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*J. G. Croft*

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ILLUSTRATED BY

UPWARDS OF TWO HUNDRED AND FIFTY TABLES, TAKEN PARTLY  
FROM THE MOST CELEBRATED AUTHORS,

AND

PARTLY FROM NATURE.

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BY ANDREW FYFE,

TEACHER OF ANATOMY, FELLOW OF THE ROYAL COLLEGE OF SURGEONS, MEMBER OF THE ROYAL MEDICAL AND ROYAL  
PHYSICAL SOCIETIES, &c. MANY YEARS ASSISTANT TO THE PROFESSOR OF ANATOMY, AND STILL  
CONSERVATOR OF THE ANATOMICAL MUSEUM OF THE UNIVERSITY, EDINBURGH.

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IN THREE VOLUMES.

FOURTH EDITION, CONSIDERABLY ENLARGED AND IMPROVED.

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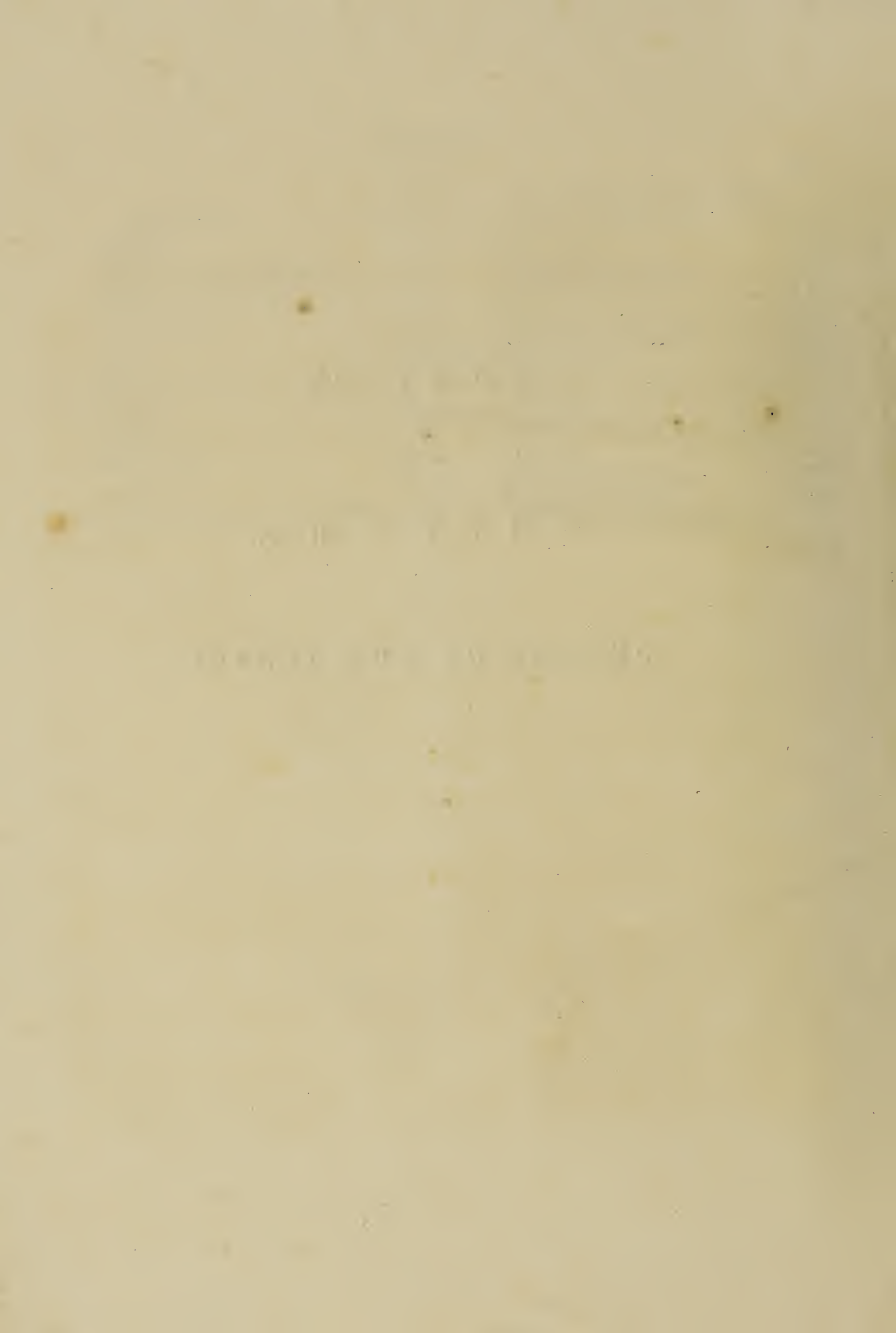
PART IV.

OF THE

VISCERA,

AND

ORGANS OF THE SENSES.





# OF THE VISCERA AND ORGANS OF THE SENSES.

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## OF THE COMMON INTEGUMENTS.

THESE consist of the *Cuticle*, *Corpus Mucosum*, *Cutis Vera*, with their Appendages.

### CUTICLE.

The *Cuticle*, *Epidermis*, or *Skarf-skin*, is a thin, greyish, semi-transparent, insensible Membrane, which covers the Skin, and adheres to it by small Vascular Filaments. Tab. LXIV. Fig. 1. a.

It is readily separated from the *Cutis* by boiling water, or by putrefaction, and, in the living Body, by the application of blisters.

Over the Body, in general, it is extremely dense, and neither laminae nor fibres can be detected in it, but it is not every where of the same density, being, even in the Fœtus, thickest in the Palms and Soles; in which parts, the thickness is afterwards much increased by pressure, and then a lamellated structure is evident. Tab. LXIV. Fig. 3. a.

The *External Surface* is marked by *Furrows*, which correspond with those in the *Cutis Vera*. Tab. LXIV. Fig. 4.

Upon the Surface of the Body, it is perforated by the terminations of Vessels for the Exhalation of the Perspirable Matter; which when increased in quantity, is considered by most of the modern Physiologists as forming the Sweat. It is perforated also by the ends of the Excretory Ducts, which are found only in particular parts of the Skin; by the beginning of the Absorbents, which take in certain Substances applied to the Surface of the Body; and by the different Hairs. Tab. LXIV. Tab. LXV.

The *Perforations*, or *Pores*, are most evident upon the Palms and Soles, and upon the Nose, Ears, and external parts of Generation, yet, in a separate piece of Cuticle, the Pores are as invisible as they are in a piece of wet filtrating paper, though obvious when the paper is dry. Tab. LXIV. Tab. LXV.

The Cuticle covers the Skin through its whole extent, excepting under the Nails.

From the external Surface of the Body, it is reflected inwards, to line the large passages; as the Nose,

Mouth, Alimentary Canal, the Trachea, Urethra, Vagina, &c.

In these passages, however, the Cuticle becomes less uniform in its texture; and in some of them, as in the *Stomach*, it is either wanting, or is so much changed in structure, as to have the appearance of being so.

From the Surface of the Cuticle, certain *Processes* are sent into the Skin, which line the passages by which the *Cutis* is perforated.

Many opinions have been advanced concerning the *Origin* of the Cuticle. The latest and most probable is, that it is formed by a condensation of the *Corpus Mucosum*, or by the extremities of Excretory Vessels;—its density, however, is such, that no Vessels can be traced in it, either by the Eye, or by the assistance of glasses. It appears also to be destitute of Absorbent Vessels and Nerves.

The Cuticle serves to protect the sensible parts under it, and to regulate the proportion of the Fluids thrown out, or taken in, by the Surface of the Skin;—particularly, to prevent too great a degree of evaporation.

The Cuticle is found to be insoluble in Water, and also in Alcohol, but is readily dissolved in the Alkalis. It is observed to resemble coagulated Albumen.

### CORPUS MUCOSUM.

The *Corpus Mucosum* has been commonly called *Rete Mucosum*, from the supposition that it is formed of a *Mucous Net-work*. It is situated under the Cuticle, which it connects to the *Cutis Vera*. Tab. LXIV. Fig. 3. f, f.

It is composed of the terminations of extremely minute Vessels passing between the *Cutis* and Cuticle, which are surrounded by a Mucilaginous or Viscid Substance, properly called *Corpus Mucosum*.

It is the chief cause of that variety of colour, which characterises the natives of different climates, and different people of the same climate; being semi-transparent, and white, or rather of a light grey colour in the European, black in the Ethiopian, brown in the Asiatic, &c. and



and in all appearing through the Cuticle, on account of the thinness and transparency of the latter.

It is likewise the cause of the difference of colour, in different parts of the Body of the same person.

It is readily detected in the Sole, especially in the Heel, by spreading out and fixing the Integuments upon a board, and then immersing them a short time in boiling water.

It is *thicker* and *stronger* in the Negro than in the White Person, Tab. LXIV. Fig. 4. *i*, and in the former can be separated into two Layers.

It covers every part of the Surface of the Cutis, excepting below the Nails, where it is wanting; and is of such a light colour in the Palms and Soles of the Negro, as to have been supposed by some Authors to be deficient there also.

Its *Origin* has not yet been sufficiently ascertained, though by some it has been supposed to be formed by the Vessels imbedded in it, nor is it determined what particular use it serves.

Among other purposes, it contributes to preserve the structure of the tender Vessels, Ducts, and Papillæ, placed between the Cutis and Cuticle; and in the Negro, it is supposed to serve as a defence against the heat of the climate.

#### CUTIS VERA.

The *Cutis Vera*, *Dermis*, or *Skin* properly so called, lies immediately under the Corpus Mucosum, Tab. LXIV. Fig. 1.—4. and gives a covering to the whole Body.

It is *formed* of Fibres intimately interwoven, and running in every direction like the hairs in the felt of a hat, and is so plentifully supplied with Nerves and Blood-vessels, that the smallest puncture cannot be made in any part of it, without occasioning pain and a discharge of Blood.

The *Blood-vessels* of the Cutis are so numerous, especially on its outer Surface, as to appear to form almost the whole of its Substance, and are of such a size as to be injected with facility. Tab. LXV. Fig. 1. 2.

It is strong and very elastic, and may be elongated in every direction, after which it recovers its former dimensions.

It forms the Body and strongest portion of the Skin, and is that part in Quadrupeds of which *Leather* is made.

The *outer part* of it is dense and firm, the inner loose, gradually degenerating into the common Cellular Substance.

It is thicker and looser on the posterior than on the anterior part of the Body, and thicker and firmer in the Palms and Soles than in the other parts of the extremities.

The *colour* of the Cutis also differs in different parts of the Body, in proportion to the quantity of Blood

in the extreme Vessels, and to the thinness of the Cuticle.

At the *edge of the Eye-lids*, the *red part of the Lips*, and *margin of the Anus*, the Cutis becomes so immediately and remarkably thin, as to appear to be lost.

The Absorbents of the Cutis are proportionally large and numerous, and are observed, when minutely injected, to have a reteform appearance.

Nerves can be traced in great abundance into the inner part of the Skin, but their branches cannot be detected upon it externally.

Upon the outer Surface of the Cutis, and produced chiefly by the extremities of the Cutaneous Nerves, Tab. LXIV. Fig. 8.—12. *small Eminences* are observed, called *Papillæ*, *Papillæ Nervosæ*, and *Papillæ Pyramidales*:—the term being borrowed from the *Papillæ* of the Tongue, which were first discovered, and to which the name is most applicable.

From their being extremely sensible, they are considered as forming the Organ of Touch; and from their being very Vascular, they are also regarded as furnishing a passage to part of the Perspirable Matter.

The *Papillæ* are most evident on the Tongue and edge of the Lips, and in the Palms and Soles, where they are placed in double rows on the Ridges, which, on the points of the Fingers and Toes, generally run in a somewhat spiral and parallel direction. Tab. LXIV. Fig. 12.

The *Ridges* are supposed to defend the *Papillæ*, and to increase the Surface for Perspiration.

In some places, as in the red part of the Lips, the *Papillæ*, from their resemblance to the Pile of Velvet, are termed *Villi*. Tab. LXIV. Fig. 13.

Various kinds of *Folds* are observed in the Skin; some depending upon the form of the Cellular Substance, as in the Hips; others on Muscular Contraction, as in the Fore-head; and others on Articular Motion, as at the Joints of the Extremities,—particularly those of the Fingers and Toes;—and these Folds, to allow easy motion, are thinner than the rest of the Skin.

A sort of Cutis, as well as a Cuticle, has been attempted to be traced from the external parts of the Body along the great passages; but in its course through these, it becomes softer and looser, changing into a fine Cellular Substance.

In an *inflamed Skin*, as in the case of Small-pox, a Reticular Texture of Vessels is observed, which can be easily injected, and has been considered by some as the Corpus Mucosum, and by others, as an additional Cuticle;—but no such appearance is to be met with in the sound Skin.

In the Cutis of the under part of the Abdomen and upper parts of the Thighs of Women who have had Children, there are many Pits of irregular form, which appear to be owing to the formation of a kind of new Skin, filling the parts of the original one, over-stretched during Gestation.

The *Cutis Vera* serves to cover and give form to the Body;



Body; unites the different parts, and defends them from injury; forms the External Organs of Sensation or of Touch, and gives passage to the Fluids which are perspired or absorbed.

The Cutis can be entirely dissolved by the action of boiling water, and consists chiefly of *Gelatin*, in consequence of which it is a principal article in the manufacture of Glue.

#### APPENDAGES OF THE SKIN.

##### NAILS.

The *Nails* were formerly regarded as a production of the Papillæ of the Cutis, but are now more generally considered as a continuation of the Cuticle.

They are removed along with it by boiling water, or by maceration.

Like the Cuticle, they are insensible, excepting where they adhere to the Cutis, are renewable after having been separated, and have no evident Vessels.

They differ from it, however, in structure; being formed of *Plates*, and the Plates of *Longitudinal Fibres*, which are closely compacted, as may be seen when they are thoroughly dried, or in a diseased state.

They begin by a transverse edge, a little before the last Joint of the Fingers and Toes.

When separated from the Skin, they are *transparent* like Horn, but are coloured in the living Body by the Vessels of the Cutis, to which they adhere, and from which they derive their nourishment.

They are fixed at their roots to a *Semilunar Fold* of the Cutis, and are there covered by a reflection of the Cuticle, which firmly adheres to them.

They grow from the roots, and not from the points; and begin to be formed about the third month after Conception.

The Nails strengthen and defend the ends of the Fingers and Toes, and thereby serve as Buttresses.

In the Fingers, they increase the power of apprehension, being useful in laying hold of minute objects.

##### HAIRS.

The *Hairs* arise by Roots or Bulbs, which are situated in the Skin, or in the Cellular Substance under it. Tab. LXV. Fig. 9. 10.

The *Bulbs* are of various shapes in different parts of the Body, and have Blood-vessels dispersed upon them for their nourishment.

Each of the Bulbs has *two Membranes*, or *Capsules*, containing an Oily Fluid between them, which gives colour to the Hair, and for want of which, as in advanced life, when the Capsules shrivel, or in certain diseases, the Hair is supposed to change its colour, and become white. It may be remarked, however, that the Hair, after being cut off, continues uniformly to preserve its colour.

All the Hairs of the Body are of a round form, and taper regularly from their root towards their point; which circumstance has explained the experiment, that when a Hair is placed lengthways, between the points of the Finger and Thumb, and these are moved backwards and forwards on each other, the Hair is gradually forced from between them, and always in the direction of its root.

The colour of the Hair has some relation to the *Corpus Mucosum*, since, in the Negro, the tint of the Hair corresponds with that of the Skin, and in a person with red or with dark-coloured Hair, there is a rosy or a dark complexion.

The Hairs go obliquely through the substance of the Skin, and in passing from it they carry with them *Processes* of the Epidermis, which serve them as Sheaths, and which are so thin and transparent, as to allow the colour of the Hairs to appear through them.

In the Human Body, the Hairs are so slender, that it is difficult to trace their structure; but in the strong Hairs of certain Quadrupeds, this becomes apparent.

By the assistance of a good Glass, these strong Hairs are observed to be composed of a bundle of smaller Hairs, among which are one or two Canals for containing their nourishing Fluid, termed the *Medulla*.

By desiccation, the Hairs separate at their points into thin constituent Filaments.

The Hairs, like the Nails, grow from their bases, in consequence of which, when they are cut short, they seem to increase in number, though it is only in diameter.

The Hairs, like the Cuticle, appear to be destitute of Blood-vessels, Lymphatics, and Nerves.

The Hairs serve in general for the ornament, warmth, or protection of the different parts on or near which they are placed.

The chemical properties of Hairs are nearly the same with those of Cartilage, Cuticle, Horn, &c.

By late experiments it is found, that Hair, boiled in water in PAPIN'S Digester, can be completely dissolved; that when Hair is digested in Alcohol, it is deprived of its colour, an oily fluid, considered as the cause of this colour, having been dissolved by the Alcohol; and that each of the Acids acts very sensibly upon the Hair.

##### SEBACEOUS DUCTS OF FOLLICLES, and MILIARY GLANDS.

The *Sebaceous Follicles* derive their name from the Fluid they contain, becoming like Suet, after acquiring a certain degree of consistency, or being inspissated by stagnation.

They are of a cylindrical form, are in the Substance of the Cutis, or directly upon its inner surface, and are found in greatest abundance in those parts which are exposed to the air, or to attrition; as in the Nose, Ears,



Ears, Nipples, Groins, and external Parts of Generation. Tab. LXIII. Tab. LXIV.

The *Sebaceous*, or *Miliary Glands*, are so called from their Contents, and from their resemblance to *Millet Seeds*, and are seated upon the inner side of the Skin of the Axilla. Tab. LXV. Fig. 12.

Other Miliary Glands are described by Authors as being placed under the Skin over the whole Surface of the Body, and as serving for the Secretion of Perspirable Matter;—but they are not demonstrable to such a general extent, and the Sweat is considered as being derived from the Exhalents, as already observed.

These Follicles and Glands secrete a Fluid which serves to lubricate the Skin, and defend it from the inclemency of the weather, or from the effects of friction.

#### MEMBRANA CELLULARIS, vel TELA CELLULOSA, OR RETICULAR, OR CELLULAR SUBSTANCE.

This is generally considered as one of the Integuments, though common to these and to the other parts of the Body.

It is composed of a fine fibrous Web, formed of many Membranes joined irregularly together, and these made up of Cells, which communicate freely with each other wherever they are found.

It is very elastic, may be drawn out to a considerable extent, after which it suddenly recoils, and may be condensed or compacted to a great degree.

It lines the Skin, covers the Muscles in general, and insinuates itself between their different Fibres;—is a universal covering to all the other parts, and even enters into the composition of almost every one of them.

It is thickest where the parts are most exposed to pressure, as in the Hips, Palms, and Soles.

The different Cells of which it is composed are constantly moistened by an Interstitial Fluid, and in many parts of the Body are filled with Fat.

Blood-vessels, Absorbents, and Nerves, are in many parts seated in it, but it has little or no Sensibility, can be handled freely, or cut, or punctured, without giving pain.

It serves to connect parts to each other, but so as to prevent them from growing together;—it covers them, supplies them with Sheaths to move in, and contains the Fat.

#### CORPUS ADIPOSUM, ADEPS, PINGUEDO, OR FAT.

The *Fat* is lodged in the common Cellular Substance, and is made up of Masses composed of small spherical Vesicles, applied closely together, but scarcely visible

to the naked eye, Tab. LXV. Fig. 13.—15.; and these are surrounded by a net-work of Blood-vessels, from which the oily matter composing the Fat is supposed to be secreted, without the intervention of Glands.

The *Vesicles* are not found to have communication with the Cellular Substance, or with each other, nor have any Excretory Ducts yet been perceived in them,—the Fat being supposed to transude from the Cells.

It is of *different colour* and *consistency* in different parts: It varies from a straw colour to a deep yellow hue. In the living Body it is generally fluid, though in some parts it approaches to a solid, and is altogether of this nature in the dead Body.

In the Bones, it forms the Marrow, which has been already described.

The Fat is chiefly *situated* immediately under the Skin, and covers almost the whole Surface of the Body. It is also found between the different Muscles and Fibres of Muscles,—within the Orbits, and in the Cheeks,—in the Substance of the Mammæ, and about the Heart.

It *abounds* in the Abdomen, about the Kidneys, Loins, Omentum, and Mesentery;—and in the Joints, it forms the Substances called *Glands of the Joints*, as already mentioned.

The Fat is *wanting* in the Scrotum, Penis, and Eyelids, and is found only in small quantity in the Fore-head, or about the Joints, where, from its bulk, it would have been inconvenient.—It is also wanting in the Substance of the Viscera situated in the great Cavities of the Body; as the Brain, Lungs, Liver, Spleen, Kidneys, &c.

The Fat serves to lubricate every part of the Body to which it is connected, and facilitates the action of the Muscles. It fills the Interstices, so as to give form and smoothness, and to guard against pressure. It serves also as a reservoir of nourishment, to be occasionally re-absorbed, and carried into the constitution.

The chemical properties of Fat are observed to be nearly the same with those of vegetable expressed Oils.

#### PANNICULUS CARNOSUS, vel TUNICA CARNOSA.

This is a general Covering found in the Quadruped, and formed by a thin Subcutaneous Muscle, which serves to agitate the Skin.

It exists only in certain parts of the Human Body; as in the Fore-head, where it is formed by the Occipito-frontalis; in the Neck, where it is produced by the Platysma Myoides; and in the Scrotum, where it is formed by the Cremaster Testis.

The Ancients described this as an additional covering.

TABLE





TAB. 64.

Fig. 1.

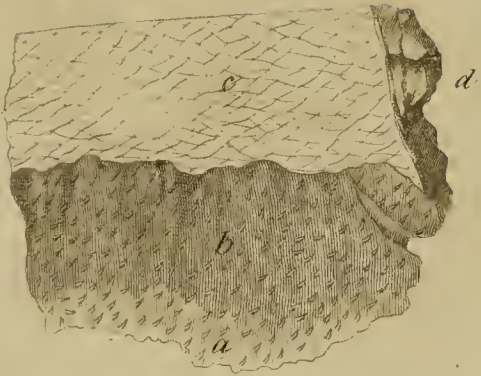


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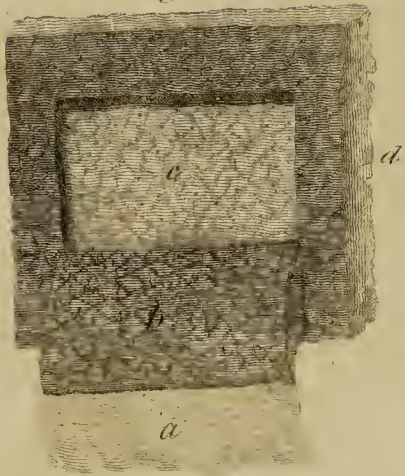


Fig. 2.

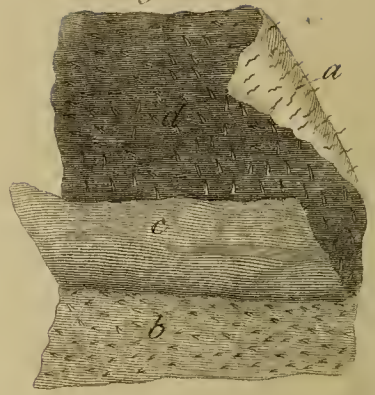


Fig. 3.

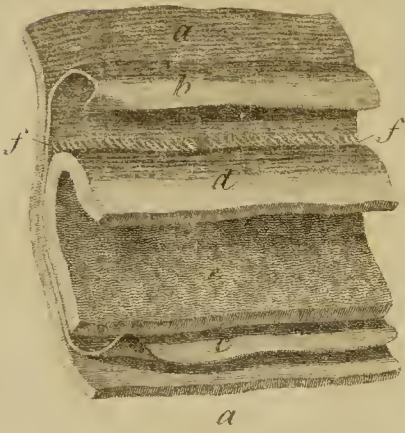


Fig. 5.

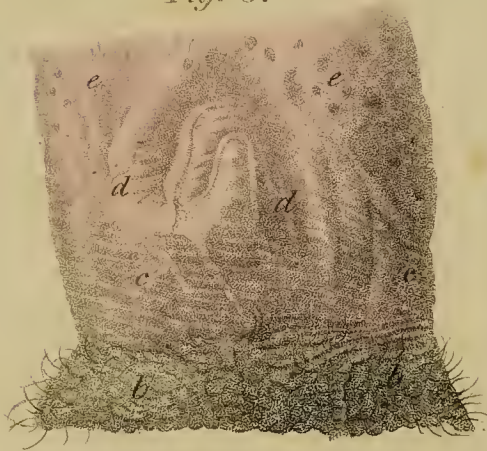


Fig. 6.

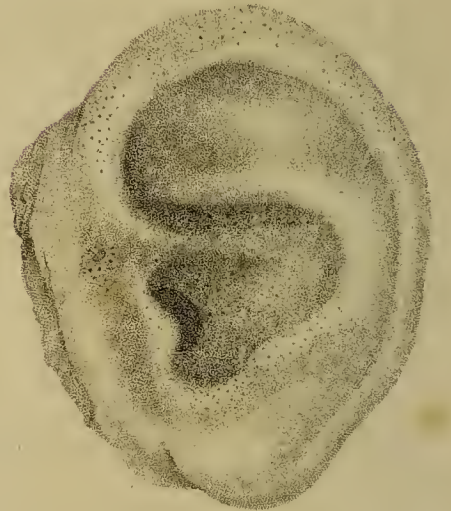


Fig. 7.



Fig. 8.

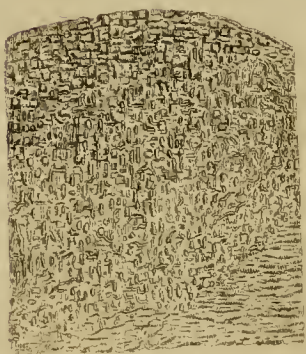


Fig. 10.

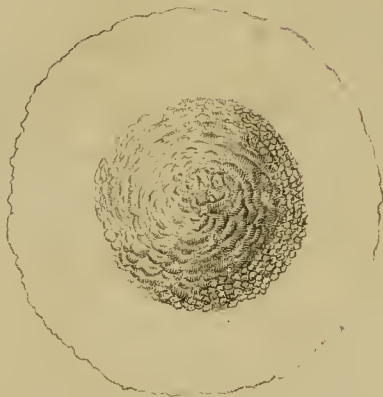


Fig. 9.

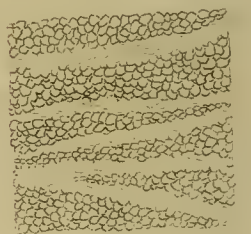


Fig. 11.



Fig. 12.



Fig. 13.





# T A B L E LXIV.

## VIEWS of the COMMON INTEGUMENTS.

See Tab. XLV. Fig. 2.

### FIG. 1.

*Part of the INTEGUMENTS of the MAMMA of a Woman thirty-two years of age.*

- a, b,* The cuticle, with the corpus mucosum, and roots of the hairs reflected; *a,* Part of the cuticle from which the corpus mucosum has been separated. The roots of the hairs pass through pores of the corpus mucosum, and adhere to vaginulæ, or processes of the cuticle.
- c,* The cutis vera, upon which the folds of the skin and pores of the hairs appear.
- d,* The subjacent fat.

### FIG. 2.

*Part of the CUTICLE and CORPUS MUCOSUM separated from the same MAMMA.*

- a,* The external surface of the cuticle, with the hairs.
- b,* The internal surface of the cuticle, with its processes, to which the hairs adhere.
- c,* The corpus mucosum, separated from part of the cuticle, and reflected.
- d,* The corpus mucosum adhering to the cuticle; the inner surface being here seen.—The roots of the hairs appear white, from the processes of the cuticle adhering to them.

### FIG. 3.

*Part of the SKIN of the HEEL, with its Layers separated some way from each other.*

- a, a,* The cuticle, of great thickness.
- b,* The corpus mucosum separated from the cuticle, and turned down.
- c,* The inner surface of the corpus mucosum.
- d,* The outer, and,

- e,* The inner surface of the cutis vera.
- f, f,* Small filaments which pass from the cutis to the cuticle; making a connexion between the two, and forming part of the corpus mucosum.

### FIG. 4.

*A Portion of the SKIN of a NEGRO, with its Layers separated and turned down.*

- a,* The cuticle turned down.
- b,* The cuticle thicker and stronger than in the European, also turned down.
- c,* The joints and pores for the hairs, seen on the external surface of the cutis vera.
- d,* The cut edge of the skin.

### FIG. 5.

*A Portion of the INTESTINUM RECTUM of an Ethiopian, inverted.*

- a,* The raphè, or sutura perinei.
- b, b,* The perineum.
- c, c,* The situation of the anus, where the external integuments of the perineum pass to the inner surface of the rectum. The transverse rugæ which appear are owing to the inversion of the rectum.
- d, d,* The longitudinal rugæ of the rectum, among which the larger mucous follicles are placed.
- e, e,* The mouths of simple glands, or mucous cells, with which the rectum abounds, uncommonly large in the preparation from which the figure was made.

### FIG. 6.

*The EAR of a Child; the CUTICLE and CORPUS MUCOSUM being removed.*

Upon the surface of the skin are seen innumerable minute pores, among which are interspersed larger foramina, especially about the concha.

FIG.



FIG. 7.

*Part of the NOSE and UPPER LIP of a Man, from which the CUTICLE and CORPUS MUCOSUM are removed.*

The cutis appears full of small pores, with larger ones interspersed; the larger ones abound most about the passage into the nostril. The red part of the lip is covered with villi.

FIG. 8.

*Part of the SKIN of the HEEL of a Man, from which the CUTICLE and CORPUS MUCOSUM are removed.*

It appears full of papillæ of different sizes, being commonly larger about the middle of the heel; towards the middle and sides of the sole they are smaller.

FIG. 9.

*The Inner Surface of a small Bit of the CUTICLE and CORPUS MUCOSUM removed from the ARM, and viewed through a Magnifying Glass.*

The darker spaces represent the foveolæ of the corpus mucosum, in which the papillæ of the cutis are lodged. The white streaks are eminences which correspond with fissures or plicæ on the external surface of the cutis.

FIG. 10.

*Part of the MAMMA of a Girl, from which the CUTICLE and CORPUS MUCOSUM are removed.*

It is full of papillæ, among which are the incisures of the skin.

FIG. 11.

*The Extremity of the PENIS, from which the CUTICLE and CORPUS MUCOSUM have been separated. The CORPORA CAVERNOSA are distended.*

- a, The cuticle, with the corpus mucosum separated from the glans, and inverted.*
- b, The glans, full of papillæ.*
- c, The corona glandis, in which larger papillæ, with the sebaceous glands, appear.*
- d, The prepuce turned back.*

FIG. 12.

*The PALMAR SURFACE of Part of the Second JOINT of the THUMB in the living Body, viewed with a Magnifying Glass.*

The figure shews the course of the ridges upon which the papillæ are placed.

In the ridges also are seen innumerable pits, which are frequently filled with a thin fluid,—the matter of perspiration.

FIG. 13.

*The LIPS represented from the Inner and Back Part, to shew the VILLI.*

- a, The skin and fat.*
- b, The inner membrane of the lips covered with villi.*
- c, The aperture of the mouth.*





Fig. 3.

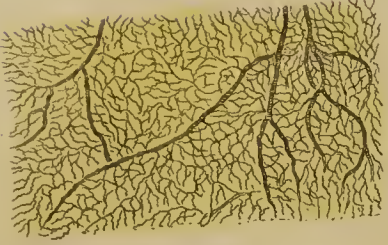


Fig. 4.



Fig. 2.



Fig. 5.



Fig. 6.

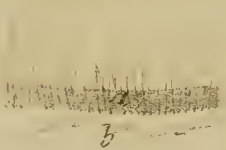


Fig. 7.



Fig. 8.

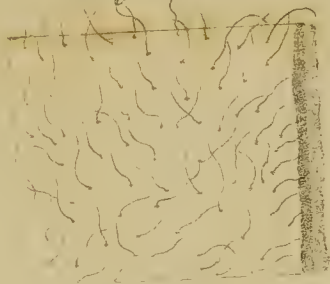


Fig. 11.

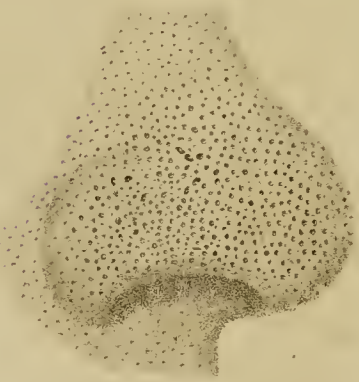


Fig. 10.

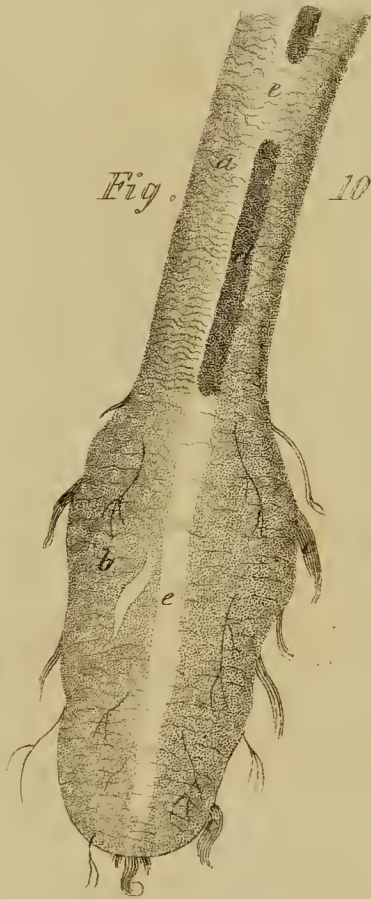


Fig. 9.



Fig. 16.



Fig. 12.

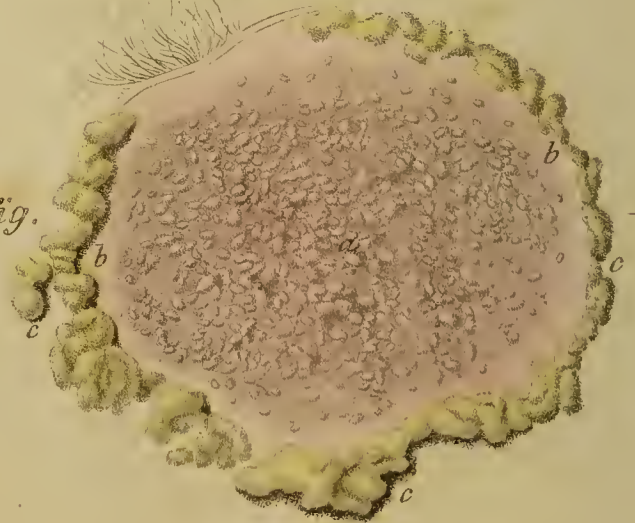


Fig. 15.

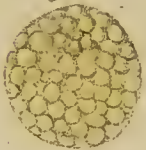


Fig. 13.

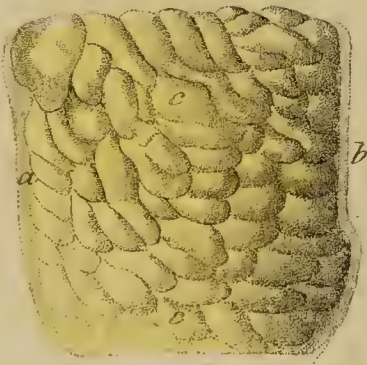
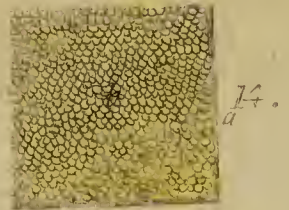


Fig. 14.





# TABLE LXV.

## VIEWS of the SKIN and its APPENDAGES.

FIG. 1.

*The ARTERIES of the SKIN*

The figure shews part of the skin of the forehead of a child about three years old, the arteries of which are injected. The larger branches were cut from their trunks in separating the skin; the smaller shew innumerable anastomoses with each other, all running in a serpentine direction.

FIG. 2.

*Part of the SKIN of a Child, after the ARTERIES had been injected with Wax, and the Preparation put into Spirit of Turpentine.*

FIG. 3.

*The VEINS of the SKIN.*

This figure shews part of the cutis of the leg of a young woman; the larger veins run under the skin, the smaller belong to it, and shew many anastomoses. They differ from the arteries painted in Fig. 1. in their greater size, in the straighter course of their branches, and in their larger intermediate spaces.

FIG. 4.

*The ABSORBENTS of the SKIN.*

The figure shews part of the skin of the thigh, below FALLOPIUS's ligament, with the absorbents injected with quicksilver.

- a*, A subcutaneous absorbent cut off at the inner part of the thigh, and turned back with the skin. A little higher are seen the division of this branch into two others, the anastomoses of the absorbents, and extremely minute branches passing from the substance of the skin, to join them.
- b*, The place where the absorbent *a* passes from the cutis to cellular substance.
- c*, The cutis separated from the subcutaneous cellular substance, and turned towards the pudendum.
- d, d*, The subcutaneous cellular substance and fat.

VOL. II.

FIG. 5.

*Part of the GREAT TOE of an Adult Man, from which the Nail is separated and turned aside.*

- a, b, c*, The part from which the nail is separated; *a*, A white spot of the skin, corresponding with the white root of the nail; *b, c*, Longitudinal lines; *c*, The extremities of these, termed *Papillæ*, where the cuticle recedes from the extremity of the nail.
- d, d*, Sulci where the margin of the nail adhered.
- e*, The inner surface of the nail;
- f*, Its white root.
- g, g, h*, The cuticle; *g, g*, Its outer surface; *h*, Its inner surface lined with the corpus mucosum.

FIG. 6.

*A Section of the SKIN from the Side of the HEAD, with the HAIRS passing from the Subcutaneous Cellular Substance, taken from a dried Preparation.*

- a*, The external surface of the skin.
- b*, The subjacent fat. The bulbs of the hairs go from the cellular membrane and fat, and perforate the substance of the skin.

FIG. 7.

*A Section of the SKIN from the CROWN of the HEAD of an Adult, to shew the Depth of the Bulbs of the HAIRS.*

FIG. 8.

*A Portion of the SKIN of an Adult Man, taken from the Fore Part of the THIGH, with the subjacent FAT.*

The cuticle and corpus mucosum are removed, yet the hairs remain, retaining their vaginulæ, or processes of the cuticle.

FIG. 9.

*A small Segment of the INTEGUMENTS, comprehending two HAIRS viewed through a Microscope.*

- a*, Part of the hairs rising above the skin.
- b*, The denser part of the skin.

B

c, The



- c*, The subcutaneous fat.  
*d, d*, The vagina of the hair, or a peculiar cellular substance surrounding it.  
*e, e*, Fibres sent out from the hairs.  
*f*, The portion viewed in the microscope, here seen of the natural magnitude.

FIG. 10.

*A* HAIR pulled from the SUPERCILIUM, and a few Hours afterwards, viewed in a Microscope.

- a*, The body of the hair.  
*b*, The bulb.  
*c*, Filaments or radicles which adhere to it.  
*d, e*, A canal in it, partly replete with juice at *d*, and partly empty at *e*.

FIG. 11.

The CUTIS of Part of the NOSE of an old Person, the CUTICLE and CORPUS MUCOSUM being removed.

In the cutis, besides the pores of the skin in general, are seen many sebaceous follicles, which are most conspicuous about the ala nasi and point of the nose. Within the larger are observed others of an inferior size opening into them.

FIG. 12.

*A* Portion of the INTEGUMENTS taken from the AXILLA of an Adult, to shew the Appearance of the SEBACEOUS GLANDS.

- a*, The glands adhering to the inner surface of the cutis.

- b, b*, The bare surface of the cutis.  
*c, c, c*, The fat dissected from the inner surface of the cutis, and left adhering to the edges of it.

FIG. 13.

FAT taken from the Fore Part of the THIGH of a recent Adult Body.

- a*, The interior surface of the skin, from which the fat has been separated by the knife.  
*b*, The thickness of the cut edge of the skin.  
*c, c*, The fat which forms larger and smaller portions.

FIG. 14.

The FAT taken from the Fore Part of the THIGH of a Fœtus of Eight Months.

- a*, The cut edge of the skin.  
*b*, The fat formed into flat granulæ.

FIG. 15.

*A* Small portion of the Subcutaneous FAT viewed with a Microscope, which increases its Diameter about thirty times.

FIG. 16.

Represents the same Piece of FAT with that shewn in the former figure, viewed through a Microscope, which magnifies it to near one hundred and fifty Diameters.



## OF THE BRAIN.

THE term *BRAIN* is applied to the whole of that Mass which, with its surrounding Membranes, fills the Cavity of the Cranium; and is larger in Man, in proportion to the Nerves belonging to it, than in any other Animal.

The Brain is divided into *Cerebrum*, *Cerebellum*, *Tuber Annulare*, and *Medulla Oblongata*, the whole of which forming a Mass of about 48 or 50 ounces in weight, but the weight varying in different persons, according to the size of the Head.

The Membranes of the Brain were called *Meninges* and *Matres* by the Ancients, from an idea that they gave birth to all the other Membranes of the Body.

They consist of the *Dura Mater*, *Tunica Arachnoidea*, and *Pia Mater*.

The *DURA MATER*, named from being of a firmer texture than the other two Membranes, incloses the Brain with all its Appendages, and lines the different parts of the Cranium. Tab. LXVI. Tab. LXVII.

Upon the outer Surface of the *Dura Mater*, there are small fleshy-looking Bodies, placed at irregular distances, which are termed *Glands of PACCHIONI*. These frequently project so much, as to make deep Pits in the Skull.

The *Dura Mater* is composed of one Membrane, which, in several parts, is divisible by maceration into two, or even more Layers of Fibres.

The *Texture* of the *Dura Mater* is very dense. It is the thickest and strongest Membrane of the Body, and is composed of Tendinous-like Fibres, which have a shining appearance, particularly in its inner Surface. In many parts, these Fibres run in a variety of directions, and decussate each other at different angles.

The *Dura Mater adheres* every where to the Surface of the Cranium by Blood-vessels, in the same manner as the *Periosteum* adheres to the Bones in the other parts of the Body; but it is more firmly connected at the Sutures and Foramina than elsewhere; and so much more firmly in Children than in Adults, that, in separating it from the Cranium, it is apt to bring along with it some of the Fibres of the Bone to which it is attached.—In the Adult, the separation of the Bone from the Membrane is less difficult, in consequence of many of the Fibres being obliterated.

The *inner Surface* of the *Dura Mater*, which is remarkably smooth, is in *close contact* with the subjacent Membranes, and adheres to the Brain only where the Veins go into the Sinuses. It is lubricated by a Fluid discharged through its Vessels, which guards the Brain from danger, according as it may be affected by the different states of Respiration.

The *Dura Mater* serves as a *defence* to the Brain, and supplies the place of a *Periosteum* to the inside of the Bones of the Cranium; giving nourishment to them,—as is evident from the numerous drops of Blood which appear after removing the Skull-cap.

From the inner side of the *Dura Mater*, *Processes* are sent off, which divide the Brain into certain parts, and serve to keep it steady; viz. the *FALX*, *TENTORIUM*, and *FALX MINOR*.

The *FALX*, *Septum Cerebri*, or *Vertical Superior Longitudinal Process*, is formed by a doubling of the *Dura Mater*, and is situated between the Hemispheres of the Brain, which it separates from each other for a considerable way downwards. Tab. LXXVIII. *y, z, v, w*.

It begins at the middle of the Sphenoid Bone, and *Crista Galli* of the Ethmoid Bone, and runs along the upper and middle part of the Head, adhering first to the Frontal Bone, then to the Sagittal Suture, and afterwards to the middle of the Occipital Bone.

In its passage, it becomes gradually broader, extending from the Cranium above, to near the part of the Brain below termed *Corpus Callosum*, and terminates behind, in the middle of the *Tentorium*.

It runs from before backwards in a straight direction, and has some resemblance in shape to a *Sickle* or *Scythe*, from which circumstance it has obtained the name of *Falx*.

Between the under edge of the *Falx* and Base of the Cranium, there is a *large space of an oval form*, occupied by that part of the Brain which is common to the two Hemispheres. Tab. LXVIII. *a, m, m*.

The *Falx* supports the *Tentorium*, and is considered as preventing the two sides of the Brain from pressing upon each other, though there have been instances where part, or even the whole, of this Process has been wanting.

The *TENTORIUM CEREBELLI*, or *Transverse Septum*, or *Lateral Processes* of the *Dura Mater*. Tab. LXVIII. *n, o, p, q, r, s, t*.

The *Tentorium* is continued laterally from the *Falx*, is connected behind to the inner Transverse Ridges and Grooves of the Occipital Bone, and, at the fore and outer edges, to the ridges and great angles of the Petrosal parts of the Temporal Bones, and terminates at the posterior Clinoid Process of the Sphenoid Bone.

Between the middle and inner edges of the *Tentorium* and posterior Clinoid Process of the Sphenoid Bone, there is a *large Notch*, or *Foramen Ovale*, where the *Cerebrum* and *Cerebellum* are united, or where the Tu-



ber Annulare is chiefly situated. Tab. LXVIII. between *a* and *n*.

The Tentorium keeps the Falx *tense*, and forms a Floor or Vault over the Cerebellum, which prevents the Cerebrum from pressing upon it.

The FALX MINOR, vel *Septum Cerebelli*, which is placed between the Lobes of the Cerebellum. It descends from the under and back part of the Falx and middle of the Tentorium, adheres to the inferior Longitudinal Spine of the Os Occipitis, and terminates insensibly at the edge of the Foramen Magnum of that Bone. Tab. LXXVIII. *q*.

Besides the Processes of the Dura Mater already described, there are four of inferior consideration, two of which are situated at the sides of the Sella Turcica, and two at the edges of the Foramina Lacera. Tab. LXVIII.

Several other Processes pass out at the different openings of the Cranium, to be connected to the Pericranium, or to accompany the Spinal Marrow and Nerves.—Those of the last description shall be afterwards taken notice of.

The Arteries of the Dura Mater are derived chiefly from the External Carotids, and partly from the Internal Carotids and Vertebrales. Tab. LXVI.

The principal Branches of these Arteries run upon the outside of the Dura Mater, minute Filaments only being observed upon its inner Surface.

The Veins of this Membrane are of two kinds. One set of them, like the Veins in other parts of the Body, accompany the Arteries, Tab. CLXVIII.;—the others are termed *Sinuses*, and differ from Veins only in this, that their Transverse Sections are of a triangular figure, and that they are inclosed in a doubling of the Dura Mater, which is so tense over them, that they are little affected by the pressure of the surrounding parts. Tab. LXVII.

In the bottom of the Sinuses are *small Transverse Cords*, termed *Chordæ WILLISII*, which may add a little to their strength, and assist in preventing them from being too much distended.

The Sinuses serve to carry the Blood from the Brain, and convey it to the Veins of the Neck; for which purpose they are properly fitted, their covering from the Dura Mater giving them strength, and their frequent communications preventing congestion.

*The Principal SINUSES are,*

The *Superior Longitudinal Sinus*, which begins at the Crista Galli of the Ethmoid Bone, runs along the upper edge of the Falx, becomes gradually larger in its progress, and terminates in the beginning of the Lateral Sinuses. Tab. LXVII. E, E. Tab. LXVIII. *h, i, k*. Tab. LXXVIII. *u, v, v*.

The *Torcular HEROPHILI*, or *Fourth Sinus* of the Ancients;—the term *Torcular* applied from a supposi-

tion that the Blood is squeezed in this Sinus as in a Wine-press.—It is chiefly formed of the Vena GALENI, runs in the junction of the Falx and Tentorium, and terminates with the former Sinus in the beginning of the Lateral Sinuses. Tab. LXVIII. *u, w, x*. Tab. LXXVIII. *r, s*. Tab. LXVII. G.

The *two Lateral Sinuses*, which are formed by the Longitudinal and Torcular Sinuses. They run in depressions of the Occipital and Temporal Bones, first transversely, and nearly opposite the great external Arch of the Os Occipitis, then in a winding direction downwards, and terminate at the Base of the Cranium, in the beginnings of the Internal Jugular Veins. Tab. LXVII. H, H. Tab. LXVIII. *y*.

Besides the Sinuses mentioned above, several others of less consideration will be pointed out in the particular description of the Veins.

The Nerves of the Dura Mater are so very minute, that they have not as yet been distinctly traced; and it is found to possess very little sensibility in the sound state.

Upon the sides of the Superior Longitudinal Sinus, and parts of the Brain contiguous to it, there are *numerous small Granulations*, which are part of the *Glandulæ PACCHIONI*. They are of a whitish colour, scarcely so large as Mustard Seeds, and commonly joined in clusters.

The nature of these Granulations is still unknown.—By some they have been supposed to belong to the Lymphatic System.

The TUNICA ARACHNOIDEA, named from its cobweb appearance, is an exceedingly thin, tender, and transparent Membrane, in which no Vessels have been hitherto observed.

It is spread uniformly over the Surface of the Brain, inclosing all its Convulsions, without insinuating itself between any of them.

At the upper part of the Brain, it adheres so closely to the subjacent Coat by fine Cellular Substance, that it can scarcely be separated from it; but in different parts of the Base of the Brain, particularly about the Tuber Annulare and Medulla Oblongata, it is merely in contact with the Pia Mater, and may readily be raised from it by the assistance of the Blow-pipe.

The Tunica Arachnoidea, like the Cuticle, covers and defends the parts under it.

The PIA MATER, named from its tenderness, is somewhat of the nature of the former Covering, but is extremely Vascular. It varies in thickness and strength in different parts of the Brain, according to the number of Vessels dispersed on it. Tab. LXIX. Tab. LXXXI. Fig. 2.

It envelopes the Brain in general, enters double between all its Convulsions, connecting Hemispheres, Lobes, and Convulsions together, and lines the different Cavities called *Ventricles*.

Over



Over the Convolution this Membrane is remarkably thin and dense; in the Furrows between them it is thicker and looser in its texture, becoming gradually thinner towards the bottom of these.

It serves to contain and support the Vessels of the Brain, and allows them to divide into such minute parts, as to prevent the Blood from entering the tender Substance of this Viscus with too great force.

The *Arteries* of the Pia Mater are the same with those of the Brain, to be afterwards taken notice of.

The *Veins* differ in no respects from those in other parts of the Body, excepting that they are a little more tender, and that they do not in general accompany the Arteries.

#### CEREBRUM.

The *Cerebrum*, or *Brain* properly so called, is situated in the upper part of the Cranium, which, with the membranes, it completely occupies, and is formed of parts which have a general similarity to each other in the opposite sides of the head.

It is divided into two halves, termed *Hemispheres*, which are separated by a deep fissure in which the Falx is situated. Tab. LXIX. C, D.

Each of the Hemispheres is of an *oval form*, or they somewhat resemble an Egg cut longitudinally into two equal parts. The inner sides are flat, and closely applied to the Falx, the upper and outer parts convex, and the under Surface irregular.

The under Surface is divided into *two Anterior, two Lateral, and two Posterior Lobes, or Processes*. Tab. LXXV. Tab. LXXX.

The *Anterior Lobes* are situated in the fore part of the Base of the Cranium, and are the largest of the lobes.

The *Lateral or middle Lobes* are lodged in the Fossæ formed by the Temporal and Sphenoid Bones, and are next in size to the former, but deeper. They pass insensibly into the posterior Lobes.

Between the Anterior and Lateral Lobes on each side, there is a *Furrow* formed by the Anterior Clinoid Process of the Sphenoid Bone, which has been termed *Fossa, vel Fissura Magna* SYLVII. Tab. LXXX.

The *Posterior Lobes* are placed over the Cerebellum, and are separated from it by the Tentorium, upon which they rest; the extreme points of these Lobes being nearly on a level with those of the Anterior Lobes. Tab. LXXX. D, D.

The Surface of the Brain in general, both above and below, is of a brown colour, and is divided by deep Fissures into many turnings or windings, termed *Circumvolutions*, which run in various directions, close to each other, and are of different sizes and lengths on different parts of the Brain. The fissures between them also vary very considerably in depth. Tab. LXIX. Tab. LXXV.

The Circumvolutions are every where connected to the Pia Mater by an infinite number of small Vessels,—called by RUYSCH, *Tomentum Cerebri*,—which run at

right angles into the Substance of the Brain, as may be readily seen, upon separating the Circumvolutions a little from each other, or by raising part of the Pia Mater from the Brain.

The Convolution are smallest at the fore part of the Brain, larger behind, and largest at the upper and middle parts of the Hemispheres, where each is from half an inch to three quarters of an inch in breadth.

Between the Hemispheres, and at the bottom of the fissure already taken notice of, a broad white Substance is observed, called *Corpus Callosum*, from its being a little firmer than the rest of the Brain. It goes across the Brain, under the Falx, and is merely a continuation of the Medullary Substance, running horizontally, and joining the two sides of the Hemispheres to each other. It is narrow before, broader behind, and is arched or turned a little down at its anterior and posterior edges. Tab. LXXXI. Fig. 5. E. Tab. LXX. I, I.

In the middle of the Corpus Callosum, there is a longitudinal *Raphè*, a *Linea Mediana*, with a Medullary Cord on each side, from which many Transverse Streaks issue. These Cords, like the Corpus Callosum itself, become gradually broader towards the Posterior Extremity. Tab. LXX. K, L, L.

A Section of the Hemispheres of the Brain shews the division into *outer and inner, or Cortical and Medullary Substance*. If this Section be made in a horizontal direction, a little above the middle height of the Brain, or upon a level with the Corpus Callosum, the Medullary Substance then appears in the greatest proportion.

The outer Substance is also termed *Cineritious*, from its somewhat resembling the ashes of wood, or being of a *greyish* colour, though a little tinged with brown, the tinge varying according to the quantity and quality of the Fluid contained in the Blood-vessels;—and *Cortical*, from its *surrounding* the inner part of the Brain, as the Bark does the inner parts of a Tree. Tab. LXX. C, C.

It is termed by some Authors *Glandular*, and by others *Secretory*, from a supposition that the Fluid was secreted in it.

The *Cineritious Substance* covers the Brain in general, and enters deep between its Convolution, is of a soft consistence, about the sixth part of an inch in thickness over the Convolution, is evidently more Vascular than the Medullary part, as appears by minute Injections thrown into the extreme Branches; but it is uniform, and, in its natural state, without any appearance of a Fibrous Texture.

The inner Substance, improperly termed *Medullary*, is of a white colour, with a slight tinge of yellow, and is considered as giving origin to the different Nerves. It has been by some called *Excretory*, from having been supposed to be formed of hollow Tubes continued from the Vessels of the Cortical part; but no Cavities have ever been observed in the soft Striæ or fibrous-like matter of which it is composed. Tab. LXXI.

A Section of this part of the Brain shews no appearance of Cells, or Globules, or Fibres, but is smooth and uniform



uniform when divided by a sharp instrument, and exhibits many red points, which are the cut extremities of Blood-vessels, with the Blood oozing from them. The number of these points varies according to the quantity of Blood remaining in the Brain. The vessels from which the blood issues here, are seldom larger than Hogs' Bristles.

A thin slice of it spread on a glass, and viewed by a microscope, has been found to resemble a kind of pulp, consisting of Globules greatly inferior in size to the Globules of blood.

The Medullary Substance is greater in quantity, more opaque, and somewhat firmer in texture, than the Cineritious Substance, with which it is so intimately connected, as to appear to be a continuation of it.—Streaks are observed in many parts of the Medullary Matter, which run in general in a parallel and transverse direction: and by plunging a part of the Medullary Substance of the Brain, for a few minutes, into boiling oil, or macerating it for a longer period in alcohol, or in some of the diluted acids, &c. so as to render it firmer and more elastic, it may be made, by lacerating it in some particular direction, to exhibit a *fibrous appearance*. Something of the same kind may be seen in the Cortical part, but is probably not so distinct.

In many parts of the Cineritious Substance, Medullary Matter appears; and, on the contrary, in different parts of the Medullary Substance, Cineritious Matter is found; the two being frequently blended together in the form of Streaks.—See MONRO on the Nervous System. Tab. VII.

*Centrum Ovale* of VIEUSSENS. This is the Medullary Substance of the Brain, forming a kind of Nucleus, which is seen after removing the Cineritious Substance, and all the Medullary parts mixed with it which lie between the Cortical Convolution.

To obtain a proper view of the Centrum Ovale, the Nucleus ought to be cut in such a manner as to preserve the Corpus Callosum, and the same convexity with that of the general convexity of the Brain.

The Centrum Ovale forms an *Arch* or *Roof* over the two Lateral Ventricles; and the under part of this Roof, which is smooth and uniform, constitutes the upper part of the Ventricles.

VIEUSSENS considered the Centrum Ovale as the *Great Dispensatory of the Animal Spirits*.

In the Substance of the Brain, there are four Cavities termed *Ventricles*, viz. two *Lateral*, a *Third*, and a *Fourth*.

The four Ventricles have their sides contiguous to each other, are chiefly formed of Medullary Matter, and are lined with a continuation of the Pia Mater, conducted in by the Blood-vessels, but differing from that part of the Membrane covering the exterior Surface of the Brain, in having fewer Vessels dispersed upon it.

The Ventricles are constantly moistened by a Fluid, which prevents their opposite sides from adhering to each other.

The Use of the Ventricles, as of many other parts of the Brain, is still unknown.

The *Lateral*, formerly called *Superior Ventricles*, are situated in the Hemispheres, one in each. Tab. LXXI. H, U, S.

They are of an irregular form, lying under the Centrum Ovale, and have each three winding Corners, compared by HALLER to Rams' Horns, which are therefore called by him *Cornua*, and the Cavities themselves *Ventriculi Tricornes*.

Each of the Cornua is placed in a corresponding Lobe of the Brain.

The *Anterior Cornua* are separated from each other only by a partition, called *Septum Lucidum*. Tab. LXXI. H, H.

The *Posterior Cornua*, Tab. LXXI. between U and S, called also *Digital Cavities*, are at a considerable distance from each other, but approach nearer at their pointed extremities.

The Anterior and Posterior Cornua run nearly in a horizontal direction, or according to the length of the Hemispheres themselves; while the Inferior pass first downwards, then forwards, and terminate in the Lateral Lobes of the Brain. Tab. LXXI. X, X.

In each of the Posterior Cornua there is an Elongation, which terminates behind in a point, and which is called *Ergot* by the French, from its resemblance to the Spur of a Cock; or *Hippocampus Minor*, from its similarity to, and connexion with, the Substance termed *Hippocampus Major*. Tab. LXXI. T.

In the fore part of the bottom of the Lateral Ventricles, are two Pyriform Eminences, called *Corpora Striata*, which are large and rounded before, where they occupy the whole Anterior Extremities of the Lateral Ventricles, but become gradually narrower, and recede from each other at their posterior extremities. Tab. LXXI. G, G.

Their inner edges are concave, and their upper surface is smooth and of a greyish colour.

The *Structure* of these is mostly Cineritious externally, but mixed with Medullary Striæ within, some of which form large Transverse Medullary Arches, and others run more in a straight direction.

Between the posterior halves of the Corpora Striata, are situated the *Thalami Nervorum Opticorum*, which have a roundish form and Medullary Surface, and have Striæ of Cineritious and Medullary Matter within; but the Striæ are less distinct than those of the Corpora Striata. Tab. LXXII. F, F, &c.

Upon the Surface of these Bodies, there are small *Eminences* or *Tubercles*, some of which are placed upon their superior, and others upon their inferior extremities, which have the name of Corpora Geniculata, and are called Anterior, Posterior, External or Internal, according to their situations.

The inner parts of the Thalami are flat and contiguous; and above, they are so closely connected as to form one continued Surface, called *Commissura Mollis* of



of the Optic Thalami. This is stretched across like a Bridge, and is best seen when the Thalami are a little separated. Tab. LXXII. I. Tab. LXXIII. I.

The posterior parts of the Thalami turn downwards and outwards, after which they are elongated, to form the two white Cords, termed *Tractus Optici*. Tab. LXXX. *d, d*. Tab. LXXV.

In the Groove between the Corpora Striata and Thalami, there is a Medullary Band, called *Centrum Semicirculare Geminum* of VIEUSSENS, or *Tænia Semicircularis* of HALLER, or simply *Tænia*, which is connected at its fore part with the anterior Crus of the Fornix. Tab. LXXII. E, E.

Over the Thalami is placed the *Choroid Plexus*, named from its being composed of a Chorus of Vessels and Membranes. It is a fine Vascular Web, consisting of small ramifications of Arteries and Veins, connected by the Pia Mater, and spread upon the Surface of the Thalami, and some of the adjacent parts, processes of it descending behind, and covering the upper portion of the *Pedes Hippocampi*. Tab. LXXI. Q, Q.

The Veins of each Choroid Plexus form a Trunk termed *Vena GALENI*, and the two *Venæ GALENI* unite together, and terminate in the Torcular HEROPHILI.

The Choroid Plexus frequently contains numerous round *Globules*, resembling Hydatids, which have been considered by some Authors as Lymphatic Glands.

Under the Raphè of the Corpus Callosum, is placed the *Septum Lucidum*, which is of considerable thickness below, but becomes thinner towards its middle and upper part. When viewed laterally, it is observed to be broad before, curved at its edges, and to become gradually narrower towards its posterior extremity. Tab. LXXI. I. Tab. LXXVIII. O.

It is connected above with the Corpus Callosum, below to the Fornix, and forms a distinct Partition between the Lateral Ventricles.

It is composed of two Cineritious and Medullary *Laminæ*, more or less separated from each other at their upper and fore part, by a small Cavity, about a quarter of an inch in length, called *Fissure*, or *Fossa* of SYLVIVS, or *Sinus* of the Septum Lucidum.

This Cavity is considered by some as a *Fifth Ventricle*. It does not, however, communicate with the other Ventricles, though, in some Subjects, it reaches a considerable way backwards, and, as well as the other Cavities of the Brain, has been found full of water in cases of Hydrocephalus. Tab. LXXI. L.

Under the Septum Lucidum is placed the Substance which has been compared in shape to a *Vault* by the Ancients, and from that has obtained the name of *Fornix*. Tab. LXXVI. P.

The *Fornix* is merely a continuation of the Corpus Callosum and Septum Lucidum, and forms a sort of hollow Ceiling, with four *Pillars*, called *Crura* or *Cornua*, from their winding direction, of which there are two anterior, and two posterior.

The *two Anterior Crura* are short, run close together, and become enlarged at their inferior parts. Tab. LXXII. C.

The *two Posterior Crura* are long, at a considerable distance from each other, and form Curvatures which correspond with the course of the inferior Cornua of the Lateral Ventricles. Tab. LXXI. M, M.

That part of the Crura Fornicis lying in the Inferior Cornua of these Ventricles, forms thin puckered borders, getting the name of *Corpora Fimbriata*;—but, according to VIC D'AZYR, they are more properly termed *Tænia Hippocampi*, from being united with the great Hippocampus.

The Body of the Fornix is *narrow* anteriorly, and becomes considerably *broader* behind, where it is incorporated with the Corpus Callosum.

The under Surface of the posterior part of the Body of the Fornix is impressed with numerous transverse and oblique Lines, which have been called *Psalterium*, or *Lyra*, from some resemblance they bear to the ancient musical instruments of these names.

The Body of the Fornix is joined above to the Septum Lucidum; and below, it is connected to the Thalami Optici by a Vascular Membrane, called *Tela Choroidea*, which spreads over the Thalami, and parts termed *Tubercula Quadrigemina* and PINEAL GLAND. Anteriorly it unites with the Choroid Plexus of the Lateral Ventricles; posteriorly it is continuous with the Pia Mater of the external part of the Brain. Tab. LXXXI. Fig. 7. F, F.

The *Pedes Hippocampi*, *Cornua Ammonis*, or *Great Hippocampus*,—named from a supposed resemblance to these Bodies,—are two Medullary Eminences, which arise from the sides of the posterior extremity of the Corpus Callosum, and are situated in the inferior Prolongations of the Lateral Ventricles. Tab. LXXI. V, W. Tab. LXXII. W, W.

They run through the whole extent of these Prolongations, first behind, then at the outer part of the Posterior Pillars of the Fornix, and are so intimately connected with them, that they have been considered by some Authors as forming part of the Pillars themselves.

They are small at their origin, from which they continue to increase to their farther extremity.

Like the greater part of the Ventricles, they are covered externally with a Medullary Lamina;—internally they are found to consist of Medullary and Cineritious *Laminæ*, which have a convoluted appearance.

At the inner edge of the *Pedes Hippocampi*, there is a *plaited*, *serrated*, or *indented Margin*, which, in the generality of Quadrupeds, is much larger, in proportion to the size of the Brain, than it is in Man. The resemblance, however, to the Human kind, in the structure of this particular part of the Brain, is more striking in the Ape than in any other Quadruped.

In the bottom of the Lateral Ventricles, behind the anterior



anterior Crura of the Fornix, and before the meeting of the Choroid Plexuses of these Ventricles, below the anterior part of the Body of the Fornix, and over the fore part of the third Ventricle, there is a *Hole* of an *oval form*, by which the Lateral Ventricles communicate freely with each other. Tab. LXXVI. S. Tab. LXXVII. S. See MONRO's *Obs. on Nerv. Syst.* 1783, and *Treatise on the Brain*, 1797.

After dividing and turning back the Fornix, another communication from the above passage is found, called *Foramen Commune Anterius, Vulva, or Iter ad Infundibulum*; but properly, *Iter ad Tertium Ventriculum*, being a *Passage to the Third Ventricle*. Tab. LXXII. H. Tab. LXXVII. above V.

Between the Commissura Mollis of the Optic Thalami and Substance called *Pineal Gland*, there is a small passage termed *Anus, or Foramen Commune Posterius*, which has been supposed by some Authors to form a communication between the back part of the Third Ventricle and Lateral Ventricles; but it is completely closed up by the Membrane termed *Tela Choroidea*, and also by the Fornix, which is intimately connected to this. Tab. LXXXI. Fig. 9. g.

The *Third Ventricle* is in form of a deep Fissure, placed between the inner ends of the Thalami Optici, having the Commissura Mollis of these Thalami situated above, the Crura Cerebri below, and the Bodies of the Thalami on each side. Tab. LXXVII. P.

The *Infundibulum*, Tab. LXXVI. U. Tab. LXXVII. Tab. LXXVIII., formed of a Cineritious and Medullary Substance, is a passage of considerable size, which leads downwards and forwards, from the anterior part of the Third Ventricle; gradually contracting, and becoming solid at its under end, where it terminates in the *Glandula Pituitaria*, and thus, contrary to the opinion of the Ancients, preventing the passage of any Pituitous Fluid from it to the Nose.

The *Glandula Pituitaria* is of an oval form, but flattened above, and longest transversely; it is about the size of a Field-bean, is lodged in the Sella Turcica, and surrounded by a doubling of the Dura Mater. Tab. LXXVI. V. Tab. LXXVII. Y.

On the outside, it is of a brownish colour, and formed of Cineritious Matter; it is whiter within, where it is mixed with Medullary Substance.

The *Glandula Pituitaria* was formerly supposed to absorb a Fluid from the Infundibulum, and transmit it to the Nose. It has been already mentioned, however, that the Infundibulum is impervious, and the real use of this Gland, as well as of the other Tubercles of the Brain, seems still unknown.

At the fore part of the Third Ventricle, and immediately before the Anterior Crura of the Fornix, there is a white Medullary Cord, which runs transversely

through the Corpora Striata, and then downwards, having the name of *Commissura Cerebri Anterior*. Tab. LXXII. uppermost D. Tab. LXXVIII. No. 4.

At the back part of the third Ventricle, and under the root of the Pineal Gland, there is another Cord similar to the former, but shorter, called *Commissura Cerebri Posterior*, Tab. LXXII. undermost D. Tab. LXXVIII. No. 9. The Commissuræ Cerebri assist in uniting the two sides of the Brain together.

From the under and back part of the third Ventricle, there is a Passage which leads to the fourth, under the name of *Iter ad Quartum Ventriculum, Canalis Medius, vel Aquæductus* SYLVII. Tab. LXXVII. c. Tab. LXXVIII. No. 24.

After the posterior part of the Fornix, and the *Tela Choroidea* to which it adheres, have been removed, there appear at the back part of the third Ventricle, behind the Thalami, and over the *Iter ad Tertium ad Quartum Ventriculum*, the *Nates* and *Testes*, or *Tubercula Quadrigenina*, or more properly *Bigemina*, and the *Pineal Gland*.

The *Nates*, or *Tubercula Anteriora*, Tab. LXXII. M, M, are placed uppermost, and are of a rounder form than the *Testes*, or *Tubercula Posteriora*, Tab. LXXII. N, N, which lie immediately under the former.

The *Testes* are a little whiter in their colour than the *Nates*, and broader from one side to the other.

A Longitudinal Section shews the *Tubercula* to be covered externally with a thin Medullary Lamina, and to be Cineritious within.

In Man they are more nearly of an equal size and colour than in Quadrupeds, as in the Ox, Sheep, &c. in which the *Nates* are large, round, and of a brown colour, and the *Testes* small and long, and have a white appearance.

Over the *Nates*, and connected to them by a thin Medullary Lamina, and under the back part of the *Fornix*, is placed the *Glandula Pinealis*, which is of a Cineritious nature, about the size of a Garden-pea, and of a Conoid Figure, placed almost horizontally, with its point backwards; obtaining its name from its resemblance in shape to a *Pine* or *Fir-Cone*. Tab. LXXII. L.

In consequence of its being always present, and seldom found in a diseased state, it has been celebrated by DES CARTES as the *Seat of the Soul*.

The *Pineal Gland* is fixed by its root to the *Commissura Cerebri Posterior*, and sends out *two long Medullary Peduncles, or Foot-stalks*, to be fixed to the upper and inner side of the Thalami, and to the Anterior Crura of the Fornix. Tab. LXXII. K, K.

Near, or in the Substance of the Pineal Gland, small Calcareous Concretions are frequently found; sometimes they are grouped together over the Base of the Gland, and then form the *Acerculus Cerebri*, of SOEMMERRING.

They



They are not met with till after the age of puberty, and do not appear to be the effects of disease.

## CEREBELLUM.

The *Cerebellum* is situated in the Inferior Fossæ of the Occipital Bone, under the Posterior Lobes of the Cerebrum, and is separated from these Lobes by the Tentorium. Tab. LXVII. I, I. Tab. LXXXVI. under M. Tab. LXXXVIII.

It is somewhat of a roundish form, though a little flattened above, and about an inch broader from one side to the other than from before backwards, Tab. LXXXV. D, D. Tab. LXXX. It is only about a sixth part of the size of the Cerebrum, and less complex.

It is divided behind by the Falx Minor into two Lobes or Hemispheres, which, like the Hemispheres of the Brain proper, have a general similarity to each other in the opposite sides of the Head, but it has no separation above, like that of the Cerebrum.

Its colour is similar to that of the Brain, and it is divided into numerous Circumvolutions, which form Arches in many parts, with their convexities turned outwards, and these decussating each other at sharp angles.

The Circumvolutions run chiefly in a Lateral direction, and are formed of Laminæ, with Sulci between them, varying much in depth, into which, as in the Brain, the Pia Mater insinuates itself, and binds them together. This may be readily seen by making a Puncture into the Arachnoid Coat, and blowing in Air, till it distend the Cellular Substance, and separate the Coats from each other.

It has two middle Eminences, called *Appendices Vermiformes*, from their resemblance to Earth-worms, one of which is situated anteriorly and superiorly, the other inferiorly and posteriorly; or there is a Superior and an Inferior Vermiform Process, Tab. LXXXI. Fig. 9. o.

Each of the Lobes of the Cerebellum is again divided into *Monticuli* or *Lobules*, which have different names according to their relative situations, connexions with other parts, &c. They vary a little in different Subjects, but are easily distinguished from the direction of their Convolution.

The Substance of the Cerebellum consists of Cineritious and Medullary Matter, as in the Cerebrum; but the Cineritious bears a greater proportion to the Medullary in the former than in the latter.

When the Cerebellum is cut in a vertical direction, the Medullary part is then found to bear a striking resemblance to the branching of the Shrub called *Arbor Vitæ*: from which circumstance it has obtained the name of this Shrub. Tab. LXXII. R, R.

When cut in slices nearly parallel to the Base of the Brain, the Medullary Substance appears in Laminæ corresponding to those of the Surface of the Cerebellum; and when cut to a considerable depth, or when

the Laminæ are removed, there is, as in the Cerebrum, a Centrum Medullare, somewhat of the form of the entire Cerebellum, consisting of a middle and two lateral portions.

If the Cerebellum be cut vertically a little from its middle, and the incision carried forwards and inwards, as far as the Tuber Annulare, a small quantity of Cineritious Substance is seen, with an indented border, which partially incloses a quantity of Medullary Matter, and has got the name of *Corpus Dentatum*. Tab. LXXIII. d. Tab. LXXIV. O. This Substance is found to be the only Cineritious part in the Centrum Medullare.

Between the Cerebellum, the under and back part of the Tuber Annulare, and upper and back part of the Medulla Oblongata, the *Fourth Ventricle* is situated, which extends from the *Testes* to the posterior-inferior Notch of the Cerebellum formed by the Falx Minor. Tab. LXXII. O, T. Tab. LXXVI. Tab. LXXVII.

A little lower than the *Testes*, the Ventricle becomes wider, and forms an Angle behind, from which again it contracts, and, becoming narrower and pointed below like a writing-pen, it has got the name of *Calamus Scriptorius*. Tab. LXXII. T.

Over the under end of the Aquæductus SYLVII, and upper part of the Fourth Ventricle, there is a thin Medullary Lamina, called *Vulvula*, but properly *Velum VIEUSSENII*. Tab. LXXVI. i.

At the sides of the Velum VIEUSSENII, there are two Medullary Tracts, called *Processus ad Testes*, or *Columnæ Vulvulæ VIEUSSENII*. Tab. LXXII. Q, Q.

The under end of the Ventricle is found to be shut up by its Choroid Plexus, which prevents any communication between this Cavity and that of the Spine.

## UNDER SURFACE OF THE BRAIN.

Upon inverting the Brain, the Lobes already taken notice of appear in a conspicuous manner, their form, and irregularities of their surface, corresponding with the inner surface of the Base of the Cranium.

At the fore part of the Brain, the Fissure between the Hemispheres extends a considerable way back between the anterior Lobes.

Behind this Fissure is observed the union of the Optic Nerves which are to be afterwards described.

Near the middle of the Base of the Brain, and between its Lateral Lobes, there are two small, round, white Bodies, termed *Eminentia Mammillares*, vel *Corpora Albicantia*, Medullary without, and Cineritious within, mistaken by some Authors for Glands. Tab. LXXV. L, L. Tab. LXXX. H.

In the Corpora Albicantia, various Medullary *Strata* terminate, which come from different parts of the Brain.

Immediately before the Corpora Albicantia, is seen the Infundibulum, leading from the Third Ventricle. Tab. LXXX. G. Tab. LXXV. M.



On the outside of the Corpora Albicantia, two large white Cords are observed, called *Crura*, vel *Pedunculi Cerebri*, vel *Crura Anteriora Medullæ Oblongatæ*, which arise from the Medullary Substance of the Brain, and gradually approach each other in their course, till they unite with the Tuber Annulare. Tab. LXXV. F, F.

Their Surface is flat, and composed of distinct longitudinal Medullary Fibres, with Grooves between them. Internally they are formed of a mixture of Cineritious and Medullary Matter, the former of which, being of a darker colour at one particular part than in any other of the Brain, has been termed *Locus Niger Crurum Cerebri*.

Between the Crura Cerebri, and likewise between the Corpora Albicantia, there is a Cineritious Substance, called *Pons TARINI*, which joins these Bodies of the opposite sides together, and assists in forming the bottom of the Third Ventricle. Tab. LXIII. between the two L's.

From the Medullary part of the Cerebellum, which forms the Trunk of the Arbor Vitæ, two white Cords arise under the name of *Crura Cerebelli*, vel *Crura Posteriora*, vel *Pedunculi Cerebelli*, Tab. LXXV. C, C. Tab. LXXX. O, O, which unite with the Crura Cerebri, to compose the *Tuber Annulare*, vel *Pons VAROLII*, Tab. LXXX. P, P, so named from forming a Ring or Bridge over the Crura. This Ring is intimately incorporated with, and formed by, these Crura.

The *Tuber Annulare* is situated over the back part of the Body of the Sphenoid, and Cuneiform Process of the Occipital Bones. It is of a roundish form, or it approaches somewhat to that of a Cube with rounded corners, and measures upwards of an inch, whether taken in a longitudinal or transverse direction.

Many Transverse Streaks and Furrows run on its Surface, and it is divided into two lateral parts by a longitudinal Depression, occasioned by the situation of the Vertebral Artery. Tab. LXXX. Tab. LXXVIII. No. 23. No. 27.

At the fore and back parts of the Tuber, are the *Foramina Cæca*, *Anterius et Posterius*, the former placed between the Nerves of the Third, and the latter between those of the Sixth Pair. These two Foramina penetrate only a little way into the edges of the Tuber, and receive a Plexus of Vessels.

The Substance of the Tuber is intermixed with a considerable quantity of Cortical Matter, formed into *Striæ* running in different directions, the *Striæ* appearing more or less distinct, according to the course of the incisions which may be made.

Continued from the Tuber, there is a large substance in form of an inverted Cone, which extends to the Foramen Magnum of the Occipital Bone, under the name of *Medulla Oblongata*, which forms the beginning of the Spinal Marrow. Tab. LXXX. R, V.

The Medulla Oblongata has a longitudinal Fissure before, and another behind, dividing it into two lateral

Portions or Cords, having the name of *Anterior* and *Posterior Median Fissures*.

Upon the anterior surface of the Medulla Oblongata, two small Eminences appear, which run longitudinally, and contiguous to each other, and, from their shape, have the name of *Corpora Pyramidalia*, vel *Eminentia Pyramidales*. Tab. LXXX. T.

Between the Corpora Pyramidalia, the Anterior Median Fissure is deep, where the Pia Mater penetrates, and where the Blood-vessels pass into the anterior part of the Medulla.

At the outside of the former Eminences, are two others, somewhat of the figure of Olives, from which they are termed *Corpora Olivaria*, vel *Eminentia Olivares*. Tab. LXXX. U, U.

Within the Corpus Olivare, on each side, there is a thin Capsule of Cineritious Substance running from above downwards, inclosing Medullary Matter, and named by VIC D'AZYR, the *Corpus Dentatum* or *Rhomboideum* of this Substance. Tab. LXXIX. Fig. 6. c.

More externally than the Corpora Olivaria, and occupying the whole remaining part of the Cord round to the posterior Median Fissure, are other two Eminences, less evident than the last, which have been described by some Authors under the names of *Corpora Pyramidalia Posteriora*, *Corpora Restiformia*, *Peduncles of Medulla Oblongata*, &c.

The two lateral Portions of the Medulla Oblongata are formed of Medullary Matter without, and a large proportion of Cineritious Matter within, joined together by Medullary Fibres. Tab. LXXX. S, T. Tab. LXXV. G, G.

When the Corpora Pyramidalia of the Medulla are separated some way from each other, after being steeped in a coagulating liquor, there is an appearance of a decussation of Fibres from the opposite sides, Tab. LXXIV. T. These apparent Fibres DRS GALL and SPURZHEIM arrange into two systems, and attempt to trace them through the various parts of the Brain, under the name of *Diverging* and *Converging Apparatus* of Fibres; thus considering the Medulla Oblongata as giving origin to the Brain, instead of the Brain being the source of the Medulla Oblongata, and other parts of the Nervous System in general. Upon this subject consult DR GORDON'S Observations on the Structure of the Brain.

The Arteries of the Brain are derived from the Internal Carotids and Vertebrales, and run in a tortuous manner through the Base of the Cranium, to prevent the Blood from rushing too violently into the Brain.

The Veins, as formerly mentioned, only differ from those of other Viscera in being more tender, and in not following the course of their respective Arteries.

*The BRAIN is the GRAND AND PRIMARY ORGAN OF SENSE, with which the Mind is supposed to be most immediately and intimately connected, and from which the Nervous*



*Nervous Influence is found, by experiment, to be communicated to all the other parts of the Body.*

ORIGIN of the NERVES.

The Nerves arise from, or are connected with, the Medullary parts of the Brain, some in solid Cords, others in separate Threads, which afterwards unite into Cords, and have their names in numerical succession, according to their situations,—beginning anteriorly.

Nine or ten Pairs are connected with the Brain, besides a Pair termed Sympathetic.

The *First*, or *Olfactory Pair of Nerves*, arise from the back part of the Anterior Lobes of the Brain, and run towards the Cribriform Plate of the Ethmoid Bone, where each forms a brownish-coloured Bulb, from which numerous small Nerves are sent off. Tab. LXXX. *a, b, c.*

The *Second Pair*, or *Optic Nerves*, are the continuation of the Thalami Optici. They are united immediately before the Infundibulum, and form what has been called the *Union*, the *Decussation*, or the *Commis-sure* of the Optic Nerves. Here there is an intimate intermixture of parts, and the Nerves again separate, previous to their passing into the Orbits. Tab. LXXX. *d, e, f.*

The *Third Pair* arise from the Crura Cerebri by numerous Threads, which are soon collected into Trunks. Tab. LXXX. *g, g.*

The *Fourth Pair*, which are the smallest Nerves of the Body, arise behind the Testes, and have a long winding course. Tab. LXXX. *h, h.*

The *Fifth Pair*, which are the largest Nerves in the Brain, have each an anterior small, and a posterior large Fasciculus, arising from the sides of the Tuber Annulare. Tab. LXXX. *i, i.*

The *Sixth Pair* arise from the beginning of the Medulla Oblongata, where it joins the Tuber Annulare. Each of the Nerves of this Pair has a small Thread at its inner part. Tab. LXXX. *k, k.*

The *Seventh Pair* arise from the beginning of the lateral parts of the Medulla Oblongata, and are divided on each side into a *Portio Mollis* and *Portio Dura*. Tab. LXXX. *l, m.*

The *Eighth Pair* arise by small Fasciculi from the Corpora Olivaria. Tab. LXXX. *n, o.*

The *Ninth Pair of Nerves* also arise by small Fasciculi a little below the former, from the Corpora Pyramidalia. Tab. LXXX. *p, p.*

*The Origin of the Nerves is described at greater length in Vol. III.*



## T A B L E L X V I.

Gives a VIEW of the DURA MATER; the INTEGUMENTS being turned down, and the Upper Part of the SKULL removed.

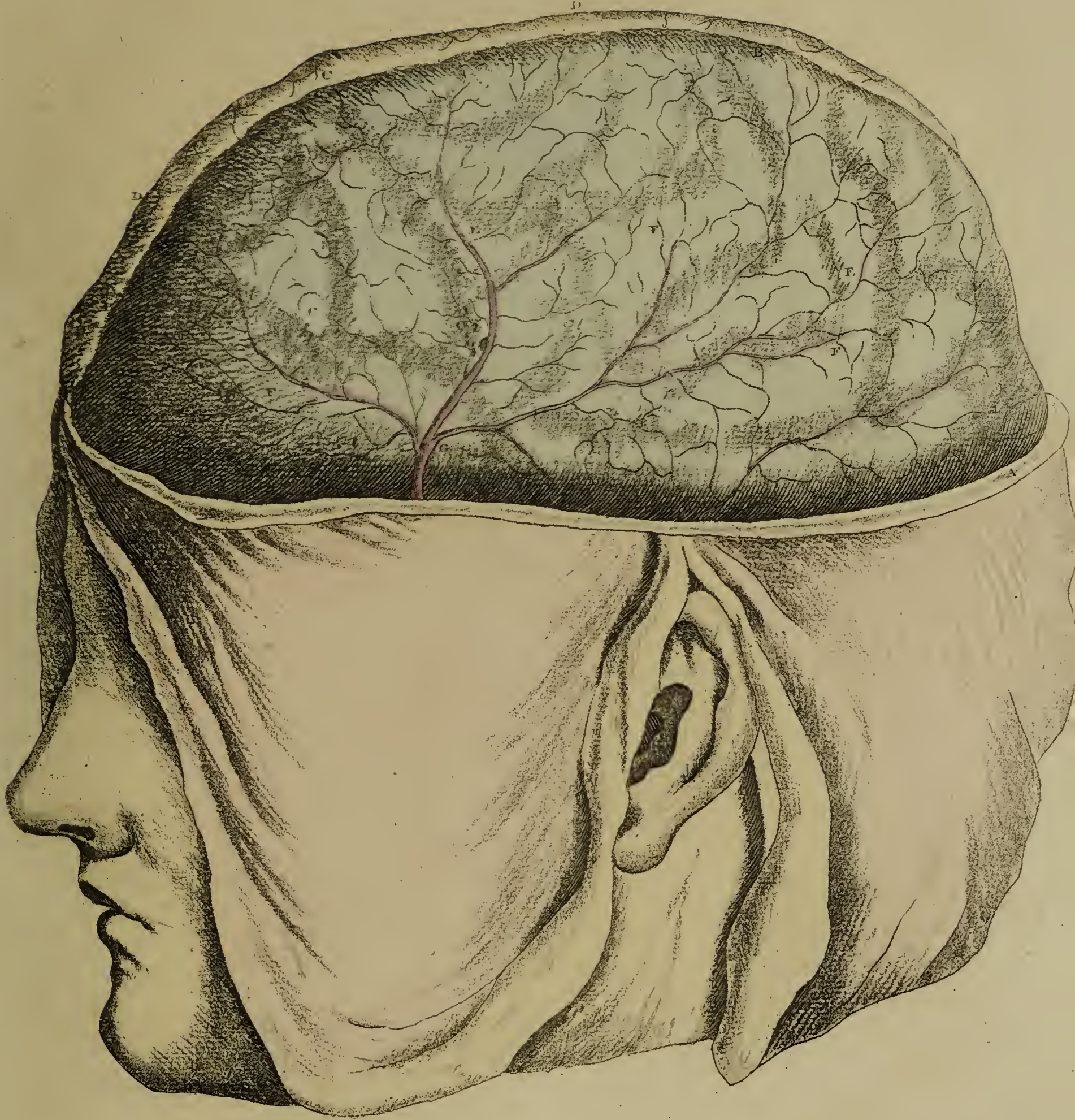


A, A, The cut edge of the cranium.  
B, B, The course of the superior longitudinal sinus.  
C, C, C, Small pits, and scattered fibres of the dura mater, commonly occupied by the *Glandulæ PACCHIONI*.  
D, D, Part of the dura mater which covers the right hemisphere of the brain.

E, E, Depressions between the convolutions of the brain appearing through the dura mater.  
F, F, F, The convolutions of the brain appearing through the dura mater.  
G, The principal artery of the dura mater, dividing into branches, which have corresponding furrows in the skull.  
H, I, Branches from the trunk G.



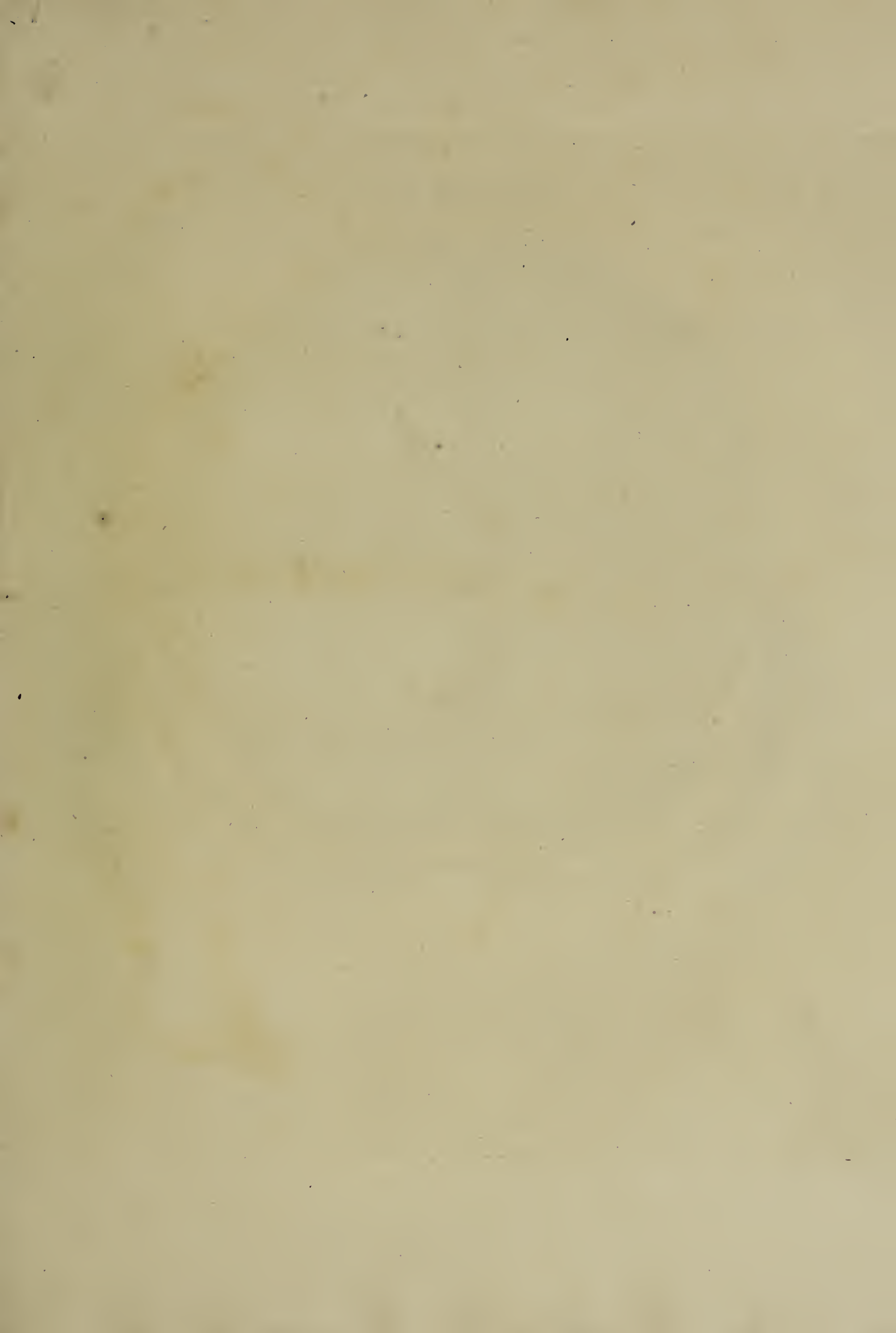
TAB. 66.



A Eye fict









TAB. 67.



Engraved by A. Fyfe.

## T A B L E L X V I I .

In this Figure the INTEGUMENTS of the Superior Part of the HEAD are cut and turned down, and the SKULL-CAP removed, to exhibit the BRAIN covered by the DURA MATER, with its principal Sinuses laid open. The View is taken from the Upper and Back Part. The Figure is the reverse of the Drawing from which it was taken.



- A, A, A, The integuments of the upper part of the head, reflected.  
B, B, The cut edge of the bone, near the base of the cranium.  
C, C, The upper, and,  
D, D, The back part of the two hemispheres of the cerebrum, covered by the dura mater; with some traces of the principal arteries of that membrane.  
E, E, The superior longitudinal sinus slit open, with the terminations of the superior cerebral veins.  
F, F, Two small portions of the dura mater, where the sinus was split in this subject.  
G, The termination of the torcular HEROPHILI, in the beginning of one of the lateral sinuses.  
H, H, The two lateral sinuses laid open, with the termination of the veins from the upper part of the cerebellum.  
I, I, The two lobes or hemispheres of the cerebellum, covered by the dura mater.



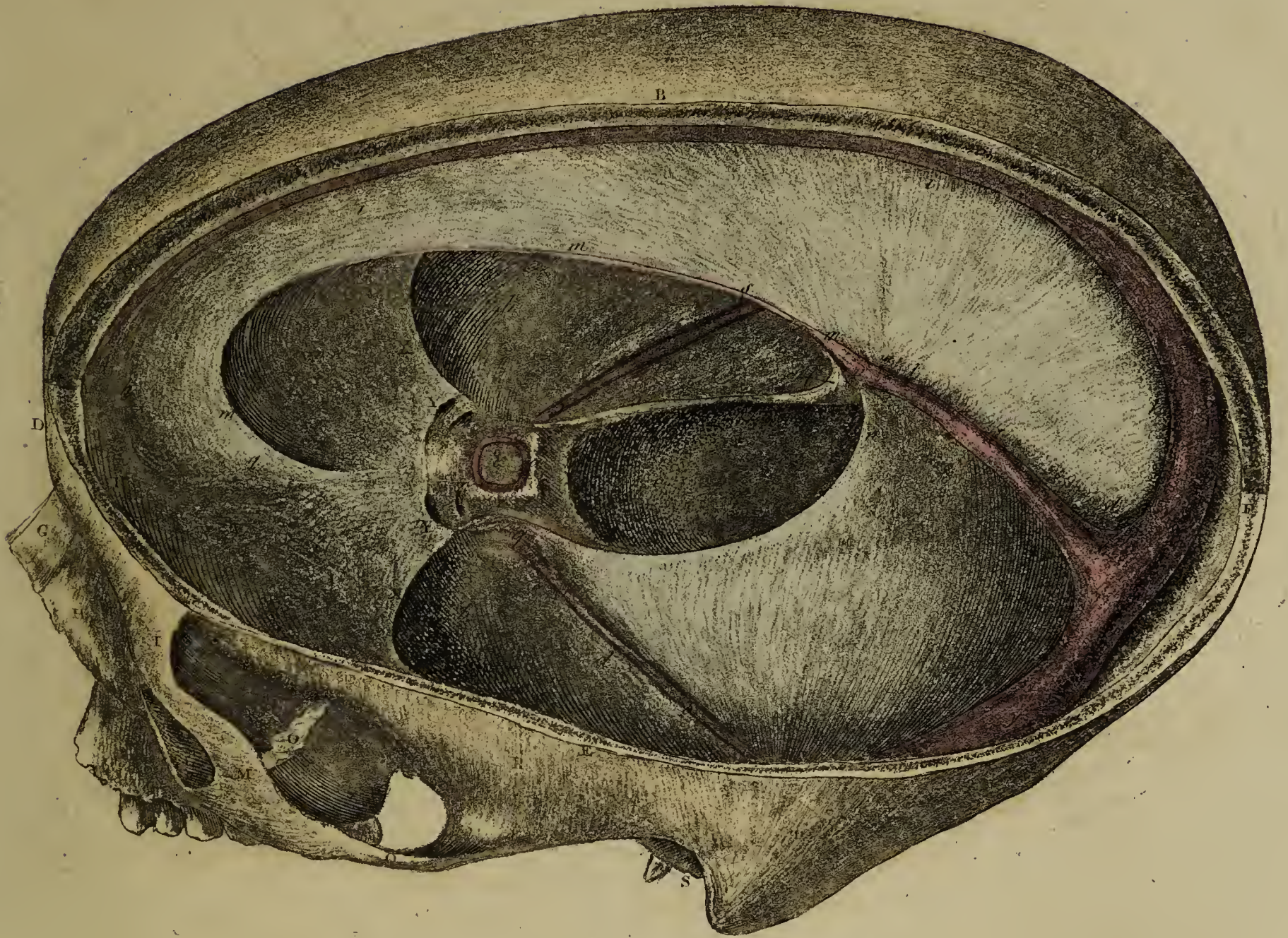
## T A B L E LXVIII.

A SECTION of the SKULL, giving a View of the Principal PROCESSES and SINUSES of the  
DURA MATER.

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- |   |   |
|---|---|
| <p>A, B, C, The cut edge of the skull, a little to the left side of the falx.</p> <p>D, E, F, The left side of the skull, cut horizontally, a little above the tentorium.</p> <p>G, The os nasi.</p> <p>H, The nasal process of the superior maxillary bone.</p> <p>I, The outer orbital process of the os frontis.</p> <p>K, The alveolar arch of the superior maxillary bone.</p> <p>L, The under part of the orbit.</p> <p>M, The os malæ.</p> <p>N, The temporal plate of the sphenoid bone.</p> <p>O, The inferior, or external orbital fissure.</p> <p>P, The large tuberosity at the back part of the superior maxillary bone.</p> <p>Q, The zygoma.</p> <p>R, The squamous part of the temporal bone.</p> <p>S, The meatus auditorius, behind which is the styloid process.</p> <p>T, The mastoid process.</p> <p>U, U, The spine of the frontal bone ;</p> <p>V, W, Its orbital plates.</p> <p>X, X, The anterior clinoid process of the sphenoid bone.</p> <p>Y, Y, The foramina optica.</p> <p>Z, Z, A section of the internal carotid arteries.</p> | <p>a, The posterior clinoid process.</p> <p>b, b, The middle fossæ for the lateral lobes of the brain.</p> <p>c, The cuneiform process of the occipital bone.</p> <p>d, d, The anterior surface of the pars petrosa.</p> <p>e, The fossa in the occipital bone, for lodging the right side of the cerebellum.</p> <p>f, The spine of the occipital bone.</p> <p>g, h, i, k, l, m, m, The falx.</p> <p>n, o, p, q, The left side of the tentorium.</p> <p>r, s, t, The right side of the tentorium.</p> <p>t, The under side raised and stretched by the falx.</p> <p>h, i, i, k, The superior longitudinal sinus ;</p> <p>v, Its termination.<br/>The backmost <i>m, m</i>, point out the inferior longitudinal sinus.</p> <p>u, w, x, The torcular HEROPHILI, or fourth sinus.—<i>u</i>, The hole where the vena GALENI entered to form this sinus ;</p> <p>x, Its termination in the lateral sinuses.</p> <p>y, The left lateral sinus.—The right is concealed by the falx.</p> <ol style="list-style-type: none"> <li>1. The seat of the left cavernous sinus.</li> <li>2. 3. The left petrosal sinus.</li> <li>4. The seat of the right inferior petrosal sinus.</li> </ol> |
|---|---|



TAB. 68.



A Eye, feet

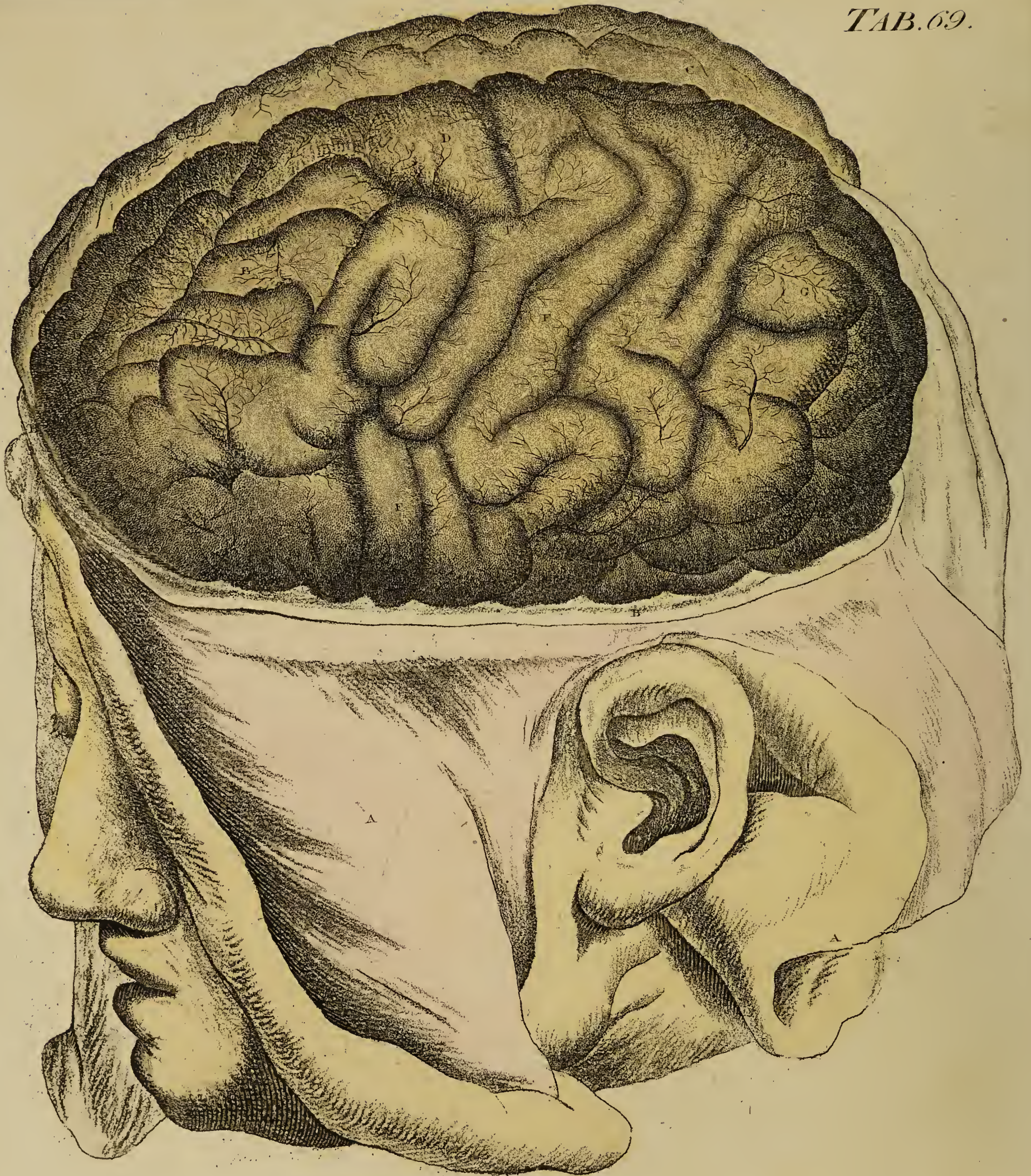












A. Fyfe fecit



## T A B L E L X I X .

The CIRCUMVOLUTIONS of the BRAIN appearing through the PIA MATER, after the SKULL-CAP and DURA MATER have been raised.

---

A, A, The skin and muscle which covered the cranium, turned down.  
B, B, The cut edge of the cranium.  
C, C, The right hemisphere of the brain.  
D, D, D, D, The left hemisphere.—Between the two hemispheres is the space which was occupied by the falx of the dura mater.  
E, E, The anterior circumvolutions of the brain, which were lodged in the cavity of the os frontis.—They are smaller than those which correspond with the parietal bone; nor do they resemble those on the opposite side of the head.  
F, F, F, The middle circumvolutions of the brain.—They

run in an oblique direction, and are larger, longer, and straighter, than those in the other parts of the brain.  
G, G, The posterior circumvolutions, which are not much inferior in size to the former, but more convoluted and numerous.  
H, H, The posterior and inferior circumvolutions, smaller than the rest, and their disposition similar to that of the anterior circumvolutions.  
I, The appearance of an union of two circumvolutions into one; instances of which are frequently met with. Over the surface of the pia mater are seen small arteries, which, after being spread out on that membrane, plunge into the substance of the brain.



## T A B L E LXX.

A VIEW of a TRANSVERSE SECTION of the BRAIN, upon a level with the CORPUS CALLOSUM.

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- A, A, The cranium sawed at its greatest diameter.  
B, B, The dura mater turned back.  
C, C, C, The cortical part of the brain.  
D, D, The fissures between the circumvolutions.  
E, E, The arteriæ callosæ, which were placed upon the corpus callosum, and are now drawn forwards.  
F, F, F, Some portions of the cortical substance separated from the rest: They belonged to that part of the brain which was raised from this.  
G, G, G, The medullary substance, in which are seen the cut orifices of many blood-vessels.  
H, A branch of an artery which sinks into the *Fossa SYLVII*.  
I, I, K, L, L, The corpus callosum.—K, A raphè, or suture, in the middle of the corpus callosum, on each side of which is a medullary cord L, L, broad behind and narrow before, which accompanies it through its whole length. On the outside of L, L, transverse lines are seen, which run under the medullary cords, are connected to them, and pass from one hemisphere of the brain to the other, so as to assist in forming the raphè.

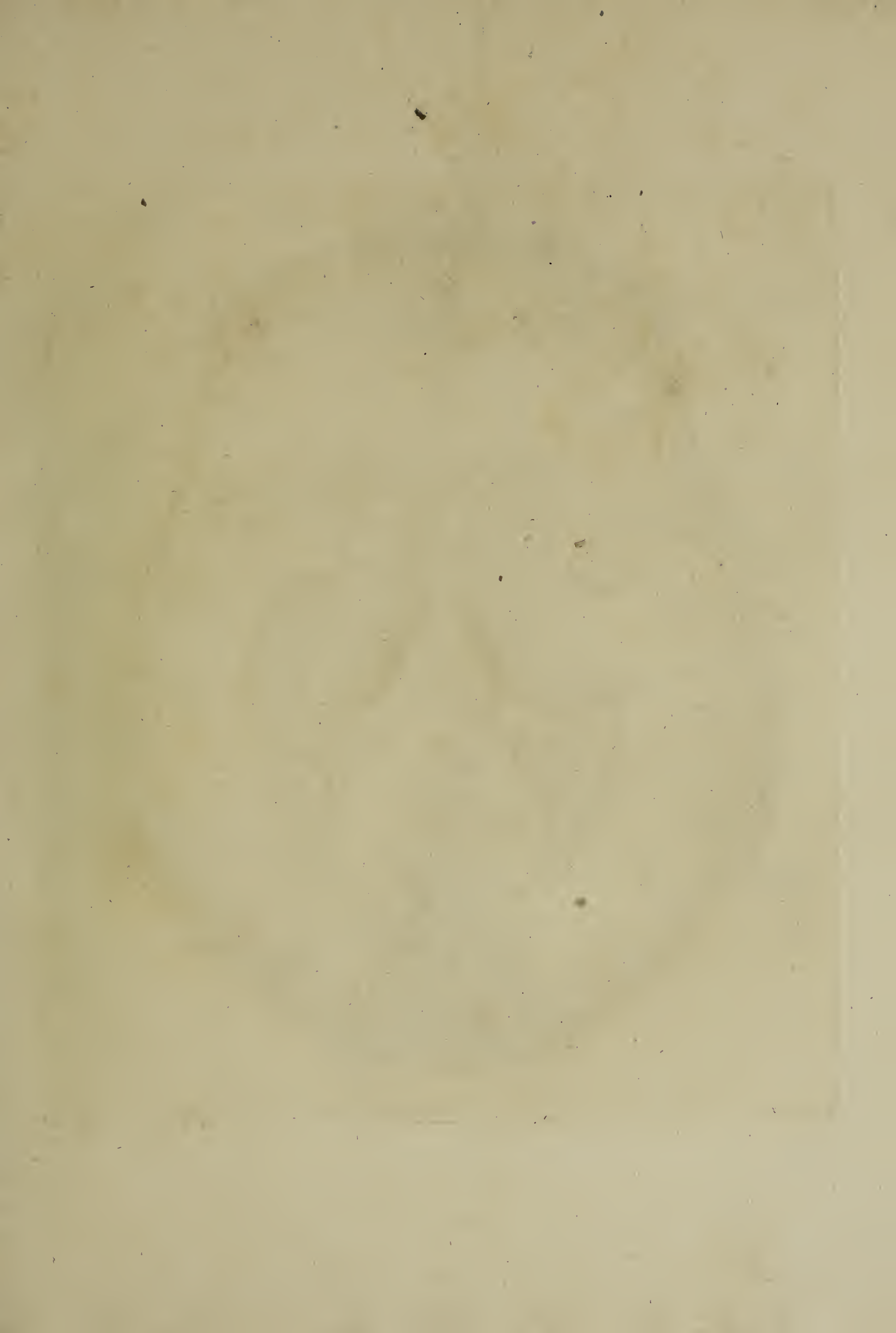




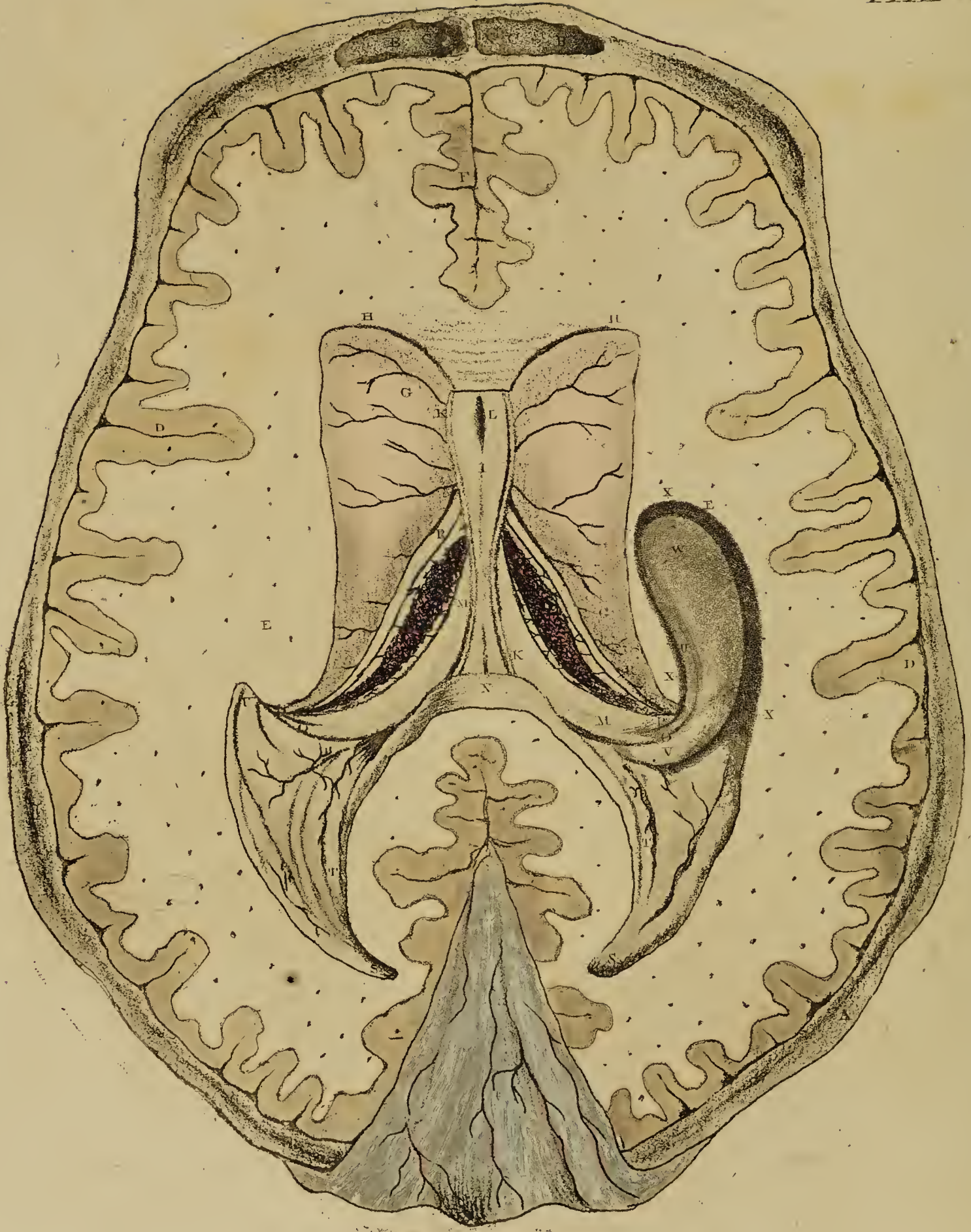












A. Byfe fecit



## T A B L E LXXI.

A deeper SECTION of the BRAIN than that shewn in the former Table.—The CORPUS CALLOSUM is removed, to obtain a VIEW of the LATERAL VENTRICLES.

