which forms its sheath, around which the blood in the Sinus is circulated; these vaginalæ are kept tense by tendinous bridles, which occasion this cavernous appearance².

The nerves, after escaping by the Foramina Lacera of the Os Sphenoides to the orbit, are distributed to the Levator, Depressor, Adductor, Obliquus Inferior of the eye, and the Levator Palpebræ Superius.

nel shape seems to admit a large quantity of effluvia at the external extremity, which becomes concentrated in its course toward the Brain.

1 This bone in all animals seems the guardian organ of the Olfactory system; in the brute it is comparatively small; we shall find it principally supplied by the fifth nerve, which is distributed as the nerve of common sensation to the eye, nostril, ear, tongue, and face; we therefore discover pain, a sense of heat, cold, dryness, &c. as distinct from the sense of effluvia.

2 The fourth, fifth, and sixth nerves have similar apparatus. The sixth nerve, was formerly supposed to possess no vagina, and was thought to lie bare in the blood of the Sinus. What then prevents the blood from passing thence to the cavity of the Cranium by its sides? I demonstrated the vagina of this nerve many years since; but this cannot be convincingly done without injecting the Sinus with soft wax, which absorbs the blood, and may be removed to exhibit the sheath.

The Nervi Pathetici, or Trochleares, arise from the testes; they do not exceed the diameter of a sewing thread; they are transmitted through the receptaculum or cavernous Sinus as the last, Plate XII. Fig. 1st and 2d, '4; they are principally distributed to the superior Obliquus of the eye.

The Fourth
Pair of Nerves,
' 4.

The Nervi Trigemini, so named from its being composed of three principal branches; the trunk is large and rather flat, and springs from the Pons Varolii near the Crura Cerebelli; after penetrating the Dura Mater, as represented Plate XII. Fig. 1st and 2d, '5, the flattened Ganglion Gasseri sends off the three principal branches.

The Fifth
Pair of Nerves,
' 5.

The first branch, or Ophthalmic, affords filaments to the great sympathetic nerve, to be mentioned hereafter; it follows the same course as the ophthalmic artery; after passing through the Foramen Lacerum of the Os Sphenoides, Plate XII. Fig. 2d, 't u; viz. entering by the Foramen Orbitarium Anterius, it supplies the Schneiderian membrane; it is likewise distributed to the Lachrymal gland, the Tunica Sclerotica, Choroidea, and Iris of the Eye, the Periosteum of the orbit, the Pericranium, muscles, and the integuments of the forehead, uniting with the Portio Dura, and Sub-occipital nerves, to be mentioned. The second branch of the fifth nerve, or superior Maxillary, passes through the Foramen Rotundum of the Os Sphenoides, Plate XII. Fig. 2d, 'v; in its route it sends off the Spheno Palatine nerve, the reflected branch of which enters the Vidian Foramen, and unites with the great

1 This nerve seems a prominent instance of sensations deriving their character more from their external organs, than their peculiar structure or connection with the Brain; its branches are distributed to the eye, nostril, ear, tongue, the bones, muscles, and integuments of the face; in all these distributions it is connected with the other nerves, viz. the olfactory, optic, auditory, gustatory, and portia dura; to the teeth and palate alone it goes singly, and these perform single and simple functions. The tongue, not the palate, is the acute organ of taste, and the fifth nerve seems in all its distributions to the organs of sense, to be merely agents of common sensations.

sympathetic, where this last passes by the Foramen Caroticum, Plate XII. Fig. 2d, 'x, to the neck; a twig enters the Foramen Superius, or Innominatum of the Pars Petrosa, Plate XII. Fig. 2d, 'y; this is bestowed on the membranes of the internal ear, unites with the Portio Dura, and forms the Chorda Tympani; the trunk enters the canal of the orbital plate of the superior maxillary bone, supplies the teeth of that bone, is transmitted to the face by the Infra Orbital Foramen, Plate I. Fig. 1st, 'x, where it supplies the adjacent bones of the face, the nose, lower muscles of the Palpebræ, those of the face and lips. The third branch passes to its destination by the Foramen Ovale, Plate XII. Fig. 2d, 'w; it supplies the tongue, is continued to the internal Foramen of the lower jaw, traverses its internal groove, where it is distributed to the lower teeth and the substance of the lower jaw, and is transmitted by the Foramen of the chin, Plate I. Fig. 1st, 'y, to supply the substance of the lower jaw, the muscles of the chin and lower lip. All these branches unite with the Portio Dura.

The Sixth Pair
of Nerves, '6.

The Nervi Abducentes, or Motores Externi, arise between the Pons Varolii, and the Corpora Pyramidalia; they enter the cavernous Sinus beneath the 4th nerve, Plate XII. Fig. 1st and 2d, '6. This nerve, previous to its ocular destination, unites with the first and second branches of the 5th nerve, composing thus the Nervus Sympatheticus Maximus; it descends in the Carotic Foramen mentioned, to be distributed to its various destinations. When it has entered the orbit, by passing through the Foramen Lacerum, 't u, of the Os Sphenoides, twigs of this nerve, the first and second branches of the fifth nerve, and the fourth and third nerves, form the Lenticular or Ophthalmic Ganglion, which supplies the Iris; this Ganglion is situate on the outside of the optic nerve. The trunk is continued to become the nerve of the Abductor muscle of the eye-ball¹.

¹ The fourth and sixth nerves being distributed to individual muscles, must have some singular intention; when we look upward or downward, the motions of both eyes must be

The Nervi Auditorii. This name belongs properly only to the posterior portion, which is a soft large nerve; it arises from the ^{The Seventh Pair of Nerves,} cranium of the Stylus Scriptorius, and emerges from the Crura Cerebelli and Pons Varolii; it enters the Meatus Auditorius Internus of the Pars Petrosa, Plate I. Fig. 2d, 'a; this never becomes the proper nerve of hearing; the Portio Dura, which lies before it, passes into the Foramen Communis 'a, mentioned; is continued through the crooked canal or Aqueductus Fallopii of the Pars Petrosa; here it joins the sixth nerve, and forms the Chorda Tympani; escapes by the Foramen Stylo Mastoideum; expands into the Pes Anserinus, as the root of the nerves which supply the cheek, and unite with those of the face and occiput.

similar, to bring both eyes to bear on the same object. Similar muscles, therefore, are in this case supplied by similar nerves, viz. the third nerve. But when we direct the eye upward or downward obliquely, the motions are dissimilar, as well as the nerves; viz. the superior oblique of the one eye, and the inferior oblique of the other; the nerves are the third and fourth. In looking aside with the Abductor of the right eye, we must bring the left toward the same object by the action of the Adductor of the left eye; the nerves are the third and sixth. Thus similar motions are connected with similar nerves, the dissimilar motions with dissimilar nerves. We may notice, however, that the third nerve is employed in both these contrasted actions, as dissimilarity of one nerve seems sufficient to produce those functions. Are the correct and rapid motions of the eye owing to these distributions? This plan of nervous distribution not being observed in other organs does not seem to affect the supposition, since no other organ requires to be continually actuated by that unison so indispensable to the functions of the eye. While this distribution would appear indispensable to the functions of two organs deriving their efficacy from the united action of contrasted muscles; this same distribution must have become an imperfection in the other voluntary organs, where the performance of diversified actions is required in all directions; we discover that varied and rapid actions of the hands of even young people, require practice before facility is acquired, as similar nerves are employed; of this circumstance we have an admirable illustration, on observing the progress toward proficiency, which performers on the piano forte or harpsichord display; since they cannot, till after continued and repeated practice, acquire a facility in crossing hands, (as it is termed,) which, however, when obtained, invariably excites the admiration of the spectator. These peculiar nervous distributions of the eye, seem to give rise to that unison in the action of contrasted muscles, which is necessary for distinct vision. Thus, in the lateral motions of the eyes, distinct vision is preserved by the adductor of the one eye, and the abductor of the other acting in unison; whereas derangement of the function is immediately produced when the two abductors or adductors act together, as in strabismus.

The Eighth
Pair of Nerves,
' 8.

The Nervi Vagi arise from the Corpora Olivaria, in small surculi, which almost immediately form fasciculi, which may be considered their proper origin; from this the Glossopharyngeus is sent off; the last, the Nervus Accessorius and Par Vagus, escape by the Foramen Jugulare, Plate XII. Fig. 1st and 2d, ' 8, 11; to their various distributions, it unites with the fifth, the sympathetic, and supplies the Larynx, Pharynx, Thyroid gland, and adjacent parts, the heart, lungs, &c.

The Ninth
Pair of Nerves,
' 9.

The Nervi Lingualis; arise from between the Corpora Olivaria and Pyramidalia by various origins, as the last; these nerves unite and pass by the Condylloid Foramen of the Os Occipitis to the tongue, Plate I. Fig. 2d, ' t, Plate XII. Fig. 2d, ' 9'.

The Sub-Occi-
pital Nerve.

The Nervi Sub-Occipitales, Plate XII. Fig. 2d, ' 10, arise by two or three origins, from the superior portion of the Medulla Spinalis, and are transmitted between the Occiput and Atlas, to supply the muscles of the neck, and unite with the nervous ramifications of the Frontal Nerves, and those of the Portio Dura, diffused on the temples.

Recapitulation
connected with
the Plates
which have
been described,
and the inten-
tions of the
work.

We have enumerated the eight bones of the Cranium, which defend and sustain the Brain, admit its arteries, and transmit its nerves and veins; as likewise its internal membrane, named Dura Mater, which becomes the internal Periosteum of these bones, and the envelope of the Brain and nerves. We have described the Cerebrum, composed of the two superior hemispheres, Corpus Callosum, and the inferior lobes. We have seen the four ventricles and their appendages; the cone and lobes of the Cerebellum, the Pons Varolii, Medulla Spinalis, their Arachnoid coat, and Pia Mater; the arteries, veins, sinuses, and nerves of the Brain.