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- |   |   |
|---|---|
| <p>A, A, The cut edge of the cranium.</p> <p>B, B, The frontal sinuses.</p> <p>C, C, Their openings into the nose.</p> <p>D, D, The fissures between the circumvolutions.</p> <p>E, E, The medullary substance of the brain, with numerous small dots, which represent the orifices of cut arteries.</p> <p>F, The fissure which separates the two anterior lobes of the brain.</p> <p>G, G, The corpora striata, rounded and large anteriorly, and diminishing towards the posterior part, where they terminate, each in a point.—Ramifications of blood-vessels are seen upon them, which pass under the fornix, and terminate in the <i>VENA GALENI</i>.</p> <p>H, H, The anterior cornua of the lateral ventricles, of the same form with the anterior extremities of the corpora striata.</p> <p>I, The septum lucidum, which separates the lateral ventricles from each other.</p> <p>K, K, The two laminæ of the septum lucidum, the internal part of which is formed of medullary, and the external of cineritious matter.</p> <p>L, The cavity or sinus of the septum lucidum.</p> <p>M, M, The two posterior crura of the fornix;—the anterior crura are hid by the septum lucidum.</p> <p>N, The back part of the corpus callosum joined to the fornix and septum lucidum.</p> | <p>O, O, The posterior bandalettes of the posterior crura fornix, which are very short, and join the pedes Hippocampi.</p> <p>P, P, The anterior bandalettes of the posterior crura fornix, the origin only of which is here seen.</p> <p>Q, Q, The choroid plexuses of the superior or lateral ventricles, situated over the outer edge of the fornix, and upper part of the thalami nervorum opticorum.</p> <p>R, R, The <i>Centrum Semicirculare Geminum</i> of <i>VIEUSSENS</i>, or <i>Tænia Semicircularis</i> of <i>HALLER</i>; placed between the corpora striata and thalami nervorum opticorum.</p> <p>S, S, Posterior prolongations of the lateral ventricles.</p> <p>T, T, The projections in the posterior prolongations of the lateral ventricles, termed <i>Ergot</i>, or <i>Hippocampus Minor</i>.</p> <p>U, Left side, the beginning of the inferior cornu of the lateral ventricle.—U, Right side, the continuation of the posterior crus of the fornix in the inferior cornu of the ventricle.</p> <p>V, The beginning, and,</p> <p>W, The termination of the pes Hippocampi in the inferior cornu of the right lateral ventricle.</p> <p>X, X, X, The inferior cornu of the lateral ventricle of this side, shewn by cutting deep into the substance of the brain.</p> |
|---|---|



## T A B L E LXXII.

A Portion of the BRAIN cut horizontally, to shew Parts deeper seated than those represented in the former Table.—The CEREBELLUM is cut perpendicularly, from before backwards, and the Lateral Parts separated a little from each other.

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- |  |  |
|--|--|
| <p>A, The middle of the brain, which surrounds the corpora striata.</p> <p>B, B, The corpora striata, with some blood-vessels upon their surface.</p> <p>C, A section of the anterior pillars of the fornix.</p> <p>D, The commissuræ anterior et posterior of the brain.</p> <p>E, E, The tænia semicircularis, or centrum semicirculare geminum.</p> <p>F, F, &amp;c. The thalami optici covered with many vessels. At the fore part, the letters, F, F, point out also the anterior tubercles of the thalami.</p> <p>G, G, The bottom of the third ventricle.</p> <p>H, The origin of the infundibulum.</p> <p>I, The commissura mollis of the optic thalami, concealing part of the third ventricle.</p> <p>K, K, The peduncles of the pineal gland. Behind, they cover part of the posterior commissure of the brain, but are distinct from it.</p> <p>L, The pineal gland, chiefly composed of cineritious substance.</p> <p>M, M, The tubercula quadrigemina superiora, vel nates, over which the pineal gland is placed.</p> <p>N, N, The tubercula quadrigemina inferiora, vel testes.</p> <p>O, A medullary lamina between the testes and valvula VIEUSSENII.</p> <p>P, P, The origin of the fourth pair of nerves.</p> <p>Q, Q, Two medullary tracts, called Processus ad Testes, Columnæ Valvulæ VIEUSSENII, &amp;c.</p> <p>R, R, The medullary part of the cerebellum, called Arbor Vitæ.</p> | <p>S, The cavity of the fourth ventricle, in the bottom of which there is the furrow termed Calamus Scriptorius.</p> <p>T, The end of the fourth ventricle and calamus scriptorius.</p> <p>U, U, The cerebellum.</p> <p>V, V, A perpendicular section of the brain.</p> <p>W, W, The cornua AMMONIS, or great Hippocampi.</p> <p>X, X, The corpus fimbriatum, or band of the great Hippocampus.</p> <p>Y, Y, The choroid plexus.</p> <p>a, A principal branch of the deep cerebral artery, which comes from the vertebral one. This sends small twigs inwards to the tubercula quadrigemina, pineal gland, and its peduncles. The principal branches run forwards to the thalami optici and choroid plexus; these frequently anastomose, and cross each other. A few also run from the former to the tænia semicircularis, and back part of the corpora striata.</p> <p>b, b, The superior arteries of the cerebellum. The first part of these sends branches to the tubercula quadrigemina, and parts near them; and some small twigs run to the fourth ventricle, where they communicate with the superior arteries of the cerebellum. On the left side of the tubercula, the deep and superficial branches of the superior arteries of the cerebellum communicate freely.</p> <p>c, c, The continuation of the superficial arteries of the cerebellum. They spread over its surface, sink into its substance, and there communicate with the arteries which come from its under part.</p> |
|--|--|











TAB.





## T A B L E LXXIII.

Shews the BRAIN placed upon its BASE.—A Cut is made in a vertical direction through the middle of the Corpus Callosum, as far as the Anterior Commissure, and continued posteriorly to the Tubercula Quadrigemina. The Hemispheres are separated from each other, and turned to each side. The Septum Lucidum and Fornix are cut and removed. The Cerebellum, in a similar manner, is divided as far as the Fourth Ventricle. In the Left Side, a Vertical Section is seen; in the Right, the parts are cut horizontally.

- |   |  |
|---|--|
| <p>A, A, The hemispheres of the brain.</p> <p>B, B, The anterior lobes.</p> <p>C, C, The posterior lobes.</p> <p>D, A vertical section of the fore and inner part of the right hemisphere, to shew the cortical and medullary parts.</p> <p>E, E, The cut edges of the corpus callosum, between which the lateral ventricles are included.</p> <p>F, F, The corpora striata. In the right corpus, a band of medullary striæ is seen.</p> <p>G, G, The thalami nervorum opticerum, on which their eminences or tubercles distinctly appear, and also some medullary striæ running in a curved direction.</p> <p>H, H, The centrum semicirculare geminum.</p> <p>I, The commissura mollis of the optic thalami.</p> <p>K, The remains of the septum lucidum.</p> <p>L, A section of the anterior commissure of the brain.</p> <p>M, The third ventricle.</p> <p>N, Part of the infundibulum.</p> <p>O, The posterior commissure of the brain.</p> | <p>P, P, The peduncles, or superior cords of connexion of the pineal gland with the thalami.</p> <p>Q, The pineal gland.</p> <p>R, R, The nates, or anterior pair of the tubercula quadrigemina.</p> <p>S, S, The testes, or posterior pair.</p> <p>T, The commissure of the tubercula quadrigemina.</p> <p>U, U, V, V, The valvula VIEUSSENI, or mass of connexion between the tubercula and the cerebellum.</p> <p>W, W, The tuber annulare.</p> <p>X, X, Y, Z, The fourth ventricle. Y, Z, The linea media of this ventricle. Z, The under part of this, termed <i>Calamus Scriptorius</i>.</p> <p><i>a, a</i>, Medullary striæ in the fourth ventricle, which form the beginning of the auditory nerves.</p> <p><i>b, b</i>, The outer surface of the cerebellum.</p> <p><i>c, c</i>, The medullary part of the cerebellum, forming the trunk of the arbor vitæ.</p> <p><i>d</i>, The corpus denticulatum vel rhomboideum of the cerebellum.</p> |
|---|--|



## T A B L E LXXIV.

Represents the BRAIN inverted, and certain Sections made into it, so as to shew several of the deep parts of the Cerebrum and Cerebellum, the intermixture of the Cortical and Medullary Substances, and the exit of some of the Nerves.

- 
- A, A, The anterior, and  
 B, B, The posterior lobes of the cerebrum.  
 C, C, The middle lobe of the left side.  
 D, The fissure of SYLVIIUS.—On the right side, a section is made into the middle lobe, somewhat in a horizontal direction, by which the connexion and intermixture of the cortical and medullary parts distinctly appear.  
 E, The corpus striatum, or great superior cerebral ganglion of GALL.  
 F, White striæ in this substance.  
 G, Sections of nervous fasciculi in the middle lobe.  
 H, H, The crura cerebri, with an intermixture of medullary matter running across these.  
 I, I, The corpora mammillaria.  
 K, A section of the commissura anterior cerebri.  
 L, Part of the right lateral ventricle.  
 M, The under surface of the cerebellum, on the left side.  
 N, N, A section of the cerebellum downwards and outwards, from the corpus restiforme, through the ganglion O, to shew the distinction into cortical and medullary parts, and its connexion with the medulla oblongata.  
 O, The fringed, denticulated, or rhomboidal body, or the ganglion of the cerebellum of GALL.  
 P, The prolongation of the cerebellum towards the medulla oblongata, or the original fasciculus of the cerebellum of GALL.  
 Q, The tuber annulare, or pons VAROLII.  
 R, R, The passage of the crura cerebri under the pons VAROLII; the pons being removed on the right side, to shew the corresponding crus fully.  
 S, The crura cerebri continued into the corpora pyramidalia.  
 T, The under end of the corpora pyramidalia, in which the connexion is seen between the fibres of the opposite sides.  
 U, U, The corpora olivaria, vel ganglia ovalia of the medulla oblongata of GALL.  
 V, V, The prolongation of the cerebellum towards the medulla oblongata entire on the left side, the corresponding part of the right side being cut to shew its connexion with the cerebellum.  
 W, The continuation of the anterior median fissure of the medulla spinalis.  
 X, The left olfactory nerve, in which are seen behind, its external and internal roots, and before, its bulb or ganglion.  
 Y, Y, The corpus geniculatum, or tuberculum externum of the optic nerve.  
 Z, the tractus opticus.  
*a*, The place of union of the optic thalami.  
*b*, The optic nerve continued from the thalamus opticus.  
*c*, The fourth, or pathetic nerve.  
*d*, The fifth nerve.  
*e*, The origin of the fifth nerve.  
*f*, The portio dura.  
*g*, The portio mollis of this nerve, incorporated with the prolongation of the cerebellum towards the medulla oblongata.



TAB. 7 A.













TAB. 75.





## T A B L E LXXV.

The BRAIN inverted, in which are seen the CRURA CEREBRI et CEREBELLI;—the TUBER ANNULARE, and MEDULLA OBLONGATA;—the ARACHNOID COAT and PIA MATER being removed, in order to shew the General Direction of their MEDULLARY FIBRES.

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- |   |  |
|---|--|
| <p>A, A, The anterior lobes of the brain.<br/>         B, B, The lateral or middle lobes.<br/>         C, C, The posterior lobes.<br/>         D, D, The lobes, or hemispheres of the cerebellum;<br/> <i>a, a</i>, Its superior and anterior lobules, called also Vermiform Processes of the Cerebellum.<br/>         E, E, The tuber annulare, the surface of which consists of medullary fibres, disposed chiefly in transverse bundles.<br/> <i>b</i>, A depression where the basilar artery was placed.<br/>         F, F, The crura cerebri, composed externally of bundles of medullary fibres.<br/> <i>c, c</i>, The principal crura cerebelli.<br/>         G, H, I, G, H, I, The medulla oblongata dissected, so as to shew that it is composed of two cords laid parallel to each other, and joined together by transverse</p> | <p>fasciculi of medullary fibres. G, G, The middle line where the cords are united. H, H, The corpora pyramidalia, which, in the natural situation, are contiguous to each other. I, I, The corpora olivaria.<br/>         K, K, The optic nerves cut horizontally, to shew the intermixture of their medullary substance. They are cut across near the foramina optica.<br/> <i>d, d</i>, Cineritious substances intimately connected to the optic nerves, and furnishing some part of their medullary substance.<br/>         L, L, The corpora albicantia.<br/>         Between the corpora albicantia, there is a cineritious substance called Pons TARINI, uniting them and the crura cerebri of the opposite sides.<br/>         M, A section of the infundibulum.</p> |
|---|--|



## T A B L E LXXVI.

The CRANIUM, BRAIN, and NOSE, cut perpendicularly, close to the Left Side of the FALX CEREBRI and SEPTUM NARIUM.

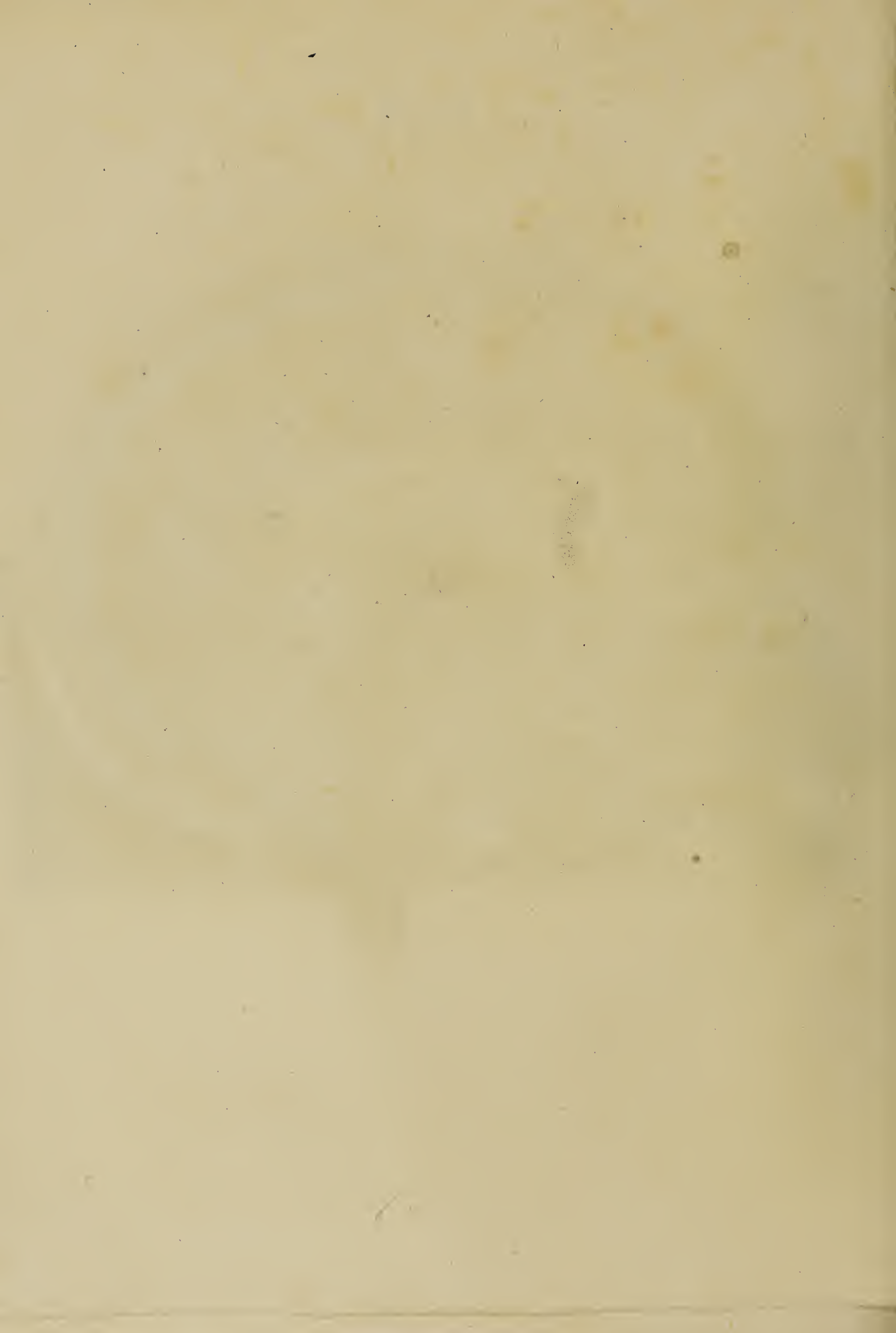
- 
- |   |  |
|---|--|
| <p>A, A, A, A, A section of the cranium.</p> <p>B, Part of the left frontal sinus.</p> <p>C, Part of the left sphenoid sinus.</p> <p>D, The nasal lamella of the ethmoid bone.</p> <p>E, The vomer.</p> <p>F, A cartilage composing a large share of the septum narium.</p> <p>G, The opening from the right nostril into the throat.</p> <p>H, The roof of the mouth and the teeth of the right side of the upper jaw.</p> <p>I, I, The cancelli of the cuneiform process of the occipital bone; from it, upwards to the sella Turcica, numerous and large cancelli were continued in this subject.</p> <p>L, L, L, The root of the falx, the rest being removed, to shew the convolutions of the inner side of the right hemisphere of the brain.</p> <p>M, M, Part of the tentorium cerebelli.</p> <p>N, N, A section of the corpus callosum.</p> <p>O, The septum lucidum.</p> <p>P, The body of the fornix.</p> <p>Q, Q, The two anterior crura of the fornix.</p> <p>R, A section of the commissura anterior.</p> <p>S, The passage by which the lateral ventricles of the brain communicate with each other, and with the third ventricle.</p> | <p>T, The right side of the third ventricle, situated under the right thalamus nervi optici.</p> <p>U, The infundibulum, at the bottom of the third ventricle.</p> <p>V, The glandula pituitaria lodged in the sella Turcica.</p> <p>W, A section of the left optic nerve.</p> <p>X, A section of the left corpus albicans, behind the infundibulum.</p> <p>Y, Part of the choroid plexus.</p> <p>Z, The pineal gland, with two peduncles, one of which connects it to the side of the third ventricle, and the other to</p> <p>a, Which is a section of the commissura cerebri posterior.</p> <p>b, The iter ad quartum ventriculum.</p> <p>c, d, A section of the testes and nates.</p> <p>e, The valvula VIEUSSENII.</p> <p>f, The arbor vitæ of the cerebellum.</p> <p>g, The cavity of the fourth ventricle.</p> <p>h, The bottom of the fourth ventricle, shut by the vascular or choroid plexus and pia mater.</p> <p>i, A section of the tuber annulare.</p> <p>k, A section of the medulla oblongata.</p> <p>l, A section of the upper part of the spinal marrow.</p> <p>m, The basilar artery.</p> |
|---|--|



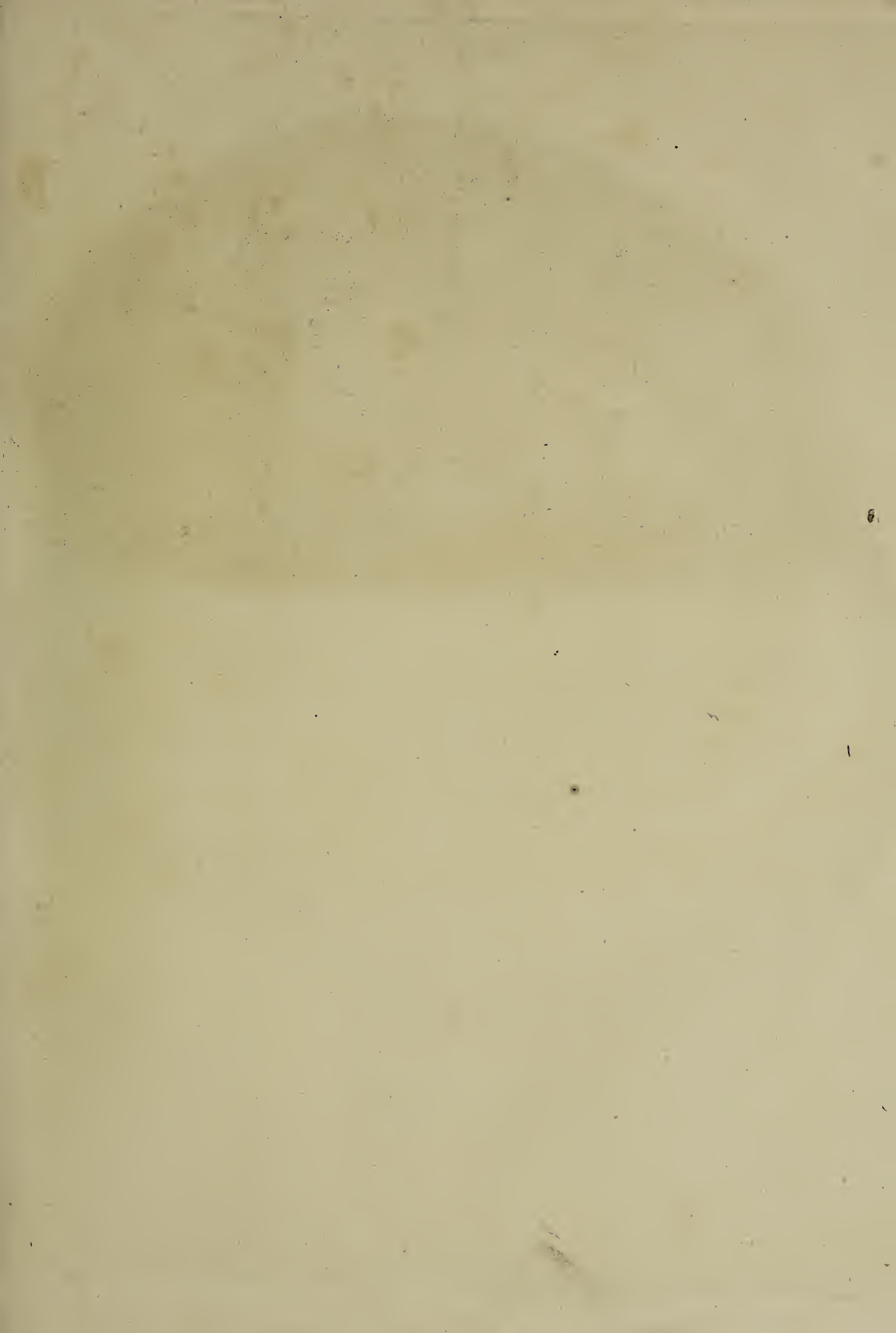
TAB. 76.

















## T A B L E LXXVII.

A Perpendicular SECTION of the CRANIUM and BRAIN, at the Left Side of the FALX  
and SEPTUM LUCIDUM.

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|--|---|
| <p>A, A, The section of the cranium.</p> <p>B, A section of the left frontal sinus.</p> <p>C, The fore part of the falx, fixed to the crista galli.</p> <p>D, The back part of the falx, fixed to the middle of the tentorium E.</p> <p>F, The upper and anterior part of the cerebellum.</p> <p>G, Part of the inner side of the right hemisphere of the brain, with arteries upon its surface, from the anterior branch of the internal carotid.</p> <p>H, H, A section of the corpus callosum.</p> <p>I, I, The septum lucidum between the lateral ventricles.</p> <p>K, The middle part, or body of the fornix.</p> <p>L, A section of the left posterior crus of the fornix.</p> <p>M, A section of the left anterior crus of the fornix.</p> <p>N, The right anterior crus of the fornix.</p> <p>O, A section of the anterior commissura cerebri.</p> <p>P, The inner side of the right thalamus nervi optici, forming the right side of the third ventricle.</p> <p>Q, A vein running on the left side of the septum lucidum, to terminate in the choroid plexus R.</p> <p>S, An oval hole under the anterior part of the body of</p> | <p>the fornix, by which the two lateral ventricles communicate with each other, and with the third ventricle.</p> <p>T, A section of the right optic nerve, at the place where it unites with the left.</p> <p>U, A blind sac in the right side of the third ventricle, under the commissura anterior, and between the continuation of the corpus callosum and joining of the right optic nerve with its thalamus.</p> <p>V, The iter per infundibulum ad glandulam pituitariam, between the joining of the optic nerves with their thalami and the corpora albicantia; a section of the left of which is represented at W.</p> <p>X, A section of the tuber annulare.</p> <p>Y, The pineal gland, fixed by a peduncle on each side to the thalami nervorum opticomum, and by a middle peduncle to Z, the commissura cerebri posterior.</p> <p>a, A section of the nates of the left side.</p> <p>b, A section of the testis of the same side.</p> <p>c, The iter a tertio ad quartum ventriculum.</p> <p>d, A section of the left internal carotid artery.</p> |
|--|---|



## T A B L E LXXVIII.

A Vertical SECTION of the HEAD and NECK, from before backwards, and a little to one side, so as to preserve in this View the Parts common to each Side of the HEAD.

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- |  |  |
|--|--|
| <p>A—F, The contour of the figure, and a section of the common integuments.</p> <p>G, The upper part of the sternum.</p> <p>H, H, The bodies of all the cervical vertebræ, and first vertebra of the back.</p> <p>I, I, The transverse processes of these vertebræ.</p> <p>K, L, The cuneiform process of the occipital bone.</p> <p>L, M, The foramen magnum of the occipital bone.</p> <p>N, The upper part of the occipital bone, and the lambdoid suture.</p> <p>N, O, The parietal bone. O, The coronal suture.</p> <p>O, R, The frontal bone.</p> <p>P, The plates of this bone separating, to form,</p> <p>Q, The frontal sinus of this side, divided from the other by a partition.</p> <p>R, The os frontis indented with the nasal bones.</p> <p>S, The ethmoid bone.</p> <p>T, The nasal bones.</p> <p>U, The crista galli of the ethmoid bone.</p> <p>V, The cribriform plate of the ethmoid bone.</p> <p>W, The right sphenoid sinus separated from the left by a partition covered with a vascular membrane.</p> <p>X, The sella Turcica.</p> <p>Y, The crista cuneiformis, or processus azygos.</p> <p>Z, The cuneiform bone joined to the occipital.</p> <p>Z, a, The osseous palate.</p> <p>a, One of the dentes incisores of the upper jaw.</p> <p>b, The lower jaw.</p> <p>c, One of the dentes incisores of the lower jaw.</p> <p>d, A small tubercle at the under and back part of the middle of the lower jaw, to which several muscles are fixed.</p> <p>e, The os hyoides.</p> <p>f—l, The larynx and trachea lined with their proper membrane.</p> <p>f, The point of the epiglottis.</p> <p>g, h, i, The thyroid cartilage.</p> <p>k, k, The cricoid cartilage.</p> <p>l, l, The trachea laid open, the cartilages of which are seen through the inner membrane.</p> <p>m, m, The intervertebral cartilages.</p> <p>n, Ligaments binding the first and second vertebræ to the occipital bone.</p> <p>o, Ligament binding the first vertebra to the second.</p> | <p>p, p, p, The portion of the dura mater which lines the spinal canal.</p> <p>q, The falx minor.</p> <p>r, s, The torcular HEROPHILI;—r, is placed before the opening of the left lateral sinus.</p> <p>t, The opening of the vena GALENI into the torcular HEROPHILI.</p> <p>u, v, v, The superior longitudinal sinus. At its upper and back part are seen the orifices of some of the veins of the brain.—u, The termination of the sinus in the beginning of the lateral sinuses.</p> <p>w, x, The inferior longitudinal sinus;</p> <p>x, The termination of the sinus in the torcular HEROPHILI.</p> <p>y, z, v, w, The falx, in which the various directions of the fibres which compose it, and some blood-vessels, are seen.—y, The connexion of the falx with the crista galli.—z, Connexion with the tentorium.—v, The upper edge connected to the cranium.—w, The under edge of the falx, extending between the hemispheres of the brain to near the corpus callosum.</p> <ol style="list-style-type: none"> <li>1. 1. Part of the surface of the left hemisphere, covered by the pia mater and its blood-vessels.</li> <li>2. 2. The corpus callosum.</li> <li>3. 3. The septum lucidum.</li> <li>4. The anterior commissure of the brain.</li> <li>5. 6. The anterior crura of the fornix.—6. The right crus cut, to obtain a view of the left.</li> <li>6.—9. The continuation of the fornix, the back part of which is seen united with the corpus callosum.</li> <li>7. The passage by which the lateral ventricles communicate with each other and with the third ventricle. <i>This opening is not represented in the original figure, but is added here from nature.</i></li> <li>8. to a little below 10. The third ventricle, which contracting, forms the infundibulum.</li> <li>Between 8. and 10. The left thalamus opticus, forming the left side of the third ventricle.</li> <li>9. The posterior commissure of the brain.</li> <li>11. One of the corpora albicantia.</li> <li>12. The union of the optic nerves.</li> <li>13. The under end of the infundibulum joining,</li> <li>14. The glandula pituitaria.</li> <li>15. The crura cerebri.</li> </ol> |
|--|--|

16. The



TAB. 78.









16. The pineal gland.  
 17. The nates.  
 18. The testes.  
 19. 20. 21. A section of the cerebellum.  
 22. The arbor vitæ, formed by the medullary parts of the cerebellum.  
 23. The tuber annulare.  
 24. 24. 25. 25. The fourth ventricle. The uppermost 24. is placed in the duct which leads from the third to the fourth ventricle. The undermost 25. is placed below the calamus scriptorius, or bottom of the fourth ventricle.  
 25. 25. 26. The medulla oblongata.  
 27. The basilar artery.  
 28. A branch of the internal carotid artery, which is distributed over the surface of the left hemisphere of the brain.  
 29. The choroid plexus, composed of small arteries and veins seated above the optic thalami:  
 30. The vena GALENI, formed by the union of these veins.  
 26. 31. The spinal marrow, continued through the vertebræ of the neck. The nerves which are seen issuing from its anterior and posterior surface, and uniting into cords, are not much to be attended to in this figure.  
 32. Ligaments which occupy the intervals of the vertebræ from their bodies to their spinous processes, and connect them together.  
 33. The rectus capitis posticus minor.  
 34. ————— major.  
 35. The inter-spinales colli.  
 36. The inter-transversales colli.  
 37. The complexus.  
 38. The splenius.  
 39. The cucullaris.  
 40. The esophagus.  
 41. The internal membrane of the esophagus;  
 42. Its cavity.  
 42.—48. A section of the pharynx.  
 43. The cut edge of the pharynx.  
 44. Muscles placed between the pharynx and vertebræ.  
 45. The mucous glands of the pharynx.  
 46. The orifice of the Eustachian tube.  
 47. The velum palati.  
 48. The posterior opening of the left nostril.  
 49. The uvula, with its glandular substance and muscle.  
 50. The septum narium, covered by its vascular membrane.  
 51. The palate.  
 52. The anterior arch of the palate pulled forward with the tongue.  
 53. The posterior arch of the palate.  
 54. The amygdala.  
 55. The root of the tongue.  
 56. The mucous glands at the root of the tongue.  
 57. The genio-hyo-glossus, extending from the root to the tip of the tongue.  
 58. The apex linguæ.  
 59. The genio-hyoideus.  
 60. The anterior belly of the digastricus.  
 61. A portion of the platysma myoides.  
 62. The sterno-hyoideus.  
 63. The sterno-thyroideus.  
 64. The ligament which binds the os hyoides to the thyroid cartilage.  
 65. The epiglottis, and membrane on each side, which binds it to the thyroid and arytenoid cartilages.  
 66. The left ventricle of the larynx.  
 67. A section of the arytenoid muscles, and between that and the ventricle of the larynx, the arytenoid cartilage.  
 68. A section of the thyroid gland.  
 69. ————— arch of the aorta.  
 70. ————— subclavian vein.



## T A B L E LXXIX.

VIEWS of certain Parts of the BRAIN, not sufficiently shewn in the former FIGURES.

### FIG. 1.

*Shews the FORNIX, CORNUA AMMONIS, and parts connected with them.*

- a, b, c,* A section continued obliquely downwards and forwards, through the tuber annulare and crura cerebri, in all of which parts a mixture of cineritious and medullary matter is observed.—*a, b,* The crura cerebri; *c,* The tuber annulare, in which there are four cineritious parts, which answer in a great measure to the tubercula quadrigemina.
- d,* A section as deep as the iter ad quartum ventriculum.
- e,* The pineal gland.
- f, f,* The inner edges of the tentorium.
- g,* The plexus choroides of the pineal gland and third ventricle supported by a thread.
- h,* The fornix cut at its anterior crura, and turned back.
- i, i,* The posterior crura of the fornix.
- k, k,* Transverse and oblique lines, forming the psalterium or lyre.
- l, l,* The tæniæ Hippocampi.
- m, m,* The indented bands or margins of the great Hippocampus.
- n, n,* The cornua AMMONIS, or great Hippocampus.
- o, o,* The inferior prolongations of the lateral ventricles.
- p, p,* Deep convolutions of the brain, with small blood-vessels running upon them.
- q, q, q, r, r,* The digital cavities of the lateral ventricles; *r, r,* The *Ergot*, or Hippocampus minor, on each side.

### FIG. 2.

*Sketch from DRS GALL and SPURZHEIM's large Work on the Brain.—It is said to represent the appearances which present themselves when the Cerebellum is divided a little to the left of the Median Plane or middle part.*

- a, b,* Fibres of the corpus restiforme, which, running upwards, enter the corpus dentatum *c.* According to Dr GORDON, no such fibres exist.
- c,* The corpus dentatum of the left hemisphere of the cerebellum divided longitudinally, and here represented as a mass of grey substance.
- d,* The commencement of the corpus pyramidale.
- e,* The entrance of the corpus pyramidale under the tuber annulare.

- f,* The progress of the bands from the corpus pyramidale through the annular protuberance.
- g,* The crus cerebri.
- h,* A section of the locus niger cerebri.
- i,* The corpus olivare, here represented as a mass of grey substance.
- k, l, m,* The second, or posterior set of diverging fibres of the brain proper. According to Dr GORDON, no such fibres exist in the brain.
- n, o,* The line of separation between this posterior set of diverging fibres and the anterior set *f,* or those proceeding from the corpus pyramidale.
- p,* A section of the optic nerve.

### FIG. 3.

*Represents a vertical Section of the CEREBELLUM of an ADULT MALE, twenty-four hours after Death, to shew what Dr GORDON considers the real appearance of the CORPUS DENTATUM when divided longitudinally. The Section begins at the Posterior Margin of the Left Hemisphere of the CEREBELLUM, about half an inch to the left of the MEDIAN PLANE; passes obliquely forwards and inwards; crosses the MEDIAN PLANE about the Anterior Surface of the FOURTH VENTRICLE, and divides the right half of the TUBER ANNULARE and MEDULLA OBLONGATA obliquely.*

- a, b,* The left pillar of the VIEUSSENIAN valve (or anterior crus cerebelli) divided in the middle; many of the fibres of which pass into the corpus dentatum *c.*
- c,* A longitudinal section of the corpus dentatum. The serpentine line is the section of its brown capsule, which is wanting at the fore part, where the fibres of the anterior crus cerebelli enter it, to form its white nucleus.
- d,* The right half of the annular protuberance cut obliquely.
- e,* A section of the left lateral part of the posterior medullary velum, not represented by DRS GALL and SPURZHEIM.
- f,* A sketch of the corpus dentatum in the right corpus olivare, cut obliquely.
- g, h, i,* The left side of the fourth ventricle; *i,* part of the calamus scriptorius.
- k,* Strata of white substance supplying the spinal lobe cut obliquely, so that they appear broader than the



Fig. 1.

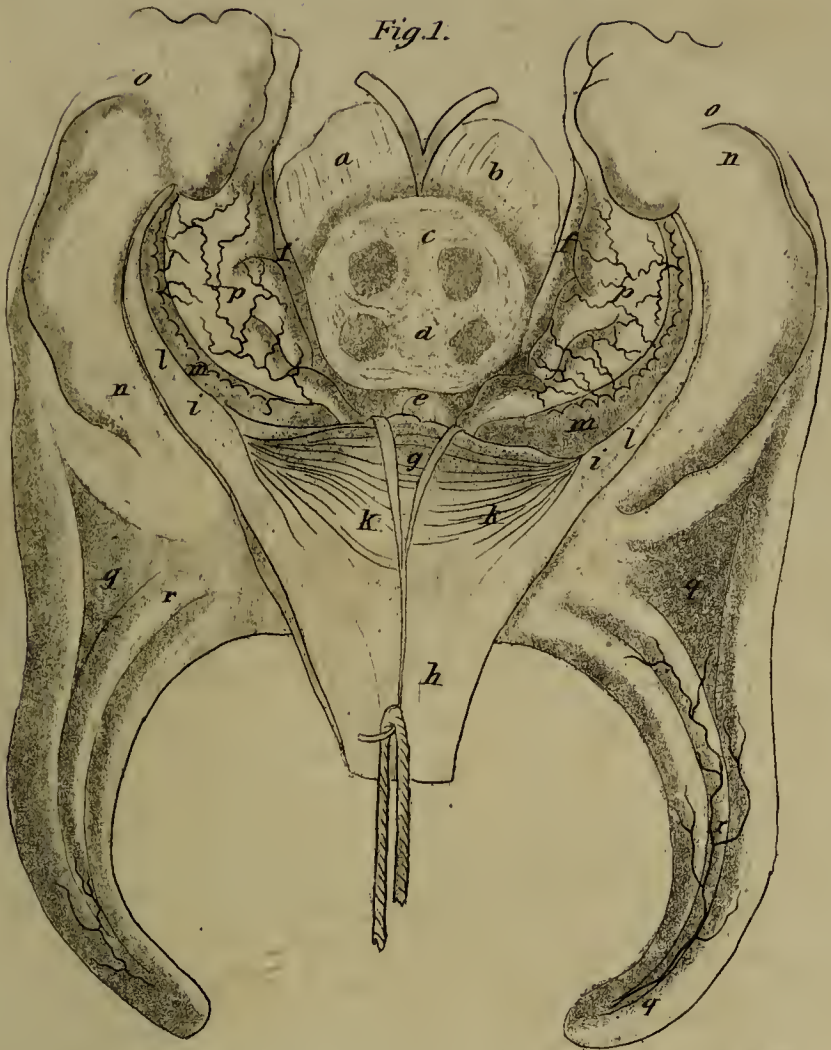


Fig. 5.

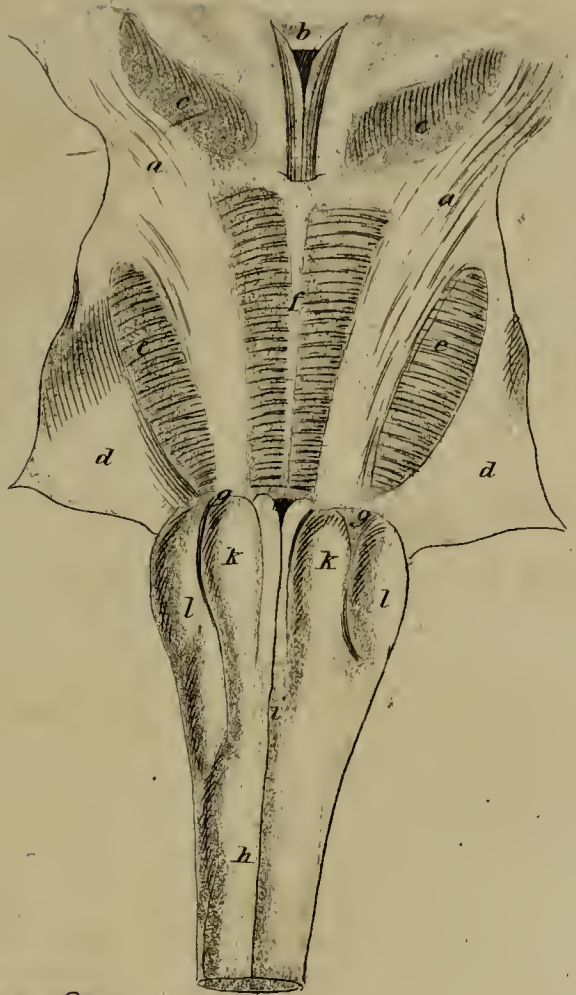


Fig. 4.



Fig. 7.

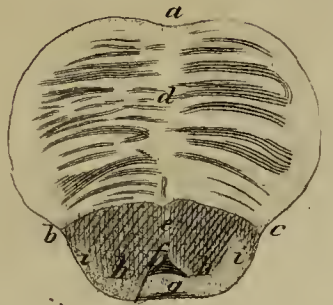


Fig. 6.

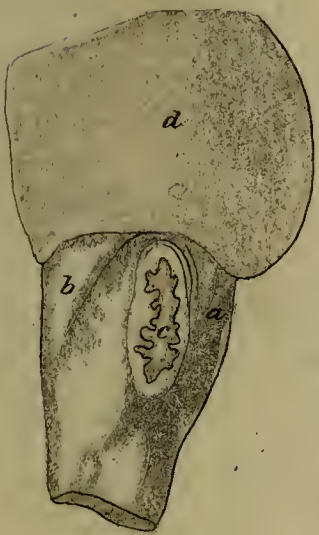


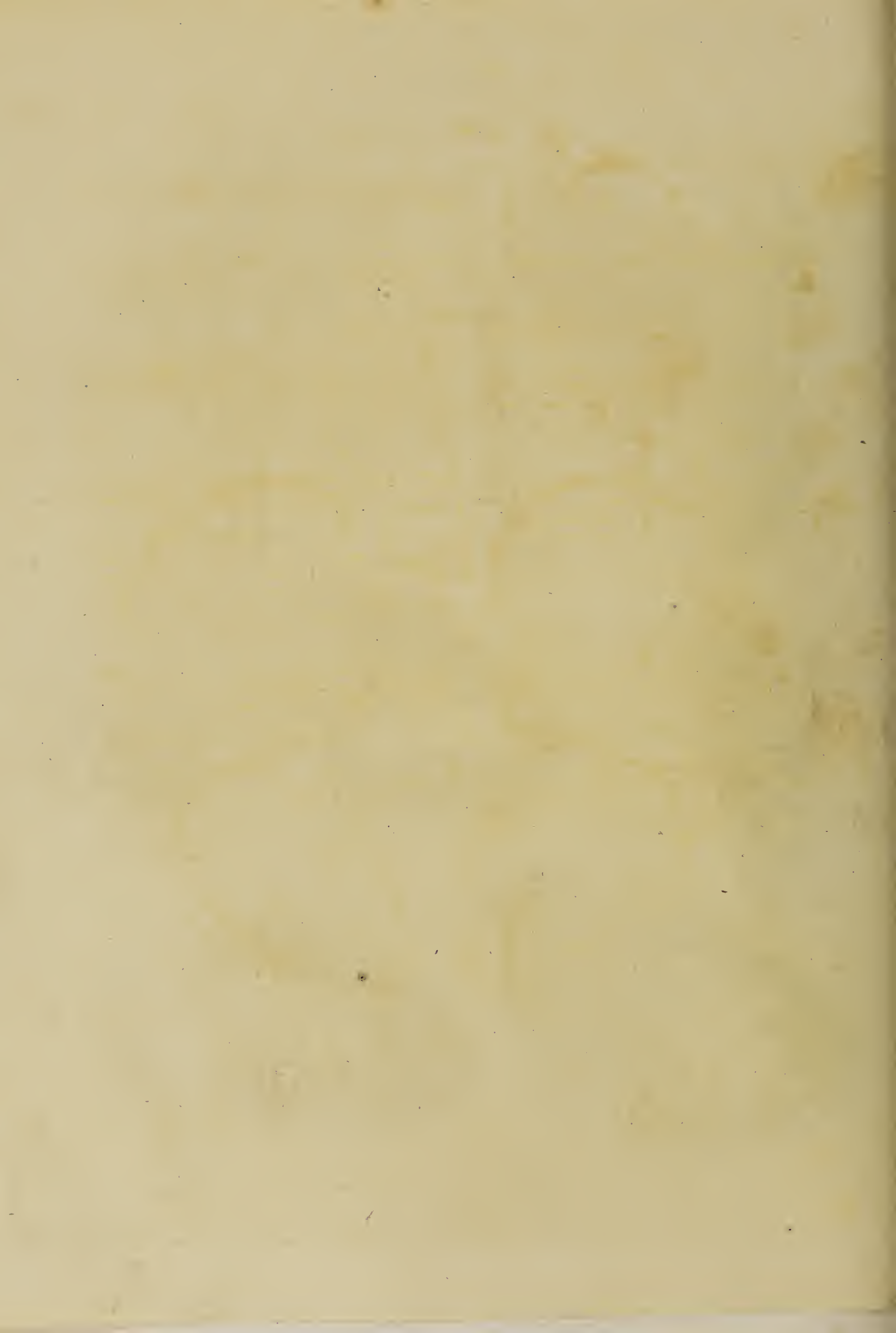
Fig. 2.



Fig. 3.









the strata supplying the other parts of the cerebellum.

FIG. 4.

*Shews the Left CORPUS DENTATUM of the CEREBELLUM cut directly across. The Left Hemisphere of the CEREBELLUM is divided into two halves by a vertical Incision, almost at right angles to the MEDIAN PLANE; and this represents the Surface of the anterior half. From the CEREBELLUM of an ADULT MALE, twenty-four hours after Death.*

*a, The corpus dentatum, the brown capsule of which, in this section, always presents a very indented margin.*

FIG. 5.

*Gives a View of a horizontal Section of the TUBER ANNULARE, and of the CRURA CEREBRI and CEREBELLI, upon a level with the CORPORA PYRAMIDALIA.*

- a, a, The crura cerebri.*
- b, The commissura posterior.*
- c, c, The locus niger crurum cerebri.*
- d, d, The crura cerebelli.*
- e, e, The tuber annulare, in which are seen the intimate union of the crura cerebri and cerebelli with the tuber; the white medullary bands which extend from the crura cerebri through the tuber, to the corpora pyramidalia; and the transverse fibres of medullary and cineritious substance, which run nearly at right angles to these bands.*
- f, The raphè, or linea mediana, dividing the tuber into right and left portions.*
- g, g, The origin of the medulla oblongata.*
- h, The beginning of the medulla spinalis.*

*i, A fissure, separating the medulla oblongata and spinal marrow into right and left portions or cords.*

*RR. corpora pyramidalia et corpora olivaria*  
FIG. 6.

*This exhibits a View of the CORPUS DENTATUM, in the Left CORPUS OLIVARE, divided longitudinally, by cutting off the whole projecting part. The Figure was taken from an ADULT, twenty-four hours after death.*

- a, The left corpus pyramidale.*
- b, The left corpus restiforme.*
- c, The corpus dentatum in the left corpus olivare, consisting of a white nucleus, and an indented brown capsule, instead of a uniform mass of grey substance, such as represented in Fig. 2.*
- d, An outline of the tuber annulare.*

FIG. 7.

*Represents a horizontal Section of the ANNULAR PROTUBERANCE, a little above its middle, after induration in Alcohol.*

- a, b, c, Cross sections of the longitudinal bands of white substance, continuous with the corpus pyramidale. In the recent subject they are of a greyish-brown hue. The whiter parts which are interspersed between, and surround these strata, consist entirely of the horizontal fibres of the annular protuberance, which are intimately blended along,*
- d, The median line.*
- e, A section of the reddish-brown substance behind the protuberance, and anterior to the fourth ventricle.*
- f, A section of the top of the fourth ventricle.*
- g, A section of the valvula VIEUSSENII.*
- h, h, The fibres of the anterior crura cerebelli, divided obliquely.*
- i, i, Cross sections of the bands of fibres denominated by REIL the Schleife.*



## T A B L E LXXX.

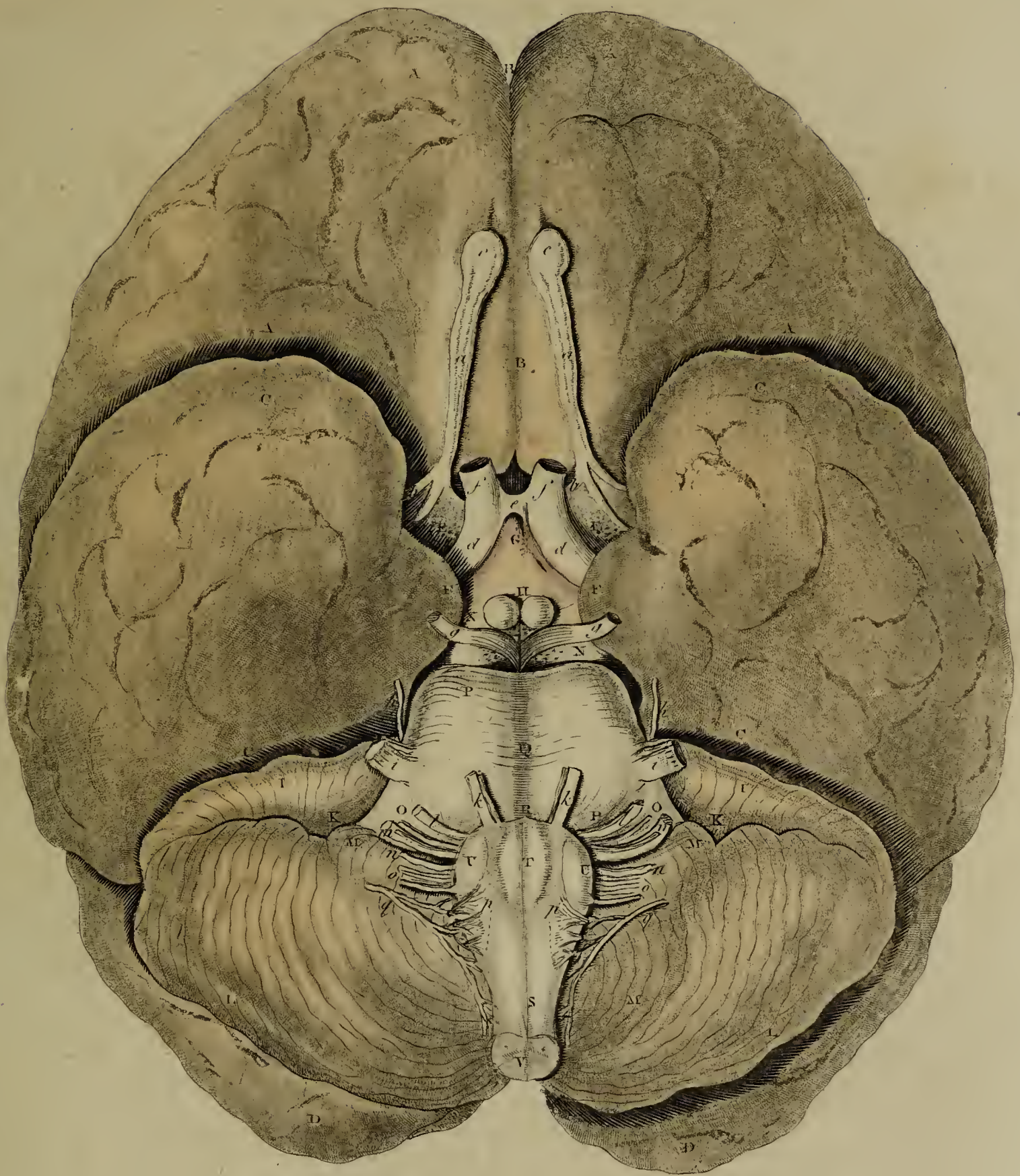
A VIEW of the BASE of the BRAIN, and of the NERVES which take their Origin from it.

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|--|--|
| <p>A, A, A, A, The anterior lobes of the brain.<br/>         B, B, The division of the anterior lobes of the brain.<br/>         CC, CC, The lateral lobes.<br/>         D, D, The posterior lobes.<br/>         E, E, A perforated part of the brain, for the passage of small arteries.<br/>         F, F, A circumvolution on each side, corresponding to the cornua AMMONIS.<br/>         G, The infundibulum, supported upon the union of the optic nerves.<br/>         H, The corpora albicantia.<br/>         IKLM, IKLM, The cerebellum.—I, I, The superior and anterior lobules of the cerebellum, called also its superior and anterior Vermiform Processes.<br/>         N, N, The crura cerebri. At their inner edge the cut extremities of blood-vessels are seen.<br/>         O, O, The crura cerebelli.<br/>         P, P, The tuber annulare.<br/>         Q, An impression made by the basilar artery.<br/>         R, S, T, U, U, V, The medulla oblongata.<br/>         S, The fissure where the two lateral cords, of which the medulla oblongata is composed, can be separated some way from each other.<br/>         T, The corpora pyramidalia.<br/>         U, U, The corpora olivaria.<br/>         V, The part where the medulla oblongata is said to terminate, and the spinal marrow to begin.<br/>         a, a, The olfactory or first pair of nerves, which, contrary to the other nerves, converge in their passage under the brain.</p> | <p>b, b, The roots of the olfactory nerves, from the back part of the anterior lobes, at the fissure of SYLVIVS; each composed of three parts.<br/>         c, c, The anterior bulbous extremities, composed of cineritious matter, mixed with streaks of medullary substance.<br/>         d, d, The tractus opticus on each side, converging to form,<br/>         e, The union of the optic nerves, partly concealed by the infundibulum.<br/>         f, f, A section of the optic nerves, near their entry into the foramina optica.<br/>         g, g, The third pair of nerves.<br/>         h, h, The fourth pair of nerves.<br/>         i, i, The fifth pair of nerves, which are composed of an anterior small, and a posterior large fasciculus.<br/>         k, k, The sixth pair of nerves, each of which has a small thread at its inner side, separate from the trunk.<br/>         l, m, l, m, The seventh pair of nerves.—l, The portio dura.—m, The portio mollis of the nerve.—Between the portio mollis and portio dura, are two small nerves which form WRISBERG'S <i>Portio Media inter Communicantem Faciei et Nervum Auditorium</i>.<br/>         n, o, n, o, The eighth pair of nerves, composed of, n, the nervus glosso-pharyngeus; and, o, the par vagum, formed of small fasciculi.<br/>         p, p, The ninth pair, each formed of three fasciculi.<br/>         q, q, The accessory nerves of the eighth pair.</p> |
|--|--|



TAB. 80.





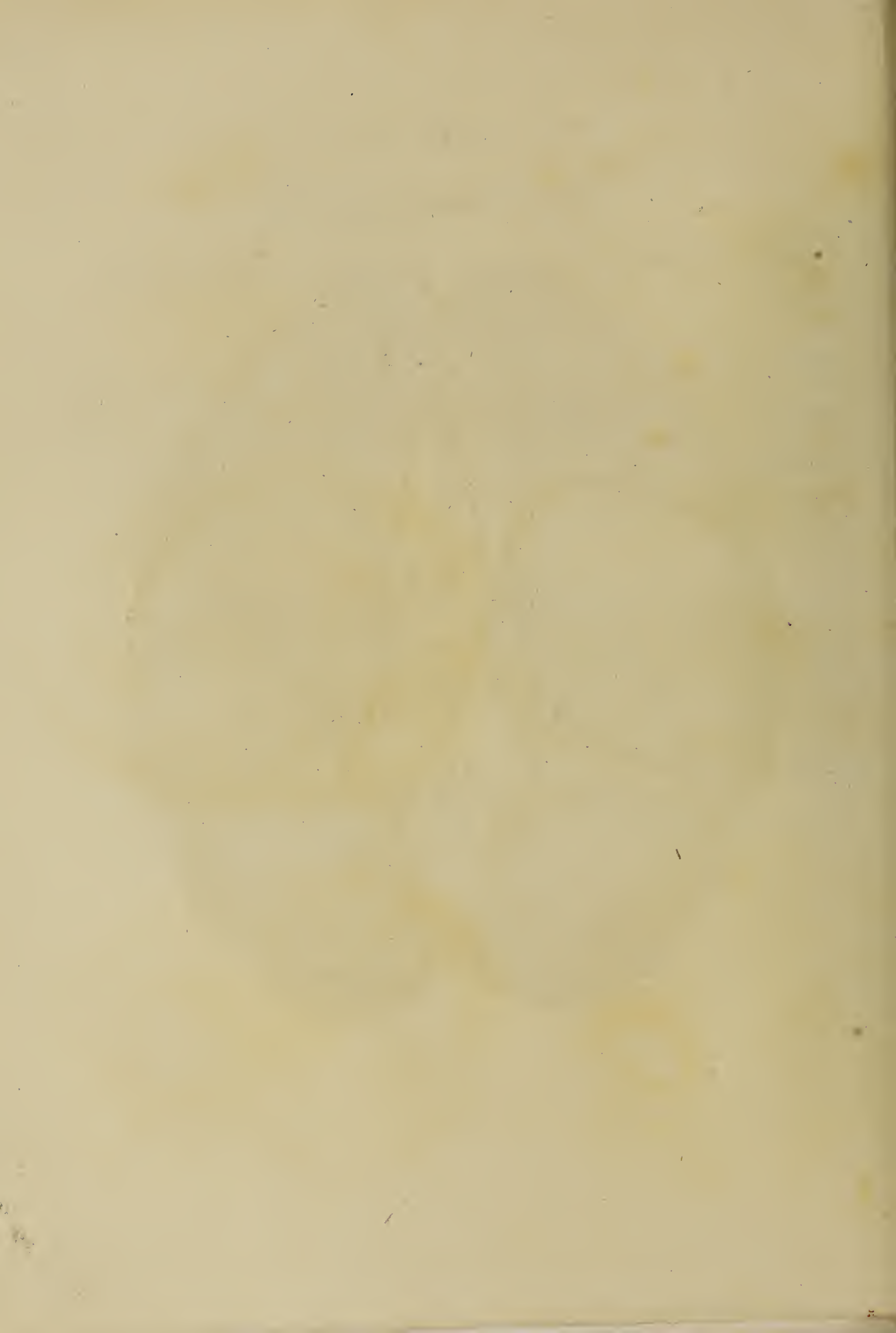








FIG. 1. TAB. 81.

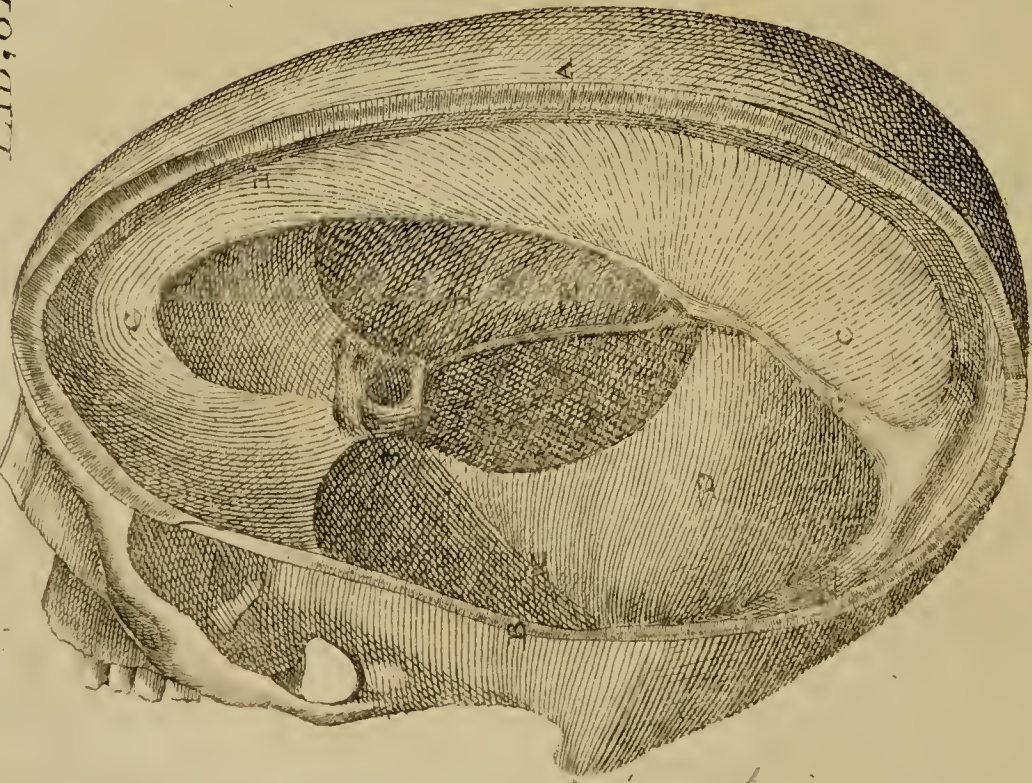


FIG. 2.



FIG. 3.



FIG. 4.

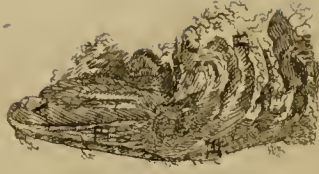


FIG. 5.

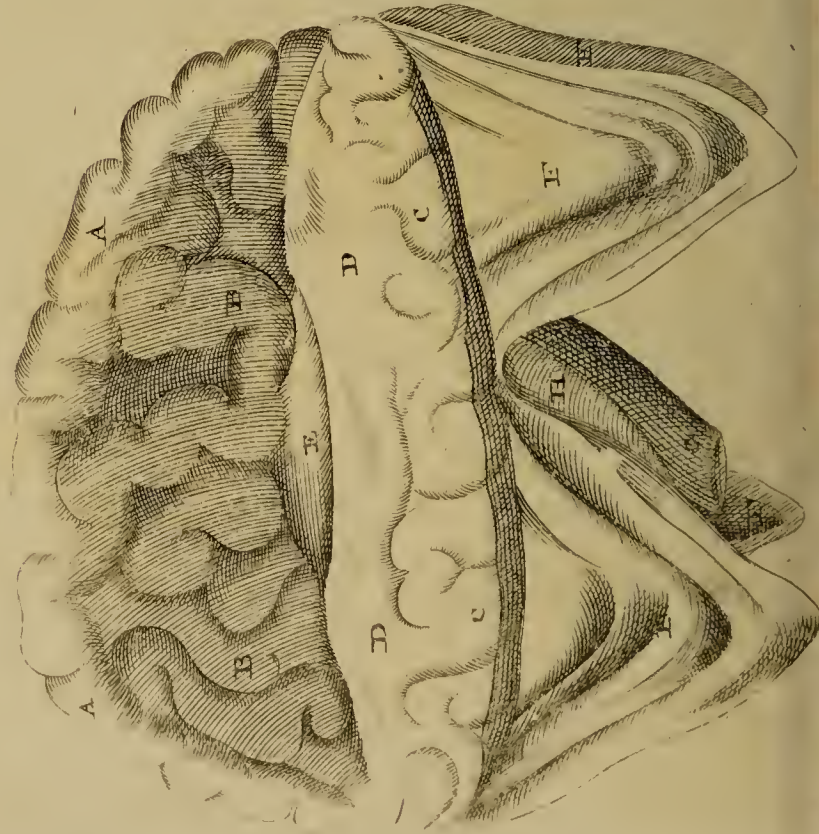


FIG. 6.

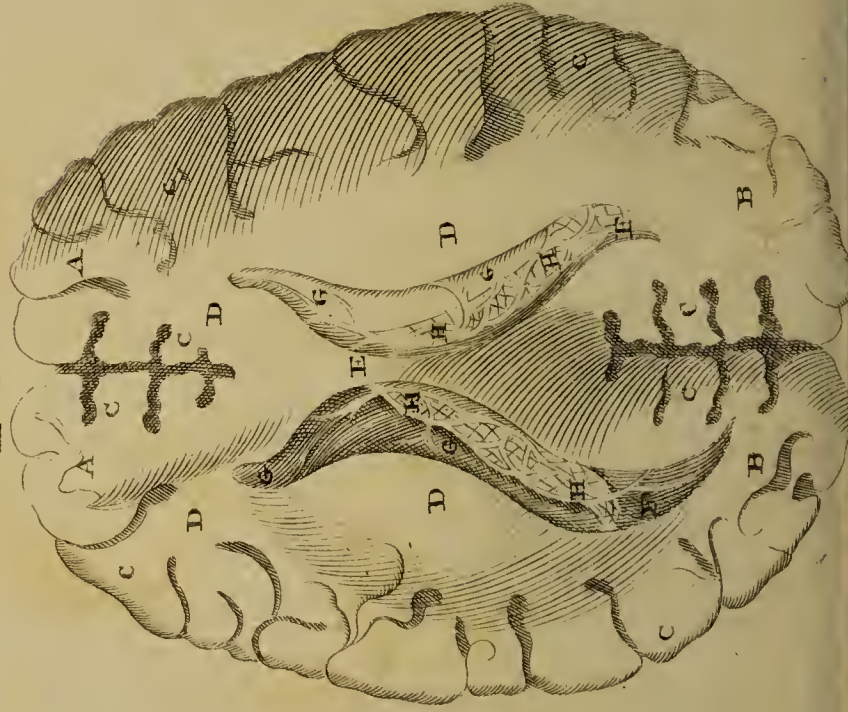


FIG. 7.

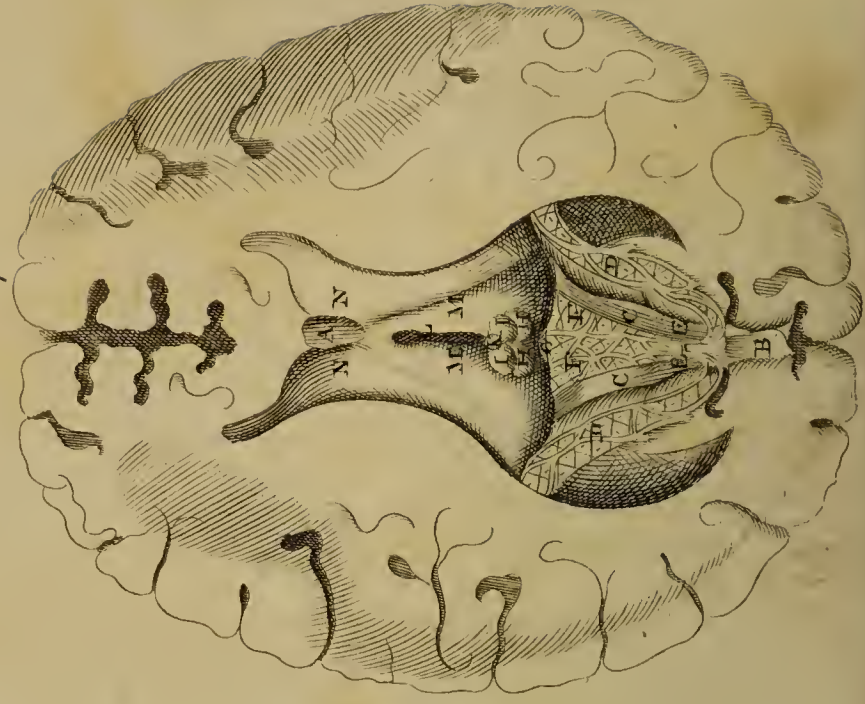




FIG. 9.

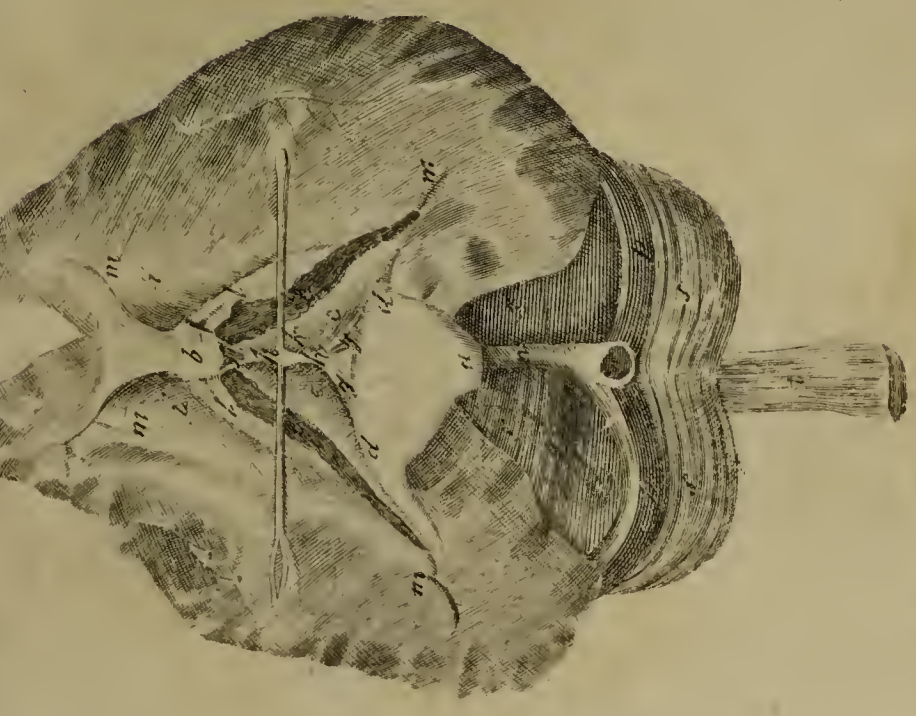


FIG. 11.



FIG. 10.

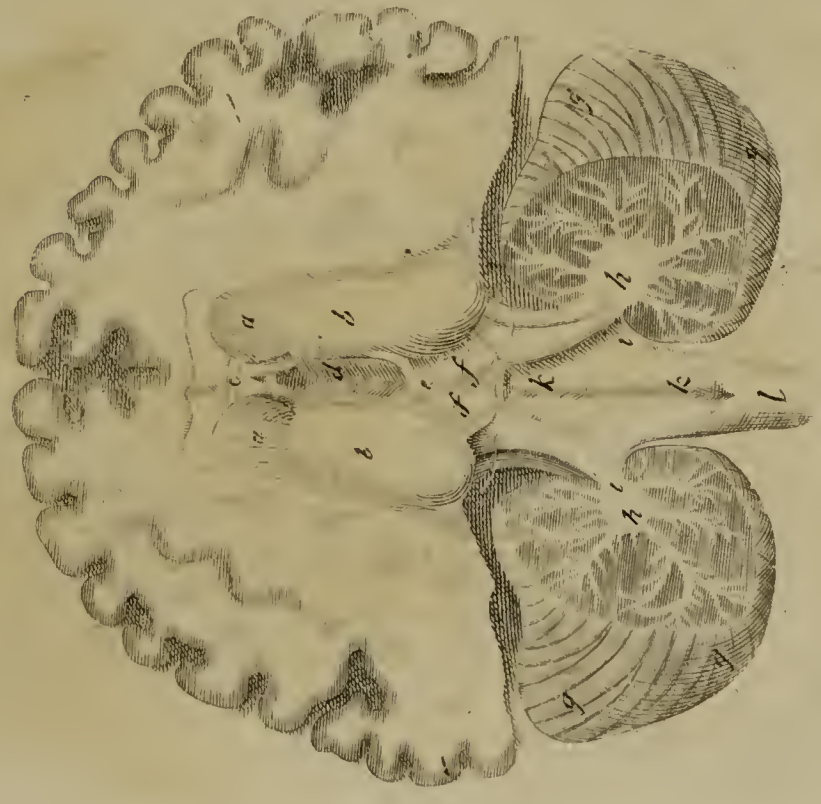
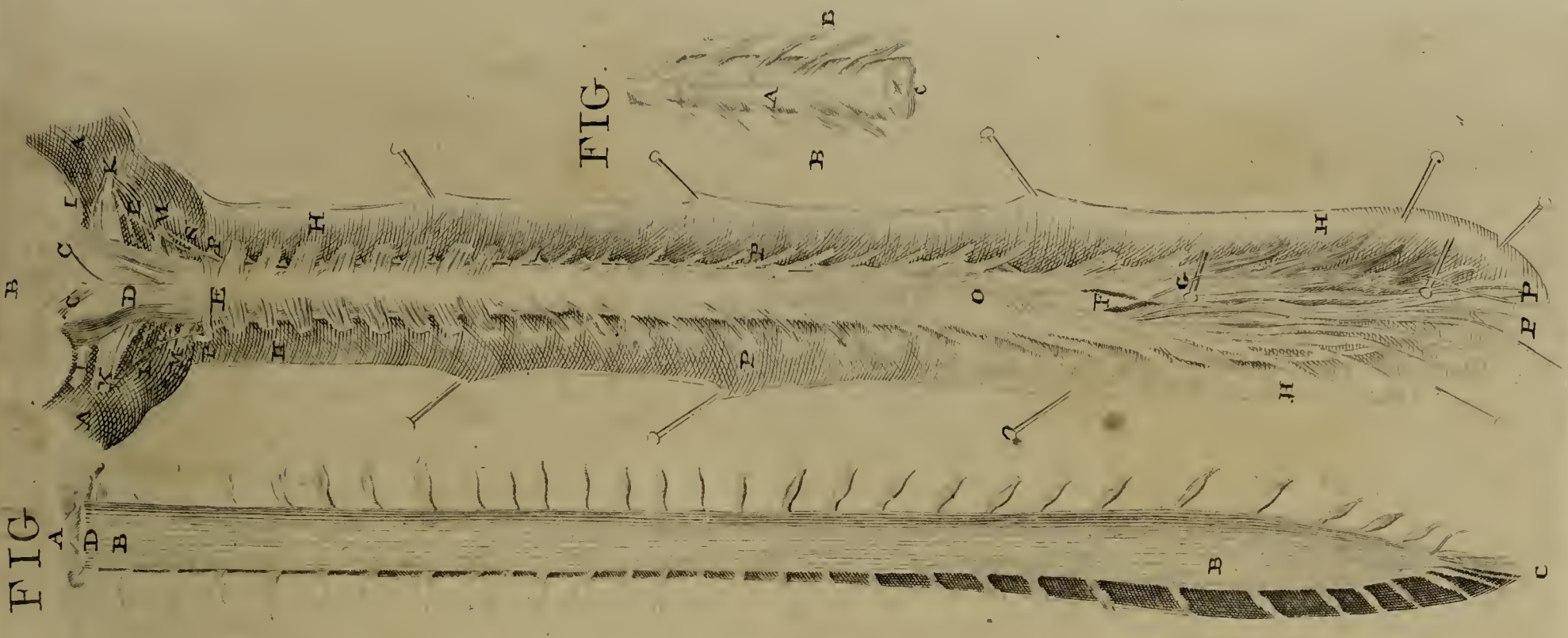
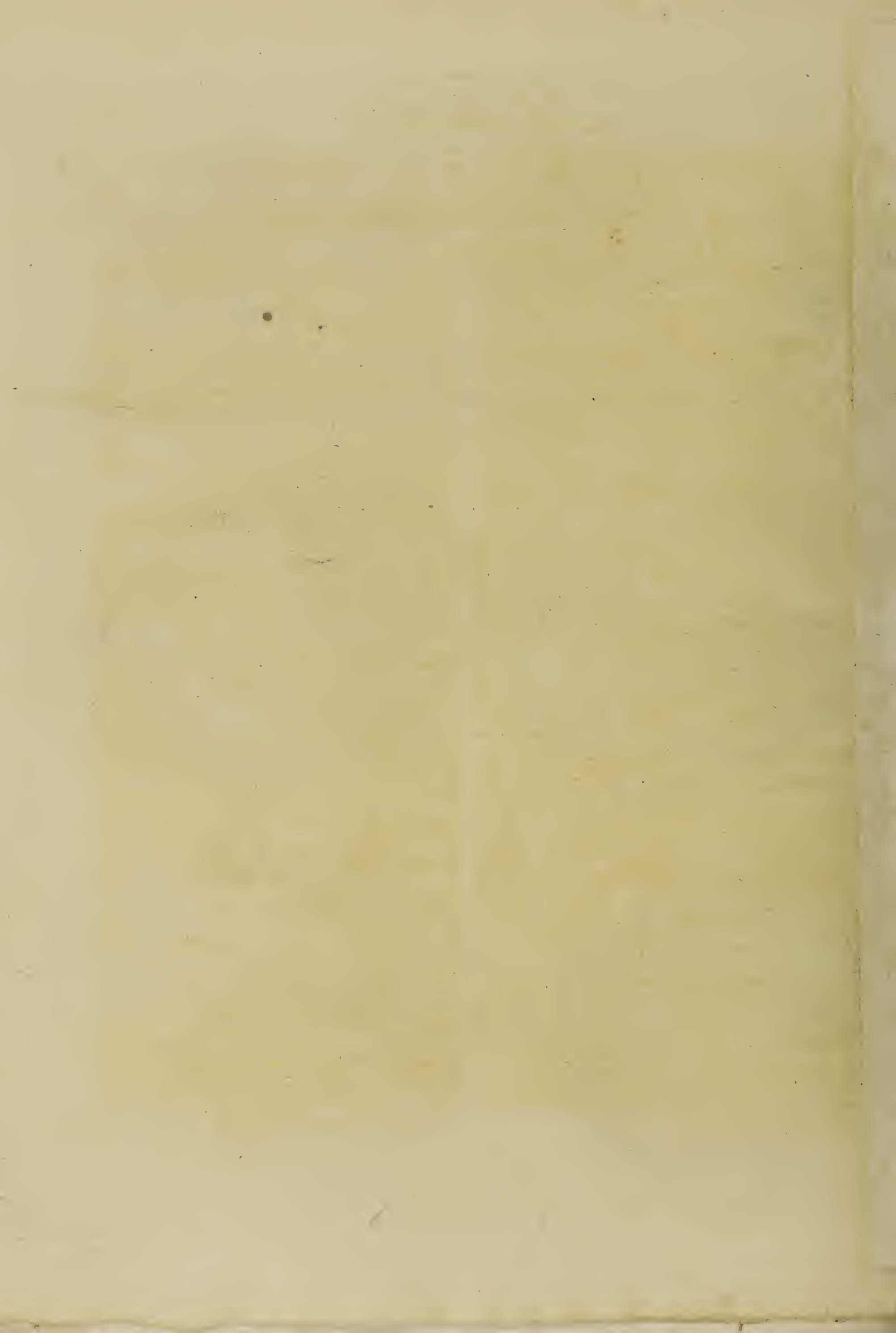


FIG.









# T A B L E LXXXI.

## Additional VIEWS of the BRAIN and SPINAL MARROW.

### FIG. 1.

*See Tab. LXVIII.*

### FIG. 2.

*A View of the Upper Part of the BRAIN of a YOUNG PERSON, with the VESSELS minutely injected.*

- A, B, The under part of the fore-head.
- C, A portion of the tunica arachnoidea, raised by inflation.
- D, The spinous part of the frontal bone, insinuating itself between the hemispheres of the brain.
- E, The groove between the two hemispheres of the brain, from which very numerous arteries emerge, and are connected by anastomoses, in an infinite number of places, with,
- F, F, The lateral arteries of the brain.
- G, G, G, The furrows or circumvolutions of the brain, covered by the pia mater and tunica arachnoidea, by which their depth is concealed.

### FIG. 3.

Shews a portion of the pia mater A, A, covering the brain with its processes B, B, B, insinuating themselves within the circumvolutions of the brain, and winding along in a serpentine direction.—Numberless arteries, C, C, &c. are seen dispersed over it, which in the subject itself are still more numerous.

### FIG. 4.

Shews the pia mater A, covering the cerebellum,—from a young subject. The same number of falciform processes B, B, B, are found in it, as there are circumvolutions in the cerebellum.—Only a few lateral branches of arteries are added; for, had the whole been represented, the falciform processes would have been concealed. C, Shews the very short, delicate, and numerous small arteries, coming from the inner surface of the pia mater, and resembling a species of moss, of which the Author of this Figure says he was the discoverer.

### FIG. 5.

*The BRAIN viewed on the Right Side, the DURA MATER being cut and turned down.*

- AA, BB, The left hemisphere of the brain.
- BB, That part which is opposed to the falx.
- CC, DD, A transverse section of the right hemisphere, a little above the corpus callosum.
- CC, The cortical part, and intervening medullary portions.
- D, D, The medullary part.
- E, The corpus callosum.

- F, F, F, F, A section of the dura mater into four parts, with its angles depending.
- G, The medulla oblongata.
- H, The cerebellum.

### FIG. 6.

*A Transverse SECTION of the BRAIN, upon a level with the LATERAL VENTRICLES, which are laid open.*

- A, A, The anterior lobes of the brain.
- B, B, The posterior lobes.
- C, C, C, A section of the cortical part of the brain, and of the medullary portions which are intermixed with it.
- D, D, D, D, The medullary part.
- E, The part from which the corpus callosum is dissected.
- F, G, G, H, H, F, G, G, H, H, The lateral ventricles of the brain.
- G, G, G, G, The corpora striata.
- H, H, H, H, Choroid plexuses, composed chiefly of blood-vessels which arise from the lateral ventricles.

### FIG. 7.

*Is nearly similar to the preceding; but differs in this,—that the FORNIX and CHOROID PLEXUS are dissected from the Anterior Parts, and turned back.*

- A, A section of the anterior crus of the fornix.
- B, The other section of the fornix turned back.
- C, C, The inferior part of the fornix turned back.
- D, D, The inferior part of the choroid plexus, also turned back with the fornix.
- E, E, Trunks formed by the veins of the choroid plexus.
- F, F, Continuation of the veins of the choroid plexus, passing under the fornix to the fourth sinus of the dura mater.
- G, A small portion of the cerebellum.
- H, H, The testes.
- I, I, The nates.
- K, The pineal gland.
- L, The third ventricle.
- M, M, The thalami nervorum opticorum.
- N, N, The corpora striata.

### FIG. 8.

*Gives a View of a SECTION of the BRAIN, nearly of the same depth with that of Fig. 7.—It also represents a Portion of the CEREBELLUM covered by the DURA MATER, with Part of the Large BLOOD-VESSELS which are injected,—and of the SPINAL MARROW.*

- a, The fornix cut at its anterior crus, and turned back;
- b, Its anterior crus, divided into two.

c, c, The



- c, c*, The thalami nervorum opticorum.  
*d, d*, The pedes Hippocampi.  
*e, e*, The choroid plexus.  
*f*, The part where the two plexus meet under the fornix.  
*g, g*, Other parts of the choroid plexus, lying under the posterior crura of the fornix.  
*h, h*, Large veins of the choroid plexus, supported by a probe, in their passage backwards to the fourth sinus of the dura mater.  
*i, i*, The corpora striata.  
*k*, The rima of the third ventricle, concealed by the large veins of the choroid plexus.  
*l, l*, The centrum semicirculare geminum.  
*m, m, m, m*, The centrum ovale of VIEUSSENS.  
*n*, The fourth sinus of the dura mater.  
*o*, The termination of the superior longitudinal sinus.  
*p, p*, The lateral sinuses.  
*q*, A large vein entering one of the lateral sinuses.  
*r, r*, The cerebellum covered by the tentorium.  
*s, s*, The under and back part of the cerebellum, covered by a continuation of the dura mater.  
*t*, The spinal marrow.

FIG. 9.

A SECTION of the BRAIN, the FORNIX and CHOROID PLEXUS being removed, to shew the Connexion of the THALAMI NERVORUM OPTICORUM; the Anterior and Posterior COMMISSURES; the PINEAL GLAND; the TUBERCULA QUADRIGEMINA; the VALVULA VIEUSSENSII, &c.

- a, a, a, a*, The cortical or cineritious substance, which surrounds the whole of  
*b, b, b, b*, The medullary, or white substance of the brain.  
*c, c*, The corpora striata, of an ashy colour.  
*d, d*, The thalami nervorum opticorum, of a white colour.  
*e*, The anterior pillar, separated from the rest of the fornix, and turned forward, to shew the two short columns which support it, and the anterior commissure which unites them.  
*f*, The anterior opening, common to the two lateral ventricles, and to the third ventricle.  
*g*, The posterior opening, which is shut up by a vascular membrane and choroid plexus.  
*h*, The pineal gland.  
*i, i, i, i*, The tubercula quadrigemina, or nates and testes.  
*l*, The large valve of VIEUSSENS.  
*m, m*, The fourth pair of nerves.  
*n, n*, The cerebellum, with blood-vessels running upon its surface.  
*o, o*, The processus vermiformis.

FIG. 10.

Represents a deeper SECTION than Fig. 9. of the BRAIN of another Subject. The THALAMI NERVORUM OPTICORUM are separated, so as to bring the Third VENTRICLE into

view; and by a Vertical SECTION of the CEREBELLUM, the ARBOR VITÆ and Fourth VENTRICLE are seen.

- a, a*, The corpora striata.  
*b, b*, The thalami nervorum opticorum.  
*c*, The anterior pillar of the fornix.  
*d*, The third ventricle, at the anterior part of which is seen the beginning of the infundibulum.  
*e*, The pineal gland.  
*f, f*, The tubercula quadrigemina.  
*g, g, g, g*, The two portions of the cerebellum.  
*h, h*, The medullary substance of the cerebellum, commonly called the *Arbor Vitæ*.  
*i, i, k, k*, The fourth ventricle.  
*k, k*, The groove in the ventricle, called *Calamus Scriptorius*.  
*l*, The extremity of the medulla oblongata.

FIG. 11.

Exhibits the BASE of the BRAIN, with Part of the SPINAL MARROW, and the BLOOD-VESSELS, which are injected with Wax.

- A, A*, The anterior lobes of the brain.  
*B, B*, The lateral lobes.  
*C, C*, The posterior lobes.  
*D, D*, The cerebellum.  
*E, E*, The vertebral arteries, where they pass between the first cervical vertebra and occipital bone.  
*F, F*, The lateral sinuses.  
*G*, The vertebral sinus of this side.  
*H*, The dura mater of the right side, cut and turned back from the spinal marrow; on the left side it remains *in situ*.  
*a*, The cut end of the infundibulum.  
*b, b*, The corpora albicantia, behind the infundibulum.  
*c, c*, The internal carotid arteries.  
*d, d*, Communicating branches between the internal carotid and vertebral arteries.  
*e, e, e, e*, Four principal branches of the vertebral arteries, which run to the back part of the cerebrum, and to the cerebellum.  
*f*, Branches running off from the carotid artery.  
*g*, The basilar artery, formed by the two vertebral arteries.  
*h, h*, The trunks of the vertebral arteries.  
*i, i*, The anterior spinal artery.  
*k, k*, The crura cerebri.  
*l, l*, The crura cerebelli.  
*m, m*, The tuber annulare, or pons VAROLII.  
*n*, The corpus pyramidale of the right side.  
*o*, The corpus olivare of that side.

FIG. 12. 13. 14.

Views of the SPINAL MARROW. See these repeated and explained in Vol. III.



## OF THE EYE.

The *EYES*, which constitute the Organ of Vision, are situated in the Cavities of the Orbits, and are surrounded by several parts, some of which protect them from injury, and others assist in the performance of their various motions.

The *Orbits* are of a conical figure, situated in the fore part of the Cranium, with their Apices behind, their Axes in a horizontal direction, and their Bases turned obliquely outwards.

They are formed of different Processes of the following Bones, viz.

The upper part of each Orbit, by the Orbital Plate of the Frontal Bone;—the inferior, by the Orbital Plates of the superior Maxillary and Malar Bones;—the internal, chiefly by the Orbital part of the Os Unguis and Pars Plana of the Ethmoid Bone;—the external, by the Orbital Plates of the Sphenoid and Malar Bones;—the posterior, by the Sphenoid and Palate Bones;—and the anterior edge of the Orbit, by the Frontal, Superior Maxillary, and Malar Bones.

The Cavities of the Orbits are lined with Productions of the Dura Mater, which pass through the Foramina Optica and Lacera; and, at the anterior edges of the Orbits, join the Periosteum of the Face, where they supply the place of Ligaments to the Palpebræ.

## SUPERCILIA.

The *Supercilia*, or *Eye-brows*, which are peculiar to the Human Species, are the Arches of Hair situated upon the Superciliary Ridges of the Frontal Bone. The hairs are placed obliquely, with their roots towards the Nose, and the Arches elevated a little above the rest of the Fore-Head, by a considerable quantity of Cellular Substance lying under the Skin.

They are moved in different directions by the action of the Occipito-frontalis, Corrugator Supercilii, and Orbicularis Palpebrarum.

They are intended partly for Ornament, and partly as Shades over the Eyes, thereby preventing them from being injured by extraneous matter, or by too great a degree of light. They also assist in expressing the Passions of the Mind.

## PALPEBRÆ.

The *Palpebræ*, or *Eye-lids*, are chiefly composed of a Doubling of the Skin inclosing the Cartilages called *Tarsi*, and a portion of the Orbicularis Palpebrarum; and form Angles at their outer and inner extremities, termed *Canthi*, or *Corners of the Eye*.

The Eye-lids are covered by the Common Integuments, which are much thinner here than in most of the other parts of the Body, and are destitute of Subcutaneous Fat. They are connected to the anterior edge of the Orbits by Cellular Substance condensed, which assists in the formation of what have been called *Ligaments* of the Palpebræ.

The *Upper Eye-lid* is the larger of the two, and is the one which moves principally in closing or opening the Eye.

The *Motions* of the Eye-lids are performed by the actions of the Orbicularis and Levator Palpebræ Superioris. The under Eye-lid is raised by that part of the Orbicularis belonging to it. It is depressed by its own elasticity.

The Eye-lids serve as Curtains or Veils, to defend the Eyes during Sleep. They likewise prevent them from being injured by extraneous objects, or by too much light. In certain situations, they assist vision, by diminishing the rays of light when they are too strong. By their frequent motion, they increase the secretion of the Tears, apply them properly to the Surface of the Eye, and conduct what remains, after washing the Eye, to the Puncta Lacrymalia.

## TARSUS.

This is a *thin Cartilaginous Arch*, situated in the edge of each Eye-lid; that in the upper one being considerably broader than the one below, and each broader at its middle than towards its extremities. Tab. LXXXIII. Fig. 8. *d, e*.

The Tarsi terminate at a little distance from the inner Angle of the Eye.—Their edges are so formed, that when the Eye-lids are shut, a Groove is left next the Eye, by which the Tears are conveyed towards the Nose.

The Tarsi serve to keep the Eye-lids extended, allow them to be accurately applied to each other, and prevent them from being collected into Folds.

## GLANDULÆ SEBACEÆ, CILIARES, vel MEIBOMIANÆ.

The last term is obtained from these Substances being described by MEIBOMIUS. They are situated between the Tarsus and lining of the Eye-lids, and are formed of a series of white Lines or Follicles, running across the Tarsus in serpentine directions, and, when viewed through a Magnifier, appearing like Rows of Pearls. From their Substance an Oily or Sebaceous Matter, resembling little Worms, may be readily squeezed out through  
the



the Foramina or Puncta Ciliaria, placed upon the edges of the Eye-lids. Tab. LXXXVI. Fig. 17. *g, g.*

The Matter of the Sebaceous Glands anoints the edges, and facilitates the motions of the Eye-lids; it likewise prevents their Accretion, or the Tears from passing over them during Sleep.

#### CILIA.

The *Cilia*, or *Eye-lashes*, are stiff Hairs placed in the edges of the Eye-lids. Those of the Upper Eye-lid are bent upwards, and are considerably longer than those of the Under one, which are bent in the opposite direction. In both Eye-lids they are wanting near the inner Angle.

The *Cilia* prevent dust, insects, &c. from getting into the Eye, assist in moderating the quantity of light sent into it, and add considerably to the beauty of the Face.

#### GLANDULA LACRYMALIS.

The *Glandula Lacrymalis*, called, till of late years, *Glandula Innominata* GALENI, is situated within the Orbit, upon the upper and outer part of the Eye, in a hollow behind the outer end of the Superciliary Ridge of the Frontal Bone.

It is a lobulated Gland, or one of the Conglomerate kind. Is of a yellowish white colour, of an oblong form, and a little flattened. Has one end pointing to the Nose, the other to the external Angle of the Eye, and is fixed to the outer part of the Orbit by a small Ligament. Tab. LXXXV. Fig. 16. 17.

Besides the *Glandula Lacrymalis*, there is a chain of smaller Glands, lying between it and the upper Eye-lid, and connecting them together.

In the direction of the smaller Glands, there are six or seven Excretory Ducts,—described by DR MONRO, 1758,—which run nearly parallel to, but do not communicate with each other.

The Excretory Ducts, on account of their smallness, are not often seen, and are injected with difficulty. They terminate on the inner side of the upper Eye-lid, near the outer Angle of the Eye and upper edge of the Tarsus.

The use of the Lacrymal Gland is to secrete the Tears, which are spread over the Surface of the Eye by their own weight, and by the motion of the Eye-lids, for the purpose of preserving the delicacy of the Eye, and particularly the transparency of the Cornea.

#### PUNCTA LACRYMALIA.

The *Puncta Lacrymalia* are two small Orifices placed near the inner Angle of the Eye, one in the upper, the other in the under Eye-lid, at the extremity of the Tarsus, and opposite to each other. Tab. LXXXV. Fig. 15. 16. 17.

Each Punctum is seated obliquely upon a little eminence, and is surrounded by a Cartilaginous Circle, which keeps it constantly open.

The *Puncta Lacrymalia* are the Orifices of two small Canals, which have been termed *Cornua Limacum*. These, after going a little across at their beginning, make a sharp Angle, and run in the direction of the Edges of the Eye-lids towards the side of the Nose, where they approach each other. They terminate together, sometimes by a common Duct, but more frequently by distinct openings, in the Lacrymal Sac, which will be described under the article Nose.

The Tears which remain after moistening the Eye are absorbed by the Puncta, in the manner of Capillary attraction, and are conveyed through their Ducts into the Lacrymal Sac by the impulse of the Eye-lids.

The Tears are transparent, colourless, and saltish to the Taste; and consist of Water and Mucus, mixed with a small proportion of Saline Matter.

#### CARUNCULA LACRYMALIS.

The *Caruncula Lacrymalis* is a small Gland of a reddish colour, and of the conglomerate kind; situated between the inner angle of the Eye-lids and Ball of the Eye. It supplies Sebaceous Matter to this part of the Eye-lids, and serves in particular to separate the Puncta Lacrymalia, and keep them open, directing the Tears to them while the Eye-lids are shut. Tab. LXXX. Fig. 17. *i.*

Minute Hairs are found upon the Surface of this Body, serving to entangle small objects which get into the Eye.

#### VALVULA SEMILUNARIS.

The *Valvula Semilunaris* is a small doubling of the Tunica Conjunctiva, and lies between the *Caruncula Lacrymalis* and Ball of the Eye. Tab. LXXXIV. Fig. 15. *f.*

It is larger in the Ape and other Quadrupeds than in the Human Species, and still larger in Birds, in which, as well as in Quadrupeds, it is called *Membrana Nictitans*, vel *Palpebra Tertia*.

It is in form of a Crescent, the Horns of which are turned towards the Puncta Lacrymalia, and assist the *Caruncula* in conducting the Tears to the Puncta.

#### BALL OF THE EYE.

The *Ball*, *Globe*, or *Bulb* of the Eye, is of a spherical form, to collect the rays of light into a proper Focus, and is surrounded behind by a quantity of soft Fat, to allow the Eye and its Muscles to move with facility.

It is composed of *Coats*, *Humours*, *Vessels*, and *Nerves*, to be next described.

COATS.



## COATS.

## TUNICA ADNATA.

The *Tunica Adnata*, vel *Conjunctiva*, Tab. LXXXV. Fig. 17. *f, f*, named from its connecting the Eye to the Orbit, is a reflection of the Skin continued from the Eye-lids, over the whole fore part of the Ball of the Eye.

It adheres slightly, by means of Cellular Substance, to the white of the Eye, but so firmly to the Cornea, as to be separated from it with difficulty till after maceration.

It is so remarkably thin, that the colour of the subjacent parts appears readily through it.

Between this Coat and the white part of the Eye, there is a quantity of loose Cellular Substance, which is very Vascular, and is the common seat of *Ophthalmia*.

The *Tunica Adnata* supports the Ball of the Eye, prevents extraneous Bodies from getting to the back part of it, and forms a smooth covering to lessen the friction between the Eye and Eye-lids.

## CORNEA.

The *Cornea*, so called from its resemblance to Horn, is termed by many Authors *Cornea Lucida*, to distinguish it from the *Sclerotica*, which these Authors called *Cornea Opaca*. Tab. LXXXV. Fig. 2. *d*.

It forms the anterior Pellucid Covering of the Eye, is more convex than the rest of the Ball, but is not quite circular. It is joined to the *Tunica Sclerotica*, like the Segment of a small Sphere to that of a larger one. The convexity, however, varies in different persons, so as to form a short or long sighted Eye, according as the *Cornea* is more or less prominent. It is found also to become more convex when we look at near objects, and the reverse when we view those at a distance. In the former case, the convexity of the fore part of the Eye may be so much increased, by making the Eye-lids approach each other, as to answer the purpose of a convex Glass.

In a recent Subject, it is hard, dense, and transparent; but after maceration in water, it becomes soft and opake, and may be readily separated, especially in young Animals, into different Lamellæ, the anterior of which is the continuation of the *Tunica Adnata*.

By a slight degree of putrefaction, it may also be separated from the *Tunica Sclerotica*.

In the Whale, the edge of the *Cornea* is received into a distinct Groove, formed by the *Sclerotica*. Something of the same kind takes place in the Human Body; but, in the latter, the *Sclerotic* overlaps

more of the anterior than the posterior edge of the *Cornea*.

In a sound state, the *Cornea* has no Vessels which carry red Blood, though such are frequently seen on it when the Eye is inflamed.

Its nerves are too small to be traced; yet it possesses exquisite sensibility.

It collects the rays of light, and transmits them to the Eye, protects the tender parts within it, and contains the Aqueous Humour.

## IRIS.

The *Iris*, Tab. LXXXV. Fig. 2. 4. so named from its various colours, is the only Coat of the Ball of the Eye which possesses motion. It was considered as a continuation of the *Choroid Coat*, until described by ZINN, who shews that it is only connected to this Coat by the medium of the Ciliary Circle.

It is placed at a little distance from the *Cornea*, begins a small way behind the junction of that coat with the *Sclerotica*, and, running across, it forms a *Septum*, a little convex anteriorly, and perforated in the middle by a Hole called the *Pupil* or *Sight* of the Eye; the former term applied, because it represents objects no larger than a *Pupilla* or *Puppet*.

In the Fœtus, the *Pupil* is occupied by a Vascular Membrane, termed *Membrana Pupillaris*, which generally disappears between the seventh and ninth month of gestation.

Upon the back part of the *Iris*, there is a dark-coloured Pigment or Varnish, considered by the Ancients as a posterior Layer of the *Iris*, and called by them *Uvea*, from its resemblance in colour to the Grape.

When the paint is washed off, the *Iris* exhibits two sets of Fibres, concerning which Authors have entertained various opinions; one set of Fibres in the form of Radii, the different colours of which give the diversity of colour to the Eye; the other Circular, surrounding the inner edge of the *Iris*, and considered by the late DR MONRO as the Sphincter Muscle of the *Pupil*.

The colour of the *Iris* corresponds in general with that of the Hair, being blue or grey where the Hair is light, and brown or black where the Hair and Complexion are of a dark colour.

The *Iris* has also many Blood-vessels, which are rendered evident by Injection; and is furnished with a greater proportion of Nerves than almost any other part of the Body.

It floats in the Aqueous Humour, and is of such a nature, that, on exposure to a strong light, or when the Eye looks upon a near object, the diameter of the *Pupil* is diminished; and *vice versa*.

The different motions of the *Iris* in man and the generality of Animals are involuntary, and are supposed to be excited by the sensibility of the *Retina*, and by



the quantity of light which falls upon that Nerve, the light having no direct effect upon the Iris itself.

The Iris serves to regulate the quantity of light sent to the bottom of the Eye.

#### TUNICA SCLEROTICA.

The *Tunica Sclerotica*, which is named from its hardness, is the largest and strongest Coat of the Eye, covering the whole Ball, excepting the parts occupied by the entrance of the Optic Nerve behind, and by the Cornea before. Tab. LXXXV. Fig. 2. *b, b, c.*

It covers the edge of the Cornea, and is so firmly fixed to it, that it has been considered by many Anatomists as a continuation of the same substance; but it differs from the Cornea in the following particulars:—it is opaque, and of a pure white colour; is formed of elastic Fibres running in every direction, and closely interwoven with each other, and is not divisible into Layers.

It is thicker in its posterior than anterior part, and receives a little tinge, on the inner Surface, from the Choroid Coat, with which it is in contact. It has few Blood-vessels when compared with the Choroides, and does not possess very acute sensibility.

It gives form and strength to the Eye, attachment to its Muscles, and protects and supports the tender parts it incloses. It has also been conjectured, and BLUMENBACH thinks he has ascertained from Comparative Anatomy the truth of the conjecture, that this Coat, by its structure, is so affected by the action of the Muscles, as to influence what are called the *Internal Changes of the Eye*; by which the form of the Eye-ball, consequently the length of its Axis, and the respective situation of the Lens, are adjusted according to the proximity or remoteness of the object.

The Tendons of the four Recti Muscles of the Eye are fixed to the fore part of the Tunica Sclerotica. These, or the Cellular Vaginæ covering them, have been supposed to give an additional whiteness to the Eye, and the part giving this whiteness has been termed *Tunica Albuginea*:—But the Sclerotic Coat is everywhere of a pure white, and can receive little additional brightness from any such covering.

#### TUNICA CHOROIDES.

The *Choroides*, Tab. LXXXVI. Fig. 7. 8. lies under the *Sclerotica*, and is connected to it by the Trunks of Vessels and Nerves which pass from the one Coat to the other, and also by a tender Cellular Substance, of a brown colour, which tinges the inner Surface of the *Sclerotica*.

It begins at the entrance of the Optic Nerve into the Eye, runs between the *Sclerotica* and Retina, nearly to the Crystalline Lens, where it is more firmly connected

to the Sclerotic Coat than it is elsewhere, by means of the Ciliary Circle. Tab. LXXXVI. Fig. 8. 9.

The *Ciliary Circle*, or *Ciliary Ligament* as it is called, is composed of a quantity of condensed shining Cellular Substance, which forms a white Ring connecting the fore part of the Choroides, and the Root or outer margin of the Iris, to the *Sclerotica*.

At the inner side of the Ciliary Circle, is the *Canal of FONTANA*, which is of a Triangular Shape, and is partly formed by the Groove at the inner edges of the Cornea and *Sclerotica*. Tab. LXXXV. Fig. 5. *f.*

The Choroid Coat is much thinner and more tender than the Sclerotic, and is one of the most Vascular parts of the Body, seeming at first sight to be entirely composed of Vessels.—The greater number of those on the outside run in whirls; while those on the inside, taking a direction forwards and nearly parallel to each other, gave rise to the supposed existence of the *Membrana RUYSCHIANA*.

It is also furnished with numerous Nerves, which are united with its Vessels by a fine Cellular Texture, and are seen running forwards flat, and in a parallel direction upon its outer Surface.

In the Human Eye, the Choroides is of a dusky brown colour, both externally and internally; but the colour varies considerably in the Eyes of different Animals.

The inner Surface of this Coat, which is *Villous*, was described by RUYSCH as a *distinct Lamina*, and has been termed by many Anatomists, *Tunica RUYSCHIANA*.—But HALLER, ZINN, and many others who followed them, have demonstrated this Coat to consist of only one Lamina; though in Sheep, and some of the larger Animals, it appears to be double.

Upon the inner side of the Choroides, there is a Mucus, the colour of which, in different Animals, is found to have some connexion with the general colour of the Hair and Skin, though commonly, in the Human Body, it is of a brownish black, and termed *Pigmentum Nigrum*; the darkness of the shade, however, still corresponding with that of the Hair, as appears very evident in the Negro.

It is supposed to be produced from the Vessels of this Coat, and is blackest and thickest at the fore part of the Eye, where it adheres so tenaciously as to be removed with difficulty; but behind it is thinner, more fluid, and more easily removed; becoming gradually less evident towards the Optic Nerve, around which it almost disappears.

In advanced age, the *Pigmentum Nigrum* becomes more diluted, and of a lighter colour, so that the Vessels of the Choroid Coat may be seen shining through the Vitreous Humour.

Though HALLER denies that the *Membrana RUYSCHIANA* can ever be separated, in the Human Eye, from the Choroides,—he retains the name, to denote the black Surface of this Coat.



In Gramenivorous Animals, and in those which go in quest of prey in the night, the Pigmentum is of a light and shining colour in the bottom of the Eye, and is called *Tapetum*.

In some entirely white Animals, as the white Rabbit, the Paint is wanting, or transparent, and the Eye has a red colour, from the Vessels of the Choroid Coat being seen in its bottom; but the redness disappears when the Animal is dead. In the Albinos also, and white Persons born of Negro Parents, the Pigmentum Nigrum is entirely or nearly deficient, and a red colour appears in the bottom of the Eye.

The fore part of the Choroid Coat, opposite to the Ciliary Circle, forms a black radiated Ring, called *Corpus Ciliare*, which is about the sixth part of an inch in breadth towards the Temple, but somewhat narrower towards the Nose. Tab. LXXXVII. Fig. 8. No. 10.

In the posterior portion of the Corpus Ciliare, there are numerous pale radiated *Ciliary Striæ*, but so covered by the Pigmentum Nigrum, as not to be distinctly seen till the Paint is removed.

Near the connexion of the Corpus Ciliare with the root of the Iris, these Striæ become gradually broader and more elevated, and form white *Plicæ* or *Folds*, about seventy in number, termed *Processus Ciliares*, the intervals of which are also covered by the Pigmentum Nigrum. Tab. LXXXVI.

The *Processus Ciliares* are commonly formed, each of two or more Striæ. They are not all of an equal size, and many of them are forked at their extremities.

The Corpus Ciliare, formed of the Ciliary Striæ and Ciliary Processes, has no appearance of Muscularity, though the contrary has been supposed by some Authors. A fine Injection shews it to be chiefly composed of a continuation of the Blood-vessels of the Choroid Coat, the Branches of which divide into such minute parts, as to give the whole a Villous appearance.

The Corpus Ciliare is glued to the Retina, at the fore part of the Vitreous Humour, and a little behind the edge of the Crystalline Lens; but the Ciliary Processes float in the Aqueous Humour in the Posterior Chamber of the Eye, at the inner side of the root of the Iris, and may be readily turned back behind the edge of the Lens, to which they are contiguous, but do not adhere, of course cannot be supposed to compress it, though this has been the opinion of some Writers.

The Choroid Coat, with its dark paint, serves to suffocate the rays of light which pass through the Retina, thereby allowing a distinct image to be formed upon the bottom of the Eye, and preventing the rays from being reflected so as to form a second image.

In those Animals in which this Coat, or its paint, is of a bright colour, it acts as a mirror to reflect light, and make the impression stronger.

#### OPTIC NERVE AND RETINA.

The *Optic Nerve*, in its passage through the Orbit, is

F 2

covered by a continuation of the Membranes which surround the Brain. Tab. LXXXIII. Tab. LXXXVII.

At the Foramen Opticum, the *Dura Mater* is divided into two *Laminæ*, one of which assists in forming the Periosteum of the Orbit; the other, which is again divided into two *Laminæ*, furnishes a Sheath to the Nerve, and accompanies it to the Tunica Sclerótica, to which it is so firmly connected by Cellular Substance, as to have induced some Authors to describe the Sclerótica as a continuation of the *Dura Mater*.

The Body of the Nerve is still more closely invested by the *Pia Mater*, which also forms Sheaths round the Nervous Fasciculi, and accompanies the Nerve into the Eye.

At the back part of the Ball of the Eye, and a little removed from the Axis, towards the Nose, the *Fasciculi* of the Optic Nerve pass through a Cribriform part of the Sclerotic and Choroid Coats.

The Nerve is contracted at its entrance through the Sclerotic Coat; but immediately after its ingress, it expands to form the Retina,—so called from its supposed Reticular appearance.

In the centre of the Optic Nerve, where it enters the Eye, the *Artery of the Retina* is seen dividing into Branches, which are dispersed upon its inner Surface.

The Retina advances between the Choroid Coat and Capsule of the Vitreous Humour, to the fore part of the Eye, and terminates or disappears upon the anterior part of the edge, or greatest diameter of the Capsule of the Crystalline Lens.