I have not annexed a vertical section of the Brain to this work, as that comes in when the anatomy of the head and neck is given

1 Thus we find three large nerves contributing to the complicated functions of the tongue; while the simple, involuntary, and unceasing actions of the heart are sustained by the aid of one small nerve.

in a style of dissection. The Diagram, Plate I. Fig. 2d, seems to supply to an attentive reader all the important minutiae of relative connection of parts. The Corpus Callosum reaches within half or a quarter of an inch of the inferior Sinus, Plate I. Fig. 2d, 'k a m; anteriorly and posteriorly the Falx comes nearly in contact with that body. The ventricles are placed beneath the Corpus Callosum, assume nearly the curve of the Falx, and terminate in the Infundibulum; this last is inserted into the pituitary gland, imbedded in the Sella Turcica 'o. The ^{Cerebellum} ~~Pons Varolii~~ occupies the cavity 'a † b f § f r. The ^{Pons Varolii} ~~Cerebellum~~ rests on the Ossa Cuneiforme 's t; and the adjacent Pars Petrosa; its Crura Cerebri are transmitted from this body by the Foramen Ovale, Dura Matris, at 's a r, understood by Plate XI. 'c i. The Medulla Spinalis is transmitted by the Foramen Magnum Occipitale 't. The Arteria Basilare rests on the Ossa Cuneiformia 's t. The circle of Willis surrounds the body of the Os Sphenoides, or Sella Turcica, Plate XII. Fig. 1st and 2d.

We may hope that an attentive discrimination of the principles of vitality, the Brain and nerves, by means of comparative anatomy, shall yet explain the economy of these organs in man. The principle of life, however, or that superadded agent, actuating all muscular and animal matter, on the presence and state of which action (by application of stimuli,) seems to depend, has so great a share in the phenomena of the functions of the Brain and Nerves, that much still remains to be done, to reconcile these seemingly mysterious connections of the Heart, Arteries, Brain, Nerves, and their respective functions.

We see how tenacious of this principle some cold blooded animals, and how much the contrary some of the warmer tribes are. May we not be the better enabled to comprehend those varieties which this principle seems to exhibit, by tracing the varieties of organization in the structure of the Heart, Lungs, Brain, &c.

of these various animals, and also by attending to the Media in which they live?

As to the laws by which muscular action is regulated, we are yet much in the dark, though probably all the varied phenomena of the animal economy depend on this. We find the muscles of the Heart and Arteries, in health, acting gently, and the Brain answering the purposes of that state which we denominate Sane; but any violent stimulus applied to the system, occasions a state in these muscles which seems as it were to revolt at the contained blood in these organs, which a moment before actuated them so laudably; the Nerves and Brain, which communicate the impressions of healthy action, must likewise communicate those of disease, since the action of muscles must depend on fixed laws. In that state named health, the muscles of the Heart and Arteries, as well as the muscles of volition, are actuated only when stimuli are applied; but, in disease, these organs often fail to be actuated by stimuli, and of their own accord assume actions which seem quite independent of the salutary principle of life; and, accordingly, in diseased states of the system, and of the organs of the senses, we have an admirable illustration of the superior and independent properties of intellect, where, notwithstanding the force with which morbid impressions are conveyed,

1 In the valetudinary, objects are occasionally not at all recognized by organs, (as the eye, &c.) though within the range of their powers; while various colours, on the contrary, shall present themselves in the mind, when no such objects are present to excite them; and the voluntary muscles of the dying man, which refuse to obey the dictates of the will, assume contractions independent of their accustomed stimulus, exhibiting Herculean force, while other organs present us with similar involuntary functions; In articulo mortis, the Penis is often found in a state of involuntary erection; the contents of the Vesiculæ Seminalis, the Urinary Bladder, and Rectum, are suddenly propelled; but these actions cannot be referred to the notions we commonly attach to strength; contraction and relaxation seem the two leading features of muscular economy; their species of these states seem to characterize the varied phenomena observed in animal organs; contraction is continually alternated with relaxation of these bodies during life, and contraction is its last effort in expiring nature, and becomes the cause of the empty state of the arteries in dead bodies.

the rational agent as instantly discovers them to be false, and therefore refers them to their true source.

The comparative contrasts of the vital and voluntary organs in the structure of animals, perhaps claim more attention than has hitherto been bestowed on this important subject, so far as they operate as fundamental causes respecting phenomena; the structure of the Heart and Arteries seem incessantly enabling them to affect the Brain, especially in man'. The comparative contrasts

While comparative anatomy, therefore, of man and other animals, may throw light on the nature and intentions of organs, we may hope that a comparative view of healthy and morbid states of the vascular system, arising from muscular laws, may yet bestow better means of treatment of diseases. Thus we discover that all stimuli (which do not overpower the system, and induce that state which ends in fever,) terminate in a soproific tendency, as passions, cold, heat, even a full meal exhibits the gentle paroxysm of fever terminating in sleep, as well as the fatigues of the day. Do these mild states of slumber, arise from that gentle pressure from congestion in the veins of the Brain, of which the coma attendant on fracture of the Cranium and apoplectic congestion, would seem the more advanced stages?

So we find the Peritoneum, Pleura, &c. in a state of health, form the nidi of serous arteries, distributed on these insensible effusing surfaces; but, in disease, we can demonstrate the Bronchial, Internal Mammary, Intercostal and Diaphragmatic arteries, relinquishing the offices of lubricating their surfaces, and forming new, large, and numerous anastomoses: the vessels now generate dense membranous accretions, and assume those actions which communicate acute sensation; these are no longer the same organs as formerly, they no longer perform their usual motions in respiration, and they assume the morbid phenomena connected with these organs. May we extend this idea to the vessels of the Brain? and notwithstanding our yet imperfect state of knowledge of the functions of living vessels, may we not easily conceive those deviations from healthy structure, which form acute maladies of a recoverable nature, and this acute state permitted to run on to chronic malady, or that state which occasions continual and irrecoverable recurrence of disease? Hence the importance of correct treatment in the beginnings of illness.

Were this a proper place, I could adduce instances where the paroxysms of epilepsy were invariably checked by cold affusion, exhibited immediately on the approach of the fit, and even contributed to improve the functions both of body and mind; and also where the busy scenes of a city life always contributed to aggravate the maniacal state of a lady, which was always removed on having recourse to the quiet of a country residence.

1. Thus the vital organs, (except the Heart,) have no valves in the cavities of their veins; the voluntary organs have valves. The former have no antagonist muscles, (viz. the heart, arteries, veins, chylopoëtic viscera, &c.) they are in contact with their appropriate stimuli, which relax their muscles, and excite their contractions; the latter have antagonist

of the Brain and external organs of sense in man and other animals, seem likewise obvious¹.

I trust in the forgiveness of my reader, respecting the various methods to which I have resorted, as the means of throwing such light as this subject admits of, from our imperfect state of knowledge, not only of the functions of the Brain itself, but likewise of those causes which give rise to its phenomena; especially when we recollect the wide field of its importance in its varied states. In man particularly, whether we recognise him in a state of health or disease, in life, or the grand catastrophe of death, the operations depending on the Brain become his distinguishing feature. These operations distinguish man from man, and man from all other animals; it is the organ of which the skilful physician avails himself, to aid applications by the sooth-

muscles, which in health are stimulated by the mind only. The nerves of the involuntary organs are few and small, their vessels large and numerous; the nerves of the voluntary are numerous and large, their vessels comparatively small. We are unconscious of the actions of the former during health; (only a few individuals are on record who had controul over them) over the latter, during health, we have complete controul, and of these we have perfect cognizance. The former continue their functions whether we are awake or asleep; the latter when we are awake only. The former are subject to violent inflammation, dropsy, and acute pain in disease, rarely to paralysis; the latter are less subject to these, but are very liable, especially in the human species, to paralysis.

1 In man we observe a large Cerebrum, a comparatively small Cerebellum, limited external organs, which are rendered subservient to the dictates of his mind, of which the Brain is the intermediate agent, and which is continually receiving impressions corresponding to the state of the heart and arteries; in man we observe diversity of genius, and this organ peculiarly liable to disease.

In brutes, on the other hand, we see a large Cerebellum, and comparatively small Cerebrum, capacious external organs, diversified in each species, so as not only to distinguish them from other animals, but seem to actuate their walk of life and attachments, beyond the limited nature of which they never aspire; even their Brain seems merely an animal auxiliary, which has no farther cognizance of their peculiar sensations than answers the immediate purposes of self-preservation, self-enjoyment, and propagation of species; we do not discover derangements of its functions in brutes. Do those differences of excitability and these contrasts of structure, at the same time, better adapt organs for their offices, and more peculiarly characterize the agents by which they are actuated? and do those contrasts of structure occasion contrasted animal character and contrasted type of malady?

ings of hope ; it is the organ, from the state of which he often draws his most certain inductions.

The Plates annexed to this work, therefore, are meant to facilitate the developement of the parts of this stupendous organ, that the philosophy of its functions may be more extensively followed up, and that practice connected with this agent may be founded on principles.

The Brain and Nerves are organs, from the functions of which effects take their rise, seemingly infinitely different from the causes employed ; but which are proved to be regulated by fixed laws, even by those illusions occasioned by their diseased states. The study of this department of the animal system, in particular, upon more ample principles than have hitherto been pursued, cannot fail to actuate philosophers with those reverential views of its structure and phenomena, which they are so evidently calculated to inspire, since in both we evidently discover the legible characters of Divine Wisdom, calling into existence myriads of beings, infinitely diversified in the arrangement of their organs, which are however admirably adapted to the various situations in which they are destined to move ; thus ensuring perfect enjoyment, in infinitely diversified modes of existence. I hope it may not be considered as inconsistent with the nature and intentions of this work to notice, that not only are these diversities of animal structure actuated by a few fixed laws, but the vegetable kingdom, as well as every object to which we can direct our attention, seem characterised in their operations by the same simple agents. The same laws which regulate the unerring motions of the planetary hosts, have their share in administering to man's stability in his locomotive faculty. The same atmospheric and solar influence, so extensively diffused, the state of which so continually arresting the attention of the physician in the sick room, becomes at once the cause of life and health in the robust, extinguishes the same in the valetudinary and the aged, and hur-

ries on dead matter to that decomposition which prepares it to mingle anew in those infinitely varied intentions directed by the unerring hand of its Sacred Author'. These widely extended phenomena, (exhibited by animal bodies in their growth, health, diseases, and dissolution,) depending on few causes, operating on the peculiar, altering, and altered structure of each individual, become the object of close attention with the conscientious physician in the responsible moment of attendance on the victim of disease.

1 The anatomical structure of the Heart, Arteries, Brain, Nerves, and their phenomena, in the varied stages of life, explain each other; in man alone, when the animal organs have evidently relinquished their energy, (after mid-life,) the Brain, so far as it is considered as an organ connected with mind, continues to improve; a circumstance not observed in any other animal, so far as our knowledge reaches.

Printed by George Ramsay & Co.