The Retina is contiguous to the Choroid Coat and Capsule of the Vitreous Humour, but does not, by Blood-vessels or otherwise, adhere to either, till it reaches the Corpus Ciliare.

Under the Corpus Ciliare, the Retina is so covered externally by the Pigmentum Nigrum, and adheres internally so closely to the Capsule of the Vitreous Humour, as to be prevented from being seen till the black Paint be washed off, or till all the Coats be removed posteriorly, and the Eye viewed through the medium of the Vitreous Humour.

In the back part of the Retina, and on the side next the Choroid Coat, directly in the Axis of the Eye, there is a transparent Spot, which appears like a Foramen, surrounded by a yellow Border, that becomes paler towards the Circumference, Tab. LXXXVI. Fig. 4. 5. 6. This was first discovered by SOEMMERRING, and is termed *Foramen Centrale*; but its nature is not yet understood. It is said to be peculiar to the Human Species and Ape. According to BLUMENBACH, it may serve as a kind of Pupil through which concentric rays may pass, and be absorbed by the Pigmentum Nigrum of the Choroides, in those Animals which have the Axes of the Eyes parallel to each other, and thereby see objects with both Eyes at once, but are in danger from this of being dazzled by strong light.

The Retina is composed of a tender and Pulpy-like Substance, is semi-transparent, and of a light grey colour,



lour, resembling that of ground glass, but becoming a little firmer and more opaque when immersed in Spirit of Wine.

From the entrance of the Optic Nerve to the edge of the Corpus Ciliare, the Retina is uniform in its Substance, and is so easily torn and separated from the edge of that Body, as to be described by many Authors as terminating there.

Under the Striæ and Processes of the Corpus Ciliare, the Retina is thinner than in the posterior part of the Eye, and is so compressed by these Bodies, as also to have the appearance of Striæ terminating in numerous minute Fibres, like Nerves in other parts of the Body.

The Retina is one of the most sensible parts of the Body. It is the seat of Vision, and therefore the primary part of the Eye, to which all the others within the Orbit are subservient; but that portion of the Retina which lies over the entrance of the Optic Nerve into the Ball of the Eye is insensible to light, and consequently does not contribute to Vision.

#### HUMOURS.

##### AQUEOUS HUMOUR.

The *Aqueous Humour* is lodged in the space between the Cornea and Crystalline Lens. Tab. LXXXVII. Fig. 8. No. 6. 13.

This space is divided into two Cavities, called *Chambers*; the anterior of which is situated between the Cornea and Iris, and is the larger of the two.

The posterior is placed between the Iris and Crystalline Lens, and is so much smaller than the former, that its existence has been denied by some Authors, though it is a distinct Cavity, demonstrable, not only in the Adult, where the Pupil is open, but in the Fœtus before the Pupil is formed.

The Aqueous Humour is as clear as the purest water, but is somewhat heavier, possesses a small degree of viscosity, is about five grains in weight, and is found to be composed of water, albumen, gelatin, and muriate of soda.

In the Fœtus, and for the first month after Birth, it is reddish and turbid.

When evacuated, it is quickly renewed; for, within forty-eight hours after it has been discharged by puncture, the Cornea is observed to be again perfectly distended.

It is supposed to be secreted from the neighbouring Arteries, particularly from those on the fore part of the Iris and Ciliary Processes.

It serves to keep the Cornea distended, and, by its roundish form and pellucidity, it assists in collecting and transmitting the rays of light to the inner parts of the Eye. It likewise guards the Iris and Lens, and admits of the motion of the former.

#### CRYSTALLINE LENS.

The *Crystalline Lens*, Tab. LXXXVI. which has its name from its resemblance to Crystal, and from its Lenticular form,—though a solid Body, which may be moulded into various shapes,—has always been classed among the Humours of the Eye.

It is situated behind the Aqueous Humour, opposite to the Pupil, and the whole of its posterior portion is received into a Depression on the fore part of the Vitreous Humour.

Like a common Lens, or magnifying Glass, it has two convex Surfaces, but the anterior is in general less convex than the posterior; the two being formed of segments of spheres of unequal size.

The anterior Surface, according to the experiments of PETIT, forms the segment of a sphere, the diameter of which is between seven and eight lines, or twelfths of an inch; while the posterior Surface is only equal to the segment of a sphere of about five lines in diameter.

It has been observed by ZINN,—that the figure of the Lens varies at different periods, being in the Fœtus almost of a spherical form, but becoming gradually flatter on the anterior and posterior Surfaces, till about the age of thirty, after which its form does not appear to vary.

As the figure, so also the colour and consistency, are found to change at different times of life.—In the Fœtus, not only a Capsule, which covers it, but the Lens also, is of a reddish colour; but immediately after Birth, they become perfectly transparent.—In a person considerably advanced in years, the Lens is observed to acquire a yellow tinge, which appears first in the centre, and afterwards extends gradually to the circumference; and in extreme old age, this yellow tinge becomes so deep as to resemble Amber.

An Aqueous Fluid is described as being situated between the Crystalline Lamellæ, which is supposed to decrease in quantity, and to become somewhat yellow, the Lens at the same time increasing in solidity as the Person advances in life.—This difference, however, of convexity, colour, and consistence, according to the difference of age, is not met with uniformly.

The Lens becomes opaque soon after death, and acquires an additional opacity when put into Spirit of Wine.

It is composed of concentric Lamellæ, laid over each other like the coats of an Onion. These Lamellæ are connected by fine Cellular Substance, and are more closely compacted the nearer they are to the centre.

This Lamellated Structure may be readily observed in the Eye of an Ox, or any other large Animal, but is most evident when the Lens has been boiled in water, or macerated in water or vinegar.

When the maceration is continued for some time, the Lamellæ put on a radiated appearance, the Radii running in a vertical manner, or issuing from the centre to the circumference, dividing the Surface into Isosceles Triangles, or like the Meridian lines running between the two Poles of a Geographical Globe.

The



The Lamellæ were discovered by LEUWENHOECK to be of a Fibrous structure. By some Authors these Fibres have been considered as Muscular, and capable of varying the convexity of the Lens according to the distance of the objects we look at; but it is observed, that the Eyes from which the Lens has been removed, are, by the assistance of Glasses, enabled to form distinct Vision.

The Substance of the Lens somewhat resembles half-melted Gum, is very soft and tender on the outside, but becomes gradually firmer and tougher towards the centre, where it forms a Nucleus, in consequence of which its refractive power is found to be more equal than any Lens produced by art.

The Lens is surrounded by a very pellucid proper Capsule, called *Tunica Aranea*, vel *Crystallina*, which is much thicker and more elastic than the Capsule of the Vitreous Humour, but adheres so slightly to the Lens, and is so easily lacerated, that after a small puncture is made in it, the Lens starts out, upon applying gentle pressure to the Capsule.

The posterior part of the Capsule is much thinner, softer, and weaker, than the anterior; but is quite a *distinct Membrane* from the Coat of the Vitreous Humour, to which it is contiguous; yet so firmly connected to it by Cellular Substance, that it is difficult to separate them without laceration.

Some Authors describe an *Aqueous Humour* as seated between the Lens and its Capsule; while others deny the existence of this Humour, as well as of that which is said to be situated between the Lamellæ of the Lens.

The *Vessels* of the Lens, or of its Capsule, are not to be seen in the Eye of the Adult; but in that of a Fœtus, PETIT found Vessels passing from the Corpus Ciliare over the fore part of the Capsule of the Lens.

WINSLOW afterwards observed, that in the Fœtus, and in new born Children, a fine Injection succeeded so well, as to discover the Vessels of the Membrana Crystallina et Vitrea;—and in a Fœtus of about six months, the injected liquor seemed to him to have penetrated a part of the Crystalline and Vitreous Humour.

ALBINUS derives these Vessels from a double source.—In the Eye of a Whale, he demonstrated Vessels passing from the Ciliary Processes to the Substance of the Lens; and, at a later period, he injected in the Human Eye a small Branch arising from the Central Artery of the Retina, which proceeded in a straight direction through the Vitreous Humour, and divided on the posterior part of the Capsule into numerous Branches, many Twigs of which plunged into the substance of the Lens.

This Artery and its Branches, Tab. LXXXV. have been frequently and successfully injected by succeeding Anatomists.

#### VITREOUS HUMOUR.

The *Vitreous Humour*, Tab. LXXXIV. Fig. 8. B,

is situated in the back part of the Cavity of the Eye, which it occupies from the insertion of the Optic Nerve to the Surface of the Crystalline Lens.

It is round at the back part and sides, where it is covered by the Retina; but is concave before, where it forms a bed for the Crystalline Lens.

It is by much the largest of the three Humours, occupying upwards of nine-tenths of the whole Eye, and has a Gelatinous appearance,—or is somewhat like the Glaire of an Egg.

In an Adult, it is always very transparent; and in an Old Person, it does not, like the Lens, degenerate into a yellow, or any other colour.

In the Fœtus, like the Aqueous Humour, it is of a reddish tint.

The liquor of which the Vitreous Humour is composed, is similar to the Aqueous,—very fluid, transpires readily through the Capsule, though that Coat be entire, and, like the Aqueous Humour, is somewhat thicker, heavier, and more viscid than Water.

When this Humour is evacuated by puncture, in the living Body, it is very seldom, though sometimes, renewed.

Upon the Surface of this Humour there is a Coat, termed *Vitrea*, vel *Hyaloides*, from its resemblance to Glass, as transparent as the Humour itself, and so thin and Cobweb-like, as to have also the name of *Aranea*.

The *Tunica Vitrea* is remarkably smooth on its outer Surface; excepting at its fore part, where it is impressed by the Corpus Ciliare and Pigmentum Nigrum; but within, it sends Processes into the Body of the Humour, of the same nature with the external Membrane.

Some Authors, and among these WINSLOW, have described this Coat as consisting of two Laminae; but SABATIER, and other late Writers, seem sufficiently satisfied that it is a single Layer; and even this single Layer cannot be raised but with difficulty, though it is demonstrable by making a puncture to allow the Humour to escape, and by afterwards distending the part with air.

The structure of the Humour consists of a set of delicate Cells, which contain the Liquor within them, as may be seen by the assistance of Acids, or by boiling Water, or by Congelation.

The Cells of the Humour communicate freely with each other, as appears from the Liquor oozing out by the smallest puncture made in the general Capsule.

Under the Corpus Ciliare, the Capsule of the Vitreous Humour sends off an external Lamina, which accompanies the Retina, and is inserted with it into the fore part of the Capsule of the Lens, a little before its anterior edge. It is termed *Membranula Coronæ Ciliaris*, vel *Zonula Ciliaris*, from its striated appearance, and circular form. This Membrane, though extremely thin, assists in fixing the Lens to the Vitreous Humour. Tab. LXXXIII. Fig. 1.

After sending off the Ciliary Zone, the Coat of the Vitreous Humour goes behind the Capsule of the Lens, with which it is intimately connected.

Between



Between the Ciliary Zone and part where the Capsule of the Vitreous Humour adheres to that of the Lens,—which is at the same distance behind the edge of the Lens with the distance of the insertion of the Ciliary Zone before it,—a passage is formed, named *Canalis PETITIANUS*, after PETIT, who discovered it.

The Membranes forming this passage are pervaded by transverse Fibres, in such a manner, that when Air is introduced, it goes freely round the edge of the Lens; but the Passage has a Cellular appearance, being contracted and dilated alternately.

The Canal of PETIT is nearly of the same breadth with the Corpus Ciliare, is always empty, and has no communication with the Capsules of the Vitreous or Crystalline Humours.

No Vessels are to be seen in the Vitreous Humour of an Adult; but in the Eye of a Fœtus, an Artery is observed to arise from the Central one of the Retina, which passes through the middle of the Vitreous Humour, sending Twigs to the Cellular Texture of this Humour, while the principal Trunk is continued to the Capsule of the Crystalline Lens, as has been already observed.

The Vitreous Humour serves to give shape to the Eye, to keep the Coats properly expanded, to preserve the due distance of the Lens from the bottom of the Eye, and direct the rays of light to the Retina.

#### MUSCLES OF THE BALL OF THE EYE.

The Ball of the Eye is moved by *six Muscles*, which are divided, on account of their direction, into *four straight* and *two oblique* Muscles, obtaining their respective names from their size, situation, direction, or use. Tab. LXXXIII. &c.

Of the Straight Muscles, one is situated above the Eye, another below it, and one on each side. Of the Oblique, one is placed in the upper and inner, and the other at the under and outer part of the Eye.

The *Recti* are not straight, as the name implies; for, on account of the form of the Eye, all, except the internal, or that next the Nose, have somewhat of a curved direction.

Neither are they all equally long, the internal being the shortest, the external the longest, corresponding with the shape of the Eye and Orbit. The other two are nearly of the same length with each other.

The four Straight Muscles, which bear a strong resemblance to one another, arise by a narrow beginning a little Tendinous and Flethy, from the edge of the Foramen Opticum, where they embrace the Optic Nerve at its entrance in the Orbit.

In their passage forwards, they form Flethy Bellies, which send off broad and very thin Tendons, to be inserted into the Sclerotic Coat, under the Tunica Adnata, about a quarter of an inch behind the edge of the Cornea, and at equal distances from each other.

At the place of their Insertion, they are so intimate-

ly connected with the Sclerotica, that they cannot be separated from it, or their Insertions be brought as far as the Cornea, without evident laceration.

Of the Oblique Muscles, one arises along with the *Recti*, the other comes from the fore part of the Orbit, and both are fixed to the back part of the Sclerotica.

The different Muscles of the Eye, where they lie upon the Ball, are covered with a Cellular Sheath, which afterwards degenerates into that Cellular Substance which is interposed between the Sclerotica and Conjunctiva.

The *Recti* Muscles move the Eye according to their respective situations. When two of the opposite *Recti* act, or all of them act together, they draw the Eye into the Orbit.

When two of the adjacent *Recti* act, they turn the fore part of the Eye obliquely in a direction towards their origins.

The Oblique Muscles, acting separately, roll the Eye according to their situation and the direction of their Fibres; moving conjunctly, they draw the Eye forward, and become the antagonists of the *Recti*.

#### LEVATOR OCULI,

*Vel Rectus Attollens, vel Superbus.*

*Origin*: From the upper part of the Foramen Opticum below the Levator Palpebræ Superioris, under which it passes to the Eye.

*Insertion*: Into the upper and fore part of the Tunica Sclerotica.

*Action*: To raise the fore part of the Ball of the Eye.

#### DEPRESSOR OCULI,

*Vel Rectus Deprimens, vel Humilis.*

*Origin*: From the inferior part of the Foramen Opticum. It lies at the bottom of the Orbit.

*Insertion*: Opposite to the former.

*Action*: To pull the fore part of the Eye downwards.

#### ADDUCTOR OCULI,

*Vel Rectus Adducens, vel Bibitorius.*

*Origin*: From the Foramen Opticum, between the Obliquus Superior and Depressor; and running at the inner side of the Orbit, it has its

*Insertion* opposite to the inner Angle of the Eye.

*Action*: To turn the fore part of the Eye towards the Nose, as in drinking.

#### ABDUCTOR OCULI,

*Vel Rectus Abducens, vel Indignabundus.*

*Origin*: From the Bony Partition between the Foramen



ramen Opticum and Lacerum. It passes at the outer part of the Orbit, to have its

*Insertion* into the Ball of the Eye, opposite to the outer Angle.

*Action*: To turn the fore part of the Eye towards the Temple.

#### OBLIQUUS SUPERIOR,

Vel *Obliquus Major, vel Trochlearis.*

*Origin*: Like the Straight Muscles, from the edge of the Foramen Opticum, between the Levator and Adductor Oculi. From thence it runs directly forwards, sends off a long round Tendon, which passes through a Cartilaginous Pulley fixed behind the Internal Angular Process of the Os Frontis, and is here inclosed in a Bursa Mucosa. From this it goes a little downwards, and is then reflected backwards and somewhat outwards, passing under the Levator Oculi.

*Insertion*: By a broad thin Tendon, into the Tunica Sclerotica, about half-way between the Insertion of the Levator Oculi and entrance of the Optic Nerve.

*Action*: To roll the Ball of the Eye, by turning the Pupil downwards and outwards.

#### OBLIQUUS INFERIOR,

Vel *Obliquus Minor.*

*Origin*: By a narrow beginning, from the anterior edge of the Orbital Process of the Superior Maxillary Bone, near the Lacrymal Groove, from which it passes obliquely outwards, backwards, and upwards, round the Ball of the Eye.

*Insertion*: By a broad thin Tendon, into the Sclerotic Coat, between the entrance of the Optic Nerve and insertion of the Abductor Oculi, and opposite to the insertion of the Obliquus Superior.

*Action*: To roll the Ball of the Eye, by turning the Pupil upwards and inwards, and, with the assistance of the Obliquus Superior, to pull the Eye forwards. By some the two Oblique Muscles have been considered, in consequence of their situation, so to constrict the back part of the Eye, as to lengthen its Axis there, and thereby increase the distance between the Lens and bottom of the Retina.

The two Oblique Muscles, on account of rolling the Eye, and assisting it in the expression of certain Passions, have been called *Rotatores*, and *Amatores*.

#### VESSELS OF THE EYE.

The *Frontal, Facial, and Temporal Arteries*, which are Branches of the External and Internal Carotids, supply the Palpebræ, and communicate with those which are dispersed within the Orbit.

Some small Branches of the *Internal Maxillary Artery* pass through the Inferior Orbital Fissure, to be dispersed chiefly upon the Periosteum of the Orbit and Fat of the Eye.

The *Ocular Artery*, which is a Branch of the Internal Carotid, passes through the Foramen Opticum in company with the Optic Nerve, and supplies the Fat, Muscles, and Ball of the Eye, and also the Lacrymal Gland and Tunica Conjunctiva.

The Branches which belong to the Ball of the Eye, have the name of *Ciliares*. They perforate the Sclerotica in different places, and are afterwards dispersed upon the Choroid Coat and Iris.

One Branch of the Ocular Artery, called *Centralis Retinæ*, perforates the Optic Nerve, and is dispersed upon the Retina.

The *Veins* which correspond with the arteries of the Eye, communicate freely with each other, and pass partly to the External Jugular Vein, by Branches situated about the fore part of the Orbit, and partly to the Internal Jugular Vein, by the Cavernous Sinus.

#### NERVES OF THE EYE.

Besides the *Optic Nerve*, already taken notice of, the Eye receives the Third and Fourth Pairs, and Branches from the first portion of the Fifth Pair, together with the Sixth Pair, and Branches from the Seventh.

The parts about the fore side of the Orbit are supplied by Branches from the Fifth and Seventh Pairs;—the Ball of the Eye by Nerves called *Ciliary*, which come from the Third and Fifth Pairs;—the Fat, Muscles, Lacrymal Gland, &c. are supplied by the Third, Fourth, Fifth, and Sixth Pairs.

#### OF VISION.

The Humours of the Eye, and especially the Crystalline Lens, receive and collect the rays of light, in such a manner as to form upon the Retina the image or picture of the object which the Eye looks at; and the point where these different rays meet is called the *Focus*.

The object is painted upon the Retina in an *inverted* manner, the rays from above being reflected to its under, and those from below to its upper part; while the rays from the right side of the object are sent to the left, and those from the left to the right side of the Eye. The rays which go through the centre of the Cornea pass in a perpendicular direction to the bottom of the Eye; and it is supposed to be by habit, or rather by instinct, that we judge of the *real* situation of any object.

That the rays of light may terminate distinctly on the



the Retina, it is necessary that both the Cornea and Crystalline Lens should have a certain degree of convexity.

If either the one or the other be too prominent, the Focus will be formed before it reach the Retina, as is the case in short-sighted people, who require concave glasses to enable them to see objects distinctly, at the proper and ordinary distance.

If, on the contrary, the Cornea or Lens be too flat, or the refractive power of the Humours be in any way diminished, the Focus will then fall behind the Retina, and be imperfectly formed, till the object is viewed at a greater distance than ordinary, as is the case with per-

sons advanced in life, to whom the assistance of convex glasses becomes necessary.

How an object, viewed with both Eyes, appears single, has been, as well as our judging of the real situation of any object, ascribed by the generality of Authors to custom and habit; and by others to instinct, which regulates the uniform motion of the Eyes, and the accurate application of both to one point.

The Eye is enabled to judge of, or accommodate itself to objects at different distances, by the action of its Muscles increasing or diminishing the length of its Axis, and by the motions of the Iris allowing a greater or smaller quantity of light to be thrown into the Eye.

TABLE



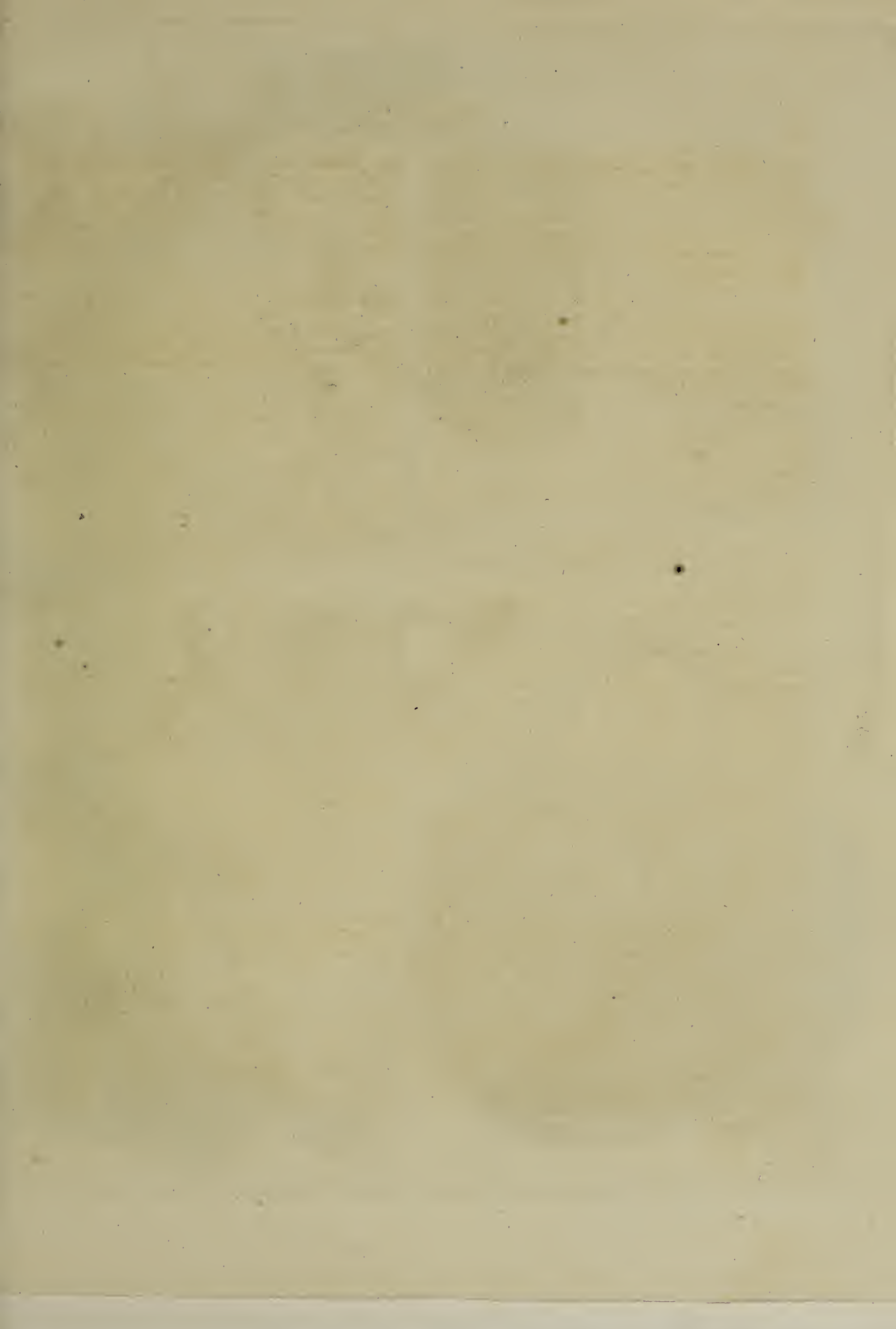
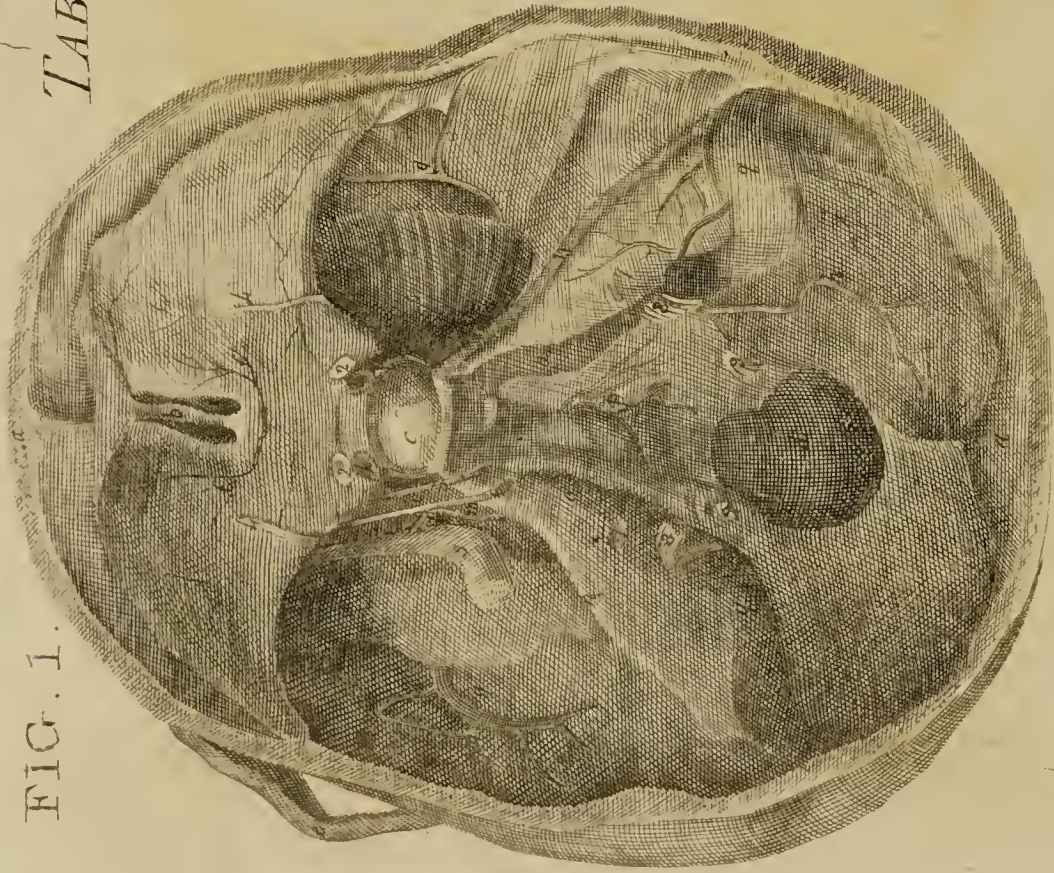




FIG. 1.



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FIG. 2.

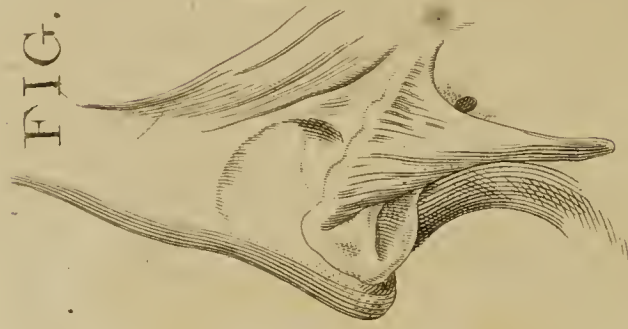


FIG. 3.



FIG. 4.

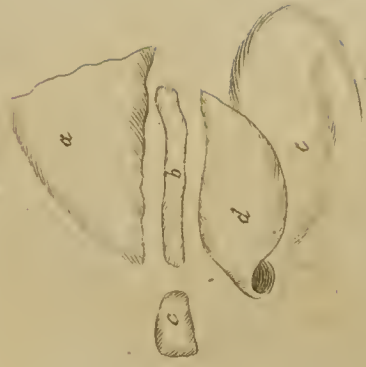


FIG. 7.

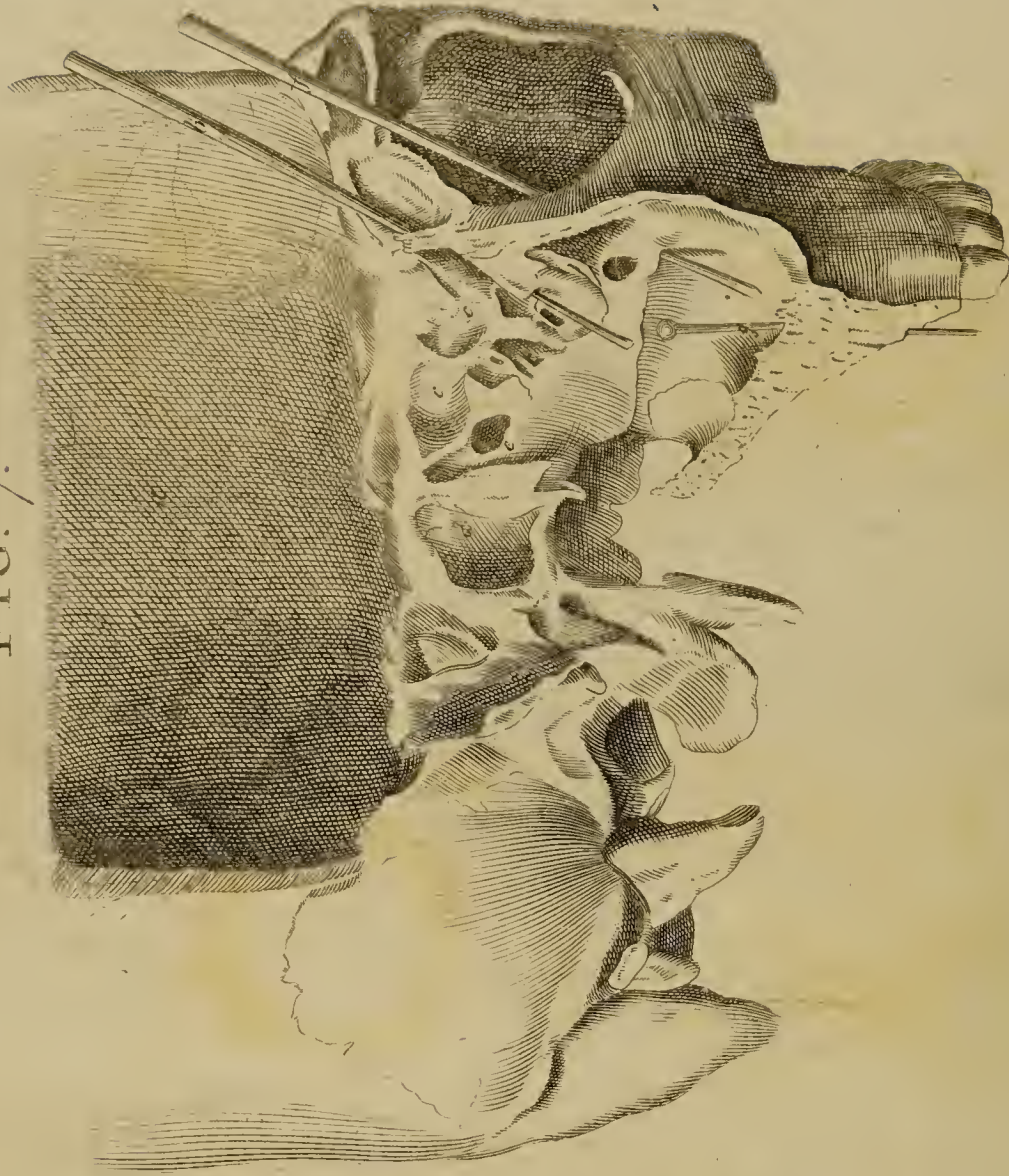


FIG. 6.



FIG. 5.



FIG. 11.

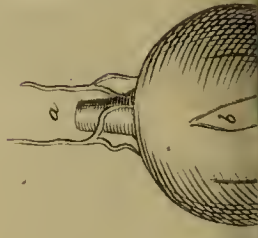


FIG. 10



FIG. 9.

FIG. 12







FIG. 13.



FIG. 14.

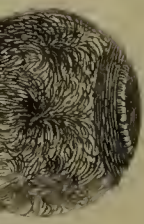


FIG. 15.

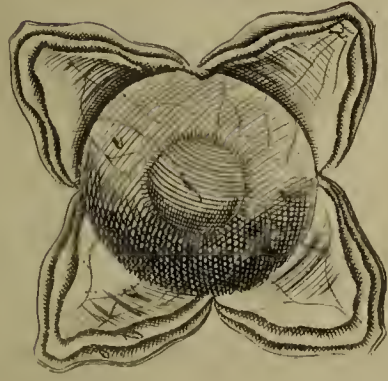


FIG. 16.



FIG. 17.

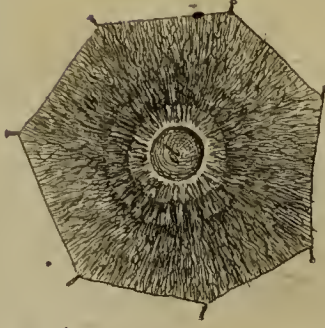


FIG. 18.

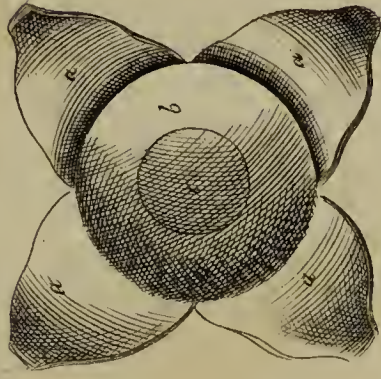


FIG. 19.

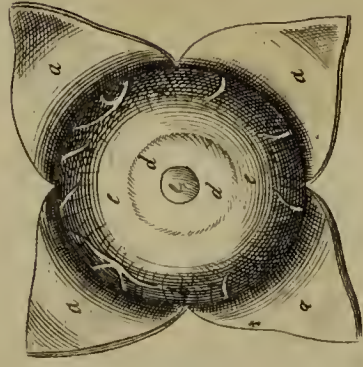


FIG. 20.

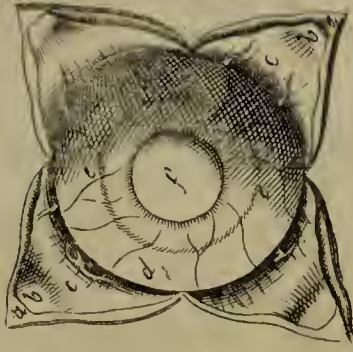


FIG. 21.

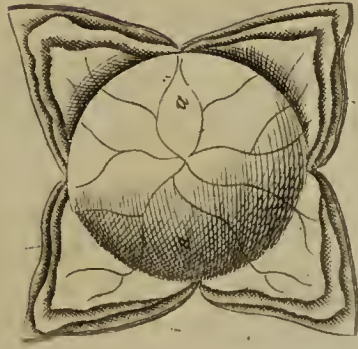


FIG. 22.

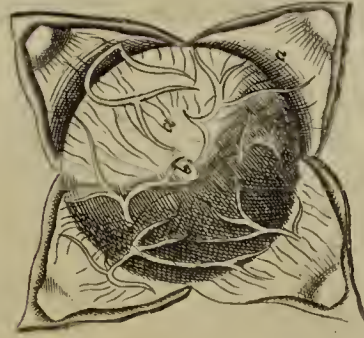


FIG. 23.

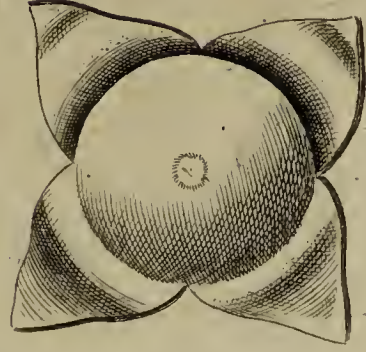
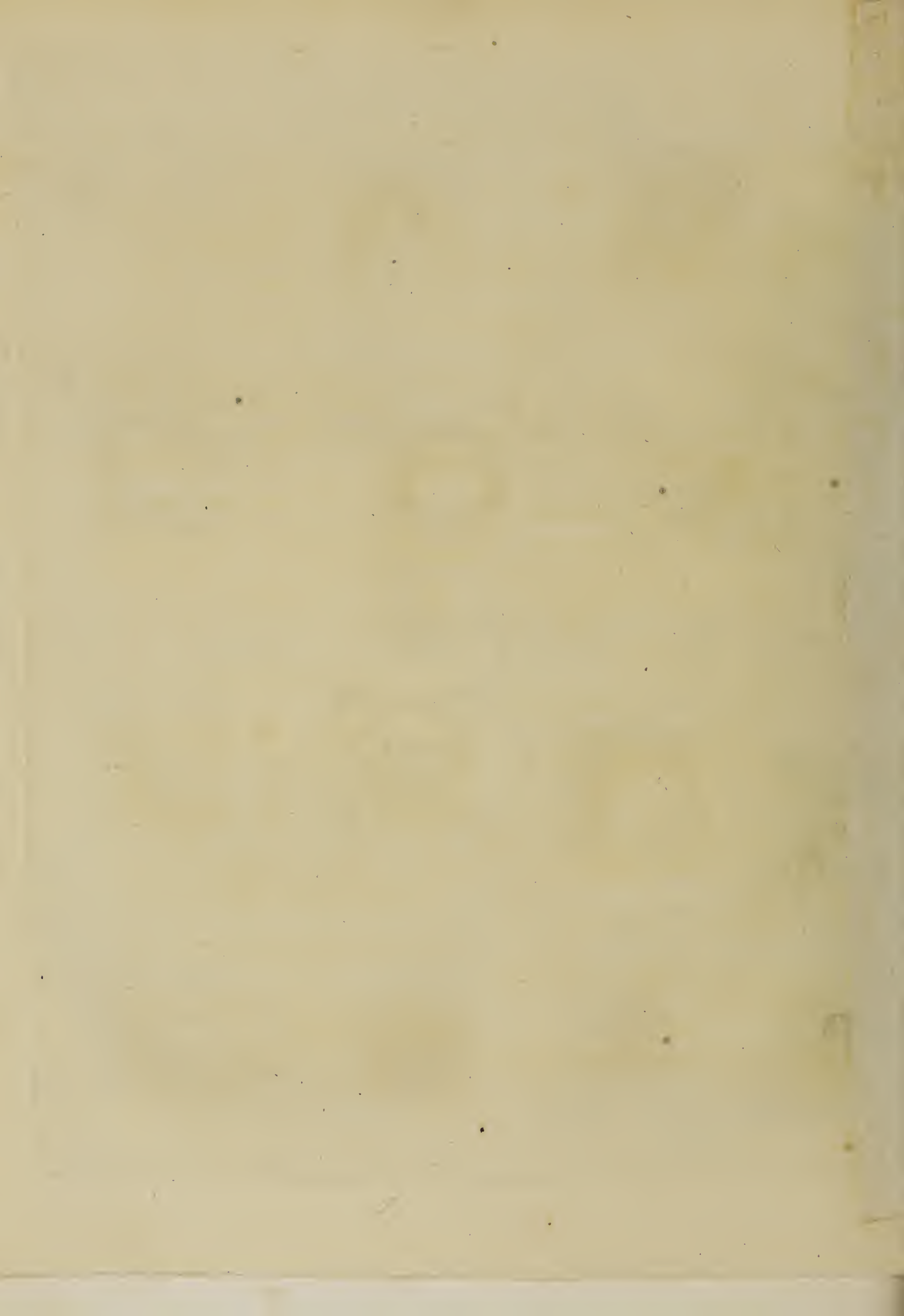


FIG. 24.







## T A B L E LXXXII.

Represents the Course of the VESSELS and NERVES in the BASE of the CRANIUM; with different Views of the Principal Parts of the NOSE, and of the EYE.

FIG. 1.

*Represents the Inside of the BASE of the CRANIUM, lined with the DURA MATER;—the Course of the ARTERIES, VEINS, and NERVES;—and the SINUSES which are injected.*

- a, a,* The cut edge of the skull.
- b,* The crista galli.
- c,* The infundibulum inserted into the glandula pituitaria.
- d,* The foramen magnum of the occipital bone.
- e,* The zygoma.
- f, f,* The anterior arteries of the dura mater.
- g, g,* The middle and principal arteries of the dura mater.
- h,* One of the posterior arteries of the dura mater.
- i, i,* The trunks of the internal carotid arteries.
- k, k,* A section of the internal carotid arteries, where they go to the brain.
- l, l,* The circular sinus of RIDLEY.
- m,* The left cavernous sinus laid open.
- n, n,* The superior petrosal sinuses.
- o, o,* The inferior petrosal sinuses.
- p,* Veins passing into the inferior petrosal sinuses.
- q, q,* The lateral sinuses.
- 1. 1. The passage of the first pair of nerves.
- 2. 2. A section of the optic nerves.
- 3. The left part of the third pair of nerves.
- 4. 4. The fourth pair, turned forwards.
- 5. 5. The fifth pair, the nerve in its natural situation on one side, and turned outwards on the other.
- 6. 6. The sixth pair.
- r,* The upper end of the great sympathetic nerve, connected with the fifth and sixth pairs.
- 7. 7. The seventh,
- 8. 8. The eighth, and,
- 9. 9. The ninth pair.

FIG. 2.

*A View of the Left Side of the NOSE, with the Musculus Levator Labii Superioris Alæque Nasi, one part of which is turned down.*

FIG. 3.

*Shews the CARTILAGES of the NOSE, viewed on the Left Side.—Part of the Muscles connected with the Cartilages are pinned out.*

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FIG. 4.

*A View from the Left Side, of the CARTILAGES which form the under part of the NOSE.*

- a,* The first or upper cartilage.
- b,* The second,
- c,* The third,
- d,* The fourth cartilage.
- e,* The membranous part of one of the alæ nasi.

FIG. 5.

*The Right Portion of the UPPER JAW, and Fore Part of the BASE of the CRANIUM, divided from the SEPTUM NARIUM, and viewed from the Left Side.*

- a,* The os frontis.
- b,* ——— nasi.
- c,* The osseous plate.
- d,* The cuneiform process of the occipital bone, united with the back part of the os sphenoides.
- e,* The sella Turcica.
- f,* The sphenoid sinus.
- g, g, g,* The ethmoid cells, which, with the other parts of the nostril, are lined with the mucous membrane.
- h,* The fore part of the nostril.
- i,* The os spongiosum superius.
- k,* ——— inferius.
- l,* A glandular body resembling the uvula.

FIG. 6.

*The Left Side of the SEPTUM NARIUM, with its Mucous Covering, and small Arteries, which are much more numerous than could here be represented.*

- A,* Part of the os frontis.
- B,* The septum, with its numberless arteries.

FIG. 7.

*A Section of the CRANIUM and UPPER JAW, to shew some of the Passages which terminate in the NOSE.*

- a,* The cavity of the cranium.
  - b,* A probe introduced from the cavity of the left frontal sinus, into the corresponding nostril.
  - c, c, c,* The ethmoid cells.
- d,* The

G



- d*, The sphenoid sinus of the right side.  
*e*, A passage by which this sinus opens into the right nostril.  
*f*, A probe passed from the left lacrymal groove into the cavity of the left nostril.  
*g*, A probe passed through the foramen incisivum into the mouth.

FIG. 8.

*Represents the BALL of the RIGHT EYE, seen on the Upper Part.*

- a*, The cornea.  
*b*, The tunica adnata, with its vessels.  
*c*, The tunica adnata, cut from the eye-lids, which are lined on the inner side by this coat reflected from the ball.  
*d*, The tunica sclerotica.  
*e*, The optic nerve.

FIG. 9.

*Posterior View of the GLOBE of the EYE.*

- a, a, a, a*, The tunica sclerotica dissected round the optic nerve, and then cut into four parts, as far as the middle of the ball, and the flaps turned aside.  
*b*, The optic nerve, cut off.  
*c, c*, The choroid coat and its vessels. These, and the vessels of several other figures of this Table, are rudely expressed.

FIG. 10.

*Shews the TUNICA CHOROIDES, the TUNICA ADNATA and SCLEROTICA being removed;—from a Boy of six or seven Years of Age.*

- a*, The ocular arteries, various branches of which go to the bottom of the tunica choroides, and others to the middle of it.  
*b*, The ciliary ligament.  
*c*, The iris.  
*d*, The pupil.

FIG. 11.

*The CHOROID COAT, the SCLEROTIC being removed, and the ARTERIES left out, to shew the CILIARY NERVES.*

- a*, The ciliary nerves.  
*b*, Their continuation upon the choroid coat.  
*c*, The iris, upon which the ciliary nerves terminate.

FIG. 12.

*The same BALL with that represented in Fig. 9. also viewed Posteriorly. The SCLEROTIC and CHOROID COATS are cut, and turned back.*

- a, a, a, a*, The sclerotic coat, turned back.

- b, b, b, b*, The choroid coat, also cut and turned back.  
*c*, A section of the optic nerve near the ball.  
*d, d*, The retina, with its blood-vessels.

FIG. 13.

*Shews the Inner Surface of the CHOROID COAT, or TUNICA RUYSCHIANA so called, from the Centre of which a Portion of the RETINA depends.*

- a*, A large portion of the choroid coat.  
*b*, The depending portion of the retina, going from the bottom of the eye.  
*c*, Numberless small arteries dispersed over the inner surface of the choroid coat, emerging from the bottom of the eye, and running in a direction different from those of its outer surface.

FIG. 14.

*Another Posterior View of the BALL, (Fig. 9.), the TUNICA SCLEROTICA, together with the CHOROIDES and the RETINA, being dissected, and turned back in the same manner.*

- a, b, c*, The reclined flaps of the tunica sclerotica, choroides, and retina;—the others are turned back in the same manner.  
*d*, The extremity of the optic nerve adhering to one of the reclined parts of the retina.  
*f*, The vitreous humour.

FIG. 15.

*The same Part of the BALL, (Fig. 9.) and the same COATS dissected and turned back, but the VITREOUS HUMOUR removed.*

- a, b, c, d*, As in the preceding figure.  
*e, e*, The anterior part of the retina entire, extending to,  
*f*, The crystalline lens.

FIG. 16.

*The same BALL, dissected and opened as above; but besides the VITREOUS HUMOUR, the CRYSTALLINE LENS and RETINA are also removed.*

- a, b*, As above.  
*c, c*, The anterior part of the choroid coat.  
*d, d*, The ciliary processes.  
*e, e*, The iris.  
*f*, The pupil.

FIG. 17.

*The Inner Surface of the CHOROID COAT expanded, with the LIGAMENTUM CILIARE, and its Processes.*

- a*, The inner surface of the choroid coat, covered with small arteries.

*b*, The



- b*, The ciliary processes.
- c*, The posterior surface of the iris.
- d*, The pupil.

## FIG. 18.

*The same BALL with Fig. 16. dissected in the same part and manner, and laid open; but consisting only of the SCLEROTICA and CORNEA; the HUMOURS being entirely removed.*

- a, a, a, a*, The sclerotic coat dissected, and its flaps turned back.
- b, b*, The anterior part of the sclerotica entire.
- c*, The cornea.

## FIG. 19.

*The same BALL, viewed Anteriorly. The CORNEA, with the SCLEROTICA, are dissected into four parts, from the middle of the CORNEA to the middle of the BALL, and the Flaps are turned back.*

- a, a, a, a*, The reflected flaps of the cornea and sclerotica.
- b, b*, The tunica choroides, and its blood-vessels.
- c, c*, The ciliary circle.
- d, d*, The iris.
- e*, The pupil.

## FIG. 20.

*The same BALL opened on the Anterior Part, in a similar manner, but the SCLEROTICA and CHOROIDES also dissected, and turned back.*

- a, a, b, c*, The reflected flaps of the sclerotica and choroides.
- d, d*, The retina, with its vessels.
- e, e*, Vestiges of the ciliary processes.
- f*, The crystalline lens.

## FIG. 21.

*The same as the former, but along with the SCLEROTICA and CHOROIDES, the RETINA also is dissected, and turned back, and the CRYSTALLINE LENS and VITREOUS HUMOUR removed, to shew,*

- a, a*, The posterior part of the retina, with its vessels.

## FIG. 22.

*The same as the former, but the RETINA also removed, to shew,*

- a, a*, The choroides, with its blood-vessels, rudely expressed.
- b*, The entry of the optic nerve.

## FIG. 23.

*The same BALL. It consists of the SCLEROTICA and CORNEA only, the other Parts being removed.*

## FIG. 24.

*A Horizontal SECTION of the EYE-BALL, shewing the Situation of its COATS and HUMOURS.*

- a*, The cornea.
- b, b*, The sclerotic coat.
- c, c*, The choroid coat connected at its fore part to the root of the iris and tunica sclerotica, and then turning inwards to form the ciliary processes.
- d, d*, The iris.
- e*, The pupil.
- f*, The optic nerve.
- g, g*, The retina.
- h*, The anterior, and,
- i, i*, The posterior chambers in which the aqueous humour is lodged.
- k*, The crystalline lens.
- l*, The vitreous humour.



## T A B L E LXXXIII.

Different VIEWS of the EYE, of the EYE-LIDS, and of the LACRYMAL GLAND and DUCTS.

FIG. 1.

*The MEMBRANULA CORONÆ CILIARIS,—with the CANAL of PETIT inflated.*

- a*, The vitreous humour.
- b*, The crystalline lens.
- c*, A serrated ring, composed of a black pigment spread upon the anterior part of the vitreous humour and corona ciliaris.
- d*, Small bubbles into which the membranula coronæ ciliaris is raised by inflation.
- e*, A small puncture through which the air was introduced.

FIG. 2.

*A horizontal SECTION of the COATS of the EYE, magnified.*

- a*, The optic nerve dissected.
- b*, The exterior, and,
- c*, The interior lamina of the sheath of the optic nerve.
- d*, The pia mater of the optic nerve.
- e*, The central artery of the retina.
- f*, Part of the lamina cribrosa, through which the medullary substance of the optic nerve passes.
- g*, The tunica sclerotica, thicker posteriorly, where it is connected with the sheath of the optic nerve.
- h*, The circle surrounding the lamina cribrosa, from whence the pia mater of the optic nerve is turned back.
- i, i*, The inner part of the tunica sclerotica.
- k, l*, Arteries which run longitudinally in the inner surface of the choroides.
- m*, The white plicæ of the ciliary processes.
- n*, The iris.
- o*, The connexion of the sclerotica with the cornea.

FIG. 3.

*The INFERIOR OBLIQUE MUSCLE of the EYE.*

- a*, The ball of the eye.
- b*, The abductor muscle.
- c*, The depressor.

- d*, The obliquus inferior, arising from the anterior edge of the orbit.
- e*, The insertion of this muscle into the ball of the eye.

FIG. 4.

*Three Figures of the CRYSTALLINE LENS, from Subjects of different Ages.*

- a*, From a new-born child.
- b*, From a child a few years old.
- c*, From an adult of twenty years of age.

FIG. 5.

*The MUSCLES of the EYE, with the LEVATOR PALPEBRÆ SUPERIORIS.*

- a*, The ball of the eye.
- b*, The optic nerve in the muscular cavity.
- c*, A section of the optic nerve before its entrance into the orbit.
- d*, A portion of the dura mater which leaves the optic nerve, to go into the periosteum of the orbit.
- e*, The levator palpebræ superioris, arising from the angle of separation of the dura mater, and terminating in a broad aponeurosis.
- f*, The attollens muscle, a great part of it covered by the levator palpebræ.
- g*, The obliquus superior, bending through the trochlea.
- h*, The insertion of the obliquus inferior.
- i*, The deprimens muscle.
- k*, The abducens muscle, arising with a double head.
- l*, The upper small head.
- m*, The under head.
- n*, The interval between the two heads, through which a fasciculus of nerves is transmitted.
- o*, The first branch of the fifth pair of nerves.
- p*, The lacrymal branch of this first branch.
- q*, The frontal branch cut off.
- r*, The nasal branch.
- s*, The root of the nasal branch, which forms the long root of the ophthalmic ganglion.

*t*, The



Fig. 1.

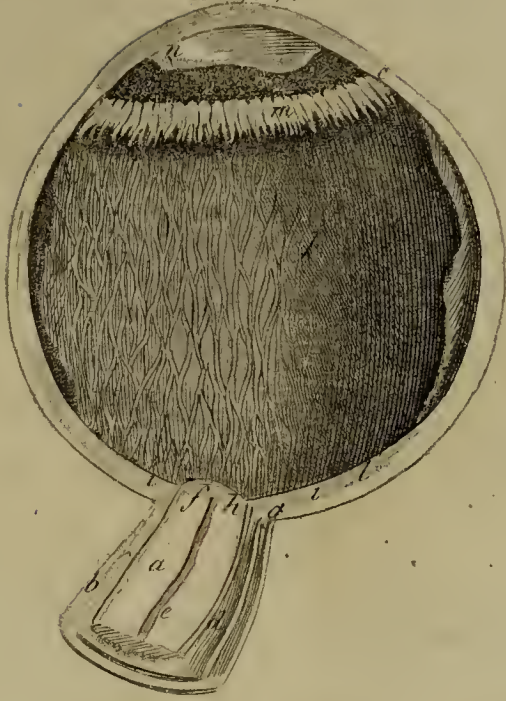


Fig. 3.

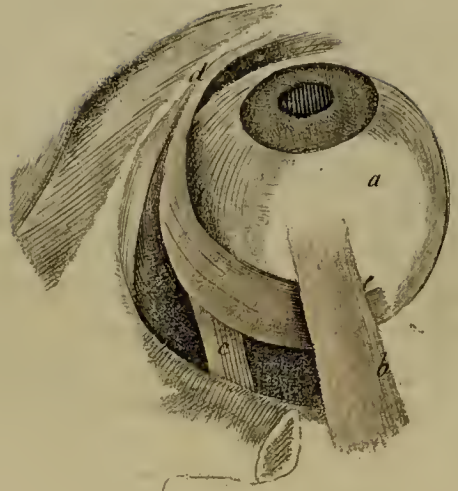


Fig. 4.



Fig. 5.



Fig. 6.



Fig. 7.

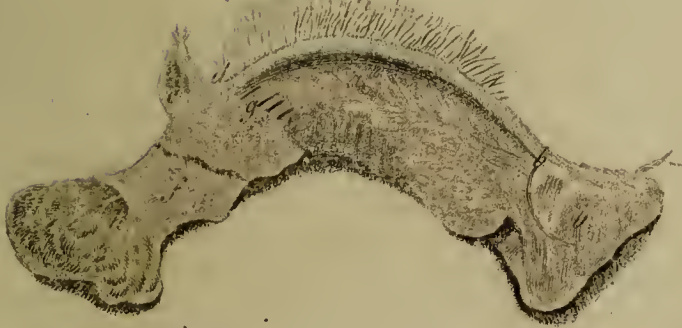


Fig. 9.

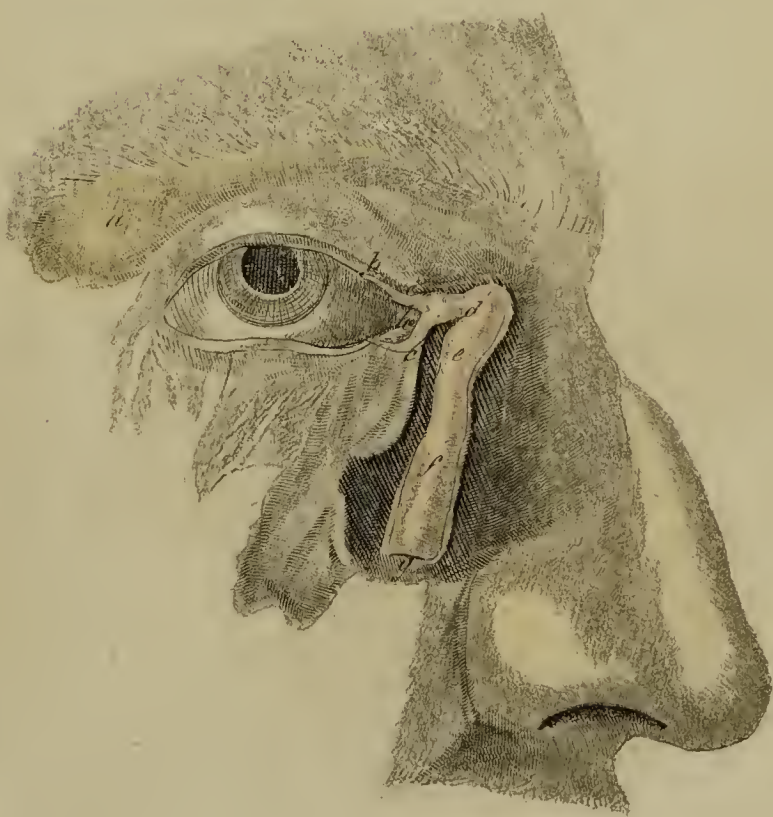


Fig. 8.









- t*, The third pair of nerves.  
*u*, The sixth pair of nerves.

## FIG. 6.

*The MUSCLES of the EYE;—the LEVATOR PALPEBRÆ removed.*

- a*, The ball of the eye.  
*b*, The optic nerve within the orbit.  
*c*, ————— without the orbit.  
*d*, A portion of the dura mater which goes into the periosteum.  
*e*, The levator palpebræ cut off near its origin.  
*f*, The obliquus superior, bending through the trochlea.  
*g*, The attollens muscle;  
*h*, Its tendon expanded near its insertion.  
*i*, The adducens muscle.  
*k*, The two last-mentioned muscles, connected with each other near their origin.  
*l*, The deprimens muscle.  
*m*, The abducens muscle.  
*n*, The upper head connected with the attollens.  
*o*, The inferior head.  
*p*, The interval between the two heads.

## FIG. 7.

*Represents the Upper EYE-LID of the Right Side, with the LACRYMAL GLAND.*

- a*, The inner side of the upper eye-lid.  
*b, b*, The two puncta lacrymalia, into which the two ends of a bit of wire are introduced.  
*c*, Part of the under eye-lid.  
*d*, The external canthus.  
*e*, The lacrymal gland.  
*f*, A number of smaller lacrymal glands, lying between *e* and the conjunctiva, and forming the *Glandulæ Lacrymales Congregatæ*.  
*g*, Four bristles introduced into the ducts of the lacrymal gland.

- h*, One of these ducts into which quicksilver was injected, which is hid where it passes between the *glandulæ congregatæ f*, but appears again where it comes out of the *glandula lacrymalis*, composed of three branches.  
*i*, A part of the tunica conjunctiva, at which, before the preparation was immersed in spirits, the orifices of two or three very small lacrymal ducts could be perceived.

## FIG. 8.

*Represents the EYE-LIDS of the LEFT EYE, viewed from the Posterior-interior Part;—the GLANDULÆ MEIBOMIANÆ;—the CARUNCULA and PUNCTA LACRYMALIA, with the PASSAGES by which the latter communicate with the NOSTRILS.*

- a, b*, The inner coat of the eye-lids.  
*c, c*, The cilia.  
*d, e*, The upper and under tarsus, with their sebaceous follicles, each terminating in a peculiar small foramen at the margin of the eye-lid.  
*f*, The puncta lacrymalia.  
*g*, The caruncula lacrymalis, and the lacrymal sac, into which the ducts of the puncta lacrymalia open.  
*h*, The lacrymal duct.  
*i*, The extremity of the lacrymal duct, with a small portion of the membrane of the nose left around it.

## FIG. 9.

*A View of the LACRYMAL PASSAGES, the INTEGUMENTS and BONES being removed.*

- a*, The lacrymal gland.  
*b, c*, The puncta lacrymalia, with the lacrymal canals proceeding from them to,  
*d*, The lacrymal sac.  
*e*, A contraction of the sac, forming,  
*f*, The lacrymal duct;  
*g*, Its termination in the nose.  
*h*, The caruncula lacrymalis.



## T A B L E LXXXIV.

## VIEWS of the COATS, MUSCLES, VESSELS, and NERVES of the EYE.

FIG. 1.

*The External VESSELS of the EYE, to obtain a View of which, a great part of the ORBICULARIS MUSCLE is removed.*

- a*, Part of the orbicularis palpebrarum.
- b*, The ciliary ligament.
- c*, The extremity of the os nasi.
- d*, A branch of the temporal artery.
- e*, Branches of the supra-orbital artery to the fore-head, communicating with the branches of the temporal artery.
- f*, The trunk of the ocular artery.
- g*, Branches to the nose.
- h*, The infra-orbital artery.
- i*, The labial artery.

FIG. 2.

*A View of the Upper Side of the EYE-BALL and its VESSELS; the ARCH of the ORBIT, the LEVATOR PALPEBRÆ, and RECTUS SUPERIOR MUSCLES, being removed.*

- A, The optic nerve with its curvatures.
- B, The trochlearis muscle passing through its pulley.
- C, The lacrymal gland.
- D, The tarsus of the upper eye-lid.
- E, The thick part of the os malæ.
- F, Part of the os frontis.
- G, The levator palpebræ and levator oculi, turned aside.
- H, The adductor oculi.
- I, The depressor oculi.
- K, The abductor oculi.
- a*, The internal carotid artery.
- b*, The ocular artery.
- c*, The lacrymal artery.
- d*, The external ciliary artery.
- e*, Branches to the muscles, between the eye and outside of the orbit.
- f*, The superior ciliary arteries.
- g*, The origin of the inferior ocular artery.
- h*, The supra-orbital artery.
- i*, The anterior ethmoid artery.
- k*, The common palpebral trunk.

- l*, The superior palpebral arch.
- m*, The nasal branch.
- n*, A branch from the temporal artery to the superior tarsal arch.

FIG. 3.

*The EYE divested of its Superior MUSCLES, and turned outwards, so as to bring its Inferior VESSELS into view.*

- A, The optic nerve.
- B, The sclerotic coat.
- C, The cornea, with the iris and pupil appearing through it.
- D, The depressor oculi.
- E, The inferior oblique muscle.
- F, A section of the frontal bone.
- G, The anterior ethmoid cell.
- H, Part of the frontal bone.
- a*, The ocular artery drawn with the eye out of its place.
- b*, The inferior branch of the eye.
- c, c*, The ciliary arteries.
- d*, The infra-orbital artery. The other branches are seen supplying the lower part of the orbit in general, and some passing into the ethmoid cells.

FIG. 4.

*Represents the CHOROID COAT and CILIARY ARTERIES, the SCLEROTICA being partly removed.*

- A, A, B, The cut edges of the sclerotic coat.
- C, The cornea, with the iris and pupil.
- D, D, The choroid coat.
- a*, The optic nerve.
- b*, The ocular artery.
- c, c*, The ciliary arteries.
- d*, The central artery of the retina.
- e*, A branch to the dura mater of the optic nerve.
- f*, The ciliary arteries forming a ring at the entrance of the optic nerve.
- g*, The long ciliary arteries.
- h, h*, The posterior ciliary arteries, perforating the sclerotica, and running upon the surface of the choroides, where they form numerous anastomoses.

FIG.



Fig. 3.

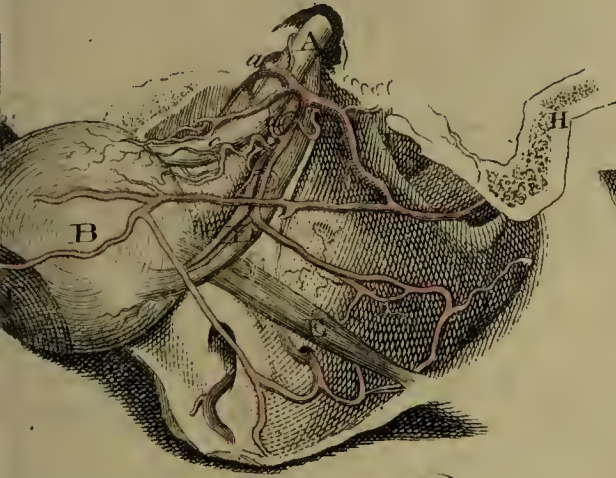


Fig. 2.



Fig. 1.



Fig. 8.

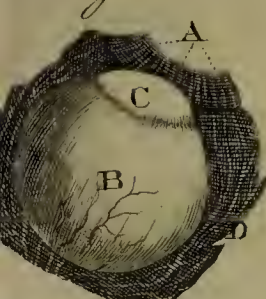


Fig. 7.



Fig. 6.

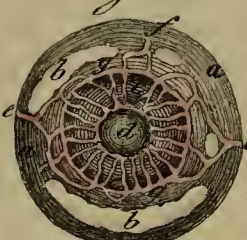


Fig. 5.



Fig. 4.



Fig. 9.



Fig. 10.



Fig. 11.

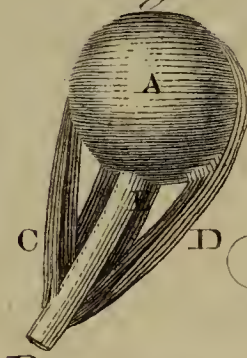


Fig. 12.



Fig. 13.

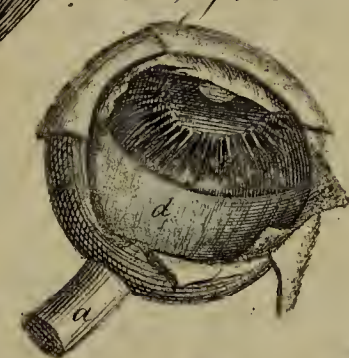


Fig. 16.



Fig. 14.



Fig. 15.





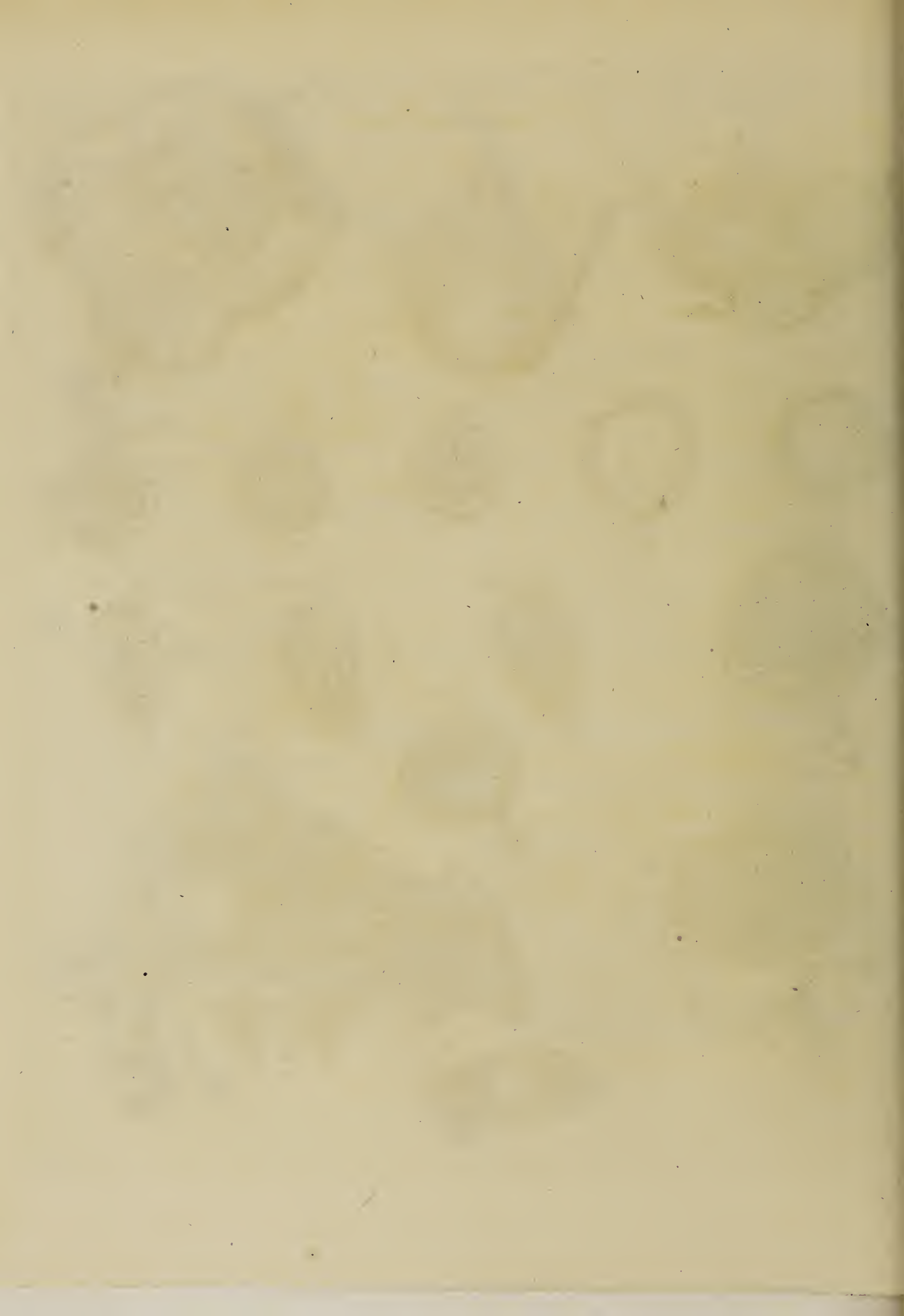




FIG. 5.

*Shews the CHOROID COAT, the CILIARY CIRCLE, and IRIS, with their Vessels; the SCLEROTIC COAT and CORNEA being removed.*

- A, A, A, The ciliary circle.
- B, B, The iris.
- C, C, The vorticose veins.
- a, a, The long ciliary arteries.
- b, The large ring of the iris, formed by the ciliary arteries.

FIG. 6.

*The Fore Part of the EYE, from which the CORNEA is removed, to shew the CILIARY CIRCLE, IRIS, and PUPIL, with the disposition of their VESSELS.*

- a, a, The choroid coat.
- b, b, The ciliary circle.
- c, c, The iris.
- d, The crystalline lens appearing through the pupil.
- e, e, The long ciliary arteries.
- f, The anterior ciliary artery inserted into the circular artery.
- g, g, The large circular artery of the iris, formed by the different ciliary arteries.

From the large circular artery branches run in radii to the small circle of the iris.

FIG. 7.

*A Side View of the EYE-BALL, from which the SCLEROTIC and CHOROID COATS are partly removed, to shew the RETINA, and the Course of the CENTRAL ARTERY on it.*

- a, The optic nerve.
- b, b, The choroid coat, turned back.
- c, The sclerotic coat and cornea, also turned back.
- d, The retina.
- e, The ciliary processes.
- f, The striæ of the retina formed by the impressions of the ciliary processes.
- g, The ophthalmic artery.
- h, The central artery of the retina penetrating the optic nerve.
- i, The continuation of that artery appearing through the retina.

FIG. 8.

*The EYE-BALL nearly as in the former Figure, but the CORNEA and SCLEROTICA removed, and the CRYSTALLINE LENS brought more into view.*

- A, The ciliary processes.
- B, the retina, with the branches of the central artery of the retina investing the vitreous humour and its capsule.

- C, The crystalline lens covered by its capsule.
- D, D, The choroid coat, with its vessels.

FIG. 9.

*Represents the EYE-BALL of a Fœtus magnified, from which the CORNEA and part of the SCLEROTICA have been removed, to shew the CHOROIDES, IRIS, and PUPIL, with the Distribution of the BLOOD-VESSELS.*

- A, A, Part of the tunica sclerotica.
- a, a, a, a, The tunica choroides.
- a, b, The iris.
- C, b, c, c, c, The membrana pupillaris, or membrane which, in the fœtus, fills the pupil.
- d, d, d, The long ciliary vessels.
- e, e, Circular and radiated vessels upon the iris.
- b, Vessels running irregularly upon the membrana pupillaris.
- B, B, The large vorticose vessels on the surface of the choroid coat, anastomosing with each other and with those of the iris.

FIG. 10.

*A View of the BALL and MUSCLES of the EYE.*

- A, A, The eye-ball.
- B, The optic nerve, with the origin of the muscles.
- C, The levator palpebræ superioris, with part of the eyelid to which it is fixed.
- D, The levator oculi.
- E, The trochlearis, or superior oblique muscle.
- F, The adductor oculi.
- G, The abductor oculi.
- H, The depressor oculi.
- I, Insertion of the obliquus inferior.

FIG. 11.

*The EYE, deprived of some of its MUSCLES.*

- A, The eye-ball.
- B, The optic nerve.
- C, The adductor oculi.
- D, The abductor oculi.
- E, The depressor oculi.

FIG. 12.

*The LEFT EYE-BALL, with all its MUSCLES, seen from the Upper and Outer Part.*

- A, The eye-ball.
- B, The optic nerve.
- C, The trochlearis, or superior oblique muscle.
- D, The obliquus inferior turned from before backwards.
- E, The levator,
- F, The abductor,
- G, The depressor, and,
- H, The adductor oculi.

FIG.



FIG. 13.

*The Three COATS of the EYE removed on one Side, to obtain a View of the HUMOURS in situ.*

- a*, The optic nerve.
- b*, The tunica sclerotica.
- c*, The choroid turned back upon the sclerotic coat.
- d*, The retina lying upon the vitreous humour.
- e*, The anterior termination of the retina, according to the author of this figure.
- f*, The posterior serrated part of the ciliary processes.
- g*, The plicæ of the ciliary processes, with white radii.
- h*, The place where the white radii appear going from the lens.

FIG. 14.

*Shews the STRUCTURE of the IRIS and CILIARY NERVES. The EYE somewhat magnified.*

- a*, The optic nerve.
- b, b, b, b*, The sclerotic coat turned back.
- c, c*, Some of the large ciliary nerves divided anteriorly into branches.
- d*, Some smaller ciliary nerves, with scarcely any branches.
- e, e*, Two of the large ciliary veins, commonly called *Vasa Vorticosa*.
- f*, A hole in the sclerotic coat, through which one of the vorticose veins passes.
- g*, A small ciliary vein.
- h*, The ciliary circle.
- i*, The large ring of the iris.
- k*, The parallel serpentine fibres of the iris.
- l*, The small circle of the iris, formed by arches which join the large fibres to each other.—Straight fibres are seen going from the convexity of the arches to the pupil.
- m*, The pupil.

FIG. 15.

*A View of the LACRYMAL PASSAGES.*

- a*, The upper eye-lid.
- b*, Orifices of the glandulæ MEIBOMIANÆ.
- c*, The ball of the eye.
- d*, The iris appearing through the cornea.
- e*, The pupil.
- f*, The small semilunar membrane before the caruncula lacrymalis.
- g*, The caruncula lacrymalis.
- h, h*, The ducts of the puncta lacrymalia, which terminate together in,
- i*, The lacrymal sac.

FIG. 16.

*The NERVES of the BALL and of the MUSCLES of the EYE.*

- a*, The ball of the eye.
- b*, The lacrymal gland.
- c*, The abducens muscle.
- d*, The attollens muscle.
- e*, The levator palpebræ.
- f*, The deprimens muscle.
- g*, The adducens muscle.
- h*, The obliquus superior.
- i*, The trochlea.
- k*, Part of the obliquus inferior muscle.
- l*, The course of the carotid in the receptaculum.
- m*, The carotid, where it penetrates into the cavity of the cranium, with the ocular artery arising from it.
- n*, The optic nerve passing through its foramen.
- o*, The optic nerve within the orbit.
- p*, The trunk of the nerve of the third pair.
- q*, The superior small branch of the third pair.
- r*, The short root of the ophthalmic ganglion, from the nerve of the obliquus inferior.
- s*, A branch of the third pair of nerves to the adducens muscle.
- t*, A branch of the third pair of nerves to the deprimens muscle.
- u*, A branch of the third pair to the obliquus inferior.
- v*, The ophthalmic ganglion, freed from its connexion with the optic nerve, and turned outwards, to obtain a view of the division of the third pair of nerves.
- w, w*, The fourth pair of nerves.
- x*, The sixth pair of nerves in the receptacle, with the double root of the intercostal nerve which goes from it.
- X*, The fifth pair of nerves in the cavity of the cranium.
- y*, The first branch of the fifth pair of nerves.
- z*, The frontal branch of the first branch *y*, of the fifth pair of nerves, divided into two branches.
  1. The nasal branch of the first branch *y*, of the fifth pair of nerves.
  2. Small ciliary branches of branch 1. passing along the optic nerve.
  3. A small branch inserted into one of the two twigs 2. which arises from the nasal nerve ascending to the outer side of the optic nerve, below the upper fasciculus.
  4. The lacrymal branch of branch *y*.
  5. The second branch of the fifth pair of nerves.
  6. The third branch of the fifth pair of nerves.



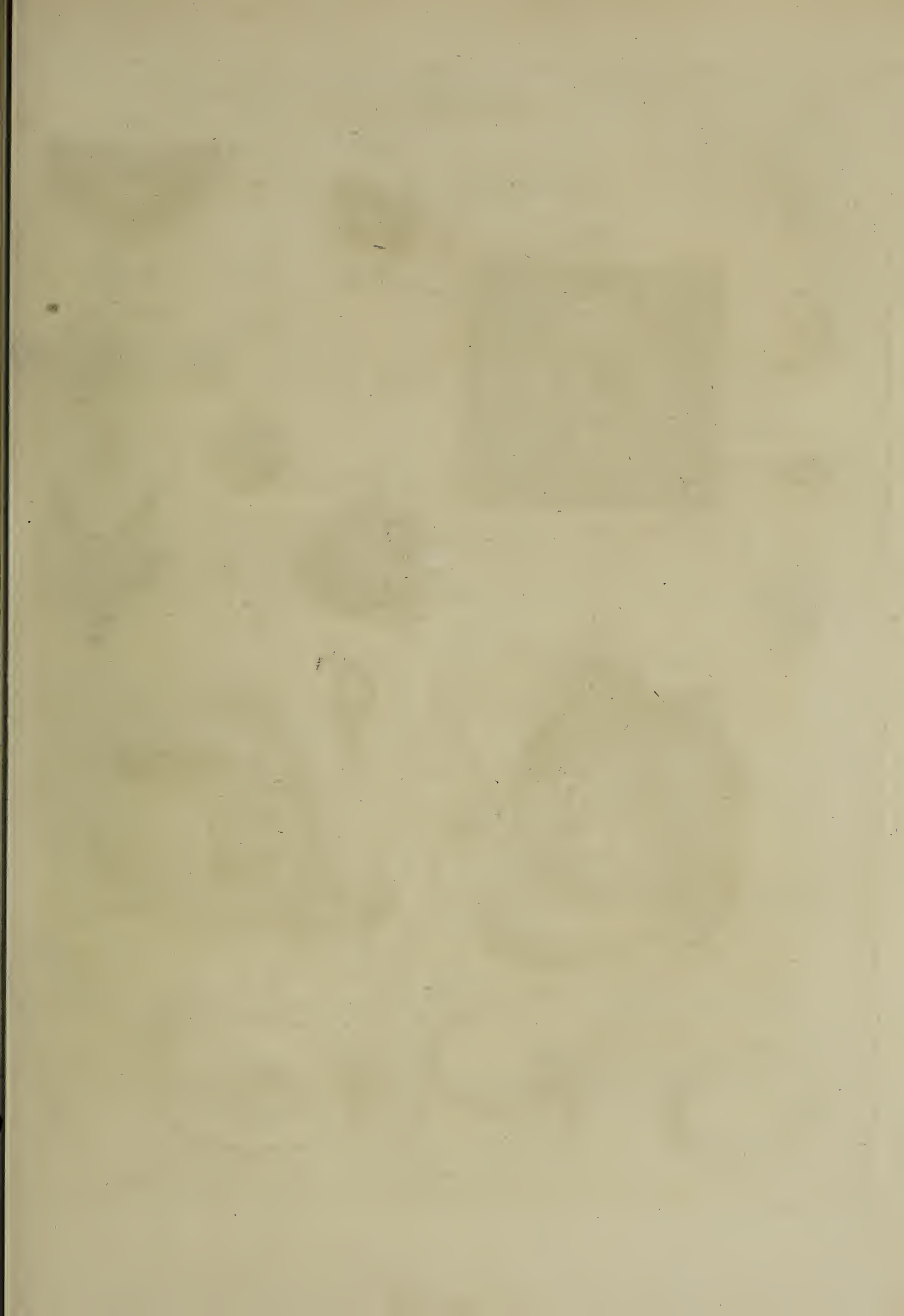




Fig. 3.

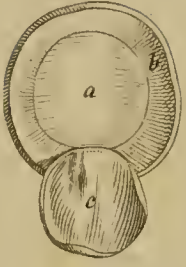


Fig. 2.

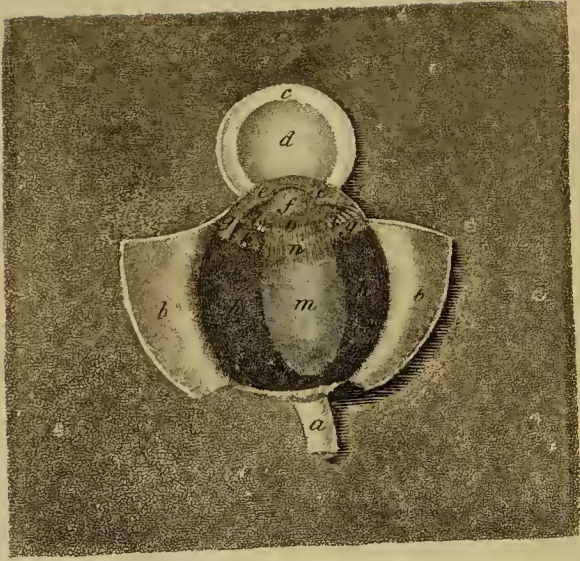


Fig. 8.



Fig. 9.

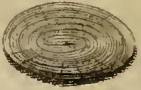


Fig. 12.



Fig. 10.

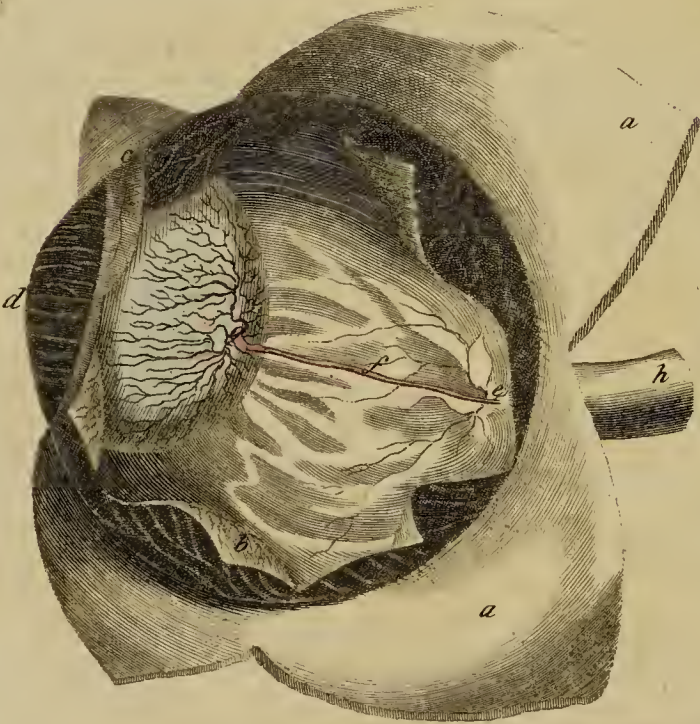


Fig. 6.



Fig. 5.



Fig. 7.



Fig. 1.

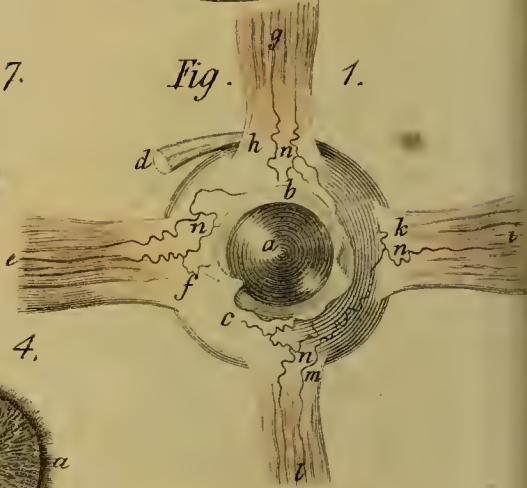


Fig. 4.

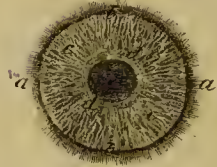


Fig. 11.



Fig. 13.

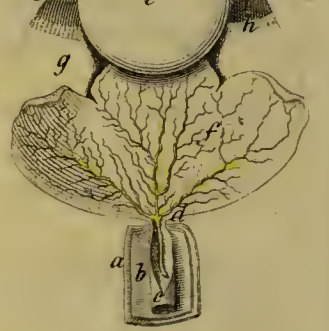


Fig. 14.

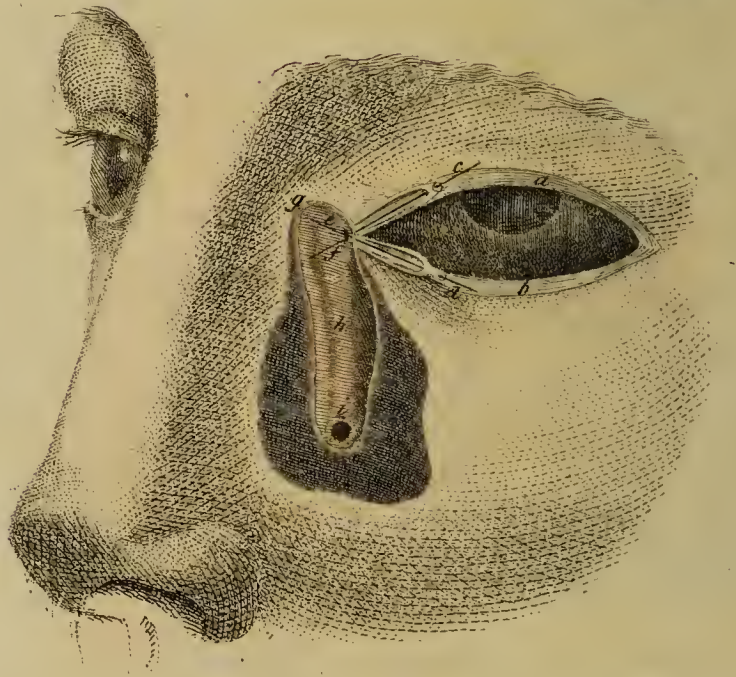


Fig. 15.

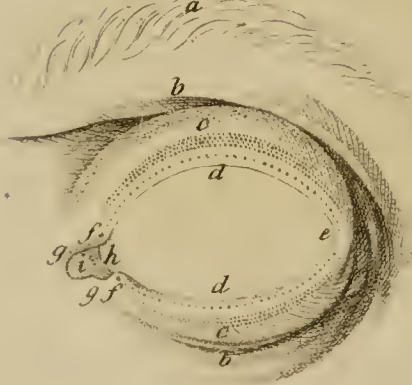


Fig. 16.

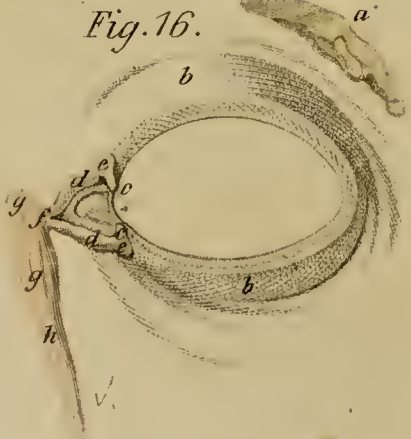


Fig. 17.

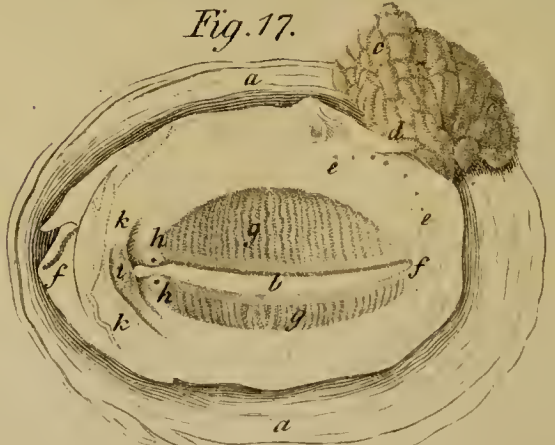
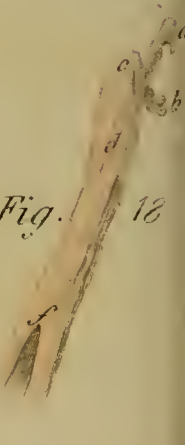


Fig. 18.





# T A B L E LXXXV.

The EYE and LACRYMAL ORGANS dissected.

---

FIG. 1.

*The Anterior Half of the LEFT EYE-BALL, with the Insertions of the Four RECTI MUSCLES, and of the OBLIQUUS SUPERIOR.*

- a*, The cornea.
- b*, The remains of the conjunctiva.
- c*, The sclerotis.
- d*, The tendon of the obliquus superior passing behind the rectus superior, to be inserted into the back part of the sclerotis.
- e*, The muscular part of the rectus internus ;
- f*, Its tendon inserted into the fore part of the sclerotis.
- g, h*, Similar parts of the rectus superior.
- i, k*, \_\_\_\_\_ externus.
- l, m*, \_\_\_\_\_ inferior.
- n, &c.* Arterious twigs penetrating the tendons of the recti muscles.

FIG. 2.

*The EYE dissected.*

- a*, The optic nerve.
- b, b*, Part of the sclerotic coat cut longitudinally, and turned outwards.
- c*, Part of the sclerotic coat cut transversely, and turned forwards with,
- d*, The cornea.
- e, e*, Half of the iris in its natural situation.
- f*, The pupil and crystalline lens.
- g, g*, The ciliary circle.
- h, h*, The choroid coat.
- i*, The ciliary processes, seen in their places, by cutting off a portion of the iris.
- k*, A portion of the iris, cut and turned back.
- l*, The ciliary processes, also turned back.
- m*, The middle smooth part of the retina, seen by cutting a hole in the choroid coat.
- n*, The roots of the ciliary processes of the retina, to which the black paint of the ciliary processes of the choroid coat adheres.
- o*, The ciliary processes of the retina, inserted into the capsule of the crystalline lens.

FIG. 3.

*The CORNEA and MEMBRANE of the AQUEOUS HUMOUR.*

- a*, The internal or posterior surface of the cornea ; and,

*b*, That of the sclerotica.

*c*, The membrane of the aqueous humour, which forms the inner lamina of the cornea, separated and reflected.

FIG. 4.

*A View of the Posterior SURFACE of the IRIS.*

- a, a*, The inner side of the anterior part of the choroid coat.
- b, b*, The ciliary processes.
- c, c*, The vessels and radiated fibres.
- d, d*, The muscular sphincter of the iris.
- e*, The pupil.

FIG. 5.

*The CANALIS FONTANÆ. From the Eye of an Ox.*

- a*, Part of the sclerotica.
- b*, The internal surface of the choroides.
- c*, The plicæ of the ciliary processes.
- d*, The iris.
- e*, The pupil.
- f*, The canal of FONTANA.

FIG. 6.

*A Section of the COATS at the Bottom of the EYE, to shew the CIRCULUS CRIBRIFORMIS CHOROIDEÆ.*

- a*, The interior surface of the posterior part of the sclerotica.
- b*, The outer, and,
- c*, The inner surface of the choroides.
- d*, The circulus cribriformis, or lamina cribrosa, through the foraminula of which the medulla of the optic nerve passes to form the retina.
- e*, The retina, with its blood-vessels.

FIG. 7.

*The CRYSTALLINE LENS, as it appears after Maceration in Water.*

FIG. 8.

The lamina of the Lens of an Ox indurated in Nitrous Acid, by which most Subtile Fibres are seen running from the one Extremity of the Lens to the other.



FIG. 9.

An Internal Section of the Lens which was boiled, and afterwards macerated in an Acid, and divided transversely at the Axis, to shew distinctly the Lamellated appearance.—This from the Eye of an Ox.

FIG. 10.

*The EYE of a Fœtus magnified, and the SCLEROTIS, CHOROIDES, and RETINA, turned aside, to shew the ARTERIA CENTRALIS RETINÆ shining through the Vitreous Humour.*

- a, a,* The sclerotic coat.
- b, b,* The choroid coat, with the venæ vorticosæ on its outer, and retina on its inner side.
- c,* The ciliary circle.
- d,* The iris and membrana pupillaris, with their blood-vessels.
- e,* The entrance of the arteria centralis, at the bottom of the eye, with the branches it gives off to the retina.
- f,* The course of the artery through the axis of the vitreous humour.
- g,* The division of this artery into branches, and the minute ramifications of these upon the back part of the capsule of the crystalline lens.
- h,* The optic nerve.

FIG. 11.

*The ARTERIES of the VITREOUS HUMOUR, and CAPSULE of the LENS, much magnified, in a Fœtus of the seventh Month.*

- a, a,* A portion of the vitreous humour.
- b,* The trunk of the arteria centralis retinæ cut off near its entrance into the ball of the eye.
- c,* Branches of the arteria centralis running to the membrane and cells of the vitreous humour. The rest are branches of the arteria centralis, which go from the circumference of the lens to the anterior and posterior surfaces of its capsule. The branches are broken off which went to the membrana pupillaris.

FIG. 12.

The Anterior Surface of the Membrana Pupillaris in a Fœtus of six Months, with the Arteries injected. The Palpebræ are opened. The Vascular nature of the Membrana Pupillaris, with its Retiform and Anastomosing Appearances, is distinctly seen; the Figure being magnified upwards of two Diameters.

FIG. 13.

*The VENA CENTRALIS RETINÆ. The View is taken from a CHILD of two years, and magnified. The RETINA is divided, and the VITREOUS HUMOUR so placed, that the Cohesion betwixt the two at one part remains entire.*

- a,* The outer, and,
- b,* The inner layer of the vagina of the optic nerve.
- c,* The optic nerve so dissected, that the vena centralis is seen perforating the vagina, and running in the centre of the nerve.
- d,* The vena centralis, dividing into three branches, which run in form of a net-work, upon the inner side of the retina, and unite with the veins of the corpus ciliare.
- e,* The vitreous humour, which conceals the progress of the venæ retinæ in the region of the corpus ciliare.
- f,* The retina separated from the vitreous humour and corpus ciliare, and reflected.
- g,* The choroid coat divided and spread out, the vessels of which are not represented in this figure.
- h,* The ciliary processes.
- i,* The iris also spread out.

FIG. 14.

*Shews the LACRYMAL SAC and DUCTS laid open.*

- a,* The upper,
- b,* The under eye-lid.
- c, d,* Bristles introduced into the two puncta lacrymalia, and the ducts from them cut open.
- e, f,* The termination of these ducts in the lacrymal sac.
- g, h, i,* The lacrymal sac and nasal duct laid open.
- i,* The termination of this duct in the nose.

FIG. 15.

*A Fore View of the EYE-LIDS of the Left Side, in a YOUNG MAN, open.*

- a,* The eye-brow.
- b, b,* Plaits or folds in the eye-lids, which are here widely opened.
- c, c,* Holes in the skin, from which the eye-lashes are pulled.
- d, d,* The openings of the sebaceous glands of the eye-lids.
- e,* The outer angle of the eye.
- f, f,* The puncta lacrymalia.
- g, g,* The two limbs of the inner angle of the eye.
- h,* The valvula semilunaris.
- i,* The caruncula lacrymalis.

FIG. 16.

*Shews the particular Situation of the LACRYMAL GLAND, and the Form of the PASSAGES for the TEARS.*

- a,* The lacrymal gland; its natural situation shewn with respect to the eye-lids.
- b, b,* The two eye-lids widely opened.
- c, c,* The puncta lacrymalia.
- d, d,* The lacrymal ducts.
- e, e,* A blind sac in each of the ducts.
- f,* The termination of the ducts in the lacrymal sac.
- g, g,* The



- g, g,* The lacrymal sac.
- h,* Part of the nasal duct continued from the sac.

FIG. 17.

*The EYE-LIDS of the Right Side separated, seen from behind, with the LACRYMAL GLAND turned up.*

- a, a,* A portion of the orbicularis oculi.
- b,* The opening of the eye-lids.
- c, c,* The lacrymal gland seen from below, divided into two principal lobes, and very little covered by the conjunctiva.
- d,* The situation of the excretory ducts of the lacrymal gland.
- e, e,* The external openings of these ducts upon the conjunctiva.

- f,* The conjunctiva.
- g, g,* The sebaceous glands of the eye-lids, shining through the conjunctiva.
- h, h,* The puncta lacrymalia.
- i,* The caruncula lacrymalis.
- k, k,* The valvula semilunaris.

FIG. 18.

*The LACRYMAL SAC and DUCTS separated from the EYE and NOSE, and viewed obliquely towards the Right Side.*

- a,* The lacrymal duct of the upper eye-lid.
- b,* \_\_\_\_\_ under eye-lid.
- c, d, f,* The lacrymal sac and duct; *c, d,* the sac; *d, f,* the duct.
- f,* The opening where the duct terminates in the nose.



# T A B L E LXXXVI.

## VIEWS of the COATS and HUMOURS of the EYE.

FIG. 1.

*The Anterior Half of the EYE-BALL, quite recent, divided perpendicularly, without any Injection.*

- a*, The edge of the sclerotis, lined with a blackish mucus.
- b*, The choroides, lined with the proper pigmentum nigrum.
- c*, The retina;
- d*, Its anterior termination, according to the author of the figure.
- e*, The ciliary processes shining through the remains of the vitreous humour.
- f*, The iris.
- g*, The pupil.

FIG. 2.

*The Posterior Half of the same EYE.*

- a, b*, As in the first figure.
- c*, The outer surface of the retina.
- d, d, e, f*, The inner surface of the retina.
- e*, A round white spot which marks the entrance of the optic nerve.
- d, d, e*, Three branches of the central artery, which penetrate the eye-ball along with the optic nerve.
- d, d*, Two of these which form a circle round the central hole in the retina.
- e*, The true middle, or central point of the retina, on which several plaits or folds of that substance meet, and conceal the central hole and its yellow border.

FIG. 3.

*The Under Half of the RIGHT EYE-BALL divided horizontally, quite recent.*

- a*, The sclerotis.
- b*, The cornea.
- c*, The union of the sclerotis with the cornea.
- d*, The concave side of the cornea.
- e*, The choroides, with the pigmentum nigrum lining it.
- f*, The lens.
- g*, The ciliary processes.

- h*, The iris.
- i*, The retina.
- k*, The optic nerve divided.
- l, m*, The coats of the nerve.
- n*, Traces of the central artery which penetrates the nerve.

FIG. 4.

*The Posterior View of the RETINA; the SCLEROTIS and CHOROIDES being removed.*

- a*, The central hole in the middle point of the retina, surrounded by a yellow border;
- b*, The point where the optic nerve is cut off, not above half the size of that near the brain.
- c, c*, The central vessels of the retina.

FIG. 5.

*Anterior View of the same.*

- a, b*, The retina; *b*, Its anterior termination, according to the author of the figure.
  - c*, The ciliary processes.
  - d*, A ring round the lens, formed by the membranes of the vitreous humour.
  - d, e*, The lens in its capsule.
  - e*, The central hole in the retina, seen through the lens and vitreous humour.
- The vessels of the retina appear also through the humours.

FIG. 6.

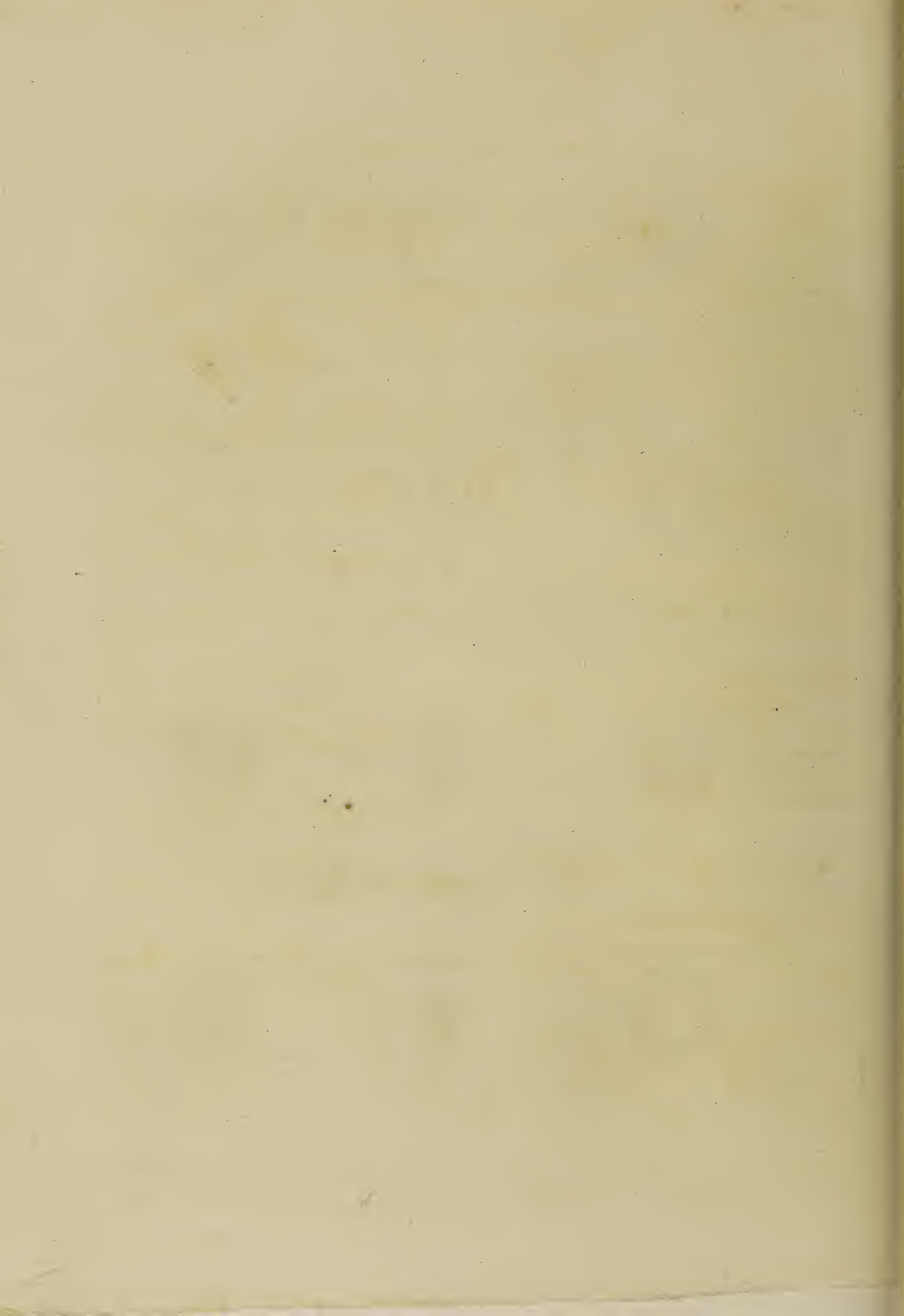
*A View of the Exterior Side of the RETINA.*

- a, b, c*, The retina.
- b*, The central hole, surrounded with its yellow border.
- c*, The apparent termination of the retina.
- d*, The optic nerve denuded of its coats.
- e, e*, Two principal twigs of the central vessels of the retina.
- f*, The ciliary processes.
- g, h*, The lens in its capsule; *g*, the portion which rises above











above the ciliary processes; *h*, the portion seen through the ciliary processes.

FIG. 7.

*The CHOROIDES of the LEFT EYE-BALL injected, and viewed from the Nasal Side.*

- a, b*, The optic nerve; *b*, its contraction before its conversion into the retina.
- c*, The remains of the sclerotis.
- d, e, e*, The choroides.
- f, g, h*, The long internal ciliary artery, vein, and nerve.
- i, i*, Longer and shorter arteries of the choroides.
- k, k*, The nerves of the iris accurately delineated.
- l, m, n*, Venæ vorticosæ.
- o*, The iris and pupil.

FIG. 8.

*The LEFT EYE seen from below.*

- a*, The optic nerve.
- b*, The sclerotis.
- c*, The choroides.
- d*, The ciliary ligament, with numerous nerves in it dividing into branches.
- e*, The edge of the iris.
- f*, The inferior vena vorticosa.
- g, g*, The ciliary nerves.

FIG. 9.

*The Anterior Surface of the CHOROIDES and IRIS.*

- a*, The choroides; the letter is placed on its under side.
- b*, The ciliary ligament.
- c*, The iris, smaller next the cheek.
- d*, The pupil.
- e*, The long internal, and,
- f*, The long external ciliary artery. The white lines represent the ciliary nerves.

FIG. 10.

*The Posterior or Inner Surface of the Anterior Half of the CHOROIDES, divided perpendicularly.*

- a*, The pupil.
- b*, The iris covered with its pigmentum nigrum.
- c*, The choroides.
- d*, The ciliary processes; their anterior edges projecting over and concealing the outer edge of the iris.

FIG. 11.

*The Anterior Surface of the Anterior Half of the CHOROIDES of a seven month Fœtus. The ARTERIES and VEINS are filled with Vermilion.*

- a*, The internal, and,
- b*, The external long ciliary artery.
- c*, The iris.
- d*, The membrana pupillaris, with its vessels injected.

FIG. 12:

*The Anterior Portion of the CONJUNCTIVA and CORNEA of the LEFT EYE of a six month Fœtus, with its Blood-vessels filled with Vermilion, and magnified twice its natural size; shewing the great degree of Vascularity at this age.*

- a*, The cornea.
- b*, The conjunctiva, with its injected vessels.

FIG. 13.

*The LENS of a new-born Child in Profile.*

FIG. 14.

*The LENS of a Child six years old in Profile.*

FIG. 15.

*The LENS of an Adult in Profile.*

FIG. 16.

*The LENS coagulated by Alcohol, and then divided. It is opaque and lamellated.*

FIG. 17.

*The LENS rendered opaque, being kept in Alcohol, and burst on its Posterior Surface into unequal Portions.*

FIG. 18.

*A LENS which broke into eight Segments, and these divided into LAMINÆ.*

FIG. 19.

*Three LAMINÆ of one of these Segments more carefully separated, but all this artificial.*



## T A B L E LXXXVII.

VIEWS of the MUSCLES, VESSELS, NERVES, COATS, and HUMOURS of the EYE.

FIG. 1.

*Shews the Distribution of the RIGHT OCULAR ARTERY, as it appears when the MUSCLES remain connected with the EYE, except the LEVATOR PALPEBRÆ and LEVATOR OCULI, which are cut and turned back.*

- a*, The inner, *b*, the outer, and, *c, c*, the under edge of the orbit.
- d*, The canal of the optic nerve.
- e*, The levator palpebræ, cut and turned back.
- f, g*, The levator, *h*, the adductor, and, *i*, the abductor oculi.
- k, k*, The optic nerve.
- l*, The eye-ball.
- m*, The cerebral artery.
- n, o*, The ocular artery; *o*, its flexure.
- p*, The long ciliary arteries.
- q*, The lacrymal artery.
- r*, The continuation of the ocular artery which crosses the optic nerve.
- s*, A branch from the inner maxillary artery.

FIG. 2.

*The same View with the former, except that the EYE-BALL and OPTIC NERVE are removed.*

- a, b, c*, The orbit.
- d*, The canal of the optic nerve.
- e*, The musculus trochlearis; *f*, its trochlea.
- g*, The depressor, *h*, the adductor, and, *i*, the abductor oculi.
- k*, The obliquus inferior.
- l*, The first long ciliary artery.
- m*, Another long ciliary artery.
- n*, The lacrymal artery.
- o*, The continuation of the ocular artery.
- p*, The trunk of the internal maxillary artery.
- q*, The under orbicular artery, a constant branch.

FIG. 3.

*The VEINS of the BALL and MUSCLES of the LEFT EYE.*

- a, b, c, c*, The orbit.

- d*, The eye-ball.
- e*, The optic nerve.
- f, f*, The levator palpebræ.
- g*, The levator oculi.
- h*, The insertion of the trochlearis; *i*, its pulley.
- k, l*, The abductor, and, *m*, the depressor oculi.
- n*, The lacrymal gland a little displaced, and part of it removed.
- o*, The cerebro-ocular vein.
- p*, The fronto-ocular vein.
- q*, Anastomoses with the internal ocular vein.
- r*, A branch, consisting of the under external ciliary vein, and anastomosing twig of the posterior cerebro-ocular vein.
- s*, The anterior ciliary vein.
- t*, The external ciliary vein.
- u*, The termination of the cerebro-ocular vein, with the fronto-ocular vein, after winding round the optic nerve.
- v*, The fronto-ocular vein communicating with,
- w*, The frontal, and with,
- x*, The palpebral vein.
- y*, The vena centralis retinae.

FIG. 4.