Edinburgh, 1812.

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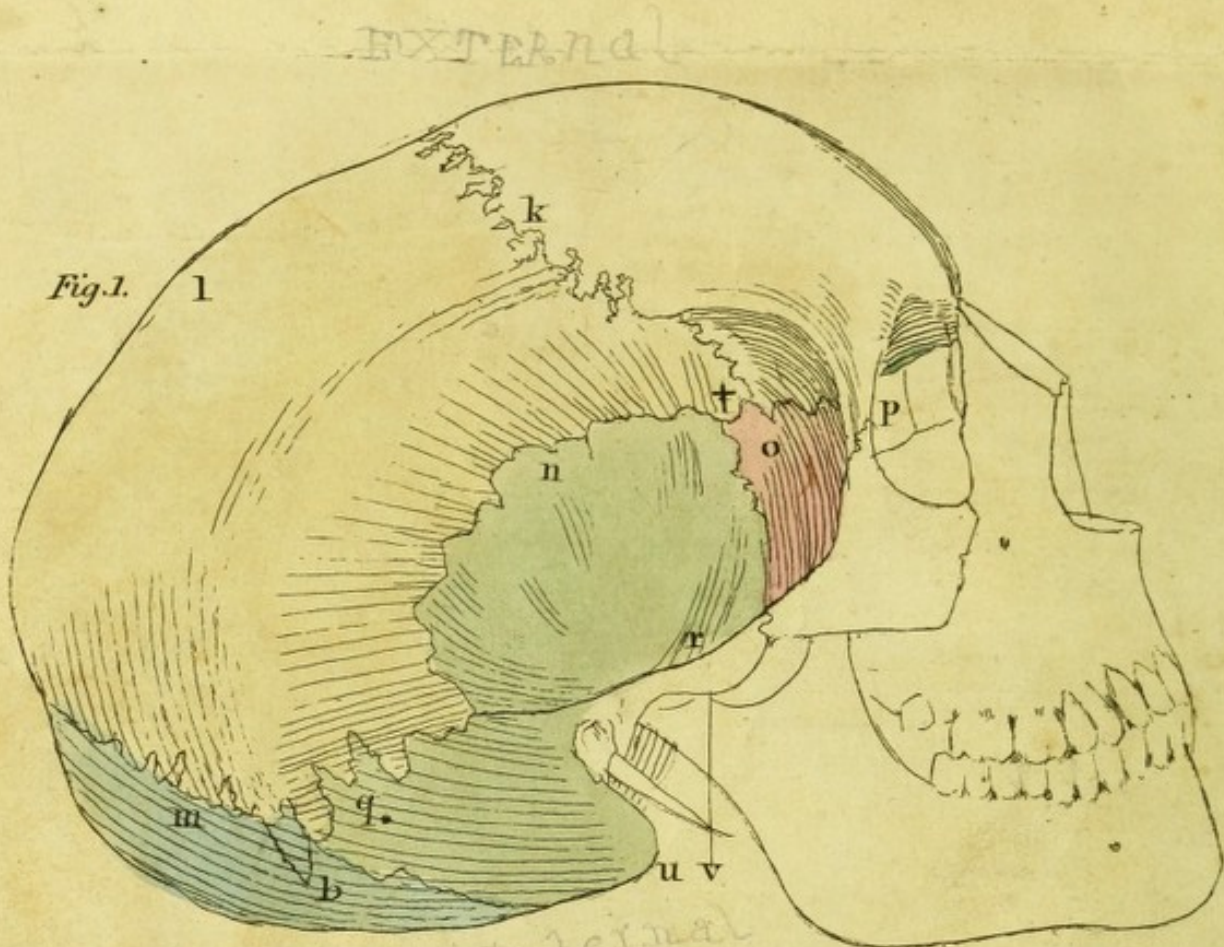
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1812.

Blade



P.I.

Fig. 2.

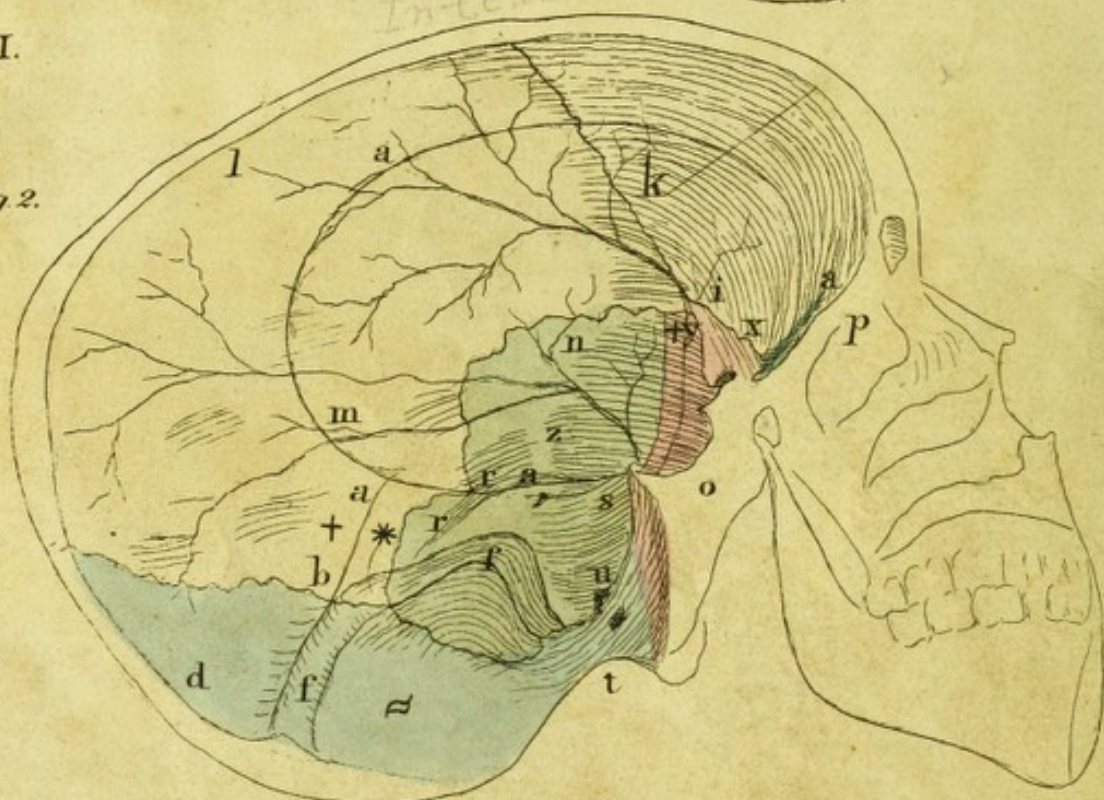
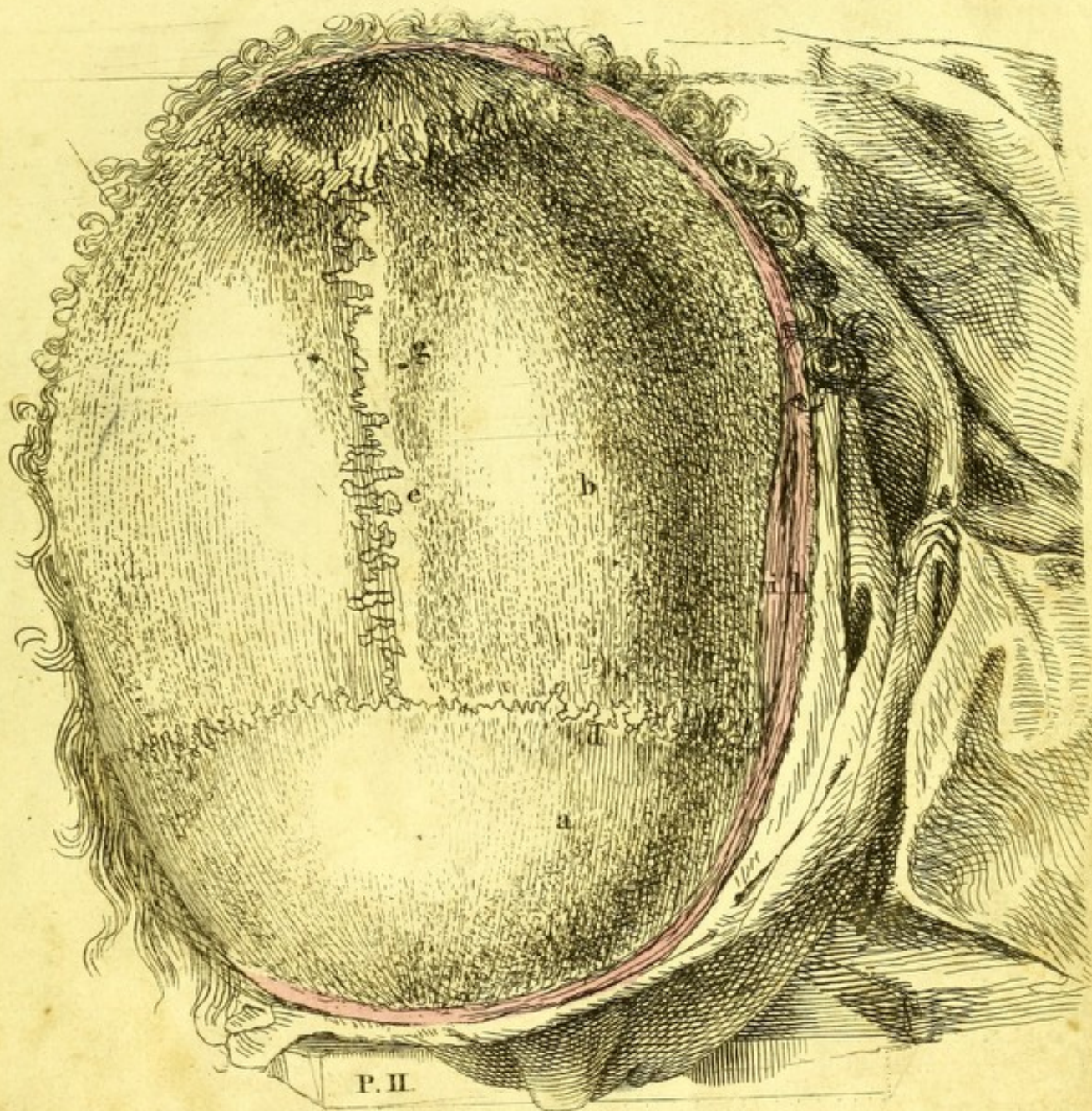


Fig. 1 & 2^d k Os Frontis — l Ossa Parietalia — m Os Occipitis — n Ossa Temporum
o Os Sphenoides — p Os Ethmoides.



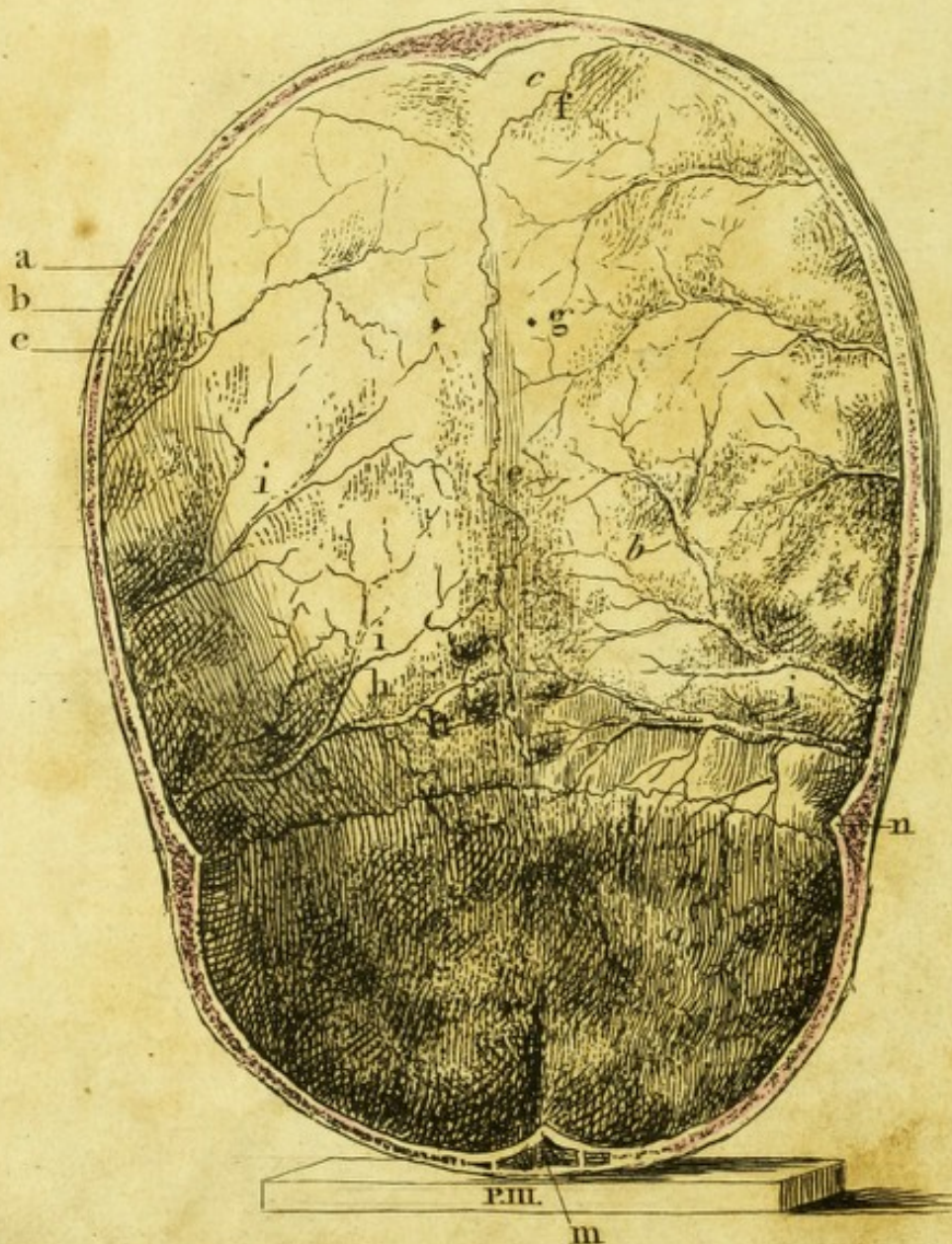
The Integuments removed

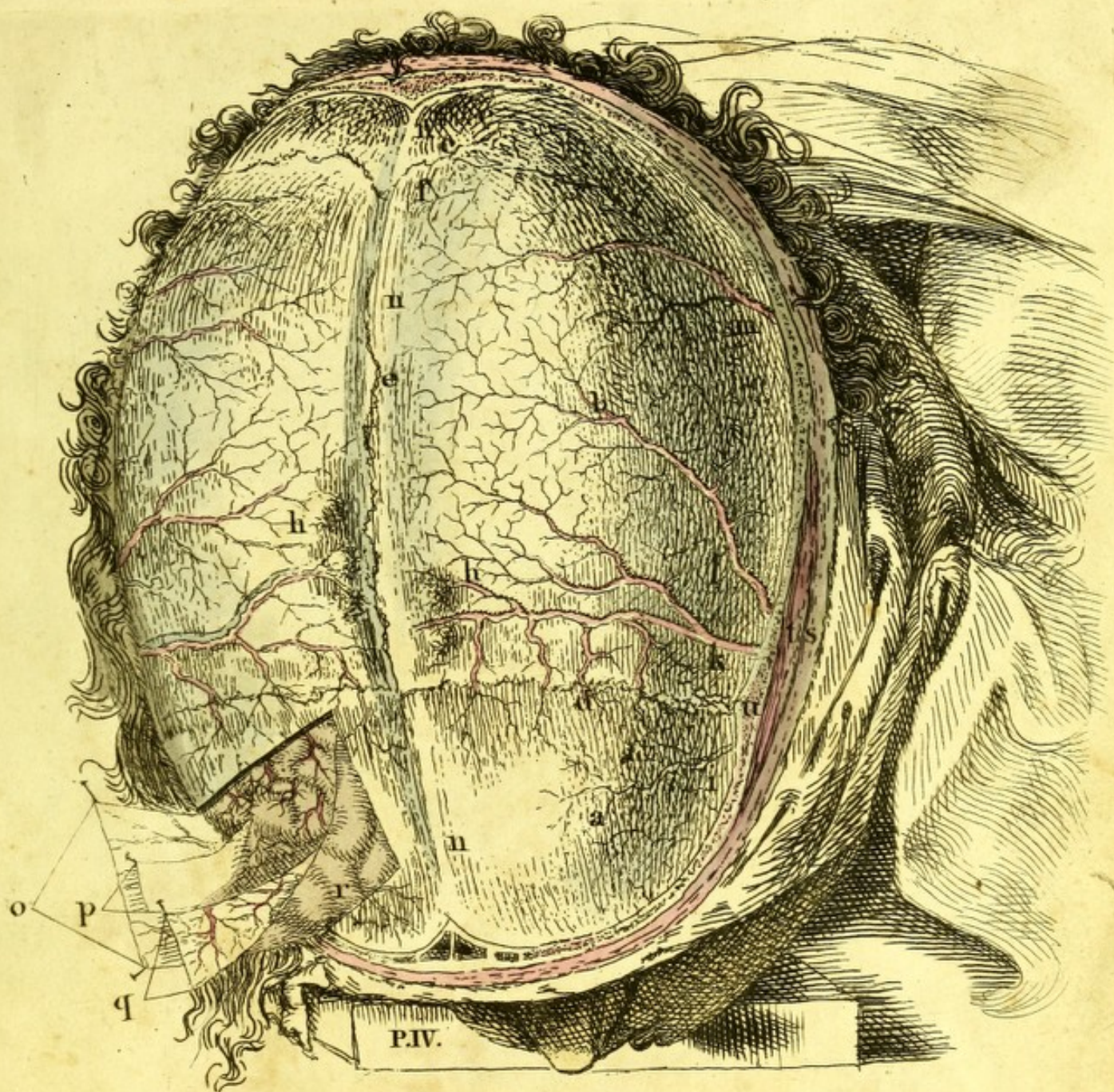
*a. os Frontis — b. Ossa Parietalia — c. os Occipitis — d. Coronal Suture
 e. Sagittal Suture — f. Lambdoidal Suture — g. Venous Foramina
 h. Section of the Integuments — 1 Section of the Temporal Muscle*

h

The Calvaria.

a. The external Table—b. Diploe—c. Internal Table—d. e. f. Coronal Sagittal & Lambdoidal Sutures—g. Venous Foramina—h. Cerebral Depressions
i. Vascular Grooves—m. Frontal Sinus