*A View of the VEINS below the EYE, after the EYE-BALL has been raised and turned back.*

- a*, The cut end of the trochlearis.
- b*, The adductor oculi.
- c, c*, The depressor oculi divided.
- d*, The obliquus inferior.
- e, f*, The anterior and posterior roots of the cerebro-ocular vein, with branches from the adjacent parts.
- g*, A short ciliary, and,
- h*, A long ciliary vein.
- i*, Anastomosis between the fronto-ocular and the posterior root of the cerebro-ocular vein.
- k*, The single under ciliary vein.
- l*, A communicating branch formed by the posterior and anterior cerebro-ocular veins, which unite with,
- m*, The internal frontal vein.
- n*, The under external ciliary vein.
- o*, The facial vein receiving,
- p*, The external palpebral vein.

FIG.



Fig. 1.

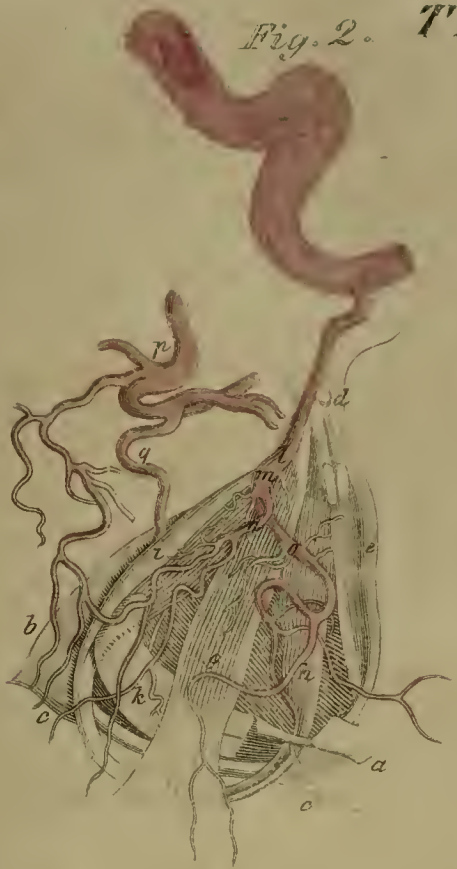
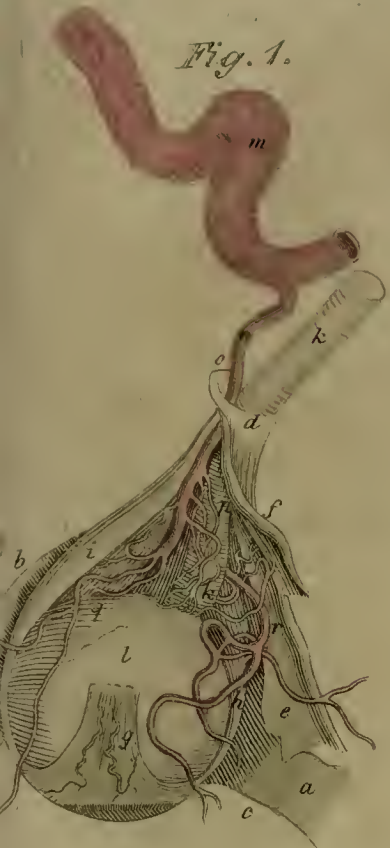


Fig. 3.

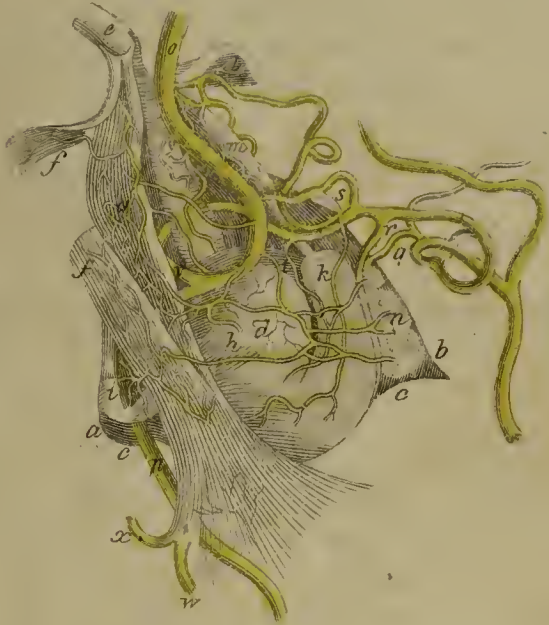


Fig. 4.



Fig. 5.

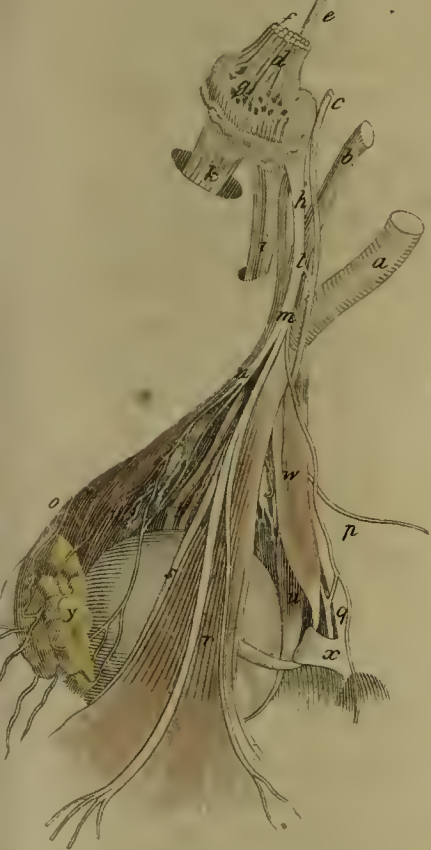


Fig. 6.



Fig. 7.



Fig. 8.



Fig. 9.





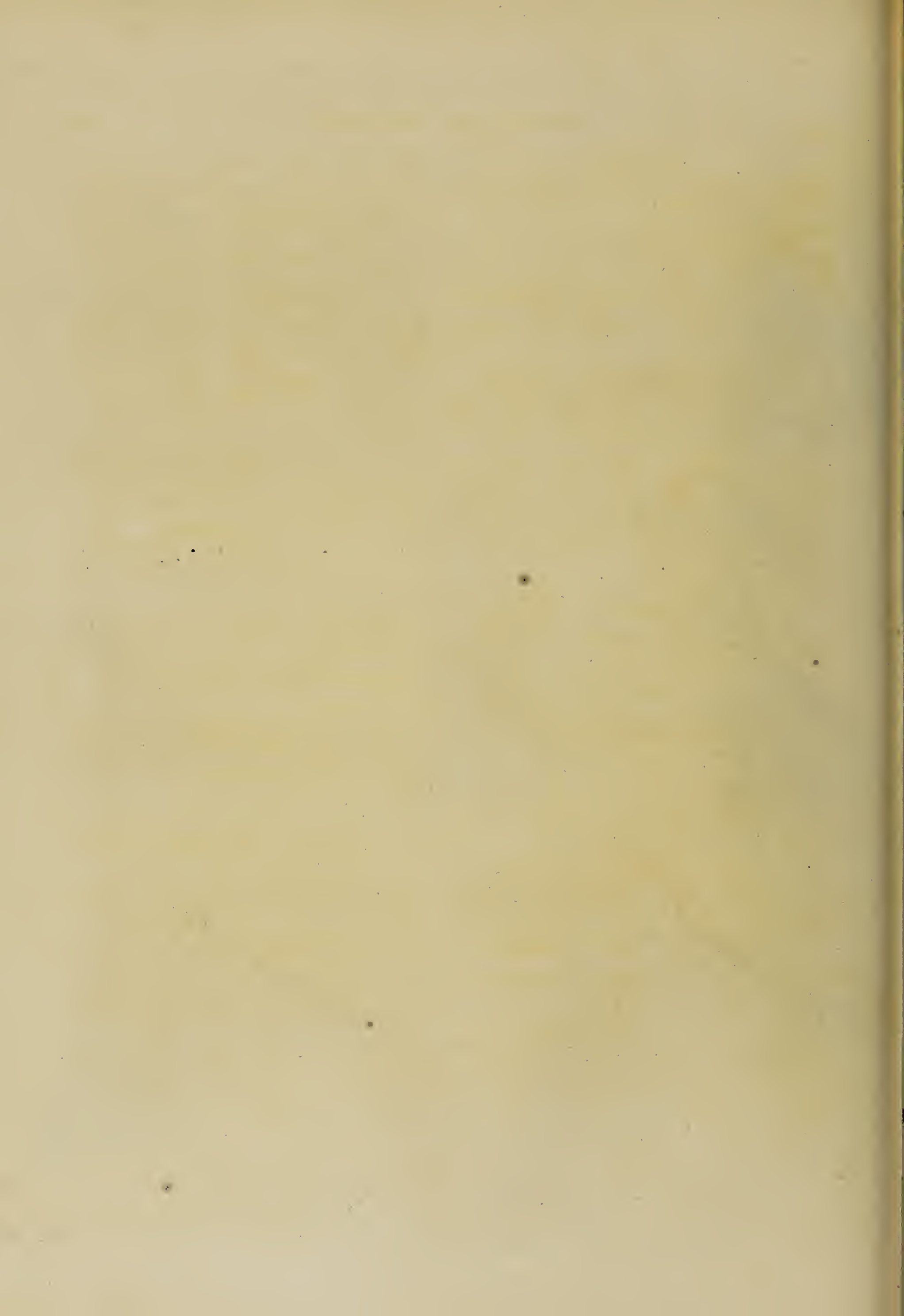




FIG. 5.

*Shews the NERVES of the RIGHT EYE in their natural situation in a young man of eighteen years of age.*

- a*, The optic nerve.
- b*, The nerve of the third pair.
- c*, \_\_\_\_\_ fourth pair.
- d*, \_\_\_\_\_ fifth pair.
- e, e*, \_\_\_\_\_ sixth pair, with its termination on the abductor oculi.
- f*, The cerebral end of the fifth pair, which terminates conically in,
- g*, A ganglion.
- h*, The first branch of the fifth pair.
- i*, The second, passing through the foramen rotundum.
- k*, The third, going through the foramen ovale.
- l*, The connexion of the first branch of the fifth with the fourth pair.
- m*, The frontal branch of the first branch of the fifth pair, sending off,
- n*, The lacrymal nerve, and afterwards proceeding by different branches to the forehead.
- o*, A branch of the facial nerve, which penetrates through the os malæ into the orbit.
- p*, A nerve to the nose.
- q*, The nervus trochlearis.
- r*, The levator palpebræ.
- s*, The levator, *t*, the depressor, *u*, the adductor, and, *v*, the abductor oculi.
- w*, The trochlearis; *x*, its trochlea.
- y*, The lacrymal gland.

FIG. 6.

*Shews chiefly the division of the FIFTH PAIR of NERVES, and the Formation of the CILIARY GANGLION.*

- a*, The levator oculi inverted.
- b*, The levator palpebræ.
- c*, The third pair of nerves.
- d*, A small branch going off before its entrance into the orbit; connected, at *e*, with the branches of the fifth pair, forming the ciliary ganglion.
- f*, The principal inferior branch of the third pair.
- g*, The ciliary ganglion, from which are sent off two bundles of ciliary nerves; the upper bundle, *h*, divides into three branches, which run along the optic nerve, and separate into six or more threads of unequal thickness, of which three are here seen penetrating the sclerotis.
- i*, A branch from the principal branch of the third pair going to the obliquus inferior.
- k*, Branches to the depressor oculi.
- l*, The branch of the third pair to the levator oculi.
- m*, \_\_\_\_\_ palpebræ.
- n*, The fifth pair, with its ganglion.

- o*, The first branch of the fifth pair.
- p*, The lacrymal nerve.
- q*, The slender branch of the frontal nerve.
- r*, The proper frontal nerve.
- s*, A twig from the first branch of the fifth pair to the ciliary ganglion.
- t, u*, The sixth pair; *u*, its termination in the adductor oculi.

FIG. 7.

*The NERVES seen directly under the DEPRESSOR OCULI, the Nasal Part of the FIFTH PAIR, and the whole of the SIXTH.*

- a*, The first pair reflected.
- b*, The ganglion of the fifth pair.
- c*, The first,
- d*, The second, and,
- e*, The third branch of the fifth pair.
- f*, The smaller portion of the fifth pair, bending to join the third branch.
- g*, The small branch corresponding with *d*, of Fig. 6. which, after receiving,
- h*, Similar to *e*, of Fig. 6. is cut across.
- i*, Two long ciliary nerves running upon the optic nerve.
- k*, A branch from these, which, under the levator oculi, splits, sends a nerve to the nose, and then forms the nervus trochlearis.
- l*, The ciliary ganglion.
- m*, Branches from the third pair to the depressor oculi.
- n*, The branch from the third pair to the obliquus inferior.
- o*, The frontal branches of the first of the fifth pair cut across.
- p*, The sixth pair.
- q*, Twigs from the sixth pair, which form a rete along the internal carotid artery, in its passage through the base of the skull.
- r*, The termination of the sixth pair on the abductor oculi.

FIG. 8.

*Represents the RIGHT EYE, when covered by the EYE-LIDS, after a perpendicular Incision from before backwards.*

- a, b*, The upper part of the orbit.
- c*, The inner side of the cranium covered by the dura mater.
- d*, The right frontal sinus.
- e, b*, The canalis opticus.
- f*, The under side of the orbit.
- g*, A cavity filled with fat, &c.
- h*, The connexion between the dura mater, the sheath of the optic nerve, and the origin of the levatores oculi et palpebræ.
- i*, The skin of the forehead.

*k*, The



- k*, The fat.  
*l*, The occipito-frontalis;  
*m*, The fat under it.  
*n*, The corrugator supercilii, before which are sections of a vein, an artery, and a hair of the supercilium, with the orbicularis muscle.  
*o*, The upper eye-lid shut upon the eye.  
*p*, The tarsus or cartilage of the upper eye-lid.  
*q, q*, The boundary of the tunica adnata.  
*r*, The under eye-lid and orbicularis muscle.  
*s*, The tarsus of the under eye-lid.  
*t*, The openings of the eye-lids, with the eye-lashes.  
 At the inner edge of the eye-lids is seen a small triangular opening, by which the tears pass towards the nose when the eye-lids are shut.  
*u*, The levator palpebræ.  
*v*, ————— oculi.  
*w*, The depressor oculi.  
*x*, The tendon of the trochlearis.  
*y*, The belly of the obliquus inferior.  
*z*, The optic nerve surrounded with fat, and contracting where it enters the eye.  
 1. The outer and inner layers of the sheath of the nerve.  
 2. A section of the nerve.  
 3. A section of the ocular artery.  
 4. 4. Sections of the vein.  
 5. The eye-ball.  
 6. The cornea and anterior chamber.  
 7. The sclerotica becoming gradually thinner towards its fore part; its anterior edge forming a groove to receive the edge of the cornea.  
 8. The choroides.  
 9. The ciliary ligament.  
 10. The corpus ciliare.  
 11. The ciliary processes.  
 12. The iris and pupil.  
 13. The lens in its capsule. The dark space between the lens and iris is the posterior chamber.  
 14. The retina seen through the vitreous humour.

FIG. 9.

Is nearly the same as Fig. 8. except that the Eye-lids are open, by which the Cornea appears more prominent, the Lens is removed, the Sheath of the Optic Nerve is slit open its whole length, the Vessels of the Choroid Coat, and the Ciliary Processes, are distinctly seen.



## OF THE EAR.

THE EAR, or Organ of Hearing, is divided into *External* and *Internal Ear*.

## EXTERNAL EAR.

The *External Ear* comprehends the *Auricle*, or *Ear* properly so called, and the *Meatus Auditorius Externus*.

It is again divided into *Pinna* or *Ala*, Tab. LXXXVIII. Fig. 1. *a—h*, which constitutes by much the greater part of it, and *Lobus*, which is placed at its under end. Tab. LXXXVIII. Fig. 1. *e*.

The *Pinna* is chiefly composed of Cartilage, and is divided, at its fore part, into several *Eminences* and *Cavities*, which have received particular names; viz.

The *Helix*, or outer Bar or Margin, which arises behind, at the Lobe of the Ear, surrounds its upper edge, and terminates below, nearly opposite to its origin; dividing the *Concha* into two parts. Tab. LXXXVIII. Fig. 1. *a, a, a*.

The *Antihelix*, *Anthelix*, or inner Bar or Margin, which is situated within the former, and is composed superiorly of two Ridges, uniting together below. Tab. LXXXVIII. Fig. 1. *b, b*.

The *Tragus*, which is a small Eminence lying over the *Meatus Externus*, and is connected to the under and fore part of the *Helix*. Tab. LXXXVIII. Fig. 1. *c*.

The *Antitragus*, placed opposite to the *Tragus*, and below the posterior extremity of the *Antihelix*. Tab. LXXXVIII. Fig. 1. *d*.

The *Cavitas Innominata*, situated between the *Helix* and *Antihelix*. Tab. LXXXVIII. Fig. 1. *f, f*.

The *Scapha*, or *Fossa Navicularis*, situated between the two limbs of the *Antihelix*. Tab. LXXXVIII. Fig. 1. *g*.

The *Concha*, which is a large Cavity under the *Antihelix*; divided by the *Helix* into two parts, the inferior of which leads to the *Meatus Auditorius*. Tab. LXXXVIII. Fig. 1. *h, h*.

The back part of the *External Ear* exhibits only one considerable *Eminence*, which is the convex Surface of the *Concha*. Tab. LXXXVIII. Fig. 2. *b, b*.

The *Lobus*, which is the inferior soft part of the *Ear*, is composed of Cellular Substance, with a small quantity of Fat.

The *Ear* is covered by a continuation of the common Integuments, which are thinner here than on the rest of the *Body*, and are perforated in many parts by the Mouths of Sebaceous Ducts, placed immediately under the *Skin*.

The motions of the *Ear*, which are very limited, are regulated by several *Muscles*, some of which are common to the *Ear* and *Head*, and others proper to the *Ear* itself. The former have been already described. The latter lie close upon the Cartilage, and, in the generality of Subjects, are so thin, white, and indistinct, as to receive from some Authors the name of *Muscular Membranes*.—They are considered as being calculated to give a degree of tension to the *Ear*, and are as follow:

## HELICIS MAJOR.

*Origin*: From the anterior acute part of the *Helix*, upon which it ascends.

*Insertion*: Into the *Helix*. Tab. LXXXVIII. Fig. 3. *a*.

*Action*: To pull that part into which it is inserted a little downwards and forwards.

## HELICIS MINOR.

*Origin*: From the under and fore part of the *Helix*.

*Insertion*: Into the *Helix*, near the Fissure in the Cartilage opposite the *Concha*. Tab. LXXXVIII. Fig. 3. *b*.

*Action*: To contract the Fissure.

## TRAGICUS.

*Origin*: From the middle and outer part of the *Concha*, at the root of the *Tragus*, along which it runs.

*Insertion*: Into the point of the *Tragus*. Tab. LXXXVIII. Fig. 3. *c*.

*Action*: To pull the point of the *Tragus* a little forwards.

## ANTITRAGICUS.

*Origin*: From the internal part of the *Antitragus*, upon which it ascends.

*Insertion*: Into the tip of the *Antitragus*, as far as the inferior part of the *Antihelix*, where there is a Fissure in the Cartilage. Tab. LXXXVIII. Fig. 3. *d*.

*Action*: To turn the tip of the *Antitragus* a little outwards, and depress the extremity of the *Antihelix*.

TRANSVERSUS AURIS, vel *Transversus Auriculæ*.

*Origin*: From the prominent part of the *Concha*, on the back of the *Ear*.

*Insertion*:



*Insertion*: Into the outside of the Antihelix. Tab. LXXXVIII. Fig. 4. a.

*Action*: To draw the parts to which it is connected towards each other, and to stretch the Scapha and Concha.

The *Cartilage* of the External Ear is connected to the Temporal Bone by the common Integuments, and by its Muscles; and is furnished with Ligamentous Membranes, which fix it to the roots of the Zygoma and Mastoid Process. Tab. XCII. Fig. 4. 5.

The Auricle collects sound, and conveys it to the Meatus Externus,—the Muscles giving tension to it, so as to render the sound more distinct.

The *Meatus Auditorius Externus* leads inwards from the Concha, and in its course proceeds somewhat forwards and upwards, turning a little downwards at its farthest extremity, and terminating at the *Membrana Tympani*, Tab. LXXXVIII. Fig. 5. The turns, however, are so inconsiderable, that the bottom of the passage may be readily seen in a clear light, on pulling the Ear backwards.

It is rather of an *oval* form, a little contracted in the middle, and from an inch to an inch and a half in length.

Its outer end, which is a continuation of the Concha, is Cartilaginous, and has two or three *Interruptions* or *Fissures* in it. Tab. XCII. Fig. 3.

On the upper and back part of its circumference, there is a *Large Interruption* terminating in an oblique Margin, which is fixed to the rough edge of the under part of the Osseous Portion of the Meatus. Tab. LXXXVIII. under part of Fig. 4.

At the superior and posterior part of the Meatus, the Cartilage has but little connexion with the Bone, being there fixed by the Skin which lines the Canal.

The Osseous is continued from the Cartilaginous part of the Canal, and is the longer of the two, particularly at its upper and back part.

The Meatus is *lined* with a continuation of the Skin, which fills up the Interruption in the Cartilage, but, like the Skin covering the Auricle, it is thinner than on the rest of the Body. Tab. XCII. Fig. 5.

Between the inner lining and Cartilage of the outer half of the Meatus, there are numerous small Glands, of a yellowish colour, placed in a Reticular Substance formed by the Corpus Mucosum, and termed *Glandulæ Ceruminosæ*. These discharge the Wax of the Ear through small Excretory Ducts. Tab. LXXXVIII. Fig. 5. c.

The wax lubricates the Passage, and defends it from injury, and, being of a viscid and bitter quality, assists in the exclusion of insects.

The *Arteries* of the External Ear come anteriorly from the Temporal, and posteriorly from the Occipital; both of which are Branches of the External Carotid Artery.

The *Veins* pass partly to the External, and partly to the Internal Jugulars.

The *Nerves* which supply the fore part of the Ear, are derived from the third part of the Fifth, and from the Portio Dura of the Seventh Pairs. Those which supply the under and back part come from the first and second Cervicals.

The Meatus Externus conveys sound from the outer towards the inner Ear, and is supposed to do this to greater advantage on account of the winding nature of the Passage.

In the Fœtus, the Meatus is entirely Cartilaginous, and only adheres to an imperfect Bony Circle, in which the *Membrana Tympani* is fixed. Tab. XCII. Fig. 22.

At the inner end of the Meatus Externus, the *Membrana Tympani* is situated, which is thin but firm, somewhat dry and elastic, almost transparent, and of an oval form; the longest diameter of the oval being about four tenths of an inch in length.

It is fixed in a *Groove* which divides the Meatus from the Tympanum. Tab. LXXXVIII. Fig. 6. d.

It is very tense, but has a small *Depression* in the middle next the Meatus, with a corresponding *Convexity* towards the Tympanum, where the extremity of the Malleus is fixed to it.

Its situation is somewhat oblique, the upper part being turned outwards, and the under inwards, so that the lower side of the Meatus is a little longer than the upper.

It forms a complete impervious *Septum*, though the contrary has been maintained by some Authors.

It is formed partly of a continuation of the lining of the Meatus, but chiefly of the Periosteum.

The *Membrana Tympani* has numerous small *Vessels*, from the Temporal and Stylo-mastoid Arteries, which run in a radiated manner, and which are most abundant in the Fœtus. The course of the Vessels in it may be the cause of its having been lately described as a Muscle with radiated Fibres.

This Membrane serves, by its form and tension, to collect the vibrations of sound, and to conduct them from the outer to the inner Ear.

In the Fœtus, the *Membrana Tympani* is fixed in an imperfect ring of Bone, being open above, and, along with the Meatus, it is covered with a Mucous Substance, which defends the parts from the too strong impulse of Sound. The Mucous Membrane sloughs off by degrees after birth. Tab. XC. Fig. 1.

#### INTERNAL EAR.

The *Internal Ear* comprehends the *Tympanum*, *Labyrinth*, and certain *Passages* leading into these.

The *Tympanum* is situated at the inner side of the *Membrana Tympani*, approaches to a hemispherical figure,



gure, and is about half an inch in width. Tab. LXXXVIII. Fig. 7.—11. Tab. XC. Fig. 15. 16.

Between the Tympanum and Cavity called Labyrinth, there is an *Osseous Septum*, which forms the bottom of the Tympanum, where there are *several Eminences*, viz.

The *Promontory*, which forms the beginning of the *Scala Tympani*, and divides the Tympanum into anterior and posterior Regions. Tab. LXXXVIII. Fig. 11. *b*.

A *Protuberance* at the upper and back part of the Tympanum, formed by the *Aquæductus FALLOPII*.

A *Projection*, called *Eminentia Pyramidalis Tympani*, situated behind the *Fenestra Ovalis*, in which is the Passage for the *Stapedius*.

An *Eminence* at the upper and fore part of the Tympanum, containing a semi-canal, for lodging part of the *Tensor Tympani*. Tab. LXXXVIII. Fig. 11. *h*.

In the Tympanum there are various *Passages*, which communicate with the neighbouring parts, viz.

The *Iter a Palato ad Aures*, or *EUSTACHIAN Tube*, so named from the describer, though known to *ARISTOTLE*, which goes off from the upper and fore part of the Tympanum, and, running obliquely forwards and inwards to the posterior Opening of the Nostril, terminates at the outer edge of that opening, above the Arch of the Palate, the whole Tube being about an inch and a half in length. Tab. XCII. Fig. 2. *G, H, I*. Tab. LXXXIX. Fig. 6. *g, h, i*.

The posterior part of the Tube is *Osseous*, being formed in the *Pars Petrosa*, at the upper and outer part of the Canal for the *Carotid Artery*.

The anterior portion is formed above, by the *Spinous Process*, and root of the *Pterygoid Process* of the *Sphenoid Bone*;—and below, by *Cartilage* and *Membrane*.

It is narrow next the Ear, where it can only admit the point of a *Surgeon's Probe*, but becomes gradually wider towards the Nose, where it terminates by an oblique opening with prominent sides, sufficiently large to admit the end of a *Goose-quill*. Tab. XCII. Fig. 7. *D, E*.

It is lined by a *Membrane* similar to that of the Nose, of which it appears to be a continuation; and which, on the edge of the Mouth of the Tube, is so thick as to add considerably to its prominency.

The *EUSTACHIAN Tube* preserves the balance of Air between the outer and inner Ear, and prevents it from pressing too forcibly upon the different *Membranes* placed in the sides of the Tympanum.

It has been supposed to convey the sound of a Person's own Voice to the inner Ear; but experiment does not favour this opinion, nor is it found to render Sound more distinct when the Mouth is open;—though Persons who have a degree of deafness are observed frequently to listen after this manner.

The *Cells of the Mastoid Process*, which open into the upper and back part of the Tympanum, opposite

to, but a little higher than, the *EUSTACHIAN Tube*. Tab. XCII. Fig. 9. *D*.

They contain Air, and are very irregular, varying in number and size in different persons, have many windings and turnings, which communicate with each other, and are lined, like the Cells of other Bones, by the *Periosteum Internum*. Sometimes, instead of Cells, the *Mastoid Process* contains one large Cavity, which communicates with the Tympanum in the common way.

They assist the Tympanum in reflecting Sound, in increasing its strength, and conveying it to the Labyrinth.

In many of the *Digitated Mammiferous Quadrupeds*, there are large *Cavities*, connected with the Tympanum, which seem to supply the place of *Mastoid Cells*.

Above the Promontory, a *Hole* called *Fenestra Ovalis*, the upper and under edges of which are convex upwards,—for lodging the Base of the *Stapes*. Tab. LXXXVIII. Fig. 11. *e*. The long diameter of this *Fenestra* is placed transversely, and nearly double the length of the short one.

The inner edges of this Hole are contracted by a narrow Border, upon which the end of the *Stapes* rests.

Below the *Fenestra Ovalis*, and at the under and back part of the Promontory, a *Hole*, smaller than the former, called *Fenestra Rotunda*. Tab. LXXXVIII. Fig. 11. *d*.

It is placed obliquely backwards and outwards, and leads to the *Cochlea*, but is shut in the Subject by a thin Substance, termed *Membrana Tympani Secundaria*, stretched across the inner side of it, which assists in communicating Sound to the Labyrinth. The two *Foramina* are placed opposite to the *Membrana Tympani*.

The *Sides* or *Walls* of the Tympanum, which likewise assist in conveying Sound to the Labyrinth, are lined with *Periosteum*, which is reflected into the different Passages leading from it.

The Cavity of the Tympanum contains air, and four small Bones called *Ossicula Auditus*, which form a Chain, stretching irregularly from the *Membrana Tympani* to the Labyrinth. Tab. XVIII. Fig. 9.

The *Ossicula Auditus* are,—the *Malleus*, the *Incus*, the *Os Orbiculare*, and the *Stapes*,—these names being derived from Substances which the *Ossicula* are supposed to resemble in shape.

The *Malleus*, or *Hammer*, consists of a round Head, a small Neck, a *Manubrium* or Handle, and two small Processes; one in the Neck, long and very slender, and therefore called *Gracilis*; the other in the upper end of the Handle, called *Processus Brevis*. Tab. XVII. Fig. 9. *B*. Tab. XC. Fig. 4. 5. 6.

The Handle is by some Authors considered as one of the Processes, and is then called the longest of the three. It forms an angle with the Neck, is slightly compressed, becomes gradually smaller, and is bent at its extremity towards the *Membrana Tympani*.

In the natural situation, the *Head* of the *Malleus* is turned



turned upwards and inwards, and the *Handle* down upon the Membrana Tympani, to which it adheres. Tab. LXXXIX. Tab. XC.

The *Incus*, compared in shape to an *Anvil*, but more resembling one of the *Dentes Molares* with its roots widely separated, is situated behind the Malleus, and is formed of a *Body* and *two Crura*, one of which is termed the Short or Superior, and the other the Long or Inferior Crus. Tab. XVIII. LXXXIX. XC.

The *Body* has a *Cavity* and *two Eminences*, corresponding to the back part of the head of the Malleus, with which it is articulated.

The *short Crus* extends backwards, and is joined by a Ligament to the edge of the Mastoid Opening.

The *long Crus*, which is smaller than the other, is turned downwards, with the point a little flattened, and bent inwards.

The *Os Orbiculare*, vel *Lenticulare*, is the smallest Bone of the Body, being considerably less than a grain of Mustard-seed. Tab. XVIII. Fig. 9. D. Tab. XC. Fig. 10. 11.

It is articulated with the point of the long Process of the Incus, and is so firmly fixed to it, that it has been frequently considered as a Process of that Bone.

The *Stapes* is named from a striking resemblance it has to a *Stirrup*. It is divided into *Head*, *Crura*, and *Base*. Tab. XC. Fig. 12. 13.

The *Head* is placed upon a small flat Neck, and is articulated with the Os Orbiculare.

The *Crura*, like those of the Incus, are unequal in length, and have each a Groove on the inside, which gives insertion to the Membrane stretched between them.

The *Base* is of an oval, or rather semi-oval shape, and has no Perforation in it; its edges correspond with those of the Fenestra Ovalis, with which it is articulated. Tab. XC. Fig. 27. Tab. XCII. Fig. 28.

The stapes is placed horizontally, being nearly at a right angle with the inferior Crus of the Incus. Its two Crura are placed in the same plane,—the longest backwards.

The small Bones of the Ear are articulated with each other by *Capsular Ligaments* proportioned to their size, and are covered by Periosteum, which likewise fixes them to the Membrana Tympani, and Fenestra Ovalis.

The small Bones have the following *Muscles* fixed to them, which serve for their different motions.

#### TENSOR TYMPANI, vel *Internus Mallei*.

*Origin*: From the Cartilaginous Extremity of the EUSTACHIAN Tube, near the entry of the Artery of the Dura Mater. From thence its Fleshy Belly runs backwards, in a Canal peculiar to it, at the upper and inner parts of the Osseous Portion of the Tube, being covered only by a thin Plate of Bone. It sends off a slender Tendon, which makes a turn in the Tympanum, and passes outwards.

*Insertion*: Into the inner and back part of the Handle of the Malleus, a little below the root of its long Process. Tab. LXXXVIII. Fig. 10. Tab. LXXXIX. Fig. 1. Tab. XCII. Fig. 19. e, f.

*Action*: To pull the Malleus and Membrana Tympani inwards, by which the Membrane is rendered more tense, and more concave towards the Meatus Externus, and thereby better adapted for the impression of weak Sounds.

#### LAXATOR TYMPANI, vel *Externus Mallei*.

*Origin*: By a very small beginning, from the extremity of the Spinous Process of the Sphenoid Bone, behind the entry of the Artery of the Dura Mater; after which it runs backwards and a little upwards, along with a Branch of the Seventh pair of Nerves, called *Chorda Tympani*, at the outside of the EUSTACHIAN Tube, in a Fissure of the Os Temporis, near the Fossa which lodges the Condyle of the Lower Jaw.

*Insertion*: Into the long Process of the Malleus, which is lodged in a small Canal at the upper part of the Tympanum. Tab. LXXXVIII. Fig. 6. g. Fig. 9. b. Tab. XC. Fig. 19. c.

*Action*: To draw the Malleus obliquely forwards and outwards, and thereby to render the Membrana Tympani less convex, or to relax it when Sounds are too strong. This Muscle is so small and tender, that its nature is known with difficulty. HALLER denies the existence of Muscular Fibres in it.—SABATIER describes it, but doubts its Muscularity.

The *Laxator Tympani* of ALBINUS, a minute Substance, arising from that part of the Meatus Auditorius to which the upper edge of the Membrana Tympani is fixed, and inserted into the Superior Extremity of the Handle of the Malleus, is considered by many Anatomists as a Ligament.

#### STAPEDIUS.

*Origin*: By a minute Fleshy Belly, from a small Cavern in the Pars Petrosa, near the Cells of the Mastoid Process, before the inferior part of the FALLOPIAN Aqueduct or Passage for the Portio Dura. Its Tendon passes forwards through a Perforation in the sides of that Cavern, and goes into the Tympanum.

*Insertion*: Into the posterior part of the Head of the Stapes. Tab. LXXXVIII. Fig. 10. c. Tab. XC. Fig. 21. b. Fig. 28. i.

*Action*: To draw the Head of the Stapes obliquely upwards and backwards, by which the posterior part of its Base is moved inwards, and the anterior part outwards, and the Membrana Tympani thereby put upon the stretch.

#### LABYRINTH.

The *Labyrinth*, so called from its Sinuosities and Windings



Windings, is situated at the inner part of the Tympanum, and is formed of the *Vestible*, *Cochlea*, and *Semicircular Canals*, together with the *Canalis FALLOPII* and *Meatus Auditorius Internus*. Tab. XC. Fig. 19. 21. 22. 23.

The *Vestible*, named from its forming a Porch or Entry to the Cochlea and Semicircular Canals, is of an oval figure, nearly of the size and shape of a decorticated grain of Barley, and is situated at the inner side of the Base of the Stapes. Tab. XC. Fig. 23. d. Fig. 25. g. Fig. 28.

There are three contiguous *Cavities* in the Vestible, one of which, the *Semi-oval*, is situated above; another, the *Hemispherical*, below; and the third, or *Sulciform*, which is the Orifice of the *Aquæductus Vestibuli*, is placed behind. Tab. LXXXIX. Fig. 10.

In the Vestible there are several Holes which communicate with the neighbouring parts, viz.

The *Fenestra Ovalis*, situated at the outside, by which it communicates with the Tympanum. Tab. LXXXVIII. Fig. 11. Tab. XC. Fig. 1.

A *round Hole*, situated at the fore and under part, by which it communicates with one of the Canals of the Cochlea. Tab. LXXXIX. Fig. 5. g. Tab. XCI. Fig. 1.

*Five similar Foramina* behind, by which it communicates with the Semicircular Canals. Tab. LXXXIX. Fig. 5. Tab. XC. Fig. 1.

Towards the *Meatus Auditorius Internus*, it has four or five *Cribriform Perforations*, for the transmission of Nerves. Tab. LXXXIX. Fig. 2. i.

The *Cochlea* is placed obliquely, next the anterior extremity of the *Os Petrosus*, and at the fore part of the Vestible, in such a manner as to have its Base towards the *Meatus Auditorius Internus*, and its Apex in the opposite direction, or facing outwards. Tab. XC. Fig. 25. k, k. Fig. 19. &c.

It has two *Canals* or *Gyri*, called *Scalae*, from a supposed resemblance to a stair-case; one of which is placed on the outer and fore side, the other on the inner and back part. The Gyri are very close to each other, and run in a spiral direction, like the turns in the shell of a Snail, from which the part has obtained its name. Tab. XCI. Fig. 2.

The Cochlea forms *two Circumvolutions* or *Turns and a half*, the first of which is much larger and wider than the other turn and a half, which become suddenly smaller, the whole approaching to a globular form. Tab. XC. Fig. 25. Tab. XCI. Fig. 1. 2.

The two Canals are upon the same level, the inner one next the Base, and the outer next the point of the Cochlea. Tab. XC. Fig. 25.

The *Gyri* go round a *Nucleus*, *Axis*, or *Central Pillar*, which is nearly horizontal, and is formed of *two hollow Cones*, with their points turned to each other, the one termed *Modiolus*, from its resemblance to the Spindle of a winding Stair-case, the other *Infundibulum*, or Funnel.

The *Modiolus* forms the inner and larger portion of the central Pillar, and is that Cavity seen in the bottom or outer extremity of the *Meatus Auditorius Internus*. Tab. XCI. Fig. 1.—3.

It lodges the Branch of the *Portio Mollis* of the Seventh Pair of Nerves, which goes to the Cochlea, and is Cribriform, or full of small Holes, for the passage of the Twigs of that Branch. Tab. XC. Fig. 2. 4.

The *Modiolus* consists of *two Plates*, with numerous *Cells* and *Passages* between them, and terminates in the middle of the second Gyrus of the Cochlea. Tab. XCI. Fig. 2.

The *Infundibulum* is an imperfect Funnel, the Apex of which is common with that of the *Modiolus*, and the Base is covered by the Apex of the Cochlea, which is termed *Cupola*. Tab. XCI. Fig. 2. 3.

Between the *Scalae* of the Cochlea there is a Partition, called *Lamina Spiralis*, or *Septum Scalae*; the larger portion of which, next the *Modiolus*, is formed of Bone; the remainder, or that part next the opposite side of the *Scalae*, is composed of a Cartilaginous Membrane, and termed by VALSALVA *Zona Cochleæ*.—This drops out by maceration, so as afterwards to leave only a partial Septum. Tab. XCI. Fig. 2. 3.

The Osseous part of the *Lamina Spiralis* is composed of *two extremely thin Cribriform Plates*, which gradually approach each other at their opposite edges, where they are perforated by numerous Holes. Tab. XCI. Fig. 2.

The termination of the *Lamina Spiralis*, and of the *Scala Tympani*, forms a *Hamulus*, or small Hook, which projects into the *Infundibulum*. Tab. XCI. Fig. 1. 2.

One of the Canals or *Scalae* of the Cochlea opens into the under and fore part of the Vestible, and is termed *Scala Vestibuli*; Tab. LXXXIX. Fig. 5. g. Tab. XCI. Fig. 1.—3.; this is not shut by any Membrane: The other, which is the smaller of the two, communicates with the Tympanum by the *Fenestra Rotunda*, but is shut in the Subject by the *Membrana Tympani Secundaria*, and is called *Scala Tympani*.

The Partition between the two Gyri or Turns of the Cochlea, like the Osseous part of the *Lamina Spiralis*, is formed of *two Plates*, with a small *Cavity* between them. Tab. XCI. Fig. 2.

The *Volute*, or Spiral of the Cochlea, begins below, runs forwards, then upwards and round, so as to form, as has been already mentioned, two Circles or Turns and a half, the direction of the Gyri corresponding with those of the Shell of a Snail. Tab. LXXXIX. Fig. 5.

The Canals of the Cochlea are Conical, becoming gradually smaller towards the Apex, where they communicate with each other, through the medium of the *Infundibulum*. Tab. LXXXIX. Tab. XCI. Fig. 1. 2. This communication is called by CASSEBOHM, *Canalis Scalarum Communis*.

The *Semicircular Canals* are three in number,—the *Superior* or *Vertical*,—the *Posterior* or *Oblique*,—and the *Exterior* or *Horizontal*. Tab. XC. Fig. 19.—26.



The *Superior* is placed transversely, in the upper part of the Pars Petrosa, with its convex side upwards.

The *Posterior* is farther back than the former one, and is parallel to the length of the Pars Petrosa, with the convex side turned backwards.—One of its extremities is placed above, and the other below, the upper extremity joining with the internal one of the Vertical Canal, by which a common Passage is formed.

The *Exterior*, less than either of the other two, which are more of an equal size, is placed next the Tympanum, and has its extremities and curvatures nearly upon the same plane;—with the convex part of the curve placed backwards.

Each of the Canals forms upwards of three-fourths of a Circle, can admit the head of a small Pin, and has a slight Dilatation, an *Ampulla*, or *Cavitas Elliptica*, at one end, the other extremity being nearly of the same size with the rest of the Canal. Tab. XCII. Fig. 29. Tab. LXXXIX. Fig. 10.

The *Orifices* are only five in number, two of the Canals having a common termination. Of these Orifices, three are situated at the inside, and two at the outside of the Vestible, into the posterior part of which the different Canals open, without being closed by any Membrane.

In the bottom of the Meatus Auditorius Internus, which is situated in the posterior Surface of the Pars Petrosa, there is a large under, and a small upper *Fossula*, separated by a sharp Ridge. Tab. XCI. Fig. 1.

The fore part of the inferior Fossula leads towards the Cochlea, and is perforated by numberless *minute Holes*, through which Branches of the Portio Mollis of the Seventh Pair of Nerves pass to the Cochlea.

One Hole in the Centre, larger than the rest, transmits a Branch of that Nerve to the Infundibulum. Tab. XCI. Fig. 1. This Hole, however, is frequently enlarged, in consequence of the Bone, which is extremely thin, being broken while preparing it.

In the back part of the inferior Fossula, four or five *Cribriform Holes* appear, for the transmission of Branches of that part of the Portio Mollis destined for the Vestible and Semicircular Canals. Tab. XCI. Fig. 1. Tab. LXXXIX. Fig. 12.—14.

In the upper Fossula of the Meatus Internus, there are *two Passages*, one posterior and smaller, transmitting Nerves into the Elliptical Cavity of the Vestible.

The other, the anterior and larger, is termed *Canalis*, vel *Aquæductus FALLOPII*,—from a resemblance it bears to an Italian Aqueduct; and serves for the transmission of the Portio Dura of the Seventh Pair of Nerves. Tab. XCI. Fig. 1. Tab. LXXXIX. Fig. 2.

The *Canal* of FALLOPIUS goes through the upper part of the Pars Petrosa, passes downwards and backwards between the Fenestra Ovalis and external Semicircular Canal, and terminates by the Foramen Stylo-mastoideum.

In its passage through the Pars Petrosa, it commu-

nicates with the Foramen Innominatum, situated on the upper and fore part of that Bone. Tab. V. n.

In Children, the Labyrinth is almost as large as in Adults, its Substance complete and hard, while the Bone which surrounds it is soft and spongy, on which account it is easily separated from the rest of the Pars Petrosa.

The different Cavities and Passages of the Labyrinth are lined with the Periosteum, which in the Vestible fills the Fenestra Ovalis, and of consequence covers the Base of the Stapes.

The Periosteum lining the two Canals of the Cochlea, by their union, assist in forming the Membranous Portion of the Lamina Spiralis, which, together with the Osseous part, completes the Septum between the two Scalæ.

The Periosteum of the Cochlea also assists that of the Tympanum in forming the Membrane of the Fenestra Rotunda, which is sometimes called *Membrana Tympani Secundaria*, from a resemblance to the Membrana Tympani, and from being also, like it, a little concave on the outer, and convex on the inner Surface, or where it faces the Scalæ to which it belongs.

Besides the Periosteum, the Vestible, Cochlea, and Semicircular Canals, contain a *Pulpy Membrane*, or there is a Membranous Labyrinth, upon which the Portio Mollis is regularly dispersed.

In the Vestible, the Pulpy Membrane forms a *Sac*, called *Sacculus Vestibuli*, in shape resembling that of the Osseous Cavity which contains it, and which is described and beautifully delineated by SCARPA. Tab. LXXXIX. Fig. 13. a.

When the Sac is laid open upon the upper and outer part, a *Partition* appears, partaking of the nature of the Sac, and termed by DR. MECKEL, *Septum Vestibuli Nervoso-Membranaceum*.

In the Cochlea, the Pulpy Membrane is in contact with the Periosteum, but can be separated from that Membrane without much difficulty.

In the Semicircular Canals, it is at some distance from the Periosteum of these Bones, and is considerably smaller; and forms distinct Tubes, which communicate with the Sacculus Vestibuli. Like the Osseous, each of the Membranous Canals also forms an Ampulla, or Elliptic Cavity, at one end. Tab. LXXXIX. Fig. 13. b.—g.

The *Arteries* of the Labyrinth arise by one or two small branches, chiefly from the Vertebral Artery, and pass through the Cribriform Plate, at the bottom of the Meatus Internus which belongs to the Labyrinth. Tab. XCII. Fig. 30.

From the Labyrinth one or two *Veins* return, and terminate in the end of the Lateral Sinus.

The Cavity of the Vestible is constantly filled with a *Watery Fluid* called *Aqua Labyrinthi*, supposed to be secreted from the Arteries of the Periosteum, and which is found to resemble the Aqueous humour of the Eye.

The



The Aqueous Fluid fills the Vestible and Scalæ of the Cochlea, and likewise surrounds the Membranous Semicircular Canals.

The *Aqua Labyrinthi* is considered as a medium by which sounds are communicated from the Membrane filling the round and oval Holes, and from the Base of the Stapes to the Pulpy Membrane placed in the Labyrinth.

The superfluous part of the *Aqua Labyrinthi* is supposed by COTUNNIUS to be carried off by two small *Conical Ducts*, more particularly described by him than by some preceding Anatomists, who were partly acquainted with them, but considered them as Blood-vessels.

One of the Aqueducts of COTUNNIUS, called *Aqueductus Cochleæ*, begins at the under part of the Scala Tympani, near the Fenestra Rotunda, and, after passing through the Pars Petrosa, is seen, in the figures he gives of it, terminating by a wide triangular Opening, upon the Surface of the Dura Mater, between the passages of the Seventh and Eighth Pair of Nerves. Tab. LXXXIX. Fig. 18. Tab. XCI. Fig. 7. q.

The other Duct, called *Aqueductus Vestibuli*, begins under the termination of the Common Canal in the Vestible, from which it descends, and terminates by a Triangular Opening between the Layers of the Dura Mater, behind the Meatus Internus, and half way between the upper edge of the Pars Petrosa and Diverticulum of the Internal Jugular Vein. Tab. LXXXIX. Fig. 7. 8. Tab. XCI. Fig. 7. v.

The Nerves of the Labyrinth are derived entirely from the Auditory or Seventh Pair.

The *Auditory Nerve* is composed of two Branches, one of which is called *Portio Dura*, and is harder than the other, termed *Portio Mollis*.

The Trunk of the Auditory Nerve passes into the Meatus Internus, covered by the investing Membranes of the Brain.

The *Portio Dura* goes through the Canalis FALLOPII, Tab. LXXXIX. Fig. 14. x, sending off Branches through Perforations, in the sides of the Canal, to the Stapedius, and to the Mastoid Cells.

One *reflected Branch*, passing through the Foramen Innominatum in the Pars Petrosa, forms a connexion between the *Portio Dura* and the second part of the Fifth Pair. Tab. XCVI. Fig. 7. t.

Another, called *Chorda Tympani*, passes across the Cavity of the Tympanum, between the Inferior Crus of the Incus and Handle of the Malleus, and, after running along the outside of the EUSTACHIAN Tube, joins the Lingual Branch of the Fifth Pair. Tab. XCVI. Fig. 6. In its passage, it supplies the Muscles of the Malleus, and Membranes, &c. of the Tympanum.

The remainder of the *Portio Dura* is dispersed upon the Face.

The *Portio Mollis* is divided into two principal parts, —one to the Cochlea, the other to the Vestible and Semicircular Canals. Tab. LXXXIX. Fig. 11. 13. 14.

The Branches to the Cochlea pass through the Cribriform Plates of the Modiolus, to the Pulpy Membrane lying on the Scalæ.

The Branches run between, and likewise on the outside of the Partitions which divide the Cochlea into Gyri, and the Gyri into Scalæ, and are large and numerous in proportion to the part they supply.

The largest and most numerous of these Branches are dispersed upon the Lamina Spiralis, where they form an intricate Plexus, the threads of which are at first opaque, but are afterwards of the colour of the Retina of the Eye. Tab. LXXXIX. Fig. 11. 13. 14. Tab. XCVI. Fig. 4.

The Branches terminate, and appear almost to meet, upon that part of the Pulpy Membrane which is most distant from the Modiolus.

Through the Cribriform Plate, common to the Modiolus and Infundibulum, the last Branches of this Portion of the Nerves pass to be spread out upon the Membrane lying within the Infundibulum.—*For a particular description of that part of the Portio Mollis distributed to the Cochlea, and of the Cochlea itself, see DR MONRO'S Treatise on the Ear.*

Of that part of the *Portio Mollis* destined for the Vestible and Semicircular Canals, one Branch goes through the posterior Hole in the upper part of the Meatus Internus; the rest pass through the Holes in the under and back part of the Meatus, already pointed out in the description of that Passage.

Having perforated the Foramina, the Nerves are seen first in distinct Plexus, after which they become transparent, and are lost upon the Sac contained in the Vestible, and upon the Ampullæ of the Membranous Semicircular Canals. Tab. LXXXIX. Fig. 11. 13.

The *Portio Mollis*, spread out upon the Pulpy Membrane of the Labyrinth, is the Primary Part of the Organ of Hearing, to which all the other parts are subservient, and may be regarded as being of the same service to the Ear, as the *Retina* is to the Eye.

Sound is conveyed to the *Portio Mollis*, by the External Ear, the Cartilage being well fitted for reflecting it to the Meatus Externus, and Membrana Tympani. From these it is conducted inwards by the small chain of Bones in the Tympanum, by the Membrana Tympani Secundaria, by the walls of the Tympanum and Labyrinth, by the Bones of the Head in general, and by the *Aqua Labyrinthi*, which communicates the tremor directly to the Pulpy Substance of the Nerve.



# T A B L E LXXXVIII.

Various VIEWS of the ORGAN of HEARING, all from the LEFT SIDE.

FIG. 1.

*The Anterior Part of the OUTER EAR.*

- a, a, a,* The helix.
- b, b,* The antihelix.
- c,* The tragus.
- d,* The antitragus.
- e,* The lobe of the ear.
- f, f,* The cavitas innominata.
- g,* The scapha.
- h, h,* The concha, divided into two cavities by an intermediate projection.

FIG. 2.

*The Common MUSCLES of the External EAR.*

- a,* The helix pressed a little forwards, that the posterior muscles may be more distinctly seen.
- b, b,* The posterior part of the concha.
- c,* The attollens aurem.
- d,* The anterior auris.
- e, e, e,* The retrahentes aurem.

FIG. 3.

*The MUSCLES proper to the Anterior Part of the CARTILAGE of the EAR.*

- a,* The helicis major.
- b,* ———— minor.
- c,* The tragicus.
- d,* The antitragicus.

FIG. 4.

*The MUSCLE proper to the Posterior Part of the CARTILAGE of the EAR.*

- a,* The transversus auris, situated on the parts opposite the antihelix and scapha.
- b,* The part belonging to the scapha, composed of shorter fibres.

FIG. 5.

*The EAR, with the MEATUS AUDITORIUS and its GLANDS, separated from the BONES, and viewed Posteriorly.*

- a,* The pinna, or upper part of the ear.

- b,* The lobe of the ear.
- c, d,* The meatus auditorius externus.—*d,* Part of the mastoid sinuosity to which the posterior part of the incus was connected.
- e,* The glandulæ ceruminosæ, placed in a reticular substance.
- f,* The inner end of the meatus, without glands.
- g,* The membrana tympani.

FIG. 5.

*The TEMPORAL BONE,—the Squamous Part of which is cut off, and only as much of the Bony Part taken away as was necessary to shew the MEMBRANA TYMPANI bare.*

- a,* The mastoid process.
- b,* The styloid process.
- c,* The bony part of the meatus externus, half of which is cut off.
- d,* The membrana tympani in situ, viewed externally.
- e,* The long branch of the incus, which appears across this membrane, but is at a little distance from it.
- f,* The handle of the malleus, which is joined to the back part of the membrana tympani.
- g,* The laxator tympani in situ.

FIG. 7.

*Represents the same BONE as Fig. 6. and cut in the same manner, only the MEMBRANA TYMPANI is taken off, to shew the OSSICULA in situ, and bottom of the TYMPANUM.*

- a,* The malleus.
- b,* The incus.
- c,* The stapes seen in front; its head covered by the beak of the long branch of the incus, and its base stopping up the fenestra ovalis.
- d,* The fenestra rotunda.
- e,* The bottom of the tympanum, which is the surface of the os petrosum.
- f, g,* The semi-canal which incloses the internal muscle of the malleus,—the anterior part being seen without, and the posterior part within the tympanum.
- h,* The bony part of the iter a palato ad aurem, or EUSTACHIAN tube, half of it being cut off to shew its cavity.

FIG.



Fig. 1.



Fig. 2.

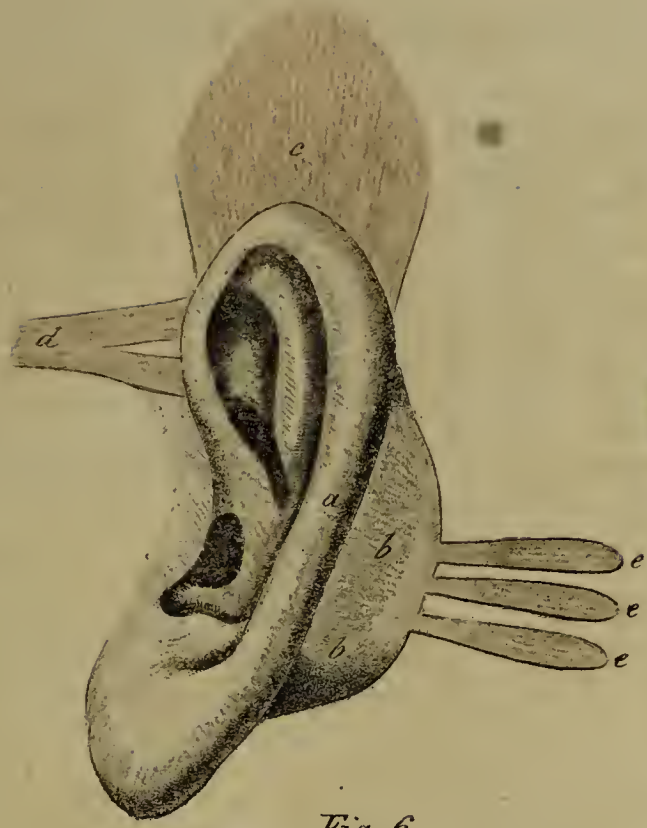
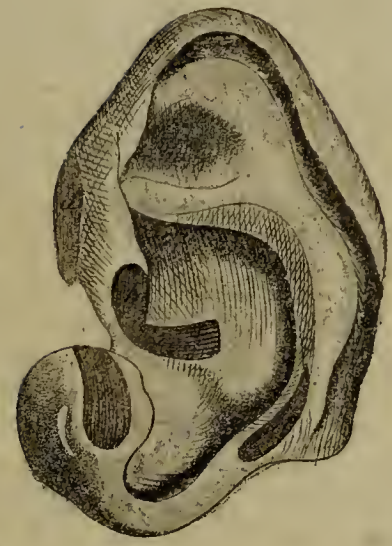


Fig. 3.



TAB. 88.  
Fig. 4.

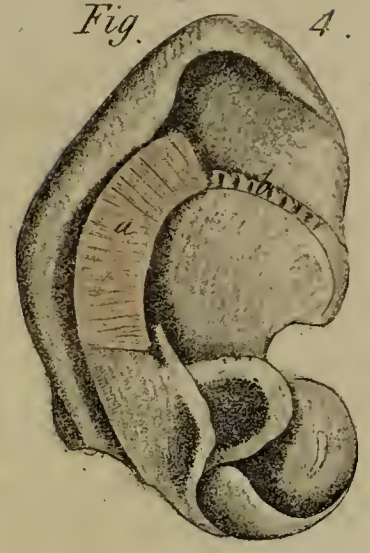


Fig. 5.

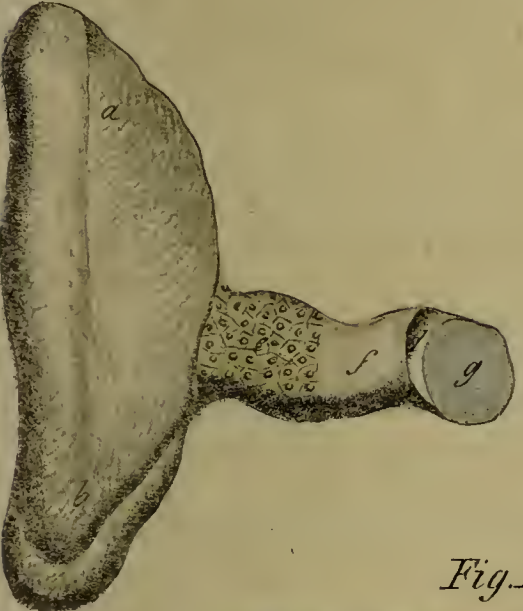


Fig. 6.

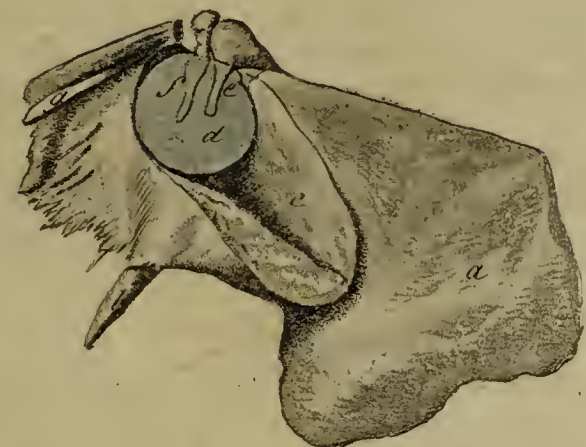


Fig. 7.

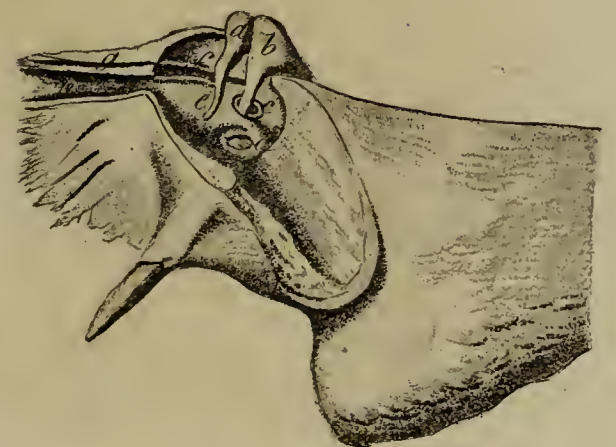


Fig. 11.

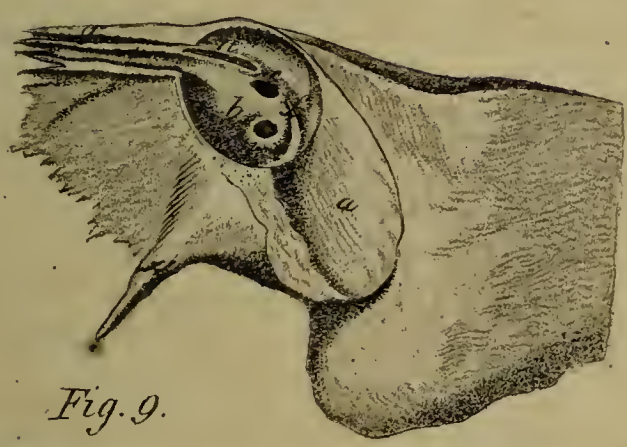


Fig. 8.

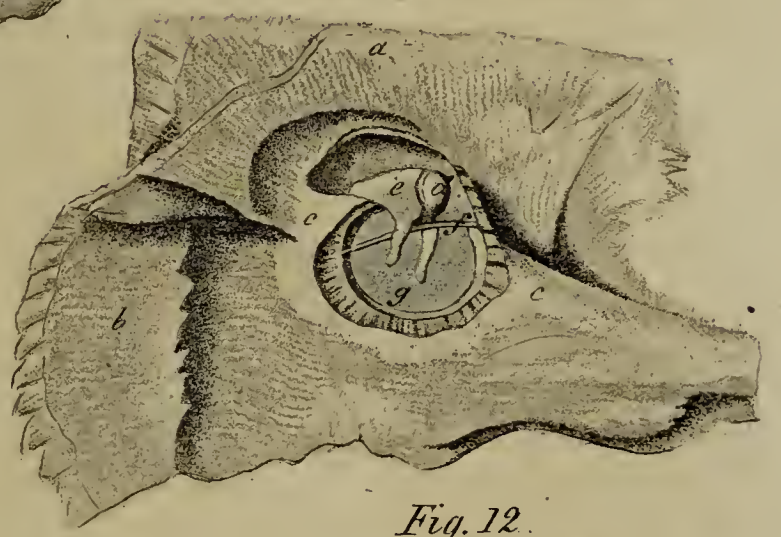


Fig. 9.

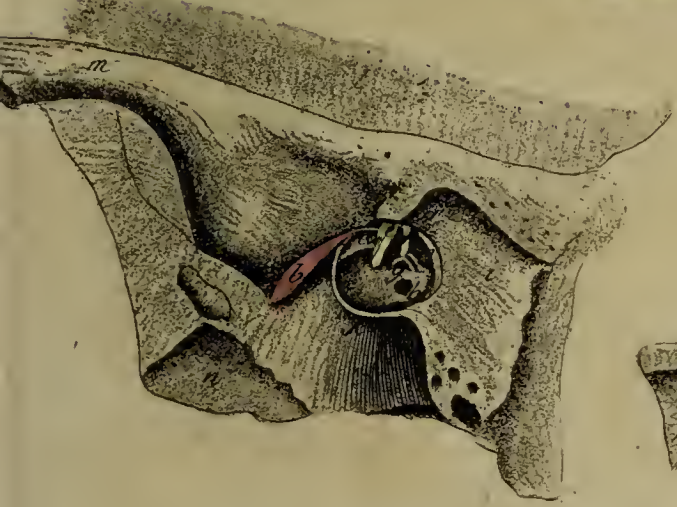


Fig. 10.

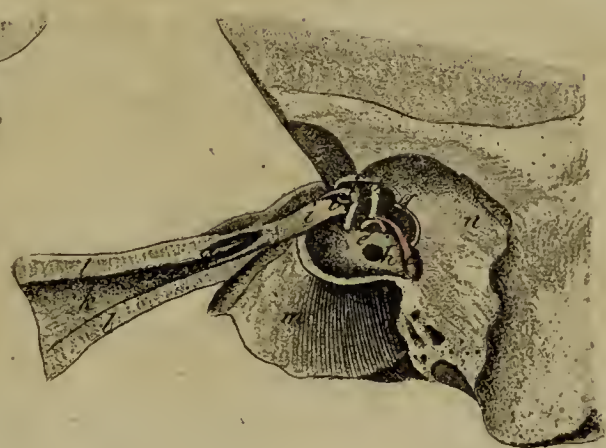


Fig. 12.





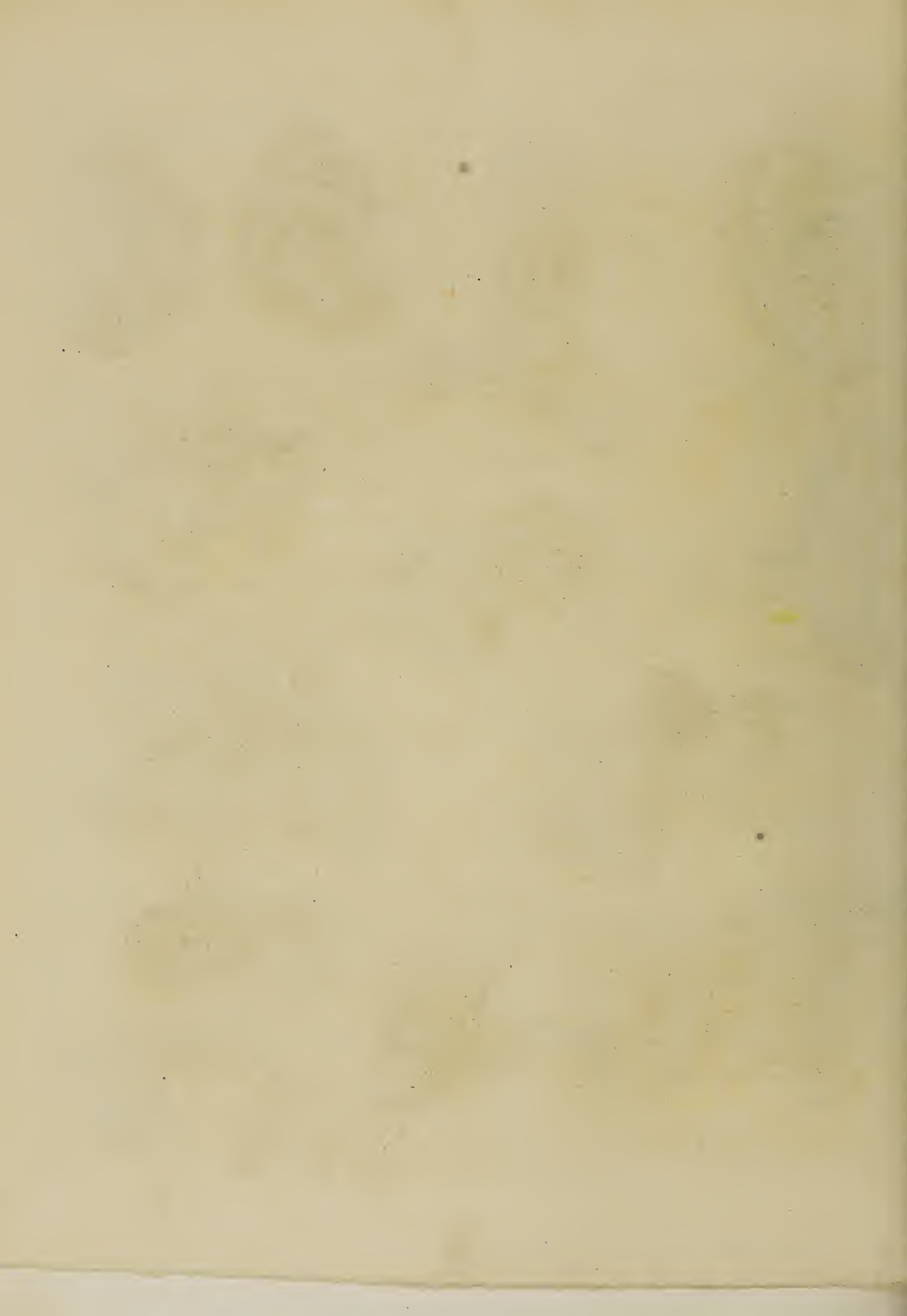




FIG. 8.

*Represents the Back or Inner Part of the TEMPORAL BONE, as much of it being cut off as was necessary to obtain a View of the MEMBRANA TYMPANI, upon which the Back Part of the MALLEUS and INCUS is shown, with the small Branch of the NERVE called CHORDA TYMPANI, and the CAVITY upon which the HEAD of the MALLEUS and the BODY of the INCUS rest, all in situ.*

- a, The inner part of the squamous process.
- b, The mastoid process.
- c, c, A section of the pars petrosa.
- d, The malleus.
- e, The incus, with its short branch resting upon the entrance of the passage into the cells of the mastoid process.
- f, The chorda tympani passing between the long processes of the malleus and incus.
- g, The inside of the membrana tympani.

FIG. 9.

*Represents the MUSCLES of the Internal EAR, with the OSSICULA and TEMPORAL BONE in their natural situation; also Part of the OS SPHENOIDES.*

- a, The *laxator tympani* of ALBINUS, arising from the upper part of the edge of the tympanum.—It is inserted into the handle of the malleus, near the root of its shorter process.—By some authors it is considered merely as a ligament.
- b, The *laxator tympani*.
- c, The tendon of the tensor tympani coming out of the small opening of the bony channel in which it is contained.
- d, The stapedius.
- e, The handle of the malleus.
- f, The long process of the incus.
- g, The stapes.
- h, The foramen rotundum.
- i, Part of the auditory passage left entire, which lies in the squamous and mastoid processes.
- k, The under edge of the tympanum.
- l, The squamous process.
- m, The zygomatic process.
- n, The pars petrosa.
- o, Part of the os sphenoides.

FIG. 10.

*The TENSOR TYMPANI and STAPEDIUS, with the Small BONES and the TEMPORAL BONE in their natural situation; also Part of the Soft Portion of the EUSTACHIAN TUBE.*

- a, The tensor tympani.
- b, The tendon of that muscle coming out of the bony

canal in which it is lodged, to be fixed to the long process of the malleus.

- c, The muscle of the stapes.
- d, The incus.
- e, The stapes.
- f, The malleus.
- g, The aqueduct of FALLOPIUS.
- h, The foramen rotundum.
- i, The osseous canal placed above the EUSTACHIAN tube, for containing the tensor tympani.
- k, The cartilaginous part of the EUSTACHIAN tube.
- l, l, The places from which the membranous part was cut off.
- m, The pars petrosa.
- n, Part of the meatus externus.

FIG. 11.

*Represents the TEMPORAL BONE, the SQUAMOUS PROCESS and Part of the BONY PASSAGE being removed, and, in general, all the Parts of the TYMPANUM obstructing the view of the PARS PETROSA, which forms the bottom of the TYMPANUM.*

- a, Part of the meatus externus.
- b, The promontory on the surface of the pars petrosa, which covers the scala tympani of the cochlea.
- c, The fenestra ovalis.
- d, ————— rotunda.
- e, The osseous canal which incloses the muscle of the stapes, from which the tendon passes out, to be inserted into the head of the stapes.
- f, The circumference which was occupied by the membrana tympani.
- g, h, The semi-canal which incloses the tensor tympani.
- i, Half of the bony passage of the EUSTACHIAN tube.

FIG. 12.

*The TEMPORAL BONE, prepared in such a manner as to shew the COCHLEA and SEMICIRCULAR CANALS in situ, and part of them cut open. They are somewhat magnified.*

- a, The vault of the vestibule.
- b, The fenestra ovalis.
- c, The fenestra rotunda open.
- d, The lamina spiralis divested of the spiral canal which covers it, and of the membrane which connects it to the surface of the canal.
- e, f, g, The three semicircular canals in situ.
- h, i, k, The tympanum.
- l, l, The styloid, and,
- m, The mastoid process.



# T A B L E LXXXIX.

## Various VIEWS of the INTERNAL ORGAN of HEARING.

FIG. 1.

*Represents the EAR viewed Anteriorly, or where it looks towards the FACE; but inclined a little to the OCCIPUT, to obtain a distinct View of the Four Small BONES of the TYMPANUM.*

- a*, The meatus auditorius externus.
- b*, That osseous portion from the wall of the mastoid sinuosity, to which the shorter process of the incus is fixed.
- c*, The osseous part of the EUSTACHIAN tube.
- d*, The anterior side of the cartilage of the EUSTACHIAN tube, from which the fleshy fibres of the tensor tympani take their origin.
- e*, The extremity of the FALLOPIAN aqueduct, through which the portio dura of the seventh pair of nerves passes.
- f*, The malleus.
- g*, The incus.
- h*, The stapes, between which and the incus the os orbiculare is seen.
- i*, The muscle of the stapes, freed from its osseous canal.
- k*, The tendon of the tensor tympani, also freed from its osseous canal.
- l*, The posterior semicircular canal.
- m*, The superior semicircular canal.
- n*, The exterior semicircular canal.
- o*, The vestibule, in the arch of which, according to this part of the view, only two of these holes are seen which transmit nervous twigs into its cavity.—The three remaining holes are seen in the following figure.
- p*, The canal of the cochlea.
- q*, The fleshy part of the circumflex muscle of the palate.
- r*, The tendinous part of that muscle.
- s*, The fleshy belly of the internal muscle of the malleus.
- t*, The external muscle of the malleus.
- v*, The chorda tympani.
- w*, The portio mollis of the auditory nerve, one part of which goes to the cochlea, and the other, which is divided into five twigs, to the vestibule;—two of these twigs are cut off, to obtain a view of the two holes in the arch of the vestibule, through which they entered.

FIG. 2.

*Represents the EAR, seen on the Posterior Part, or where it looks to the OCCIPUT, but turned forwards to a certain length, to obtain a View of the FENESTRA ROTUNDA, MEMBRANA TYMPANI, and also Part of the Four Small BONES.*

- a*, The FALLOPIAN aqueduct.
- b*, The origin of the EUSTACHIAN tube.
- c*, The posterior side of the cartilage of this tube.
- d*, The termination, or mouth of the tube.
- e*, The circumflex muscle of the palate.
- f*, The posterior semicircular canal.
- g*, The superior semicircular canal.
- h*, The exterior semicircular canal.
- i*, The vestibule, in the arch of which, from this part of the view, three of the five small holes are seen, which transmit nervous twigs into the vestibule.—Under these is the fenestra rotunda.
- k*, The base of the cochlea, perforated by numerous small holes for the transmission of its nerves.

FIG. 3.

*Represents the Sacculus Vestibuli, also the Zone or Lamina Spiralis of the Cochlea, and the Membranaceous Semicircular Canals, joined to the Portio Mollis of the Auditory Nerve;—of the natural Size.*

FIG. 4.

*The LABYRINTH inverted, so as to be viewed on that Part which looks to the CAVITY of the TYMPANUM, whereby the FENESTRA OVALIS and ROTUNDA are seen. The Parts are magnified.*

- a*, The posterior semicircular canal.
- b*, The superior semicircular canal.
- c*, The exterior semicircular canal.
- d*, The fenestra rotunda.
- e*, ————— ovalis,
- f*, The cochlea.

FIG.



Fig. 1.

Fig. 2.

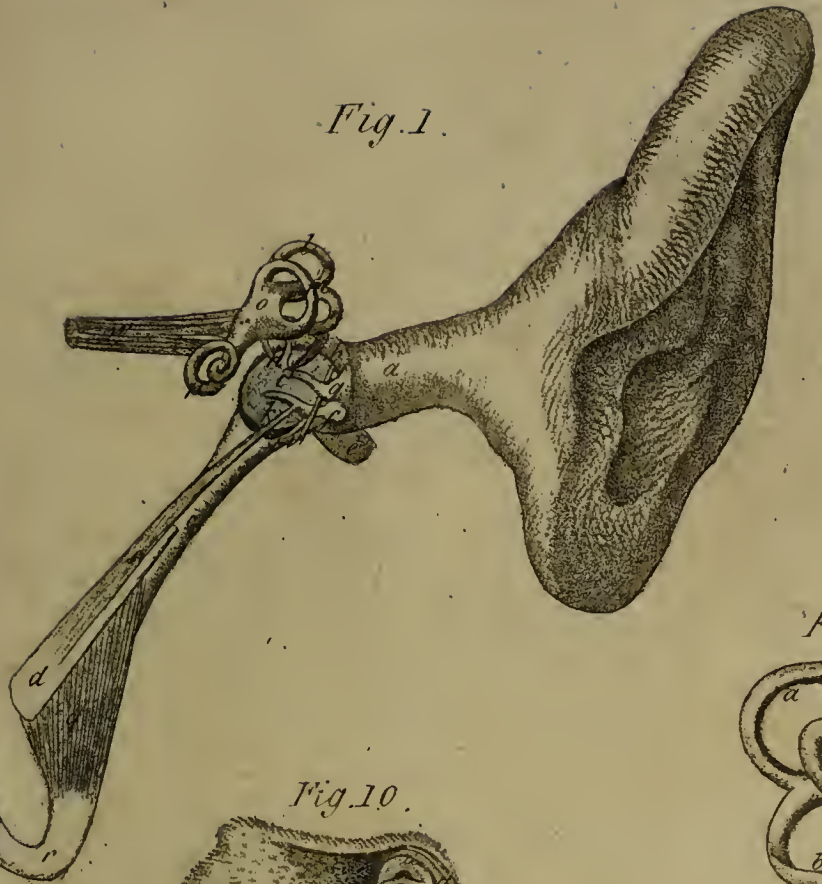


Fig. 4.

Fig. 3.



Fig. 10.

Fig. 6.

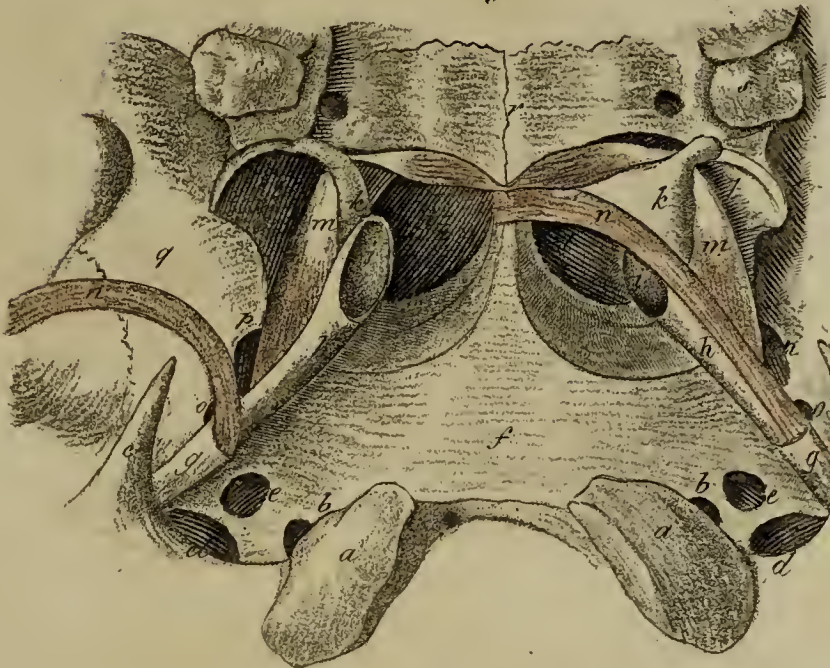


Fig. 5.

Fig. 11.



Fig. 7.

Fig. 8.

Fig. 9.



Fig. 12.

Fig. 13.

Fig. 14.

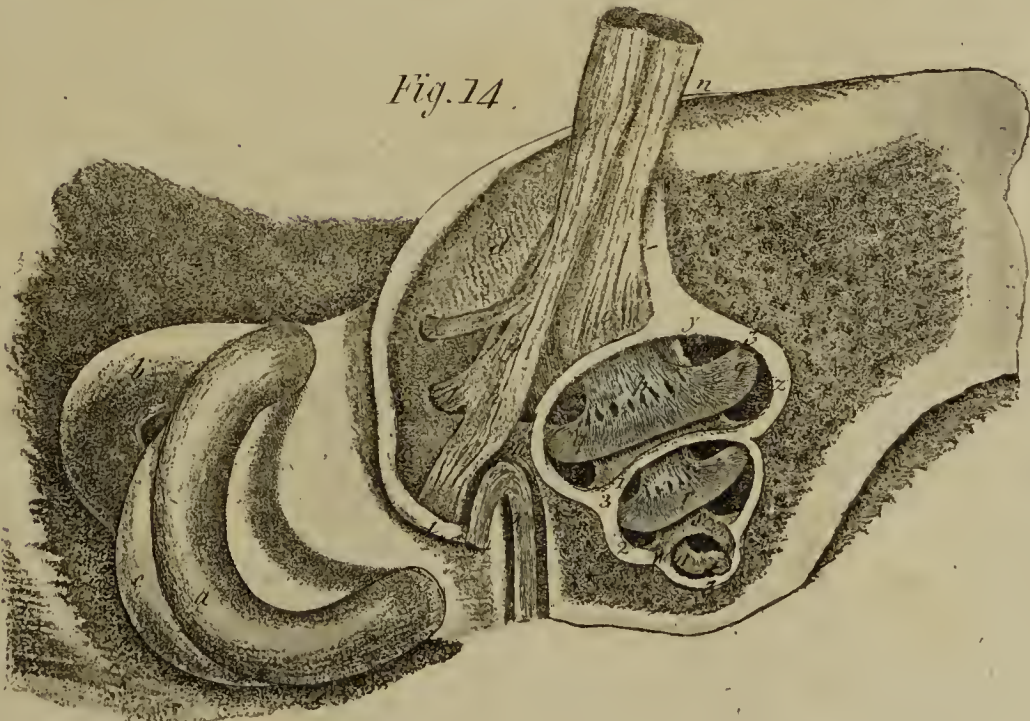
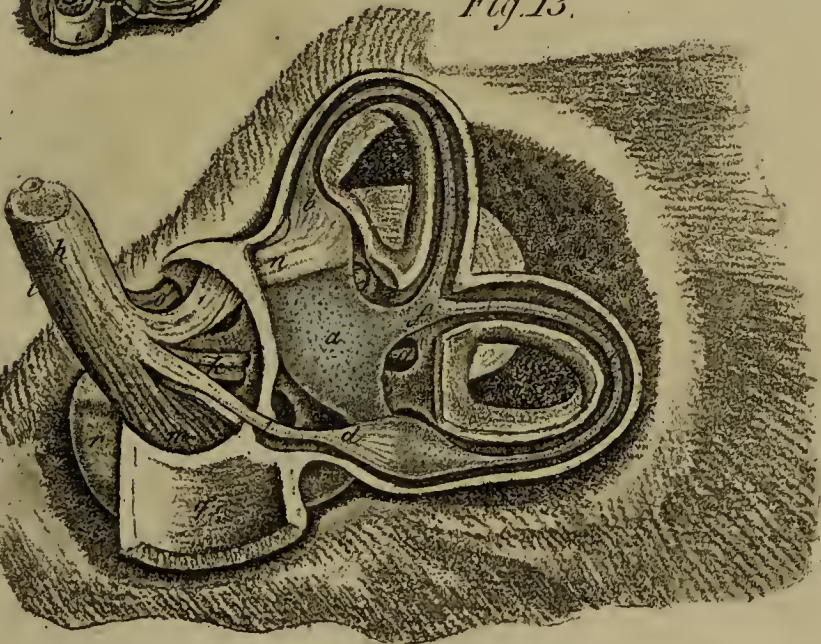








FIG. 5.

Shows the LABYRINTH seen on the side next the BRAIN, the Upper Part of the VESTIBLE removed, to obtain a View of its Cavity, and in it the Orifices of the FENESTRA OVALIS, and the SCALA VESTIBULI, in situ.

- a, The posterior canal.
- b, The superior canal.
- c, The common canal.
- d, The exterior canal.
- e, e, e, The cavity of the vestibule.
- f, The fenestra ovalis.
- g, The orifice of the scala vestibuli.

FIG. 6.

Part of the BASE of the CRANIUM, with the EUSTACHIAN TUBES opening into the Back Part of the NOSE.

- a, a, The condyles of the occipital bone.
- b, b, Holes for the transmission of the ninth pair of nerves.
- c, The styloid process of the right side.
- d, d, The holes for the transmission of the internal jugular veins.
- e, e, The holes for the entrance of the internal carotid arteries.
- f, The interior membrane of the nostrils, extending from thence to the pharynx;—left *in situ*.
- g, h, g, h, The EUSTACHIAN tubes;—g, g, Their osseous portions.
- i, i, Their mouths, or large extremities opening into the back part of the nose.
- k, k, The internal plates of the pterygoid processes of the sphenoid bone, over the inferior part of which the circumflex muscles of the palate transmit their tendons.
- l, l, The external plates of the pterygoid processes.
- m, m, The circumflex muscles of the palate, the tendons of which run over the inferior part of the plates k, k, to be inserted into the velum palati and semilunar edge of the ossa palati.
- n, n, The levatores palati muscles, the left of which remains *in situ*; but the right is separated from its fellow, and removed out of its place, that the progress and termination of the tube, and the insertion of the circumflexus palati muscle, may be distinctly seen.
- o, o, The foramina spinalia, for the entrance of the arteries of the dura mater.
- p, p, The foramina ovalia, through which the third branches of the fifth pair of nerves pass out.
- q, The temporal plate of the sphenoid bone.
- r, The ossa palati.
- s, s, The dentes sapientiæ.
- t, t, The internal or posterior foramina of the nose.

FIG. 7.

Shows the OS TEMPORIS of a Fœtus of nine months, entire; viewed from that part which looks to the CAVITY of the SKULL.

- a, The concave squamous portion.
- b, The extremity of the zygomatic process.
- c, The pars petrosa.
- d, The meatus of the common canal of the nerves, called *Meatus Auditorius Internus*.
- e, e, The upper portion of the superior semicircular canal, which, in the fœtus, is obviously elevated above the os petrosum.
- f, The superior portion of the posterior semicircular canal, which, in the fœtus, is in like manner frequently elevated.
- g, The osseous tube of the aqueduct of the vestibule.
- h, A cavity imprinted in the bone, receiving the extremity of the osseous tube of the aqueduct.
- i, A bristle introduced into the foramen of the aqueduct.
- k, —————. vena vestibuli.
- l, The entrance or arched margin of the inferior orifice of the aqueduct of the cochlea.
- m, A bristle introduced into this aqueduct.
- n, The foramen innominatum which leads to the VI-DIAN canal, through which a reflected branch passes from the second part of the fifth, to the portio dura of the seventh pair of nerves.
- o, A part where small blood-vessels penetrate the substance of the bone.
- p, A cavern found in the fœtus, under the superior semicircular canal, which, in the adult, is contracted into a foramen.
- q, The anterior wing of the upper side of the os petrosum covering the upper part of the tympanum.
- r, r, The joining of this plate with the pars squamosa.

FIG. 8.

Shows the Left LABYRINTH entire, with the Common CANAL of the NERVES, and the AQUEDUCTS, seen on the Part which looks to the OCCIPUT, and laid open by the removal of the surrounding BONE.

- a, The orifice of the meatus internus, or common canal of the nerves.
- b, The tuber, under which part of the vestibule and cochlea are hid.
- c, The superior semicircular canal.
- d, The posterior semicircular canal.
- e, Part of the exterior canal, seen in this attitude of the bone.
- f, The common canal formed by the union of the superior and posterior canals.
- g, The first part of the aqueduct of the vestibule, the size of the cavity of which does not exceed that of a small bristle.
- h, Part of the same aqueduct, gradually increasing into a horn, and compressed in some places.
- i, The broad extremity of the osseous cornu of the aqueduct.
- k, The arched entrance of the aqueduct of the cochlea.
- l, The



- l*, The narrow part of the same aqueduct, near the fenestra rotunda.  
*m*, The inferior orifice of the aqueduct of the cochlea.  
*n*, The semi-canal descending through the anterior and inferior part of the above orifice.  
*o*, A small foramen through which the vena cochleæ passes.

FIG. 9.

*The same LABYRINTH with that shewn in the preceding Figure, but here viewed from the Anterior Part, where it is turned towards the TEMPLE.*

- a*, The anterior part of the common canal of the nerves.  
*b*, Part of the superior semicircular canal.  
*c*, The posterior semicircular canal.  
*d*, The exterior semicircular canal.  
*e*, The vestibule.  
*f*, The orifice of the common canal.  
*g*, The orifice of the aquæductus vestibuli.  
*h*, The broad extremity of the same duct, corresponding to Fig. 8. *h, i*.  
*i*, The cochlea.  
*k*, Part of the first circle of the cochlea opened from the vestibule, to obtain a view of the lamina spiralis and scalæ.  
*l*, The lamina spiralis, with the scalæ on each side of it.  
*m*, The orifice of the aqueduct of the cochlea.  
*n*, The broad extremity of this duct, answering with Fig. 8. *k, l*.

FIG. 10.

*The Right LABYRINTH, viewed from the Outer Side, the VESTIBULE and SEMICIRCULAR CANALS being cut open.*

- a*, The superior semicircular canal.  
*b*, The posterior, and,  
*c*, The exterior.  
*d*, The elliptical cavity of the superior canal.  
*e*, ————— exterior canal.  
*f*, The orbicular cavity of the posterior canal.  
*g*, The common opening of the superior and posterior canals.  
*h*, The other orifice of the exterior canal.  
*i*, The osseous pyramid of the vestibule.  
*k*, The semi-oval cavity of the vestibule.  
*l*, The hemispherical cavity of the vestibule.  
*m*, The sulciform cavity of the vestibule, or the orifice of the aquæductus vestibuli.  
*n*, The cochlea.  
*o*, The sinus of the fenestra rotunda.  
*p*, The scala tympani.  
*q*, ————— vestibuli.  
*r*, The macula cribrosa.

FIG. 11.

*A View of the LABYRINTH as in the former Figure, magnified; with the addition of the Contents of the VESTIBULE and SEMICIRCULAR CANALS.*

- a*, The membranaceous tube of the superior semicircular canal.  
*b*, ————— posterior canal.  
*c*, ————— exterior canal.  
*d*, The ampulla of the membranaceous tube of the superior canal.  
*e, f*, The ampullæ of the other two membranaceous tubes.  
*g*, The sacculus vestibuli, or alveus communis of the membranaceous tubes.  
*h*, The membranaceous tube, entering,  
*i*, The canal common to the superior and posterior canals.  
*k*, The sacculus vestibuli opened.  
*l*, Branches of the portio mollis of the seventh pair of nerves, to the ampullæ of the superior and exterior canals.  
*m*, A nervous expansion on the sacculus vestibuli.  
*n*, A nervous expansion on the ampulla of the posterior canal.  
*o*, A pulpy expansion of the nerve in the bottom of the spherical sac.  
*p*, The sinus of the fenestra rotunda, at the beginning of the scala tympani.  
*q*, The scala vestibuli, separated from the scala tympani by the lamina spiralis.

FIG. 12.

*The Right LABYRINTH cut open, and viewed from the CAVITY of the CRANIUM.*

- a*, The canalis superior.  
*b*, ————— posterior.  
*c*, ————— exterior.  
*d*, The elliptical cavity of the superior canal.  
*e*, That of the exterior canal.  
*f*, The orbicular cavity of the posterior canal.  
*g*, The common canal; and before *g*, the other orifice of the exterior canal.  
*h*, The fenestra ovalis.  
*i*, The common canal of the nerves, or meatus auditorius internus.  
*k*, The foramina in the small fossula at the bottom of the meatus internus, for the passage of branches of the portio mollis.  
*l*, The macula cribrosa vestibuli.  
*m*, The foramina behind the hemispherical cavity of the vestibule, for the passage of branches of the portio mollis.  
*n*, A canal for the nerve which goes to the ampulla of the posterior canal.  
*o*, The cribriform spiral plate, through which branches of the portio mollis pass into the cochlea.  
*p*, The centre of the modiolus.  
*q*, The beginning of the lamina spiralis of the cochlea.  
*r*, The beginning of the aqueduct of FALLOPIUS.  
*s*, The cochlea.

FIG.



FIG. 13.

*The same Section of the LABYRINTH with that represented in the former figure, with the addition of the ALVEUS COMMUNIS, the MEMBRANACEOUS TUBES, and the AUDITORY NERVE.—The Parts much magnified.*

- a*, The alveus communis, or sacculus vestibuli.
- b*, The ampulla of the membranaceous tube of the superior canal.
- c*, The membranaceous tube of that canal.
- d*, The ampulla of the membranaceous tube of the posterior canal.
- e*, The membranaceous tube of that canal.
- f*, ————— the common canal.
- g*, ————— exterior canal.
- h, i*, The trunk of the seventh pair, or auditory nerve.
- k*, Filaments of the portio mollis of the seventh pair, to the spherical sac of the vestibule.
- l*, The smaller branch of the portio mollis, to the ampulla of the posterior membranaceous tube.
- m*, Filaments to the cochlea.
- n*, The larger branch of the portio mollis, to the ampullæ of the superior and exterior membranaceous tubes.
- o*, The portio dura of the seventh pair.
- p*, The beginning of the lamina spiralis of the cochlea.
- q*, The meatus auditorius internus, or common canal of the nerves.
- r*, The cochlea.

FIG. 14.

*A View of the LABYRINTH and SEVENTH PAIR of NERVES of the Right Side. The COCHLEA is cut on its Upper Part; the SEMICIRCULAR CANALS are left entire. The whole, as in the former Figure, is much magnified.*

- a*, The superior semicircular canal.
- b*, The posterior canal.
- c*, The exterior canal.

- d*, The meatus internus, or common canal of the nerves.
- e*, The portio mollis of the seventh pair of nerves.
- f*, The anterior fasciculus of the portio mollis.
- g*, A plexus formed by that fasciculus.
- h*, A gangliform enlargement of that fasciculus.
- i*, The larger branch of that fasciculus.
- k*, The smaller branch.
- l*, Filaments behind the bottom of the hemispherical cavity of the vestibule.
- m*, Filaments which pass through the beginning of the lamina spiralis of the cochlea.
- n*, The posterior fasciculus of the portio mollis.
- o*, Filaments passing through the cribriform plate, which forms the modiolus of the cochlea.
- p*, Nervous stamina, still included in the small osseous canals of the modiolus.—Below *p* are seen the principal branches of this part of the portio mollis, at the root of the lamina spiralis, and farther on, their reticulated appearance.
- q, q*, The continuation of these nerves upon the soft part of the lamina spiralis, in the first turn of the cochlea.
- r*, Similar parts to the above, in the second turn of the cochlea.
- s*, The infundibulum.
- t, u*, The last half-turn of the lamina spiralis mollis, with the continuation of the branches of the portio mollis dispersed upon it.
- v*, The termination of the scala tympani in the infundibulum.
- w*, ————— vestibuli in the infundibulum.
- x*, The portio dura of the seventh pair of nerves, part of which is reflected.
- y*, The scala tympani in the first turn of the cochlea.
- z*, ————— vestibuli in the first turn of the cochlea.
- 1. 2. The same parts seen in the second turn of the cochlea.
- 3. 3. 3. The cut edge of the scalæ of the cochlea;—the undermost 3. points out its cupola.



## T A B L E X C.

Additional VIEWS of the EAR;—all from the Right Side.

FIG. 1.

*The TEMPORAL BONE, with the MEMBRANA TYMPANI, and the MEMBRANA MUCOSA, which covers it in a Fœtus.*

- a*, The membrana tympani.
- b*, The manubrium of the malleus, adhering to the membrana tympani, and shining through it.
- c*, The membrana mucosa, separated from the membrana tympani, and turned upwards.
- d*, The ring of bone in which the membrana tympani is incased.

FIG. 2.

*The ARTERIES of the Inner SURFACE of the MEMBRANA TYMPANI of a Fœtus, viewed with a Magnifying Glass.*

- a*, A portion of the pars squamosa of the temporal bone, which is cut.
- b*, The annulus of the membrana tympani.
- c*, The fissura GLASERI.
- d*, The malleus.
- e*, The incus.

Two small arterious trunks are observed; one emerging under the long process of the malleus, arises from the ramus tympanicus of the temporal artery: The other, which runs between the manubrium of the malleus and the long crus of the incus, springs from the arteria stylo-mastoidea. They join together by various anastomoses.

FIG. 3.

*The ARTERIES of the PERIOSTEUM of the TYMPANUM.*

The periosteum is separated from the cavity of the tympanum, the arteries of which appear very conspicuous.

FIG. 4.

*The MALLEUS of an ADULT, of the Natural Size.*

FIG. 5.

*The same BONE magnified.*

- a*, The caput mallei, with a pit in the middle of it, surrounded by two prominent lines.
- b*, The cervix.
- c*, The processus brevis.
- d*, The processus longus, in this specimen, as often happens in the adult, terminating in the form of a spatula.
- e*, The manubrium, with its apex turned outwards and forwards.

FIG. 6.

*The MALLEUS of a new-born CHILD, cut across and magnified.*

FIG. 7.

*The INCUS of an ADULT, of the Natural Size.*

FIG. 8.

*The same BONE magnified.*

- a, a*, The body.
- b*, The foveola which receives the head of the malleus.
- c*, The long crus which joins the os sub-rotundum.
- d*, The short crus.

FIG. 9.

*The INCUS of a Fœtus of the Fifth Month, cut and magnified.*

- a*, A cavity in the body of the incus.
- b*, The cavity which receives the head of the malleus.

FIG. 10.

*The OSSICULUM SUB-ROTUNDUM of an ADULT.*

FIG. 11.

The same Bone magnified: The Surface which corresponds to the long Crus of the Incus, is a little concave; that which answers to the Apex of the Stapes is somewhat convex.



Fig. 1.



Fig. 2.

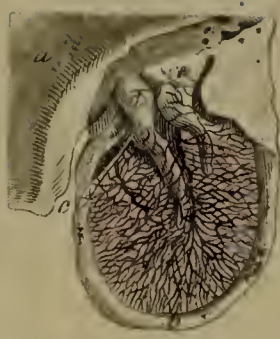


Fig. 3.

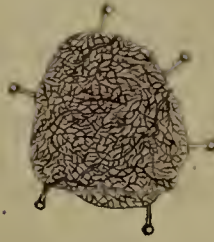


Fig. 5.

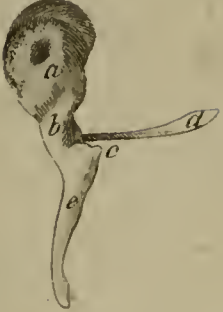


Fig. 6.



Fig. 4.



Fig. 7.



Fig. 8.



Fig. 9.

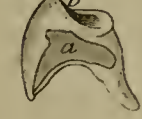


Fig. 10.

Fig. 11.



Fig. 12.



Fig. 13.

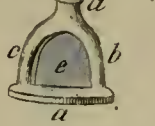


Fig. 14.



Fig. 16.

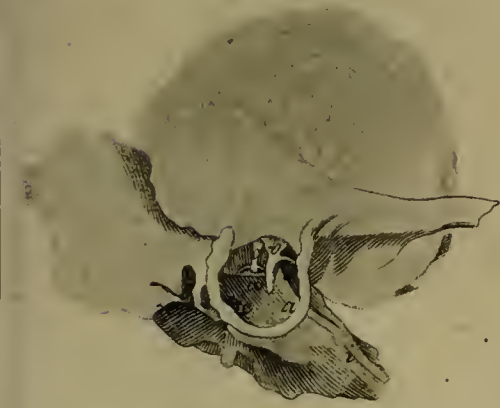


Fig. 15.



Fig. 17.



Fig. 18.



Fig. 19.

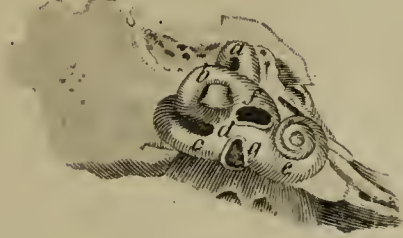


Fig. 20.



Fig. 21.

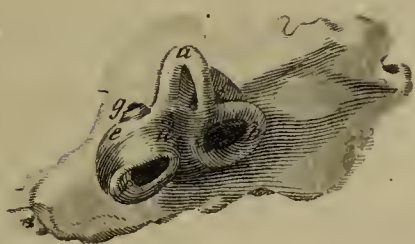


Fig. 22.

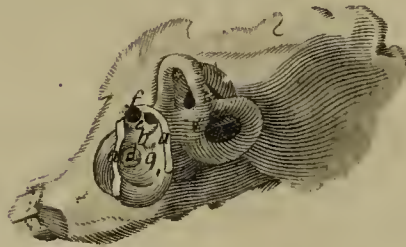


Fig. 23.



Fig. 24.



Fig. 25.



Fig. 27.

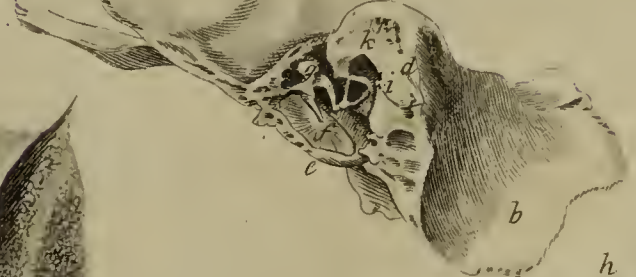


Fig. 26.

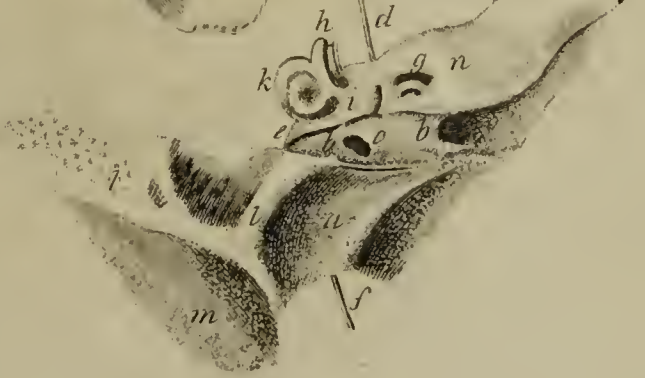








FIG. 12.

*The STAPES of an ADULT of the Natural Size.*

FIG. 13.

*The same BONE magnified.*

- a*, The basis.
- b, c*, The crura.
- d*, The apex which joins the ossiculum sub-rotundum.
- e*, The membrane which occupies the space between the crura.

FIG. 14.

*The BASIS of the STAPES magnified, seen from the Inner Side, or that corresponding with the FENESTRA OVALIS.*

FIG. 15.

*The OS TEMPORIS of a CHILD, with the MEMBRANA TYMPANI and OSSICULA AUDITUS separated from the PARS PETROSA, and viewed from the Anterior and Inner Side.*

- a*, The anulus membranæ tympani.
- b*, The membrana tympani adhering to a groove of the anulus.
- c*, Part of the tympanum formed by the pars squamosa.
- d*, The malleus; its long process is placed in a groove of the anulus.
- e*, The incus.
- f*, The basis of the stapes, the other parts of the bone not being seen in this view.
- g*, The part where the pars squamosa joined the petrosa.
- h*, The pars squamosa.
- i*, The zygomatic process.

FIG. 16.

*The TEMPORAL BONE of a CHILD, viewed obliquely from the Under and Outer Part; the MEMBRANA TYMPANI being removed.*

- a*, The tympanum.
- b*, The malleus, with its manubrium, and long and short processes.
- c*, The long process of the incus.
- d*, The stapes fixed in the fenestra ovalis.
- e*, The fenestra rotunda.
- f*, The semi-canal for lodging the tensor tympani.
- g*, The exit of the canalis FALLOPII.
- h*, The part which gives origin to the styloid process.
- i*, Part of the EUSTACHIAN tube.

FIG. 17.

*The Under Part of the TEMPORAL BONE, seen from the Outer Side, after the ANULUS and Small BONES of the EAR have been removed.*

- a, a, a*, The edge to which the anulus and pars squamosa were connected.
- b—g*, The tympanum.
- b*, The prominence between the vestibule and cochlea.
- c*, The promontory or prominence over the cochlea.
- d*, The prominence over the canal of FALLOPIUS.
- e*, The prominence over the sheath or receptacle of the musculus stapedius.
- f*, Part of the tympanum belonging to the pars squamosa.
- g*, The semi-canal of the tensor tympani.
- h*, The fenestra ovalis.
- i*, ————— rotunda.
- k*, Part of the EUSTACHIAN tube.
- l*, The foramen stylo-mastoideum.
- m*, The canalis caroticus.
- n*, The fossa of the jugular vein.

FIG. 18.

*The BOTTOM of the TYMPANUM, with the CANALIS FALLOPII, and Receptacle of the MUSCULUS STAPEDIUS cut longitudinally.*

- a*, Part of the FALLOPIAN canal, which passes by the tympanum.
- b*, The exit of this canal, or the foramen stylo-mastoideum.
- c*, The receptacle of the stapedian muscle, or the eminentia pyramidalis tympani.

FIG. 19.

*The BONE in the Bottom of the TYMPANUM, incrusting the LABYRINTH, is removed with the CANALIS FALLOPII and EMINENTIA PYRAMIDALIS, that the LABYRINTH may entirely appear.*

- a—e*, The labyrinth.
- a, b, c*, The semicircular canals; *a*, the superior; *b*, the exterior; *c*, the posterior.
- d*, The vestibule.
- e*, The cochlea.
- f*, The fenestra ovalis.
- g*, ————— rotunda.

FIG. 20.

*The same TEMPORAL BONE which is exhibited in Fig. 15. shewn here from the Inner Side.*

- a*, The pars squamosa.
- b*, The zygomatic process.

*c, A*



- c*, A projection of the superior semicircular canal.  
*d*, ————— posterior semicircular canal.  
*e*, The meatus auditorius internus, or common canal of the acoustic nerve, and communicans faciei.  
*f*, The beginning of the FALLOPIAN canal.  
*g*, The exit or external orifice of the aquæductus vestibuli.  
*h*, ————— cochleæ.

FIG. 21.

*The PARS SQUAMOSA, and the BONE which incrusts the LABYRINTH and Common CANAL of the former Figure removed.*

- a—e*, The labyrinth.  
*a, b, c*, The osseous semicircular canals; *a*, the superior; *b*, the posterior; *c*, The exterior.  
*d*, The vestibule.  
*e*, The cochlea.  
*f*, The meatus auditorius internus.  
*g*, The beginning of the canalis FALLOPII, which runs through the tympanum.

FIG. 22.

*A SECTION of the CANALIS NERVORUM COMMUNIS.*

- a, a*, The longitudinal section of the canalis nervorum communis.  
*b—f*, The bottom of the common canal divided into two unequal sized cavities, by an intermediate spine.  
*b*, The spine separating the two cavities.  
*c, d*, The larger cavity, the back part of which is opposed to one of the gyri of the cochlea; the fore part forms the base of the modiolus.  
*e*, The smaller cavity.  
*f*, A foramen in the smaller cavity, which is the beginning of the canalis FALLOPII.

The other parts are nearly the same as in the former Figure.—See also Tab. XCI. Fig. 1.

FIG. 23.

*The CANALIS NERVORUM COMMUNIS, to shew the entire LABYRINTH.*

- a—e*, The labyrinth.  
*a, b, c*, The semicircular canals; *a*, the superior; *b*, the posterior; *c*, the exterior.  
*d*, The vestibule; the letter points also at the bottom of the canalis nervorum communis, which forms the basis of the modiolus.  
*e*, One of the gyri of the cochlea; the *e* under it is placed over part of the cochlea opposed to the fenestra rotunda.  
*f*, The beginning of the FALLOPIAN canal.

FIG. 24.

*The EAR, seen from its Outer and Fore Part, in a dried Preparation.*

- a*, A portion of the squamous part of the temporal bone.  
*b*, The mastoid, and,  
*c*, The styloid processes.  
*d*, The under end of the condyloid or articular cavity, concealing the cavity of the internal carotid artery, and internal jugular vein.  
*e—h*, The outer ear; *e*, the helix; *f*, the antihelix; *g*, the lobe of the ear; *h*, the concha.  
*i, i*, The meatus auditorius, laid open to its bottom.  
*k*, The connexion of the cartilage of the ear to the osseous part of the meatus externus.  
*l*, The membrana tympani, fixed in an osseous groove, at the inner end of the meatus externus, and hollow near its middle, where it is connected to the under end of the malleus, which is seen shining through it.  
*m*, A section of the carotic canal.  
*n*, The point of the pars petrosa. At the under side of the membrana tympani, the labyrinth is exposed, with its passages laid open, of which the following appear in this view; viz.  
*o*, The superior, and,  
*p*, The exterior semicircular canal.  
*q*, The vestibule.  
*r, r*, The cochlea.  
*s*, The beginning of the canalis FALLOPII.

FIG. 25.

*The TYMPANUM and LABYRINTH, viewed from the Upper and Fore Part, after removing the OSSEOUS SUBSTANCE which covered them.*

- a, a*, The membrana tympani, with the light shining through it from the outside; shewing at the same time the boundary of the tympanum.  
*b*, The incus, with the os orbiculare at its under extremity; the stapes being removed to procure a view of the vestibule.  
*c*, The malleus, joined to the incus and to the membrana tympani.  
*d, e, f*, The three semicircular canals laid open; *d*, the vestibule; *e*, the horizontal; and *f*, the oblique canal.  
*g*, The vestibule, also laid open.  
*h, h*, A section of the meatus auditorius internus.  
*i*, The beginning of the canalis FALLOPII.  
*k—p*, The different turns of the cochlea; *k, k*, the scalæ; *l*, the lamina spiralis, complete behind; the osseous part only is represented before; *m*, the modiolus; *n*, the partition between the first and second gyri of the cochlea; *o*, the second gyrus, in which are seen the two scalæ, with the lamina spiralis between them; *p*, the infundibulum, with the hamulus, or termination of the lamina spiralis projecting into it.