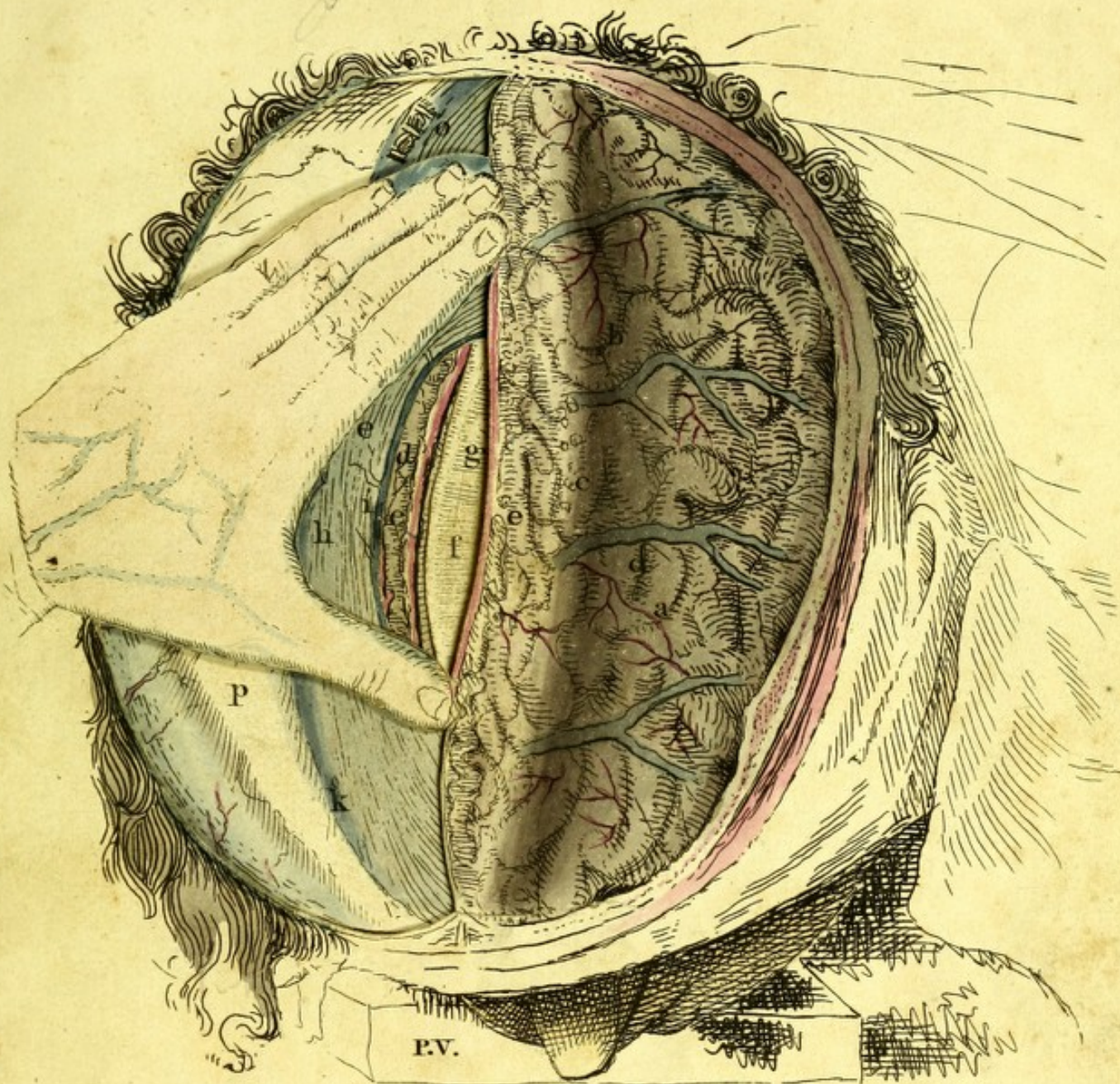




The Calvaria removed.

a, b, c The external Lamina of the Dura Mater—*d, e, f* Lacerations corresponding to the Sutures—*h* Cerebral Eminences—*i, k, l, m* Meningeal Arteries—*n* Longitudinal Sinus—*o* Internal Smooth Lamina of the Dura Mater—*p* Arachnoid Coat—*q* Pia Mater—*r* Choroid Substance—*s* Section of the Integuments—*t* Temporal Muscle—*u* Section of the Calvaria.

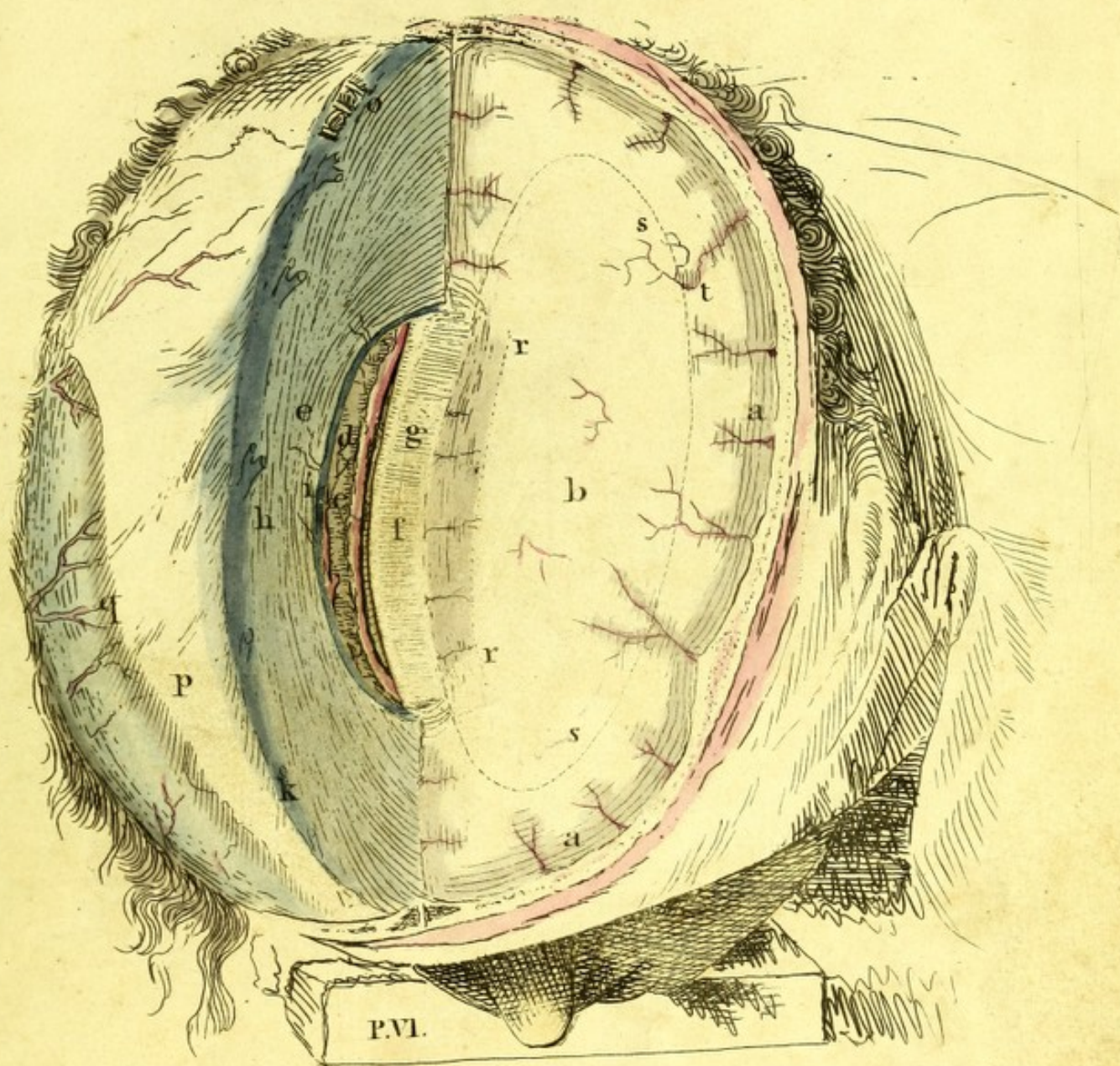
posteriorly cut



The Hemispheres separated, to exhibit the
Vertical Walls. Falx. & Corpus Callosum.

*The Dura Mater on the left removed from—*a. *The Hemisphere of the Cerebrum—*b. *Its Convolutions—*c. *Glandulae Pachioni—*d. *Veins—*e. *Vertical Walls—*f. *Corpus Callosum—*g. *Raphe—*h. *Falx—*i. *Inferior Longitudinal Sinus—*k. *Superior Longitudinal Sinus.*

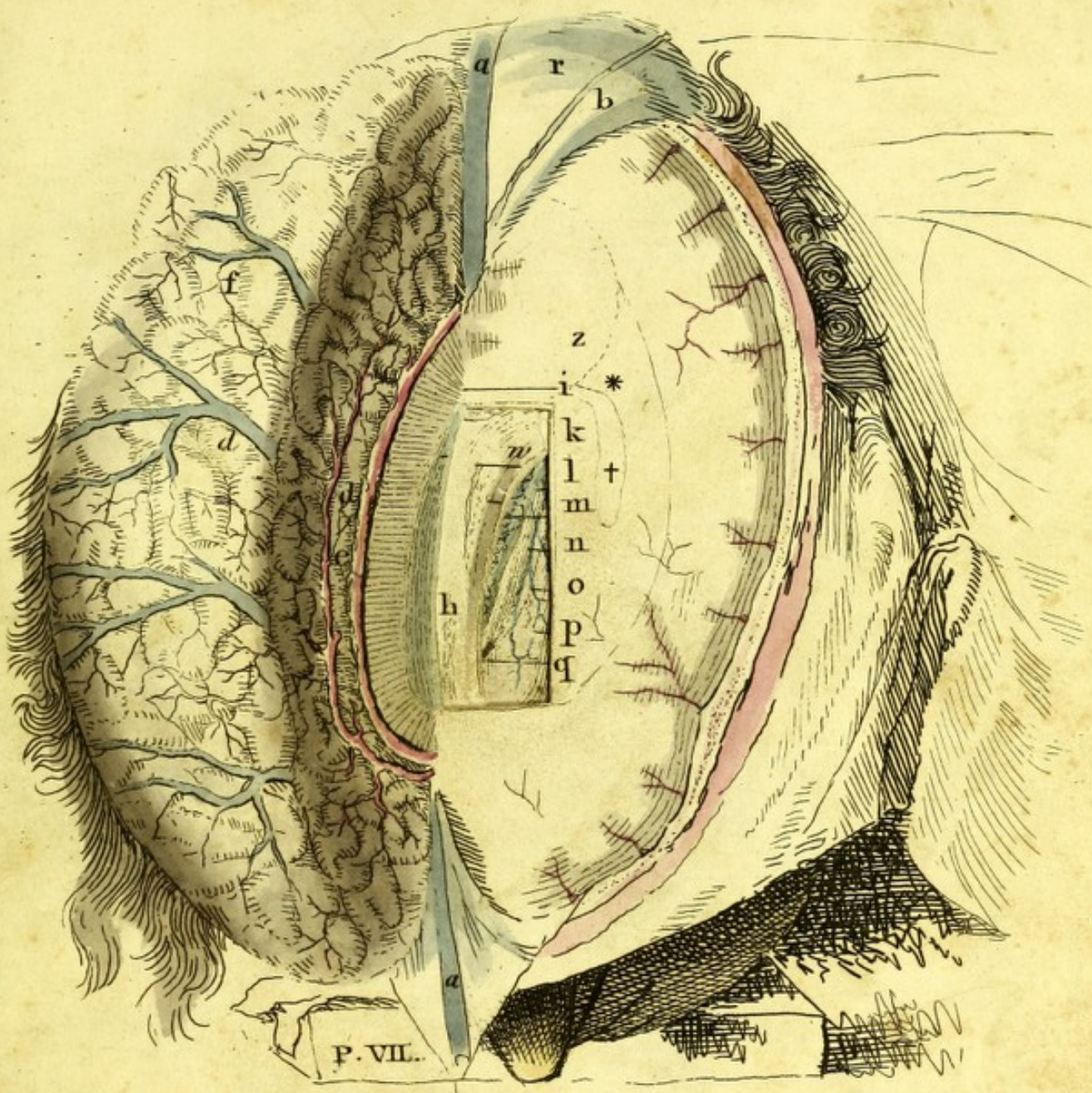




The left Hemisphere removed

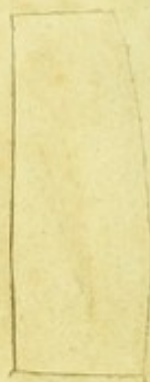
a. The Cuneus Substance—b. Centrum Ovale—c. Frenula of the Sinus—p. Internal Lamina of the Dura Mater of the Left Hemisphere thrown up—q. External Lamina of the Dura Mater of the right side—d. Inferior Artery of the Corpus Callosum—e. Superior Artery of the Corpus Callosum.