*q*, The



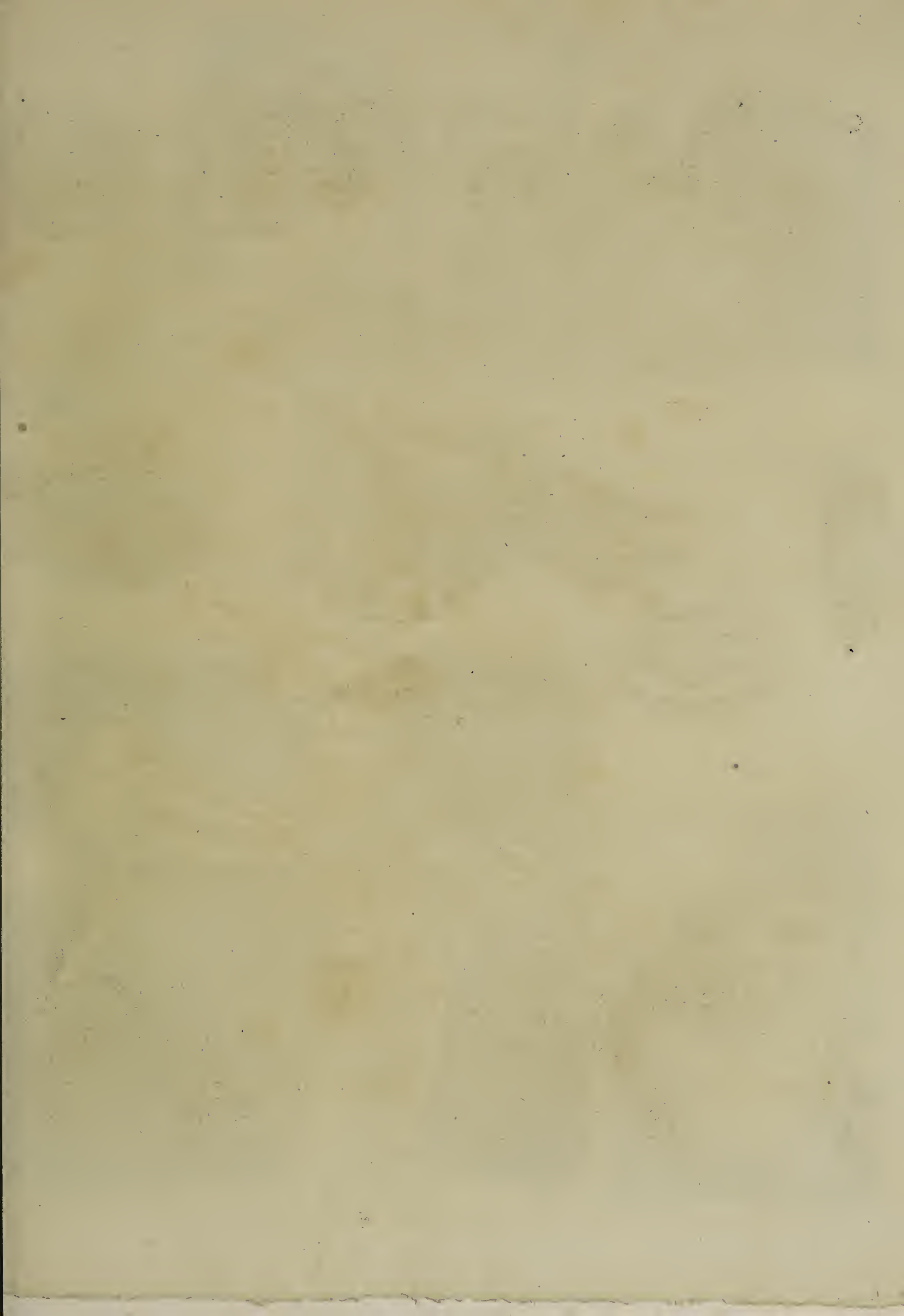




Fig. 1.

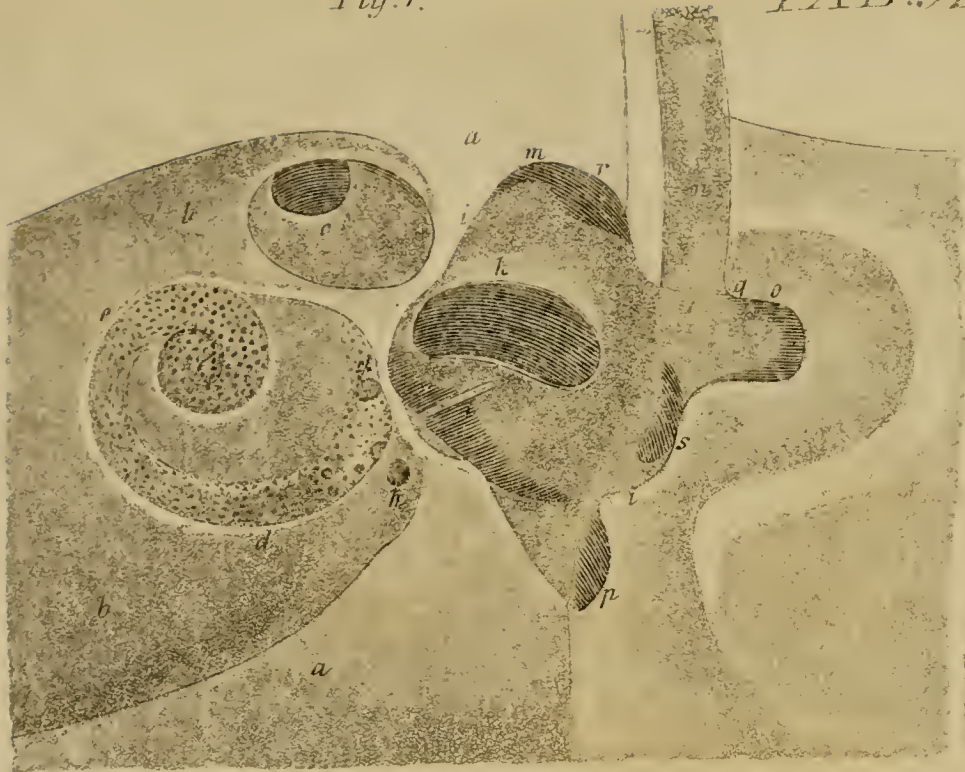


Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.

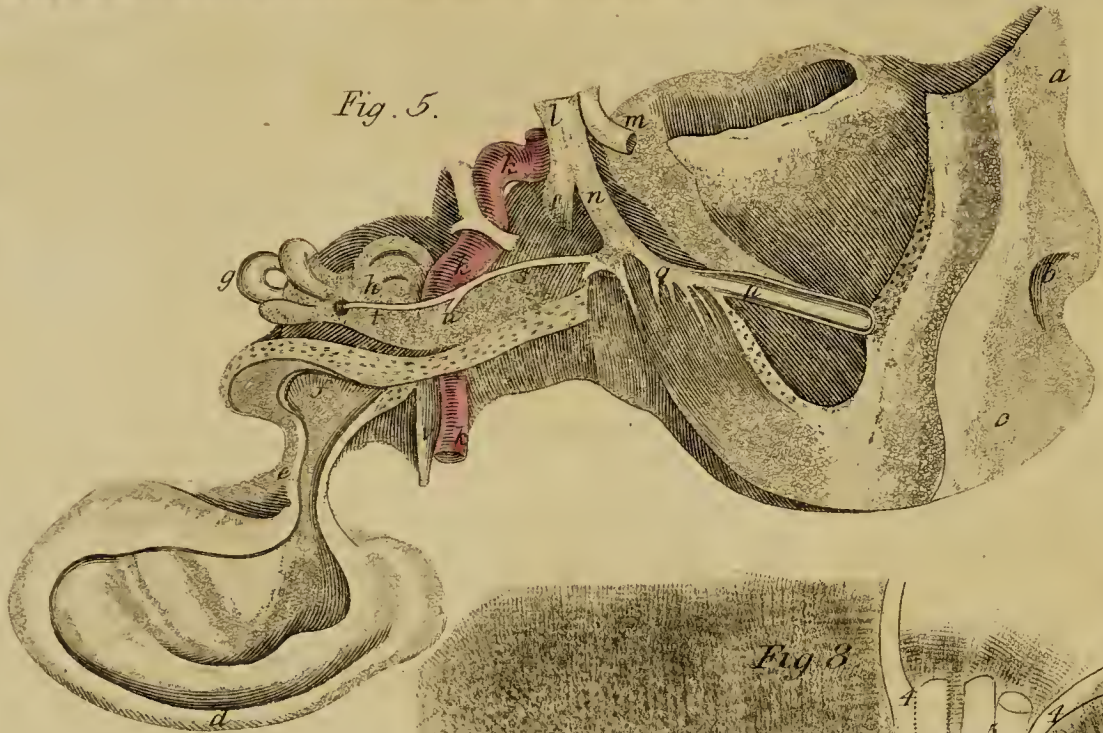


Fig. 6.

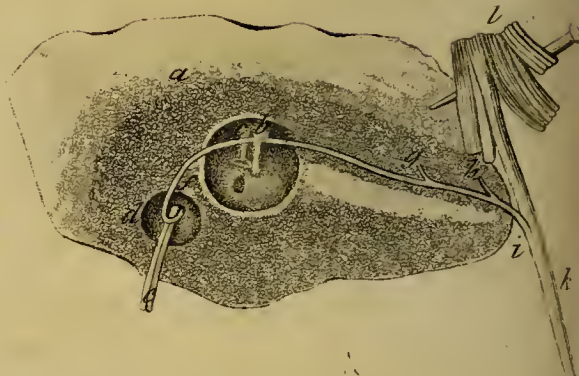


Fig. 7.

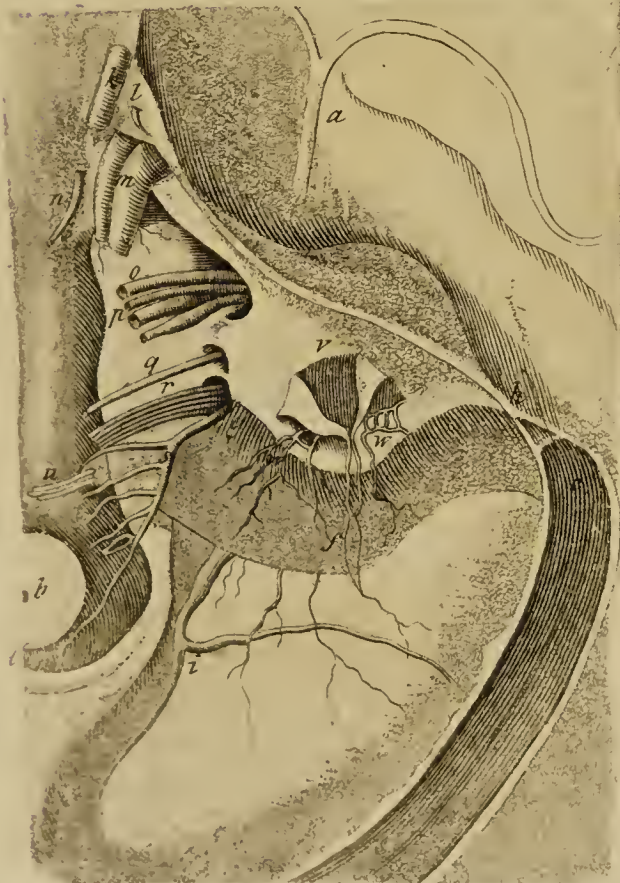
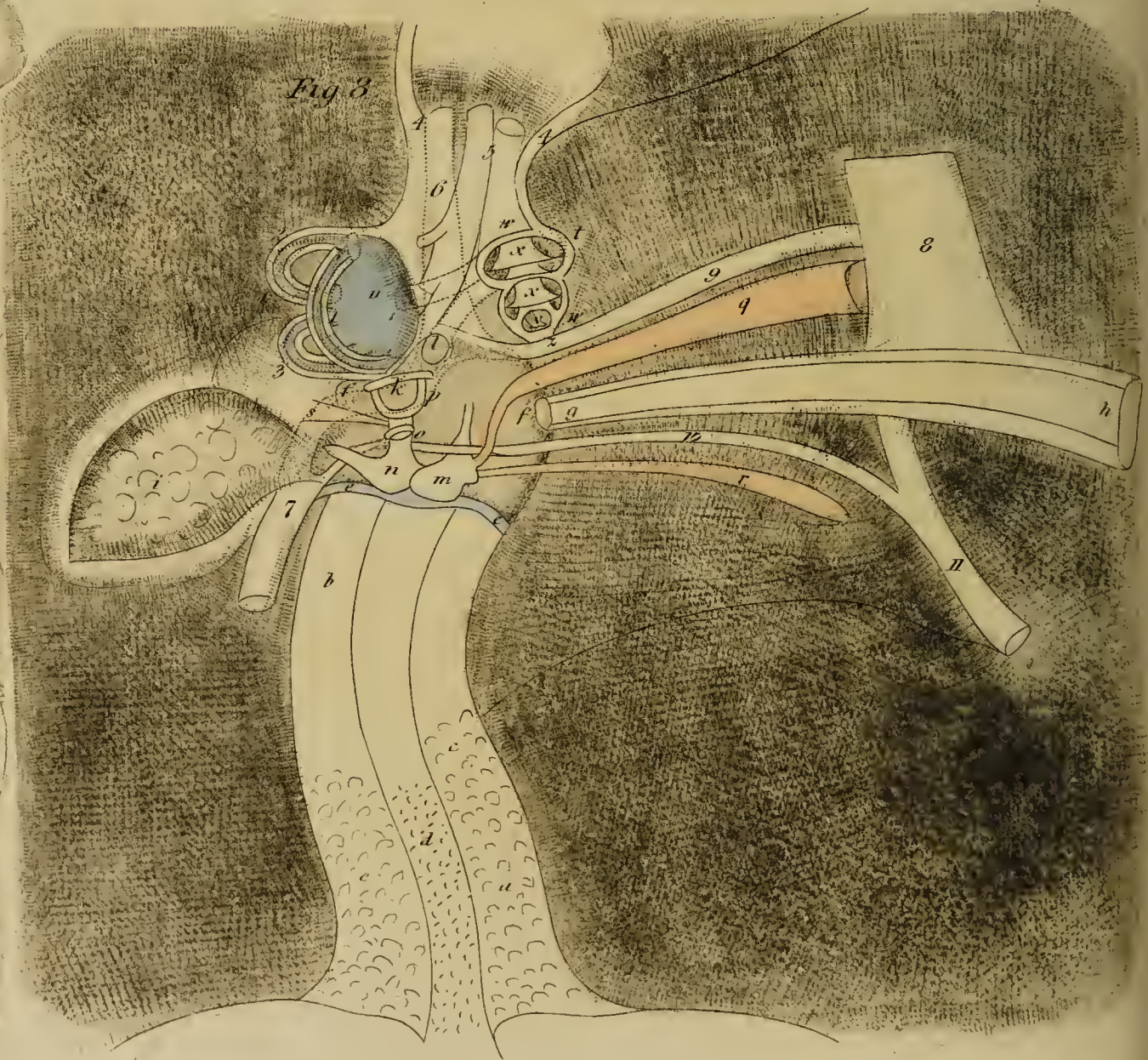


Fig. 8.





- q*, The passage of the internal carotid artery.  
*r*, The point of the pars petrosa.  
*s, t*, The passage of the lateral sinus; *t*, the part where it goes through the cranium.  
*u, v*, The cells of the bone.

FIG. 26.

*The Os TEMPORIS, so prepared as to shew the LABYRINTH, &c. from the Upper and Outer Side.*

- a*, A section of the meatus externus.  
*b, b*, The bottom of the tympanum.  
*c*, The fenestra ovalis, the rotunda being concealed in this oblique view.  
*d, e, f*, A bristle put into the aqueduct of FALLOPIUS; *d*, its entrance at the bottom of the meatus internus; *e*, its continuation at the inner and back part of the tympanum; *f*, its exit at the foramen stylo-mastoideum.  
*g*, A section of the cochlea.  
*h, i, k*, The three semicircular canals; *h*, the superior, and *i*, the exterior cut open; *k*, the interior.

- l, l*, A section of the bone.  
*m*, The mastoid process.  
*n*, A section of the pars petrosa.  
*o*, The canalis caroticus.

FIG. 27.

*A Section of the TEMPORAL BONE of a CHILD, shewing the TYMPANUM, with the OSSICULA TYMPANI in situ, from the Fore and Inner Part.*

- a*, The squamous process.  
*b*, The part which forms the future mastoid process.  
*c*, The zygomatic process.  
*d*, A section of the pars petrosa.  
*e*, The ring of bone which surrounds,  
*f*, The membrana tympani.  
*g*, The malleus, with its handle fixed to the membrana tympani.  
*h*, The incus articulated with,  
*i*, The stapes, by the intervention of the os orbiculare.  
*k*, The vestibule laid open.

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## T A B L E X C I.

VIEWS of the ORGAN of HEARING, continued.—All the Figures belong to the Right Side of the HEAD.

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FIG. 1.

*Shews the Passages for the BRANCHES of the PORTIO MOLLIS into the COCHLEA and VESTIBLE; and the Cavity of the VESTIBLE laid open, by removing a Portion of the Inner and Back Part of the Os PETROSUM.*

- a, a*, A section of the os petrosum.  
*b, b*, The bottom of the canal, which contains the right branches of the auditory or seventh pair of nerves.  
*c*, The beginning of the canal for the portio dura of the seventh pair.  
*d, e*, A cribriform plate, through which the branches of the portio mollis of the seventh pair pass into the cochlea.  
*f*, The continuation of that plate, forming the centre and bottom of the cavity of the modiolus.

- g, h*, Cribriform plates, through which branches of the portio mollis pass into the vestibule.  
*i, i*, The cavity of the vestibule laid open by cutting away the bone which covers its posterior part.  
*k*, The foramen ovale.  
*l*, A probe passed from the vestibule into the scala vestibuli of the cochlea.  
*m*, The anterior, and, *n*, the posterior opening of the superior semicircular canal.  
*o*, The upper, and, *p*, the under end of the posterior semicircular canal.  
*q*, The termination of the tube which is common to the superior and posterior semicircular canals.  
*r*, The anterior, and, *s*, the posterior extremity of the exterior semicircular canal.



FIG. 2.

*A View, from above, of the COCHLEA, after removing part of the OS PETROSUM.*

- a, a,* A section of the os petrosum.
- b,* Part of the canal for the internal carotid artery.
- c, c,* The side of the cochlea viewed somewhat obliquely.
- d, e, f, g,* The outer part of the modiolus, which is cribriform or pierced with holes, for the passage of the branches of the portio mollis.
- h,* A wire passed between two lamellæ of which the modiolus consists.
- i,* The osseous septum between the first and second gyri of the cochlea, composed of two plates.
- k,* The osseous septum which separates the second gyrus from the infundibulum.
- l,* The first turn of the osseous part, or root of the lamina spiralis.
- m,* Part of the lamina spiralis cut, to shew that it is composed of two plates, between which branches of the portio mollis are lodged, which afterwards pass through the minute holes seen on the edge of the under part of the lamina.
- n,* The second turn of the osseous part of the lamina spiralis.
- o,* The hamulus, or termination of the lamina spiralis.
- p,* The infundibulum.
- q, r,* The first and second scalæ of the tympanum.
- s, t,* The first and second scalæ of the vestibule.

FIG. 3.

*Represents the COCHLEA, from the Fore and Outer Part, after removing a Portion of the OS PETROSUM.*

- a,* The fore and outer side of the os petrosum.
- b,* The basis of the cochlea.
- c,* The scala tympani.
- d,* The outer edge of the osseous part of the lamina spiralis, perforated by innumerable holes for the passage of nerves.
- e,* A ridge in the middle of the osseous part of the lamina spiralis, produced by a separation of the plates which compose it.
- f,* The scala vestibuli.
- g,* The osseous septum which divides the first from the second gyrus of the cochlea.
- h,* The second gyrus of the cochlea.
- i,* The hamulus of the lamina spiralis.
- k,* The infundibulum.

FIG. 4.

*Represents the Distribution of the BRANCHES of the PORTIO MOLLIS in the COCHLEA.*

- a,* The modiolus.
- b, b,* The plexus of nerves on the osseous part of the lamina spiralis.

- c,* The plexus of nerves on the outer and softer part of the lamina spiralis.
- d, e, f,* The outer part of the lamina spiralis dividing into its two constituent membranes; *d,* the part continued to line the scala vestibuli; and, *f,* the part continued to line the scala tympani.

FIG. 5.

*The EAR of a Child, so prepared as to shew the NERVE contained in the CANALIS PTERYGOIDEUS of the SPHENOID BONE, which joins the Second Branch of the Fifth Pair to the First Ganglion of the GREAT SYMPATHETIC NERVE, and to the PORTIO DURA of the Seventh Pair.*

- a, b, c,* The side of the nose and upper lip.
- d,* The outer ear.
- e,* The meatus externus laid open.
- f,* The membrana tympani.
- g,* The three semicircular canals.
- h,* The cochlea.
- i,* The tympanum.
- k,* The internal carotid artery.
- l,* The trunk of the fifth pair of nerves.
- m, n, o,* The three branches of the fifth pair, the first and third of which are divided.
- p,* The infra-orbital branch of the second of the fifth.
- q,* Descending branches from the second of the fifth.
- r,* The nasal branch of the second of the fifth running towards the inner part of the nose.
- s,* A branch reflected from the second branch of the fifth through the canalis caroticus.
- t,* A branch from the branch *s,* which joins the portio dura of the seventh pair.
- u,* A branch descending from *s,* to terminate in,
- v,* The uppermost cervical ganglion of the great sympathetic nerve.

FIG. 6.

*The CHORDA TYMPANI joining the PORTIO DURA of the Seventh Pair to the LINGUAL BRANCH of the Third Portion of the Fifth Pair: the BONE which covered it externally being removed.*

- a,* The temporal bone.
- b,* The malleus.
- c,* The incus.
- d,* The foramen stylo-mastoideum.
- e,* The portio dura of the seventh pair.
- f,* The rise of the chorda tympani.
- g, h,* Small nerves connected with the chorda tympani.
- i,* The termination of the chorda tympani in,
- k,* The lingual branch of the third portion of the fifth pair of nerves.
- l,* The trunk of the third pair.

FIG.



FIG. 7.

The Right Posterior Part of the Inner Side of the Base of the SKULL, covered with the DURA MATER, in which the Membranous Cavity of the AQUÆDUCTUS VESTIBULI is seen opened, with the LYMPHATIC VEINS which arise from it, and the TRUNKS of all the NERVES which proceed from the BRAIN, from the Third to the Ninth Pair.

- a*, The principal artery of the dura mater.  
*b*, The beginning of the spinal marrow separated from the medulla oblongata.  
*c, e*, The right lateral sinus opened, the tentorium being cut off.  
*f*, The remaining broader part of the lateral sinus descending behind the right os petrosum, covered with the dura mater.  
*g*, The part under which is the extremity of the lateral sinus, terminating in the diverticulum of the jugular vein.  
*h*, The triangular orifice of the superior petrosal sinus, by which it communicates with the lateral sinus.  
*i*, The posterior artery of the dura mater.  
*k*, The right nerve of the third pair.  
*l*, The nerve of the fourth pair.  
*m*, ————— fifth pair.  
*n*, ————— sixth pair.  
*o*, The portio dura of the seventh pair.  
*p*, The portio mollis of the seventh pair.  
*q*, The nervus glosso-pharyngeus of the eighth pair, penetrating under the entrance of the inferior orifice of the aquæductus cochleæ.  
*r*, The pars vaga of the eighth pair.  
*s*, The nervus accessorius of the eighth pair.  
*t*, Its root from the spinal marrow.  
*u*, The nerve of the ninth pair.  
*v*, The membranous cavity of the aquæductus vestibuli opened.  
*w, w*, Small lymphatic veins, according to the author of the figure, filled with quicksilver, arising from the membranous cavity of the aqueduct, and spread over the lateral sinus.

FIG. 8.

A Sketch taken from different Figures, but in the enlarged state, to give at one glance, a View of the ORGAN of HEARING in general. The Parts are supposed to be seen from above, after removing the Upper Side of the TYMPANUM, and laying open the MEATUS AUDITORIUS EXTERNUS, MASTOID CELLS, and EUSTACHIAN TUBE. In a Composition of this kind, considerable allowance must be made for the Proportion and Situation of these Parts.

- a, b*, The meatus auditorius externus laid open longi-

- tudinally; *a*, the cartilaginous, and *b*, the osseous part of the meatus.  
*c, c*, The glandulæ ceruminosæ.  
*d*, The mouths of the ducts of these glands.  
*e, e*, The upper edge of the membrana tympani.  
*f, f*, The extent of the tympanum.  
*g, h*, The EUSTACHIAN tube;—*g*, the opening into the tympanum;—*h*, the opening into the nose.  
*i*, The cells of the mastoid process, communicating with each other, and with the cavity of the tympanum.  
*k*, The fenestra ovalis, shut by the base of the stapes.  
*l*, The fenestra rotunda, leading by the dotted lines to one of the scalæ of the cochlea.  
*m—p*, The ossicula auditus;—*m*, the malleus;—*n*, the incus;—*o*, the os orbiculare;—*p*, the stapes.  
*q*, The tensor tympani, its tendon passing across the tympanum to be fixed to the malleus.  
*r*, The laxator tympani.  
*s*, The stapedius.  
*t, t*, The labyrinth, consisting of vestibule, cochlea, and semicircular canals.  
*u*, The vestibule, filled by the sacculus vestibuli.  
*v*, A round hole leading to one of the scalæ of the cochlea, behind, are the orifices of the semicircular canals.  
*w, w*, The cochlea.  
*x, x*, The lamina spiralis, winding round the modiolus, and terminating in,  
*y*, The hamulus, which is covered by,  
*z*, The cupola.  
 1. The superior osseous semicircular canal, with an ampulla at its outer extremity.  
 2. The posterior osseous semicircular canal, forming a common tube with the superior one.  
 3. The exterior osseous semicircular canal. Within the osseous, the membranous semicircular canals are seen, continued from the sacculus vestibuli.  
 4. 4. The meatus auditorius internus.  
 5. The portio mollis divided into two parts; one going by different branches to the vestibule and semicircular canals, the other by innumerable filaments through the cribriform plate of the cochlea, to the pulpy membrane on the scalæ.  
 6. The portio dura passing through the aqueduct of FALLOPIUS, which is marked with dotted lines, and afterwards by the foramen stylo-mastoideum towards the face.  
 7. The continuation of the nerve, where it leaves the foramen stylo-mastoideum.  
 8. The third branch of the fifth pair of nerves.  
 9. A reflected branch from the second of the fifth pair joining the portio dura, where it lies in the aqueduct.  
 10. The chorda tympani, passing from the portio dura across the tympanum, to join,  
 11. The lingual branch of the fifth pair.



## T A B L E X C I I .

Different VIEWS of the ORGAN of HEARING, in addition to those exhibited in the former TABLES.

FIG. 1.

*Represents the EXTERNAL EAR, with the Parotid Gland and its Duct.*

The letters of this figure, from A to H, point out the same parts shewn in Tab. LXXXVIII. Fig 1.

- I, I, The parotid gland.
- K, L, The lymphatic glands.
- M, The duct of the parotid gland.
- N, The orifice of the duct opening into the cavity of the mouth.

FIG. 2.

*Gives a View of the Posterior Part of the EXTERNAL EAR, the MEATUS EXTERNUS, the TYMPANUM, with its Small Bones, and the EUSTACHIAN TUBE of the Right Side.*

- A, The glandulæ ceruminosæ, with their reticular substance.
- B, The incus.
- C, The malleus.
- D, Part of the mastoid sinuosity, to which the short process of the incus is joined.
- E, The chorda tympani.
- F, The membrana tympani.
- G, H, I, The EUSTACHIAN tube.

FIG. 3.

*The CARTILAGE of the EAR, and the Cartilaginous Part of the MEATUS EXTERNUS, stripped of their coverings.*

- A, The cartilage of the ear.
- B, The cartilaginous passage somewhat flattened.
- C, That part of the cartilage which forms the beginning of the meatus.
- 1. 2. 3. The three fissures of the cartilaginous passage.

FIG. 4.

*The Back Part of the EAR, and the Upper Part of the CARTILAGINOUS PASSAGE, with the LIGAMENT which ties the CONCHA to the TEMPORAL BONE.*

- A, A, The back part of the ear.
- B, B, ————— concha, divested of the skin.
- C, C, The appendices which terminate the cartilage in the upper part.
- D, The superior part of the passage, with the glandulæ ceruminosæ.
- E, The ligament of the ear reversed.

FIG. 5.

*Represents the Back part of the Ear, the parts which connect it to the Head, and the Membrane which lines the Meatus Externus.*

FIG. 6.

*The Under and Back Part of a Portion of the Temporal Bone.*

- A, The squamous process cut towards its fore part.
- B, The styloid process.
- C, The pars petrosa.

FIG. 7.

*A Section of the TEMPORAL BONE, to shew the TYMPANUM and EUSTACHIAN TUBE.*

- A, The tympanum.
- B, The fenestra ovalis, and,
- C, The fenestra rotunda, leading from the tympanum to the labyrinth.
- D, The osseous part of the EUSTACHIAN tube ;
- E, Its cartilaginous extremity.
- F, Its membranous part turned back.

FIG. 8.

*Represents the Outer Part of the TEMPORAL BONE of a FÆTUS.*

- A, The pars squamosa.
- B, The zygomatic process.
- C, The pars petrosa.
- D, D, The bony ring which receives the membrana tympani.
- E, The fenestra ovalis.
- F, ————— rotunda.

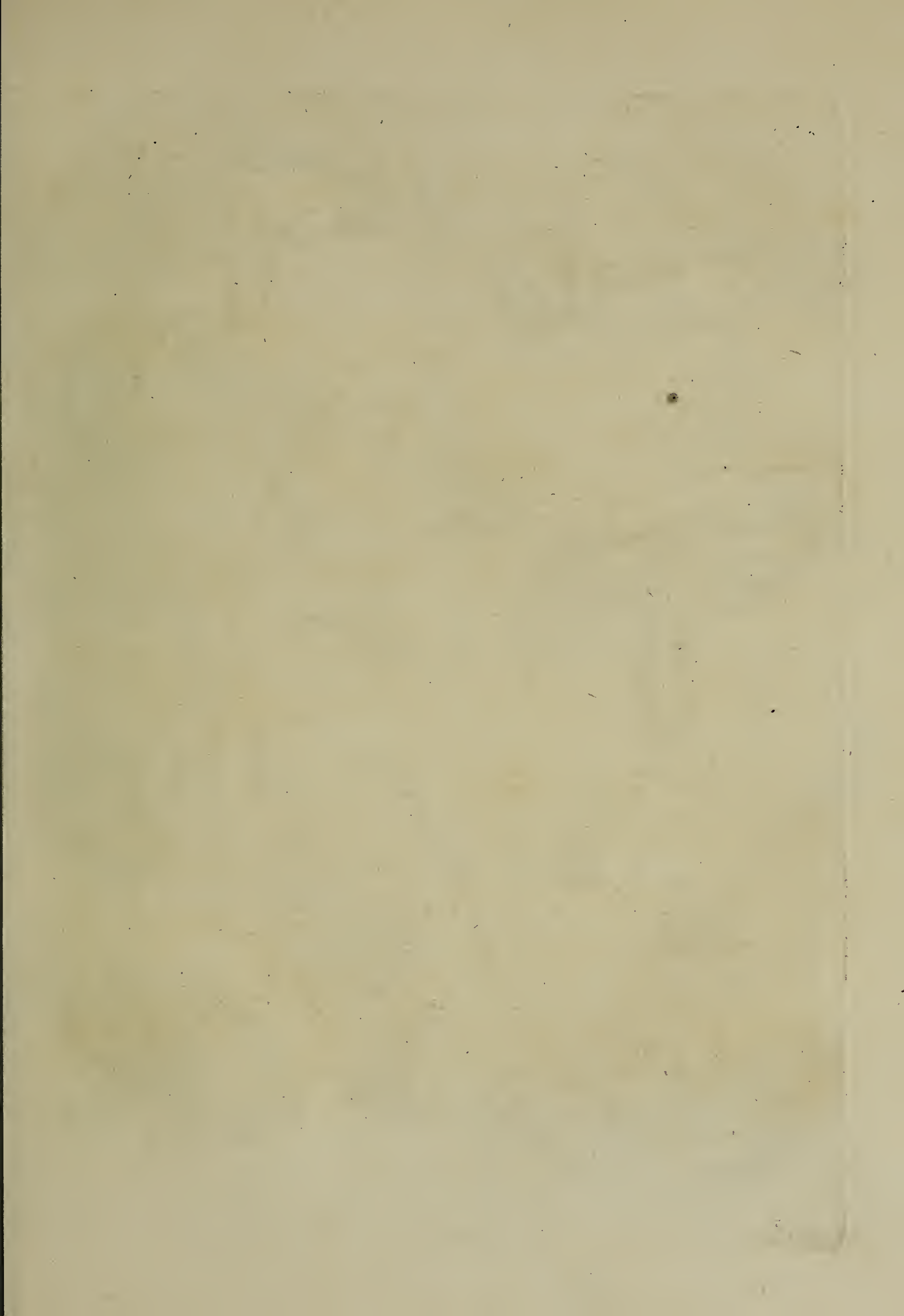
FIG. 9.

*Represents the TEMPORAL BONE, cut perpendicularly downwards, in such a way as to shew the depth of the TYMPANUM, and the Vessels spread out upon the Membrane which lines it, together with the CELLS of the MASTOID PROCESS.*

- A, B, The tympanum.
- C, The posterior extremity of the EUSTACHIAN tube.
- D, An opening from the cells of the mastoid process.

FIG.







TAB. 92.



FIG. 1.

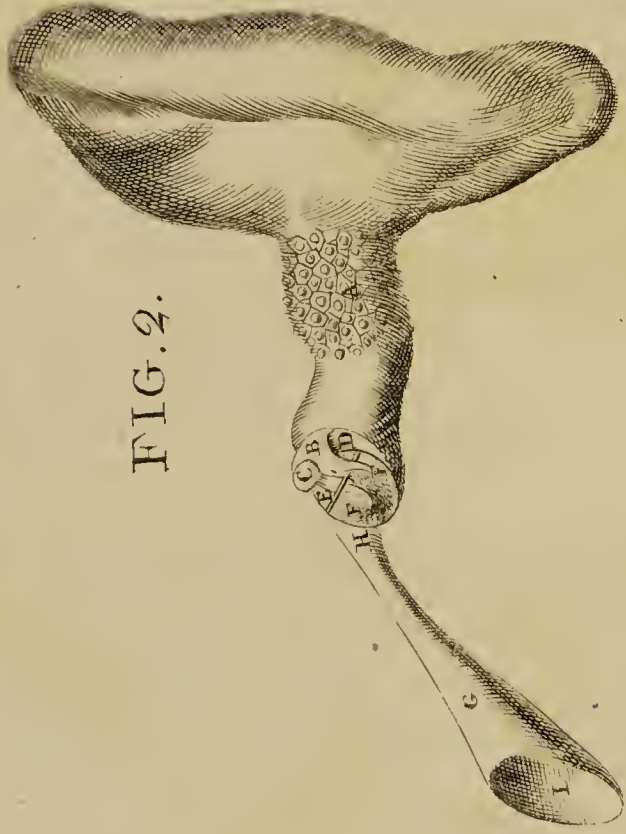


FIG. 2.

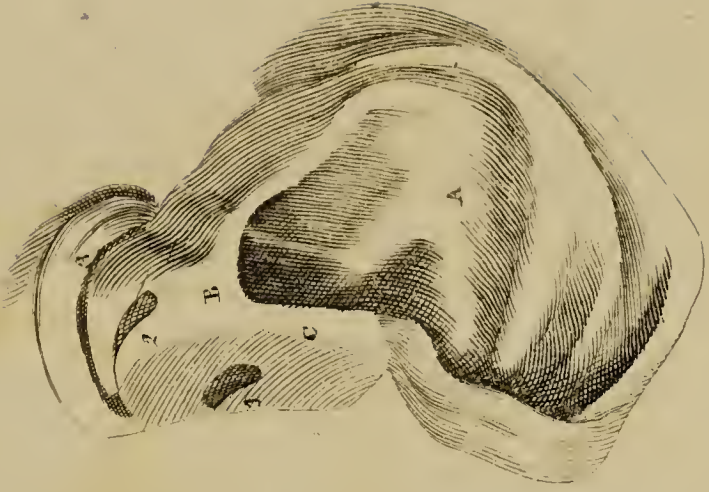


FIG. 3.

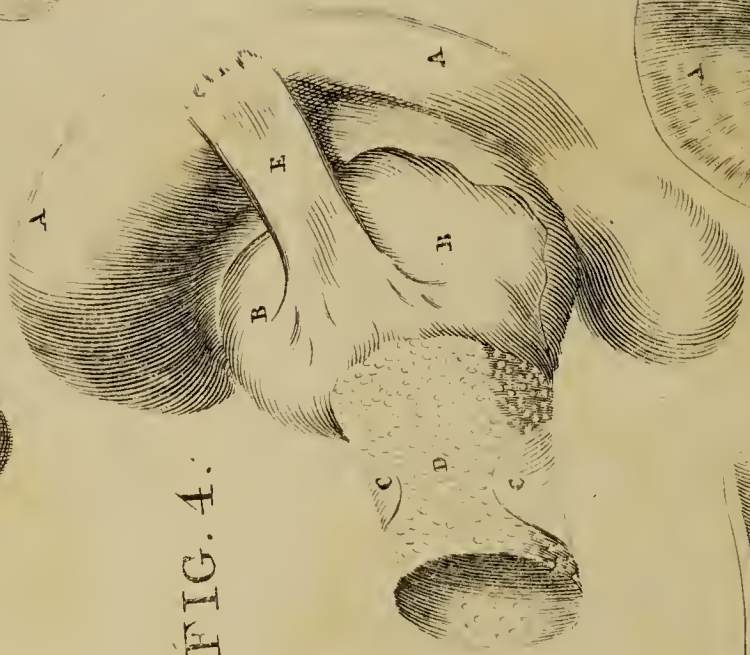


FIG. 4.

FIG. 5.



FIG. 6.

FIG. 7.

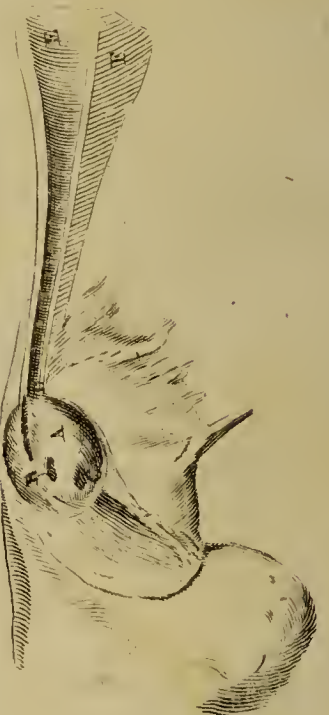


FIG. 8.



FIG. 9.

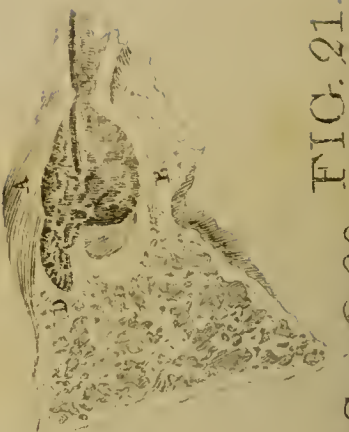


FIG. 10.

FIG. 11.

FIG. 12.

FIG. 13.

FIG. 14.

FIG. 15.

FIG. 16.

FIG. 17.

FIG. 18.

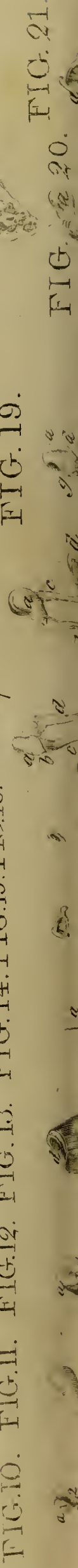


FIG. 19.

FIG. 20.

FIG. 21.



FIG. 23.



FIG. 22.



FIG. 25.



FIG. 24.



FIG. 27.



FIG. 26.



FIG. 28.



FIG. 30.

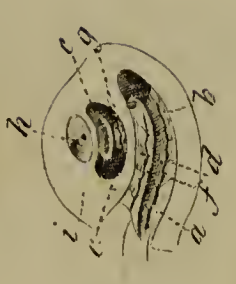


FIG. 29.



FIG. 31.

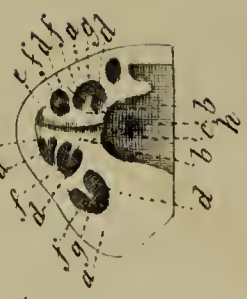


FIG. 32.



FIG. 33.



FIG. 34.

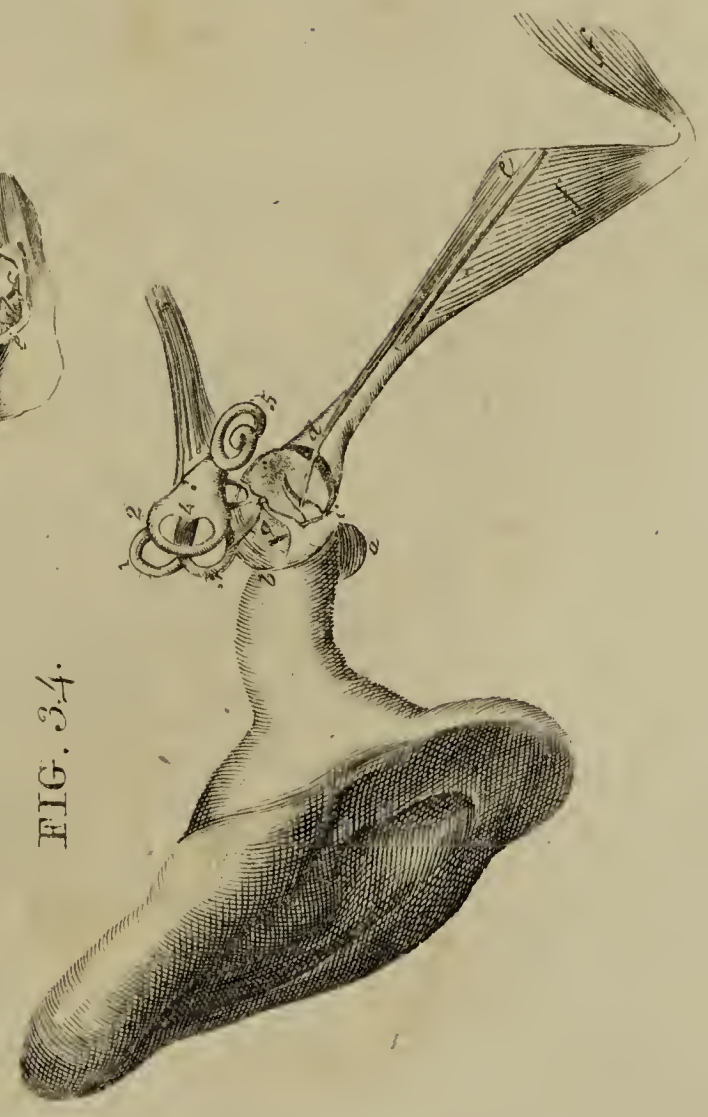
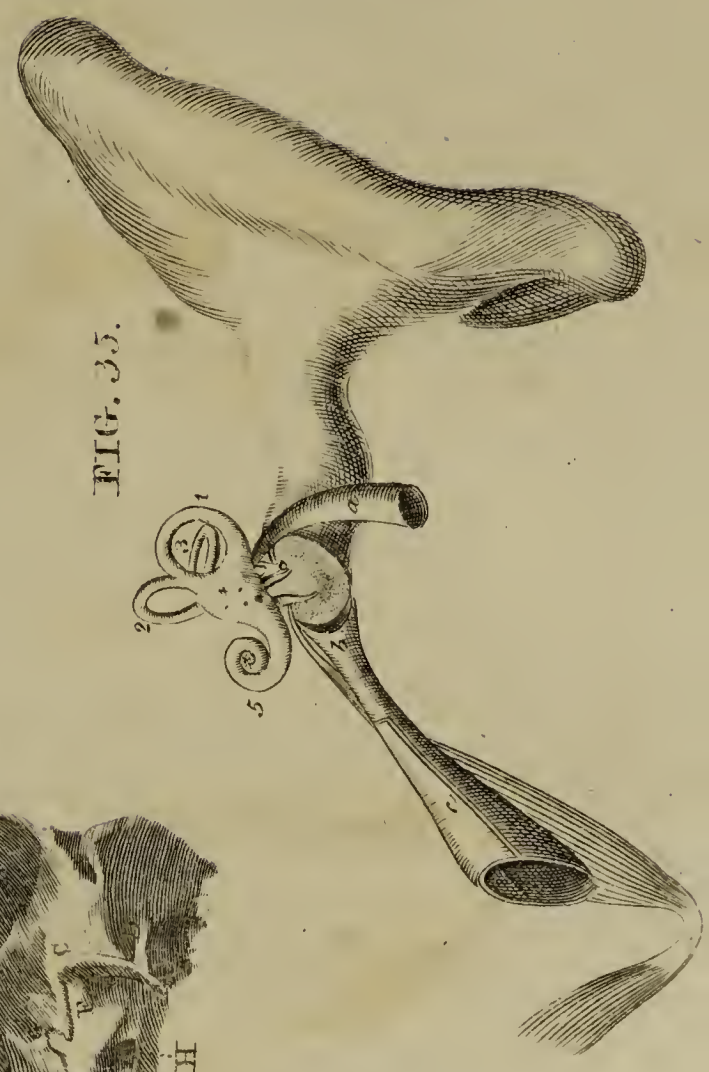


FIG. 35.









## FIG. 10.

*The MALLEUS, with the Eminence and Cavity which serve for its Articulation.*

- a*, Its head ;
- b*, Its handle ;
- c*, Its large process.
- 1. Its first eminence ;
- 2. Its second eminence ;
- 3. The cavity between the two eminences.

## FIG. 11.

*A View of the opposite side of the same Malleus with that of Fig. 10.*

## FIG. 12.

*The INCUS, viewed on the side by which it is articulated with the MALLEUS.*

- a*, The body of the incus, with the eminences and cavity for articulation.
- b*, The short branch, fore-shortened.
- c*, The long branch.

## FIG. 13.

*A Lateral View of the INCUS.*

- a*, The short,
- b*, The long process.
- c*, The os orbiculare adhering to the long process.
- d*, The cavity for articulation with the malleus.

## FIG. 14.

*The Under End of the INCUS, with the Os Orbiculare and Head of the Stapes.*

- a*, The long process of the incus.
- b*, The os orbiculare.
- c*, The head of the stapes.

## FIG. 15.

*Shews the Base, Crura, and Head of the Stapes.*

## FIG. 16.

*The Base of the Stapes inverted, to shew that it is somewhat Concave.*

## FIG. 17.

*The small Bones of the EAR, articulated with each other, and viewed Posteriorly.*

- a*, The body of the incus ;
- b*, Its short branch, seen in front.

- c*, Its long branch, articulated with the stapes, by the intervention of the os orbiculare.
- d*, The handle of the malleus.
- e*, The base of the stapes.

## FIG. 18.

*The small Bones of the EAR, viewed Anteriorly.*

- a*, The head of the malleus ;
- b*, Its handle ;
- c*, The long branch of the incus.
- d*, The base of the stapes.

## FIG. 19.

*A View of the Fore Part of the MALLEUS, and its MUSCLES.*

- a*, The head of the malleus ;
- b*, Its handle.
- c*, The external muscle of the malleus ;
- d*, Its insertion.
- e*, The internal muscle, with its sheath opened.
- f*, The curvature of the internal muscle, before its insertion into the handle of the malleus.
- g*, The large process of the malleus.
- h*, The small process, into which the external muscle is fixed.

## FIG. 20.

*The MALLEUS, with its two Muscles, the Eye being supposed to be placed in the EUSTACHIAN Tube.*

- a*, The malleus.
- b*, The external muscle of the malleus.
- c*, The internal muscle.

## FIG. 21.

*The STAPES, with its Muscle.*

- a*, The stapes ;
- b*, Its muscle.

From Fig. 10. to Fig. 21. inclusive, the small Bones of the Ear are represented somewhat larger than Nature.

## FIG. 22.

*Represents the Fore Part of the Temporal Bone of a Fœtus.*

- A*, The squamous process, the small bony fibres of which are easily distinguished.
- 2. 3. The sides of its circumference, which are yet cartilaginous.
- B*, The zygomatic process.
- C*, The membrana tympani.
- D*, The bony ring which receives the membrana tympani.
- E*, The styloid process, as yet cartilaginous.

*F*, The



- F, The mastoid process, very small.  
 4. The foramen, through which the portio dura passes out.  
 G, This letter marks an obscure line, which is the part where the squamous is separated from the mastoid process. These two bony parts are firmly united in adults.  
 H, The canal which incloses the internal carotid.  
 I, The foramen, where the tube which goes from the ear to the palate is connected.

FIG. 23.

Represents the Temporal Bone, from which the Squamous Part and Membrana Tympani are cut off, and as much of the Body of the Bone as is necessary to give a View of the Tympanum and Small Bones of the Ear.—See Tab. LXXXVIII. Fig. 7.

FIG. 24.

Represents the Inner Side of the Temporal Bone, with as much of it cut off as was necessary to shew the Membrana Tympani, upon which the Malleus and Incus are seen, with the Nerve called Chorda Tympani, and the Tendon of the External Muscle of the Malleus:—all of them in situ.

A—F, Point out similar parts explained Tab. LXXXVIII. Fig. 8.

- G, The meatus auditorius internus.  
 1. The tendon of the external muscle of the malleus.  
 2. 3. The chorda tympani.

FIG. 25.

The Temporal Bone prepared, so as to shew the Cochlea, Vestible, and Semicircular Canals in situ.—See Tab. LXXXVIII. Fig. 12.

FIG. 26.

The Covering of the Cochlea taken off, to shew its Semi-oval Spiral Canal.

FIG. 27.

A Section of the Mastoid and Petrosal Processes, to shew several Parts belonging to the Tympanum.

- a, The canal for one of the muscles of the malleus.  
 b, A section of the EUSTACHIAN tube.  
 c, ————— aqueduct of FALLOPIUS.  
 d, The foramen ovale.  
 e, ————— rotundum:  
 f, The canal for the muscle of the stapes.  
 g, The styloid process.  
 h, The foramen stylo-mastoideum; the dotted lines running from it mark the canal of the portio dura of the seventh pair of nerves.

- i, The cells of the mastoid process.  
 k, The mastoid sinus.

FIG. 28.

The Internal EAR opened transversely.

- a, Part of the meatus externus.  
 b, ————— membrana tympani.  
 c, The external muscle of the malleus.  
 d, The chorda tympani.  
 e, The malleus.  
 f, The incus.  
 g, The articulation of the incus with the os orbiculare, and of the os orbiculare with the stapes.  
 h, The base of the stapes, fixed in the foramen ovale.  
 i, The muscle of the stapes.  
 k, The orifice proper to the superior semicircular canal.  
 l, ————— of the posterior canal.  
 m, ————— common to the superior and posterior canals.  
 n, The superior orifice of the exterior canal.  
 o, The inferior orifice of that canal.  
 p, A section of the aqueduct of FALLOPIUS.

FIG. 29.

The Vestible and Cochlea of a Child, laid open on the Side next the Cavity of the Cranium.

- a, The orifice of the superior semicircular canal.  
 b, ————— posterior canal.  
 c, The orifice common to the superior and posterior canals.  
 d, The outer orifice of the exterior canal.  
 e, The inner orifice of that canal.  
 f, The foramen ovale.  
 g, The orifice of the scala vestibuli.  
 h, The lamina spiralis.  
 i, The membranaceous part of the lamina spiralis.  
 k, The perforated part of the cochlea, for the passage of nerves.

FIG. 30.

Represents a Section of the Cochlea, to shew its Spiral Process.

- a, The beginning of the scala tympani.  
 b, c, The first and second turns of the scala tympani.  
 d, e, ————— vestibuli.  
 f, g, ————— osseous part of the lamina spiralis, the membranaceous part being removed.  
 h, The extremity, or hamulus, of the lamina spiralis.  
 i, That portion of the pars petrosa which covers the cochlea.

FIG. 31.

The Cochlea, cut from its Base to its Centre.

- a, a, The bone which incloses the cochlea.  
 b, b, The



- b, b*, The modiolus, or nucleus.
- c*, The cavity of the modiolus.
- d, d, d, d*, The scala tympani;
- e*, Its extremity.
- f, f, f, f*, The scala vestibuli.
- g, g*, The lamina spiralis of the first turn of the cochlea;  
—the same is seen in the other turns.
- h*, The meatus auditorius internus.
- i*, The aqueduct of FALLOPIUS.

FIG. 32.

*The Temporal Bone of a Fœtus of four Months, with the small Bones of the Tympanum, in their natural situation.*

- a*, The malleus.
- b*, The incus.
- c*, The os orbiculare.
- d*, The stapes.
- e*, The canal for the muscle of the stapes.
- f*, The foramen rotundum.
- g*, The canal for the internal muscle of the malleus.

- h*, The osseous ring, to which the membrana tympani is fixed.

FIG. 33.

*A back View of the Temporal Bone of a Fœtus.*

- A, The pars squamosa.
- B, B, The part where it is separated from the pars petrosa.
- C, The superior semicircular canal, seen without any preparation.
- D, The posterior semicircular canal.
- E, The point of communication.
- F, A considerable fossa, which is situated under the superior canal, and which is filled up and effaced as the fœtus grows older.
- G, The foramen in the passage of the portio dura.
- H, ————— of the auditory nerve.

FIG. 34. and 35.

*See Tab. LXXXIX. Fig. 1. 2.*



## OF THE NOSE.

THE *Nose* is divided into the External Prominent Part, and the Internal Cavity, which is separated by the Septum Narium into two smaller Cavities;—or it is divided into hard and soft Parts.

The External Part, or Nose properly so called, is composed superiorly of Bones, inferiorly of Cartilages, and has a partial Covering from the Muscles, and a general one from the Common Integuments.

On the outside of the Nose are observed,—the *Radix*, or upper part;—the *Dorsum*, or middle prominence;—the *Apex*, or point;—the *Alæ*, or lateral moveable parts; and *Columna*, or inferior part of the Partition next the Upper Lip.

The Osseous part of the Nose is formed by the *Os Frontis*, *Ossa Nasi*, and *Ossa Maxillaria*, which constitute the upper and fore part:

By the *Os Ethmoides* and *Ossa Unguis*, which form the upper, inner, and lateral parts:

And by the *Ossa Maxillaria Superiora*, *Ossa Palati*, *Os Sphenoides*, *Ossa Spongiosa Inferiora*, and *Vomer*, which form the under, inner, and back parts.

The *Two Cavities*, or *Nostrils*, terminate anteriorly in the Face, and posteriorly in the Fauces, and are much enlarged by the different Sinuses which communicate with them.

The under and fore part of the Nose consists of *Five Cartilages*, of a somewhat regular figure, and of some smaller pieces, which are more irregular, and of an indeterminate number.

Of the five Cartilages, one is situated in the middle, and the other four laterally.

The middle Cartilage is the most considerable, and supports the rest: It constitutes the Cartilaginous part of the Septum Narium, and is joined to the anterior edge of the Nasal Lamella of the Ethmoid Bone, to the anterior edge of the Vomer, and to the fore part of the Spinous Process of the Superior Maxillary Bones.

Of the lateral Cartilages, two are placed anteriorly, forming by their curved union the tip of the Nose; and two posteriorly, which form the *Alæ Nasi*.

Between the anterior and posterior Cartilages, are Spaces filled with the additional Cartilages, the number, size, and figure, varying in different Bodies. Tab. LXXXII. Fig. 3. 4.

The Elasticity of the Cartilages contributes to the defence of the Nose against external injuries.

The Nose is covered by the Common Integuments, which are perforated, especially at the under and outer parts of this Organ, by the Ducts of Sebaceous Glands, the contents of which may be readily squeezed out by the pressure of the Fingers.

The Cartilages of the Nose are moved in different directions, by the following Muscles on each side, which have been already described; viz. the *Compressor Narium*, the *Nasal* part of the *Frontal Muscle*, and the *Levator* and *Depressor Labii Superioris Alæque Nasi*.—The Nose may also be moved by the neighbouring Muscles, which, in many instances, become assistants to the others.

The Internal Nares, or Cavities of the Nose, extend upwards to the Cribriform Plate of the Ethmoid, and to the Body of the Sphenoid Bone.

At the inner side, they are bounded by the Septum Narium, which is formed by the Nasal Lamella of the Ethmoid Bone, by the Vomer, and by the middle Cartilage of the Nose. Tab. XVII. Fig. 2. F, G, H, I.

On the outside, or that next the Cheek, the *Ossa Spongiosa* project a considerable way into the Cavities of the Nares, and increase the Surface of the Membrane of the Nose, for enlarging the Organ of Smell. Tab. XVII. Fig. 1. s, t. Tab. XCIII. In Animals which smell acutely, the *Ossa Spongiosa* are remarkably large and complex.

The bottom of the Nostrils runs directly backwards, or goes in a horizontal direction in the erect position of the Body, so that a straight Probe may be passed through either of them to the Throat.

In the fore part of the Nostrils there are stiff Hairs, called *Vibrissæ*, which prevent the Mucus from constantly flowing, and insects or other extraneous matter from entering.

The general Cavity of each Nostril is divided by the *Ossa Spongiosa* into *three Meatus*, or *Passages*, which run from before backwards, and are described by HALLER according to their situations, viz.

The *Meatus Narium Superior*, placed at the upper, inner, and back part of the Superior Spongy Bone. Tab. XVII. Fig. 1. between K and I.

The *Meatus Medius*, situated between the Superior and Inferior Spongy Bones. Tab. XVII. Fig. 1. o, p, and,

The *Meatus Inferior*, situated between the Inferior Spongy Bone and Bottom of the Nose. Tab. XVII. Fig. 1. s, t.

The inside of the Nose is lined by a thick Spongy Substance, termed *Membrana Mucosa*, or *Membrana Pituitaria* of SCHNEIDER, or *Membrana SCHNEIDERIANA*, which adheres to the Periosteum, and is also continued into the different Sinuses, to the Lacrymal Sacs and Palatine Ducts, to the Pharynx, Palate, and EUSTACHIAN Tubes.

This Membrane is very *Vascular* and *Nervous*, and is lubricated



the Primary Organ of Smelling. It is constantly lubricated and preserved in a proper degree of moisture by the *Mucus* of the Nose, which is discharged from numerous small Follicles, every where dispersed over the Surface of that Membrane.

The *Passages* of the different Sinuses of the Bones of the Head, after having run obliquely backwards in a short winding direction, terminate by small openings in the Cavity of the Nose.

The *Frontal Sinuses* send Passages downwards to the anterior Ethmoid Cells, which terminate in the upper part of the Nose, behind the beginning of the Lacrymal Sacs. Tab. XVII. Fig. 3. B.

Besides the Passages common to the Frontal Sinuses and anterior Ethmoid Cells, there are others proper to the posterior Ethmoid Cells, which terminate in the upper and back part of the Nose, near the openings of the Sphenoid Sinuses.

The *Sphenoid Sinuses* open, behind the Cells of the Ethmoid Bone, into the upper and back part of the Nose. See. Vol. III. first Plate of the Nerves of the Nose.

The *Maxillary Sinuses* open at their upper and inner sides, each by one, and sometimes by two Passages, into the middle of the space between the Superior and Inferior Spongy Bones, nearly opposite to the under edge of the Orbit. Tab. XVII. Fig. 1. *q*.

At the upper part of the Maxillary Sinuses, *Appendices*, described by HALLER, are sometimes found, which communicate with the Ethmoid Cells. Tab. XVII. Fig. 3. G.

The Sides, or Walls of the Maxillary Sinuses, are formed of thin Plates of Bone, excepting where the Processes project and give them additional strength; and below, the Bone is so thin between them and the Dentes Molares, that the roots of these Teeth are sometimes found to perforate the Septum.

The different Sinuses are lined by a continuation of the *Membrana SCHNEIDERIANA*; but in these it is much thinner, and less Vascular and Nervous, than that part of it which lines the general Cavity of the Nose.

They are constantly moistened, but not filled with a Fluid.

Their Passages, being directed backwards, prevent extraneous matter from getting into them.

*Lacrymal Groove*.—This is formed by the Superior Maxillary, Lacrymal, and Inferior Spongy Bones. In its descent, it runs a little obliquely backwards to the lower and lateral part of the Cavity of the Nose, where it terminates at the inner and fore part of the Antrum Maxillare, under the Os Spongiosum Inferius, a little behind the anterior extremity of that Bone, and in a direct line upwards from the second Dens Molaris. Tab. IV. No. 3. *y*.

The upper part of the Groove forms only a semi-canal, the under end a complete one.

The *Lacrymal Sac* is a Membranous Canal, situated

in the upper part of the Lacrymal Groove, behind the Tendon of the Orbicularis of the Eye-lids; about a fourth part of it above the Tendon, and forming a kind of Intestinum Cæcum, and the rest below it. Tab. LXXXV.

Towards the inner Angle of the Eye, behind the Tendon of the Orbicularis, the Sac is perforated by the Lacrymal Ducts.

The continuation of the Sac becoming a little narrower, but without possessing any Valve, passes into the Nose, under the name of *Canalis Nasalis, Ductus ad Nasum*, or *Lacrymal Duct*, and terminates at the inferior extremity of the Osseous Canal, by a round Aperture, large enough to admit the blunt end of a Surgeon's Probe. Tab. XCIII. Fig. 3. 4.

The Structure of the Lacrymal Sac and Duct is similar to that of the *Membrana SCHNEIDERIANA*. They are defended by the same kind of Mucus with which this Membrane is lubricated, and are firmly connected to the Periosteum of the Osseous Canal. Tab. IV. No. 8. *y*. Tab. XCIII. Fig. 4.

The *Use* of this passage is,—to convey the superfluous Tears to the Nose, so as to prevent them from passing over the Cheek.

The *Ductus Incisivus, vel Nasalo-Palatinus* of STENO, is a small Canal, which, as has been already observed in the Description of the Bones, is only sometimes met with in the Human Body, and even then it is very minute; though it is always to be found, and of considerable size, in the Ox, Horse, Sheep, &c.

When present, it takes its origin from a small Pit, formed in the fore part of the bottom of the Nostril, under the termination of the Lacrymal Duct. It runs obliquely downwards and forwards, placed in such a manner as to receive and conduct the Tears into the Mouth. Tab. LXXXII. Fig. 7. *g*.

The *Arteries* of the Nose come chiefly from the External Carotids.

Those of the outer part of the Nose come from the Facial and Internal Maxillary Arteries;—those of the inner from the Internal Maxillary; and a few Twigs are furnished by the Ocular Arteries.

The *Veins* go to the External Jugulars. They likewise communicate with the Ocular Veins, and of course with the Lateral Sinuses and Internal Jugulars.

The *Nerves* with which the outer part of the Nose is chiefly supplied, come from the second Branch of the Fifth, and from the Portio Dura of the Seventh Pairs.

The inner part is principally supplied by the First Pair, or Olfactory Nerves, and by some Branches from the first and second Portions of the Fifth Pair.

The Nose constitutes the Organ of Smelling,—contributes to the general purposes of Respiration and the modelling of the voice,—receives the superabundant humours from the external surface of the Eyes, and adds to the beauty of the Face.

The Sense of Smelling is performed by means of the Nerves dispersed upon the SCHNEIDERIAN Membrane



of the Nose. The Mucus defends the Nerves, which are almost naked, from the air which is respired. By this Fluid they are kept moist, and free from pain; but, by becoming acrid, it irritates them, and excites sneezing for its removal.

The Air, filled with subtile Effluvia of Odorous Bodies, is, by the power of Inspiration, drawn through the Nose, and applied to the Pulpy Extremities of the Nerves, in which the Sensation is excited termed *Smelling*.—By this Sense, the several kinds of Odoriferous Bodies are distinguished, and the more readily, in proportion to the extent of the Mucous Membrane.

Of the different parts of this Membrane, that cover-

ing the Septum Narium and Ossa Spongiosa appears to be the principal seat of the Organ of Smelling, since upon it the greater part of the Nerves of the Internal Nares are distributed; and this part of the Membrane, and the Bones it covers, are expanded and multiplied, in proportion to the acuteness of Smell, in quick-scented Animals.

The Sinuses leading into the Nose increase and modulate the Voice; their hollow structure renders the Bones lighter; they separate a Fluid, which assists in lubricating part of the Nose, but do not appear to constitute part of the Organ of Smelling.

T A B L E



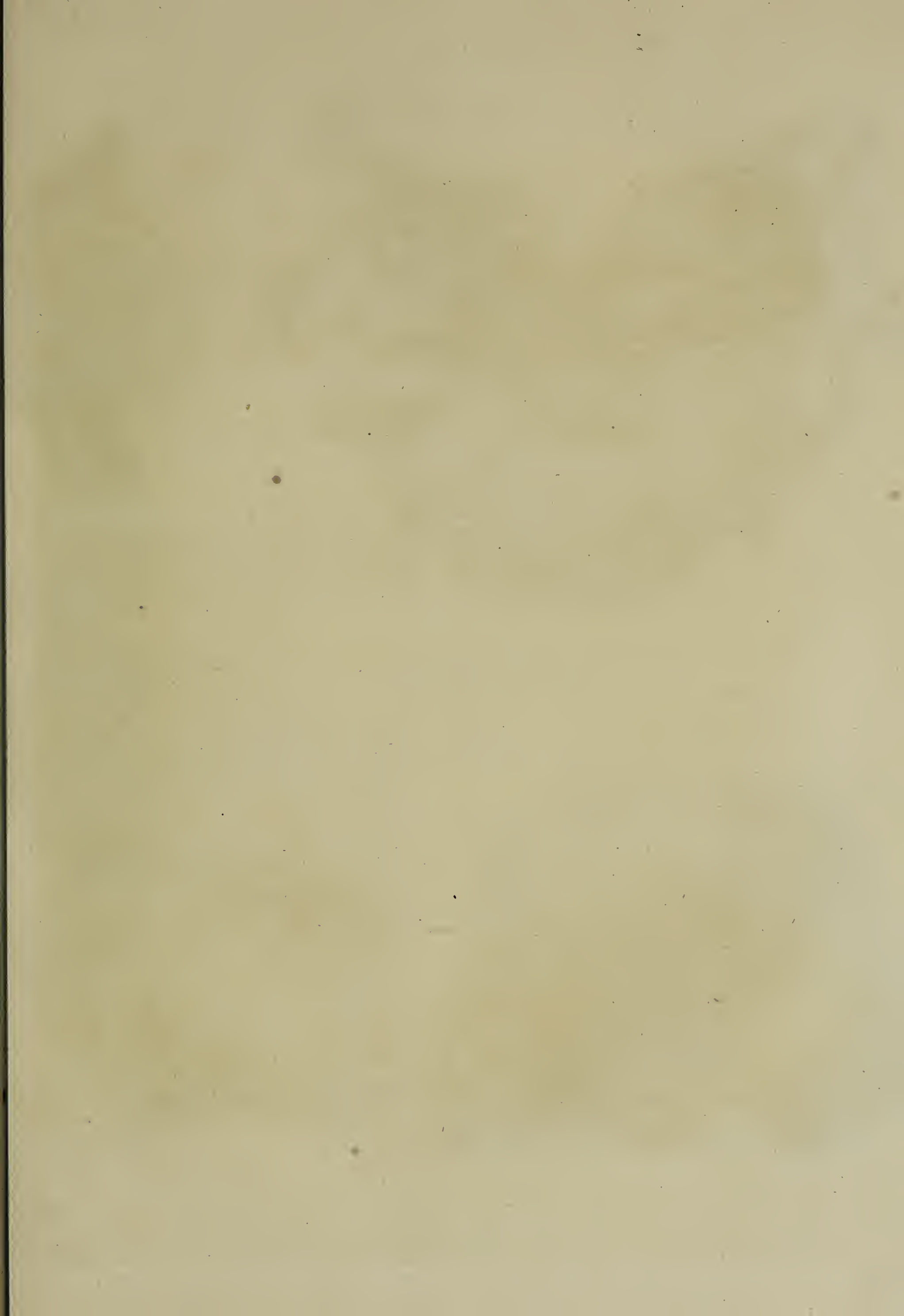




Fig. 2.



Fig. 1.



Fig. 4.

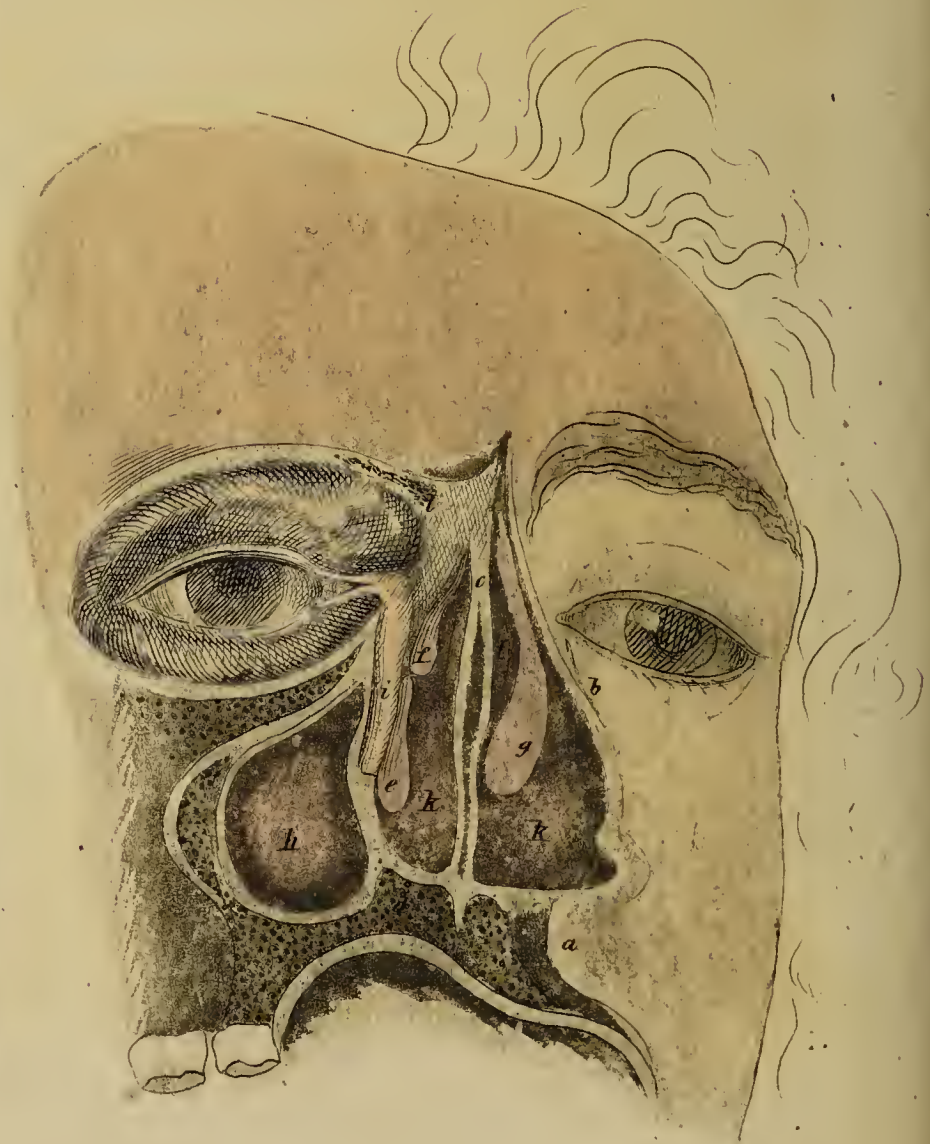
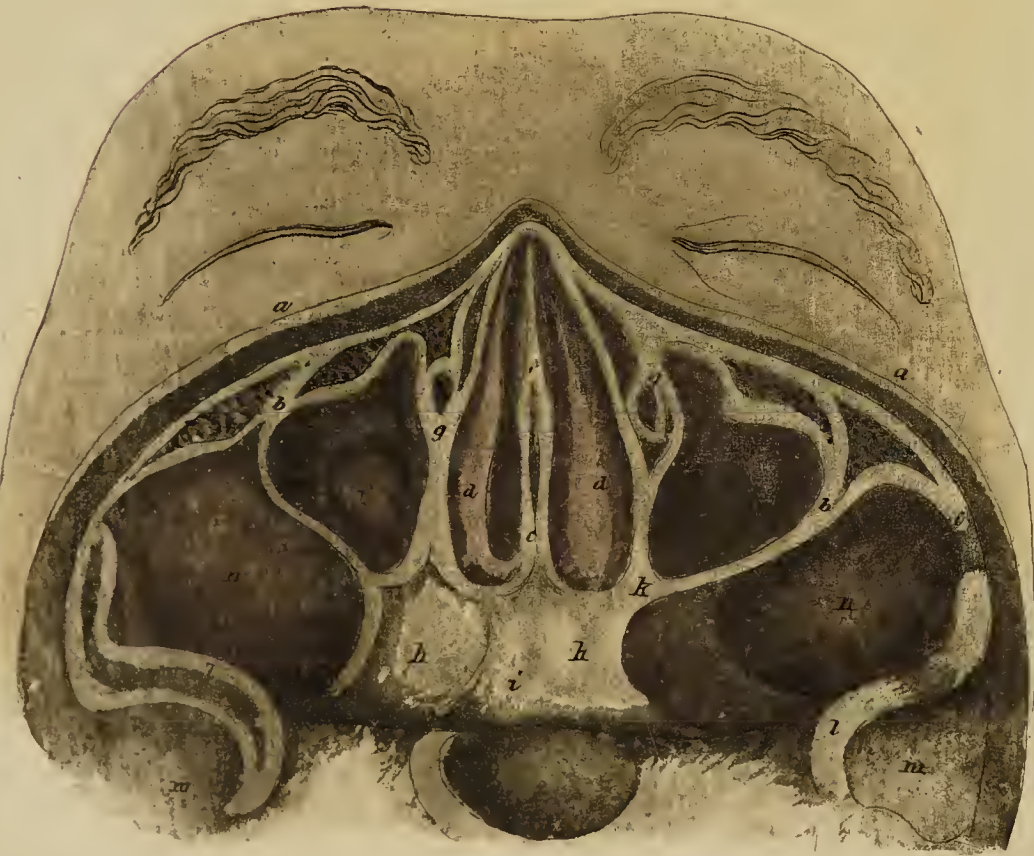


Fig. 3.





## T A B L E X C I I I .

Gives VIEWS of the Inner Parts of the NOSE, &c.

FIG. 1.

*Represents a Vertical Section of the CRANIUM and FACE, to shew the Interior Part of the NOSE, MOUTH, and PHARYNX. The greater part of the Septum Narium, and the Ossa Spongiosa of the Right Nostril, are removed.*

- a*, The frontal sinus.
- b*, The crista galli.
- c*, The sella Turcica.
- d*, The sphenoidal sinus.
- e*, The opening of the sinus into the cavity of the nose.
- f*, The os minimum turbinatum of the Author of this figure.
- g*, Os turbinatum tertium, seu supremum, of the same Author.
- h*, Os turbinatum superius.
- i*, Os turbinatum inferius.
- k*, An elliptic foramen which corresponds to cells of the ethmoid bone.
- l, l*, The cartilaginous mouths of the EUSTACHIAN tubes.
- m*, Mucous sinuses.
- n*, The basilar process of the occipital bone cut longitudinally.
- o*, A probe introduced into the orifice of the right nostril.
- p*, The osseous part of the palate.
- q*, The ductus incisivus.
- r*, Orifices of the glands of the palatum molle.
- s*, Anterior arch of the palate.
- t*, The uvula.
- u, u*, The posterior arch of the palate.
- v, v*, The tonsils.
- w*, The epiglottis.
- x*, The tongue.
- y*, Part of the sublingual gland.
- z*, Membrane of the mouth.
- 1. 1. 2. 2. The upper and under lips.
- 3. 3. A section of the under jaw.
- 4. 4. The teeth.
- 5. The genio-glossi, and genio-hyoidei.

FIG. 2.

*Shews Part of the Left Side of the SEPTUM NARIUM, with the MEMBRANA MUCOSA.*

- a*, The os frontis.

- b*, The superior maxillary bone.
- c*, The membrane of the nose covered with innumerable mucous follicles, the mouths of which are distinctly seen.

FIG. 3.

*Exhibits a Horizontal Section of the NOSE, between the Superior and Inferior Spongy Bones.*

- a, a*, A section of the skin and muscles.
- b, b*, A section of the superior maxillary bones.
- c, c*, A section of the zygomæ.
- d, d*, The superior spongy bones.
- e, e*, A section of the septum nasi.
- f, f*, The cavities of the maxillary sinuses.
- g, g*, A section of the lacrymal ducts.
- h, h*, A section of the pterygoid processes, and ossa palati.
- i, i*, The crista of the sphenoid bone.
- k, k*, The fossæ nasales.
- l, l, m, m*, The glenoid cavities of the temporal bones covered with cartilage.—*l, l*, The roots of the zygomatic processes upon which the condyles of the lower jaw move.
- n, n*, A section of muscles and fat.

FIG. 4.

*A. Longitudinal Section of the NOSE, and one of the Maxillary Sinuses, in a direction from Right to Left, near the Middle Depth; and the Situation of the LACRYMAL DUCT.*

- a*, A section of the upper lip.
- b*, A section of the nose.
- c*, A section of the septum narium, and its membranes.
- d, d*, A section of the superior maxillary bone, to near the third dens molaris.
- e*, A section of the right inferior spongy bone, where it concealed the lacrymal duct.
- f, f*, The anterior extremities of the superior spongy bones.
- g*, The left inferior spongy bone.
- h*, The cavity of the right maxillary sinus.
- i*, The situation of the lacrymal duct, between the antrum maxillare and os spongiosum inferius.
- k, k*, The cavity of the nose.
- l*, A section of the fore part of the frontal bone.



## OF THE MOUTH AND THROAT, WITH THEIR APPENDAGES.

## MOUTH.

THE *Osseous Parts* of the Mouth are,—the *Ossa Maxillaria Superiora*, the *Ossa Palati*, the *Maxilla Inferior*, and the *Teeth*:—all of which, except the *Teeth*, have been already described.

The *Soft Parts* of the Mouth consist of the *Lips* and *Cheeks*, the *Gums*, the *Palate*, the *Velum Palati*, the *Uvula*, the *Tongue*, the *Membrane* lining the Mouth, and the *Salivary Glands*.

The *Lips* and *Cheeks*, which are principally composed of *Muscles*, are covered on the outside by the common *Integuments*, and lined within by the *Membrane* of the Mouth, under which there are numerous *Mucous Glands*, obtaining their names from their situations.

The *Lips* possess but a small proportion of *Fat*, much more of it is found in the *Cheeks*; and the intervening space between the *Masseter* and *Buccinator* is occupied by a large quantity of it, which, while it gives shape to the *Face*, forms a sort of cushion about the *Mucous* and *Salivary Glands*.

The *Membrane* of the Mouth is covered by fine *Villi*; but these are most conspicuous upon the edges of the *Lips*, as may be distinctly seen after a minute *Injection*, or after macerating the parts till the *Cuticle* can be separated. Tab. LVI. Fig. 13.

From the edges of the *Lips*, the common *Integuments*, now become extremely thin, are converted into the *Membrane* which lines the Mouth, and which, opposite to the *Dentes Incisores* of the Upper and Under *Jaws*, forms two *Doublings* or *Fræna*, which fix the *Lips* more firmly to the *Jaws*. Tab. XCVII. Fig. 1. *d, d.*

The *Lips* are serviceable in the general purposes of *Speaking*, *Eating*, *Drinking*, &c.

The *Gums* cover the sides of the *Alveolar Border* of both *Jaws*, pass in between the different *Teeth*, and surround and adhere firmly to the *Collar* of each.

The Substance of the *Gums* is of a dense nature, and very *Vascular*, from which they derive their florid appearance, and the *Vessels* are united by a compact *Cellular Texture*.

They may be said to consist of the common *Membrane* of the Mouth and the *Periosteum* of the *Jaws*, intimately connected.

They serve as a *Covering* to the *Jaws*, and contribute to the security of the *Teeth*.

The *Arteries* of the *Lips*, *Cheeks*, and *Gums*, which are considerable both as to number and size, are from the *Facial*, *Temporal*, and *Internal Maxillaries*, which are derived from the *External Carotids*.

The *Veins* go chiefly to the *External*, and partly to the *Internal Jugulars*.

The *Nerves* come from the first and second *Branches* of the Fifth Pair, and also from the *Portio Dura* of the Seventh Pair.

The *Palate*, or *Roof* of the Mouth, is divided into the *Palatum Durum* and *Palatum Molle*. The former is composed of the *Palate-Plates* of the Superior *Maxillary* and *Palate Bones*, and is covered by the *Periosteum* and common *Membrane* of the Mouth, which prevent the *Bones* from being injured. Tab. XCVII. Fig. 1. *e, f, f.*

The *Membrane* which covers the *Bones* of the *Palate* is remarkably thick, and is marked by a middle longitudinal *Line*, and numerous transverse *Rugæ*, which assist in the division of the *Food*.

It is nearly of the same structure with that of the *Gums*, but perforated by the *Ducts* of the *Palatine Glands*, for the excretion of *Mucus*, which serves to lubricate the *Palate*, and assists in dissolving the *Food*.

The *Palatum Molle*, *Velum Pendulum Palati*, or *Soft Palate*, is that part which projects from the posterior edge of the *Ossa Palati*, and from the *Pterygoid Processes* of the *Sphenoid Bone*, over the root of the *Tongue*, and forms a *Musculo-Membranous Partition* suspended between the *Nose* and *Mouth*. Tab. LIV. Fig. 10. *d, d.* Tab. LXXVIII. No. 47.

It is composed of the *Membranes* which line the *Nose* and *Mouth*, and of the *Expansions* of the *Circumflexi* and *Levatores Palati*, and likewise of numerous *Mucous Glands*, which serve to lubricate the *Mouth* and *Throat*, and facilitate *Deglutition*. Tab. LVII. Fig. 5. *b.* Tab. LIV. Fig. 14.

The *Palatum Molle* conducts the *Fluids* of the *Nose* into the *Mouth*, and acts like a *Valve* in preventing what we swallow from passing into the *Nose*.

In the middle of the *Posterior* edge of the *Velum Palati*, the *Uvula* or *Pap* of the *Throat* takes its origin. It hangs pendulous from the *Velum* over the base of the *Tongue*, and is peculiar to *Man* and the *Ape* tribe. Tab. LIV. Fig. 15. *d.* Tab. LXXVIII.—XCVII. No. 49.

It is of a *Conical* form, and is covered by the *Membrane* of the Mouth. Numerous *Mucous Glands* are found in its Substance, and it has a small *Muscle* within it, by which it is elevated and shortened;—its other motions depending upon the *Muscles* of the *Palate*.

The *Use* of the *Uvula*, in *Speaking* and in *Deglutition*, is evident from the inconveniences which result from its being destroyed by disease.



The *Arteries* of the Palate, &c. come from the Facial and Internal Maxillary.

The *Veins* go to the External and Internal Jugulars.

The *Nerves* are chiefly from the second of the Fifth, with some Twigs from the Eighth Pair.

#### TONGUE.

The *Tongue* is of an oval form, and is divided into *Base*, *Body*, and *Apex*.

The *Base*, or posterior part of the *Tongue*, is supported by, and connected to, the *Os Hyoides*, and, by the medium of this Bone, it is connected to the adjacent Bones and Muscles.

The *Body*, or middle part of the *Tongue*, terminates anteriorly in the loose moveable point.

On the *Dorsum* or Upper Surface, there is a *Linea Mediana*, or middle Groove, running longitudinally, and dividing it into two lateral Convexities.

The inferior Surface, which reaches only from the middle of the *Tongue* to the point, is connected to the parts below it by the *Sublingual Ligament*, or *Frenum Linguae*, which is a Doubling of the Skin or Lining of the Mouth.

The sides of the *Tongue* are fixed to the Lower Jaw, and to the Styloid Processes and parts adjacent, by *Membranous Ligaments*.

The *Tongue* is chiefly composed of the Fibres of the Muscles, which serve for its motions.—These Fibres are disposed in various directions, and intermixed with Medullary Fat.

The upper and lateral parts of the *Tongue* are composed of the *Stylo-glossi*.—Its middle portion, between the two former Muscles, is formed of the *Linguales*.—The lower part is chiefly formed of the *Genio-glossi*;—and behind, the *Stylo-glossi* enter into its composition. Tab. LVII. Fig. 4.

The *Tongue* is covered by a continuation of the Common Integuments, which are preserved soft and moist by the *Saliva*.

The *Cuticle* of the *Tongue* forms *Vaginæ* for receiving the Substances called *Papillæ*, and is here so remarkably thin, as to be properly adapted to the office these Bodies have to perform.

The *Corpus Mucosum* of the *Tongue* is thicker than in other parts of the *Body*, but more moist.

The third Covering of the *Tongue*, the *Cutis Vera*, is plentifully supplied with *Nerves*.—The *Papillæ*, which take their origin from it, are very Vascular, especially near the *Apex* of the *Tongue*, but are wanting on its under Surface.

The *Papillæ* are divided into three kinds, the *Maximæ*, *Mediæ*, and *Minimæ*.

The first class, called *Papillæ Maximæ*, *Lenticulares*, *Capitatae*, vel *Vallatae*, are by much the largest, and of a Lenticular form, having round Heads and short Stems. Tab. LVII. Fig. 5. f. They are placed at the base of the *Tongue*, in superficial *Fossulæ*, and the

whole are arranged in such a manner as to form an Angle with its point backwards. Tab. CI. Fig. 20.

They are Glands of the Salivary kind, and each of them has a small Perforation in the middle of its convex Surface.

Besides the *Papillæ Capitatae*, there are numerous *Mucous Follicles*, which cover the greater part of the Surface of the root of the *Tongue*.

At the root of the *Tongue*, and behind the Angle formed by the *Papillæ Maximæ*, there is a Hole called *Foramen Cæcum* of MORGAGNI, by whom it was first described. Tab. XCVIII. Fig. 8. m. Tab. CI. Fig. 20.

It penetrates only a small way into the Substance of the *Tongue*, and receives the Mouths of several Excretory Ducts which terminate in it.

The second class, called *Papillæ Mediæ*, *Semi-lenticulares*, vel *Fungiformes*, are much smaller than the former, and are scattered over the upper Surface of the *Tongue*, at some distance from each other. Tab. CI. Fig. 20.

They are of a Cylindrical form, supported on a small Pedicle, and terminated by a round extremity. Tab. CI. Fig. 17. 20.

The third class, called *Papillæ Minimæ*, vel *Conicæ*, vel *Villosæ*, are by much the most numerous, but very minute. They occupy almost the whole upper Surface of the *Tongue*, becoming gradually shorter at its Sides, and are most abundant towards the *Apex*, where the sensation of taste is most acute. Tab. XCVIII. Fig. 8. Tab. CI. Fig. 20.

This and the second class have been supposed to be formed chiefly of the Extremities of *Nerves*, and to constitute the real Organ of Taste.

The principal Blood-vessels of the *Tongue* are large in proportion to the size of that Organ.

They are called *Linguales*, vel *Raninæ*, on account of the dark-coloured Branches which appear under the *Tongue*.

The *Arteries*, which are Branches of the External Carotids, are not found to communicate so freely on the opposite sides of the *Tongue*, as they do in other parts of the *Body*.

The *Veins* open chiefly into the External Jugulars.

The *Nerves*, like the *Arteries*, are large and numerous, and have little connexion on the opposite sides.

They come from the Fifth, Eighth, and Ninth Pairs.

The first set supply the parts next the point of the *Tongue*, and are therefore considered as being principally concerned in conveying the sensation of Taste.

The second set supply the root, and the third the middle of the *Tongue*, and are chiefly dispersed upon its Muscles. There is a considerable intermixture, however, between the three sets on the same side.

Besides being the principal Organ of Taste, the *Tongue* is the chief instrument of Speech, and of the articulation of the Voice.—It also assists in Manducation, Deglutition, Spitting, Sucking, &c.

When



When a Sapid Body is applied to the Papillæ, they are supposed to be erected, and thereby to render the sense of Taste more acute. In exercising this sense, the substance applied is dissolved in the Saliva, and the Tongue is then pressed against the Palate, the roughness of which renders the impression stronger.

By being constantly moistened, the Papillæ perform also the office of Touch more exquisitely than the dry Cutaneous Papillæ of the other parts of the Body.

Though the Tongue is the principal Organ of Taste, other parts, as the Palate, and even the Pharynx and Esophagus, possess this sense in a certain degree.

#### SALIVARY GLANDS.

The *Salivary Glands* consist of three large Glands on each side of the Face, viz.—the *Parotid*, the *Submaxillary*, and the *Sublingual*,—besides many small Glands named from the parts to which they belong.

They are of a pale red and yellowish colour, and irregular on their Surface, being of the conglomerate kind. They are divided into Lobes, and each of these into minute Granulæ.

The *Parotid Gland*, which is the largest of the Salivary Glands, is named from its situation near the Ear.

It occupies the whole space between the Ear, Mastoid and Styloid Processes, and Angle of the Lower Jaw. Tab. XCVIII. Fig. 1. *m.* Fig. 2. *p.*

It extends superiorly to the Zygoma, and anteriorly to the Masseter, part of which it covers, though by a thin expansion only.

The under end of it lies contiguous to the Submaxillary Gland.

It is somewhat of a triangular form, but longest from above downwards; is flattened externally, and is covered by a condensed Cellular Substance, which gives it a whitish appearance. The External Carotid Artery and corresponding Vein, are sunk deep in the Substance of the Gland; and when it is removed, the Trunks of these Vessels, or their divided extremities, with the posterior Belly of the Digastricus, and part of the Sterno-mastoideus, are exposed. Through the Substance of the Gland, also, the Portio Dura passes in its way to the Face.

From the different Lobes of the Gland, numerous small Branches arise, which join together to form a large Duct, sometimes called *STENO'S Salivary Duct*, or *Ductus Superior*, which passes from the upper and fore part of the Gland. Tab. XCVII. Fig. 3.

The Parotid Duct is of a white colour, and appears large, but, from the thickness of its Coats, the Cavity is small, in proportion to the general size of the Duct.

It passes forwards and a little downwards over the Masseter, about the middle of its height, where the Muscle is Tendinous, in consequence of which it is free from compression; and, concealed by the Fat of

the Cheek, perforates obliquely the Buccinator, and Membrane of the Mouth, by an Orifice without any Papilla, opposite to the Interstice of the second and third Dens Molaris of the Upper Jaw.

Near the fore part of the Masseter Muscle, there is sometimes one, at other times two, small Glands, termed by HALLER *Glandulæ Accessoriæ*, which send an equal number of Tubes into the Parotid Duct; but these are very inconstant. Tab. XCVII. Fig. 4.

In the vicinity of the Parotid, some Lymphatic Glands are situated, two of which, more constant than the rest, are placed at its upper and under extremities, which are frequently swelled in scrofulous cases.

The *Submaxillary Gland* is smaller and rounder than the Parotid, and is situated on the inside of the Angle of the Lower Jaw, between it and the Tendon of the Digastricus, and directly under the Platysma Myoides. Tab. XCVIII. Fig. 2. *s.* See also Blood-vessels and Nerves of Head, Vol. III.

From the upper and fore part of this Gland, a Duct arises, called by some Authors *Ductus WHARTONI*, vel *Ductus Inferior*, which is much thinner in its Coats than the former Duct, but longer.

It passes forwards between the Mylo-hyoideus and Genio-glossus, along the under and inner edge of the Sublingual Gland, and perforates the Membrane of the Mouth at the side of the Frænum Linguae, behind the Dentes Incisores, by a small Orifice in form of a Papilla.

The *Sublingual Gland* is smaller, longer, and softer, than the Submaxillary, and is flat, and of an oval form.

It is situated under the anterior lateral portion of the Tongue, its upper edge projecting into the Cavity of the Mouth. It is placed above the Duct of the Inferior Maxillary Gland, and under the Gustatory Nerve, near the Lower Jaw, between the Mylo-hyoideus and Genio-hyo-glossus; the former of which sustains it. Tab. XCVII. Tab. XCVIII. Fig. 2. *t.*

Its extremities are turned forwards and backwards, and the edges obliquely inwards and outwards.

It is covered by a continuation of the Skin of the under side of the Tongue, which fixes it in its place.

It opens by several Orifices arranged in a line near the Gums, a little to the outside of the Frænum of the Tongue.

Sometimes this Gland sends off a Duct, which communicates with that of the Submaxillary; but generally it is otherwise.

In several Quadrupeds, as the Ape, Horse, and Hog, there is a distinct Duct belonging to this Gland, like that of the Submaxillary.

The smaller Glands of the Mouth are in great numbers, lying between the inner lining of the Mouth and its Muscles, and deriving their names from their situations.

They are much inferior in size to the former, each forming a simple little Lobe, which is somewhat flattened, or Lenticular. Each Gland sends out a Duct, which



which perforates the Skin of the Mouth, and opens into its Cavity. They consist of—

The *Buccales*, which are dispersed over the whole of the Cheek, but most plentifully near the termination of the Parotid Duct;

The *Molares*, which are in a group, and a part of the Buccal, situated opposite to the large superior Dentes Molares;

The *Labiales*, lying on the inside of the Lips; Tab. XCVII. Fig. 1. o;

The *Palatinae*, upon the Palate; and

The *Linguales*, at the root of the Tongue.

The *Arteries* of the Salivary Glands are from different Branches of the External Carotids.

The Parotid Gland is supplied from the Temporal, the Inferior Maxillary Gland from the Facial, and the Sublingual Gland from the Lingual Artery.

The *Veins* of these Glands go to the External Jugulars.

The *Nerves* are chiefly from the third part of the Fifth, and from the Portio Dura of the Seventh Pairs. The latter Nerve perforates the Parotid Gland in such a manner, that it must unavoidably be divided in the extirpation of the Gland.

The Salivary Glands serve for the secretion of the Saliva, which they pour out in large quantity, and which is promoted by the motion of the lower Jaw during manducation. The Saliva is found to consist of water, in which are dissolved Albumen, Mucus, and certain Saline Substances, in various proportions.

The Saliva assists in the solution of the Food in the Mouth, in lubricating the Throat for its passage downwards, and in the digestion of it in the Stomach.

## OF THE TEETH.

### OF THE STRUCTURE OF THE TEETH IN THE ADULT.

THE *Teeth* are situated in the Alveoli or Sockets of the Jaws, and are sixteen in number in each Jaw, though, in some instances, there is one or two Teeth more or less than this number, and the surplus or deficiency occurs chiefly at the fore part of the Jaw. Tab. XVIII.

Each Tooth consists of a *Base*, or *Body*, or *Corona*, and one or more *Roots* or *Fangs*; the former appearing without, the latter within the Sockets. Tab. XVIII.

Around the Surface, where the Body ends and the Root begins; the Tooth is a little contracted where it forms the *Cervix* or *Collar* of the Tooth. The Collar is connected to the Socket, and Gum which closely embraces it; and which being destroyed, from whatever cause, the Teeth are apt to drop out. Tab. XVIII.

The Roots are of a Conical form, Tab. XVIII. becoming gradually smaller as they recede from the Body of the Tooth, in consequence of which, pressure is re-

moved from the tender parts placed at their points, and divided equally over the Surface of the Fangs. The Roots are incrustated by a thin covering, of a yellowish tint, harder than the part it incloses, and sometimes called *Horny Substance*.

Upon the Body of each Tooth, there is an additional Covering, termed *Cortex Striata*, or *Enamel*, which is spread over all that part of the Tooth that, in the healthy state, appears beyond the Gums. Tab. XCIV. Fig. 1. 2.

The Enamel is of a white colour, insensible, and so hard, that a Saw or File impresses it with difficulty. The action of Fire does not much affect its colour. It is almost completely dissolved in the Acids.

It is thicker towards the cutting and grinding Surfaces, and becomes gradually thinner towards the Cervix of the Tooth.

It is composed of Fibres so disposed as to form Radii round the Body of the Tooth: or they are nearly perpendicular to its Surface. Tab. XCIV.

The Fibres are remarkably small and straight on the cutting Edges and grinding Surfaces of the Bodies, but curved at the sides of these, with the convex part turned towards the Fangs of the Teeth, which better enables them to resist the impression of hard Substances placed between them during manducation; nor are they, from this structure, so apt to exfoliate by disease, nor so easily fractured by the inordinate motion of the Jaws.

Near the point of each of the Roots of the Teeth, there is a *Foramen*, and a passage leading from it into a common Cavity in the Body of the Tooth, for lodging the Substance called *Pulp* of the Tooth. Tab. XCIV. Fig. 1. 2.

The Foramen is placed towards one side of the point, which prevents the Vessels and Nerves entering here from being injured by pressure.

In old people, the Foramen is sometimes obliterated; in such cases the Vessels and Nerves are destroyed.

The shape of the Cavity resembles that of the Body of the Tooth, being narrow next the Fangs, and gradually expanding towards the opposite extremity. Tab. XCIV.

The Cavity is smooth, and has no Cancelli nor Marrow, being filled with the Pulp, which is inclosed in a fine Membrane, connected to the Tooth by Cellular Substance.

The Pulp consists of minute Vessels and Nerves, intermixed with Gelatinous Matter, the remains of that which gave origin to the Tooth; and which, being exposed, occasions Toothache.

The *Arteries* of the Teeth called *Dental*, are Branches of the Internal Maxillary; the *Veins* returning from them pass into the Internal Jugular Veins.

After the Arteries have entered the Teeth, they are dispersed upon the Membrane which lines their Cavity, Tab. XCIV. Fig. 6. as may be seen by injecting them.—The Vascularity of the Teeth is also proved by the appearance



appearance produced by age, the Cavity in old people often filling up with Osseous Matter, and the Teeth acquiring a horny transparency;—or where, in some Animals, as the Horse, a Tooth is wanting, and the corresponding Tooth of the opposite Jaw extends so far as to fill the space formerly occupied by the body of the absent Tooth, when the Jaws are closed;—by accident, as when a Tooth is loosened by a blow, the Tooth being sometimes fixed again in its Socket, at other times becoming black, from its nourishing Vessels being destroyed;—by disease, as Exostosis, or in Anchylosis of the Roots of the Teeth, or in some rare cases, of the Roots of one Tooth to those next it; but especially by the Blood which is observed by Dentists to issue from the Cavity of the Teeth in sawing them across, for the purpose of fixing other Teeth.

The *Nerves* of the Teeth are from the Fifth Pair, those of the Teeth of the Upper Jaw being from the Second, and those of the Teeth of the Lower Jaw from the Third Branches of that Pair.

In the Upper Jaw, the Nerves enter through various parts of the *Ossa Maxillaria Superiora*. Tab. XCIV. Fig. 5. In the Under Jaw, the Trunk which furnishes the Dental Nerve is lodged in the inferior Maxillary Canal. Tab. XCIV. Fig. 4.

The Nerves which supply the Teeth, though small, can be observed to enter the Foramina at the points of the Fangs, and, by properly preparing the Teeth, can be distinctly traced in their Osseous Canals. In the *Fœtus* the Nerves can be observed first to form a Plexus, and then to penetrate into the Pulp of the Teeth. Tab. XCIV. Fig. 5.

The Absorbents of the Teeth have not been seen, but their existence is proved,—by the Absorption of the Fangs of the Temporary Teeth during the second Dentition;—the removal of part of the Teeth in consequence of ulceration within them;—by the colour given, from the internal use of Madder, to the Osseous Substance of the Teeth, disappearing after the use of it has been for some time discontinued;—by the swelling of the Lymphatic Glands from a Carious Tooth;—and the disappearing of part of the internal Substance of the Teeth of such large Animals as the Elephant, where the Tusks have been found with extraneous Bodies forced into, and lodged within them.

The Substance of the Osseous part of the Teeth, like that of Bone in other parts of the Body, is lamellated. It differs chiefly in being harder and more dense, in having its Fibres generally in a longitudinal direction, and in having a partial covering from the Enamel.

The Teeth are fixed in their Sockets by Gomphosis, *i. e.* like a Nail in a Board, and attached to the Alveoli by a strong Periosteum. The Periosteum lines the Sockets, and is reflected upon the Fangs as far as the Necks of the Teeth, where it is intimately connected with the Gums; but all that portion of the Teeth that appears beyond the Gums is destitute of this Membrane.

The Teeth serve to masticate the Aliment, to assist in pronouncing several of the Letters, and are ornamental to the Face.

ANALYSIS of the TEETH, as made by MR PEPYS of London.

100 parts of Enamel yielded,

|                                |     |       |
|--------------------------------|-----|-------|
| Phosphate of Lime,             | -   | 78    |
| Carbonate of Lime,             | - - | 6     |
| Water of composition and loss, |     | 16    |
|                                |     | <hr/> |
|                                |     | 100   |

100 parts of the Osseous Substance yielded,

|                                |       |       |
|--------------------------------|-------|-------|
| Phosphate of Lime,             | -     | 58    |
| Carbonate of Lime,             | - -   | 4     |
| Gelatin,                       | - - - | 28    |
| Water of composition and loss, |       | 10    |
|                                |       | <hr/> |
|                                |       | 100   |

So far the Teeth agree in their general structure; but, in consequence of certain differences among them, they are in each Jaw divided into four classes, *viz.* *Four Incisores, two Cuspidati, Four Bicuspidati, and Six Molares.*

The *Incisores*, or Cutting Teeth, Tab. XVIII. are placed in the fore part of the Jaw, and have their Bodies formed into Wedges, sloped out behind. Viewed anteriorly, their cutting edges appear broader than the rest of the Tooth; when seen in a lateral direction, they appear thicker towards their roots. Their Fangs, when taken laterally, appear broader than when examined in their anterior and posterior Surfaces. Each of these Teeth has a single Fang, and this, in the Upper Jaw, is the longest of any, excepting those of the Canine Teeth.

Their Enamel is thicker on their anterior and posterior Surfaces than at the sides, where it is remarkably thin, and thicker before than on the back part of the Tooth.

The middle Incisores of the Upper Jaw are broader and longer than the lateral ones, and these larger than the Incisores of the Under Jaw, the lateral of which are larger than the middle set.

The Incisores of the Upper Jaw overlap those in the Under one when the Molares are worn down, and act then like Scissars. In this state the Incisores of one Jaw frequently press the Gums from the roots of those of the opposite Jaw, so as to loosen the Teeth in their Sockets.

The *Cuspidati*, vel *Canini*, Tab. XVIII. are placed at the sides of the Incisores, are larger than these, and, like them, have their Bases in form of *Wedges*, but pointed in the middle.

The



The Enamel covers more of these Teeth than of the Incisores, and is more equal in thickness all round the Teeth.

The Fangs are thicker, larger, and more depressed at the sides, than those of the Incisores, and appear broadest when viewed in a lateral direction.

The Roots of the Canini are the longest of any, and being also the largest, they project more in the Jaw, as is obvious both to the sight and touch; hence the Incisores and Canini are almost in a straight line, especially in the Under Jaw. The Canini have each commonly but one long root, which is crooked at the point. In some rare cases they have two. They somewhat resemble the Tusks of Carnivorous Quadrupeds, especially those of the Dog tribe, from which they have got their name.

The two of the Upper Jaw are a little larger and longer, and have their roots more crooked than those of the Under one.

In the Upper Jaw, they are placed immediately under the Orbital Plates, and are termed *Eye-Teeth*, from a supposed connexion with the Eyes. The two below are placed almost as deep as the Base of the Bone, and are called *Angular Teeth*, from supporting the Angles of the Mouth.

The *Bicuspidati*, formerly termed *Small Molares*, or *First and Second Grinders*, Tab. VI. Tab. XVIII. are situated behind the *Cuspidati*, and bear an intermediate resemblance to these and the Molares.

Viewed in the Jaws, they are somewhat like each other, and not unlike the *Cuspidati*. The Body of each has two points upon the middle of its grinding Surface, one external, the other internal; and those in the Upper Jaw are nearly upon a level. In the Under Jaw, the points project most on the outside of the Teeth.

The Enamel is nearly equal in thickness round the Body of the Tooth, but is thinner at the sides than on the *Cuspidati*.

The Fangs resemble two Fangs united, with a depression between them; sometimes, however, the *Bicuspidati* of the Upper Jaw have distinct roots.

The *Bicuspidati* of the Under Jaw are smaller than those of the upper one, the points on their grinding Surfaces are not so distinct, and the Teeth themselves have a slight inclination inwards in the Jaws.

The *Molares*, or *Grinders*, formerly termed *Large Molares*, which are the most numerous but shortest of any, Tab. VI. Tab. XVIII. are behind the *Bicuspidati*. They are the largest of the Teeth, and have broad Bases with several points. The roots divaricate from each other, and have partitions of the Sockets between them, which assist in lessening the pressure on their points during Manducation. They have thinner Enamel than the other Teeth.

The first of the Molares of the Under Jaw has five, and each of the other has four points.

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Each has two roots, one placed forwards, the other backwards, and these are flat and broad, their flat Surfaces facing anteriorly and posteriorly. Sometimes there are three roots.

In the Upper Jaw, the first Molaris has four, and each of the others only three points.

In the two anterior Molares of the Upper Jaw, there are generally three roots, of which two are on the outer side; the third is on the inner side, and placed obliquely, and is the largest and roundest of the three. The roots of the two anterior Molares of the Upper Jaw are shorter than those of the under one, on account of their situation under the Maxillary Sinus; in certain cases, they project some way into it. Sometimes, though rarely, there are four roots. Tab. XVIII. Fig. 4. I.

The Molares above have a perpendicular direction in respect to the Jaw, those below have an inclination inwards, which should be attended to by the Dentists in the extraction of the Teeth.

The backmost Molares are termed *Dentes Sapientiæ*, from appearing later than the rest of the Teeth.

They are smaller than the other Molares, and have generally fewer roots; these are often quite indistinct, as if squeezed together; and frequently there is only a single Fang.

The *Dentes Sapientiæ* of the Under Jaw have frequently curved roots, and are sometimes placed so obliquely inwards, as scarcely to appear beyond the Gums.

The Incisores of the Upper Jaw being for the most part much broader than those of the Under one, the other Teeth are thrown farther back than the corresponding Teeth of the Under Jaw; in consequence of which, in well-formed Teeth, when the Jaws are shut, the Teeth of the Upper Jaw are opposed to the Interstices of the Teeth of the Under one, and the third Molares of the Upper Jaw being smaller than those of the Under, allow the Teeth to close even at their posterior parts. Tab. VI. Tab. XVIII.

By such a construction, the Teeth are properly adapted to the Manducation of the Food; and one Tooth being lost, its opponent remains useful, by acting upon the parts of the Teeth immediately opposed to it.

#### OF THE TEMPORARY TEETH.

In a Fœtus of three or four Months after Conception, the Jaws are distinctly formed; but in place of Sockets, there are Grooves running along the Jaws, with impressions within them, forming the origins of the future Alveoli. Tab. XCIV. Fig. 7. 9.

The Grooves are narrow and deep at the fore part of the Jaws, and become wider and more shallow towards their posterior extremities.

In the bottom of the Groove of the Lower Jaw, the

N



Inferior Maxillary Vessels and Nerves are placed, which have afterwards a Canal peculiar to themselves.

Within the Alveolar Grooves, there are, at this time, Ridges across, which gradually extend from the bottom and inner sides, forming Arches; and the Cavities becoming deeper, their external Openings contract, till at the time of Birth, when they are almost closed. Tab. XCIV. Fig. 16. In consequence of this, considerable pressure can be made in the time of Suction, without injuring the tender Teeth which the Cavities contain.

The Alveoli of the Molares are produced directly before the roots of the Coronoid Processes of the Under Jaw, and in the Bulges or Tubers of the Upper Jaw, and come forwards as the Jaws increase in length and size. Tab. XCVI. Fig. 12.

In a Fœtus of about four Months, small Pulpy Processes are found to proceed from the inner Surface of the Gums, and to be lodged in the Alveolar Grooves of both Jaws. These are the Rudiments of the future Teeth. Tab. XCIV. Fig. 8.

At this time they are of a Gelatinous or Pulpy nature, resembling in shape the Bodies of the Teeth which are to be formed in them; each contained in a Membranous Capsule proper to itself. Tab. XCIV. Fig. 13.

By degrees the Pulp becomes firmer, and extremely Vascular; and having increased to near the size of the Body of the Tooth, Bone is deposited upon its extreme points by the Blood-vessels, the Pulp itself continuing to grow for some time after this.

About the fifth or sixth Month, Bone begins to appear on that part of the Tooth which is afterwards to form the cutting Edges and grinding Surfaces, and in as many points as there are Eminences on the Pulp. Tab. XCIV. Fig. 15.

The Ossification begins in the Incisores at three points, and in the other Teeth at points corresponding with the number of the future points of the Teeth.

The Osseous points gradually increase, unite, and form a Layer of Bone, which extends over the Surface of the Pulp to the Necks of the Teeth. Tab. XCIV. Fig. 20.

Between the eighth and ninth Month, Ossification is considerably advanced in all the Pulps, and,

In the full-grown Fœtus, the outer Shells of five Teeth in each side of each Jaw are found, which are termed *Temporary, Deciduous, Shedding, or Milk Teeth*.

Of these there are in each side two *Incisores*, one *Cuspidatus*, and two *Molares*; besides, there is the Shell of the Anterior Permanent Molaris; but the whole of the Temporary Teeth are much smaller than the corresponding classes of Teeth in the Adult.

In the Upper Jaw, the points or Eminences of the Shells correspond with the Depressions in the Teeth of the Under Jaw.

After the outer Shell of a Tooth is formed, the Os-

seous Matter gradually penetrates the greater part of the Pulp, and, having completed the Body, it contracts, and forms the *Cervix* of the Tooth.

Having formed the Cervix, the Cavity of the Tooth is by degrees diminished, and in proportion as it is lessened, part of the Pulp is pushed out or elongated, and assumes the part of the respective Fang. Upon this Pulp also Bone is deposited.

While the Fang is extending, the Socket is found to accommodate itself to it, by extending along with it till the Fang is completed.

Where there are two or more Fangs, the Osseous Fibres shoot across at the Cervix, and form the beginning of these, after which the Ossification of each Fang advances in the same manner as that of a Tooth with a single root.

At Birth, the Capsules containing the Pulps of the Teeth can be separated into two Membranes, the external of which is of a Spongy and somewhat Vascular nature, and adheres to the Gums, while the internal, smoother and firmer than the other, and extremely Vascular, adheres to the Pulp.

The Membrane of the Pulp derives its Vessels from those of the Gums; the Pulp receives its Vessels from those which enter the Foramina at the points of the Fangs.

The Membrane containing the Pulp is firmly attached to the inside of the Gums, and to the Basis of the Pulp, and has the same form with the Tooth it incloses. Tab. XCIV. Fig. 12. 13.

The Vascularity of the Pulp is shewn by Injection, as is also that of the Membrane by which it is covered; and this appearance is rendered still more evident by examining the growing Teeth of large Animals, as those of the Elephant.

That part of the Pulp has the most Vascular appearance which is covered by Bone; but the Osseous Shell is found to adhere so slightly to the Pulp, as to be readily separated from it without apparent laceration.

The Osseous Matter of a Tooth is formed in Strata, one Layer being added within another, till the Tooth is completed. Tab. XCIV. Fig. 2.

After the Osseous Substance is formed, the Enamel is added, which increases in thickness, till within a little while of the time at which the Tooth begins to pass through the Gum.

The Enamel is secreted by the Capsule which contains the Pulp, soon after the Osseous Shell has begun to be formed. It is always thickest where first deposited; of course, it is thicker upon the Body than upon the Cervix of the Tooth.

The Enamel is secreted in the form of a pure white earthy Substance, moistened with a Mucilage, and has much the appearance of crystallization.

The deposition of the Enamel continues nearly as long as the Teeth are contained in their Capsules. It is at first, and even for some time after Birth, so soft,

as



as to be little firmer than Chalk, being easily scraped by the Nail, but soon acquiring a flinty hardness and a striated appearance.

After the Bodies of the Teeth have attained their full size, no addition of Substance is made to the Enamel, the Membrane which produces it being destroyed previous to the appearance of the Teeth beyond the Gums. The Osseous part of the Teeth, on the contrary, continues to grow for a considerable time afterwards, one third of the length of the Fangs being added after the Teeth have first appeared in the Mouth.

While the Teeth are extending in their Sockets, they press upon their Capsules, and occasion an absorption of them; the remains of the Capsules surround the Necks of the Teeth, and are gradually removed as the Tooth is completed.

#### OF THE ORIGIN AND FORMATION OF THE PERMANENT TEETH.

Of the Permanent Teeth the anterior Molares are first formed, the Pulps being found in the Fœtus previous to its Birth, and are situated in the back part of the Jaws.

The Permanent Incisores and Cuspidati succeed to, and are formed on the inner side of the Temporary Incisores and Cuspidati. They are similar in shape to these Teeth, but much larger.

The Bicuspidati, which are much smaller than the Temporary Molares, are formed at the roots of these, thin Osseous Partitions being placed between the two Sets.

The second and third Permanent Molares are formed after the Bicuspidati, and in the same manner with the other Permanent Teeth.

When the rudiments of the Temporary Teeth are somewhat advanced, *New Sacs* are sent off in succession at the under and inner part of the Sacs of the Temporary Teeth of the Upper Jaw, and at the upper and inner part of the corresponding Sacs of the Under Jaw, the new Sacs lying between those of the Temporary Teeth and the Internal Alveolar Plate, each being on the inner side of the Tooth it is to succeed, and connected to the Gum.—See Dr Blake's Thesis, Edin. 1798. Tab. XCV. Fig. 2. 3.

The Sacs are at first contained in the same Sockets with the Temporary Teeth, and are loosely connected with the Membranes of these.

During the growth of the Jaws, little Niches are formed in the Internal Alveolar Plate, and these gradually form a distinct Socket round each of the Sacs of the Permanent Teeth.

When the Temporary Teeth have advanced in their Sockets, the Sacs of the Permanent Teeth become elongated, but still remain attached to the Sacs and Gums at the Necks of the Temporary Teeth, each by means

of a Process which passes through a small Foramen at the inner edge of the Jaw. Tab. XCV. Fig. 7. 8.

By degrees, as the Alveoli increase in size, the Permanent Teeth get Sockets of their own. Tab. XCV. Fig. 2. 3. 9.

At the time of Birth, Ossification has commenced upon the tips of the Pulp of the anterior Permanent Molares, and there are small Membranous Sacs, containing the Pulps, with the Rudiments of the other two Molares. Ossification commences upon the points of their Pulp some time after, but always first in the lower Jaw. Tab. XCV. Fig. 10.

In the formation of the second Permanent Molaris, a small Sac is sent back, which is at first contained in the same Socket with the Pulp of the first Molaris; a new Socket is afterwards formed, in which the Pulp of the second Molaris becomes perfect; this, in a similar way, sends off another Process, in which the third Molaris is formed.

About four years after Birth, all the Permanent Teeth have got Sockets for themselves, as may be seen by removing the outer Alveolar Plate of the Jaws.

About the sixth year all the Permanent Teeth, excepting the Dentes Sapientiæ, have made considerable progress. Forty-eight Teeth are now present, twenty are commonly seen beyond the Gums, which are to be succeeded by twenty-eight, that at this time lie concealed in the Jaws. Tab. XCV. Fig. 10.

In the eighth or ninth year, the Dentes Sapientiæ begin to be formed.

#### OF THE APPEARING OF THE TEMPORARY TEETH.

The Temporary Teeth generally begin to appear between the sixth and eighth Month after Birth, the corresponding Teeth commonly appearing about the same time, first in the Under, then in the Upper Jaw, though they frequently appear a little sooner, and often considerably later than this period; the circumstance depending in some measure upon the strength or weakness of the Child.

They commonly appear in the following order: First, one of the Central Incisores of the Under Jaw, and soon after the other one: a few weeks afterwards, the Central Incisores of the Upper Jaw pass through; these are soon succeeded by the Lateral Incisores of the Under Jaw, and then by those of the Upper one.

About the sixteenth or eighteenth Month, the anterior Molares of the Under Jaw appear, and are succeeded by those of the Upper Jaw.

The Cuspidati come next in order, and first those of the Under Jaw, which are soon followed by those of the Upper Jaw.

About the end of the second year, or a little later, the second, or posterior Molares, appear, which complete the first Set; though there is a great irregularity with



with respect to the time at which the Temporary Teeth appear in the Mouth.

OF THE SHEDDING OF THE TEMPORARY, AND THE APPEARING OF THE PERMANENT TEETH.

As the first Set of Teeth do not increase in breadth after they appear through the Gums, a second Set succeed to them, which correspond with the larger size of the Jaw.

About seven years of age is the common time at which Children begin to shed their Teeth, though some shed them a little sooner, others considerably later than this period; and it not unfrequently happens, that some of the first set remain in the Jaws to adult, or even to old age.

The anterior Permanent Molares first appear, soon after the Temporary Central Incisores of the Under Jaw are removed, and are succeeded by the Permanent Central Incisores, one coming a short time before the other; then the Central Incisores of the Upper Jaw come out, and the Permanent Central Incisores succeed them.

Next the Lateral Incisores are succeeded by the Permanent ones.

Then the first, or anterior Temporary Molares come out, and are succeeded by the anterior Bicuspidati.

Then the second Temporary Molares and Cuspidati are succeeded by the Permanent Cuspidati and Bicuspidati. The second Permanent Molares appear some time afterward. The whole shedding of the Teeth occupies a space of five or six years.

The Dentes Sapientiae do not appear till between the eighteenth and twenty-first years; sometimes, however, they appear a year or two sooner, and frequently not till some years later.

The number of the Teeth does not increase till between the sixth and eighth year, when the Teeth that first made their appearance through the Gums are shed, are replaced by others, and more soon begin to appear farther back in the Jaws.

The second Set of Teeth, it is found, contrary to the opinion of former times, do not push out the first, the second Set being formed in Sockets of their own, and the Fangs of the first Set gradually decaying as the succeeding Teeth grow; the decaying of the Fangs of the first Set being in proportion to the decay of the first Set of Sockets.

The Permanent Teeth arise in Sockets appropriated to themselves, and are inclosed in these Sockets after the Temporary Teeth have been shed.

During the growth of the Permanent Teeth, absorption proceeds in the Fangs of the Temporary Set, which facilitates their removal from the Sockets, and affords a Passage for the Permanent Teeth.

While the Permanent Teeth increase in size, they

occupy more space, come forwards, produce a pressure against the Bony Partitions placed between them and the Temporary Teeth, and then against the posterior Surface of the roots of these Teeth, till at length the greater portion, or the whole of the parts pressed against, are observed.

The Permanent Teeth now come forwards under the Temporary Set, which, by the pressure being continued, soon drop out.

Besides the causes mentioned above, with respect to the shedding of the Teeth, others contribute; for now and then the Temporary Teeth drop out long before the Permanent Teeth appear, and sometimes where they never appear.

That absorption of the first Set is much influenced, however, by the pressure of the second Set, is rendered probable, from the instances where one or more of the Temporary Teeth have been observed remaining in the Jaws for many years, and where, upon examination, no Permanent Teeth have been found to be formed.

In some very rare instances, a third Set of Teeth appear at a very advanced age.

OF THE GROWTH OF THE JAWS.

After all the Temporary Teeth have appeared through the Gums, the Jaws are observed to grow little in the parts the Teeth occupy.

The Lower Jaw receives its greatest increase between the second Temporary Molaris and the Coronoid Process, the lengthened part being destined for the Permanent Molares. Tab. XCVI. Fig 10.

The Temporary Incisores and Cuspidati being much smaller than the Permanent, while the Temporary Molares are larger than the Bicuspidati which succeed them, space is gained for the Front Teeth, which otherwise would be distorted in the Jaws.

The Jaws grow uniformly throughout for about a year after birth, and as far as the Teeth extend, form nearly half of a circle; after all the Temporary Teeth have appeared, the Jaws elongate, so that in the Adult they form half of a long Ellipsis.

The extension which takes place between the last Temporary Molaris and the Coronoid Process, and in the corresponding parts of the Upper Jaw, continues to increase till the eighteenth or twentieth year, the anterior part of the Jaw adapting itself to the Permanent Teeth, but scarcely receiving any additional size.

CHANGES PRODUCED IN THE TEETH AND JAWS AS A PERSON ADVANCES IN LIFE.

By degrees, as a Person advances in life, the Teeth are worn down by Friction during Mastication, and this appears



appears more particularly in those whose Teeth have naturally been so short as not to overlap, but to meet each other at their cutting edges.

While the Teeth are wearing down, the Vessels in their Pulp seem to assume a new action, in consequence of which, additional Bone is formed, the Pulp is absorbed, and this Process continues till their Cavity is obliterated.

In old People, when the Front Teeth overlap each other, and when extraneous Matter, as Tartar, has been allowed to collect, the Gums are apt to be pressed from the sides of the Teeth, in consequence of which, they loosen in their Sockets and appear longer; and the loosening is increased by the Absorption of the Alveoli.

With respect to the Jaws, it is observed that they continue to become larger in proportion to the general size of the Head, till the person arrives at the prime of life.

As age advances, the Teeth drop out, and chiefly from the causes mentioned above.

The Alveolar Process disappears by being absorbed, and the distance between the Nose and Chin becomes considerably decreased. Tab. XVIII.

When the Jaws are now shut, the under one projects beyond the upper one, at its anterior part, and in some measure overlaps it, the Jaws being then only opposed to each other behind. In cases of this kind, the Cavity of the Mouth becomes too small for the Tongue, and the food is masticated with difficulty.

TABLE



## T A B L E X C I V .

The STRUCTURE of the TEETH in the ADULT ; their Origin in the FŒTUS, and Progress in the CHILD.

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- |  |   |
|--|---|
| <p style="text-align: center;">FIG. 1.</p> <p>Longitudinal Sections of the Teeth, in which the Distribution of the Enamel is distinctly seen ; particularly in the first of the Row, where the Osseous Part is affected by the Tooth having been exposed to the action of Fire.</p>                    | <p style="text-align: center;">FIG. 8.</p> <p>The Gums removed from the Preparation in Fig. 7. to shew the first appearance of the Pulps, of which the Incisores are the most distinct.</p>   |
| <p style="text-align: center;">FIG. 2.</p> <p>Other Examples of Sections of Teeth, to shew the Structure of the Enamel, and of the Osseous Part.</p>   | <p style="text-align: center;">FIG. 9.</p> <p>The Alveolar Processes represented in the Left Half of the Upper Jaw of a Fœtus of three or four months.</p>  |
| <p style="text-align: center;">FIG. 3.</p> <p>A Section of the Under Jaw of a Child of fifteen months, to shew the Course of the Alveolar Artery. In this Section are seen also the Anterior Temporary Molaris, the Socket of the Posterior Temporary Molaris, and the Anterior Permanent Molaris.</p> | <p style="text-align: center;">FIG. 10.</p> <p>The Pulps contained in the Alveolar Processes of the Left Half of the Upper Jaw of a Fœtus of the same age as in Fig. 9.</p>   |
| <p style="text-align: center;">FIG. 4.</p> <p>A Section of the Inner Side of the Left Half of the Lower Jaw, with the Trunk of the Inferior Maxillary Nerve, which is a little displaced, to show the Nerves which enter the Cavities of the Teeth.</p>  | <p style="text-align: center;">FIG. 11.</p> <p>The Left Half of the Under Jaw of a Fœtus of six months, in which the Alveolar Processes are more advanced.</p>  |
| <p style="text-align: center;">FIG. 5.</p> <p>A Section of the Fore Part of the Upper Jaw, with the Teeth. The Fangs are cut longitudinally, to shew the Nerves in the Osseous Canals.</p>   | <p style="text-align: center;">FIG. 12.</p> <p>The Pulps, with the Membranes inclosing them, removed from the same Jaw.</p>   |
| <p style="text-align: center;">FIG. 6.</p> <p style="text-align: center;">An Artery entering a Tooth, magnified.</p>   | <p style="text-align: center;">FIG. 13.</p> <p>The Gums, with the Rudiments of the Teeth in their Membranes, removed from the half of the lower Jaw, in a Fœtus of about four months. Of the Teeth, the Incisores, Cuspidatus, Molares, and Anterior Permanent Molaris, are seen. The small Figures below shew the Shells removed from the Membranes of the Incisores, Cuspidatus, and two Molares.</p> |
| <p style="text-align: center;">FIG. 7.</p> <p>Half of the Lower Jaw of a Fœtus of three or four months. In the Anterior Part of the Jaw, Processes of Bone are shooting across to form the Alveoli for the Temporary Incisores.</p>  | <p style="text-align: center;">FIG. 14.</p> <p>Half of the Under Jaw of a Fœtus of five months, with the Inner Alveolar Plate removed ; shewing the Membranes of the Incisores, Cuspidatus, and Molares, with the Membrane of the Anterior Permanent Molaris and Blood-vessels.</p>   |



Fig. 1.

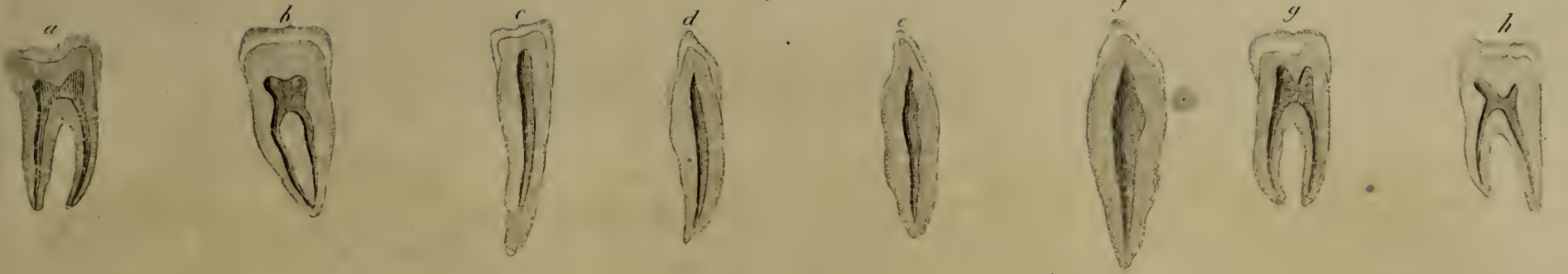


Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.

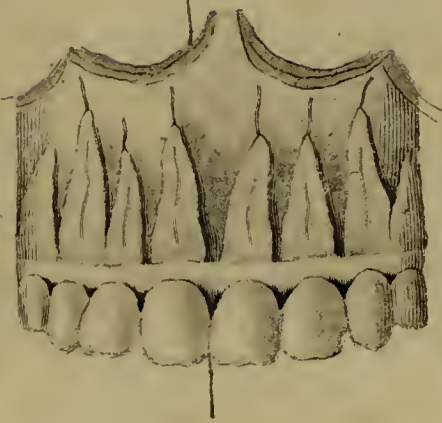


Fig. 6.



Fig. 7.



Fig. 8.

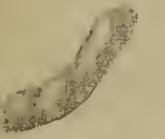


Fig. 11.

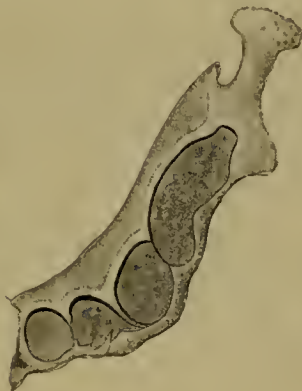


Fig. 12.



Fig. 13.

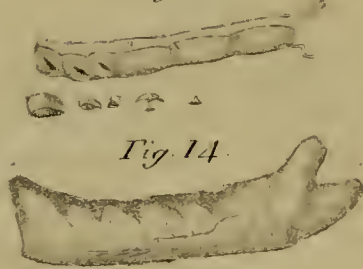


Fig. 15.

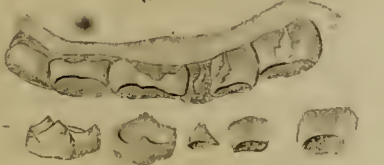


Fig. 14.

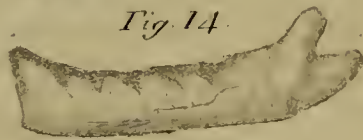


Fig. 16.

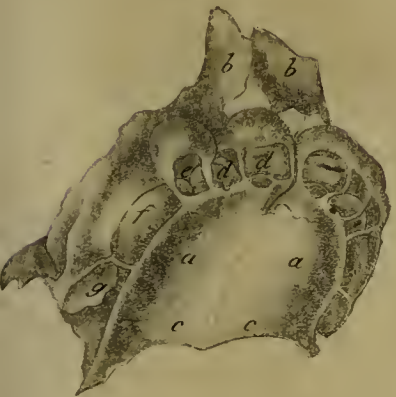


Fig. 17.



Fig. 18.



Fig. 19.

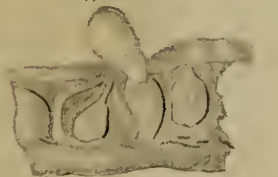


Fig. 21.



Fig. 22.

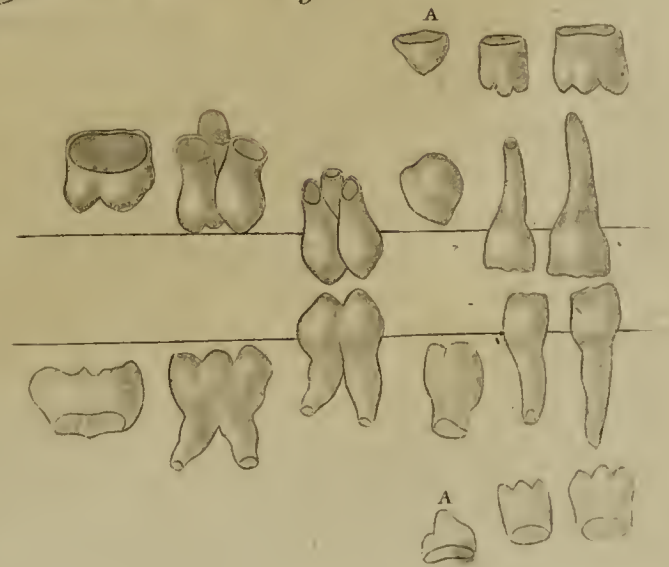
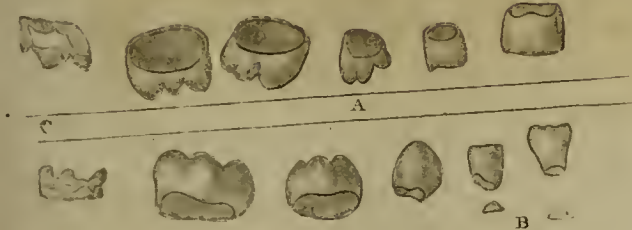


Fig. 20.





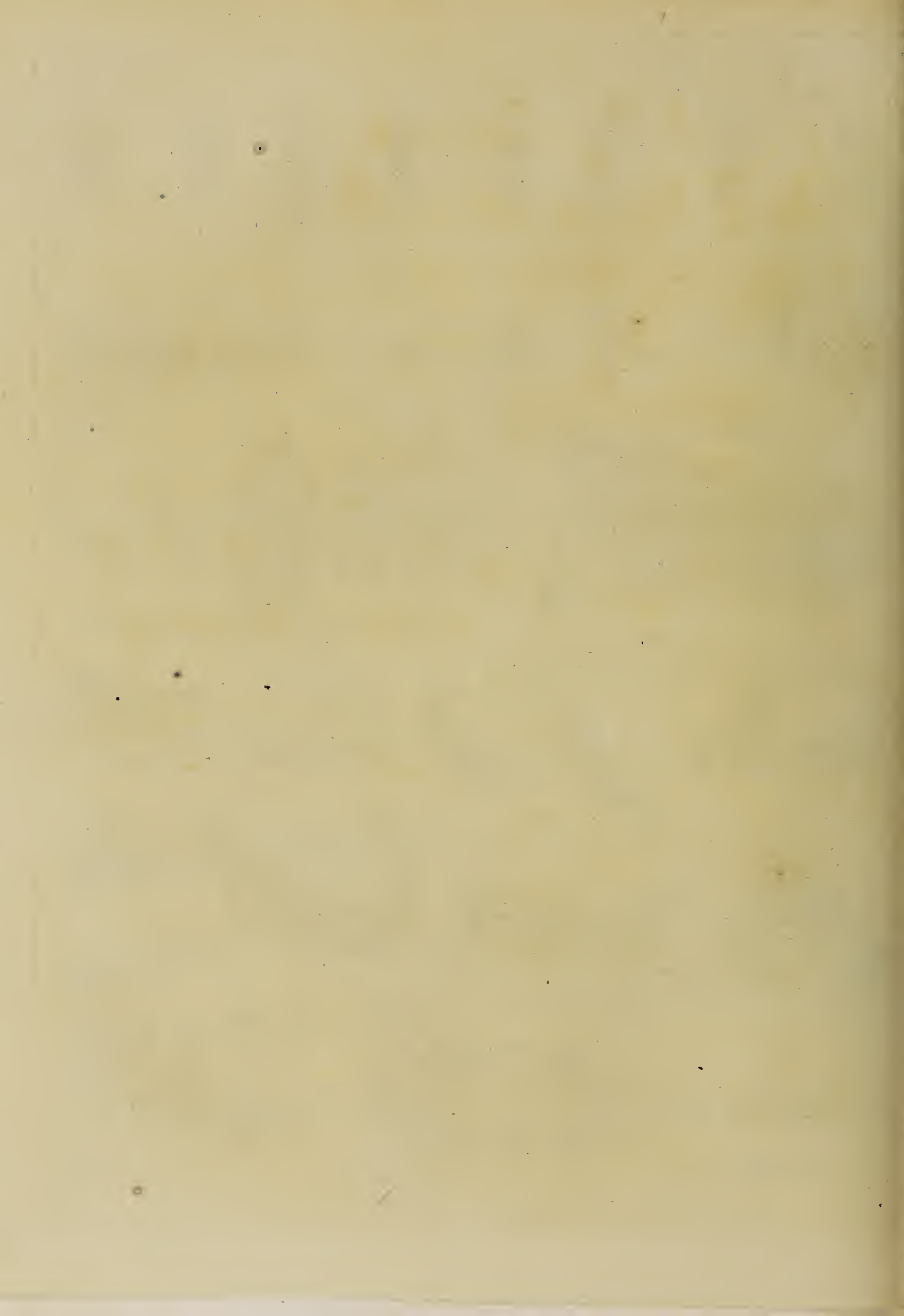




FIG. 15.

An Internal View of the Gums, with the Rudiments of the Teeth in their Membranes, in one Side of the Upper Jaw, in a Fœtus of eight months; shewing the Incisores, Cuspidatus, two Molares, and the Anterior Permanent Molaris. The Figures below shew the shells of these Teeth removed from their Membranes.

FIG. 16.

*A View from below, of the Upper Jaw of a Fœtus of nine months; shewing the Alveoli of the Deciduous Teeth, and the Sockets of the Permanent Teeth beginning to form.*

*a, a,* The ossa maxillaria superiora;

*b, b,* Their nasal processes.

*c, c,* The ossa palati.

*d, d, e, f, g,* The alveoli of the temporary teeth, and the same are seen in the opposite side of the jaw.

In *g,* the membrane of the anterior permanent molaris was also contained.

The small perforations behind the alveoli of the anterior deciduous teeth are the origins of the alveoli of the permanent incisores and cuspidati.

FIG. 17.

Half of the Lower Jaw of a Fœtus of seven or eight months, seen from the outside, the External Plate being cut to shew the Nerves entering the Pulps of the Teeth. The Parts are contracted by their having been kept in Spirit of Turpentine. The figure shews the Central Incisores almost through the Gum, the Lateral Incisor, the Cuspidatus, the two Molares, and the Anterior Permanent Molaris. The Nerve is seen in the Maxillary Canal, sending Branches to the Teeth.

FIG. 18.

The Inner Side of the Jaw represented in Fig. 17. Part of the Alveolar Process being cut, the Figure shews the Pulps, the Sacs, and connecting Processes of the Permanent Incisores, Right Cuspidatus, and two Deciduous Molares, from the anterior of which a small Process, the beginning of the Anterior Bicuspis, is sent off.

FIG. 19.

The Fore Part of the same Jaw seen from the Inner Side, in which the Sacs of the Anterior Permanent Incisor and the Cuspidatus appear, the former towards the left, and the latter towards the right hand Side. Between these, the Sac with the Lateral Incisor is raised and inverted, by which the Sac of the Lateral Deciduous Incisor is exposed.

FIG. 20. 21. 22. of this, and FIG. 1. of next Table, represent the Progress of Ossification of the Teeth, from the ninth month of the Fœtus till between the second and third year of the Child. The Teeth are represented as taken out from the Sockets of one Side of the Jaw, but so placed, that the back ground in some measure points out their depth with respect to the Jaws and Gums.

FIG. 20.

*The Teeth at the time of Birth, when the Parts of them ossified are only Shells, having the form of the Crowns of the Teeth.*

A, The deciduous teeth.

B, The rudiments of the permanent incisores.

C, The rudiments of the anterior permanent molares.

FIG. 21.

*The Teeth of a Child six or eight months old. Now the Central Incisores of the Upper Jaw, and the Central and Lateral Incisores of the Lower Jaw, have made their appearance.*

A, The deciduous teeth.

B, B, The permanent incisores.

C, The cuspidatus of the lower jaw.

D, The two permanent molares.

FIG. 22.

*The Teeth of a Child sixteen months old. The Incisores and first Molaris in each Jaw have appeared beyond the Gums.*

A, A, The permanent cuspidati.



## T A B L E X C V .

Exhibits the DISPOSITION of the First and Second SETS of TEETH, in Children from two to nine Years of Age.

FIG. 1.

*The Teeth of a Child between two and three years of age. The whole of the Temporary Set have got through the Gums; and, in addition to the Permanent Teeth seen in the three last Figures of the former Table, are,*

A, A, The points of the first bicuspidati.

FIG. 2. and 3.

*From a Child about four years of age.*

FIG. 2.

*An Inner View of the Left Half of the Upper Jaw, with the Teeth. The Alveolar Processes, and Part of the Septum Palati, are cut.*

*a, b,* The temporary teeth.

*c—f,* The rudiments of the permanent teeth inclosed in their capsules, and attached by processes to the membranes and gums of the temporary teeth.—*c,* The central, and, *d,* the lateral incisor; *e, e,* the bicuspidati; *f,* the cuspidatus deep in the jaw, yet connected to the temporary cuspidatus; *g,* the gum over the anterior and central molares, not yet cut.

*h,* The septum palati.

*i,* The pterygoid process.

*k,* The posterior naris.

FIG. 3

*The Right Half of the Lower Jaw, with the Teeth, viewed from the Inner Side, the Internal Table being cut off.*

*a, b,* The temporary teeth.

*c—i,* The membranes inclosing the permanent teeth, with their processes connecting them to the gums, and to the membranes of the deciduous teeth.—*c,* The central incisor; *d,* the lateral incisor; *e,* the cuspidatus; *f, f,* the bicuspidati; *g,* the anterior, and, *h,* the middle molaris; *i,* the part where the dens sapiens is afterwards to be formed.

*k,* The inferior maxillary trunk of vessels, nerves, and periosteum, sending branches to the teeth, the remains passing out by the anterior maxillary foramen, to be dispersed upon the under lip.

FIG. 4.

*The Deciduous Cuspidatus of a Child of about eighteen months, inclosed in its Membrane, and the Capsule of a Permanent Tooth firmly connected to it.*

*a,* The capsule of the deciduous tooth.

*b,* That of the permanent tooth, with its attachment to the other. The shell which was formed in it is removed.

FIG. 5.

*The Connexion between a Deciduous and a Permanent Incisor.*

*a,* The deciduous incisor.

*b,* The sac of the permanent incisor.

*c,* The process by which they are connected.

FIG. 6.

*A Section of the Lower Jaw of a Child about four years old, representing a Temporary and a Permanent Tooth in different Alveoli.*

*a,* The body of a temporary incisor;

*b,* Its fang.

*c,* A process descending from the gum through a foramen to,

*d,* The capsule of a permanent tooth.

*e,* The gum inverted to shew this connexion.

FIG. 7.

*An Under View of the Upper Jaw of a Child, to shew the Foramina through which the Processes passed, which made the Connexion between the Temporary and Permanent Teeth. In the Figure are seen all the Temporary Teeth, and the Anterior Permanent Molares.*  
Behind



Fig. 1.



Fig. 2.

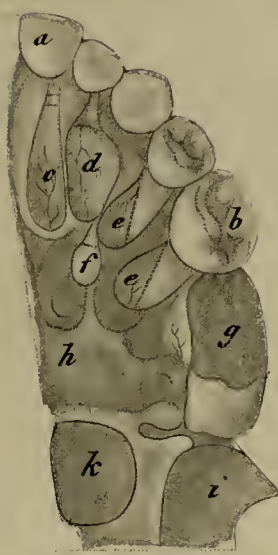


Fig. 3.



Fig. 4.



Fig. 5.



Fig. 6.



Fig. 7.

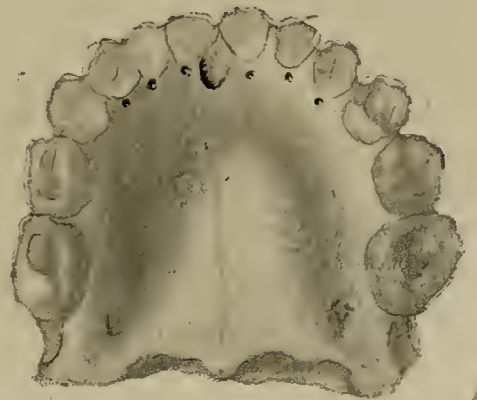


Fig. 9.

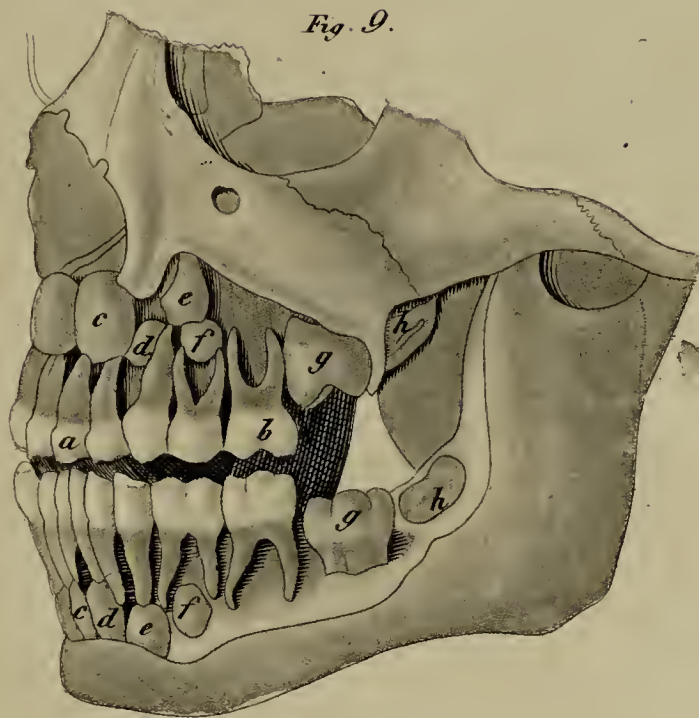


Fig. 8.

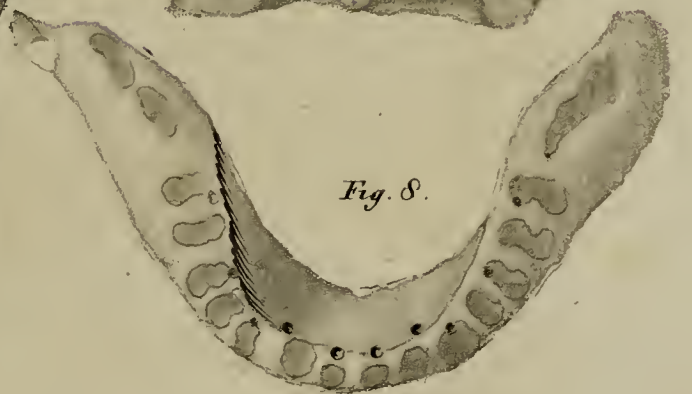


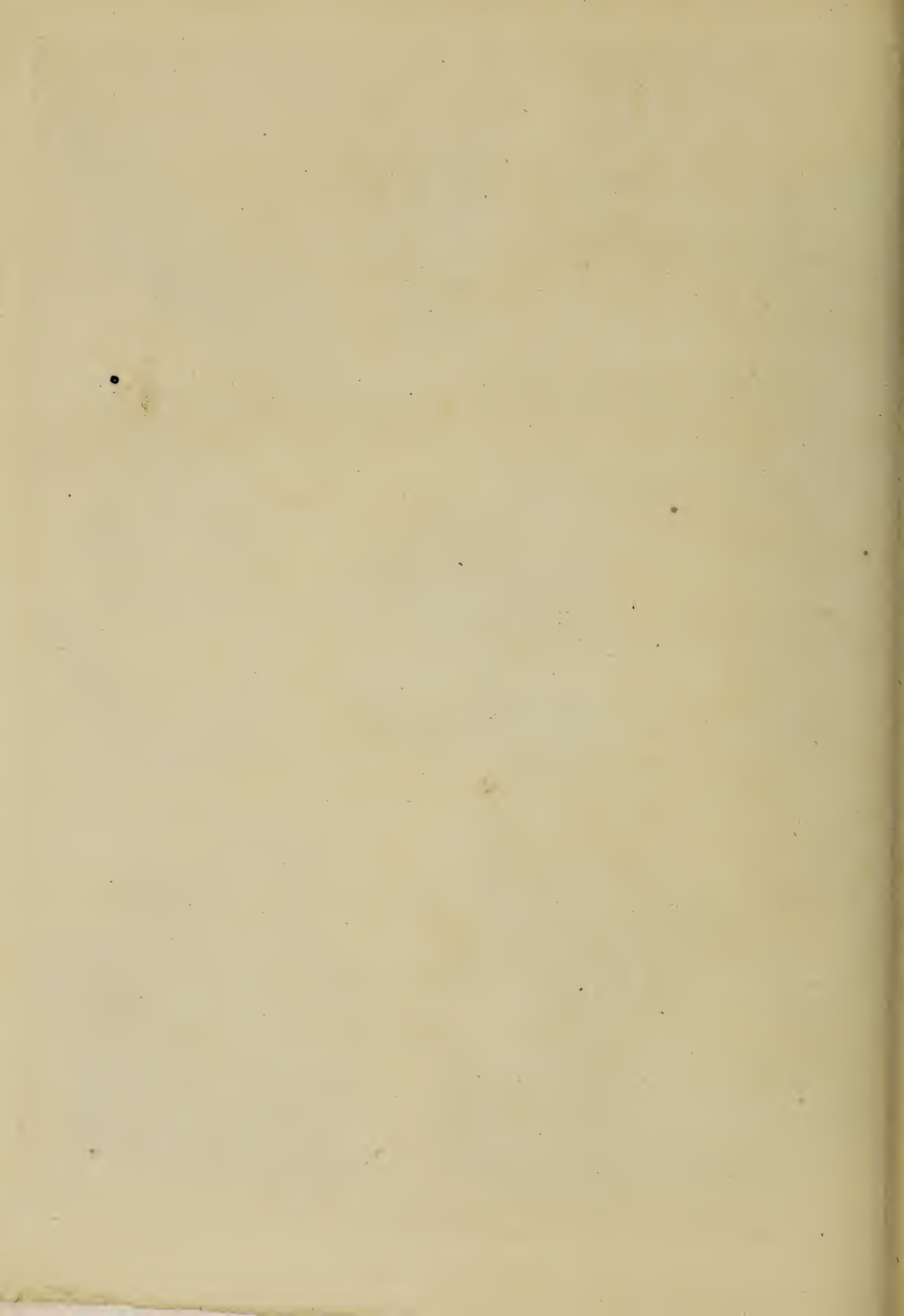
Fig. 10.



Fig. 11.









Behind the Incisores and Cuspidati, the Foramina appear, with the Canalis Incisivus between them.

FIG. 8.

A View of the Upper and Inner Side of the Lower Jaw of a Child, with the Teeth removed, to shew the Foramina for the connecting Membranes of the two Sets of Teeth. Of these Foramina, five are seen on the edge of the Alveolar Plate, at the Inner Side of the Alveoli in each Side of the Jaw.

FIG. 9. 10. 11.

The Jaws and Teeth of Children at different ages. The Jaws are cut to shew the Teeth, the white unshaded part of which is considered to have passed through the Gums, and to be appearing in the Mouth.

FIG. 9.

A View, from the Left Side, of the Disposition of the Teeth of a Child between four and five years of age.

*a, b, a, b*, The temporary set of teeth, consisting of the two incisores, the cuspidatus, and the two molares in each Jaw.

*c—h*, The permanent teeth.—*c*, The central, and, *d*, the lateral incisor; *e*, the cuspidatus; *f*, the first bicuspidatus, the formation of the second not yet having commenced; *g*, the first, and, *h*, the second molaris.

FIG. 10.

In the Right Side of the Head, a View of the two Sets of Teeth in a Child of six years of age.

*a, b*, The temporary set of teeth.  
*c—h*, The permanent set.—*c*, The central, and, *d*, the lateral incisor; *e*, the cuspidatus; *f, f*, the two bicuspidati; *g*, the first, and, *h*, the second molaris.

FIG. 11.

A View of the Teeth, from the Left Side, in a Child of eight or nine years of age. The Temporary Incisores have been shed, and replaced by the Permanent Set, and the first Permanent Molares have appeared.

*a, b, b*, The remaining temporary teeth.—*a*, The cuspidatus, and, *b, b*, the molares.  
*c—i*, The permanent teeth.—*c*, The central, and, *d*, the lateral incisor; *e*, the cuspidatus; *f, f*, the bicuspidati; *g*, the first, and, *h*, the second molaris; *i*, the commencement of the third molaris, or dens sapiens.



## T A B L E X C V I .

Shews the Increment of the TEETH, the Absorption of the FANGS of the TEMPORARY SET, and the Disposition of the TEETH in the JAWS at different Periods.

FIG. 1.

*Represents a Series of the Increment of an Anterior Permanent Molaris of the Under Jaw, from the commencement of Ossification to the Perfect State.*

- a*, Five points of ossification; *b*, the shells conjoined; *c*, the fangs beginning to form; *d*, the fangs more perfect.
- e*, The pulp advancing more rapidly than the ossification.
- f*, The roots almost complete; *g*, a fang with two cavities, a rare occurrence; the other fang has a single cavity.

FIG. 2.

*A Series of the Increment of an Anterior Permanent Molaris of the Upper Jaw.*

- a*, Five points of ossification not yet perfectly conjoined; *b*, the shells united; *c*, the incipient roots; *d*, the roots more perfect; *e*, the pulp advancing faster than the osseous part of the fangs. The pin is stuck into the membrane of the tooth which is drawn over the enamel.
- f*, A perfect tooth, with an opening in the point of each fang.

FIG. 3.

*The same Series of Increment in a Bicuspis.*

- e*, A bicuspis of the lower jaw with a single fang.
- f*, The same in the upper jaw with two fangs, as not unfrequently happens.

FIG. 4.

*Different Deciduous Teeth, the Fangs of which are wasted by Absorption.*

- e*, A tooth in which the enamel is imperfectly formed, there being several grooves and pits in it.

- f*, A tooth where the pulp is not divided, of course there is only a single root.

FIG. 5.

*Several Specimens of Temporary Cuspidati, to shew the progress of Absorption.*

FIG. 6.

*The same thing seen in the Temporary Molares.*

FIG. 7.

*Sections of the Lower Jaw, representing the Progress in the Formation of the Permanent Teeth, and the Absorption of the Fangs of the Temporary Teeth.*

FIG. 8.

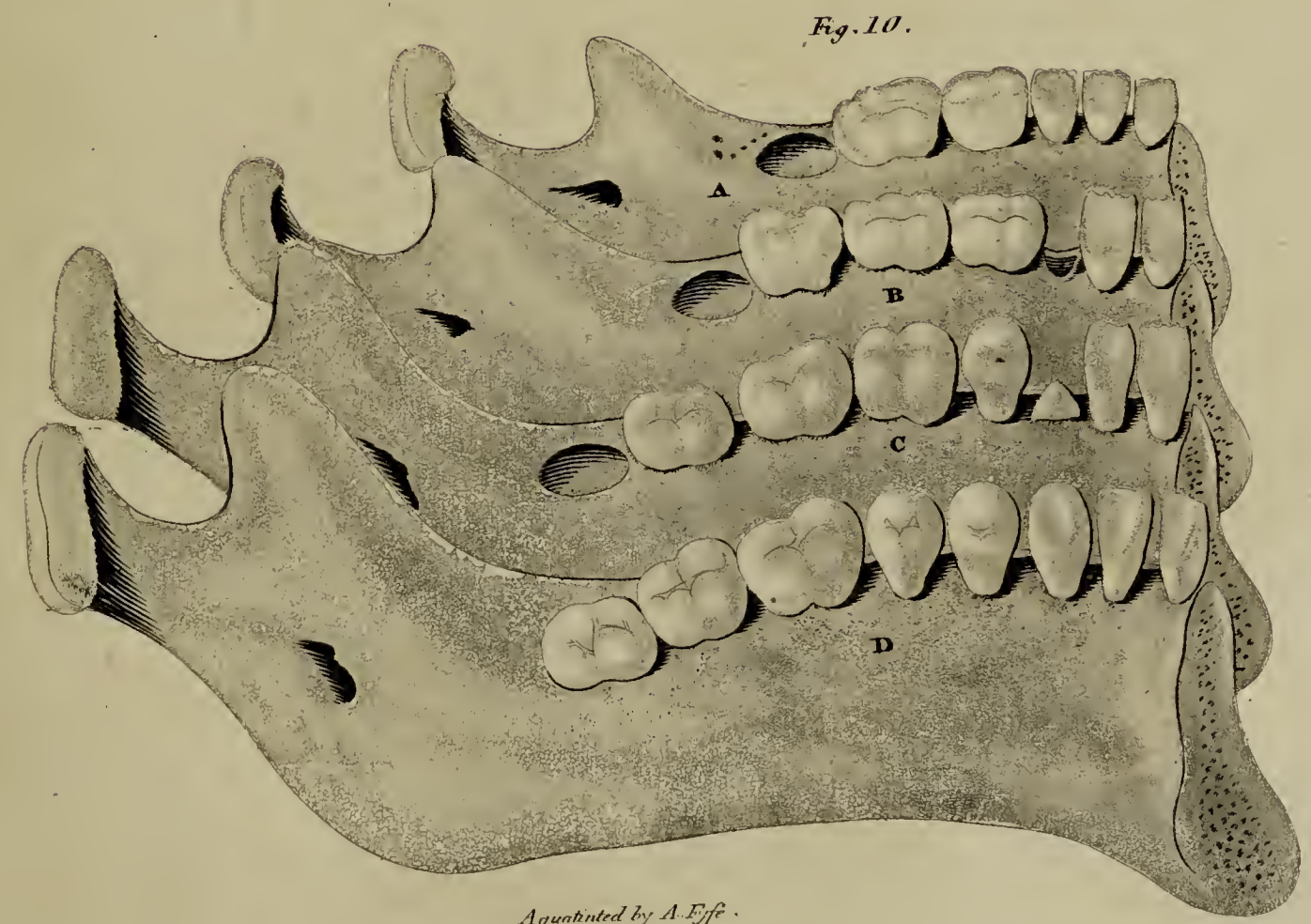
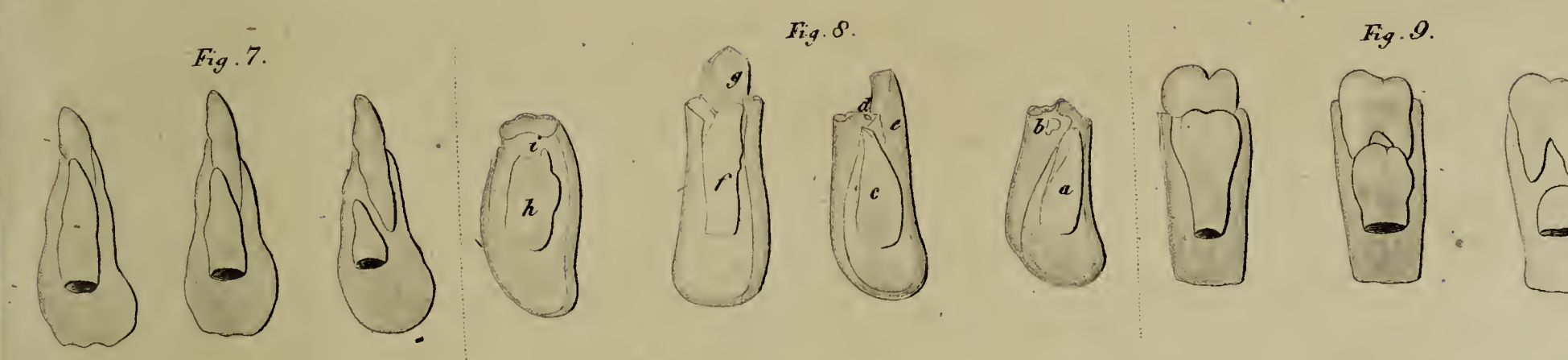
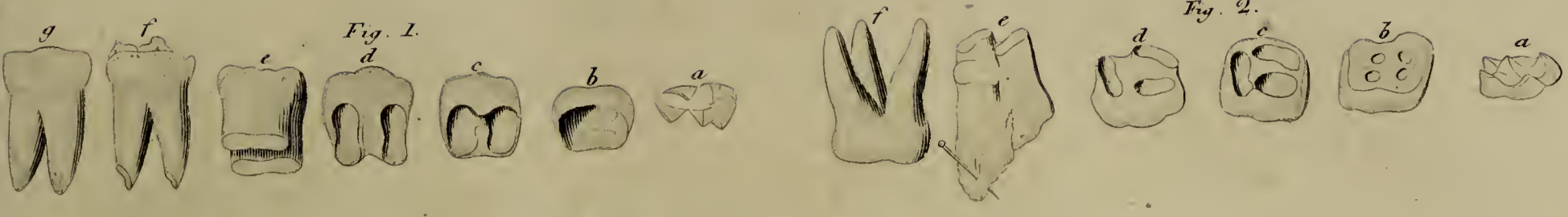
*A Section of Jaws, representing the Permanent Teeth partly in their own Sockets, and partly in those of the Temporary Teeth.*

- a*, A permanent incisor passing into the socket of a temporary tooth which is shed; *b*, a foramen through which the membranes of the two teeth were connected.
- c*, A permanent incisor appearing through the inner part of the jaw, and more internally than the foramen; *d*, where the membranes were connected; *e*, a central deciduous incisor retaining its root.
- f*, A permanent incisor which has appeared in the inner side of the mouth, on account of the resistance of *g*, a temporary cuspidatus.
- h*, One of the permanent bicuspidati passing into the socket of a deciduous molaris, which had been extracted; *i*, the osseous septum not yet absorbed; *k*, the socket of one of the molares.

FIG. 9.

*Other Examples of Sections of the Lower Jaw, shewing the Progress in the Formation of the Permanent Teeth,*











*Teeth, and the Absorption of the Fangs of the Temporary Teeth.*

FIG. 10.

*Represents the Left Half of four Lower Jaws, viewed from the Inner Side, shewing the Disposition of the Teeth at different Periods, the change of the Temporary Teeth for the Permanent, and the addition of the Permanent Molares; that the Permanent Incisores and Cuspidati are larger than the Temporary Incisores and Cuspidati, while the Bicuspidati are smaller than the Temporary Molares, which they succeed; and that the Extension of the Jaw is chiefly formed between the last Temporary Molaris and the Coronoid Process.*

- A, From a child at six years of age, when only the temporary teeth have passed through the gums.  
 B, From a child of eight or nine years of age. The temporary incisores and cuspidatus have been shed; the permanent incisores and the first permanent molaris have grown up.  
 C, The first temporary molaris has been shed, and is succeeded by the first bicuspidatus; the cuspidatus and the second permanent molaris are appearing.  
 D, Shews the appearance in the adult state. The second temporary molaris is shed, and its place supplied by the second bicuspidatus. The third molaris, or dens sapiens, has appeared.



## OF THE THROAT, &amp;c.

THE *Throat* consists of the *Arches of the Palate*, of the *Pharynx* and *Larynx*, with the *Muscles*, *Vessels*, *Nerves*, &c. which surround them; to these may be added the *Thyroid Gland*.

The *Arches of the Palate* are two in number in each side of the *Throat*, one of which is termed the *Anterior*, the other the *Posterior Arch*. Tab. XCVII.

They are formed of a Doubling of the *Skin*, with a few scattered *Muscular Fibres*.

The *Anterior Arch* arises from the middle of the *Velum Palati*, at the side of the *Uvula*, and is fixed to the edge of the *Base of the Tongue*. Tab. LIV. Fig. 15. *b*. Tab. LXXVIII. No. 52.

The *Posterior Arch* has its origin likewise from the side of the *Uvula*, and passes downwards, to be inserted into the side of the *Pharynx*. Tab. LIV. Fig. 15. *a*. Fig. 10. *f*. Tab. LXXVIII. No. 53.

The *Anterior Arch* contains the *Circumflexus Palati*, and, with its fellow on the opposite side, forms the opening into the *Throat*, called *Isthmus Faucium*.

The *Posterior Arch* has within it the *Levator Palati*.

Between the *Anterior* and *Posterior Arches*, and close by the sides of the *Base of the Tongue*, the *Amygdalæ*, *Tonsils*, or *Almonds* of the *Ears*, are situated. Tab. LXXVIII. No. 54. Tab. XCVII. Tab. LIV. Fig. 10.—13.

They are of a reddish colour, of an oval form, or somewhat of the figure of *Almonds*, full of *Cells*, which communicate with each other, and have large irregular *Openings*, which convey *Mucus* into the *Throat*; the discharge of which is promoted by the motion of the *Arches of the Palate* and surrounding parts.

The *Mucus*, secreted from these *Bodies*, is naturally transparent, but in *Inflammatory* cases, it frequently assumes a white appearance, and is apt to be mistaken for *Sloughs*, or *Purulent Matter*.

## PHARYNX.

The *Pharynx*, so called from its conveying food to the *Stomach*, and *Air* to the *Lungs*, is a large *Musculo-Membranous Bag*, situated behind the *Tongue* and *posterior Nares*. It is somewhat oval, or in form of an irregular *Funnel*, with the *Tube* termed *Esophagus* descending from it, and forming the under end of that *Funnel*. Tab. LIV. 6.—9.

It is bounded above by the *Cuneiform Process* of the *Occipital Bone*, and by the *Pterygoid Processes* of the *Sphenoid Bone*, and back part of the *Jaws*; with all of which it is intimately connected.

The anterior *Margins* of its *Fleshy parts* are connect-

ed to the edges of the *Larynx*, and its sides are covered by the great *Blood-vessels* of the *Neck*. Tab. LVII. Fig. 6.

The fore part of the *Pharynx* is formed by a *Membrane* common to it and to the back part of the *Larynx*.

Behind, it lies flat upon the *Cervical Vertebrae*, and upon the *Muscles* which cover the fore part of the sides of these *Vertebrae*, to both of which parts it is so slightly connected, that it may be readily separated from them. Tab. LXXVIII. No. 42.—46.

It has several *Openings*, by which it communicates with the neighbouring *Cavities*.

Two of these lead upwards and forwards by the *posterior Nares* into the *Nose*, Tab. LXXVI. G. Tab. LXXVIII. No. 48.; two go laterally by the *EUSTACHIAN Tubes* to the *Ears*, Tab. LXXVIII. No. 46.; one passes forwards through the large *Opening* termed *Fauces*, or top of the *Throat*, to the *Mouth*, Tab. LXXVIII. No. 52.; one goes downwards and forwards through the *Larynx* and *Trachea*, to the *Lungs*, Tab. LIV. Fig. 10. *l*.; and another directly downwards by the *Esophagus* to the *Stomach*. Tab. LXXVIII. No. 42.

The *Pharynx* is surrounded by a loose *Cellular Substance*, and consists of different *Layers of Muscles*, called *Constrictores Pharyngis*, which have been already described.

On the inner side, it is lined by the continuation of the *Membrane of the Mouth*, which is perforated by the *Ducts of numerous Glands*, for the secretion of *Mucus*.

The lower end of the *Pharynx*, opposite to the under edge of the *Cricoid Cartilage*, and *Fifth Cervical Vertebra*, describes a complete *Circle*, which forms the beginning of the *Esophagus*.

The *Pharynx* is supplied with *Blood* by the *Pharyngeal Branches*, which come directly or indirectly from the *External Carotids*. It returns its *Blood* to both *Jugular Veins*.—Its nerves are from the *Eighth Pair*.

The *Pharynx* receives the *Aliments* from the *Mouth*, and, by the action of its *Muscles*, conveys them to the *Esophagus*. It also receives the *air* we inspire, and must likewise assist in the modification of the *Voice*.

## LARYNX.

The *Larynx*, so called from its being the principal *Organ of voice*, forms the anterior part of the *Pharynx*. It is situated at the upper and fore part of the *Neck*, immediately under the *Os Hyoides*, which is placed at the root of the *Tongue*. Tab. LVII. Fig. 5.

In the *Male*, the *Larynx* is proportionally larger, and is



is also more prominent, than in the Female; before Puberty, however, and in cases of early castration, the size of the Larynx in the Male is more nearly similar to that in the Female.

It is broader above than below, is composed of Cartilages, Muscles, Ligaments, Membranes, and Mucous Glands. It is connected above to the Tongue and Os Hyoides, Tab. XCVIII. Fig. 8. Tab. XCIX.; and behind to the Pharynx. Tab. LVII. Fig. 5. 6.

The *Cartilages* of the Larynx are generally considered as being five in number, though, besides these, some choose to enumerate small Projections which are connected with them.

The *Five* Cartilages are,—the *Thyroid*, the *Cricoid*, the *Two Arytenoid*, and the *Epiglottis*.

The *Thyroid*, *Scutiform*, or *Shield-like Cartilage*, is placed at the upper lateral and fore part of the Larynx, and is the largest of the whole. The lateral portions of this Cartilage are somewhat compressed where they are covered by the Thyro-hyoid Muscles. Tab. XCVIII. Fig. 3. g. Tab. XCIX. Tab. XXXVI. Fig. 1. i, k.

When spread out, it is of an oblong shape, Tab. XCVIII. Fig. 6. a, a; but in the natural situation, it consists of two lateral Wings or Portions, of a quadrangular form, uniting before in a longitudinal Angle, which can be readily felt in the fore part of the Throat, and which, from its being larger, and projecting more in Men than in Women, has obtained the name of *Pomum Adami*. Tab. XCVIII. Fig. 3: g.

The upper part of the Angle is formed into a Notch, from which, and from the upper edge of the Cartilage in general, a *broad Ligament* ascends, to fix it to the under part of the Os Hyoides. Tab. XCVIII. Fig. 3. e.

From the posterior Corners four Processes project, called *Cornua*, two of which, termed *Superior*, are long, and ascend to be joined by round Ligaments to the extremities of the Cornua of the Os Hyoides. Tab. LVII. Fig. 7. Tab. XCVIII. Fig. 3. f, f.

In the middle of these Ligaments, one or two small Cartilaginous, or sometimes Osseous Substances, of an oval form, are frequently found. Tab. XCVIII. Fig. 7. k, k.

The other two Cornua, called *Inferior*, are shorter than the Superior, and curved backwards, to be fixed by smooth articulating Surfaces to the sides of the Cricoid Cartilage. Tab. XCVIII. Fig. 3. i, i. Fig. 6. b, b.

The Thyroid Cartilage serves for the protection of the other Cartilages, for the attachment of the Vocal Ligaments, and, along with the Os Hyoides, preserves the passage open, for the transmission of Food to the Stomach.

In old age, this Cartilage is frequently ossified.

The *Cricoid*, *Annular*, or *Ring-like Cartilage*, is placed below, and also behind the Thyroid, and, like it, may be readily felt in the fore part of the Throat. Tab. XCVIII. Fig. 3. k. Fig. 4. g. Tab. XCIX. Tab. C. Fig. 1. p.

It is narrow before, where it lies under the Thyroid Cartilage, and thick, broad, and strong posteriorly, where it is placed behind that Cartilage. Tab. XCVIII. Fig. 6. f, g.

The back part of this Cartilage is divided by a longitudinal Ridge into *two lateral Depressions*, for the reception of the posterior Crico-arytenoid Muscles. Tab. XCVIII. Fig. 4. h, h.

Its under edge is horizontal, and fixed to the whole circumference of the beginning of the Trachea. Tab. XCVIII. Fig. 6.

The upper edge slants considerably, or rises between the wings of the Thyroid Cartilage, and has its anterior narrow part fixed to the under edge of that Cartilage. Tab. XCVIII. Fig. 3. 6.

It has four small Articular Surfaces, with distinct Capsular Ligaments, of which two are placed above, for the articulation of the Arytenoid Cartilages, and two at the under and lateral parts, for the connexion of the inferior Cornua of the Thyroid Cartilage. Tab. XCVIII. Fig. 6. i, h.

The Cricoid Cartilage forms part of the general Tube of the Trachea, constitutes the Base of the Larynx, and gives a firm support to the Arytenoid Cartilages.

The two *Arytenoid Cartilages* are much smaller than the other Cartilages, and are placed upon the superior, posterior, and lateral parts of the Cricoid Cartilage, at a small distance from each other. Tab. XCVIII. Fig. 7. e, e. Tab. XCIX. Tab. XXXVI. Fig. 2. G, G.

They are of a *triangular* form and a little twisted; and are bent back above, so as to have a broad concave Surface behind, which is occupied by the Arytenoid Muscles. Tab. XCVIII. Fig. 6. k, l.

The anterior Surface of these Cartilages is convex, but upon each convexity there is a small Depression, which is also occupied by Glands.

Their upper Extremities, or Cornua, are turned towards each other, and are now and then found loose in the form of Appendices, which are considered by some Authors as distinct Cartilages, and termed *Cuneiform* or *Tuberculated*.

Their Bases are *broad and hollow*, where they are articulated by Capsular Ligaments with the Cricoid Cartilage, upon which they are moved in different directions, by the action of various Muscles. Tab. XCVIII. Fig. 4. i, i.

They are connected to each other, and to the adjacent Cartilages, by different Muscles and Ligaments. Tab. XCVIII. Fig. 4. 6. 7.

The Arytenoid Cartilages form a part of the Opening called *Glottis*, and give attachment to its Ligaments.

The *Epiglottis*, obtaining its name from its situation above the Glottis, is of an oval form when surrounded by its Ligaments and Membranes; but when divested of these, it is found to be narrow below, broad above, and rounded, and slightly notched, at its upper extremity. Tab. XCVIII. Fig. 7. a. Fig. 4. b. Tab. XCIX.

It



It is convex towards the Tongue, and concave towards the Glottis, with its point reflected a little forwards.

It is placed behind the upper part of the Thyroid Cartilage, is situated obliquely over the Glottis, and may be seen and examined in the living Body, by pressing down the root of the Tongue.

Its under end is fixed by a broad and short Ligament to the middle Notch of the Thyroid Cartilage; laterally it is attached by two ligaments to the whole length of the Arytenoid Cartilages, forming, at this part, the Superior Opening of the Larynx. Tab. XCVIII. Fig. 4. —7. 9.

It is fixed to the roots of the Os Hyoides and Tongue by a Ligament, which is the Doubling of the inner Membrane running along the middle of its anterior Surface, and forming the *Frænum Epiglottidis*. Tab. XCVIII. Fig. 3. *d*. Fig. 8. *c*.

It is very elastic, and is much more pliable than the other Cartilages, being of a Cartilago-ligamentous nature.

It is found to have a number of *Fissures* with *Lacunæ* in them, and to be perforated by numerous *Foramina*, which are the Mouths of so many Mucous Follicles, and which are in a great measure concealed by the Membrane covering it. Tab. XCVIII. Fig. 7.

The Epiglottis breaks the current of the Air coming from the Mouth and Nose, and prevents it from rushing too forcibly into the Cavity of the Lungs. Pressed and drawn down by the Tongue and by small Muscles, it defends the Glottis, and shuts it completely in the time of swallowing. After the action of swallowing, it is raised by its own elasticity, and by the root of the Tongue, to which it is fixed; returning to its former position.

*Ligamenta Thyro-arytenoidea*, or *Ligaments* of the Glottis.—From the fore part of the Body of each of the Arytenoid Cartilages, a *Ligamentous Cord*, about three quarters of an inch in length, passes horizontally forwards, to be fixed by its other extremity, at the side of its fellow, to the inner Surface of the anterior Angle of the Thyroid Cartilage. Tab. XCVIII. Fig. 4. *k*, *k*. Fig. 5. *e*, *e*. Fig. 6. *m*, *m*. Tab. XCIX.

The Opening formed between these Ligaments is called *Glottis*, *Mouth of the Larynx*, and *Rima Glottidis*, and is of a triangular figure, the Ligaments being in contact before, but at a considerable distance from each other at their posterior extremities, the Cricoid Cartilage forming the back part of the triangle.

Under these two ligaments there are two others, larger and more distinct than the former, and which are commonly considered as the *Vocal Ligaments*, or the *proper Ligaments of the Glottis*, upon which Voice more immediately depends. They arise from the Base of the Arytenoid Cartilages, and run in the same direction with the former, to be fixed also to the Thyroid Cartilage. Tab. XCVIII. Fig. 4. *l*, *l*. Fig. 5. *f*, *f*. Fig. 6. *n*, *n*.

In the Interstice of the Superior and Inferior Liga-

ments, on each side there is a *Fissure*, which leads to a small Membranous Cavity or Depression, about the size of the point of the little Finger, which has its bottom turned outwards. Tab. XCVIII. Fig. 4. *m*, *m*. Fig. 5. *g*, *g*. Tab. XCIX.

These are the *Ventricles of the Larynx*, named after GALEN.—They are chiefly formed by the inner Membrane of the Larynx.

They differ in size in different people, have Mucous Follicles opening into them, and are found to be serviceable in the modulation of the Voice.

On the anterior Surface of each of the Arytenoid Cartilages, there is a small Depression, filled by a *Glandular Body*, which not only covers the fore part of the Cartilage, but is continued over the posterior extremities of the Ligaments of the Glottis. Tab. XCVIII. Fig. 5. *d*, *d*. Tab. XCIX.

The *Arytenoid Glands* are larger in some Subjects than in others. They were discovered, and are particularly described and delineated, by MORGAGNI.

The Ligaments which connect the Epiglottis to the Notch of the Thyroid Cartilage, and to the under side of the Os Hyoides, together with one which ties the Base of the Os Hyoides, form a *Triangular Space*, in which are found a quantity of Cellular Substance and Mucous Glands. Tab. XCVIII. Fig. 3. between *e* and *g*.

The Cavity of the Larynx is lined by a Membrane, which is extremely irritable, and is every where perforated by the Mouths of small Mucous Glands, for the purpose of moistening it.

The Larynx has a number of Muscles, for its different motions, some of which are common to it and other parts of the Body, others are proper to itself; all of which have been already described.

The *Arteries* of the Larynx are the two Superior Laryngeals, which come from the External Carotids, and the two Inferior Laryngeals, which are sent off from the Subclavian Arteries.

The *Superior Laryngeal Veins* return to the Internal Jugulars; the Inferior to the Subclavians, or Superior Cava.

The *Nerves* are chiefly the Superior and Inferior Laryngeals, which are Branches of the Eighth Pair.

The Larynx is subservient to *Respiration*, it forms and modulates the *Voice*, and is also useful in *Deglutition*.

It is the principal Organ of Voice;—for, if a Hole be cut in the Trachea, of sufficient size to allow the Person to breathe freely through it, the power of producing Voice is destroyed till the cut is closed.

Voice is formed by the Air, in its passage through the Glottis, acting upon the Ligaments of the Glottis and Cartilages of the Larynx and Trachea, and thus producing a Tremor;—and is different in different Persons, according to the form and structure of the Larynx.

The



The *strength* of Voice is in proportion to that of the Larynx, to the quantity of Air expired, and the narrowness of the Glottis.

A Tone is *acute* in proportion to the small size of the Larynx, to the tension of the parts of the Larynx and Trachea in general, of the Ligaments of the Glottis in particular, and to the contracted state of the Rima Glottidis; all of which circumstances are produced by the Muscles belonging to these parts.

On the above circumstances are supposed to depend the acuteness of the Voice in Females, in Children, and in Eunuchs, where the Larynx is less expanded than in Adult Males.

A Tone is *grave* in proportion to the reverse of the above.

*Speech* is performed chiefly by the different parts of the Mouth, assisted by the Cavity of the Nose,—the Larynx moving only in a small degree.

When the Air passes through the Larynx without producing a tremor, it occasions a *Whisper*.

When a Person speaks during Inspiration, the Voice is thereby very materially altered, and, by practice, may be made to appear as coming from other places than the Mouth of the Speaker; as is the case with those who call themselves *Ventriloquists*.

#### THYROID GLAND.

The *Thyroid Gland* has its name from its connexion with the Thyroid Cartilage, though more immediately connected with the Trachea.

It is a large Mass, but varying in size in different persons; is of a deep red colour, is situated at the under and fore part of the Larynx, behind the Sterno-hyoidei and Sterno-thyroidei, and is proportionally larger in Man than in any other Animal.

It has two triangular Lobes, with their Bases undermost, placed at the under and lateral parts of the Larynx, descending over two or three Rings of the Trachea, and also over part of the Esophagus. Tab. XCIX.

The Lobes are joined by an intermediate portion, called *Isthmus*, which lies across the upper and fore part of the Trachea. Tab. XCVIII.

Sometimes a Process from the middle Portion, which may be mistaken for what HALLER calls *Levator Glandulæ Thyroideæ*, and SOEMERRING, *Musculus Glandulæ Thyroideæ*, Tab. XCVIII. Fig. 8. *p.* ascends between the Sterno-hyoidei, and is fixed to the Base of the Os Hyoides.

This Gland has a granulous appearance within, and a Viscid Liquor is sometimes observed in it, which has been supposed by SABATIER, and some others, to lubricate the parts in the neighbourhood.

It is supplied with large Blood-vessels, and with several Nerves, from the superior and inferior Vessels and Nerves of the Larynx. It is likewise furnished with numerous Lymphatics.—But no Excretory Duct has ever been observed to come from it; nor is its office yet understood, though many opinions have been entertained respecting it.

#### TABLE



## T A B L E XCVII.

Exhibits Parts belonging to the MOUTH and THROAT.—They are diminished to three-fourths of their natural diameter.

FIG. 1.

*Gives a View of the Mouth and Cavity of the Fauces.*

- a, b,* The upper and under lips.
- c, c,* The angles of the mouth dissected.
- d, d,* The frænulæ of the upper and under lips.
- e,* The palatum durum; *f, f,* the palatum molle.
- g,* The tongue.
- h, h,* The anterior arches of the palate.
- i, i,* The posterior arches.
- k,* The uvula.
- l,* A white line dividing the palate.
- m, m,* The tonsils.
- o,* Labial glands placed upon the inner side of the lip.

FIG. 2.

*The Lower Jaw, with the Tongue turned back.*

- a, a,* The lower jaw.
- b, b,* The upper surface of the tongue, in which are seen the papillæ.
- c,* The under surface.
- d,* The frænum, which binds the tongue to the subjacent glands.
- e, e,* The sublingual glands.
- f, f,* The orifices of the ducts of the submaxillary glands.

FIG. 3.

*The Ducts and Lobes of the Parotid Gland, after an Injection of Wax had been thrown in by the Parotid Duct, and the parts dried.*

- a,* The zygomatic part of the cheek bone.
- b,* That of the temporal bone.
- c,* The lower jaw.
- d,* The masseter muscle.
- e,* The buccinator.
- f,* The depressor anguli oris.
- g, g,* The lobes of the parotid gland, with the principal branches of the parotid duct dissected.
- h,* The trunk of the parotid duct passing across the masseter muscle.
- i,* The part where it perforates the buccinator to open into the mouth.

FIG. 4.

*Shews the Sublingual and Inferior Maxillary Glands, the latter of which has been minutely dissected after a penetrating Injection had been thrown in by its principal Duct.*

- a,* The under surface of the anterior portion of the tongue.
- b,* The sublingual gland.
- c, c,* The lobes of the submaxillary gland, with,
- d, d,* The principal branches of the duct dissected.
- e,* The duct of this gland passing along the edge of the sublingual gland.
- f,* The termination of the duct under the tongue.
- g,* Part of the duct of the gland of the opposite side.

FIG. 5.

*Gives a View of the Back Part of the Throat, after separating from it the Cervical Vertebrae.*

- a, a,* The condyloid process of the occipital bone.
- b, b,* The posterior part of the nostrils, in which are seen the ossa spongiosa, with the vomer between them.
- c, c, c, c,* The pharynx, cut longitudinally behind, and spread out.
- d, d,* The velum palati.
- e,* The uvula.
- f, f,* The posterior arches of the palate, with the opening between them termed *Fauces*.
- g, g,* The amygdalæ. *tonsils*
- h,* The root of the tongue.
- i—p,* The larynx, covered by its membranes, muscles, and ligaments.
- i, i,* The superior cornua of the thyroid cartilage.
- k, k,* Ligaments ascending from these cornua, to be fixed to the corresponding cornua of the os hyoides.
- l, l,* The seat of the cricoid cartilage.
- m, m,* The arytenoid cartilages.
- n, n,* Ligaments ascending from the arytenoid cartilages, to be fixed at the edges of the epiglottis.
- o,* Points at the chink of the larynx and root of the epiglottis.
- p,* The point of the epiglottis.



Fig. 1.

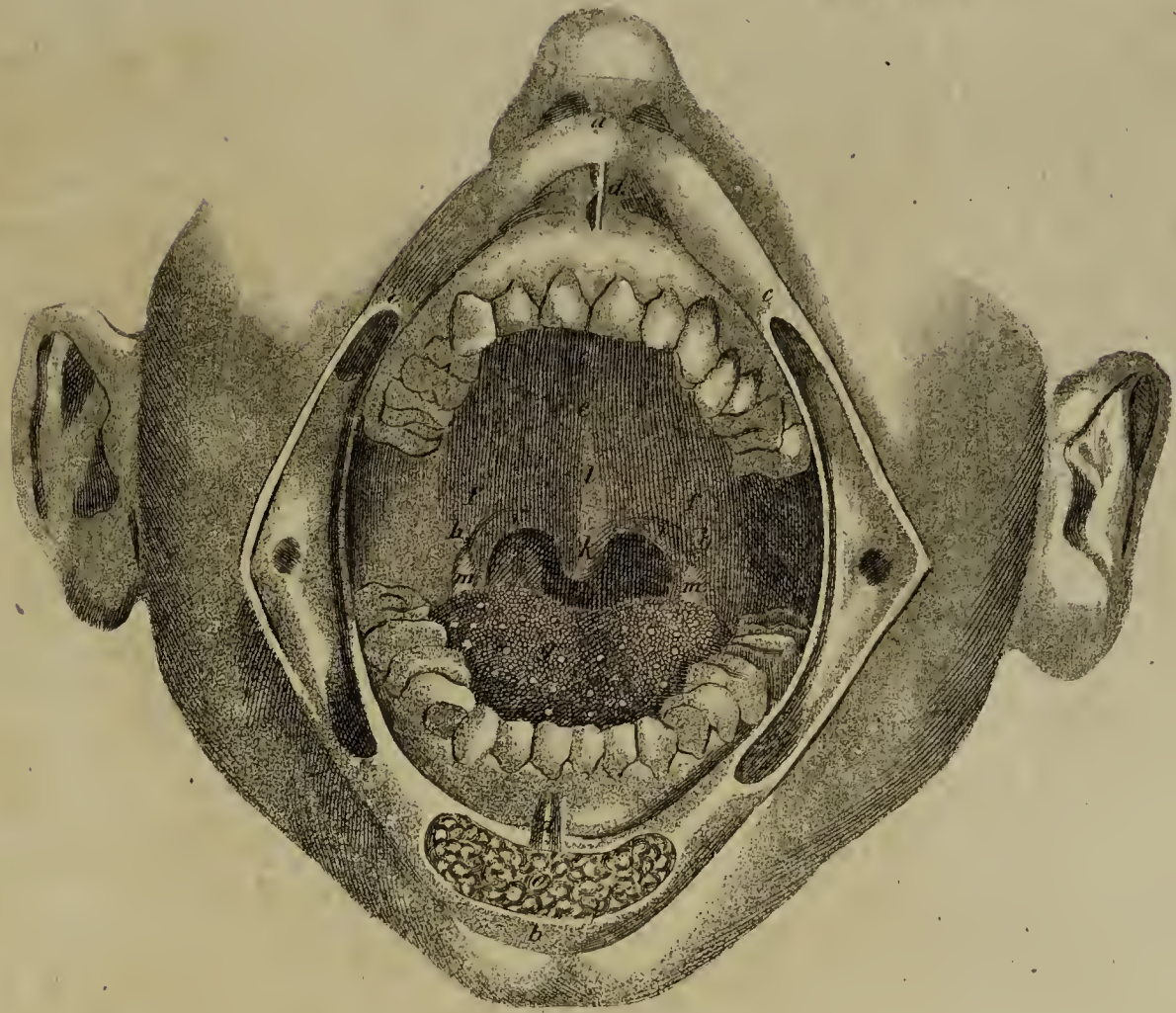


Fig. 2.

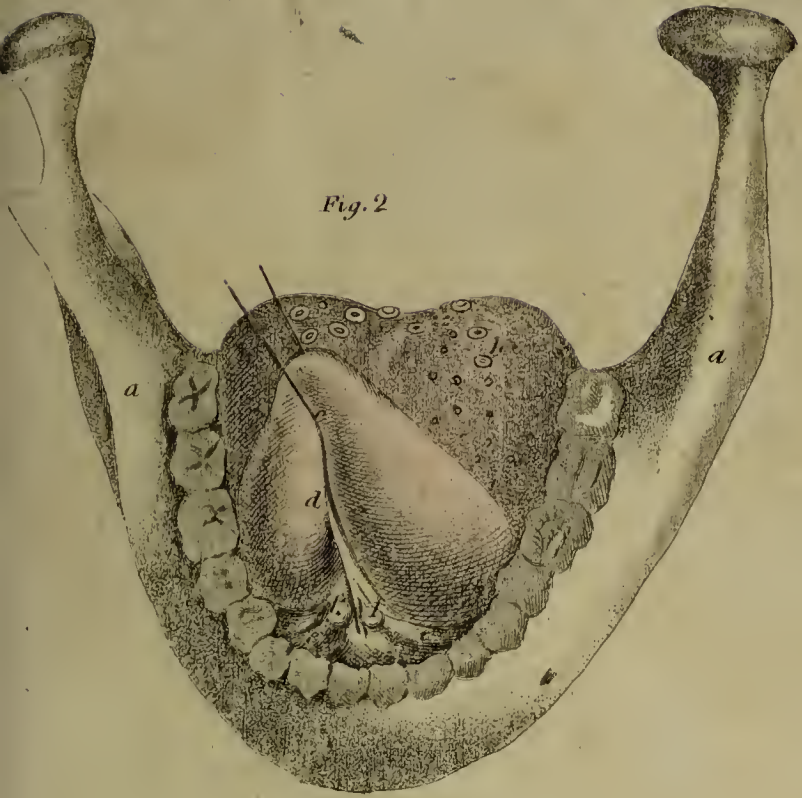


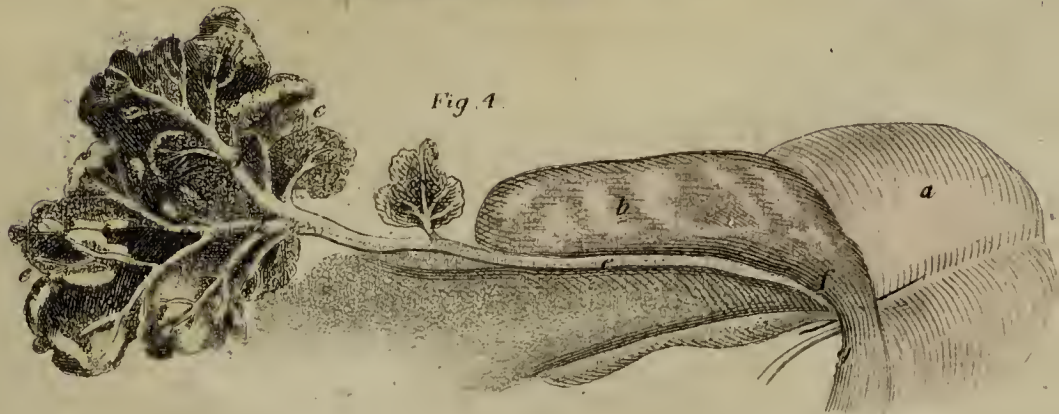
Fig. 3.



Fig. 5.



Fig. 4.





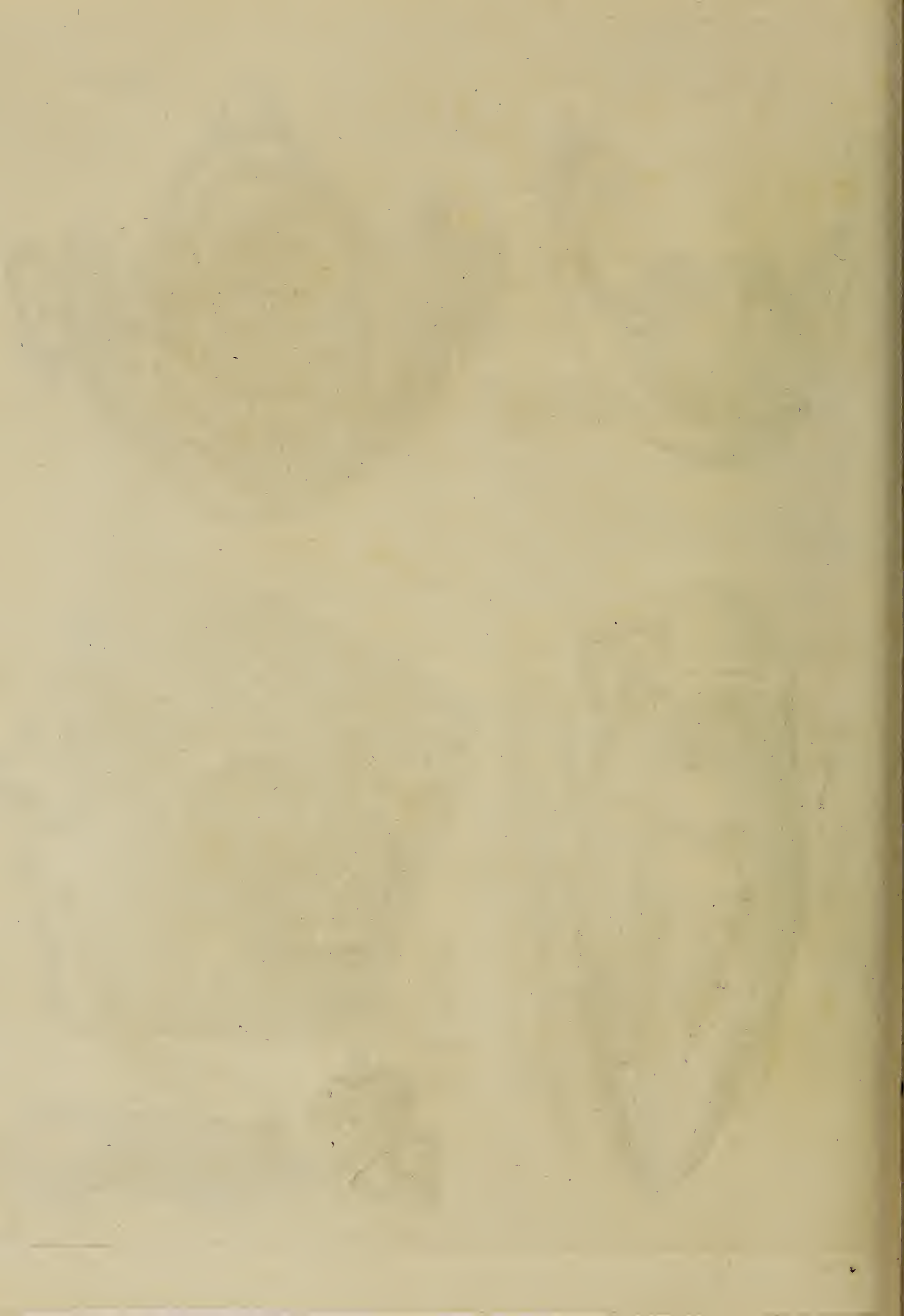








Fig 1

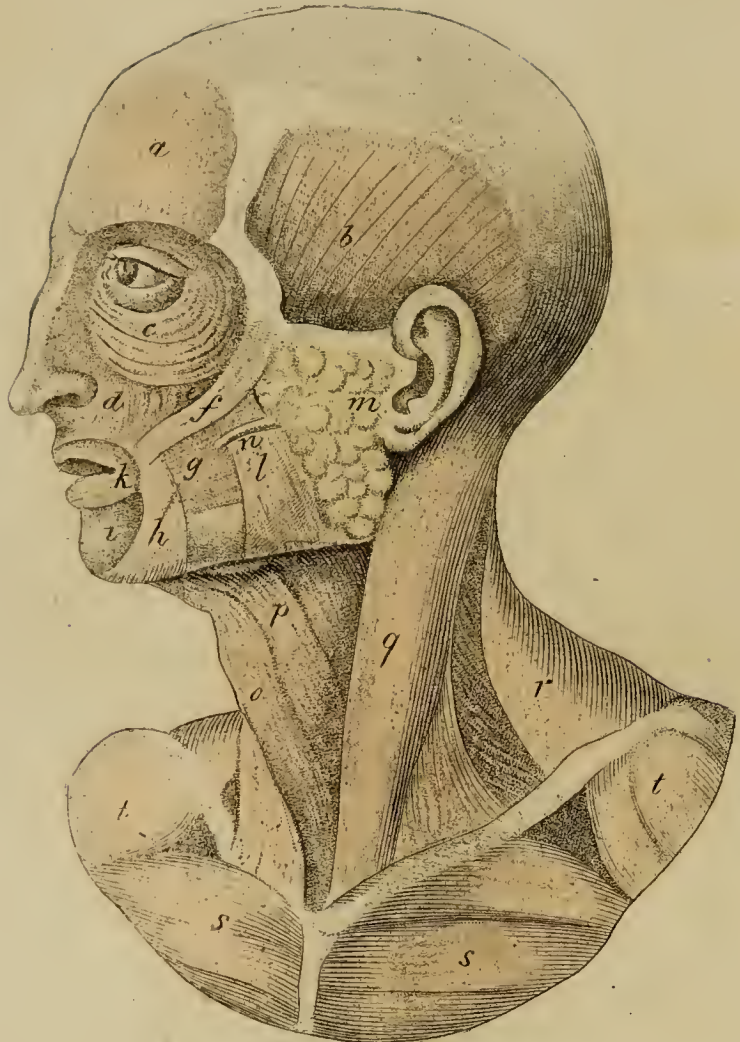


Fig 2

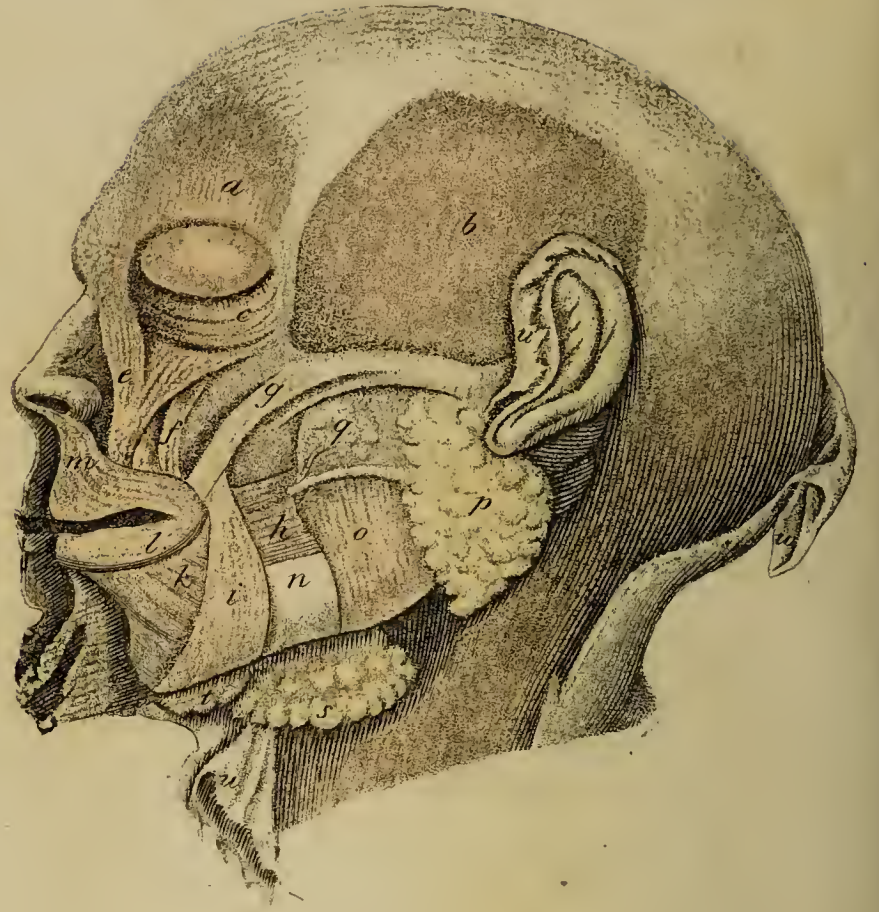


Fig 4

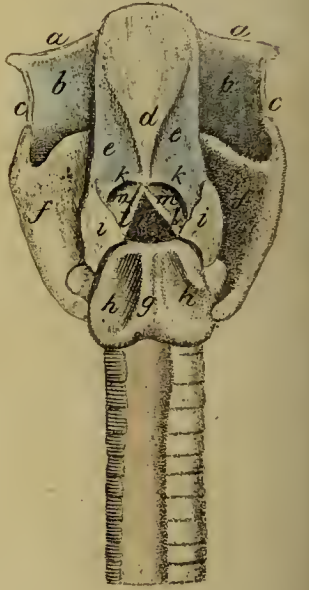


Fig 3

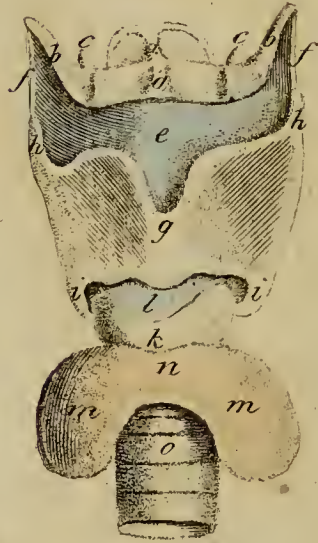


Fig 8



Fig 9

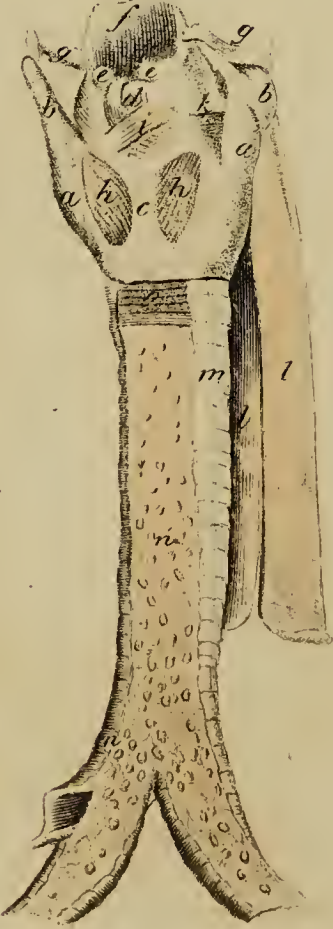


Fig 5



Fig 6

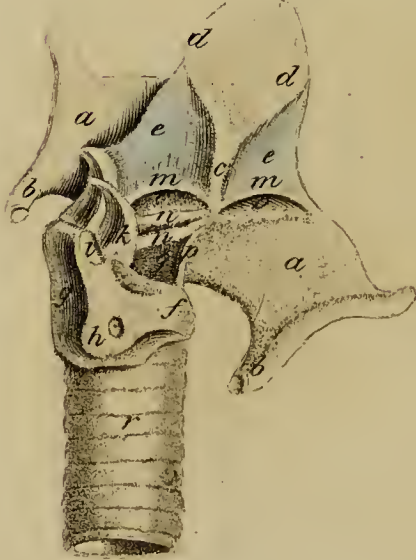


Fig 7





## T A B L E XCVIII.

VIEWS of the SALIVARY GLANDS, and of the TONGUE, LARYNX, and TRACHEA.

FIG. 1.

*A View of the PAROTID GLAND.*

- a*, The frontal,
- b*, The temporal muscle.
- c*, The orbicularis of the eye-lids.
- d*, The levator labii superioris.
- e*, ————— anguli oris.
- f*, The zygomaticus major.
- g*, The buccinator.
- h*, The depressor anguli oris.
- i*, ————— labii superioris.
- k*, The orbicularis oris.
- l*, The masseter.
- m*, The parotid gland.
- n*, Its duct, running across the masseter, and perforating the buccinator muscle, to open into the mouth.
- o*, The sterno-hyoid muscle.
- p*, The omo-hyoid muscle.
- q*, The sterno-mastoid muscle.
- r*, The cucullaris.
- s, s*, The large pectoral muscles.
- t, t*, The deltoid muscles.

FIG. 2.

*A View of the Large SALIVARY GLANDS of the Left Side of the HEAD.*

- a*, The frontal,
- b*, The temporal muscle.
- c*, The orbicularis palpebrarum.
- d*, The compressor naris.
- e*, The levator labii superioris.
- f*, ————— anguli oris.
- g*, The zygomaticus major.
- h*, The buccinator.
- i*, The depressor anguli oris.
- k*, ————— labii inferioris.
- l*, The orbicularis oris.
- m*, The nasalis labii superioris.
- n*, The lower jaw.
- o*, The masseter muscle.

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- p*, The parotid gland.
- q*, A gland, occasionally found, with a duct joining that of the parotid.
- r*, The termination of the parotid duct in the mouth.
- s*, The inferior maxillary gland.
- t*, The sublingual gland, drawn a little down, from behind the lower jaw.
- u, u, u*, The common integuments.

FIG. 3.

*A Front View of the LARYNX, with the Upper Part of the TRACHEA, and THYROID GLAND.*

- a, b, b, c, c*, The os hyoides;—*a*, its body;—*b, b*, its cornua; *c, c*, its appendices.
- d*, The epiglottis. The letter is placed upon a ligament which ties it to the tongue and os hyoides.
- e*, The ligament which fixes the os hyoides to the thyroid cartilage.
- f, f*, Round ligaments fixing the cornua of the os hyoides to those of the thyroid cartilage.
- g*, The thyroid cartilage; the letter is placed upon that part of it called *Pomum Adami*.
- h, h*, The superior cornua of the thyroid cartilage.
- i, i*, The inferior cornua, joined to the cricoid cartilage.
- k*, The cricoid cartilage.
- l*, A ligament fixing the cricoid to the thyroid cartilage.
- m, m*, The two lobes of the thyroid gland.
- n*, The isthmus of this gland.
- o*, The cartilages of the upper end of the trachea.

FIG. 4.

*A Back View of the LARYNX.*

- a, a*, The cornua of the os hyoides.
- b, b*, The broad ligament which fixes the os hyoides to the thyroid cartilage.
- c, c*, Round ligaments fixing the cornua of the os hyoides to those of the thyroid cartilage.
- d*, The epiglottis.
- e, e*, The lateral ligaments fixing the epiglottis to the arytenoid cartilages.

P

*f, f*, The



- f, f*, The hollow cavity of the thyroid cartilage, with its superior and inferior cornua.  
*g*, The cricoid cartilage;  
*h, h*, Prints made upon it by the posterior crico-arytenoid muscles.  
*i, i*, The arytenoid cartilages of the glottis.  
*k, k*, The superior ligaments of the glottis.  
*l, l*, The inferior ligaments of the glottis, or ligaments of the glottis vera.  
*m, m*, The ventricles of the larynx.  
*n*, The rima glottidis.

FIG. 5.

*Part of the LARYNX inclined forwards; cut longitudinally behind, and expanded, to shew the APPENDAGES of the VENTRICLES of the LARYNX.*

- a, a*, The upper part of the cricoid cartilage.  
*b*, The epiglottis.  
*c, c*, The arytenoid cartilages.  
*d, d*, The long crura of the arytenoid glands.—The short crura lie under *e, e*, the superior, and *f, f*, the inferior ligaments of the glottis.  
*g, g*, The ventricles of the larynx.

FIG. 6.

*A Lateral View of the LARYNX, the Inferior CORNUA of the THYROID CARTILAGE being separated from the CRICOID, and turned aside.*

- a, a*, The inner posterior surface of the thyroid cartilage.  
*b, b*, Its inferior cornua, separated from the cricoid cartilage, and the right cornu turned aside.  
*c, d, d*, The epiglottis.  
*e, e*, Its lateral ligaments; the right one is separated from the arytenoid cartilage, and turned back along with the corresponding side of the thyroid cartilage.  
*f*, The anterior narrow part of the cricoid cartilage;  
*g*, Its posterior large and thick part.  
*h*, The articulating surface by which it is connected with the right inferior cornu of the thyroid cartilage.  
*i*, The articulating surface of the cricoid cartilage, for the connexion of *k*, the right arytenoid cartilage, the capsular ligament of which is cut, and the cartilage displaced.  
*l*, The left arytenoid cartilage *in situ*.  
*m, m*, The superior, and,  
*n, n*, The inferior ligaments of the glottis.  
*o, o*, The ventricles of the larynx, the right of which is displaced along with the thyroid cartilage.  
*p*, A section of the membrane lining the larynx.  
*q*, A passage leading down to,  
*r*, The trachea.

FIG. 7.

*LIGAMENTS of the Outer and Back Part of the LARYNX.*

- a*, The epiglottis, in which are seen the orifices of many mucous glands, which exist here, as well as in the membrane which covers the other cartilages of the larynx.  
*b, b*, The margins of the alæ of the thyroid cartilage.  
*c, c*, The cornua of the os hyoides, joined to the superior cornua of the thyroid cartilage.  
*d*, The cricoid cartilage.  
*e, e*, The posterior concave surface of the arytenoid cartilages.  
*f, f*, Ligaments fixing the base of the arytenoid to the cricoid cartilage.  
*g, g*, Ligaments between the cricoid and thyroid cartilages.  
*h*, A ligament fixing the arytenoid cartilages to each other.  
*i, i*, The proper posterior ligaments of these cartilages.  
*k, k*, An osseous granula between each of the cornua of the thyroid cartilage and of the os hyoides.  
*l, l*, Impressions where the thyroid gland adheres.  
*m, m*, Cartilages of the beginning of the trachea.

FIG. 8.

*A View of the TONGUE, LARYNX, TRACHEA, &c.*

- a, a*, The thyroid cartilage.  
*b*, The epiglottis.  
*c*, A ligament connecting the epiglottis to the tongue.  
*d*, One of the lateral ligaments of the epiglottis.  
*e*, The cartilages of the trachea.  
*f*, The trachea and part of the bronchi cut length-ways, to shew the internal longitudinal bands of muscular fibres, and between these the orifices of excretory ducts.  
*g, g*, The bronchi.  
*h*, The esophagus.  
*i*, The pharynx.  
*k*, One of the cornua of the os hyoides.  
*l*, The tongue, upon which are seen the papillæ minores, and, interspersed among these, the papillæ mediæ.  
*m*, The foramen cæcum, surrounded by the third class of papillæ, called *Majores*.  
*n*, The thyroid gland.  
*o*, The isthmus of this gland.  
*p*, An appendix from the thyroid gland sent upwards.  
*q, q*, The crico-thyroid muscles.  
*r, r*, The sterno-thyroid muscles.  
*s*, The omo-hyoid muscle.  
*t*, The sterno-hyoid muscle.  
*u*, The hyo-thyroid muscle.

FIG.



## FIG. 9.

*A Back View of the LARYNX, TRACHEA, &c.*

- a, a*, The thyroid cartilage.  
*b, b*, The right prominence, and left superior cornu of this cartilage.  
*c*, The cricoid cartilage.  
*d*, The arytenoid cartilages.  
*e, e*, The arytenoid glands.  
*f*, The epiglottis.  
*g, g*, The os hyoides.

- h, h*, The posterior crico-arytenoid muscles.  
*i*, The arytenoid muscles, as found in this subject.  
*k*, The thyro-arytenoid muscle, occupying the lower region of the ventricle of the larynx of this side.  
*l, l*, The sterno-hyoid muscles.  
*m, m*, The cartilages of the trachea.  
*n*, The soft or fleshy part of the trachea, stripped of its external coat, to shew its numerous glands, the excretory ducts of which open into the trachea, between the muscular fibres seen in Fig. 8.  
*o*, The glandular part of the trachea, separated and pulled down, to shew its transverse muscular fibres.



## T A B L E X C I X .

Exhibits VIEWS of the LARYNX, TRACHEA, ESOPHAGUS, and THYROID GLAND, contracted to three-fourths of their Diameter.

FIG. 1.

*The LARYNX and TRACHEA of a MAN Forty Years of age; seen from the Fore Part, the Internal Membrane being removed.*

- a*, The base of the os hyoides.
- b, b*, The cornua fore-shortened in this view.
- c, c*, The thyroid cartilage representing two planes.
- d, d*, The superior cornua joined to the cornua of the os hyoides by ligaments.
- e, e*, The inferior cornua connected to the sides of the cricoid cartilage.
- f*, The anterior surface of the epiglottis.
- g*, The cricoid cartilage.
- h*, The cavity of the larynx, on the posterior surface of the cricoid cartilage.
- i, i*, The cartilaginous rings of the trachea.
- k, k*, Two of the annular cartilages joined into one.
- l, l*, Part of the bronchi.

FIG. 2.

*A Front View of the LARYNX and THYROID GLAND.*

- a*, The base of the os hyoides.
- b, b*, Its cornua.
- c, c*, The thyroid cartilage.
- d, d*, The superior, and,
- e, e*, The inferior cornua of this cartilage.
- f*, The cricoid cartilage.
- g*, The trachea.
- h, h*, The thyroid gland.
- i*, The musculus glandulæ thyroideæ, arising from the base of the os hyoides, and inserted into the thyroid gland. This, according to the Author of the figure, has not yet been delineated. It is described, however, by DUVERNEY, and published among a collection of anatomical paintings by GAUTIER, at Paris, in 1746.

FIG. 3.

*The Anterior Surface of the THYROID CARTILAGE.*

- a*, The angle in which the two planes composing this cartilage are united.

- b*, The notch at the upper end of the angle.
- c, c*, The superior cornua, with oval ossicula in this subject, upon their upper extremities.
- d, d*, The inferior cornua, with articular surfaces by which they join the cricoid cartilage.

FIG. 4.

*The Anterior Surface of the CRICOID CARTILAGE.*

- a*, The anterior part.
- b*, The internal surface of the posterior part.
- c, c*, The smooth surface upon which the base of the arytenoid cartilages are placed.
- d, d*, The parts to which the inferior cornua of the thyroid cartilage are connected.

FIG. 5.

*The Posterior Surface of the same Cartilage.*

- a, a*, The pits or foveæ which are occupied by the posterior crico-arytenoid muscles.
- b*, A prominent line separating the foveæ from each other.

FIG. 6.

*The Anterior Surface of the Right Arytenoid Cartilage.*

- a*, The base, in which is a smooth impression, by which it is joined to the cricoid cartilage.
- b*, The upper end in form of a tuberculated appendix.

FIG. 7.

*The Posterior Surface of the above Cartilage, representing nearly the same Parts as in the former Figure.*

FIG. 8.

*The LARYNX cut Longitudinally behind, to shew its INTERNAL SURFACE.*

- a, a*, The divided cricoid cartilage.
- b, b*, The divided musculo-glandular membrane.
- c, c*, The two planes of the thyroid cartilage.
- d, d*, The superior cornua of this cartilage, with oval ossicula upon their extremities.

*e, e*, Part



Fig. 1.

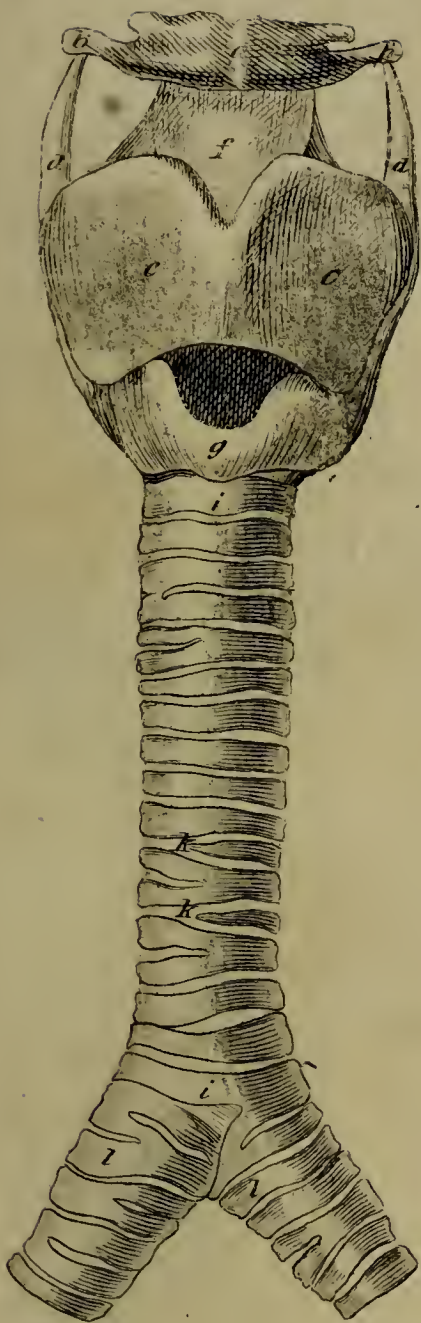


Fig. 8.



Fig. 3.

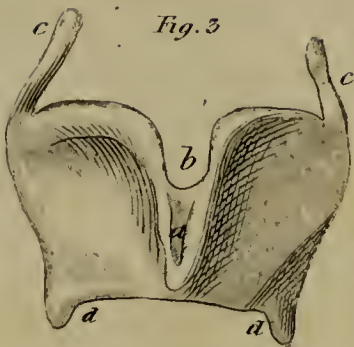


Fig. 4.



Fig. 5.



Fig. 9.



Fig. 10.

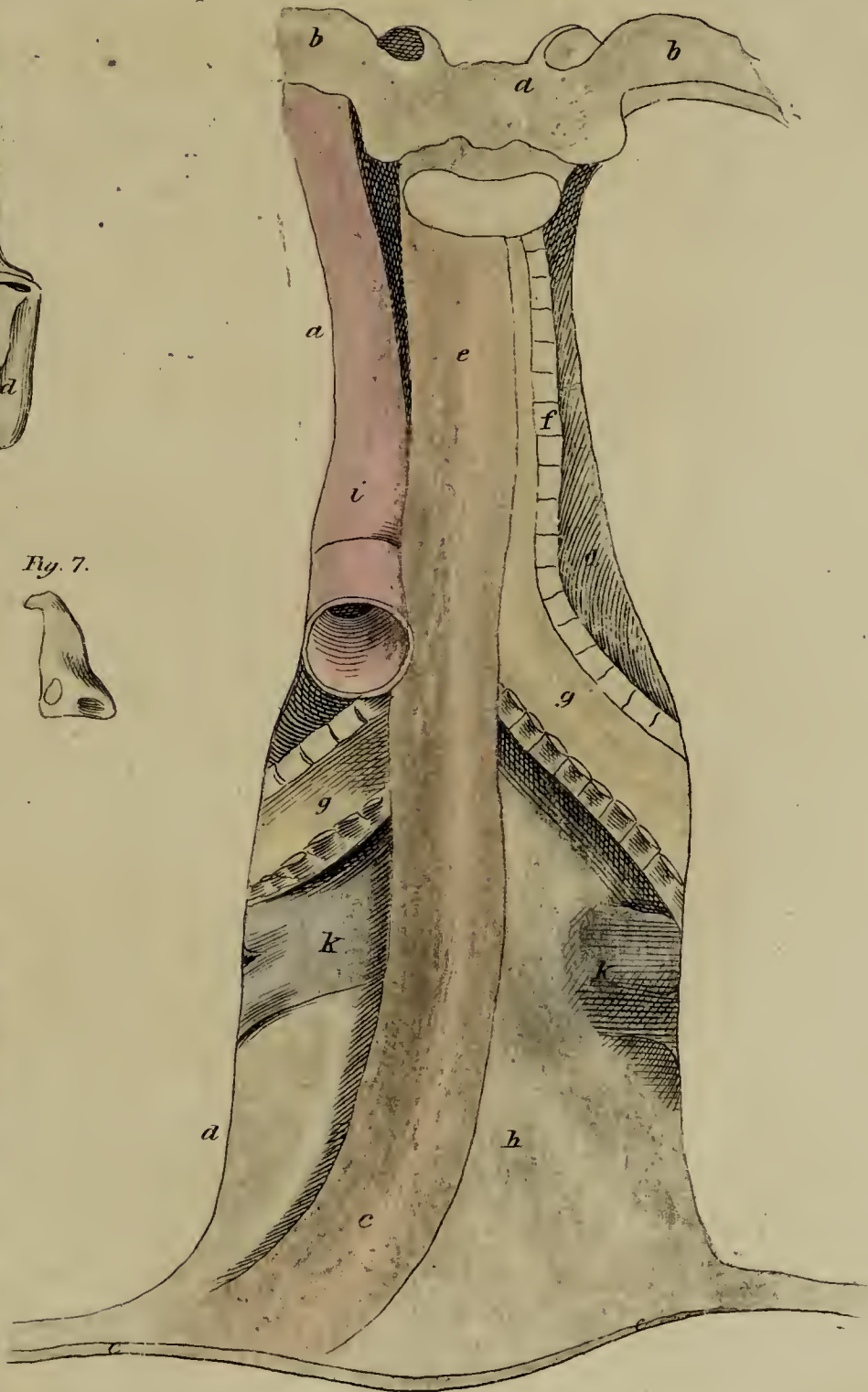


Fig. 2.