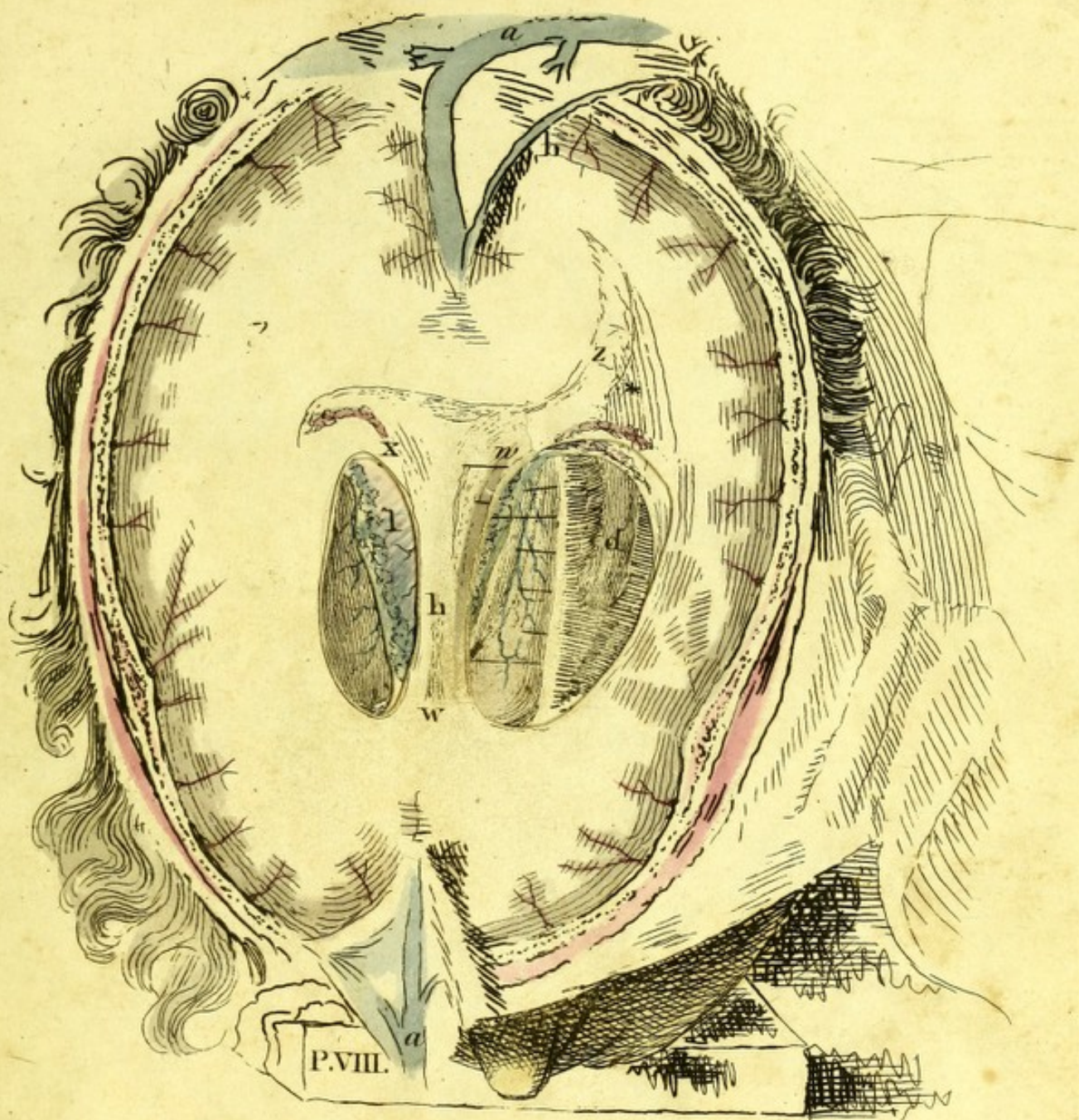




Vertical section of the Hemisphere
Corpus Callosum, Septum Lucidum, &c.

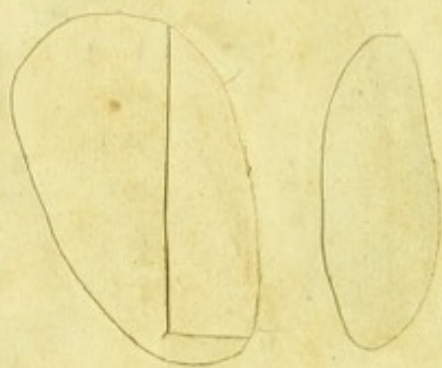
e. Vertical Walls of the Hemisphere—f. Extremities of
the Cerebral Arteries—d. Veins of the Brain—i. Vertical Section
of the Corpus Callosum—k. Septum Lucidum—l. Fornix
m. Plexus Choroides—n. Thalⁱ nervi Optⁱ—o. Temia Striata—p. Corp^s Striatum—q. Foramen
of Monro—a. Sup^r Longitudinal Sinus—b. Inf^r Longitudinal Sinus—r. Falx

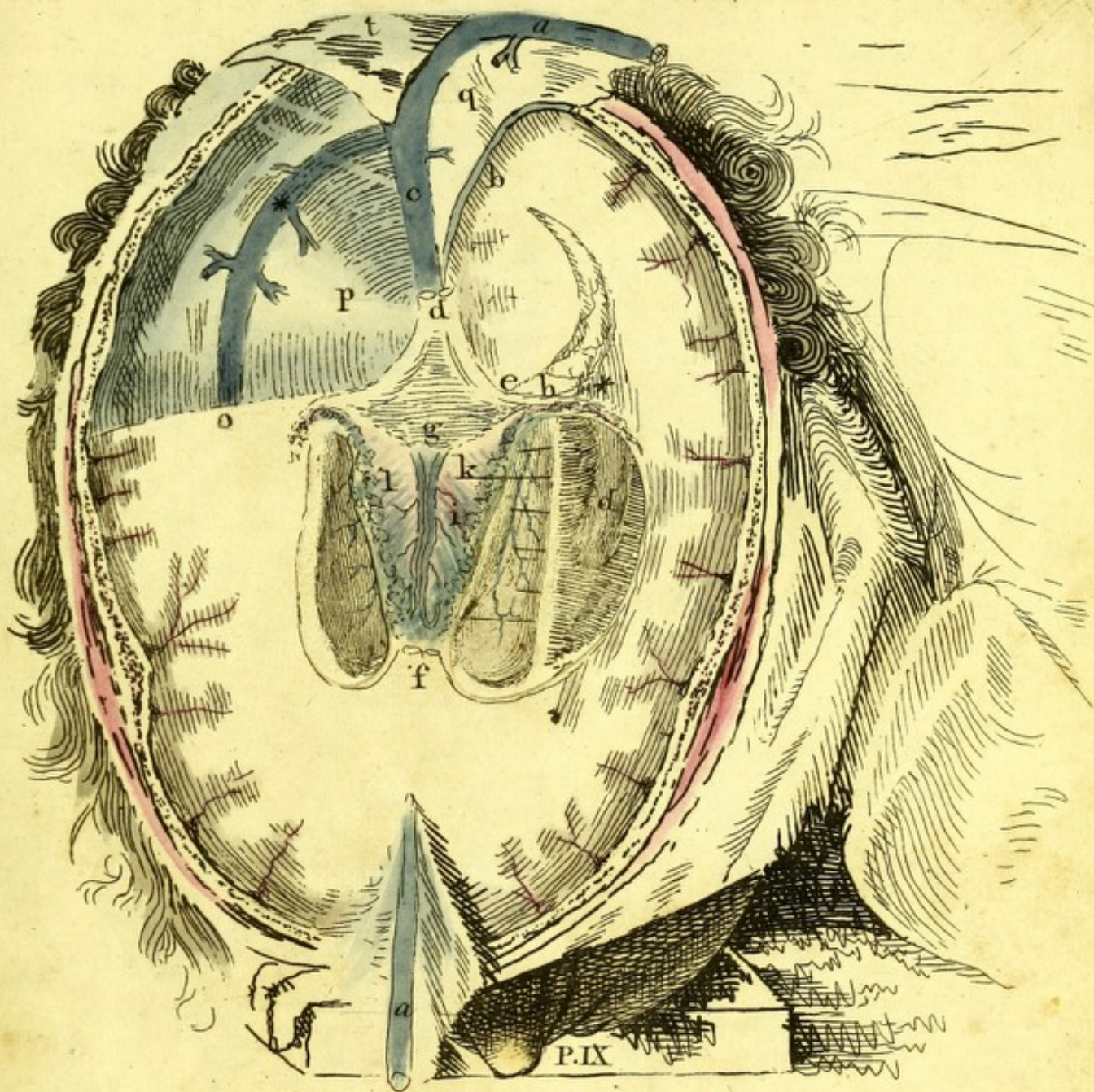




The Hemisphere, Corpus Callosum, &
Septum removed.

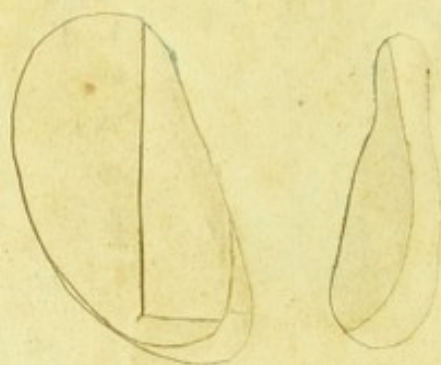
h. The Body of the Fornix — *w.* The Anterior Crura Fornicis
w. the Fimbriae — *x.* the Posterior Crura Fornicis —
z. Hippocampus Minor — *d.* Hippocampus Major — * Digital
or Posterior Sinus

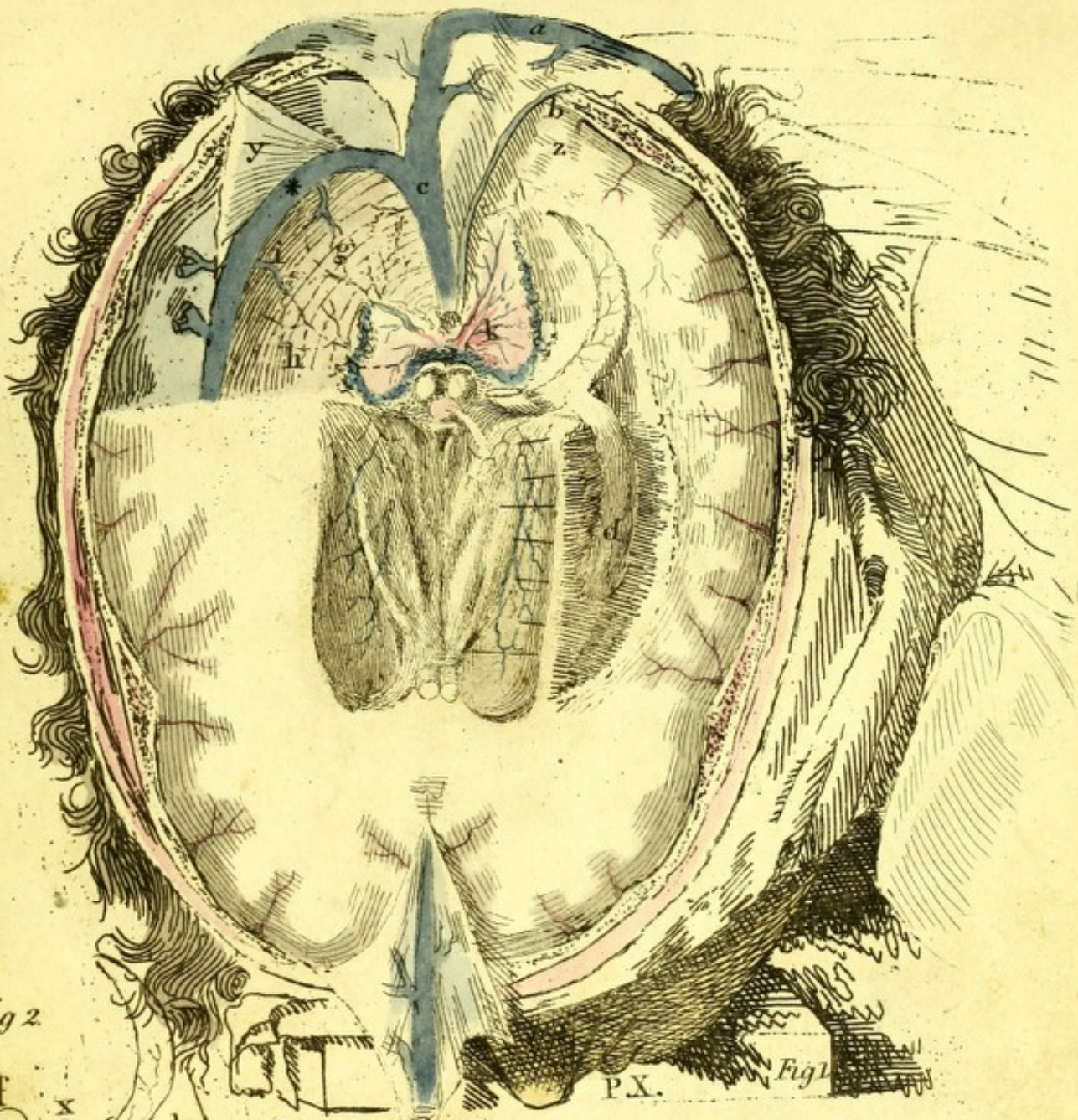




The Fornix removed.

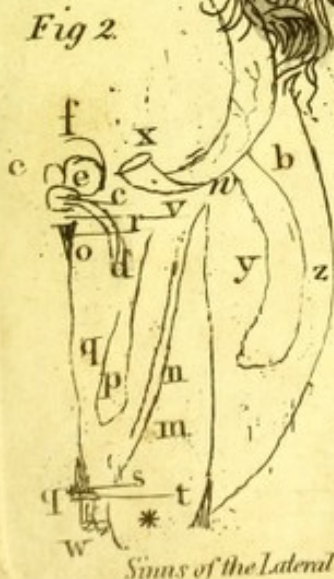
- o. The Posterior lobe of the Cerebrum removed to exhibit—p. the Tentorium—
 t . The Dura Mater—q. Falx—*a.* Superior Longitudinal Sinus—*b.* Inferior—
 * Lateral Sinus—*c.* Torcular Herophili—*d.* Body of the Fornix—*e.* Posterior
f. Anterior Cava—*g.* Lyra—*h.* Fimbria—*i.* the Velum composal of the Pia Mater
k. Vena Cava—*l.* Plexus Choroideus

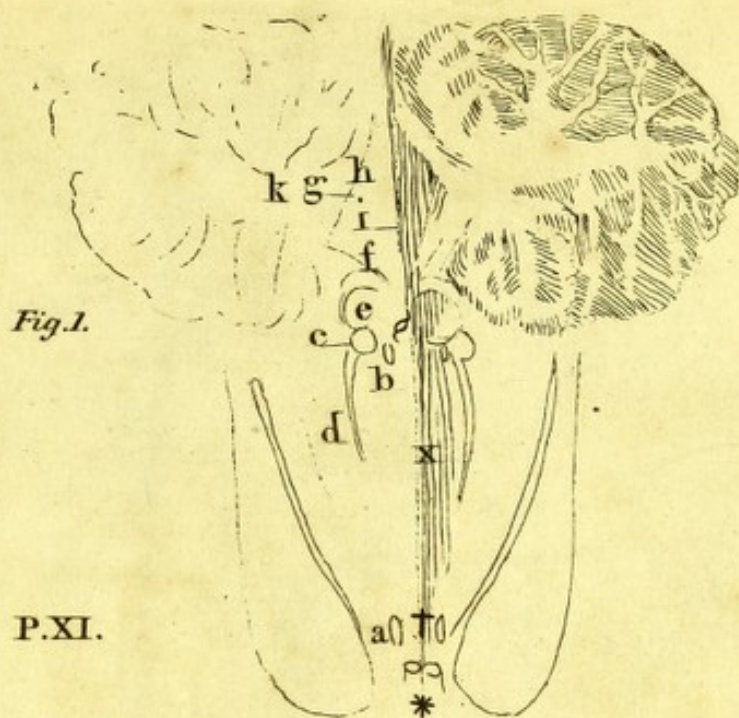




Lateral Ventricles

Fig 1st—g. Cone of the Cerebellum—h. its Arteries—i. its Veins
 k. Velum thrown up—Fig 2^d—m. Corpus Striatum—n. Tania
 o. p. Eminences of the Thalamus Nervi Optici—q. Commissura Mollis
 r. the Arms—s. the Vulva—t. anterior Commissure of the Cerebrum—v. Posterior
 w. anterior Pillars of the Fornix—x. Posterior Pillars—y. Fimbriae * anterior
 Sinus of the Lateral Ventricle—b. Posterior or Digital Sinus—c. Pineal Gland—d. Peduncle—e. Nates—f. Testes





P.XI.