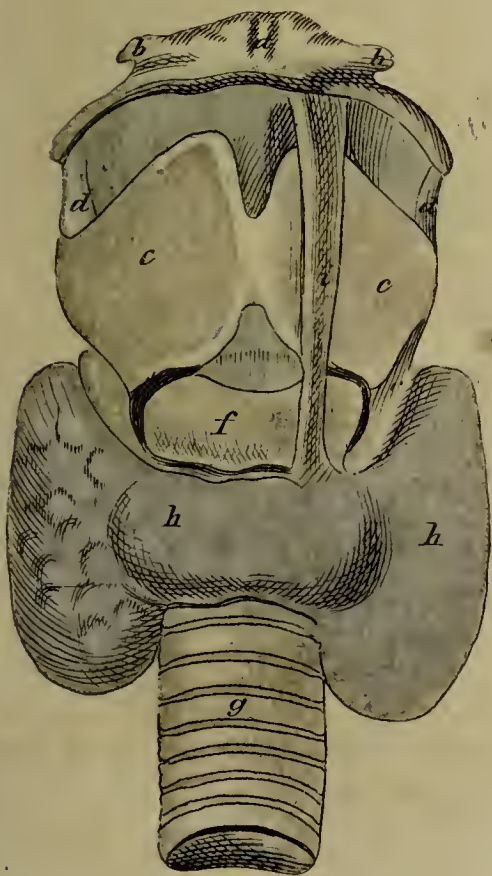


Fig. 6.



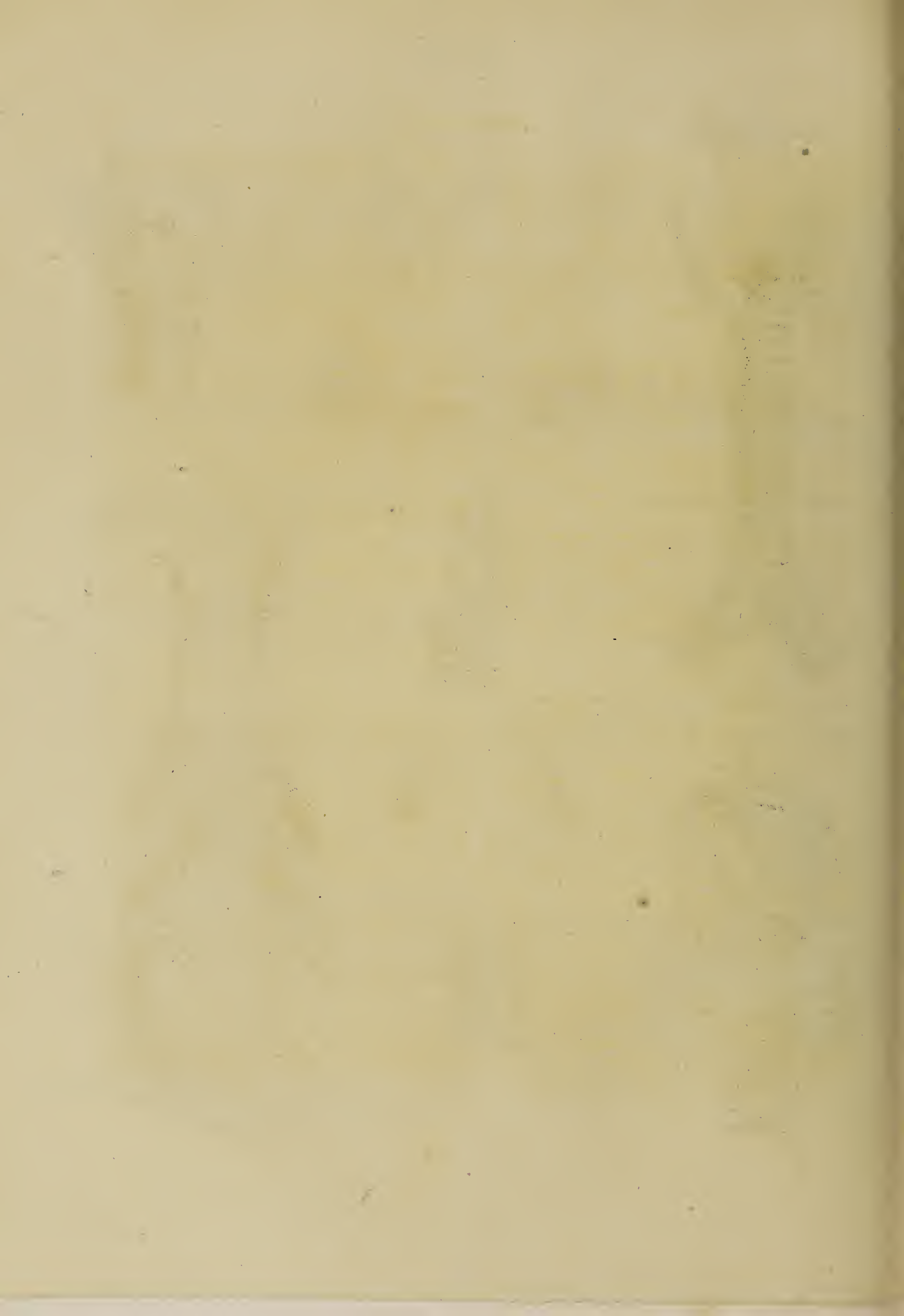
Fig. 7.



Fig. 11.









- e, e*, Part of the thyro-hyoid ligaments.  
*f, f*, The arytenoid cartilages.  
*g, g*, The membrane which proceeds from the arytenoid cartilages to the epiglottis.  
*h, h*, The superior ligaments of the glottis.  
*i, i*, The inferior ligaments of the glottis.  
*k, k*, The ventricles of the larynx.  
*l*, The interior surface of the trachea.

FIG. 9.

*The Glands of the Arytenoid Cartilage.*

- a*, The cricoid cartilage viewed from the left side.  
*b*, The inferior cornu of the thyroid cartilage.  
*c*, The superior cornu.  
*d, e*, The right and left arytenoid cartilages.  
*f*, The epiglottis.

- g*, The membrane which proceeds from the arytenoid cartilage to the epiglottis.

FIG. 10.

*A Posterior View of the ESOPHAGUS and TRACHEA.*

- a*, The first dorsal vertebra.  
*b, b*, The first pair of ribs.  
*c, c*, The cut edge of the diaphragm.  
*d, d*, The edges of the lungs.  
*e, e*, The esophagus.  
*f*, The trachea.  
*g, g*, The bronchi.  
*h*, The pericardium.  
*i*, The descending aorta.  
*k*, The pulmonary veins.

*Fig 11*  
*... of the rings of the*  
*trachea raised to show*  
*the mucous glands*



## OF THE THORAX.

THE *Thorax*, or *Breast*, extends from the Neck to the Diaphragm, and is divided into *External* and *Internal* parts.

## EXTERNAL PARTS OF THE THORAX.

The *External* Parts of the Thorax, besides the common Integuments and Mammæ, are,

The *Muscles*, consisting of the *Pectorales*, *Subclavii*, and under end of each *Platysma Myoides*, which are situated anteriorly.

The *Serrati Magni*, which are placed laterally.

The *Trapezii*, *Latissimi Dorsi*, and numerous other Muscles, placed posteriorly.

The *Inter-costales* and *Sterno-costales*, which are situated, the former between, and the latter on the inner side of the Ribs,

And the *Bones*, consisting of *Sternum*, *Ribs*, and *Dorsal Vertebrae*.—All these parts, excepting the Mammæ, have been already described.

## MAMMÆ.

The *Mammæ* are two Glandular Bodies, of a hemispherical form, situated on the anterior, and a little towards the lateral parts of the Thorax, adhering loosely by Cellular Substance to the Surface of the large Pectoral Muscles.

The term *Mammæ* is peculiar to the Breasts of Women.—In Men, they are called *Mammillæ*;—in the Brute kind, *Ubera*.

In the Ape, and a few other Animals, these parts are placed, as in the Human Body, upon the Thorax; but in the generality of Quadrupeds, they are situated under the Abdomen.

The Mammæ vary in size in different Women, and in the same Woman at different periods of life.

In Girls, previous to the age of puberty, they are remarkably small.

About the age of fourteen, at which time the Menses, in this Climate, most commonly begin to appear, they evolve quickly, and become prominent.

Near the commencement of each Menstruation, they increase in size, and diminish immediately after this period.

During Utero-gestation they also increase in bulk, and soon after Delivery arrive at their greatest extent; but, after several Gestations, are apt to become pendulous. And this is said to be so much the case among certain Nations, as the Hottentots, that the Wo-

men can suckle their Children while carrying them on their Backs.

After the age of forty-five, or from that to fifty,—the period when the Menses generally disappear,—they decrease in size, and become soft and flaccid.

Under the Skin there is a large quantity of *Fat*, which constitutes a considerable portion of the bulk of the Mamma. It defends the Glandular part, but is not found to pass into or communicate with the Lactiferous Ducts, which some have asserted. Tab. CLXIII. Fig. 12. e, e, e, e, f, f, f.

On the quantity of *Fat* in the Mamma, much of the Bulk of the Breast depends; from this circumstance, a Woman with small Breasts frequently produces more Milk in suckling, than those whose Mammæ are of a larger size.

The *Glandular* part of the Mamma is of a whitish colour, is of the Conglomerate kind, and therefore irregular in its Substance. Tab. CLXIII. Fig. 12. G.

It is composed of Lobes and Lobules, or of a number of smaller Masses or Glands, which are separated by *Fat*, and these again are divided into still smaller parts, in which the Milk is originally secreted.

Near the centre of the Mamma, but a little towards the outside, is the *Papilla* or *Nipple*, which is of a cylindrical form, and of a redder colour than the rest of the Integuments of the Breast. It has a delicate Skin, and is extremely sensible. Tab. CLXIII. Fig. 12. A.

It is of different sizes in different ages and constitutions, and is always larger in the time of Gestation, or of Nursing.

It is capable of distension from titillation, or when influenced by the Passions of the Mind.

It is composed of a *tough Cellular* or *Ligamentous Substance*, which incloses the Lactiferous Tubes, and which is so elastic, that after the part is drawn out or distended, it readily recovers its former dimension, when the cause of distension is removed.

Upon the Apex of the Nipple, the *Orifices* of the Lactiferous Ducts appear, which are of the same number with the Ducts that enter its Base. Tab. CLXIII.

Around the Nipple, there is a *Circle* or *Disk*, called *Areola*,—nearly of the same colour with that of the Nipple itself. Tab. CLXIII. Fig. 12. B, B.

The colour here, however, varies at different times of life,—being florid in Girls, of a pale brown in Women more advanced in life, and in old age dull and livid.

During Pregnancy, it is of a darker colour than at other times, in consequence of a change which takes place in the Corpus Mucosum which forms it.

Under



Under the Skin of the Areola, there are numerous *Sebaceous Glands* or *Follicles*, the orifices of which discharge an oily Mucus, to defend the Nipple and Areola around it, and prevent them from being excoriated. Tab. CLXIII. Fig. 12. *c, c*.

The *Arteries* of the Mamma are partly from the Internal, and partly from the External Mammaries; the former of which are sent off from the Subclavian, and the latter from the Axillary Artery;—the Branches entering the Mamma at different places.

The *Veins* accompany the Arteries, and are distinguished by the same name.

The *Absorbents*, like the Blood-vessels of the Mamma, are numerous. The greater part of them pass through the Axillary Glands; others penetrate the Interstices of the Ribs, near the Sternum, and enter the Glands which belong to the Internal Mammary Vessels.

The *Nerves* are chiefly from the Axillary Plexus, a few Branches being also sent off from the Intercostals.

From the extremities of the Arteries in the Substance of the Mamma, numberless Tubes arise, called *Ductus* vel *Tubuli Lactiferi*. They gradually unite into Trunks, which run in a radiated manner, and, becoming greatly enlarged in the time of Suckling, serve as Reservoirs in which the Milk is contained. Tab. CLXIII. Fig. 12. *h, h, h*. Fig. 13. 14.

The Lactiferous Ducts are accompanied, in the Substance of the Mamma, by a *tough white Elastic Substance*, which follows them to the Nipple.

At the root of the Nipple they become contracted, and are there from *twelve to eighteen* and upwards in number. Tab. CLXIII. Fig. 13. 14.

Either from the want of uniformity, however, with respect to their number in different Subjects, or from the difficulty of perceiving them, they have been variously estimated by different Authors.

Near the root of the Nipple, they have been supposed by DR MECKEL to form a Circle of communication;—but this has been ascribed, by still later Anatomists, to a laceration of Vessels. Numerous preparations and experiments,—particularly that of throwing in an Injection at one Duct, and finding that it fills only one part of the Mamma, without returning by any other Duct,—seem sufficiently to indicate, that there is no such circular communication.

In the Substance of the Nipple, the Lactiferous Tubes are at a little distance from each other, and are coiled up in such a manner, that the spontaneous flow of the milk is prevented, unless it be accumulated in so large a quantity as to extend them.

But when the Nipple is drawn out and extended,—as by the application of the Child's Mouth,—the Ducts become straight and parallel to each other, so as to allow an uninterrupted flow of the Milk.

After Sucking, the Nipple, and consequently its Ducts, immediately recover their former situation.

Sometimes one or more of the Lactiferous Ducts terminate upon the Surface of the Areola, from which MORGAGNI supposed that the Glands there were of the Lactiferous kind.

In Children the Mammæ are merely Cutaneous Tubercles, but at the time of Birth they are large in proportion, and in both Sexes contain a *Milky-like Mucus*, which can be readily squeezed out.

This Fluid commonly disappears a short time after Birth;—but there are various examples on record, where Milk has been brought to the Breasts, both of young Girls and old Women, by the frequent application of a Child to the Nipple, and where there was no cause for suspecting this to be the consequence of Impregnation. Nor are instances wanting of Milk having been brought to the Mammillæ of Men by the same application.

The Mammæ add much to the ornament of the Sex, but serve in particular for furnishing Nourishment to the Child, which is conveyed through the medium of the Nipple.

The Secretion of the Milk begins a little before Delivery, but increases more rapidly soon after it; and continues to flow for many months, and even for some years, if the Woman suckle her child; and the more frequently the Milk is extracted, the greater is the quantity of Milk received in a given time.

The operation of Sucking depends upon the principles of the Air-pump.—The Child embraces the Nipple closely by means of its Lips, which prevents the external Air from entering; then draws the Ducts to a straight line, and prepares a space for the Milk, which is forced from the Breast by the pressure of the Atmosphere, and flows to the Mouth in the manner a fluid follows the Piston of a common Pump or Syringe.

Milk varies in its qualities in different Animals. It is considered to be a sort of Emulsion, composed of an oily Concrete or Butter,—a Curd, from which the Cheese is produced,—and a Serum, or Whey, that contains a Saccharine Matter, which keeps the other two Substances in union with its Water. Each of these ingredients is again composed of various others, which have been most attended to in the Milk of the Cow, from which that of Women differs chiefly in having less Curd, and that so intimately combined with the Oil, as not to yield Butter, and in possessing more Saccharine Substance.

#### INTERNAL PARTS OF THE THORAX.

The Mammæ and Muscles, covering the fore and lateral parts of the Thorax, being laid aside, and the Ribs afterwards cut from the Sternum and turned back, the *Internal Parts* of the Thorax are brought into view.

They consist of the *Pleura*, which lines the Thorax;—the *Mediastinum*, which divides it into right and left Cavities, and contains several Vessels, Nerves, &c. between its Layers;—the *Pericardium* and *Heart*, which occupy



occupy the middle;—and the *Lungs*, which surround the Heart, and fill the greater part of the Thorax.

#### PLEURA.

The *Pleura* is a thin Membrane, with some degree of transparency, and of considerable strength, which lines the inner side of the Thorax, and covers most of its Contents. Tab. CXIV. Fig. 1. C, c, c.

Its External Surface is *Cellular*, and adheres closely to the parts with which it is connected.

Its Internal Surface is *smooth* and *polished*, being moistened by a Serous Fluid, which exudes from its Arteries; hence the Pleura is one of those Membranes called *Serous*.

It is divided into *two lateral Sacs* or *Pleuræ*, of unequal size, the right being the larger, corresponding with the greater size of the Right Lung, which it covers. The form of the Sacs corresponds exactly with that of the surrounding Bones of the Thorax.

The Pleuræ adhere to the Periosteum of the Ribs, line the Inter-costales and Sterno-costales, the Sternum, and Dorsal Vertebræ, and cover the Pericardium, Lungs, and lateral or fleshy parts of the Diaphragm.

They descend at the under part of the Thorax, as far as the Twelfth Pair of Ribs, to which they are attached; and, at the upper end of the Thorax, they rise a little above the first Rib on each side. Tab. CVII.

Behind the Sternum, the Pleuræ are contiguous to each other, and form the *Partition* called *Mediastinum*, which extends between the Sternum and Vertebræ.

The *Arteries* of the Pleura are from those of the adjacent parts, viz. from the Inter-costal, Mammary, Diaphragmatic, Bronchial, and Esophageal Arteries.

The *Veins*, which return the Blood, accompany the Arteries, and are distinguished by the same names.

The *Nerves* are from the Inter-costals and Diaphragmatics, but too small to be easily traced; and the Membrane itself is not observed to possess much sensibility in a sound state.

The Pleura by its smoothness facilitates the motions of the Heart and Lungs, divides the Thorax into Cavities, and strengthens its containing and contained parts.

#### MEDIASTINUM.

The *Mediastinum*, so named from its situation in the middle of the Thorax, extends, as has been already observed, between the Sternum and Vertebræ, but is intercepted by the Heart and root of the Lungs, and divides the Thorax into two distinct Cavities, which have no communication with each other.

It is formed by a reflection of the Pleura, and is of course double, and contains between its Layers a considerable quantity of Cellular Substance, by which they are united. Tab. CXIV. Fig. 1. C.

It is divided into *Anterior* and *Posterior Mediastina*,

the former of which is situated at the fore, and the latter at the back part of the Thorax.

The *Anterior Mediastinum* is connected before to the Sternum, and behind to the Pericardium and large Vessels of the Heart.—See Tab. with Blood-vessels in the anterior part of the Thorax, Vol. III.

The two Layers of the Anterior Mediastinum are closely applied to each other, excepting at the upper part of the Thorax, where they are separated by the remains of the *Thymus Gland*. Tab. CXIV. Fig. 1. D. Tab. CIX.

At the upper part of the Thorax, it lies exactly behind the middle of the Sternum; but in its descent, it inclines gradually to the left edge of that Bone, so as to divide the Thorax unequally.

In consequence of its obliquity, a pointed instrument, pushed through the centre of the Sternum, is generally found to pass into the right cavity of the Thorax.

Frequent deviations, however, from this general rule have been met with.—In particular, LIEUTAUD and SABATIER relate several instances where the Anterior Mediastinum was found to descend along the middle of the Sternum; and others, though rare, where it descended even to the right side of this Bone.

The *Posterior Mediastinum* reaches from the root of the Lungs and back part of the Heart, to the Dorsal Vertebræ.

Between the Layers of the Posterior Mediastinum, a *Triangular Space* is formed, in which are situated the under end of the Trachea, the Esophagus, the Aorta Descendens, the Vena Azygos, the Thoracic Duct, with some Lymphatic Glands, and the Eighth Pair of Nerves.

The *Blood-vessels* of the Mediastinum are from those of the neighbouring parts:—The Anterior Mediastinum is supplied by Branches from the Subclavian, Internal Mammaries, and Diaphragmatics,—and the Posterior Mediastinum by Branches from the Intercostals and Esophageals.

The *Veins* accompany the Arteries, and have the same names.

The Mediastinum divides the Thorax into two Cavities, supports its general Contents, keeps one Lung from pressing upon the other when the Person lies on his side, and prevents Fluids, which, in consequence of accidents or disease, may be contained in the Cavity of the Thorax, from passing from one side to the other.

#### PERICARDIUM.

The *Pericardium*, *Sac*, or *Capsule* of the Heart, is one of the strongest Membranes of the Body, and its size such as to be properly adapted to that of the Heart, which it contains. Tab. CXIV. Fig. 1. E, E. Tab. CIX. Tab. CXVII.

It is formed of *two Layers*; the *External* of which is a continuation of that part of the Pleura which forms the Anterior



Anterior Mediastinum, and which afterwards passes over the Lungs and lateral parts of the Diaphragm.

The *Internal Layer* is smooth, tendinous-like, and has Fibres running in different directions, something like those of the Dura Mater. It is polished on its inner Surface, and stronger than the External.

The Pericardium adheres so firmly to the Tendinous and left side of the Fleishy part of the Diaphragm, as not to be separated from it without much difficulty.

It extends a considerable way beyond the Base of the Heart, and includes the large Blood-vessels as far as the roots of the first principal Branches, in consequence of which it forms several angles, which have been termed *Cornua* of the Pericardium. Tab. CVI. 8. 8. &c.

While the External Layer is reflected to cover the parts which surround it, the Internal is also reflected, first over the roots of the large Blood-vessels, and then over the Heart, to form the proper covering of that Organ; in the same manner, the Tunica Conjunctiva is reflected from the Eye-lids to cover the fore part of the Eye; or, strictly speaking, the Heart lies behind, or on the outside of the Pericardium.

From the ends of the Extreme Arteries upon its Surface, a Fluid, called *Liquor Pericardii*, is discharged, by which it is lubricated, and the effects of friction diminished.

The *Liquor Pericardii* is commonly found, after death, in the quantity of a few Drachms, though not unfrequently of one or two Ounces.

According to the experiments of DR BOSTOCK, it is composed of Water, with a small proportion of Albumen, Mucus, and Muriate of Soda.

It is redder in a young Subject than in a Person advanced in life, in whom it becomes paler, or more of a straw colour.

The *Arteries* of the fore part of the Pericardium are from the Internal Mammaries and Diaphragmatics; those of its back part from the Bronchials and Esophageals.

The *Veins* correspond with the Arteries, and have the same names.

The *Nerves* of this Membrane are not obvious to the Senses.

The Pericardium preserves the Heart *in situ*; prevents it from pressing upon the Lungs; defends it from being injured by these, or by other parts that surround it; and admits of its ordinary, but restrains its inordinate motions.

#### HEART.

The *Heart* is a hollow Muscle, varying a little in size in different Persons independent of the bulk of the Body, but is generally about a pound in weight. It is divided into different Cavities, and inclosed in the Pericardium. Tab. C. F.

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It is situated in the Cavity of the Thorax, behind the Sternum and Cartilages of the true Ribs, and between the Right and Left Lungs. Tab. CXIV. CX. CIII.

It is of a *Conical* figure, but flattened at one side, and is divided into *Base*, *Body*, and *Apex*, with a *Superior* and *Inferior Surface*, and a *Right* and *Left Margin*, the whole being commonly about five inches in length.

The Base is placed backwards next the Spine, while the Body and Apex are turned forwards, and obliquely over to the left side. Tab. CX. CXI.

In Quadrupeds, the Heart is placed upon a line with the Sternum; the point of it being the only part which touches the Diaphragm.—In the Human Body, the Apex is but a little lower than the Base, and projects between the two Lobes of the Left Lung, behind the Cartilages of the Fifth and Sixth True Ribs of that Side, or a little below the left Nipple. Here the Pulsation may be felt in a living Person, in consequence of the Apex of the Heart being elevated and thrust forward during the dilatation of the Base of this Organ, and contraction of its Body. The situation, however, varies in a small degree, according to the position of the Body, and state of Respiration. Tab. CIII. CXI.

Though this be the common situation of the Heart, a few rare and singular instances have occurred, where it has been found to occupy the right side of the Thorax; and a displacement has sometimes happened, in consequence of different kinds of Tumours occurring in the left side of this Cavity.

The *Superior* or *Anterior Surface* of the Heart is convex, and is opposed to the posterior Surface of the Sternum and Cartilages of the Ribs; the anterior edges of the Lungs intervening.

The *Inferior* or *Posterior Surface* is flat, and rests upon the Tendon of the Diaphragm which supports it. The Heart is not much affected, however, by the motions of that Muscle in time of Respiration; its Tendon moving only in a small degree. Tab. CXIV. Fig. 2.

The Apex Cordis lies directly behind the Cartilages of the Ribs, the Left Lung not intervening, but forming at this place a curve about the Heart.

The right side of the Body of the Heart is thin and sharp, and is called, by DR HALLER, *Margo Acutus*.

The left side is thick and round, and is termed, by the same Author, *Margo Obtusus*.

The Base is formed of a Right and Left *Auricle*, and the Body of a Right and Left *Ventricle*.

The Apex is commonly formed by the Left Ventricle, but sometimes there are two Apices, one belonging to each Ventricle.

When all the Cavities of the Heart are distended, the Right Auricle, and part of the corresponding Ventricle, project into the right, and the rest of the Heart into the left Cavity of the Thorax.

The Heart is connected above and behind to the upper and back part of the Thorax, through the Medium

Q of



of the *great Vessels* which go into, or pass out from it. Tab. CXIV. CXVII. CXI.

The other parts of the Heart are free, being merely contiguous to the inside of the Pericardium.

The External Surface of the Heart is covered by a thin, smooth, Serous Membrane, which is a reflection of the inner Layer of the Pericardium, and which gives additional strength to its Fleshy Fibres.

Between this Coat and the Substance of the Heart, there is commonly a considerable quantity of *Fat*, which lubricates it, and facilitates its motions.

In the interstices of the Fat, the Heart has somewhat of a pink appearance, interspersed with whitish lines, formed by the Branches of Blood-vessels and Nerves.

The Fat is chiefly placed in the Grooves between the Auricles and Ventricles, in the furrows which distinguish the Ventricles from each other, and along the principal Ramifications of the Blood-vessels; the Auricles are, for the most part, destitute of Fat.

The Substance of the Heart consists of what is called the *Muscular Coat* of the Heart; here the *Fibres* are smaller but firmer, and more closely connected than the Fibres of Muscles generally are in the other parts of the Body.

The Fibres of the Heart run in different directions, longitudinally and transversely, but most of them obliquely. Tab. CI. Fig. 5—10.

Many of them run over the point of the Heart from one Surface to the other, and the whole are so much twisted and folded, and so variously intermixed, as to render it difficult to unravel or describe them.—In general, however, their course is such as to lessen the Cavities of the Heart in all their dimensions.

The *Cavities* of the Heart are lined by a Membrane extremely thin, but dense and strong, to defend it against the pressure of the Blood, and to prevent the latter from insinuating itself between the Muscular Fibres of this Viscus. No Blood-vessels, Absorbents, nor Nerves, have yet been traced in this Membrane.

The Heart is formed of an *Anterior* or *Right*, and a *Posterior* or *Left* side, or of a *Right* and a *Left Heart*, joined together by a *Partition*, which prevents the two sides from having any direct communication with each other.—The terms *Right* and *Left* are, strictly speaking, more applicable to the Heart of the Quadruped, and those of *Anterior* and *Posterior* to that of the Human Body; but as the Heart is placed obliquely, the *Anterior* Auricle and Ventricle are turned more to the right than the *Posterior* are, therefore the common terms of *Right* and *Left* may be still applied with propriety.

The *Right Heart* belongs to the Lungs, and has, therefore, also the name of *Pulmonic* or *Pulmonary*; and the *Left Heart* to the rest of the Body, and is on that account called *Systematic*, and sometimes *Aortic*. Between the two Hearts there is a Furrow which marks the line of distinction externally.

Each side of the Heart is furnished with a set of *Veins*, with an *Auricle*, a *Ventricle*, and an *Artery*, and also with two Sets of Valves, one of which is situated between the Auricle and Ventricle, the other between the Ventricle and Artery.

At the right side of the Heart are two Veins, called from their large size *Venæ Cavæ*; the one *Superior*, the other *Inferior*. Tab. CVI. P, T.

The *Superior Vena Cava*, called also *Vena Cava Descendens*, conveys the Blood from the upper parts of the Body; and the *Inferior Vena Cava*, termed likewise *Ascendens*, conveys it from the lower parts; and both terminate in the Right Auricle; the Superior Cava entering at the fore, upper, and right side, and the Inferior Cava at the back, under, and right side of that Cavity. The Blood in the Auricle is prevented from returning by the fulness of the Veins, and by the pressure of the Blood *a tergo*.

The *Auricle* is situated upon the right, and partly upon the back part of the Heart. It is somewhat of an oval form, and is divided into the *Right Sinus Venosus*, and *Proper Auricle*. Tab. CVI. W—Z. Tab. CXI.

The *Sinus Venosus*, vel *Sinus Venarum Cavarum*, is formed by the union of the two *Venæ Cavæ*, which swell out towards the anterior and left side. It is notched at its anterior edge, is thin when compared with the corresponding Ventricle, being only about the eighth part of an inch in thickness; but is a Muscular Bag of considerable strength, and, both upon its outer and inner Surface, is uniform and smooth. Tab. CVI. W, Z, Y.

At the upper and left side of the Sinus, and to the left of the Superior Cava, is the Projection or Appendix, termed, from its supposed resemblance to the Ear of a Quadruped, *Proper Auricle*. It is formed by a blind Sac, which is serrated and notched on its posterior edge, convex or rounded anteriorly, and terminates obliquely in an obtuse point, which turns backwards and to the right side. Tab. CVI. W, X.

The Sinus and Proper Auricle form one common Cavity, have no Valve between them, and are therefore filled and emptied at the same time.

Where the two Cavæ meet in the Hearts of Quadrupeds, there is a *Projection* in the Sinus Venosus, called *Tuberculum LOWERI*, which is supposed to prevent the Blood of the one Cava from rushing upon that of the other, and to direct it into the Auricle.

At the meeting of the two Cavæ in the Human Heart, an Angle is formed, which also has frequently got the name of *Tuberculum LOWERI*.—This term, however, is more properly applied to the Projection in the Hearts of Brute Animals.

Under this Angle or joining of the *Venæ Cavæ*, there is a superficial depression, about the size of the point of the Finger, which is the Vestige of the *Foramen Ovale*. This, in the Fœtus, forms a communication between the Right and Left Auricles, but in the Adult, is occupied by



by the original Valve, which now assists in forming the *Fossa Ovalis*. Tab. CIV. Fig. 1. *q*.

The Foramen Ovale is generally completely shut in the Adult, but sometimes a small aperture remains, at the upper part of the oval fossa, and this has been more frequently detected in the Female than in the Male Subject.

The Fossa Ovalis has thick and strong edges, at its upper and fore part, called *Columnæ Foraminis Ovalis*, *Isthmus VIEUSSENII*, vel *Annulus Fossæ Ovalis*.

At the left side of the Mouth of the Inferior Cava, where it joins the Sinus, is the *Valve of EUSTACHIUS*, which is formed by the inner Coats of the Cava and Sinus. Tab. CIV. Fig. 1. *o, o*.

It is in the shape of a Crescent, with the convex edge fixed to the union of the Sinus and Cava, and the concave edge turned obliquely upwards, and reaching about half way over the Mouth of the Cava. Its size and appearance, however, vary much in different subjects, being sometimes half an inch in breadth, at other times scarcely a vestige of it is to be seen.

Its posterior Cornu is continued with the left side of the Isthmus of the Fossa Ovalis, the other end vanishes in the right side of the Sinus.

It is equally distinct in the Adult as in the Fœtus; but in the former it is frequently found reticulated, or Cribiform, which appearance is seldom, though sometimes, met with in the latter. Tab. CI. Fig. 11. *F*. See also the Pulmonary Plexus of Nerves near end of Vol. III. In a recent case, the Author found this Valve perfectly Cribiform in a child that died a few hours after Birth.

In the Adult, it is supposed to prevent the Blood of the Auricle from passing into the Inferior Cava; and in the Fœtus, to direct the Blood of the Inferior Cava to the Foramen Ovale.

Upon the left side of the Valve of EUSTACHIUS, in the under and back part of the Auricle, is the *Orifice* or *Termination* of the great Coronary Vein of the Heart.

Over and towards the right side of the Orifice of this Vein, there is a Semilunar Valve to prevent the Blood in the Auricle from passing into the Vein. This, like the EUSTACHIAN valve, varies much in appearance. Tab. CIV. Fig. 1. *p*. Tab. CI. Fig. 11. *G*.

The inner side of the proper Auricle is readily distinguished from the Sinus, by having a number of *Fleshy Pillars* in it, which, from their supposed resemblance to the Teeth of a Comb, sometimes obtain the name of *Musculi Auriculæ Pectinati*. Tab. CIV. Fig. 1. *m, n*.

The Musculi Pectinati have smaller Columns running in different directions, giving the whole a reticulated appearance.

Between the Fleshy Pillars, are *Depressions*, or *Furrows*, where the sides of the Auricle are thin, and semi-transparent, being here chiefly formed of the outer and inner Membranes only.

The Right Auricle receives the Blood from the Venæ Cavæ and Coronary Veins, and, by its Muscular con-

traction, discharges it into the corresponding Ventricle, out of which it is prevented from returning by a Valve, called *Tricuspid*, placed within the Ventricle.

At the under and left side of the Sinus Venosus, and opposite to a *Groove* situated externally between the Auricle and Ventricle, there is a *Circular Hole*, about an inch and a half in diameter, which opens into the upper and right part of the corresponding Ventricle, and is termed Auricular Orifice of the Ventricle. Tab. CIV. Fig. 1. *s, s*.

The *Right* or *Pulmonary Ventricle* is situated on the fore side of the Heart, the Base and Apex corresponding to those of the Heart; in general this is of a triangular form externally, and is about the sixth part of an inch in thickness, and of course stronger than the corresponding Auricle, which has merely to send the Blood to the Ventricle. Tab. CVI. *a, b, c, d*.

It has internally, but more especially towards the Apex Cordis, many strong Eminences, Columns, *Lacertuli*, or *Cords*, called *Columnæ Carneæ*. Tab. CII. *CV*.

The *Columnæ* run in different directions, but the strongest of them longitudinally with respect to the Ventricle; and are of various sizes, forming so many distinct Muscles, which are extremely compact in their structure, and compose a beautiful, intricate, and irregular net-work, that varies in appearance almost in every subject.

In general, they adhere through their whole length to each other, or to the sides of the Ventricle, but many of them are loose in their middle, and may be raised by a Probe put under them.

They assist the Ventricle in its *Systole* or contraction, render it stronger, prevent it from being over-stretched in its *Diastole* or dilatation, and agitate the Blood in its passage through the Ventricle, so as to mix its different parts freely together, and prevent Coagulation.

They are supposed to bring the opposite sides of the Ventricle completely together, during its contraction.

The *Columnæ* intersect each other in different directions, and inclose many deep *Grooves*, *Pits*, or *Foveæ*, in the bottom of which there are still smaller Cavities. Into all of these the blood readily enters.

Around the Auricular Orifice of the Ventricle, there is a *Tendinous Margin* or *Ring*, from the whole edge of which a circular Membrane is sent off, called *Valvula Tricuspis*, vel *Triglochis*, from its having three principal but unequal points or divisions, though there are others, but they are less considerable. This is white, semi-transparent, and thin, but of great toughness and strength, and lies contiguous to the sides of the Ventricle. Tab. CIV. Fig. 1. *r, r*. Fig. 3. *e, e*. Tab. CV.

From the whole edge of the Valve, next the point of the Heart, small round *Tendinous Cords* are sent off, which uniting, form a number of Cords of an unequal size. Tab. CIV. Fig. 3. *f, f, g, g*. Tab. CV.

The



The *Chordæ Tendineæ* descend obliquely within the Ventricle in the same direction with the Valve from which they arise.

They are fixed to the extremities of a few strong *Columnæ Carneæ*, termed here also *Musculi Papillares*, which are joined by their other ends to the corresponding sides of the Ventricle; the Anterior and largest being on the fore part, and the other two on the posterior and inferior sides of that Cavity. Besides the three principal portions of the Valve, it has some Tendinous Cords, and Fleshy Pillars of inferior size, fixed in the same manner with the rest. Tab. CIV. Fig. 3. *h, h*. Tab. CV.

The Tricuspid Valve prevents the reflux of the Blood to the Auricle, during the contraction of the Ventricle, the Blood at this time insinuating itself between the Walls of the latter and the Valve.

The Tendinous Cords are of such a length as to allow the Valves to be laid against the sides of the Ventricle, in the distended state of this Organ, but admit it to be pushed back by the Blood, until a complete Septum or Partition is formed at the Mouth of the Ventricle, during the contraction of the latter.—The Papillæ, by their contraction, prevent the Valve from being pushed into the Auricle.

The Valve is opened, and pressed back against the sides of the Ventricle, by the Blood, in its passage from the Auricle.

The upper and left side of the Ventricle becomes smooth and uniform, and leads to a large Opening, about an inch in diameter, and of a firm callous nature, which is the Mouth of the Pulmonary Artery. This is termed *Auricular Orifice* of the Ventricle.

The Right Ventricle, by its dilatation, receives the Blood from the Auricle, and sends it, by a strong and sudden convulsive contraction, to the Pulmonary Artery, from whence it is prevented from returning by Three Valves placed in the Mouth of that Artery.

The Valves at the Mouth of the Pulmonary Artery are called *Valvulæ Semilunares*, vel *Sigmoideæ*, from the resemblance of their edges to those of a crescent. Two of them are placed in the fore, and one in the back part of the Artery. Tab. CIV. Fig. 3. *i, i*.

Each of them is turned upwards, so as to form a *small Sac*, one edge of which adheres to a third part of the circumference of the inside of the Artery; the other edge is loose in the Cavity of that Vessel, and is somewhat thicker and stronger than the rest of the Valve—the thickened edges serving it as Ligaments. Tab. CI. Fig. 13. *E, E, E*.

The loose edge has a *general Curve*, divided into *two smaller ones*, which meet in a *point* at the middle.

The Valves are chiefly formed of a doubling or extension of the inner Coat of the Artery.

In the middle point, or loose edge of each of the Valves, there is a small hard *Triangular Granula*, of a somewhat redder colour than the rest of the Valve, called, from its reputed Discoverers, *Corpusculum ARAN-*

*THI*, vel *Corpusculum MORGAGNI*; or, from its resemblance in shape to the Seed of the Sesamum, *Corpusculum Sesamoideum*. Tab. CV. Fig. 2. *b, c, d*.

The Corpuscles complete the Valves at the centre or Axis of the Artery, and enable them to make a stronger resistance against the Blood, while the Artery is in action.

The Semilunar Valves are *concave* towards the Artery, *convex* towards the Ventricle, and when shut, their loose edges are opposed to each other, so as to enable them to form a complete *Partition* between the Ventricle and Artery.

Opposite to the Semilunar Valves, the Artery bulges out, and forms *Three Projections*, which have corresponding Pits or Depressions within, and are called, from their Discoverer, *Sinus VALSALVÆ*. Tab. CVI. *e*.

The *Sinuses* of VALSALVA are of the same nature with those Dilatations which are found in the Veins and Lymphatics, between their sides and Valves; and, like them, are partly formed by the pressure of the Fluids upon the sides of the Vessels.

The Pulmonary Artery receives the Blood from the Right Ventricle, and, by its contractile power, assists the Ventricle in driving it through the Lungs.

The Semilunar Valves, pressed back by the Blood in the Artery, prevent its return into the Ventricle.

The Valves are opened again in consequence of their being driven towards the sides of the Artery by the current of the Blood, upon the next contraction or stroke of the Ventricle.

The Pulmonary Artery passes behind the Sternum, and separates into *Right* and *Left Branches*, which go to the corresponding parts of the Lungs. Tab. CII. Fig. 1. Tab. CVI. *f, g, h*. Tab. CXI.

The two Branches of the Pulmonary Artery, like those of the Arteries of the Viscera in other parts of the large Cavities, suddenly divide into still smaller Branches.

From the extreme Arteries of the Lungs, corresponding Veins arise, which are merely the continuation or reflection of the Arteries, without any intermediate Cells or dilatations.

The Pulmonary Veins, in the Substance of the Lungs, gradually unite, and form *Four Principal Trunks*, which terminate in, and carry the Blood to, the Left Auricle. Tab. CVI. *i, k, i, k, l*.

Of the Pulmonary Veins, *two* come from the right, and *two* likewise from the left Lung, which are somewhat smaller than those from the right; and the whole terminate in the corresponding sides of the Left Auricle, towards its upper and back part. Tab. CIV. Fig. 2. *f, g*. Tab. CXVII.

The *Left Auricle* is considerably thicker and stronger than the Right, and is also divided into *Sinus Venosus* and *Proper Auricle*, which form one Common Cavity, without the intervention of any Valve. Tab. CIV. Fig. 2. *a, b, c*.

The *Left Sinus Venosus*, called also *Sinus Pulmonalis*, is turned towards the Spine, is more of a cubical form



form than the Right one, but resembles it in the uniformity and smoothness of its outer and inner Surfaces, also in its Colour, which is paler than that of the ventricles.

From the fore and left part of the Sinus, the *Proper Auricle* projects, and forms a distinct flat *Appendix* or *Bag*, which is twisted with different Curvatures or Indentations upon its edges, and points forwards, and to the left side. Tab. CVI. *m*.

The inner part of the *Proper Auricle* is *longer*, but *narrower* than that on the right side; like it, however, it is formed of *Columnæ*, with Furrows between them, but these less distinct than those on the other *Auricle*. Tab. CIV. Fig. 2. *m, n*.

The *Proper Auricle* is somewhat less capacious than that on the right side; but the Sinus is as much larger as to render the two common Cavities of the right and left *Auricles* nearly equal.

The two *Auricles* have a slight Groove between them externally, and a thin *Fleshy Septum* within, formed by their opposite sides, in which, as has been already mentioned, there is the *Foramen Ovale* in the Fœtus;—but in the Adult the Partition is generally perfect, leaving merely the vestige of the Valve which belonged to this Passage, and which is distinguished from the rest of the *Septum*, by its greater degree of transparency, being only about the thickness of a wafer. Tab. CII. Fig. 3. G. Tab. CIV.

From the under part of the Sinus Venosus, a *Circular Passage* termed *Auricular Orifice* of this Ventricle, Tab. CIV. Fig. 2. *o*, leads down to the posterior part of the base of the Cavity of the Left Ventricle. This is opposite to a *Groove* seen externally between the *Auricle* and Ventricle, and is about the same size with that of the right *Auricular Orifice*. Tab. CVI. *m*.

The Left *Auricle* receives the Blood from the Pulmonary Veins, and, by its Muscular contraction, drives it to the Left Ventricle, out of which it is prevented from returning, by a Valve in the Ventricle, called *Mitralis*.

The *Left* or *Aortic Ventricle* is situated in the posterior and left part of the Heart, and is somewhat of an egg shape. Tab. CVI. *m, n, o, p*.

Its sides are about *three times thicker* and *stronger* than those of the Right Ventricle; the thickness being in proportion to the force required to propel the Blood to the most remote parts of the Body. Tab. CIV. Fig. 3.

It is *narrower* and *rounder*, but considerably *longer*, both on its External Surface and in its Internal Cavity, than the Right Ventricle, and generally descends some way below the other, and forms the Apex Cordis. Tab. CIV. Fig. 3. Tab. CVI.

The Cavity is commonly described as being less than that of the Right Ventricle;—but the apparent difference, which takes place after death, is accounted for with seeming propriety by some Authors,—from the Left Ventricle being then for the most part found empty,

and the Right one full, and from the greater degree of contractility in the former.

That the capacity of the Cavities of the right and left sides of the Heart is more nearly equal during life than after death, or than it is generally supposed to be, is evident from the appearance of the Heart of the Human and also of the Brute kind, and from Injections thrown into the two sides of the Heart, where the force applied is in proportion to the relative strength of each side.

The size of the Cavities of the Heart, varies in different persons. In general, each is found to contain between two and three Ounces of Water, when moderately distended.

The inner Surface of the Left Ventricle has the same general appearance with the Ventricle of the right side, but differs from it in having its *Columnæ Carneæ* larger and greater in number, firmer and stronger; more detached, and more varied in their directions. They form Meshes in the shape of Lozenges, in which are *Columnæ* of a more slender nature, intercepting Meshes of an inferior size; the last of which appearing to be deeper here than in the Right Ventricle.

In the Passage of communication between the *Auricle* and Ventricle, there is a *Ring*, from which a *Circular Valve* goes off, with all its Apparatus similar to that between the Right *Auricle* and Ventricle, and differing in no respect from it in structure and use, except in being stronger, and divided into two principal Portions only; and in the *Chordæ Tendineæ* being stronger and more numerous. Tab. CIV. CV.

This Valve has been supposed to bear some resemblance to a *Bishop's Mitre*, from which it has been called *Valvula Mitralis*.

One of the Portions of this Valve is larger than the other, lies over the Mouth of the Aorta, and is supposed to cover it while the Ventricle is filling. The other is contiguous to the opposite side of the Ventricle.

The *Valvula Mitralis* prevents the reflux of the Blood during the contraction of the Ventricle.

After the contraction is over, the Valve returns to its former situation, by the impulse of a fresh current of Blood from the *Auricle*.

Between the Right and Left Ventricle, there is a thick, strong, impervious *Partition*, which forms a share of the general *Septum Cordis*, having *Columnæ Carneæ* upon it, similar to those upon the other parts of the Ventricles. It is composed partly by the Wall of the Right, but chiefly by that of the Left Ventricle; the Right being united to the Left, almost in the form of an *Appendix*; but the Fibres of the two Ventricles intermix in such a manner as to render the *Septum* somewhat thicker and stronger than the other parts of the Heart. Tab. CII. Fig. 3. *c, c*. Tab. CIV. Fig. 3. *d, d*.

This Partition prevents any direct communication between the two Ventricles.

Opposite



Opposite to the outer edge of the Septum, both upon the upper and under Surfaces of the Heart, there is a *Groove*, which distinguishes the two Ventricles from each other, and in which some of the principal Trunks of the Coronary Vessels are situated. Tab. CII. CVI.

At the fore and right side of the Valvula Mitralis, and behind the beginning of the Pulmonary Artery, there is a *Round Opening*, which is the Mouth of the Aorta, and which is nearly of the same size with that of the Pulmonary Artery.

Under this opening, the Surface of the Ventricle becomes *smooth* and *equal*, having none of the Columnæ Carneæ, which are seen on the other parts of the sides of its Cavity. Tab. CII. Fig. 5. A.

The Left Ventricle receives the Blood sent to it from the Auricle, and, by a contraction similar to, but much stronger than that of the Right Ventricle, propels it to the Aorta.

At the Mouth of the Aorta, there are *three Semilunar Valves*, with their *Corpuscula ARANTII*, perfectly similar to those of the Pulmonary Artery,—but somewhat stronger. Tab. CII. CIV. CV.

On the outside of the Semilunar Valves, are the *Sinuses* of VALSALVA, resembling those of the Pulmonary Artery,—but a little more prominent. Tab. CVI. r.

The Semilunar Valves are pressed back by the Blood, the reflux of which they prevent during the contraction of the Aorta.—They are returned towards the sides of the Aorta, in the same manner, and from the same cause, as those in the Pulmonary Artery.

The *Aorta* passes upwards from the top of the Left Ventricle, and is situated first behind, and then on the right side of the Pulmonary Artery, and between it and the Superior Cava. Tab. CVI. r, s.

It bears nearly the same proportion in thickness and strength to the Pulmonary Artery, which the sides of the Left Ventricle do to those of the Right.

Where the Aorta is about to send off the first of its large Branches at the top of the Thorax, it is of great size, and is sometimes called the *Large Sinus* of VALSALVA. Tab. CVI. s.

The Aorta receives the Blood from the Left Ventricle, and by its Muscular contraction, re-acts upon it, and assists the Ventricle in sending it by numberless Branches through the different parts of the Body, from whence it is returned by the Veins to the Right Auricle.

Besides the Blood-vessels already taken notice of, and which are common to the Heart and the rest of the Body, the Heart is furnished with Vessels peculiar to itself, termed *Cardiac* or *Coronary* from a *Corona* which they form upon its Surface.

The *Coronary Vessels* consist of two Arteries, a right and left, and one principal Vein.

The *Coronary Arteries* arise from the Sinuses at the Mouth of the Aorta, opposite to two of the Semilunar Valves. Tab. CII. Fig. 5. b, b.

One runs in a Groove between the Right Auricle

and Ventricle, and supplies chiefly the right side of the Heart. Tab. CII. Fig. 2. a.

The other passes partly between the Left Auricle and Ventricle, and partly in the Groove between the Ventricles on the fore side of the Heart,—supplying the left side of that Organ, and communicating with the Branches of the other Artery on its upper and under Surfaces. Tab. CII. Fig. 2. b.

The Coronary Arteries run under the Serous Membrane, and are entirely dispersed upon the Substance of the Heart, and upon the roots of the great Vessels, forming upon these some of the minute Branches, termed *Vasa Vasorum*.

The Coronary Arteries, from their situation opposite to the Valves, have been supposed to be filled at a different time from that of the rest of the Arterious System;—but from Experiment, it seems now sufficiently ascertained, that the Coronary Vessels have their Pulsation at the same instant with the other Arteries.

The *Coronary Veins* return the Blood from their corresponding Arteries. The principal part of them join into a Trunk, called the *Great Coronary Vein*, which is short, but about the third of an inch in diameter. This, after making a turn from the left side, and running between the Left Auricle and Ventricle, terminates in the under and back part of the Right Auricle, and is there covered by its Valve. Tab. CII. Fig. 3. d.

Other Coronary Veins, much smaller than the former, terminate in different parts of the right side of the Heart.

Besides the termination of the Coronary Vessels, as mentioned above, some have taken notice of Branches of these, both Arteries and Veins, as terminating directly in the Cavity of the right side of the Heart, by minute Orifices, which have been termed, after their original Describer, *Foramina THEBESII*; but penetrating Injections, thrown into these Vessels, do not appear to detect any such terminations.

The *Absorbents* of the Heart go to the neighbouring Lymphatic Glands.

The *Nerves* are from the Great Sympathetics and Eighth Pair.

With regard to the Circulation of the Blood in general:—The Veins, by a slow and equal motion, and without Pulsation, return the Blood from the different parts of the Body to the Auricles, which serve as Reservoirs of this Fluid. Immediately after receiving it, the Auricles, on account of the quantity and stimulating quality of the Blood, contract suddenly and at the same time, and send it to the Ventricles, which, having discharged their Contents, are ready to receive it: Its reflux is prevented by means of the Valves.

The Ventricles, from the same cause which stimulates the Auricles, and on account of the stroke the former receive from the latter, contract convulsively, with a force proportioned to the thickness of their sides; and, like



like a forcing Machine, send the Blood to the Pulmonary Artery and Aorta, or Arterious System in general, which, in dilating to receive it, have a pulsatory motion: Its reflux is prevented by the Semilunar Valves. During the contraction of the Ventricles, these are thrown, by the dilating Auricles and Arch of the Aorta, against the Ribs, where the Stroke occasioned by the Pulse of the Heart may be felt.

The Arteries, by their contractile power and elasticity, send the Blood suddenly to the Veins, through which, by the united force of the Ventricles and Arteries, called the *Vis a tergo*, by the pressure of the surrounding parts, by the Pulsation of the adjacent Arteries, by the weight of the Column of Blood in the Veins in certain parts of the Body, and, as some suppose, by a contractile power in the Veins themselves, it is driven again to the Auricles.

In its course, the Blood performs a double Circulation,—one called the *Lesser*, the *Pulmonary*, or that through the Lungs,—the other called the *Greater*, the *Aortic* or *Systematic*, or that through the rest of the Body.

In the former, it passes from the Right Ventricle to the Lungs, and returns to the Left Auricle.—In the latter, it goes from the Left Ventricle to the different parts of the Body, and returns to the Right Auricle.

During this Circulation, the Auricles and Ventricles contract and dilate in succession, but the Auricles and Arteries, and the Ventricles and Veins, act in concert with each other.

The Heart is the centre of the Vascular System, and the principal agent in the Circulation of the Blood.

The right side of the Heart receives the Blood, which is contaminated in passing through the Body, and sends it to the Lungs, where it is purified through the medium of the Air.

From the Lungs the Blood, now purified, is returned to the left side of the Heart, to be circulated through all the other parts of the Body, thereby imparting nourishment, growth, and strength, to the general System; being found also to be the source of Sensibility, Irritability, Motion, and Animal Heat.

The Circulation of the Blood is demonstrated by throwing a Ligature round an Artery and its corresponding Vein. The part of the Artery on the side of the Ligature next the Heart then swells, while the portion on the other side of the Ligature becomes collapsed. The reverse of these circumstances takes place in the Veins, the Blood being now interrupted in its course. The Circulation is also shewn by the aid of the Microscope, in the Blood-vessels of transparent parts of small Animals, as the Foot of a Frog. In the dead Body, by Injections thrown into the Arteries, it can be made to return by the Veins.

#### CONSTITUENT PARTS OF THE BLOOD.

The Blood has a saponaceous feel, a saline taste, and

a peculiar smell. When circulating through the Body, if it be exposed to the Microscope, it has the appearance of Globules diffused through a liquid.

The Blood, when drawn from an Artery, is of a bright red; when taken from a Vein, it is of a deep purple colour; but when the Venous Blood is exposed to the Air, it assumes the colour of Arterious Blood. It becomes florid upon exposure to Oxygen, and is darkened by the noxious Gases.

When taken from the Body, and allowed for some time to remain at rest, it coagulates into a Mass, of the consistence of curdled Milk. This separates into a thin Fluid called *Serum*, and a Coagulum termed *Clot*, *Cruor*, or *Crassamentum*, of which there is commonly about three parts of the latter to one of the former, but the proportions varying much in different Animals, and in the same Animal placed under different circumstances.

The Serum is a little heavier than Water, and of a yellowish-green colour. When slightly heated it coagulates, owing to the presence of Albumen. From the Coagulum a thin turbid Fluid can be separated, which is called *Serosity*. This contains Water, with a small proportion of Albumen, and different Saline Substances. Gelatin was also considered as a constituent of the Serum, but late experiments seem to shew that this opinion is not well founded.

The Clot is of a dark red colour, but acquires a more florid hue on exposure to the Air. When put into a Bag, and washed with Water, it is separated into two parts, the red Globules, which the water retains, and a Substance termed *Gluten*, *Coagulable Lymph*, or *Fibrin*, which is of a white colour, and an elastic Fibrous nature, and which forms the Buffy Coat seen on the surface of the Blood of a Person labouring under Inflammation. BERZELIUS and BRANDE have shewn that the Clot is a compound of Fibrin, Albumen, and Colouring Matter of the Blood.

From late experiments, it appears that the colouring Particles contain Iron, with some saline Matter, the former of which is supposed to be the cause of the red colour of the Blood.

#### LUNGS.

The *Lungs* are two soft spongy Bodies, which occupy the greater part of the Cavity of the Thorax.

They completely fill the two Bags of the Pleura, and are every where in contact with the parts adjacent; no Air intervening between them and the Thorax, till an opening is made into the Cavity of the latter, when they instantly collapse. Tab. CXIV. CIX. CVII.

In *Figure* they are somewhat Conical, or they have been compared to that of the Foot of an Ox, with the back part turned forwards, and this figure they retain, whether in their dilated or collapsed state;—or their shape corresponds exactly with the inside of the Thorax, being

*Blood circulates once in 160 sec. -*



being rounded next the Ribs, hollow towards the Diaphragm, and irregularly flattened and depressed next the Mediastinum and Heart.

The *Colour* of the Lungs has been said by some to vary in different parts of this Organ, and to be deepest below, on account of the greater quantity of Blood there; but this deeper tinge, occasionally seen in the lowest part, is chiefly owing to the Blood, from its own gravity, falling to the most dependent part of the Lungs after death.

They are of a reddish or pink colour in Children, of a light blue or greyish colour in Adults, and more of a purple and livid colour in old age, at which period they are also observed to be tinged with black spots, proceeding from a matter secreted in their Substance.

They are joined to the Neck by the Trachea; to the Spine by the two Layers of the Mediastinum, which serve them as Ligaments; and to the Heart by the Pulmonary Vessels; the rest of them being free and unconnected, unless when an adhesion takes place in consequence of inflammation.

They are divided into *Right* and *Left Portions*, or *Lungs*, which are independent of each other, a separation being made between them by the Heart and Mediastinum, and which have no communication, except through the medium of the Trachea, in consequence of which Respiration is sometimes continued for a considerable time, where one of the Lungs is almost entirely consumed.

Each of the Lungs is again divided by Fissures, varying in depth in different Bodies, into large Portions, called *Lobes*, which facilitates their motion, and the dilatation of their Cells.

Of the Lobes, *three* belong to the Right Lung, corresponding with the larger Bag of the Pleura, and *two* to the Left, between which there is a Notch or Sinus, occupied by the point of the Heart. Tab. CII. Fig. 1. Tab. CIX. Sometimes an *additional Lobe* is found in the Left Lung, or the reverse in the Right one; but mistakes may arise in numbering these, in consequence of morbid adhesions.

Each of the Lobes is subdivided into many smaller parts, termed *Lobules*, which are of different sizes, and of an irregular angular form. Tab. CIX. CXVII.

The Lobules diminish in size, and degenerate at last into small *Vesicles* or *Cells*, which constitute a large share of the Lungs.

The Cells of the Lungs are purely Membranous, of an irregular figure, but all nearly of the same size, compressed and closely connected, and have a free communication with each other.

Between the different Lobes, Lobules, and Cells, a large quantity of common Cellular Substance, destitute of Fat, is interposed, which unites and strengthens them, and allows the Blood-vessels to be minutely dispersed over them.

The Cells of the Lungs have no communication with this common Cellular Substance, for when Air is blown

into it, the Lobules are compressed; but when the Air is blown in through a Branch of the Trachea, the Cells are again distended, and the Lobules recover their former dimensions.

In the Fœtus, the Cells are empty and in a collapsed state;—but as soon as Respiration begins, they become distended, and continue so during life, and in every state of Respiration, and even in the recently dead Body:—But if an opening be made into the Cavity of the Thorax, whether in the living or dead Body, and the Air in this or in any other way freely admitted, they immediately collapse by their *weight* and *elasticity*, the pressure of the Air being then the same on the outer Surface of the Lungs, and inner Surface of the Trachea.

The Lungs are covered by *two Coats*, an External or Common, and an Internal or Proper one.

The *External* or *Common Coat* is a continuation or reflection of the Pleura, is extremely thin, but dense, and, like the other Parts of the Pleura, is found to possess little Sensibility. It forms a general covering to the Lungs, but does not enter between their different Lobules.

The *Internal* or *Proper Coat* adheres so firmly to the former, as to appear, in the Adult, to constitute part of its Substance, but, in the young Subject, may be readily separated from it. It not only covers the Lungs, but insinuates itself between their Lobes and Lobules, and is intimately connected with their Cellular Substance.

Besides the Cells, various kinds of Vessels, viz. the *Vessels* or *Branches of the Trachea*, *Blood-vessels*, and *Absorbents*, together with small Branches of *Nerves*, enter into the composition of the Lungs.

#### TRACHEA.

The *Trachea*, vel *Aspera Arteria*, so called from the inequality of its Surface, and from its conveying Air, is a Cartilago-Membranous Tube, which begins at the under part of the Cricoid Cartilage, and descends in the fore part of the Neck, and is covered there only by the skin and Cellular Substance. Its lateral parts are covered by the Sterno-hyoidei and Sterno-thyroidei. Tab. XLIII. Fig. 1. g. Tab. XCVIII. XCIX.

From the Neck, it passes into the Thorax, where it is situated between the Layers of the upper part of the Posterior Mediastinum.

Behind the Curvature of the Aorta, and opposite to the Third Dorsal Vertebra, the Trachea divides into two lateral Branches, termed *Bronchi*, one of which goes directly to the Right, and the other, which is the longer, but rather the smaller of the two, passes under the Arch of the Aorta to the Left Lung. Tab. CII. Fig. 1. Q, R, S. Tab. CVI. Fig. 8. g, g.

Each of the Bronchi is subdivided at the place where it enters the Lung, the Right separating into three principal Branches, the Left often only into two. In the Substance



Substance of the Lungs, the Bronchial Branches are every where distributed, each Branch running between a corresponding Ramification of an Artery and Vein. They divide and subdivide after the manner of the branching of a Tree.

They become smaller and smaller, till at length they form an infinite number of Capillary Tubes, which, dilating at their extremities, terminate in the *Cells* of the Lungs. Tab. CVIII.

The Cells of the Lungs, in a Child, are barely visible to the naked Eye. In the Adult they are larger, and in both they communicate so freely together, that upon introducing Air into a Bronchial Tube of moderate size, a large portion of the Lungs may be inflated. Tab. XCIX.

The Trachea consists of *Cartilaginous Rings*, about sixteen or eighteen in number, the number varying a little according to the length of the Neck.

The Cartilages give strength and firmness to the Trachea, and preserve it constantly open for the transmission of Air. They are incomplete, however, behind, where the Trachea is formed of a *flat, soft, fleshy Substance*, which is closely connected with the Esophagus, and yields to it in the time of Deglutition. Tab. XCVIII. XCIX.

Each Cartilage forms a large Segment, or nearly two-thirds of a Circle, about a line or one-twelfth of an inch in breadth, and a fourth of a line in thickness.

The Cartilages are situated transversely, with respect to the length of the Trachea, and have their edges opposed to each other; small spaces intervening.

They are united to each other by a Ligamentous Substance, which is so elastic, that when the Lungs are taken out of the Body, it draws the Cartilages closely together.

At the upper end of the Trachea, two or three of the Cartilages are frequently joined by a union of Substance, Tab. XCIX.; but below this, they are perfectly distinct from each other. The last of the Cartilages is now and then triangular, to adapt itself more readily to the beginning of the Bronchi.

The Bronchi, at their beginnings, have the same kind of Cartilages with the Trachea, but after they enter the Lungs, each Cartilaginous Ring is divided into two or three pieces, which, however, are so connected to each other, as to go completely round the Bronchi, and keep the Passage open, and free from compression.

Upon tracing the smaller divisions of the Bronchi, the Cartilages are observed to become less numerous, and more separated from each other, till at length they vanish; the Capillary Branches becoming entirely Membranous, as well as the Vesicles in which they terminate.

The Trachea has several *Coats* entering into its composition, some for strengthening it, others for giving it a certain degree of motion, viz.

A *Cellular Coat*, which, in the Thorax, is covered by the Mediastinum;

An *Elastic Ligamentous Coat*, which passes along the Trachea, and also upon the different Branches in the Substance of the Lungs, adding much to the elasticity of these;

A *Muscular Coat*, placed between the Cartilages and in the back part of the Trachea, and composed of Circular Fibres without, and Longitudinal Fibres within;—the former for straitening, the latter for shortening the general Passage. Tab. XCVIII. Fig. 9. Fig. 8.

The Longitudinal Fibres are collected into Bundles, which are distinctly seen through the inner Coat, and may be traced considerably farther than the Cartilages in the Substance of the Lungs. Tab. XCVIII. Fig. 9. f.

A very *Vascular and Irritable Membrane*, continued from the Mouth, which lines the inner side of the Trachea, and forms at last the extreme Branches, which terminate in the Cells of the Lungs.

The inner Membrane of the Trachea is every where perforated by the *Ducts* of *Mucous Glands*, and by the *Mouths* of the *Exhalent Arteries*, the former pouring out Mucus to lubricate the Lungs, the latter the vapour which is thrown off in Expiration.

Three different kinds of Glands are connected with the Trachea,—the *Thyroid*, which has already been described, the *Tracheal*, and the *Bronchial*.

The *Tracheal Glands* are small, but numerous, and of different sizes, surrounding the Muscular Coat of the Trachea, and its Branches in the Lungs;—the largest of them are placed in the Fleshy Substances behind, Tab. XCVIII. Fig. 9. n, the smallest are situated between the Cartilaginous Rings, Tab. XCIX.

From each of these Glands a small duct issues, and throws out a Mucus, to defend the inner Surface of the Trachea from being injured by the Air, or by the extraneous particles which it carries along with it.

The *Bronchial Glands* are placed in the Cellular Substance round the under end of the Trachea and roots of the Bronchi, where these penetrate into the Substance of the Lungs. Tab. CVIII.

They are of various sizes, from that of the point of the Little Finger to that of a millet-seed, and have a bluish or blackish colour, corresponding in a great measure with the colour of the darkest parts of the Lungs.

They were formerly considered by many Authors as sending Fluids to the Trachea, and particularly the dark Mucus which is occasionally expectorated; but they are now universally known to be entirely of the Lymphatic kind,—the Absorbents of the Lungs passing through them in their way to the Thoracic Duct.

The Trachea is furnished with Blood-vessels from the Inferior Laryngeals, and *Nerves* from the Recurrents and Great Sympathetic Pair.

The Trachea serves to convey Air into, and out from, the Cells of the Lungs, during Respiration, and to carry off the Perspirable Matter from the Arteries in the time of Expiration.

The *Blood-vessels* of the Lungs consist of the *Pulmonary*



nary and *Bronchial Vessels*; the one for the general circulation, the other proper to the Lungs.

The Pulmonary Blood-vessels have been already taken notice of in p. 124. But here it may be proper to observe, that the minute Branches of the Artery, running in the common Cellular Substance of the Lungs, form at last a *Plexus* upon the proper Cells, sometimes called *Rete Mirabile*, vel *Rete Vasculosum* MALPIGHI. Part of this Plexus terminates in the Cells, and their corresponding Bronchi, by Exhalent Vessels, from which that Halitus is derived which is expelled by the Lungs in Expiration.

The *Pulmonary Veins* are commonly observed to be smaller, in proportion to the corresponding Arteries, than Veins are to Arteries in other parts of the Body, which has been supposed to be owing to the large quantity of Fluids expired.

The *Bronchial Arteries* arise by three or four small Branches; one of which is from an adjacent right Superior Intercostal, the rest from the Trunk of the Aorta.

They are dispersed upon the Bronchi and Bronchial Glands, and the Substance of the Lungs in general, and are found to communicate with Branches of the Pulmonary Artery.

The Bronchial Arteries are supposed to serve for the nourishment of the Lungs, and for the secretion of the Mucus.

The *Veins* return the Blood to the Vena Azygos, and Left Superior Intercostal Vein.

The *Lymphatics* form a Plexus upon the Surface of the Lungs:—They communicate freely with the deep-seated Absorbents, and pass through the Bronchial Glands.

The *Nerves* of the Lungs are partly from the Great Sympathetics, but chiefly from the Eighth Pair, and are rather small in proportion to the bulk of the Organ on which they are dispersed.

The Lungs serve the general purpose of *Respiration*, which consists of *Inspiration* and *Expiration*, or the passage of the Air into, and out from the Lungs, by the alternate dilatation and contraction of the Thorax.

During *Inspiration*, the Thorax is lengthened by the descent of the lateral portions of the Greater Muscle of the Diaphragm; it is rendered wider by the elevation and expansion of the Ribs; and, by the ascent of these, is made deeper, the Sternum being at the same time thrust forward.

Moderate *Inspiration* is performed in consequence of the Thorax being dilated by the action chiefly of the Diaphragm, assisted in a small degree by the Intercostales; the Lungs, which are passive, and in contact with the Thorax, following it, and the Air rushing into the Trachea by its own gravity.

In strong Inspirations, additional Muscles are brought into action, as the Scaleni, Serrati Postici Superiores, Serrati Magni, and Pectorales Minores.

*Expiration* is performed in consequence of a relaxa-

tion of the Muscles which dilate the Thorax,—of the contraction of the Abdominal and a few other Muscles,—assisted in strong Expirations chiefly by the Triangulares Sterni, Sacro-lumbales, and Serrati Postici Inferiores,—of the elasticity of the Cartilages of the Ribs, and the elasticity and contractile nature of the Bronchi, by all which circumstances the Cavity of the Thorax is diminished, and the Air is expelled from the Lungs.

Upon the alternate states of *Inspiration* and *Expiration* depend the formation of the Voice, the sensation of Smell, and all the other functions of the Body:—But the great and principal office of the Lungs, which was formerly supposed to be that of cooling the Blood overheated by Friction, is, during *Respiration*, to make such changes upon that Fluid as may be necessary for Animal life.

Air that has been expired differs from Atmospheric Air, in having less Oxygen, and in containing Carbonic Acid Gas; it is also charged with watery vapour.

The quantity of Air taken in at each *Inspiration* has been differently estimated by different Authors; by some it is rated at 40, while others make it as low as 14 cubic inches. The quantity must vary with the size of the Thorax, and state of the Lungs.

According to some, it appears,—that the Venous Blood passing to the Lungs, of a dark red or purple colour, is charged with Carbon or Hydrogen;—that while circulating upon the Bronchial Cells, part of the Oxygen, contained in the Air which has been inspired, unites with the Carbon and Hydrogen, and forms fixed Air and a watery Halitus, which are carried off by *Expiration*.—Others suppose that part of the Oxygen of the Atmosphere is imbibed by the Blood, which, in consequence of these changes, or having received an Arterial quality, returns from the Lungs of a florid red colour, and full of heat in a latent state; that this, in the course of the general circulation, by the Oxygen uniting with the Carbon, and forming Carbonic Acid, becomes sensible, and is diffused over the different parts of the Body, the Carbonic Acid being carried by the Veins to the Lungs, where it is evolved.—According to the latest Experiments, however, it is stated that the Blood, during the Circulation, acquires an excess of Carbon, which, in its passage through the Lungs, unites with the Oxygen of the Air, and forms Carbonic Acid; and that thus the Venous is changed into Arterial Blood, which, owing to this change, affords a stimulus to the Arteries, and promotes the different Secretions.

#### ESOPHAGUS.

The ESOPHAGUS, called also *Gula* or *Gullet*, derives its name from carrying what is eaten into the Stomach.

It is a Fleishy Canal, which begins from the inferior part of the Pharynx, descends along the Neck, and through the Thorax, following nearly the direction of the Spine. Tab. LIV. Fig. 6. b. Tab. CXII. XCIX.

It is situated between the Trachea and Vertebrae, and in



in the Neck inclines a little to the left side. In the Thorax, it proceeds behind the Base of the Heart, and between the Layers of the Posterior Mediastinum, from which it receives a lateral covering.

Soon after entering the Thorax, it makes a slight turn to the right, and passes down upon the fore and right side of the Aorta; consequently the Artery and it are prevented from injuring each other by pressure. Tab. CXVIII.

In its progress, it inclines more forwards and to the left side; and about the ninth Dorsal Vertebra, it perforates the Muscular part of the Diaphragm, and afterwards terminates in the upper Orifice of the Stomach. See Tab. in Vol. III. with Great Sympathetic and Eighth Pair of Nerves.

It has several *Coats* proper to it, the first of which is *Cellular*, and connects it to the adjacent parts.

The second Coat is *Muscular*, and is sometimes termed *Vaginalis Gulæ*.—It consists of two Layers; the external of which has thick, strong, longitudinal Fibres, somewhat fasciculated. A portion of these ascends some way up the Pharynx on each side, to be fixed to the back part of its Inner Membrane. The internal Layer is formed of circular or transverse Fibres, and is thinner than the former.—The outer Layer is fitted for shortening and relaxing, and the inner for contracting the Canal, during Deglutition. Tab. CXXIV. Fig. 2.

The third Coat is termed *Nervous*, and is considered by some as a continuation of the Cutis Vera, but is more properly called Cellular, being formed of loose Cellular Substance, which connects the Muscular to the Inner Coat.

The *Inner Coat* is continued from the lining of the Mouth; it consists of many longitudinal *Plicæ*, which are distinctly seen when the Esophagus is contracted, but are scarcely visible when the Tube is dilated. It is also furnished with numerous Foramina, which discharge a Mucus from corresponding Glands, for lubricating the passage, and facilitating Deglutition.

The *Arteries* of the Esophagus are Branches of the Inferior Laryngeals, and supply the Cervical part of

it, and the Esophageals and Branches of the Bronchials, which are derived from the Aorta Descendens, and supply the Thoracic Portion.

The *Veins* go to the Inferior Laryngeals, to the Vena Azygos, and to the Left Superior Intercostal Vein.

The *Absorbents* are numerous, and intermix with those of the Heart and Lungs.

The *Nerves* are chiefly from the Eighth Pair.

The Esophagus receives the Aliments from the Pharynx, and conveys them to the Stomach.

#### THORACIC DUCT.

The THORACIC DUCT is a small Membranous-like Canal, situated at the back part of the Thorax, and is the principal Trunk of the Absorbent System.

It begins upon the third Vertebra of the Loins, and passes behind the Aorta, crossing obliquely from left to right, till it gets to the right side of that Artery.

Upon the first Lumbar Vertebra, it forms an *Oval Sac*, termed *Receptaculum Chyli*, which is placed behind the Right Crus of the Diaphragm, and a little higher than the Right Renal Artery. Table of Absorbents, Vol. III.

The Duct afterwards passes between the Crura of the Diaphragm, and ascends in the Thorax, on the anterior part of the Spine, between the Layers of the Posterior Mediastinum, on the right side of the Aorta, and between it and the Vena Azygos. See Vol. III.

It crosses behind the upper part of the descending Aorta, and emerges from the Thorax, to reach the under part of the left side of the Neck.

In the Neck, it passes behind the Internal Jugular Vein, and a little higher than the Subclavian.

It then turns downwards, forming an Arch, which terminates in the upper part of the Angle, between the Internal Jugular and Subclavian of the left side.

The Thoracic Duct receives the Chyle from the Lacteals, and Lymph from the Lymphatics, and discharges these into the red Veins.



## T A B L E C.

The INTEGUMENTS cut and turned back, and some of the RIBS of the LEFT SIDE removed, to shew part of the Contents of the THORAX and ABDOMEN.

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- |  |  |
|--|--|
| A, The trachea.  | K, The umbilicus, to which the umbilical vessels and urachus, now changed into ligaments, are connected. |
| B, B, The sternum.   | L, L, The right and left lobes of the liver.   |
| C, The pectoralis major.                                     | M, The suspensory ligament.  |
| D, The right mamma.  | N, The stomach.  |
| E, E, A section of the uppermost ribs of the left side.      | O, O, The omentum majus, through which the arch of the colon appears.                                    |
| F, Part of the surface of the heart, exposed by laying open, | P, P, The convolutions of the intestines.  |
| G, G, The pericardium,                                       | Q, Q, The containing parts of the abdomen folded back.   |
| H, H, The left lung,   |  |
| I, The upper surface of the diaphragm.                       |  |















FIG. 1. TAB. 101.



FIG. 2.

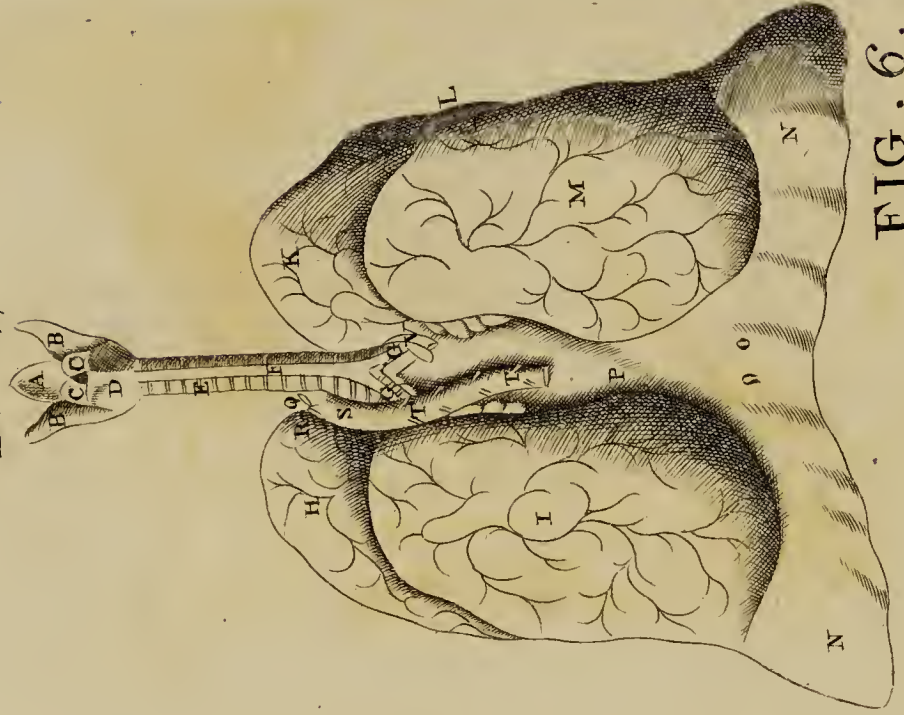


FIG. 3.



FIG. 4.



FIG. 8.

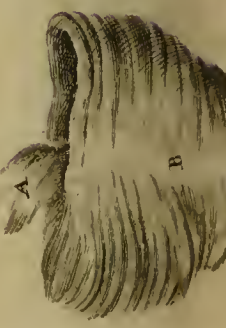


FIG. 5.



FIG. 9.



FIG. 6.

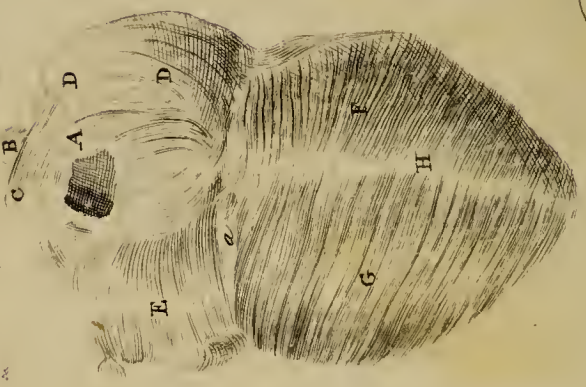


FIG. 7.

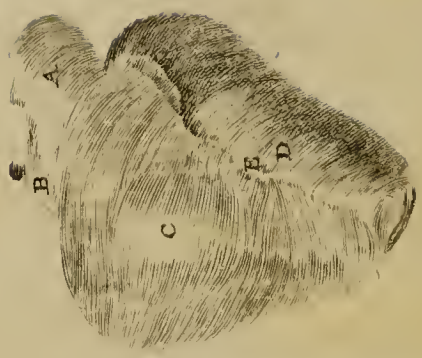


FIG. 11.



FIG. 10.





FIG. 12.

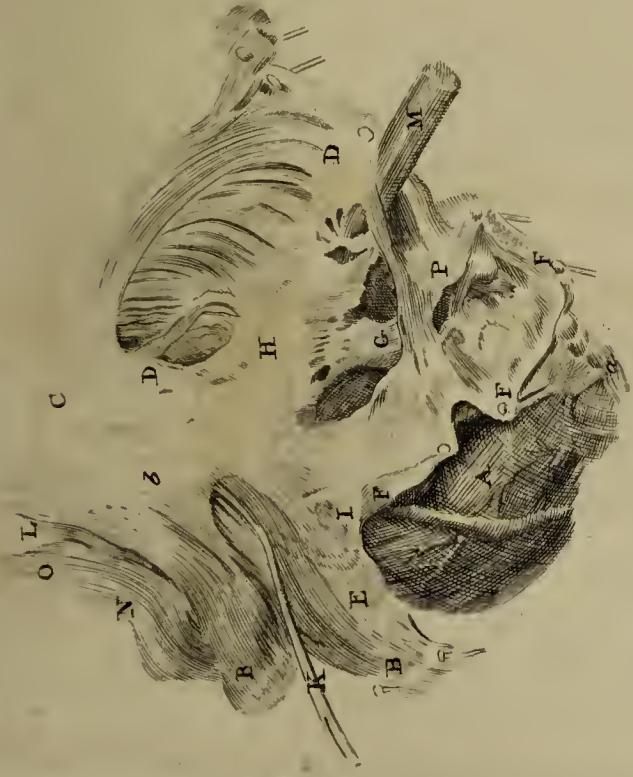


FIG. 13.

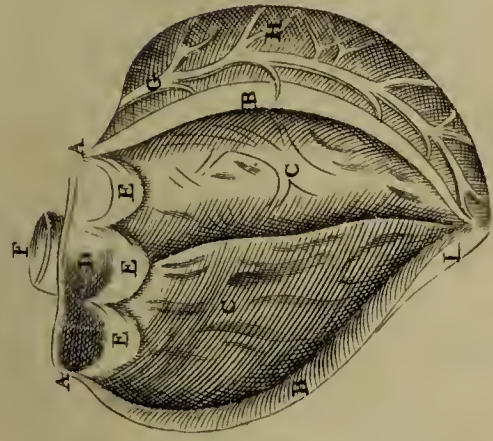


FIG. 14.

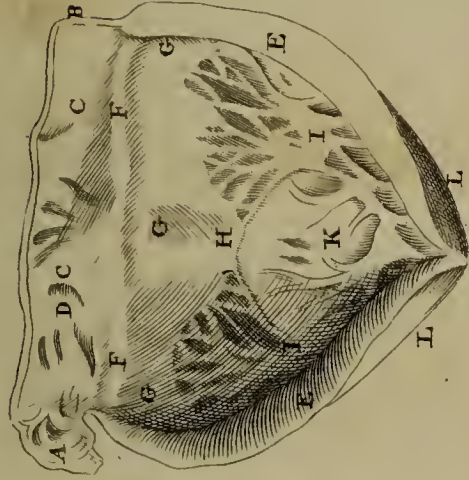


FIG. 15.

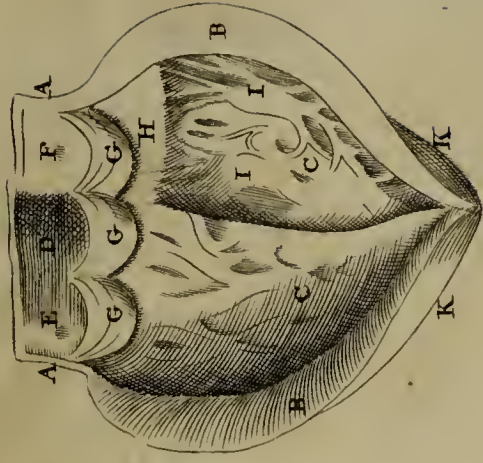


FIG. 16.

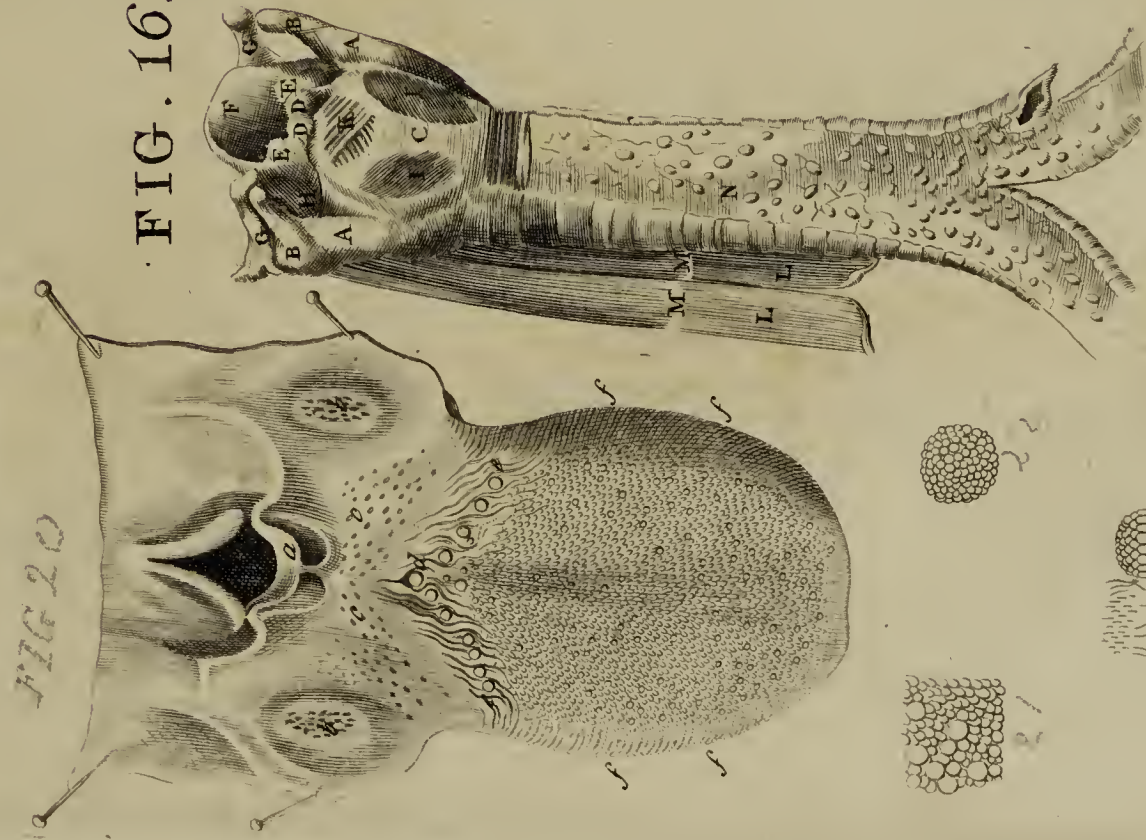


FIG. 17.

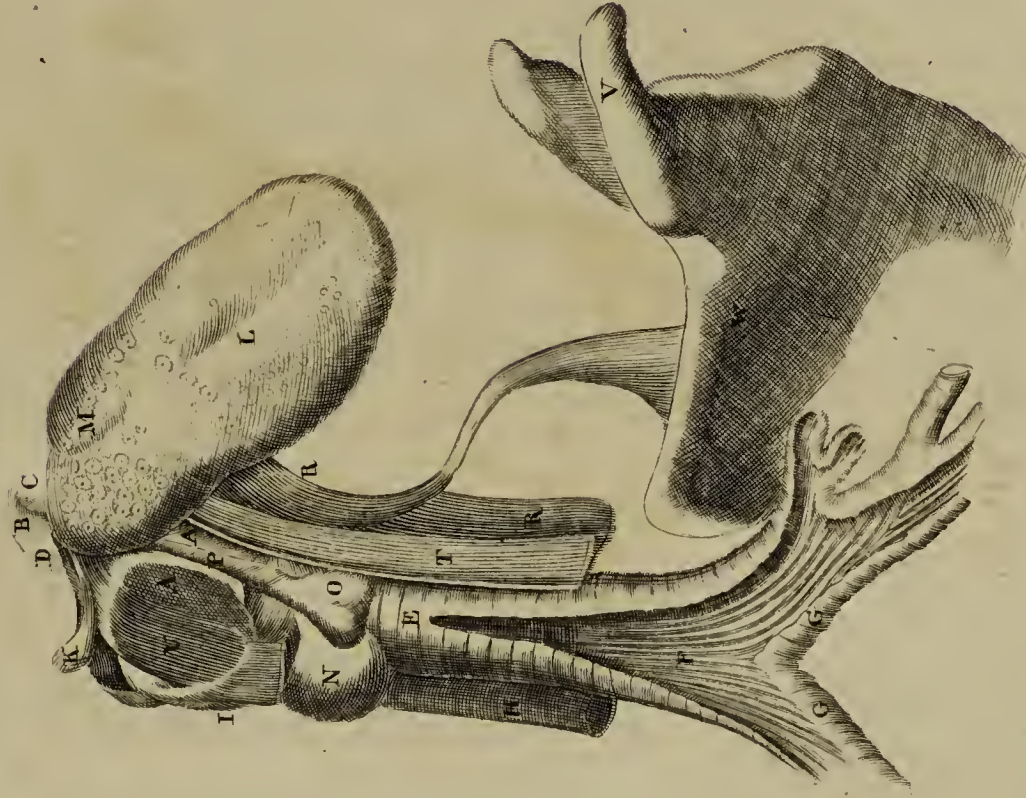


FIG. 18.

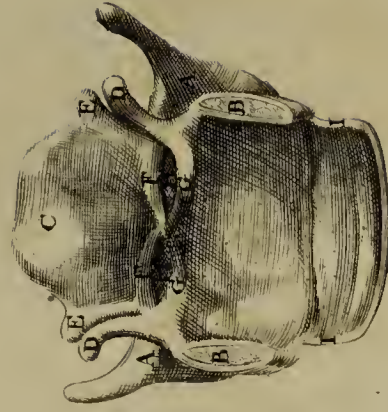
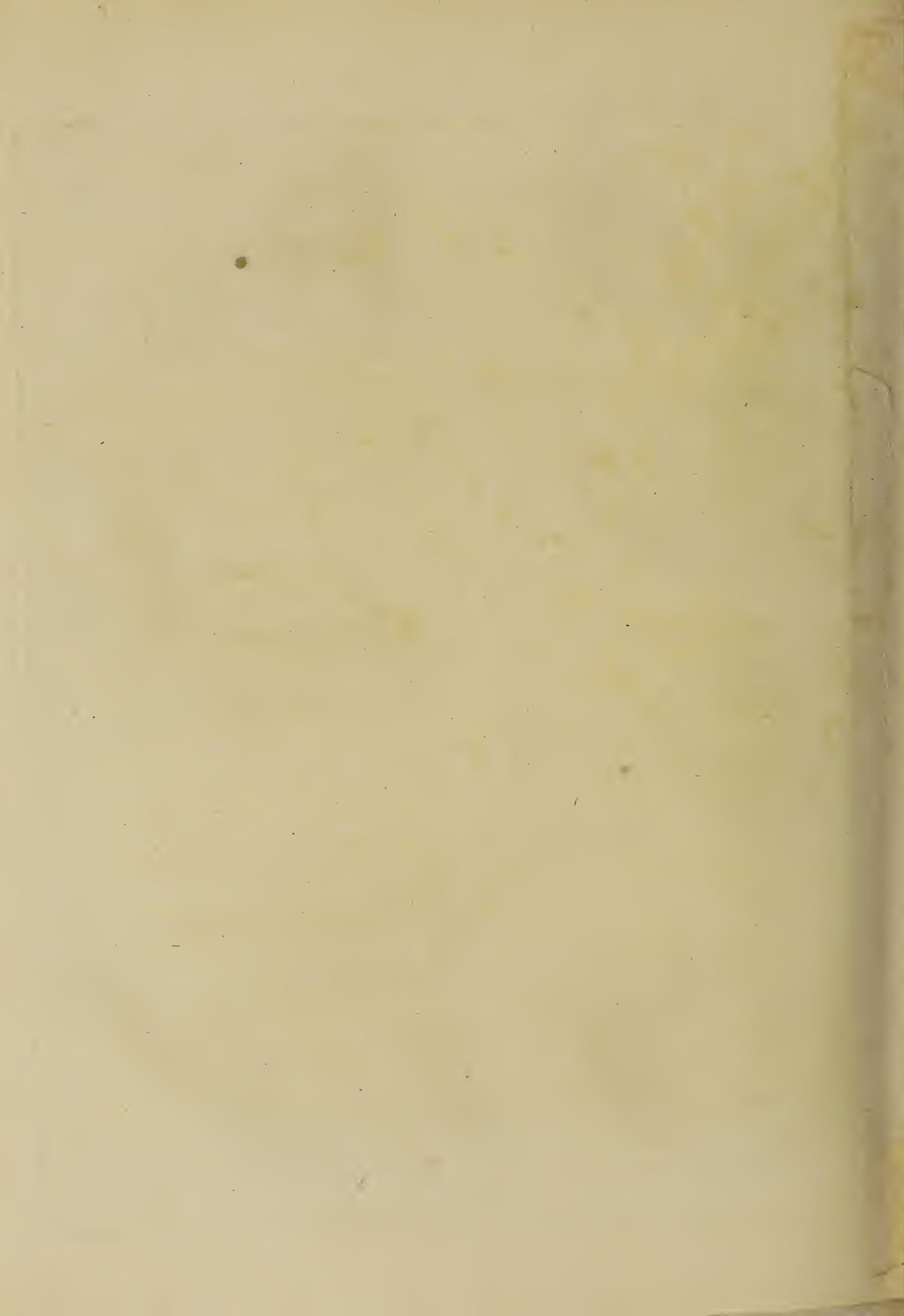


FIG. 19.









## T A B L E C I.

## VIEWS of the THORACIC VISCERA.

## FIG. 1.

*The LARYNX, TRACHEA, and THORACIC VISCERA, removed from the BODY, and viewed Anteriorly.*

- A, B, C, The larynx.  
 A, The epiglottis.  
 B, The thyroid cartilage.  
 C, The cricoid cartilage.  
 D, The trachea.  
 E, F, G, H, I, The lungs turned back.  
 E, F, G, The three lobes of the right side.  
 H, I, The two lobes of the left side.  
 K, K, The diaphragm cut from the thorax.  
 L, L, The pericardium cut in a crucial direction, and the angles turned back.—The upper angles not lettered.  
 M, The right ventricle of the heart.  
 N, The right auricle.  
 O, O, The vena cava superior.  
 P, Q, The subclavian veins.  
 R, The aorta.  
 S, The pericardium adhering to the aorta.  
 T, The situation of the trunk common to the right subclavian and right carotid arteries.  
 V, The situation of the left carotid artery.  
 W, That of the subclavian artery.  
 X, The pulmonary artery.  
 Y, The right coronary artery.  
 Z, One of the coronary veins.  
 &, The left coronary artery and vein: The coronary vessels in this, as well as in the other Figures of this Table in which they are represented, are beyond the proportional size.

## FIG. 2.

*A Posterior View of the Parts represented in the former Figure.*

- A, B, B, C, C, D, The larynx.  
 A, The epiglottis.  
 B, B, The thyroid cartilage.  
 C, C, The arytenoid cartilages.  
 D, The cricoid cartilage.  
 E, The trachea;  
 F, Its membranous and fleshy part.  
 G, G, The bronchi, also membranous and fleshy behind.

- H, I, The lobes of the left, and,  
 K, L, M, The lobes of the right lung.  
 N, N, The diaphragm.  
 O, The foramen through which the esophagus passes to the stomach.  
 P, The pericardium, containing the heart.  
 Q, The left carotid artery.  
 R, The left subclavian artery.  
 S, The aorta, which turns over the left branch of the trachea, and sends off,  
 T, T, The intercostal arteries.  
 V, The vena azygos, which bends over the right branch of the trachea.

## FIG. 3.

*An Anterior View of the HEART and Large VESSELS.*

- A, The right ventricle of the heart.  
 B, The right auricle.  
 C, The vena cava inferior, cut across close to the right auricle.  
 D, The vena cava superior.  
 E, F, The subclavian veins.  
 G, H, The internal mammary veins.  
 I, K, The aorta;—K, its arch.  
 L, The root of the aorta, common to,  
 M, The right subclavian, and,  
 N, The right carotid artery.  
 O, The left carotid artery.  
 P, The left subclavian artery.  
 Q, The pulmonary artery.  
 R, The right, or small coronary artery, arising from the aorta, and passing between the right auricle and pulmonary artery.  
 S, The right, or small coronary vein, terminating in the right auricle. The right and left coronary vessels are seen running chiefly upon the right ventricle, and below, turning round towards the posterior surface of the heart.  
 T, The left coronary vessels.

## FIG. 4.

*The same HEART viewed Posteriorly.*

- A, The left ventricle.  
 B, ——— auricle.

C, The



- C, The right auricle.  
 D, The inferior cava, divided near the right auricle.  
 E, F, The superior cava.  
 G, The vena azygos.  
 H, H, The venæ subclaviæ.  
 K, L, M, The aorta;—L, its arch.  
 N, The common root of the right subclavian and right carotid.  
 O, The right subclavian.  
 P, ——— carotid.  
 Q, The left subclavian.  
 R, ——— carotid.  
 S, The trunk of the pulmonary artery.  
 T, V, The two great branches of the pulmonary artery.  
 W, A section of the left or pulmonary sinus.  
 X, The left, or great coronary artery, arising from the aorta, and running between the pulmonary artery and left auricle.  
 Y, The great coronary vein, represented in this Figure, terminating in the inferior cava. Upon the surface of the heart in general are seen, the principal branches of the coronary artery and vein, which, after supplying this side of the heart, turn round to communicate with the vessels represented in Fig. 3.

## FIG. 5.

*An Anterior View of the HEART, to shew its MUSCULAR STRUCTURE, and the Obliquity of the MUSCULAR FIBRES.*

- A, The vena cava.  
 B, A section of the pulmonary artery.  
 C, C, C, The pulmonary veins tied.  
 D, A section of the aorta.  
 E, What was the ductus arteriosus in the foetus, now changed into ligament.  
 F, The right auricle distended, to shew the series of its muscular fibres.  
 G, The left auricle.  
 H, The oblique descending progress of the fleshy fibres of the right ventricle.  
 I, The oblique ascending process of the fibres of the left ventricle.  
 K, K, The tendinous union of the two sets of fibres in the septum of the heart.

## FIG. 6.

*A View of the Posterior SURFACE of the HEART.*

- A, The termination of the inferior cava in the right auricle.  
 B, Part of the superior cava.  
 a, The vena coronaria.  
 C, The vena azygos, tied at its termination in the superior cava.  
 D, D, The right auricle, representing the various dispositions of its fibres.  
 E, The muscular fibres of the left sinus venosus.  
 F, The fibres of the right ventricle.  
 G, Those of the left ventricle.  
 H, Their tendinous union in the septum.

## FIG. 7.

*The Series of FIBRES under those represented in Fig. 5.*

- A, Part of the pulmonary artery.  
 B, Part of the aorta.  
 C, The fibres of the right,  
 D, Those of the left ventricle.  
 E, The tendinous union of the fibres of both ventricles.

## FIG. 8.

*The MUSCULAR FIBRES as they appear under those of Fig. 6.*

- A, Part of the aorta.  
 B, The tendinous union of the fibres of both ventricles.

## FIG. 9.

*The Double Spiral Order of the FIBRES at the APEX of the HEART, which may partly be seen in Fig. 7.*

- A, Part of the arteria pulmonalis.  
 B, The contortion of the fibres at the apex of the heart.  
 C, The tendinous union of both ventricles.

## FIG. 10.

*A View of the Inner SURFACE of the CONE of the HEART, seen in the last Figure.*

- A, The point of the right ventricle,  
 B, That of the left.  
 C, The thickness of the side of the right ventricle,  
 D, D, That of the left.  
 E, A thread supporting the tendinous fibres which pass from one side of the left ventricle to the other.  
 F, The trunk of the coronary artery and vein divided.  
 G, The tendinous union of both ventricles.

## FIG. 11.

*The Right AURICLE and VENTRICLE, cut longitudinally, to shew their INTERNAL SURFACE.*

- A, The outer, and,  
 B, The inner surface of the right auricle.  
 C, C, The cut edge of the right auricle and superior vena cava.  
 D, D, The inner surface of the right sinus venosus, without columnæ.  
 E, The orifice of the superior cava.  
 F, The Valve of EUSTACHIUS, reticular in this Figure.  
 G, The orifice of the vena coronaria major, with its semilunar valve.  
 H, The vestige of the foramen ovale.  
 I, I, The cut edge of the right ventricle.  
 K, K, The opening between the right auricle and ventricle.  
 L, L, M, M, The valvula tricuspis;—M, M, A portion of it split down the middle.  
 N, N, N, Tendinous cords continued from the valvula tricuspis.

O, O, The



- O, O, The columnæ carneæ of the right ventricle, forming plexuses, and running in various directions.  
 P, The outer surface of the right ventricle.  
 Q, The pulmonary artery.  
 R, The aorta.  
 S, the principal branch of the coronaria major.

## FIG. 12.

*The Right AURICLE and VENTRICLE laid open.*

- A, The left side of the heart and its blood-vessels filled with wax.  
 a, The apex of the heart.  
 B, B, The inferior, and,  
 C, The superior cava laid open.  
 b, The right sinus venosus.  
 D, The right auricle, with its columnæ carneæ.  
 E, The EUSTACHIAN valve at the mouth of the inferior cava.  
 F, F, The sides of the right ventricle divided.  
 G, One of the columnæ carneæ, to which the tricuspid valve is fixed.  
 H, The valvula tricuspidis.  
 I, The valve at the orifice of the great coronary vein.  
 K, A probe passed through the foramen ovale, which, in this, an adult subject, remained open.—The probe leads into,  
 L, The left sinus venosus.  
 M, A probe supporting the tricuspid valve.  
 N, The right branch of the pulmonary artery.  
 O, The left branch of that artery.  
 P, Fleshy fibres passing between the septum cordis and opposite side of the right ventricle.

## FIG. 13.

*The HEART, with the PULMONARY ARTERY and Right VENTRICLE cut longitudinally near the Left VENTRICLE, and spread out.*

- A, A, The cut edges of the pulmonary artery.  
 B, B, The cut edges of the right ventricle.  
 C, C, The inside of the ventricle, in which the columnæ carneæ are slightly represented.  
 D, The inside of the pulmonary vein.  
 E, E, E, The three semilunar valves placed at the mouth of the artery.  
 F, The aorta.  
 G, The ramus major of the great coronary vein.  
 H, The exterior surface of the left, and,  
 I, That of the right ventricle.

## FIG. 14.

*The Left SINUS VENOSUS and VENTRICLE laid open by a Longitudinal Incision.*

- A, The left auricle.  
 B, The cut edge of the left sinus.  
 C, C, The inner surface of the sinus.  
 D, The sinus lunatus, formed by the vestige of the foramen ovale.

- E, E, The cut edge of the left ventricle.  
 F, F, The passage between the auricle and ventricle.  
 G, G, G, The valvula mitralis.  
 H, That part of the valve which is before the mouth of the aorta.  
 I, I, The columnæ carneæ, from which the tendons fixed to the edges of the valvula mitralis arise.  
 K, Other columnæ carneæ within the ventricle.  
 L, L, The outer surface of the ventricle.

## FIG. 15.

*The Left VENTRICLE, and beginning of the AORTA, laid open by a Longitudinal Incision.*

- A, A, The cut edge of the aorta.  
 B, B, —————- ventricle.  
 C, C, The inner surface of the ventricle, with traces of the columnæ carneæ.  
 D, The inside of the aorta.  
 E, The orifice of the right, and,  
 F, The orifice of the left coronary artery.  
 G, G, G, The three semilunar valves in the mouth of the aorta.  
 H, The valvula mitralis.  
 I, I, The columnæ carneæ, from which tendons run to the edges of this valve.  
 K, K, The outer surface of the ventricle.

## FIG. 16.

*A Back View of the LARYNX, TRACHEA, and some of the MUSCLES of the LARYNX.—See Tab. XCVIII. Fig. 9.*

## FIG. 17.

*Exhibits the TONGUE, LARYNX, Part of the ESOPHAGUS, and SCAPULA.—See Tab. XCVIII. Fig. 8.*

- V, The coracoid process, and,  
 W, The upper part of the scapula.

## FIG. 18.

*The LARYNX, cut Longitudinally behind, and stretched back, to shew,*

- A, A, The thyroid cartilage.  
 B, B, The cricoid cartilage.  
 C, The epiglottis.  
 D, D, The arytenoid cartilages.  
 E, E, The long crura of the arytenoid glands.  
 F, F, The superior, and,  
 G, G, The inferior ligaments of the glottis.  
 H, H, The ventricles of the larynx.  
 I, I, The first cartilages of the trachea.

## FIG. 19.

*Represents the ARTICULATION of the ARYTENOID with the CRICOID CARTILAGE, also one of the ARYTENOID GLANDS, &c.*

- a, A right longitudinal section of the cricoid cartilage, viewed anteriorly.

b, The



- b*, The right arytenoid cartilage, inclined outwards and backwards.  
*c, d*, Its articulation with the cricoid cartilage.  
*e*, The superior, and,  
*f*, The inferior processes of the right arytenoid cartilage.  
*g*, The cavity in the anterior surface of the arytenoid cartilage, in which is situated,  
*h*, The arytenoid gland, which is here represented detached.  
*k*, Represents the shape and size of the left ventricle of the larynx.

## FIG. 20.

*The TONGUE of a Child two years old, the ARTERIES of which were injected with Wax.*

- a*, The epiglottis.  
*b, b*, The tonsils.  
*c, c*, Mucous follicles, seen at the root of the tongue.  
*d*, The foramen cæcum.  
*e, e*, The papillæ maximæ.

- The papillæ mediæ and minimæ are seen upon the upper surface of the tongue, extending from the papillæ maximæ as far as the apex linguæ.  
*f, f*, The papillæ striatæ, seu lineares.

## FIG. 21.

The Left Part of the Upper side of the Point of the Tongue magnified, to shew the Papillæ Mediæ and Minimæ.

## FIG. 22.

The Vertex of one of the Papillæ Fungiformes viewed in a Microscope, to shew the Tuberculous appearance.

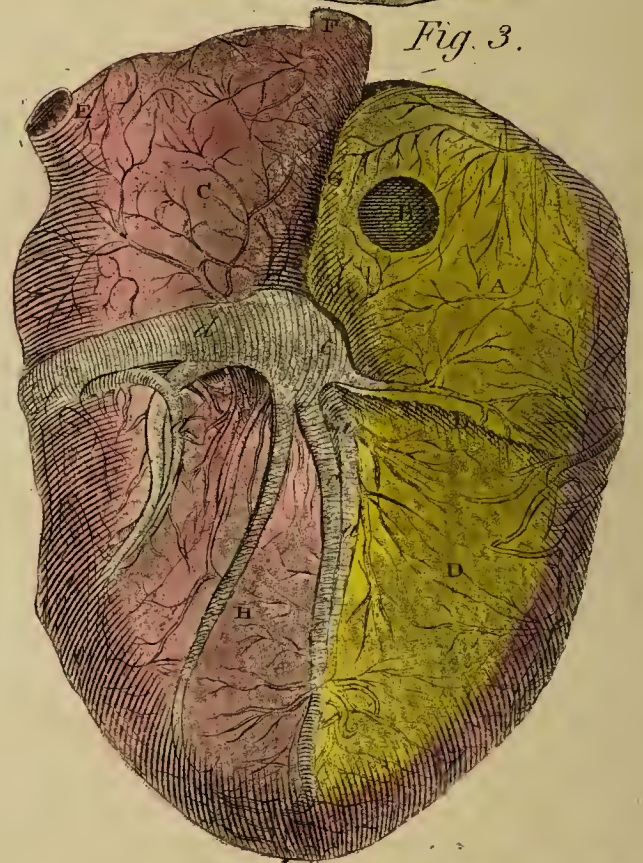
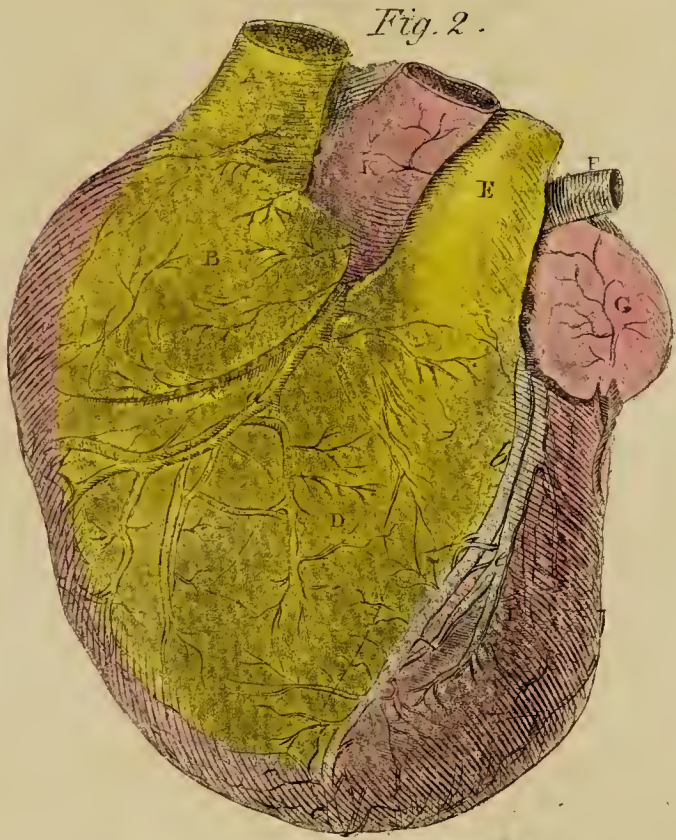
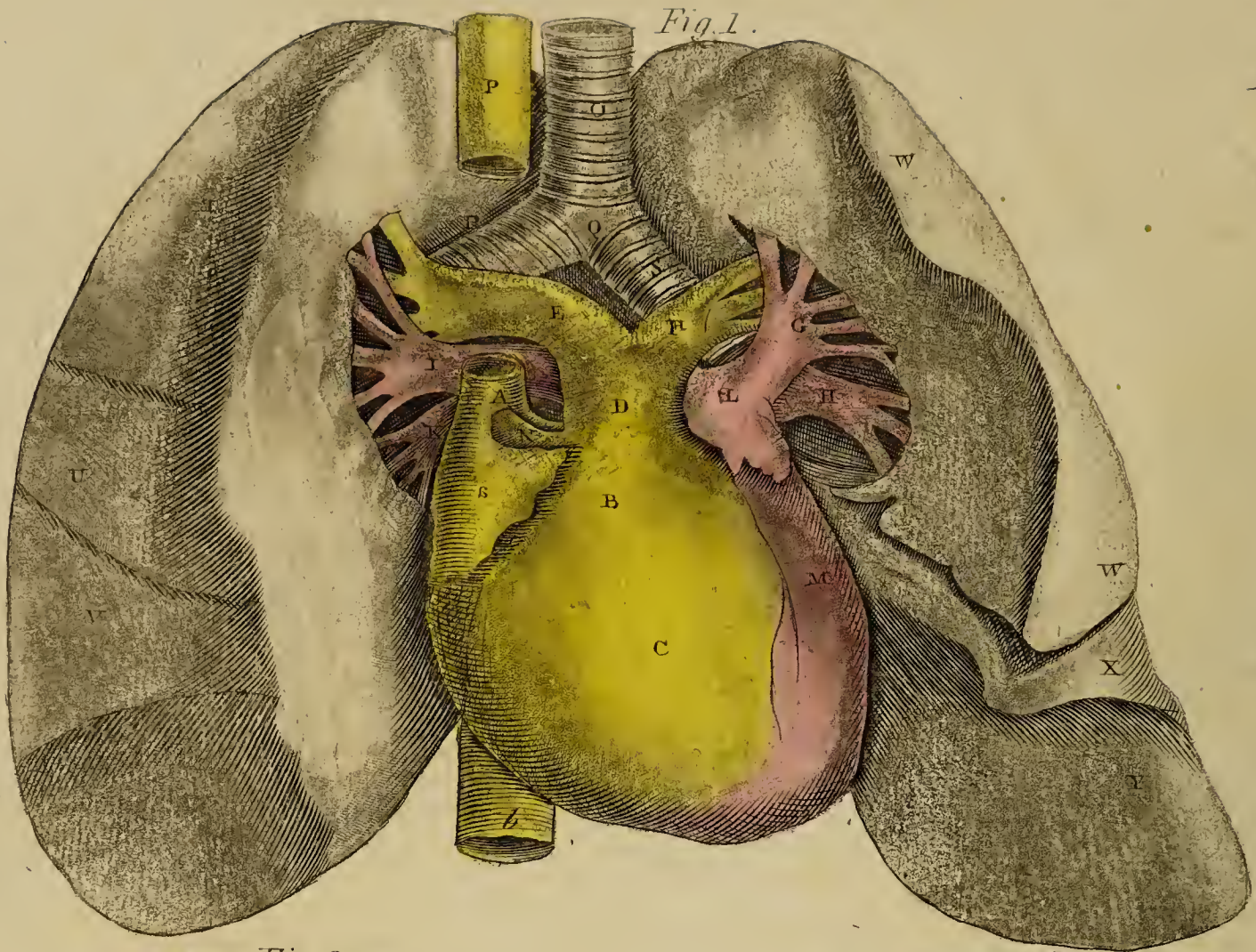
## FIG. 23.