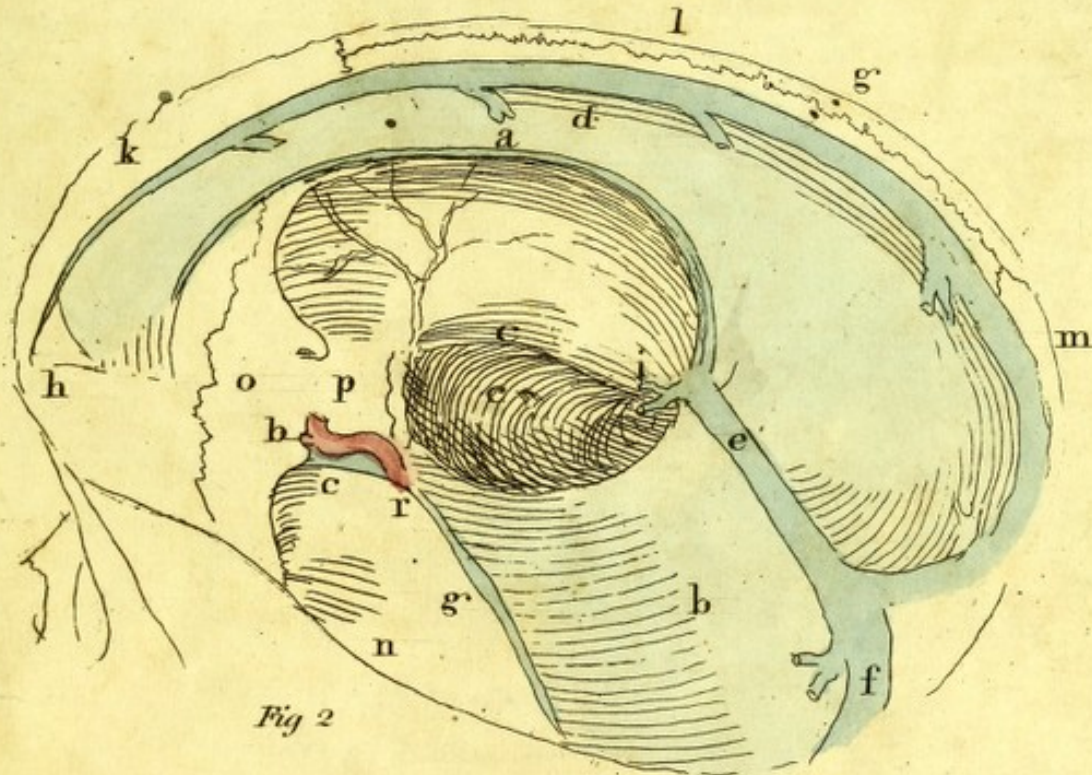
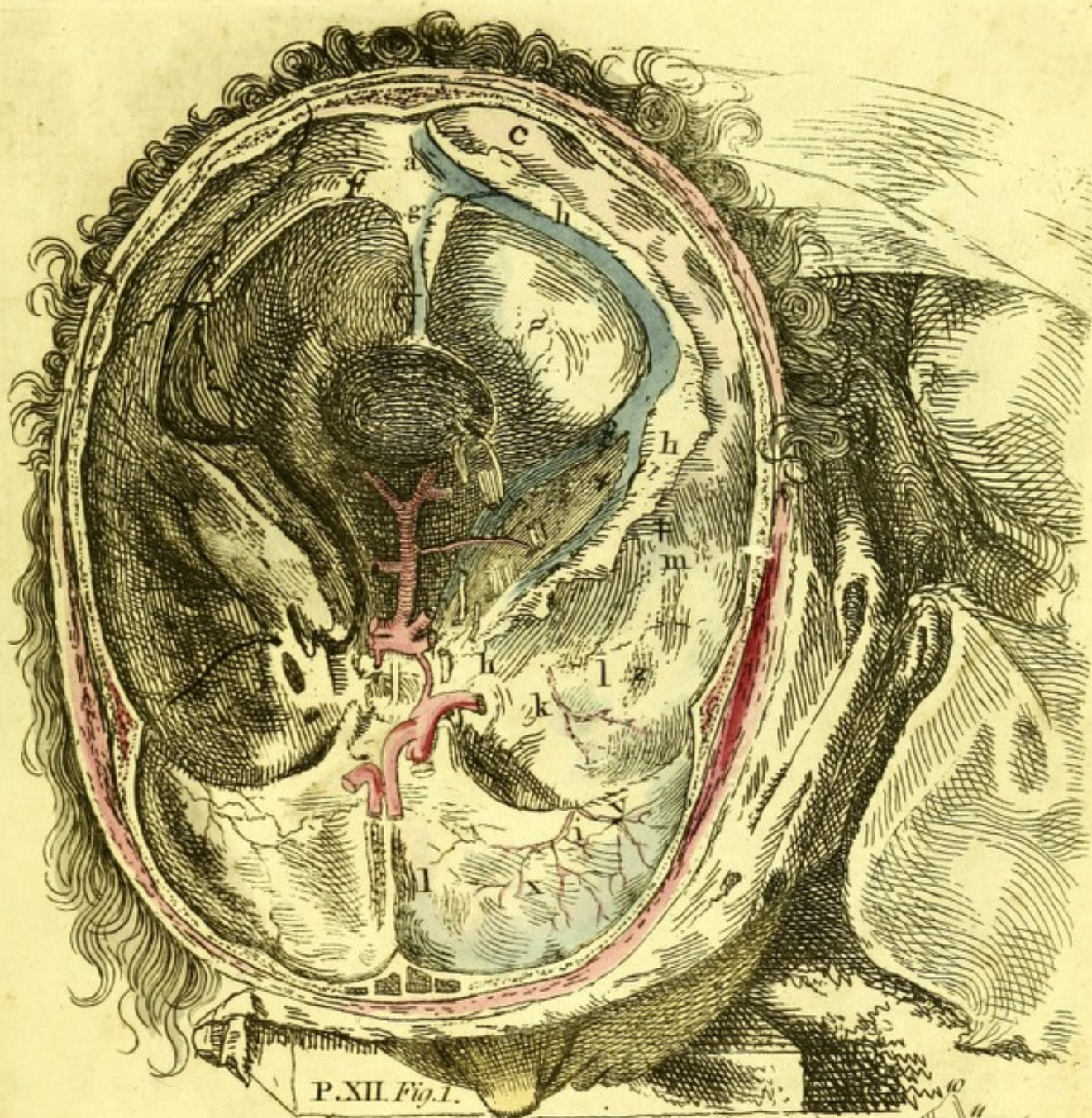


Fig 2

— Fig. 1.st Section of the Commissura Mollis— Commissura anterior & Posterior— Nates— Testes & Cerebellum

Fig. 2.^d a. Falx b. Tentorium— c. Foramen Ovale d. Longitudinal Sinus e. Torcular— i. Vena Galeni & Lateral sinus— g. Superior petrous Sinus h. Crista Galli— a. Inferior Longitudinal Sinus.

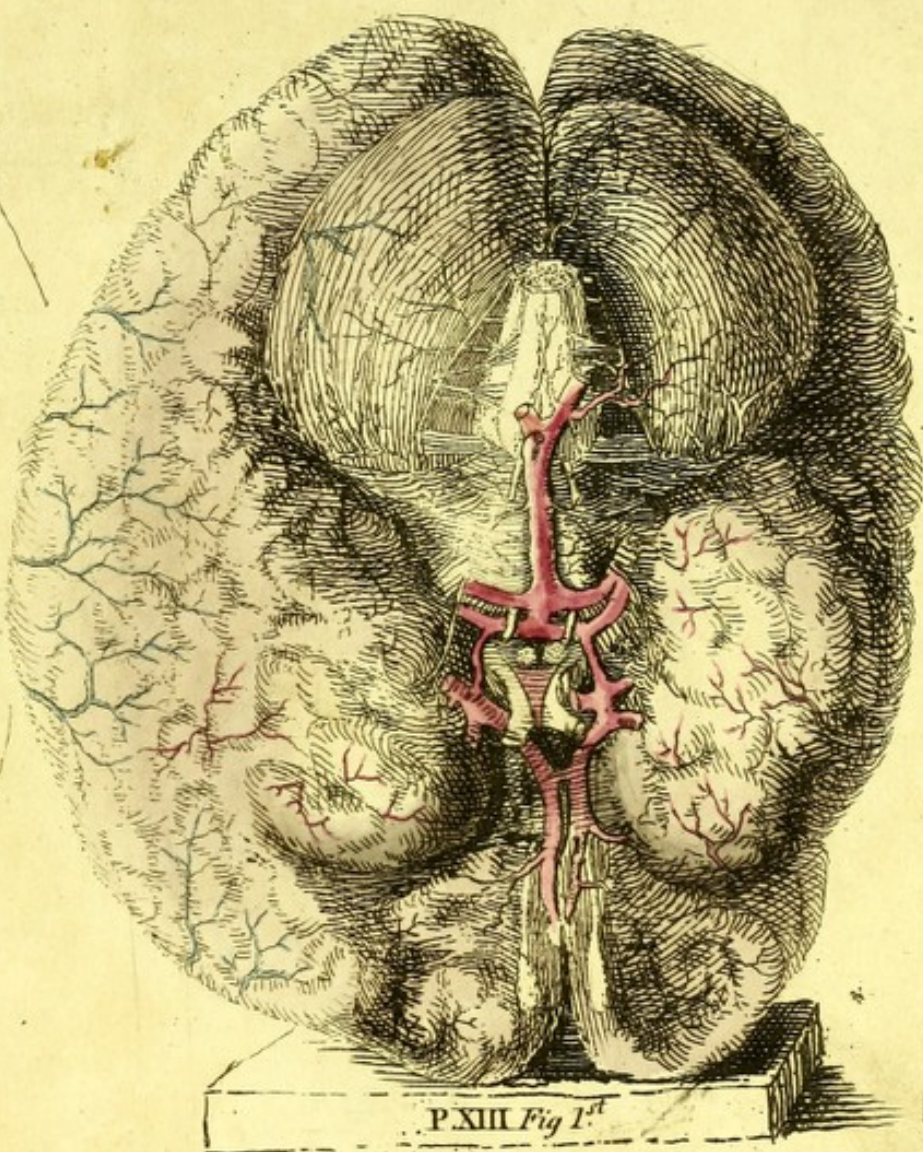
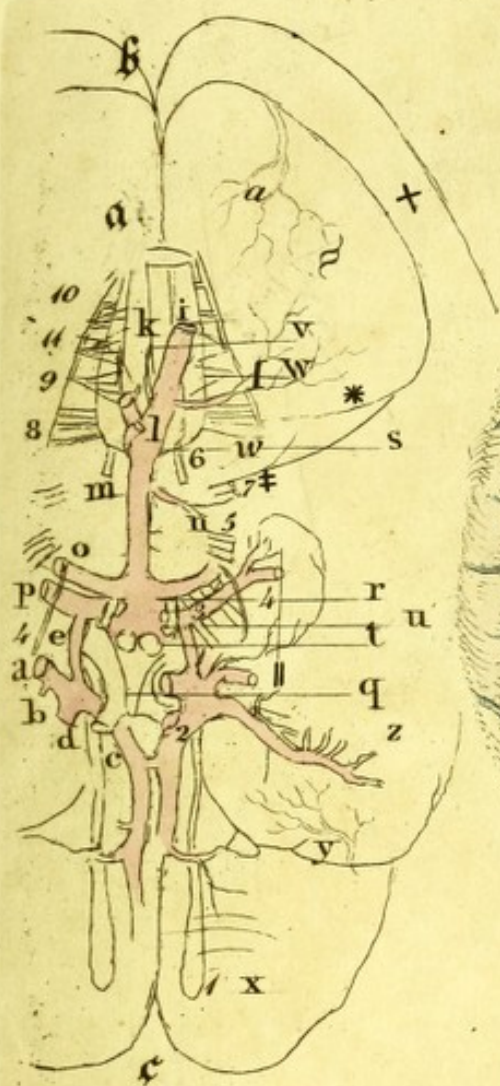


Base of the Cranium.

Fig. 1. a Junction of the Torcular, Sup^r Long^l & Lateral sinus f—g Occipital Falx & Sinus h Tentorial Origins—i Gibriform Plate.

Fig. 2. i Pituitary gland & Circular sinus k Cavernous sinus—l Inferior Petrous sinus s Superior Petrous sinus





Base of the Brain.

Fig. 2.^d a. Carotid Artery—b. Ophthalmic—c. Anterior Cerebral & its transverse communicating Branch—d. Middle Cerebral—e. Lateral Communicating Branches—f. Vertebral—g. anterior Spinal Artery—h. inferior Cerebellic—m. Basillary—n. Auditory—o. Superior Cerebellic p. Posterior Cerebral—q. Infundibulum—r. Foramen Cecum Anterior—s. Foramen Cecum Posterior—t. Corpora Albicantia—u. Crura Cerebri—v. Pons Varolii—w. Crura Cerebelli v. Corpora Pyramidalia—x. Corpora Olivaria—y. Anterior Lobe of the Cerebrum y. Fissura magna Sylvii—z. Middle Lobe—+ Posterior Lobe—≠ Fissura Posterior ∩. Inferior Lobe of the Cerebellum—* Cone of the Cerebellum—|| Plexus Choroideus

①
to Mr. [illegible]
Lancaster