The same Papilla viewed Laterally; shewing the Stamina which compose it, with Vessels which adhere to them.









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## T A B L E CII.

### Different Views of the HEART and LUNGS.

#### FIG. 1.

*Represents the HEART attached to the LUNGS by the large BLOOD-VESSELS.*

- A, The vena cava superior.
- b, ————— inferior.
- a, The right auricle, or appendix of the heart.
- B, C, The right ventricle of the heart.
- D, The pulmonary artery, which is here short in proportion to its diameter.
- E, The right branch of the pulmonary artery.
- F, The left branch, which is very short, and not so thick as the right.
- G, The left anterior, and,
- H, The left posterior pulmonary vein.
- I, The right anterior, and,
- K, The right posterior pulmonary vein.
- L, The left auricle, or appendix of the heart.
- M, The left ventricle of the heart.
- N, A section of the aorta.
- O, The trachea, proportionally small.
- P, The vena cava superior, cut and raised, to shew the pulmonary vessels.—It is represented too large.
- Q, The angle of the trachea, a little to the right side of that of the pulmonary artery.
- R, The right branch of the trachea, a little thicker than the left.
- S, The left branch of the trachea.
- T, U, V, The three lobes of the right lung represented in shade, and folded in, as far as the commencement of the light.
- W, W, X, Y, The two lobes of the left lung.—W, W, The upper lobe, the edge of which is folded in, as far as the dark shade.—X, Y, The inferior lobe.

#### FIG. 2.

*The CAVITIES of the HEART injected.—The exact proportions of the VESSELS have not been preserved, various degrees of force having been applied in the Injection.*

- A, The vena cava superior.
- B, The right auricle injected;—the indented appearance of its edges effaced by the injection.

Vol. II.

- C, The groove opposite the opening of the right auricle into the right ventricle.
- D, The right ventricle.
- E, The pulmonary artery.
- F, The anterior pulmonary vein.
- G, The left auricle, which is more elevated than the right.
- H, The groove opposite the opening of the left auricle into the left ventricle.
- I, The left ventricle.
- K, The aorta, which rises behind the pulmonary artery, and becomes curved in its ascent.
- a, The right coronary artery.
- b, The anterior branch of the left coronary artery.
- c, The anterior branch of the coronary artery, which passes over the posterior part of the apex of the heart.
- d, The venæ innominatæ, which open into the auricle with their trunk.
- e, The vein which accompanies the coronary artery.

#### FIG. 3.

*A View of the Posterior and Under, or Flat SURFACE of the HEART, the CAVITIES of which are injected. The CORONARY VESSELS are also filled: The TRUNK of the CORONARY VEIN has been forced by the Injection.*

- A, The right auricular sac, shorter than the left.
- B, The orifice of the vena cava inferior.
- C, The left auricle.
- D, D, The uppermost D points out the groove opposite the opening of the auricle into the ventricle. The undermost D points out the extremities of the small arteries, which are spread transversely over the right ventricle.
- E, F, The termination of the left and right posterior pulmonary veins in the left auricle.
- G, The septum or partition of the two auricular sacs.
- H, The left ventricle.
- a, a, a, Branches of the coronary arteries.
- b, The coronary artery, which comes from the opposite surface of the heart.
- c, c, The vein which runs along the septum of the ventricles.

S

d, The



- d*, The trunk, or sinus of the coronary vein, distended by the injection.  
*e*, The entrance of the coronary sinus into the right ventricle.

FIG. 4.

*The Inner SURFACE of the Left VENTRICLE. The AORTA has been divided, and pushed to a distance from the SEPTUM.*

- A*, An incision necessary for extending the ventricle, and bringing it into view.  
*B*, A second incision for the same purpose.  
*C*, A third incision, made at the apex of the ventricle.  
*D*, The smooth space under the aorta.  
*E*, The large portion of the mitral valve, which considerably surpasses that hid underneath.  
*a*, A tendinous cord to which the mitral valve is attached.  
*b, b*, Tendinous filaments which creep along the valve, and go to join those coming from the root of this valve.  
*c, c*, The posterior pillars, some of which divide the filaments of the smaller portion of the valve.  
*d, e, f, g*, The pillars from which the tendinous fibres go off.

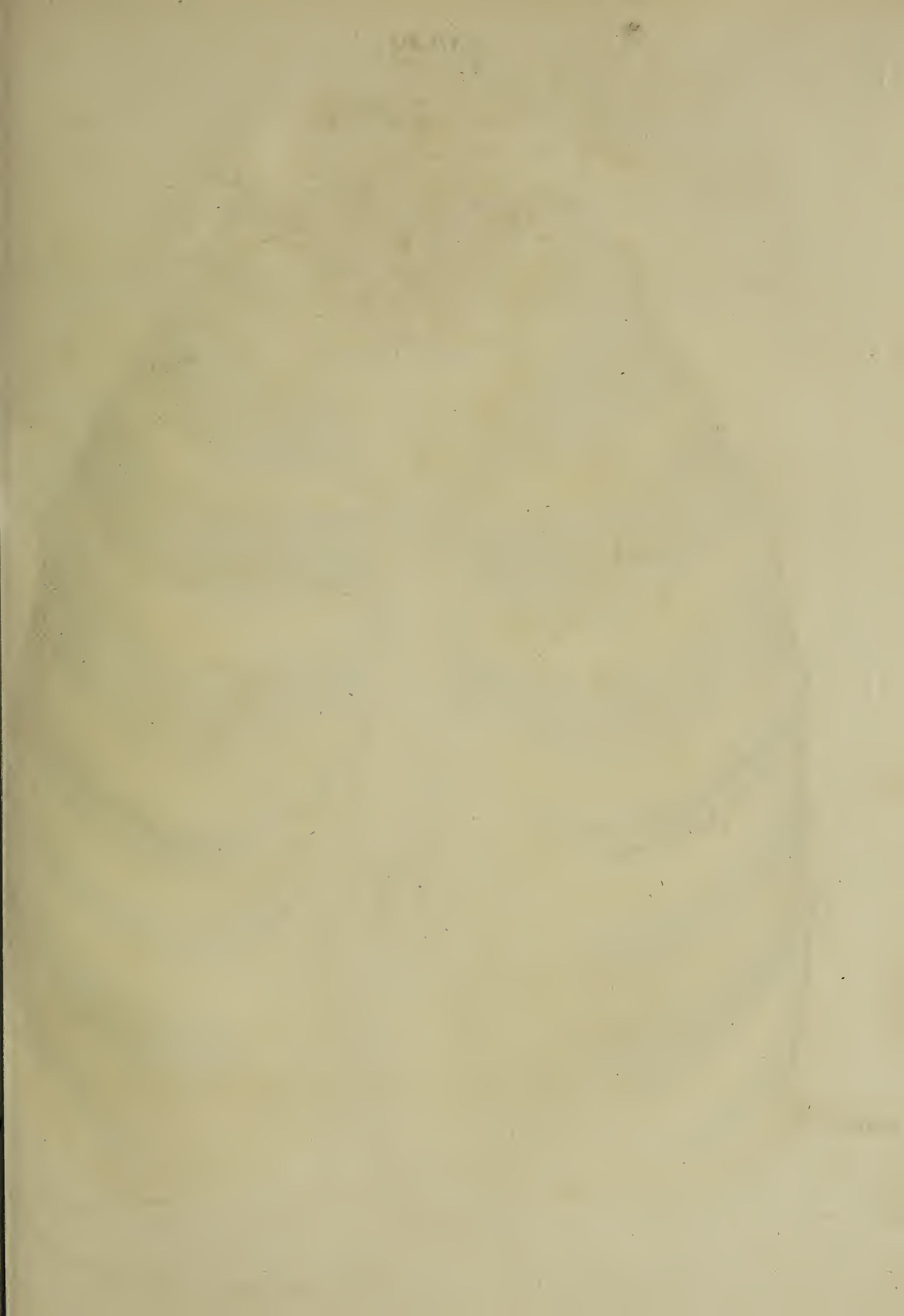
- h, h, h, h*, The columnæ carneæ and small fossæ, with which the inner side of the ventricle is covered.

FIG. 5.

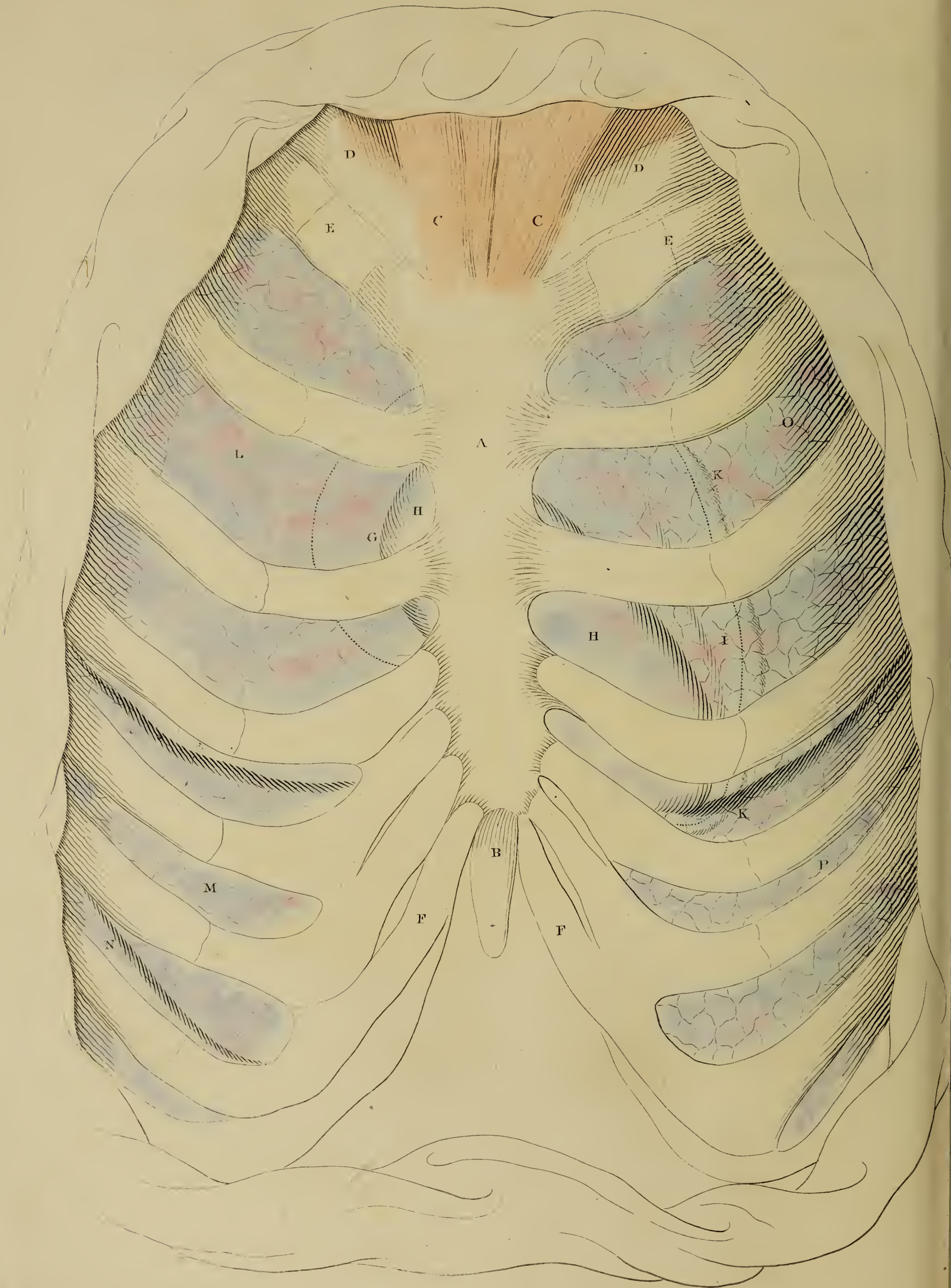
*The Left VENTRICLE and MOUTH of the AORTA laid open to shew the COLUMNÆ CARNEÆ and SEMILUNAR VALVES; —the greater part of the VALVULA MITRALIS being removed.*

- A, A*, The smooth space under the aorta.  
*B*, The pillar, with its tendinous filaments which go to the remainder of the mitral valve.  
*C*, Another pillar, with some tendinous filaments which also go to the remainder of the valve.  
*D, D, D*, What is deficient here has been represented in Fig. 4.  
*a, a, a*, The semilunar valves, with their *Corpuscula ARANTII*.  
*b, b*, Orifices of the coronary arteries.  
*c, c*, The cord under the sigmoid valves.  
*d, d, &c.* The columnæ carneæ, with their pits or fossæ.  
*e, e*, The cord of the mitral valve, seen a little below the letters.  
*f, f, f*, The insertion of the fibres of the columns under the chord of the mitral valve.











## T A B L E CIII.

A Sketch of the HEART and LUNGS, distended with Air, and preserved, as much as circumstances will allow, in their natural Situation. The Intercostal Muscles are removed.

---

- |   |   |
|---|---|
| A, B, The sternum.  | H, H, The right ventricle.  |
| B, The cartilago ensiformis.                                    | I, Part of the left ventricle.                                      |
| C, C, The origin of the sterno-mastoid muscles.                 | K, K, The cut edge of the pericardium, also marked by dotted lines. |
| D, D, The clavicles.  | L, The upper,   |
| E, E, The first, and,   | M, The middle, and,   |
| F, F, The seventh pair of ribs.                                 | N, A small part of the under lobe of the right lung.                |
| G, H, H, I, The situation of the heart, marked by dotted lines. | O, The upper, and,  |
| G, The right auricle.   | P, The under lobe of the left lung.                                 |



## T A B L E CIV.

Represents the CAVITIES of the HEART laid open, to shew its INTERNAL STRUCTURE.

FIG. 1.

*A view of the CAVITY of the RIGHT AURICLE, laid open Anteriorly.*

- a, b, c, d, e,* The cut edge of the right auricle.  
*f,* The vena cava superior.  
*g,* The termination of this vein in the right auricle.  
*h, i,* The vena cava inferior;—*i,* its mouth.  
*k,* The boundary between the right venous sinus and proper auricle.  
*l,* The boundary between the sinus and right ventricle.  
*m, n,* Fleshy pillars within the auricle, called *Musculi Pectinati*.  
*o, o,* The Valve of EUSTACHIUS.  
*p,* The valve at the mouth of the coronary vein.  
*q,* The vestige of the foramen ovale.  
*r, r,* A tendinous circle giving origin to the valvula tricuspidis.  
*s, s,* Are placed upon the valvula tricuspidis, and in the opening between the auricle and its corresponding ventricle.  
*t, t,* The beginning of the right ventricle.  
*u,* The pulmonary artery.

FIG. 2.

*Represents the CAVITY of the LEFT AURICLE.*

- a, b,* The cut edge of the left venous sinus.  
*c,* Part of the sinus cut and turned down.  
*d, e,* The proper auricle laid open on its posterior and left side.  
*f, g,* The termination of the superior and inferior pulmonary veins of the right side.  
*h, i,* The orifices of the superior and inferior pulmonary veins of the left side.  
*k, k, l,* The inner surface of the sinus, which is smooth and uniform.  
*m, n,* The cavity of the proper auricle, with its columnæ carneæ.  
*o,* The beginning of the valvula mitralis, and opening of the auricle into the corresponding ventricle.

- p,* Part of the left ventricle.  
*q,* The vena cava superior.

FIG. 3.

*The VENTRICLES laid open at their Fore and Left Side; a Portion of the SEPTUM removed, and the HEART turned obliquely forwards and to the Right Side, to exhibit the VALVES of the VENTRICLES and ARTERIES, with their Relative Situations.*

- a, b, c, d,* The cavity and cut edge of the right ventricle.—*c,* A thick fleshy part of the ventricle.—*d, d,* The partition between the right and left ventricle.  
*e, e,* The fore part of the circular membrane of the tricuspid valve.  
*f, f, f,* Tendinous cords from the fore part of the tricuspid valve.  
*g, g,* Tendinous cords from the back part of the tricuspid valve, lying flat upon the sides of the ventricle.  
*h, h,* Fleshy columns fixing the valve to the side of the ventricle.  
*i, i, i,* The semilunar valves at the mouth of the pulmonary artery, with their corpuscula.  
*k,* The trunk of the pulmonary artery.  
*l, l,* The left pulmonary veins.  
*m,* Part of the left auricle.  
*n, o, p,* The cut edge of the left ventricle.  
*q, q,* The circular membrane which forms the valvula mitralis.  
*r, r,* Tendinous cords sent off from the valve.  
*s, s,* Columnæ carneæ, fixing the valve to the side of the ventricle.  
*t,* Tendinous cords from the back part of the valve, resting upon the side of the ventricle.  
*u, u,* Fleshy columns fixing the tendinous cords of the back part of the valve to the side of the ventricle.  
*v, v,* A few of the many fleshy columns and foveæ represented, with which the side or wall of the ventricle abounds.  
*x,* The semilunar valves at the mouth of the aorta.  
*y,* The aorta.  
*z,* The origin of one of the coronary arteries of the heart, from the beginning of the aorta.



TAB. 104.

Fig. 1.

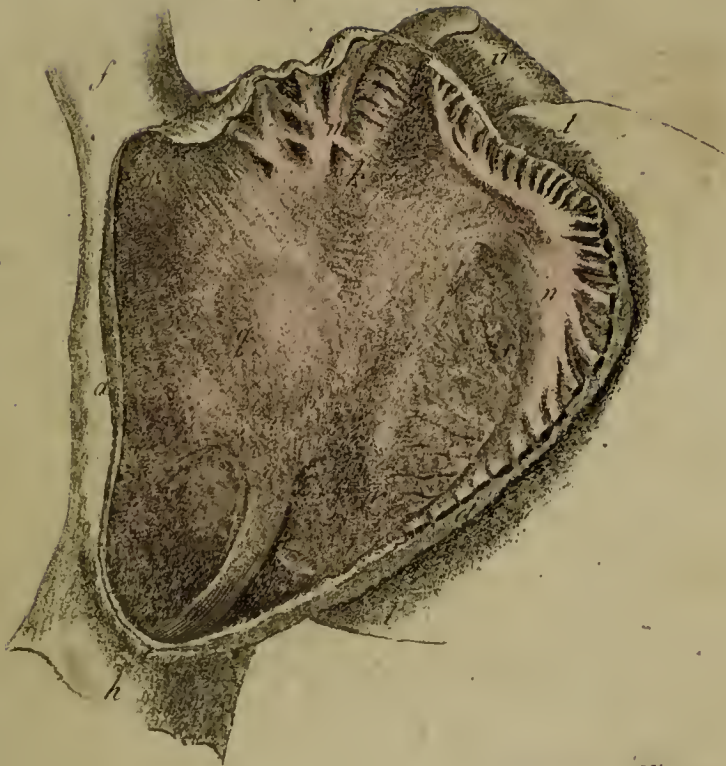


Fig. 2.

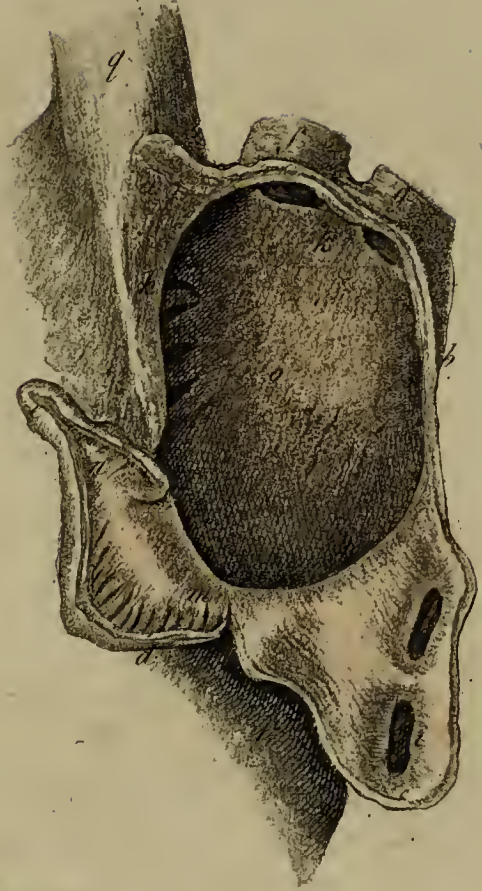
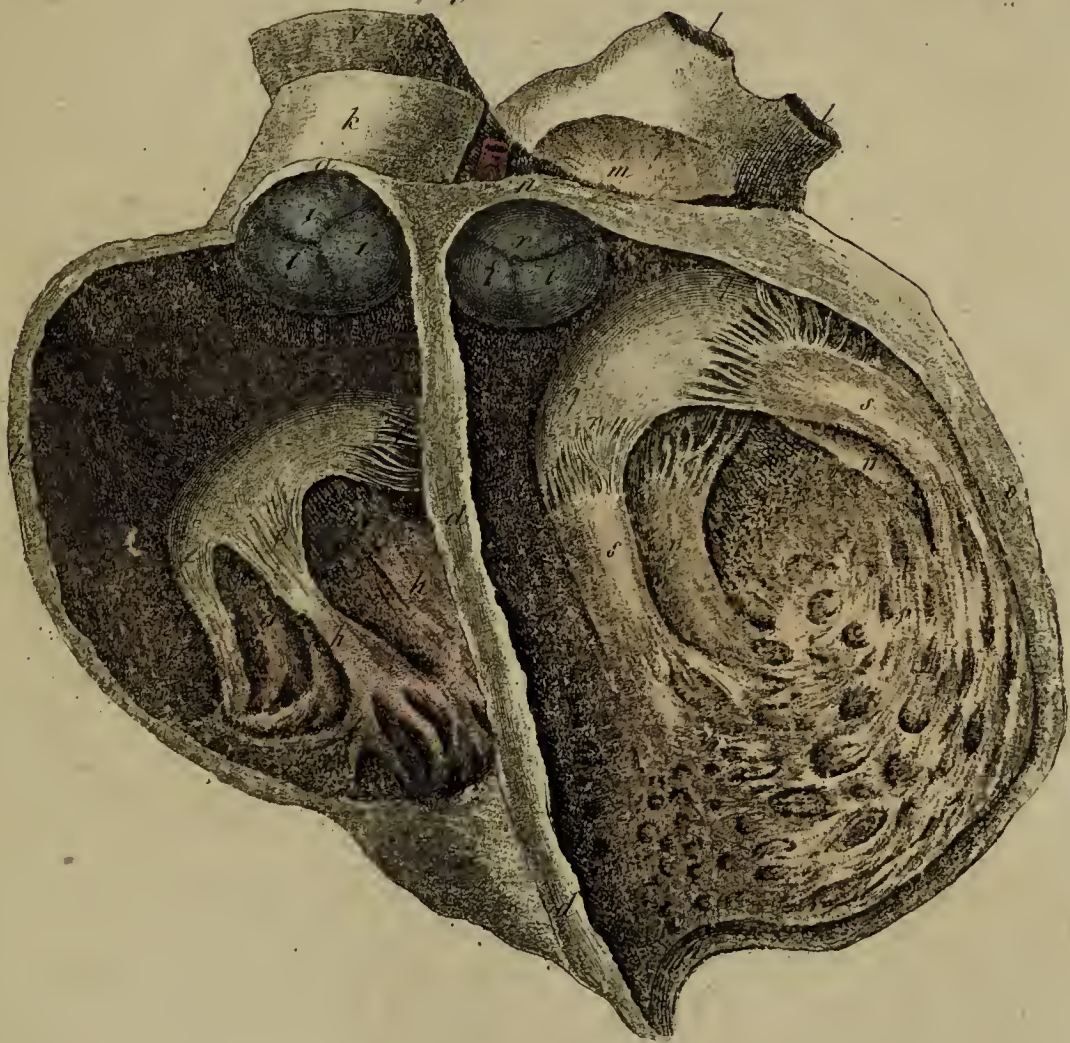
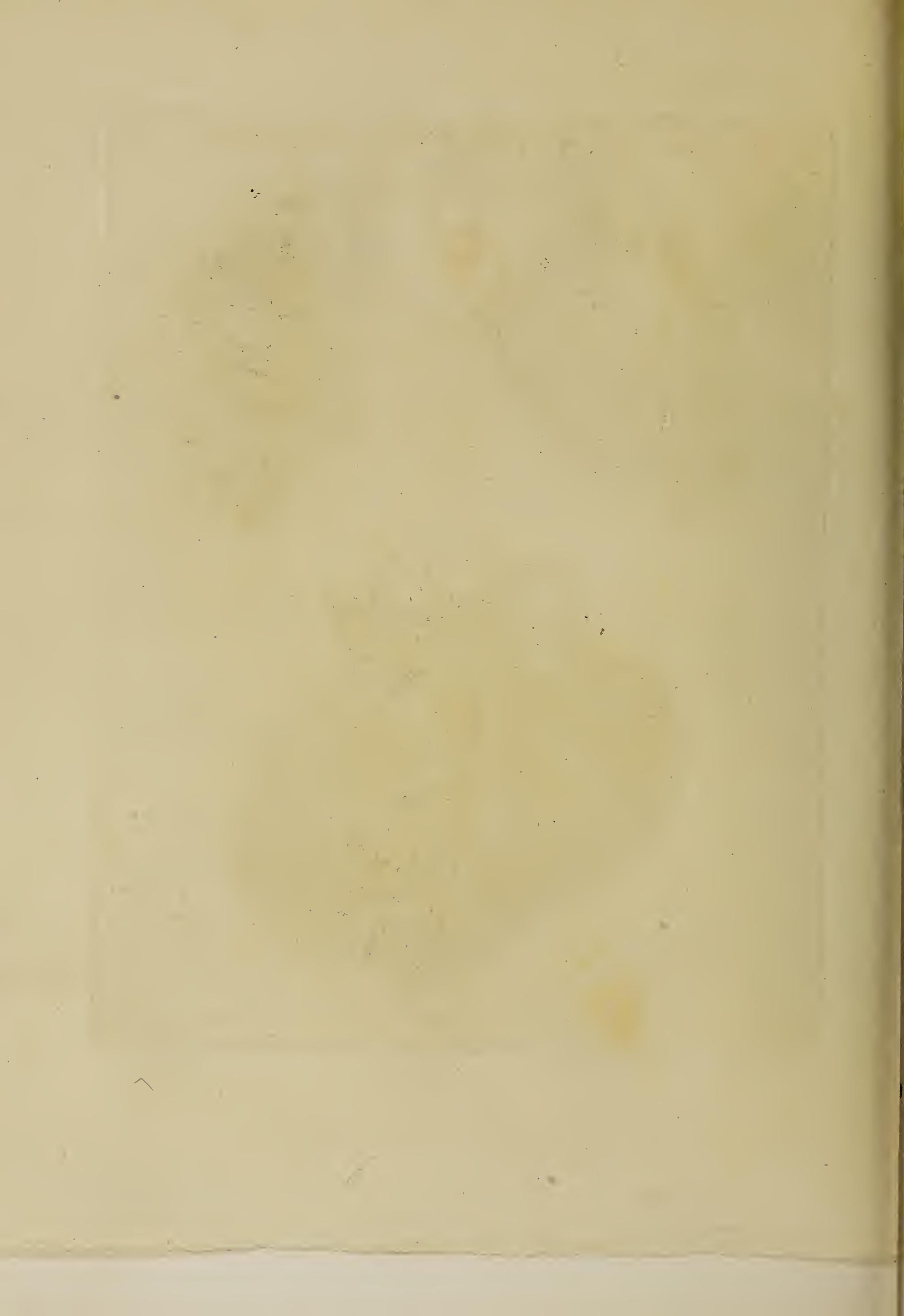


Fig. 3.



A. K. sculp.







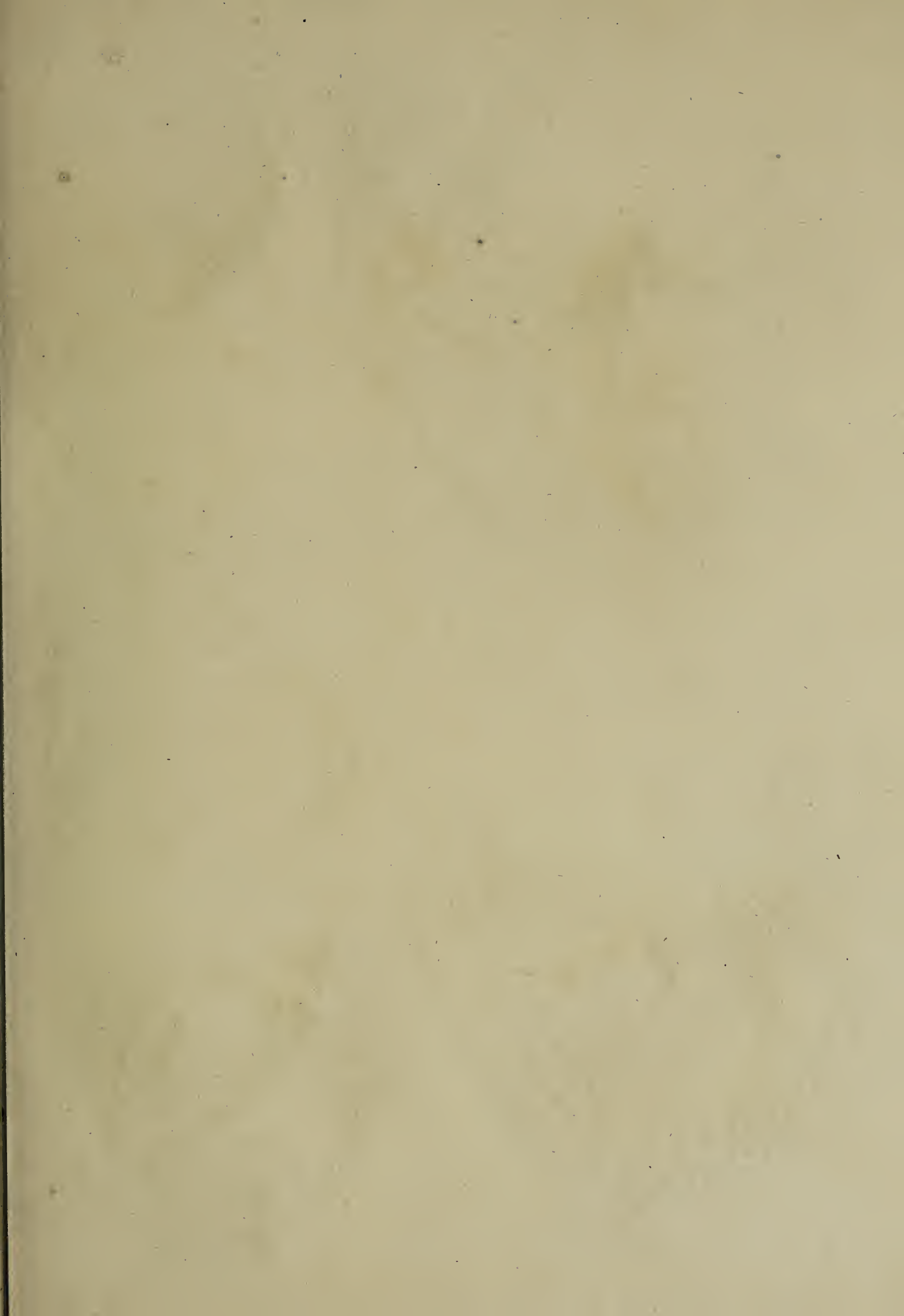




Fig. 1.

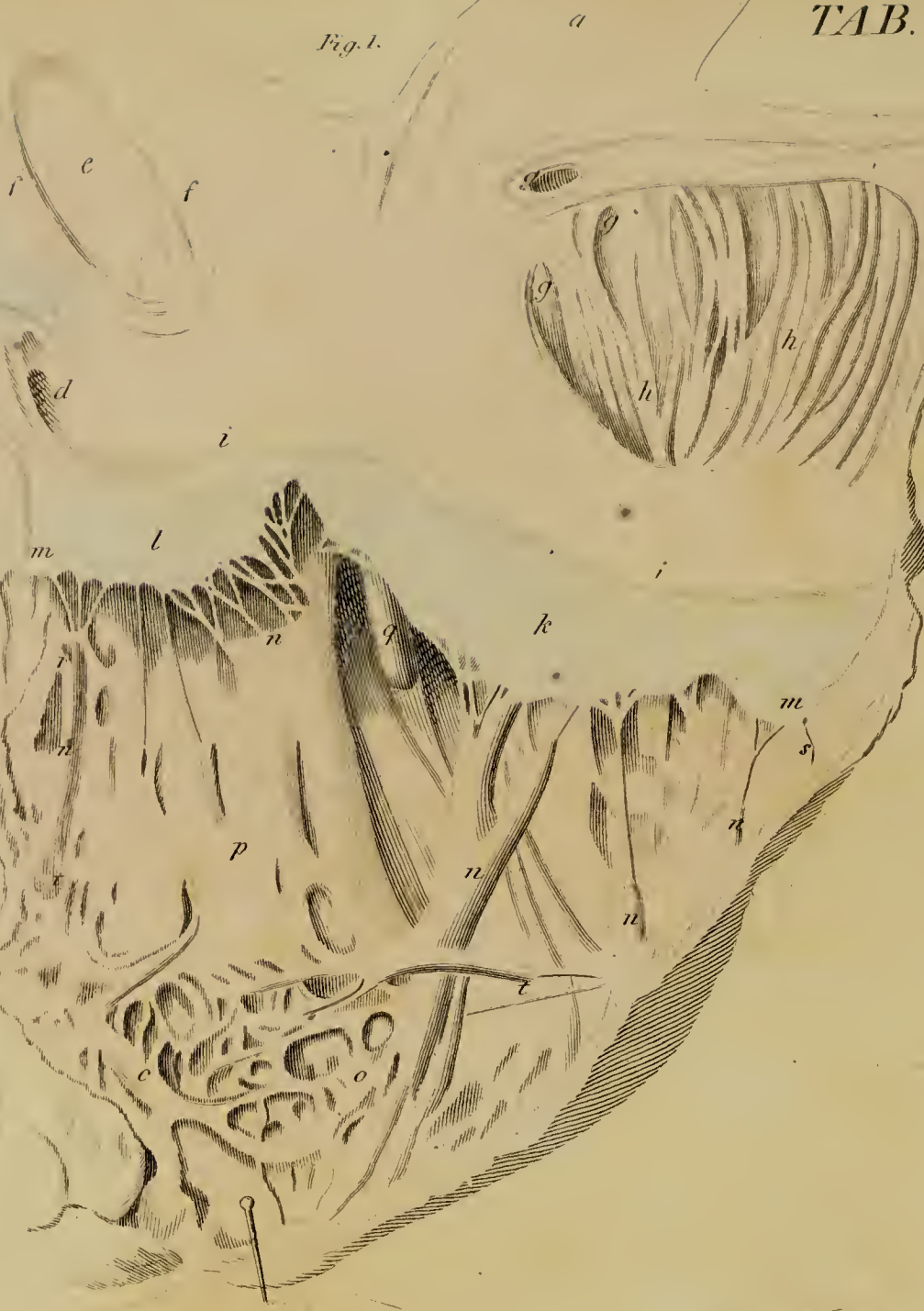


Fig. 2.

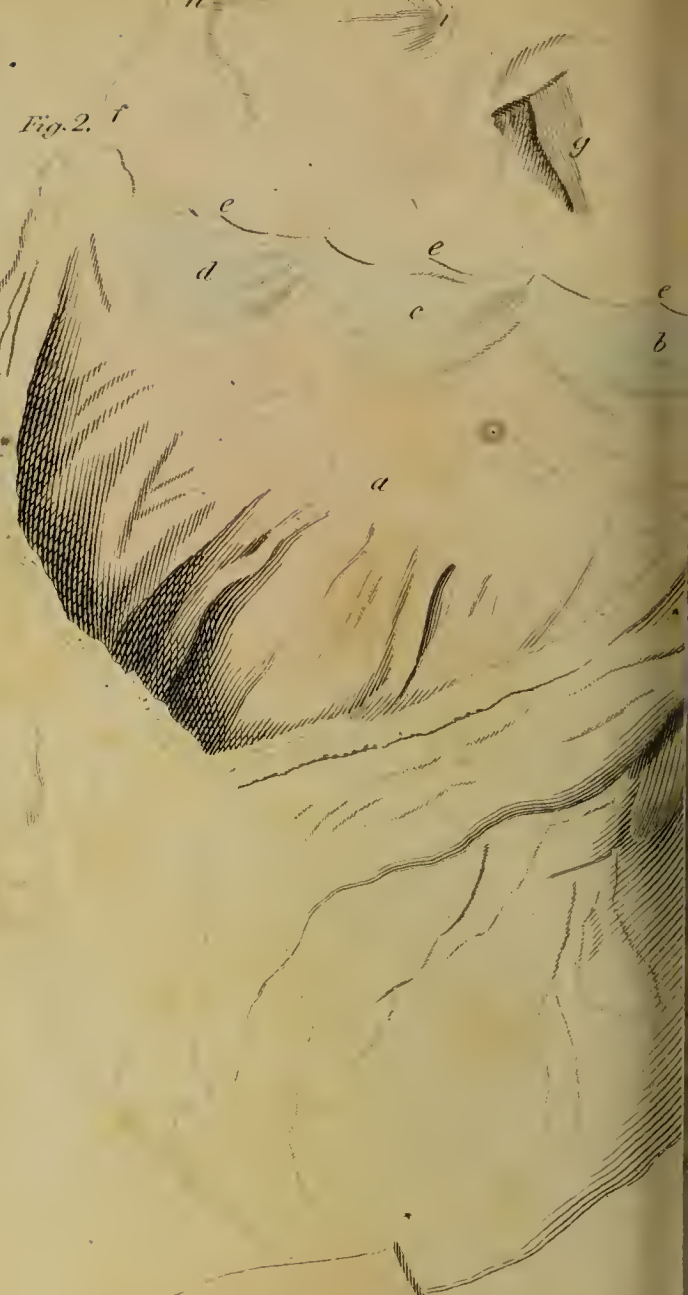


Fig. 3.

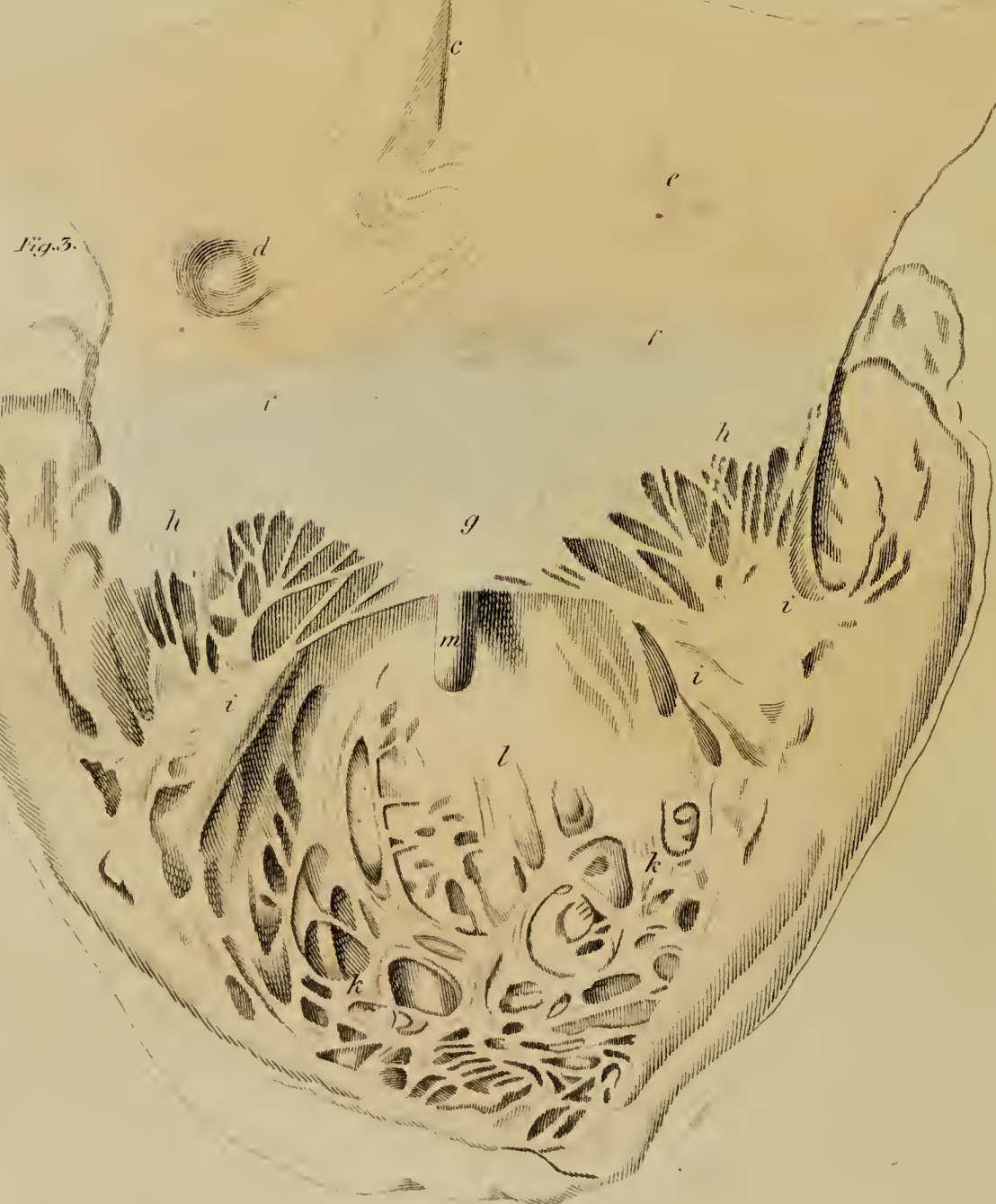


Fig. 4.





## T A B L E CV.

The four Figures of this Table shew the Interior Parts of the HEART of an Adult, of the natural size.

FIG. 1.

*The RIGHT AURICLE and VENTRICLE laid open.*

- a—h*, The sinus of the venæ cavæ, or sinus venosus dexter, and its appendix or proper auricle.  
*a*, The vena cava superior.  
*b*, The vena cava inferior.  
*c*, The EUSTACHIAN valve.  
*d*, The mouth of the vena coronaria major, partly covered by its valve.  
*e*, The fossa ovalis in the septum auricularum.  
*f, f*, The annulus of this fossa.  
*g*, The passage into the proper auricle.  
*h, h*, The muscoli pectinati of this auricle.  
*i—t*, The right or pulmonary ventricle.  
*i, i*, The mouth of this ventricle.  
*k—m*, The tricuspid valves.  
*k*, The anterior and superior valve, which is the largest.  
*l*, The posterior valve.  
*m*, The anterior and inferior, or the least, which is divided into two parts.  
*n, n*, The muscoli papillares, inserted into the valve by tendinous cords.  
*o, o*, The columnæ carneæ, seu muscoli retiformes.  
*p*, The septum ventriculorum.  
*q*, A probe introduced into the mouth of the pulmonary artery.  
*r*, Part of the muscoli papillares cut, corresponding with,  
*s*, Cut chordæ tendineæ.  
 Another muscular part cut, corresponding with part *t*.

FIG. 2.

*Part of the RIGHT VENTRICLE, and of the PULMONARY ARTERY, laid open and viewed anteriorly.*

- a*, The inner surface of the right ventricle.  
*b, c, d*, The semilunar valves of the pulmonary artery.  
*b*, The anterior.  
*c*, The posterior.  
*d*, The superior, or valvula dextra.  
*e, e, e*, The corpuscula, seu noduli ARANTII.  
*f, f*, A section of the pulmonary artery.  
*g*, The mouth of the right branch of this artery.  
*h, h*, A section of the left branch.  
*i*, A vestige of the mouth of the ductus arteriosus.

FIG. 3.

*The LEFT AURICLE and VENTRICLE laid open.*

- a—c*, The sinus pulmonalis, vel sinus venosus sinister, and its proper auricle.  
*a*, The left inferior pulmonary vein divided.  
*b*, The place from whence the left superior pulmonary vein has been cut.  
*c*, The mouths of the right pulmonary veins, which here appear in form of a chink, on account of a pin being fixed into them.  
*d*, The mouth of the appendix or proper auricle.  
*e*, The place in the septum auricularum answering to the fossa ovalis.  
*f—m*, The left or aortic ventricle.  
*f, f*, The venous mouth of this ventricle.  
*g, h*, The valvulæ mitrales.  
*g*, The valvula superior, seu major.  
*h*, The valvula inferior, seu minor, divided.  
*i, i*, The muscoli papillares, which, by tendinous cords, are fixed to the valve.  
*k, k*, The columnæ carneæ, seu muscoli retiformes.  
*l*, The septum ventriculorum.  
*m*, A probe introduced into the arterious mouth of this ventricle.

FIG. 4.

*The LEFT VENTRICLE and AORTA laid open.*

- a, a*, The inner side of the right ventricle slightly expressed.  
*b, b*, The septum ventriculorum so divided, that the ventricle is brought into view.  
*c*, The internal surface of the left ventricle.  
*d*, The valvula mitralis superior.  
*e, f, g*, The valvulæ semilunares.  
*e*, The anterior.  
*f*, The posterior.  
*g*, The inferior.  
*h, h, h*, The corpuscula ARANTII.  
*i*, The mouth of the anterior, and,  
*k*, The mouth of the posterior coronary artery.  
*l*, The trunk of the aorta divided.  
*m, n, o*, The mouths of the right common carotid and subclavian arteries, and of the left carotid and left subclavian.



## T A B L E C V I.

A FRONT VIEW of the HEART and LUNGS, with their Large VESSELS. The ARTERIES and VEINS are injected, and preserved nearly in their Natural Situation.—The LUNGS from which the Figure was taken were dried, much shrivelled, and contracted.

- 
- A, The right subclavian vein.  
 B, The right external jugular vein;  
 C, Its termination in the subclavian.—Between B and C, two pair of valves are seen.  
 D, The right internal jugular vein.  
 E, A pair of valves at the termination of this vein in the subclavian.  
 F, The termination of the principal lymphatic trunk in the angle between the internal jugular and subclavian veins.  
 G, The great right subclavian vein.  
 H, The left subclavian vein.  
 I, The left external jugular vein, with a pair of valves at its termination in the subclavian.  
 K, The internal jugular vein;  
 L, Its termination and valves.  
 M, The thoracic duct, where it forms a curvature previous to its termination;  
 N, Its termination, with a pair of valves.  
 O, The great left subclavian, with the termination of the left internal mammary vein.  
 P, The vena cava superior, formed by the great subclavian veins, and receiving the right internal mammary vein.  
 Q, The vena azygos, turning round the right branch of the trachea, and terminating in the superior vena cava.  
 R, The vena cava entering the pericardium.  
 S, Its course within the pericardium, before it reaches the heart.  
 T, The vena cava inferior.  
 U, U, U, The trunks of the hepatic veins joining the vena cava, where it perforates the diaphragm.  
 V, The vena cava joining the right auricle.  
 W, X, Y, Z, The right auricle; only a small part of which is seen in this view.—W, X, The proper auricle.—Y, Z, The right venous sinus.  
*a, b, c, d*, The right ventricle, with branches of the coronary artery and vein dispersed upon it.—*a*, The space opposite to the opening of the auricle into the ventricle.—*c*, The point of the ventricle.—*d*, The beginning of the pulmonary artery.  
*e*, Two of the *Sinuses* of VALSALVA, the third being placed on the opposite side of the artery.  
*d, f*, The continuation of the trunk of the pulmonary artery, which is here fore-shortened, on account of its oblique course backwards.  
*f*, The passage of the artery through the pericardium, and its division into two great branches.  
*g, g*, The two pulmonary branches, the right considerably longer than the left.  
*h, h, &c.* The principal ramifications of these branches in the lungs.  
*i, i, &c.* The pulmonary veins.  
*k, k*, Their passage towards the left venous sinus and auricle.  
*l*, A small part of the left auricle.  
*m*, The part where the left auricle opens into *n, o, p, q*, the left ventricle.  
*m, o, p*, The septum cordis, over which the left coronary artery and vein pass.  
*q*, The apex of the heart.  
*r*, The beginning of the aorta, and one of the *Sinuses* of VALSALVA.  
*r, s*, The aorta ascendens, and its situation within the pericardium.—*s*, That part of the aorta sometimes called its *Great Sinus*, on account of its size.  
*s, t*, The arch of the aorta, sending off,  
*u*, The arteria innominata,  
*v*, The left carotid, and,  
*w*, The left subclavian.  
*x*, The division of the arteria innominata into,  
*y*, The right subclavian, and,  
*z*, ——— carotid.  
 1. The continuation of the left carotid.  
 2. That of the left subclavian.  
 3. The aorta descendens.  
 4. The trachea.  
 5. The right branch of the trachea, the left branch being concealed under the arch of the aorta.  
 6. 6. &c. Branches of the trachea in the lungs.  
 7. 7. &c. The lungs shrivelled.  
 8. 8. &c. The root of the pericardium remaining in its natural situation, to shew that that membrane incloses not only the heart, but also a considerable portion of some of its large vessels.



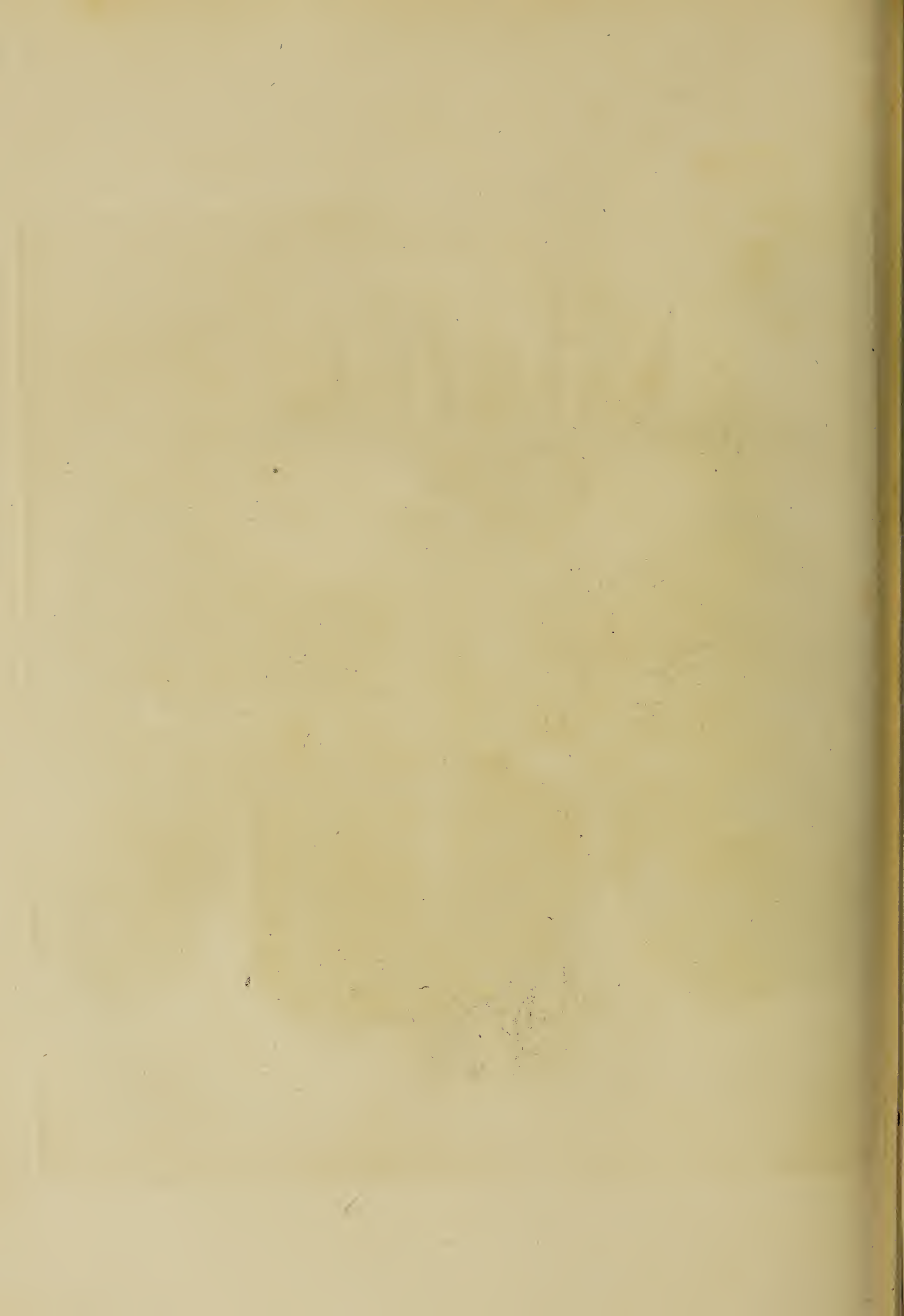
TAB. 106.



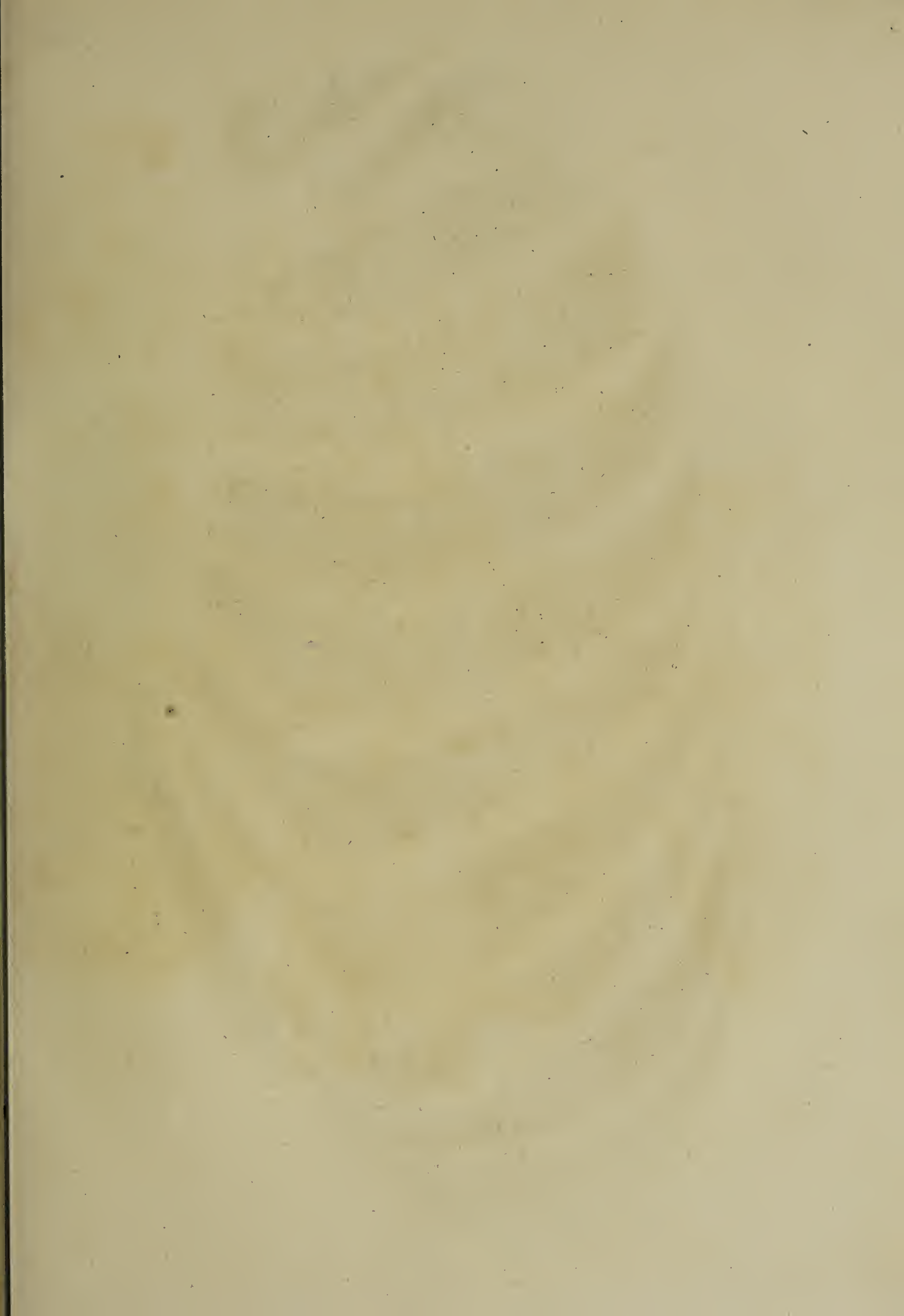
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A. Fyfe del.



## T A B L E CVII.

Gives an oblique View of the Right Side of the THORAX ; a Portion of the INTERCOSTAL MUSCLES being cut out, to shew the depth of the PLEURA, and the attachment of the DIAPHRAGM to the RIBS.

- 
- A, The upper part of the sternum.  
B, The cartilago ensiformis.  
C, The anterior portion of the clavicle.  
D, The first rib.  
E, The tenth rib.  
F, The eleventh rib.  
G, The cartilage of the first rib.  
H, \_\_\_\_\_ seventh rib.  
I, K, L, M, N, O, The insertions of the diaphragm to the ribs ; I, K, A dotted line opposite to the insertion of the diaphragm to the cartilage of the seventh rib ; L, M, N, The cut edge of the diaphragm, at its insertion to the eighth, ninth, tenth, and eleventh ribs ; O, The back part of the diaphragm attached to, and concealing the twelfth rib.  
P, The upper part of the superior mediastinum.  
Q, R, S, T, The three lobes of the right lung collapsed ;  
S, An adhesion of the lung to the diaphragm.  
U, U, The thoracic side of the diaphragm, which is pulled a little down, to shew the depth of the pleura at the lateral and posterior part of the thorax.  
V, V, The inner surface of the back part of the thorax, covered by a thickened pleura, which conceals the ribs there.  
W, The trachea pulled towards the left side.  
X, The common carotid artery not sufficiently filled with injection.  
Y, The internal jugular vein collapsed.  
Z, The vertebral artery.  
*a*, The subclavian artery over-distended.  
*b*, \_\_\_\_\_ vein.  
*c*, One of the brachial nerves.  
*d*, The cavity of the thorax, extending somewhat higher than the first rib.



## T A B L E C V I I I .

Exhibits the TRACHEA, with the BRONCHI and CELLS of the LUNGS.

---

FIG. 1.  
*The BRONCHI, with the BRONCHIAL GLANDS, seen from the Fore Part.*

*a, The trachea.  
b, c, The right and left bronchi.  
d, d, d, The bronchial glands.*

FIG. 2.  
*The BRONCHI, with their GLANDS, seen Posteriorly.*  
*a, a, a, The musculo-glandular membrane of the trachea and bronchi.  
b, b, b, The bronchial glands.*

FIG. 3.  
*The TRACHEA, with the BRONCHI separated from the Lungs, seen Anteriorly.*

*a, a, The trachea.  
b, b, The division of the trachea into the two bronchi, and these into the small ramifications, which terminate in the cells of the lungs.*

FIG. 4.  
*Part of the largest Branches of the BRONCHI, freed from the Lungs, together with the PULMONARY BLOOD-VESSELS, after they had been injected with Wax.*  
*a, The pulmonary artery.*

*b, The corresponding vein.  
c, The bronchial branch.*

FIG. 5.  
*A BRONCHIAL BRANCH magnified, to shew the manner in which Anatomists, in former times, as WILLIS, &c. considered the small Branches of the Bronchi to communicate with the Lungs.*

*a, A branch of the trachea slit open:  
b, b, The cells of the lungs.*

FIG. 6.  
*After injecting the Trachea with Wax, and then corroding the parts by means of an Acid, a Branch of the same is here represented, communicating with the Cells of the Lungs, and these again with each other. Attention has been paid in this Figure to the natural size of the Cells.*

FIG. 7.  
*Shews part of the Lungs highly magnified, to point out the real appearance of their Cells, after distending them with Air blown in from a small Branch of the Trachea. In this are to be observed their irregular form, and their close connexion with each other. Compare these two last Figures with Fig. 5.*



Fig. 2.

Fig. 3.

Fig. 1.



Fig. 7.

Fig. 4.

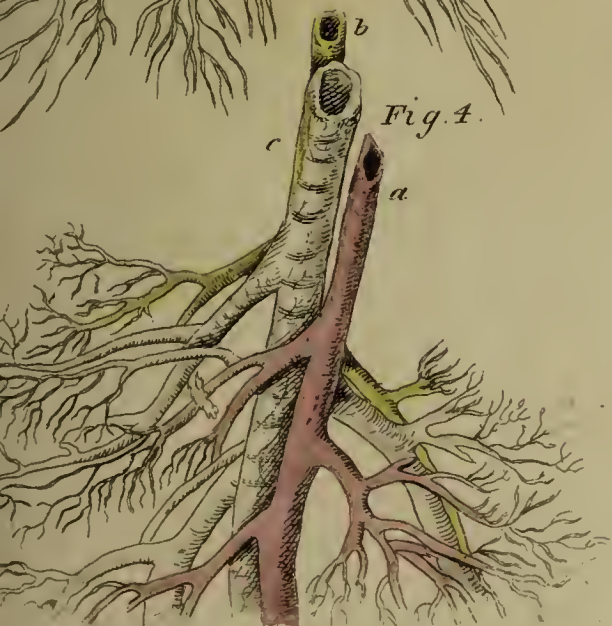


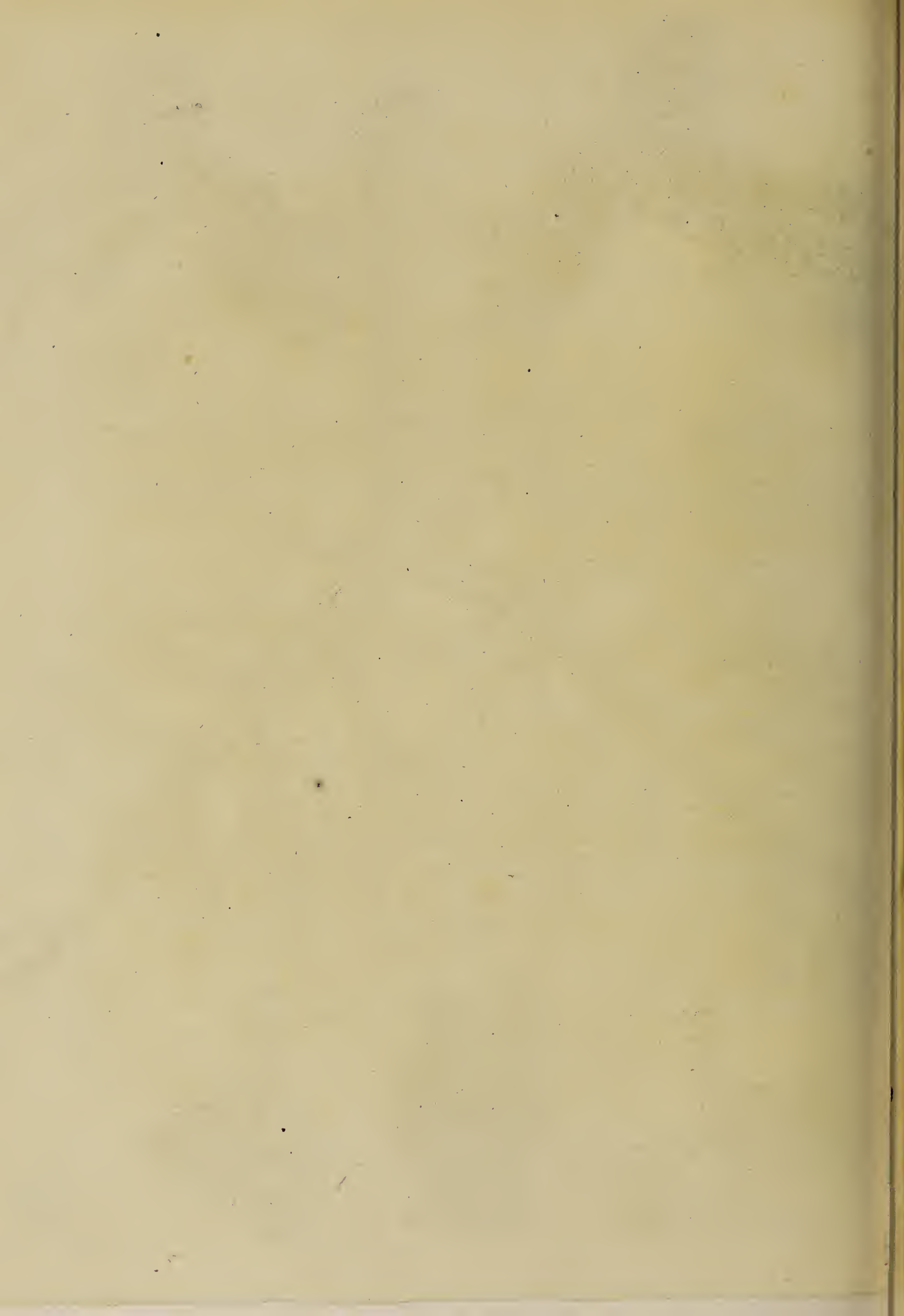
Fig. 5.



Fig. 6.









## OF THE ABDOMEN.

THE *Abdomen*, or *Belly*, extends from the *Thorax* to the under part of the *Trunk*.

It is bounded above by the *Diaphragm*, and the *Bones* to which that *Muscle* is fixed; below, by the *Pelvis*; behind, by the *Lumbar Vertebrae* and *Muscles* of the *Loins*; anteriorly, by its proper *Muscles*; and laterally, by the *False Ribs*, *Ossa Ilii*, and *Muscles* connected with these;—all of which have been described in their places.

It is divided into *three Regions*, termed *Upper*, *Middle*, and *Under Region*; each of which is subdivided into three others.

The *Upper Region* begins opposite to the *Cartilago Ensiformis*, at a small depression called *Scrobiculus Cordis*, and descends to about a hand-breadth from the *Umbilicus*, or to a line extending between the *Cartilages* of the eighth pair of *Ribs*.

The middle of this *Region* is termed *Epigastrium*, or upper part of the *Belly*, and the two lateral parts *Hypochondria*, from their lying under the *Cartilages* of the *False Ribs*.

The *Middle Region* occupies an equal distance above and below the *Umbilicus*.—The middle part of it is called the *Umbilical*, and its lateral parts the *Lumbar Regions*, or *Loins*.

The *Under Region* begins where the middle one terminates, or at a line drawn between the superior-anterior *Spinous Process* of the *Ossa Ilii*, and forms, in the middle, the *Hypogastrium*, or bottom of the *Belly*; and at the sides, the *Iliac Regions*.

The *Abdomen* is covered on the outside by the *common Integuments*, and lined within by the *Peritoneum*, in the manner the *Thorax* is lined by the *Pleura*, but without being divided by the intervention of a *Partition*.

The *Abdomen* contains the *Chylopoietic* and *Assistant Chylopoietic Viscera*, or *Organs of Digestion*,—the *Organs of Urine*, and part of those of *Generation*, with the *Vessels* and *Nerves* which belong, some of them to these *Viscera*, and others to the lower parts of the *Body*.

The *Chylopoietic Viscera* comprehend the *Stomach*, which is situated in the upper and left part of the *Abdomen*,—the *Intestines*, which fill the greater part of it, —and the *Membranes*, termed *Omenta* and *Mesentery*, which are connected with these.

The *Assistant Chylopoietic Viscera* consist of the *Liver*, which is placed in the upper and right side of the *Abdomen*,—of the *Spleen*, which is situated in the up-

per and left side of it,—and of the *Pancreas*, which lies under the *Stomach*.

Of the *Organs of Urine*, the *Kidneys* are placed in the back part of the *Abdomen*, and the *Bladder*, with some of the *Organs of Generation*, in the *Pelvis*.

## PERITONEUM.

The *Peritoneum*, named from its being stretched or spread around the *Bowels*, is a firm but simple serous *Membrane*, by which the *Abdominal Viscera* are surrounded and partly supported, and the *Walls* of the *Abdomen* lined, as already observed, somewhat after the manner the *Pleura* covers the *Lungs*, and lines the *Cavity* of the *Thorax*.

Its *External Surface* is rough and *Cellular*, and closely connected with the parts to which it belongs.

The *Internal Surface* is remarkably smooth, and lubricated by a *Liquor* which is exhaled from its own *Vessels*, without the interference of *Glands*.

It is very elastic, and admits of great extension, as happens in *Utero-gestation*, *Corpulency*, *Ascites*, and *Hernia*; but, upon the causes of extension being removed, it returns to its former dimensions.

It lines the *Diaphragm*, and passes downwards, adhering firmly to the *Abdominal Muscles*.—It also lines the containing, and covers the contained parts of the *Pelvis*, from which it is reflected in the back part of the *Abdomen*, lining the *Muscles* there, and, by its reduplications, covering the *Bowels* and great *Blood-vessels* of that *Cavity*. Strictly speaking, however, the *Abdominal Viscera* may be said to lie on the outside of the *Peritoneum*.

In its passage from one *Bowel* to another, it forms *Doublings* which serve as *Ligaments* to fix the *Bowels* to each other, and likewise to the *Body*.

It gives a general covering to most of the *Bowels*, a partial one to a few, and to those which are deep-seated, and project least, a still more partial covering.

It forms a large *Sac*, the posterior part of which adheres firmly to the different *Viscera*, and the anterior to the *Abdominal Muscles*;—the part lining the *Abdomen* being merely in contact with its contents, and allowing a small degree of motion.

The *Cellular Substance* on the *External Surface* of this *Membrane*, is not every where of equal thickness, being in some parts, as upon the *Bowels*, remarkably thin; in others, as over the *Kidneys*, filled with a considerable quantity of *Fat*.



The Cellular Substance forms various Processes or Productions, some of which, as those on the Spermatic Cords, pass through Foramina, to be connected with the neighbouring parts; and the Processes are sent off without affecting the Internal Membrane; the one not accompanying the other.

The *Arteries* of the Peritoneum come from the Internal Mammary, Epigastric, Inferior Intercostal, Lumbar, Sacral, and Ilio-Lumbar Arteries, and from those which supply the Abdominal Viscera.

The *Veins* have the same course, bear the same names with the Arteries, and in general pass to the Inferior Cava.

The *Absorbents* are numerous, and run chiefly to the Iliac and Lumbar Plexus.

The *Nerves*, which are few in number and small, are from the Phrenic, the Inferior Dorsal, the Lumbar, the Great Sympathetic and Sacral Nerves.

Its Blood-vessels, however, are not very numerous, neither does it possess much Sensibility when free from disease.

The Peritoneum lines and strengthens the Cavity of the Abdomen; incloses and assists in supporting the different Viscera; furnishes most of them with an External Coat; connects them to the Body; and, by its smoothness and slipperiness, prevents the effects of Friction.

Between the Peritoneum and Abdominal Muscles, are *Four White Lines*, or small Cords, three of which are Vessels in the Fœtus,—one of them a Vein, and two of them Arteries; the fourth is the Urachus.—In the Adult, they are shrivelled, and serve as Ligaments; the Vein forming the round Ligament of the Liver, the three other Cords forming Ligaments of the Bladder. Tab. C. CXIV.

### STOMACH.

The *Stomach* is a large Bag or Reservoir, situated obliquely across the upper and back part of the Abdomen, in the Epigastric and left Hypochondriac Regions. Tab. C. N. Tab. CXV.

It is turned downwards and forwards, so as to form an Angle with the Esophagus, the Angle becoming more conspicuous in proportion as the Stomach is more distended.

The right portion of the Stomach is situated under the left part of the Liver, the rest of it is placed immediately under the Diaphragm; and in the upright position of the Body, the Stomach rests upon the Intestines. Tab. CXV.

The Stomach is long, round, and tapering, and has been compared in shape to the Bag of a Bagpipe, or to a Cone, with the Base drawn back towards the summit, Tab. CXII.; but in certain morbid cases, the Stomach is found spasmodically contracted at its great curvature, near the Pylorus, so as to represent two Sacs of une-

qual size. This appearance commonly vanishes soon after death, though in some cases it remains permanent. Contractions of a similar nature are frequently met with in the tract of the Intestinal Canal.

The size of the Stomach is in proportion to the quantity of Aliment it has been accustomed to receive, and therefore is commonly larger in Men than in Women.

It has a *Large* and *Small Extremity*, an *Upper* and *Under Surface*, a *Great* and *Small Curvature*, a *Left* and *Right Orifice*, Tab. CXX. CXII. and consists of several *Layers* or *Coats*.

The *Large*, called also the *Left Extremity*, or *Base*, is situated in the Left Hypochondriac Region, and forms the great *Cul de Sac* of the French. Tab. CXV. This is in contact with the Spleen, and is considerably higher than the *Small* or *Right Extremity*, or small *Cul de Sac*, which is placed in the Epigastric Region, and approaches more or less towards the Right Hypochondrium, in proportion as the Stomach happens to be more or less distended. Tab. CXVIII. Fig. 1.

The *Upper Surface* is turned towards the Diaphragm, the *Under* towards the Intestines;—but when the Abdomen is laid open, unless the Stomach be considerably distended, it falls back against the Spine, so that the superior Surface becomes anterior, and the inferior Surface posterior.

In the empty state of the Stomach, its opposite sides, internally, are in contact; but they gradually recede from each other in proportion as it becomes distended.

The *Large Curvature* is turned obliquely forwards and downwards towards the Abdominal Muscles, and extends from one Orifice to the other. Tab. CXII.

The *Small Curvature* is opposed to the large one, and turned backwards and upwards, towards the Spine, extending also between the two Orifices.

The *Orifices* are next the Small Curvature. The Left is termed *Cardia*, *Os Ventriculi*, or *Upper Orifice* of the Stomach.—It is placed at the right side of the great Extremity, and is opposed to the Spine, but at a little distance from it, and is formed by the termination of the Esophagus.—It allows a free passage for the Food into the Stomach, the return of which is prevented by the Angle formed between the Stomach and Esophagus, by the Fleishy parts of the Cardia, and by the Fleishy Crura of the Diaphragm, between which the Cardia is situated.

The *Right* or *Inferior Orifice*, commonly termed *Pylorus*, is situated under the small Lobe of the Liver, a little to the Right side of the Spine,—is turned more forwards than the Cardia, and is considerably lower, but rises in proportion to the distension of the Stomach. Tab. CXV. CXII.

The Stomach is connected by the Cardia to the Esophagus,—by the Pylorus to the beginning of the Intestines,—by the Peritoneum and Blood-vessels to the Spleen,—and by a reflection of the Peritoneum to the root of the Liver, and to the part of the great Intestines termed *Areh* of the *Colon*.

The



The *Structure* of the Stomach is in general similar to that of the Esophagus, of which it is a kind of expansion.

The *Coats* of the Stomach are *Four* in number.

The First, or *External Coat*, called also *Peritoneal*, is a Reflection of that part of the Peritoneum which comes from the root of the Liver. Tab. CXXV. Fig. 2.

It is remarkably thin, but dense and somewhat elastic. It strengthens the Stomach, prevents it from being over distended, and, by its smoothness, being constantly lubricated with a liquor discharged from the exhalents of the Peritoneum in general, diminishes the effects of Friction; and, possessing few Nerves or Blood-vessels, it is not very susceptible of pain or inflammation.

The Cellular Substance under the Peritoneal Covering is described by some Authors as a distinct Coat, called *Tunica Cellulosa Ruyschiana*;—but ought not to be numbered among the Coats of the Stomach.

The Second, or *Muscular Coat*, is composed chiefly of two Planes of Fibres variously disposed.

The External Plane is longitudinal. It extends from the longitudinal Fibres of the Esophagus, and follows the same general course with that of the Stomach from the Great to the Small Extremity. Tab. CXXV. Fig. 4.

Upon each side of the small Curvature, the External Plane forms a thick strong Band of Muscular Fibres.

The second Plane is chiefly transverse or circular, and considerably thicker and stronger than the other. Tab. CXXV. Fig. 3. 5.

Its Fibres are intersected by many small, white, Tendinous-like Lines;—these, however, are in a great measure formed of that Cellular Substance by which the two Coats are united.

The Muscular Coat assists in the Digestion of the Food, by giving a gentle motion to the Stomach, according to the direction of its Fibres; the one set shortening it, the other rendering it narrower, and both sets accommodating themselves to the quantity of contained Aliment.

The Pylorus is formed by a Doubling of the two inner Coats, which project into the Passage between the Stomach and Intestines, and contain a Circular Muscle, called *Sphincter Pylori*. Tab. CXXV. Fig. 9.

The Pylorus varies considerably in different persons, being sometimes circular, at other times oval; in some it is thick, in others it is thinner, which gives, of course, a difference in appearance to the Orifice it forms.

The Pylorus, by contracting, prevents the grosser indigested parts of the Aliment from escaping, and, by dilating, allows the Pulpy digested part, which is now of a greyish colour, and called *Chyme*, to pass to the Intestines.

The Third Coat, commonly called *Nervous*, sometimes *Vascular*, but properly *Cellular*, consists of a large

quantity of fine Cellular Substance without Fat, and is intermixed with and supported by, small Aponeurotic-like Filaments, which cross each other obliquely, but which are also of a Cellular nature. Tab. CXXV. Fig. 8.

This Coat, which, like the corresponding one in the Esophagus, has been compared by some Authors to the Cutis Vera, strengthens the Stomach, and allows the Vessels to be distributed to the Inner Coat, with which it is intimately connected.

The Fourth, or *Inner Coat*, called also *Villous*, is continued from the Inner Coat of the Esophagus, but has much more of a Velvet appearance than it.—It is formed of fine, short, prominent Villi, which are crowded with small Vessels, some for furnishing a Mucous Liquor to the Stomach, others for absorbing a portion of the thinner part of the Food. Tab. CXXV. Fig. 7.

The two last Coats are more extensive than the rest, and form, upon the inner part of the Stomach, many Doublings, termed *Rugæ*, the greater number of which run in a waving transverse direction, and are afterwards divided into a sort of *Net-work*. Near the Orifices, however, especially towards the upper one, they run more in a longitudinal direction, corresponding with the Plicæ of the Esophagus, and have a radiated appearance at the Cardia. Tab. CXXV. Fig. 6.

The *Rugæ* of the Stomach, like the Plicæ of the Esophagus, are most distinct when the Stomach is empty;—when it is full, they are much less evident.

They admit of distension, without endangering the Vessels and Nerves dispersed in them, and assist a little in detaining the Aliment till properly digested.

From the inner Surface of the Stomach, a *Liquor* issues, termed *Gastric Juice*, which has something of the general appearance of the Saliva, but is different in its qualities.—This was formerly supposed to come from Glands seated in the Third Coat, but is now more frequently considered as a Secretion from the Arteries of the Stomach, no Glands being evident there, at least in the sound state of this Viscus, unless we consider the Villi as such; though in some Animals, as the Ostrich, there are numerous Glands which pour Mucus into the Stomach.

The Arteries of the Stomach are derived from the Cœliac Artery. They consist of the Superior Gastric, which supplies the place next the small Curvature; of the Right Inferior Gastric, which is a Branch of the Hepatic; of the Pyloric Arteries, which are small Branches from the Gastrics and the Hepatic; and of the Left Gastric and Arteriæ Breves, which are Branches of the Splenic Artery.

When the Arteries arrive at the Curvatures of the Stomach, they separate into two Layers, or Sets of Branches; the inner is spread out upon the Nervous Coat, and is distributed to the Villi by Filaments, which form a most delicate Plexus. The External Layer is expanded under the Peritoneal Coat, supplying it and the



the Muscular one with numerous Branches, which form frequent Anastomoses with each other.

The *Veins* have the same names, and nearly the same course, with the Arteries. The whole of them terminate in the Vena Portæ.

The *Absorbents* of the Stomach are numerous and large. They pass through small Glands situated upon its Curvatures, and go afterwards to the Thoracic Duct. They appear to carry Lymph only, no Chyle having been detected in them, even in cases where the Lacteals were found full of it. Yet the Author has seen a few Absorbents filled with a White Fluid like Chyle, on the Stomach of a Dog fed with Milk some hours before death.

The *Nerves* are chiefly from the Eighth Pair, and partly from the Great Sympathetics, and are most numerous upon the Cardia.

The Stomach receives the Food from the Esophagus, and afterwards prepares it, by Digestion, for the Intestines.

The Digestion of the Food in the Stomach is found to be effected,—by Triture, which is performed by the motions of the Stomach, and Muscles of the Abdomen and Diaphragm,—by Dilution,—by a partial Fermentation,—but chiefly by the solvent power of the Gastric Juice.

With respect to the real nature of the Gastric Juice, Authors are not yet sufficiently informed; partly owing to the difficulty of obtaining it pure and unmixed with the Saliva, &c. and in sufficient quantity.

It appears from experiments, that it is adapted to the Food on which the Animal is accustomed to live, and of course, is different in different classes of Animals.

In young Animals in particular, it has the power of coagulating Milk, and it is found to act entirely in a chemical manner, for it operates not only on the Aliments in the Stomach, but on the dead Animal Fibre out of the body; and, in several instances, part of the Stomach itself has been found dissolved by it after death.

The Gastric Juice is also observed to have an anti-septic quality, as it arrests the progress of putrefaction where that has begun.

After the Food in the Stomach has been exposed for some time to the Agents mentioned above, it loses its tenacity, becomes somewhat gelatinous, and is changed into a grey coloured Fluid termed *Chyme*.

Besides the Aliments we take in, the Stomach and Intestines commonly contain different Gases, which appear to be generated there; and also common Air, which is supposed to be swallowed with the Food.

In the perfectly healthy state of the body, part of the Aeriform Fluid appears to be consumed, at least it does not increase to such a degree as to create any unusual distension.

The Gases which were found in the Stomachs of four criminals executed at Paris some time ago, were Oxygen, Carbonic Acid, Hydrogen, and Azote, in various proportions in the different parts of the Canal.

From these experiments it appears, that the Oxygen

Gas gradually decreases, and at last vanishes in the course of the Canal, while the proportion of the Carbonic Acid and Hydrogen Gases increases; and that the largest proportion of the Gases in the Alimentary Canal is Azote; but no Acid is found in the healthy state of this Canal.

## INTESTINES.

THE *Intestines* consist of a long Cylindrical Canal, which begins at the Inferior Orifice of the Stomach, and, after winding in various directions, terminates in the Anus. Tab. CXV. CXVII.

In general, they are about six times the length of the Body to which they belong; though, in a person of short stature, the proportional length of the Intestines is greater, and *vice versa*.

They occupy a large part of the Abdomen, and are connected to the Body through their whole extent, by a Doubling of the Peritoneum.

On account of the inequalities of their size, they are divided into *Small* and *Large* Intestines, and each of these again have their subdivisions.

### SMALL INTESTINES.

The *Small Intestines* are smooth on their outer Surface, and of a tapering form, becoming gradually less in their diameter from their upper to their under extremity, and are divided into the *Duodenum*, *Jejunum*, and *Ilium*.

The *Duodenum* begins at the Pylorus, and makes a short turn upwards and backwards, by the Neck of the Gall-Bladder, to which it is contiguous; having the Anterior Layer of the Omentum fixed to its inferior part, and the Omentum Minus to its opposite side. Tab. CXIX.

It then passes obliquely downwards and to the right side, before the Great Vessels which go into the Liver, and likewise before the Renal Artery and Vein; the Gut being here included in the Cellular Substance of the Meso-colon.

Opposite to the under part of the right Kidney, it makes a turn to the left side, and is now lodged in the common root of the Meso-colon and Mesentery, receiving into its back part the ends of the Biliary and Pancreatic Ducts, and at the upper part of the Lumbar Vertebrae, going over the Aorta and Vena Cava, and under the superior Mesenteric Vessels.

In passing across these Vessels, it ascends a little till it gets to the left side of the Spine; then, perforating the common root of the Mesentery and Meso-colon, it makes a turn forwards, and obtains the name of *Jejunum*.

The *Jejunum*, so named from its being commonly more empty than the other Intestines, in consequence of the thinner parts of its Contents being sooner absorbed,



sorbed, begins at the last turn of the Duodenum, and forms numerous Convolutions, which run in all directions, and are situated at the upper part of the Umbilical Region. Tab. CXV. H.

The *Ilium*, named from its numerous Turns, begins where the *Jejunum* terminates, or where the *Internal Plicæ* become less conspicuous, and is distinguished externally from that Gut, by being smaller, thinner in its Coats, and paler, and from its forming about three-fifths of the length of the two Intestines.

The *Ilium*, like the *Jejunum*, forms many Convolutions, which are situated on the under part of the Umbilical Region, and extend as far as the Hypogastric and Iliac Regions, and not unfrequently, especially in Women, into the Cavity of the Pelvis. Tab. CXV. I.

It surrounds the lateral parts of the *Jejunum*, and is supported by the *Ossa Iliæ*; and, the last turn of the Gut passing across towards the upper edge of the *Right Os Ilium*, it terminates by a Valve in the posterior and left side of the beginning of the *Colon*.

Through the whole of this course, the *Jejunum* and *Ilium* are fixed to the Spine by a continuation of the *Mesentery*, but in such a manner that they are allowed to float in the Cavity of the Abdomen, and to give way to the Stomach in proportion as it becomes distended.

#### GREAT INTESTINES.

The *Great*, like the *Small Intestines*, form one continued Canal, which tapers from its upper to near its under extremity; but they differ from them in being considerably wider, shorter, and straighter,—in being irregular on their outer Surface, and tacked up into Cells,—and in having many Processes upon them, termed *Appendiculæ Pinguinosæ*. Tab. CXXIII. CXVII. CXI. They differ likewise considerably in their internal appearance.

Like the *Small Intestines*, also, they are divided into three parts, termed *Cæcum*, *Colon*, and *Rectum*.

The *Intestinum Cæcum* forms a short Bag, only about three or four inches in length, and nearly the same in diameter. The *Cæcum*, strictly so called, is that part of the Intestine which lies under the insertion of the *Ilium*, though more frequently the dilated beginning of the *Colon* is distinguished by the same name.

It is situated in the *Right Iliac Region*, resting on the Cavity of the corresponding *Os Ilium*, at the under end of the *Right Kidney*, and is concealed by the last Convolutions of the *Ilium*. Tab. CXV. L.

The bottom of it is turned downwards, and forms a shut Sac; the mouth of which is directed towards the *Colon*, and may be considered as forming the *Cæcum Caput Coli*. Tab. CXXIII.

At the posterior and left side of the *Cæcum*, there is a *Small Process* about the same length with the *Cæcum* itself, but the diameter not larger than that of a *Goose-quill*,—termed *Appendix Vermiformis*, from its resem-

blance to an Earth-worm, and *Appendix Cæci*, from its connexion with the *Cæcum*. Tab. CXXIII.

It is convoluted, variable in its length, and fixed by its sides to the *Cæcum*.

It has two extremities, one of which is impervious, the other opens obliquely into the back part of the *Cæcum*.

The *Colon* is by much the longest of the large Intestines. It encircles the small Guts, and is contiguous to most of the Abdominal Viscera. Tab. CXV. CXVII.

It is a continuation of the *Cæcum*, beginning at the termination of the *Ilium*.

It ascends in the *Right Lumbar Region*, over the *Kidney* of that side, to which it is connected, and is here sometimes termed *Colon Dextrum*.

From the *Kidney*, it passes forwards, and crosses the Abdomen in the *Epigastric* and *Hypochondriac Regions* connected to the *Duodenum*, under the name of *Great Arch of the Colon*, or *Colon Transversum*.

The right portion of the *Great Arch* is situated under the *Liver* and *Gall-Bladder*, the latter of which, after *Death*, commonly tinges part of it and the *Duodenum* with *Bile*.

The left portion of the *Colon Transversum* is situated under the *Stomach*; and immediately below the *Arch* are the Convolutions of the *Jejunum*.

In the *Left Hypochondrium*, it turns backwards under the *Spleen*, and descends in the *left Lumbar Region*, on the fore side of the *Kidney*, to which also it is closely connected. Here it is sometimes called *Colon Sinistrum*. Tab. CXVII.

In the *left Iliac Region* it forms two Convolutions, compared in shape to the Greek letter  $\sigma$ , and hence called *Sigmoid Flexure* of the *Colon*, which afterwards constitutes the *Rectum*. Tab. CXVII. CXXII.

The *Sigmoid Flexure* varies considerably in length in different Persons, extending frequently into the *Hypogastric Region*, and in some instances as far as the *Intestinum Cæcum*.

The *Colon*, through its whole extent, is fixed to the *Body* by means of the *Meso-colon*.

The *Rectum*, which has its name from its being among the straightest of the Intestines, begins at the last *Lumbar Vertebra*, descends upon the fore side of the *Os Sacrum* and *Os Coccygis*, and terminates in the *Anus*, a little beyond the extremity of the last-named Bone. Tab. CXVII. CXXIII. CXXV.

In its course it follows the direction of the *Bones* over which it passes; turning first downwards, then a little backwards, then forwards, and is fixed to them by the *Meso-rectum*.

The *Rectum* differs from the other Intestines, in becoming wider in its progress downwards, and forming below a *Reservoir* for the *Fæces*.

At the *Anus*, it contracts into a narrow *Orifice*, the sides of which are disposed in close longitudinal *Folds*.

Upon the *Outer Surface* of the great Intestines, but more especially upon the *Colon*, are the *Appendiculæ Pinguinosæ*,



*Pinguedinosæ*, situated at different distances from each other,—thin at their roots, becoming thicker in their bodies, and projecting from the Intestines like so many pendulous Papillæ.

They are covered by the Peritoneum, continued from the Surface of the Intestine, and are of the same structure and use with the Omentum.

Besides the Appendiculæ, there are on both sides of the adhesion of the Meso-colon to the Intestine, *Adipose Strata*, which are of the same nature with the others.

The Colon is divided, longitudinally, into three parts, by as many *Ligamentous-like Bands*, which run upon its Surface.

One of them goes along each side of the Colon; and that most exposed to view, when the Omentum is turned up, is the largest: The third, which is the smallest, and which was discovered by MORGAGNI, is concealed by the attachment of the Meso-colon. Tab. CXI. CXVII. CXXIII.

They begin at the root of the Appendix Vermiformis, and, after running along the Cæcum and Colon, they gradually unite, form two, and then terminate on the Rectum. Tab. CXXV. Fig. 1. Y, Y.

#### MESENTERY.

The *Mesentery* is formed by a Doubling of the Peritoneum, which is detached forwards, and includes the Intestines as in a Sling.

It is named from its situation in the middle of the Intestines, and is divided into two parts, one connecting the Small Intestines, and retaining the name of *Mesentery*; the other, the Great Intestines, and termed *Meso-colon*.

The Mesentery begins at the last turn of the Duodenum, and runs obliquely downwards and towards the right side, along the Vertebrae of the Loins, to the first, second, and third of which it is chiefly connected.

Between the two Layers of the Mesentery, are inclosed a considerable quantity of Cellular Substance and Fat, with the numerous Blood-vessels, Nerves, Lacteal Vessels, and Glands of the Jejunum and Ilium. Tab. CXXV. Fig. 19. D—G.

Its anterior edge is much more extensive than the posterior, being plaited or puckered up,—the Plaits corresponding with the Convulsions of the Intestines to which they are fixed, and which they prevent from being entangled in the various motions of the Body.

The *Meso-colon* is the continuation of the Mesentery, which, after reaching the lower extremity of the Ilium, contracts and obtains this name.

It follows the course of the Great Intestines, and fixes them in their place; its different portions getting names from the parts of the Colon to which it is attached. Tab. CXI.

Under the Right Kidney it is narrow and firm, and forms the *Right Ligament* of the Colon.

Opposite to that Kidney, it appears to be lost by the immediate adhesion of the Colon to the Kidney and Duodenum.

It then turns across, and forms a broad Expansion, which incloses the Arch of the Colon at its anterior edge; and behind, it separates and incloses the anterior part of the Duodenum, and is fixed to the Spine.

It adheres a little to the under part of the left extremity of the Stomach, and then descends over the Left Kidney, at the under end of which it forms the *Left Ligament* of the Colon. Here, as on the right side, it forms a partial covering to the Colon, the Gut being connected behind by Cellular Substance only.

It afterwards expands, adheres to the Psoas Magnus, and forms a Loose Fold, which retains the Sigmoid Flexure of the Colon.

At the last Vertebra of the Loins, it forms the *Mesorectum*, which by degrees becomes narrower, and disappears towards the under part of the Pelvis; the Rectum being then immediately connected to the Os Sacrum.

Between the Layers of the Meso-colon are placed the Arteries, Veins, and Nerves, with the Absorbents and Glands of the Colon.

The Mesentery, in general, suspends, connects, and retains the Intestines in their places, but allows them a certain degree of motion; it furnishes them with an external Coat, receives their Glands, Vessels, and Nerves, and allows the two last to be properly distributed.

#### OMENTUM.

The *Omentum* or *Cawl*, formerly called *Epiploon*, from its seeming to float upon the Intestines, is a fine Membranous Bag, produced from the Peritoneum, and intermixed with much Fat, and covers a large portion of the Anterior Surface of the Abdominal Viscera. Tab. C. Fig. 1. Tab. CIX. T. Tab. CXIV. CXVII. CXXII.

It is divided into *Omentum Gastro-colicum* and *Omentum Colicum*; the former common to the Stomach and Colon, the latter proper to the Colon: They are, however, a continuation of one and the same Substance.

The *Omentum Gastro-colicum* consists of an Anterior and Posterior part, each of which is originally formed of two Membranes intimately united.

The Anterior part is a continuation of the Peritoneal Coats, produced from the upper and under Surfaces of the Stomach.

This Production arises from the whole length of the large Arch of the Stomach, and extends as far laterally as the beginning of the Duodenum and inner Surface of the Spleen, to both of which it is also connected. The Posterior part arises in a similar manner from the Peritoneal Coat covering the upper and under Surfaces of the Colon. The two portions thus produced from the Stomach and Colon, soon become incorporated, and form a thin production, which commonly extends, especially



pecially in Fat people, a little below the Umbilicus. Sometimes, however, it does not reach so far, at other times it descends as low as the Pubes, but without adhering to the Walls of the Abdomen, or to the small Intestines over which it is placed.

The *Omentum Colicum*, which is merely an Appendix of the Omentum, arises from the right part of the Arch of the Colon, in the same manner as the other portion of the Omentum arises from the left part of the Arch, and sends downwards and to the right side a Cuneiform Process, which is connected with the Colon Dextrum as far as the Cæcum.

Besides the Omentum, there is a Membrane much smaller, situated between the Liver and Stomach, termed *Omentum Hepato-gastricum*, or *Omentum Minus* of WINSLOW, or *Membrana Macilentior* of HALLER from its having little Fat in it. Tab. CXX. c. c. Tab. CX. W.

It passes from the fore part of the Sinus of the Porta, to the under and back part of the Liver, to be connected to the whole edge of the small Curvature of the Stomach, and to the beginning of the Duodenum.

It is bounded on the left side by the Cardia, on the right by the Capsule of Glisson, on the upper part by the root of the Liver, and on the lower by the small Curvature of the Stomach.

Like the other Omentum, it is composed of two Layers, but is thinner, less fat, and more uniform in its structure than it.

After the Omentum Minus reaches the Stomach, its two Layers separate from each other, inclose that Viscus, and form its External Coat.

At the great Curvature of the Stomach, they rejoin and form the Anterior, which soon joins the Posterior part of the Omentum Majus.

The Posterior part is formed by the Peritoneal Coat of the Colon, in the same manner as the Anterior portion is produced from that of the Stomach.

At the opposite side of the Colon, the layers re-unite, and form the Meso-colon.

By the Membrane thus continued, a large irregular Sac is formed, of which the Omentum Minus, Stomach, and Anterior portion of the Omentum Majus, constitute the Anterior, and the Posterior part of the large Omentum, the Colon, and Meso-colon, the Posterior part of this Sac.

In Young Subjects, the sides of this Sac are so complete, that it may be inflated from the Foramen of WINSLOW; but in old emaciated people, the Layers of which it is composed become Cribriform or Reticular in consequence of Absorption.

At the upper and right side of the Sac, there is a Passage large enough to admit a Finger, termed *Foramen WINSLOII*. Tab. CX. Tab. CXXI. Fig. 2. n.

It is situated immediately behind the Cord of the Great Vessels which lead to the Liver, and is of a Semicircular form.

It is composed of the Peritoneum, under the appear-

ance of two Ligaments which connect the surrounding parts to each other.

The Foramen of WINSLOW maintains a communication between the Large Sac of the Omentum and common Cavity of the Abdomen; from which circumstance Fluids generated by disease may readily pass from one of these Cavities to the other.

The Omentum, by its Fatty nature, serves to lubricate the Viscera, and to prevent them from being injured by Friction. Being suspended as a Curtain over the Intestines, it has also been supposed to retain the Heat that would otherwise escape from them; but a large portion of the Intestines has no covering from this Substance.

#### STRUCTURE OF THE SMALL INTESTINES IN GENERAL.

The *Structure* of the Small Intestines is nearly similar to that of the Stomach, and the number of their *Coats* the same.

The *External Coat*, excepting in a portion of the Duodenum, is a continuation of that part of the Peritoneum which forms the Mesentery. It closely surrounds the Intestines, adhering to them by fine Cellular Substance. Tab. CXXV. Fig. 11. A.

The *Second* or *Muscular Coat*, as in the Stomach, is composed of two Planes of Fibres; the External or Longitudinal of which are much more minute than the Internal. Tab. CXXV. Fig. 11. B.

The *Circular Fibres* are distinct and numerous: They consist of Segments of Circles, which unite with each other at different distances, so as to surround the Canal. Tab. CXXV. Fig. 11. C.

The *Longitudinal Fibres* shorten, and the *Circular* contract the Intestines; and upon the alternate relaxation and contraction of these Fibres depends that *Vermicular motion* forwards and backwards in the Canal, or that motion called *Peristaltic* and *Anti-Peristaltic*, by which the Aliments are intimately intermixed, the nutritive part applied to the Mouths of the Lacteals, and the fæculent part is discharged.

The *Third*, commonly called *Nervous Coat*, like that in the Stomach, is white and firm, and composed of Cellular Substance without Fat;—its firmness giving strength to the Intestines. Tab. CXXV. Fig. 11. D.

This Coat, like the corresponding one in the Esophagus and Stomach, though Cellular, forms a distinct Lamina, and, as in those parts of the Canal just mentioned, has by some been compared to the Cutis Vera covering the external Surface of the Body, though it is much looser in its texture.

The *Fourth*, or *Villous Coat*, differs from that of the Stomach, in being proportionally more extensive, and in forming, with the Cellular Coat, numerous transverse Plicæ or Folds, about an eighth part of an inch in breadth, termed *Valvulæ Conniventes*, from their serving as a kind of imperfect Valves, to retard the motion of the Food. Tab. CXXV. Fig. 21. 13. 14.

By



By this extension of the inner Surface of the Intestines, sufficient space is afforded for the absorption of the Chyle, and for the secretion of those Fluids which assist in the digestion of the Food, and in the lubrication of the Canal.

One edge of these Plicæ is fixed to the Intestine, the other is loose. They are much deeper than the Rugæ of the Stomach, and placed opposite to the Interstices of each other, and are of different lengths, not forming entire Circles.

The Villi of the Inner Coat, are much more conspicuous than in the Stomach, being composed not only of the extremities of Arteries, Veins, and Nerves, but particularly of the Mouths of Lacteal Vessels, the Origins of which, however, are extremely small, and have a fungous appearance.

Numerous Ducts of Simple and Compound Glands terminate on this Coat, for the secretion of Mucus.

The former are called *Solitary*, and the latter *Congregate*; and, from their Describers, *Glandulæ PEYERI*, and *Glandulæ BRUNNERI*.

They are in the form of Papillæ, but so minute as seldom to be seen, excepting in the diseased state;—though they are supposed to be dispersed over the whole of the Canal.

They are seated in the Substance of the Nervous Coat, and serve to discharge that Matter, which, while it prevents the acrimony of the Aliments from injuring the Intestines, enables them to discharge their Contents.

#### STRUCTURE OF THE SMALL INTESTINES IN PARTICULAR.

The *Duodenum* is the most lax, and the straightest of the Small Intestines, and so large as to have been considered as a *Ventriculus Succenturiatus* or *Secondary Stomach*.

It is of a redder colour than the rest, has a thicker Muscular Coat, receives only a partial covering from the Peritoneum, and is fixed more closely to the Body, without floating like the other Intestines.

It is perforated at the distance of three or four inches from the Pylorus, by the ends of the Biliary and Pancreatic Ducts, for the reception of Bile and Pancreatic Juice. Tab. CXXVI.

On the Duodenum, the Lacteal Vessels begin to make their appearance, and numerous Mucous Glands are found in it, especially near the Pylorus. The inner Surface presents only some irregular Rugæ, in place of Valvulæ Conniventes.

The Duodenum receives the Food from the Stomach, and detains it till it be mixed with the Bile and Pancreatic Juice.

The *Jejunum* differs from the Duodenum in deriving its common Coat wholly from the Peritoneum,—in being smaller,—in having a weak Muscular Coat, the external Fibres of which are extremely minute,—and in the Valvulæ Conniventes, Villi, and Lacteals, which

proceed from them, being much more conspicuous and numerous.

The *Ilium* differs from the former, in being less in diameter, in its Coats being thinner and of a pale colour, and in having fewer and smaller Lacteal Vessels.—In this Intestine the Valvulæ Conniventes gradually decrease in size and number, and at length entirely disappear.—At its under end, the Mucous Glands are distinct and frequent.

The Small Intestines in general admit the food to be divided into the Nutritive part or Chyme, and the Excrementitious part or Fæces. They promote the formation of the Chyle,—allow it to be separated from the Chyme, and to be absorbed,—and propel the remains of the Food into the Large Intestines.

#### STRUCTURE OF THE GREAT INTESTINES IN GENERAL.

The Great have the same number of Coats with the Small Intestines, but differ from them in being thicker and stronger.—The Valvulæ Conniventes, Tab. CXXIV. are deep, and placed opposite to each other, and, like the Small Intestines, diminish in number and size towards the under extremity.—The Villous appearance is much less distinct.—The Mucous Glands are larger, but simpler than those of the Small Intestines.

#### STRUCTURE OF THE GREAT INTESTINES IN PARTICULAR.

The *Intestinum Cæcum* is of the same general structure with the rest of the Great Intestines: Its Villi are very short; and it has a number of solitary Mucous Glands, broader than those of the Small Intestines, which, when diseased, sometimes appear like Small-pox, with a Perforation in each.

The *Appendix Vermiformis* is of the same structure with the other Intestines, but contains no Fæces. It is furnished with numerous Glands similar to those of the Duodenum, the contents of which pass into the Cæcum, a little below the Valve of the Colon, and assist in lubricating that Intestine, and in facilitating the expulsion of the Fæculent Matter. Tab. CXXV. Fig. 16. C. Fig. 17. L. Tab. CXXIII.

In the Cæcum and beginning of the Colon, the Food coming from the Ilium is retained for some time, and, in consequence of Absorption, acquires a greater degree of consistency, and receives a fœtid smell. After this, it may properly be considered as Excrementitious Matter.

The *Valvula Coli*,—sometimes called *Valvula Ilii*, or *Valvula BAUHINI*, from its supposed Discoverer, and *Valvula TULPII*, from the Author who gives a particular description of it,—is situated at the beginning of the Colon, and is placed transversely in the posterior and left part of that Intestine. Tab. CXXV. Fig. 17. 18. Tab. CXXIV.

It is formed of a Projection of the Villous and Nervous

vous



vous Coats, and Circular Muscular Fibres of the Ilium, Cæcum, and Colon, and has two Folds or Lips, with an Aperture in form of a Mouth or Chink between them; but the size of the Folds, and of the Opening they inclose, varies in different Persons.

At the ends of the Valves are two Cords, termed *Retinacula*, vel *Fræna* MORGAGNI, which retain the Valve in its proper situation.

The Valve of the Colon allows a free passage for the contents of the Small into the Large Intestines, but completely prevents their return.

The *Colon* is of a similar structure with the Cæcum.—The inner Surface is smooth.—The Longitudinal Muscular Fibres are collected upon it into three Fasciculi, which, with the Peritoneum covering them, form so many Ligamento-muscular Bands, that arise at the root of the Vermiform Process, and are continued along the Colon till they arrive at the Rectum, where they are first united into two parts, and then spread out into a uniform Coat. Tab. CXXIII. Fig. 16. E, E, E. Tab. CXXV. Fig. 16. E.

The Longitudinal Bands are shorter than the rest of the Colon, and of course assist in diminishing its length, and forming it into Plicæ, which lie across the Gut, answering to the Valvulæ Conniventes; only they are at a greater distance from each other, and much larger; dividing the Intestines into little apartments, or Pouches, called *Cells* of the Colon. Tab. CXXIV. Fig. 18. I, I, I. Tab. CXXV. Fig. 18. L.

The *Cells of the Colon*, with their Partitions, have a threefold order, the Intestine being almost quite smooth or plain, opposite to the Longitudinal Bands.

The Cells assist in preventing the too rapid descent of the Fæces.

The Colon receives the Excrementitious parts of the Aliment, retains them, till they are changed into Fæces, and then, by the Peristaltic motion of the Intestines and power of Respiration, pushes them, by slow degrees, to the Rectum.

The *Rectum* differs from the Colon in being covered only anteriorly and laterally by the Peritoneum:—Its Muscular Fibres are stronger and thicker, and spread uniformly over the Intestine. The Circular Fibres are so considerable at the end of the Rectum, as to have been named *Internal Sphincter* of the Anus. Tab. CXXV. Fig. 1. Y, Y. Tab. CXXIV.

The Rectum has no cells like the Colon; but the Cellular and inner Coats are so much larger here than they are higher up, as to fall into Transverse Folds, which however, disappear in proportion to the distension of the Intestine.

The middle and under end of the Rectum has numerous large Mucous Glands or Follicles.

The Extremity of the Rectum forms a firm Circle, which acts as a Valve, and assists the proper Sphincter in preventing the involuntary discharge of the Fæces.

The Verge of the Anus is surrounded with deep Follicles, the contents of which prevent the tender Skin of the Anus from being excoriated by hard or acrid Fæces.

The Anus is also surrounded with a great deal of Fat, which admits of the dilatation of the Rectum, and facilitates the discharge of the Fæces.

The Rectum receives the Fæces from the Colon, retains them for a certain time, till, stimulated by their weight and acrid nature, it discharges them; which it does by the power of its Muscular Coat, and that of the Levator Ani, assisted by the action of the Diaphragmatic and Abdominal Muscles.

The Fæces, according to the late experiments of BERZELIUS, consist, in the 100 parts, of Water 73.3, Vegetable and Animal Remains 7.0, Bile 0.9, Albumen 0.9, Peculiar and Extractive Matter 2.7, Salts 1.2, Slimy Matter, consisting of Picromel, Peculiar Animal Matter, and insoluble residue, 14.

The *Blood-vessels* of the Intestines are large and numerous, and are derived from different sources.

The Duodenum receives Branches from the Splenic and Hepatic Arteries.

The Jejunum, Ilium, and right half of the Colon, are supplied by the Superior Mesenteric Artery; and the left half of the Colon, with the Rectum, by the Inferior Mesenteric Artery.

The *Veins* of all the Intestines send their Blood to the Vena Portæ.

The *Absorbents* of the Intestines are large and numerous.—They arise from the inner Surface of the Canal, and run in the Mesentery and Meso-colon, passing through numerous Glands.—The Absorbents of the Small Intestines terminate in the Receptacle of the Chyle; those of the Large Intestines go partly to the Thoracic Duct, and partly to the Lymphatics of the Loins.

The Absorbents of the Great Intestines are strictly of the Lymphatic kind, the Chyle being completely absorbed while in the Small Intestines; yet they are capable of sending nourishment into the Constitution, for nutritious Injections thrown into the Rectum, have been found occasionally to support life, for the space of some weeks, in cases where nothing could be received by the Mouth.

The *Nerves* of the Intestines are very small, but numerous, and are derived partly from the Eighth Pair, but chiefly from the Great Sympathetics.

The Vessels and Nerves of the Omentum are Branches of those which supply the Stomach, and have the name of *Gastro-Epiploic*.

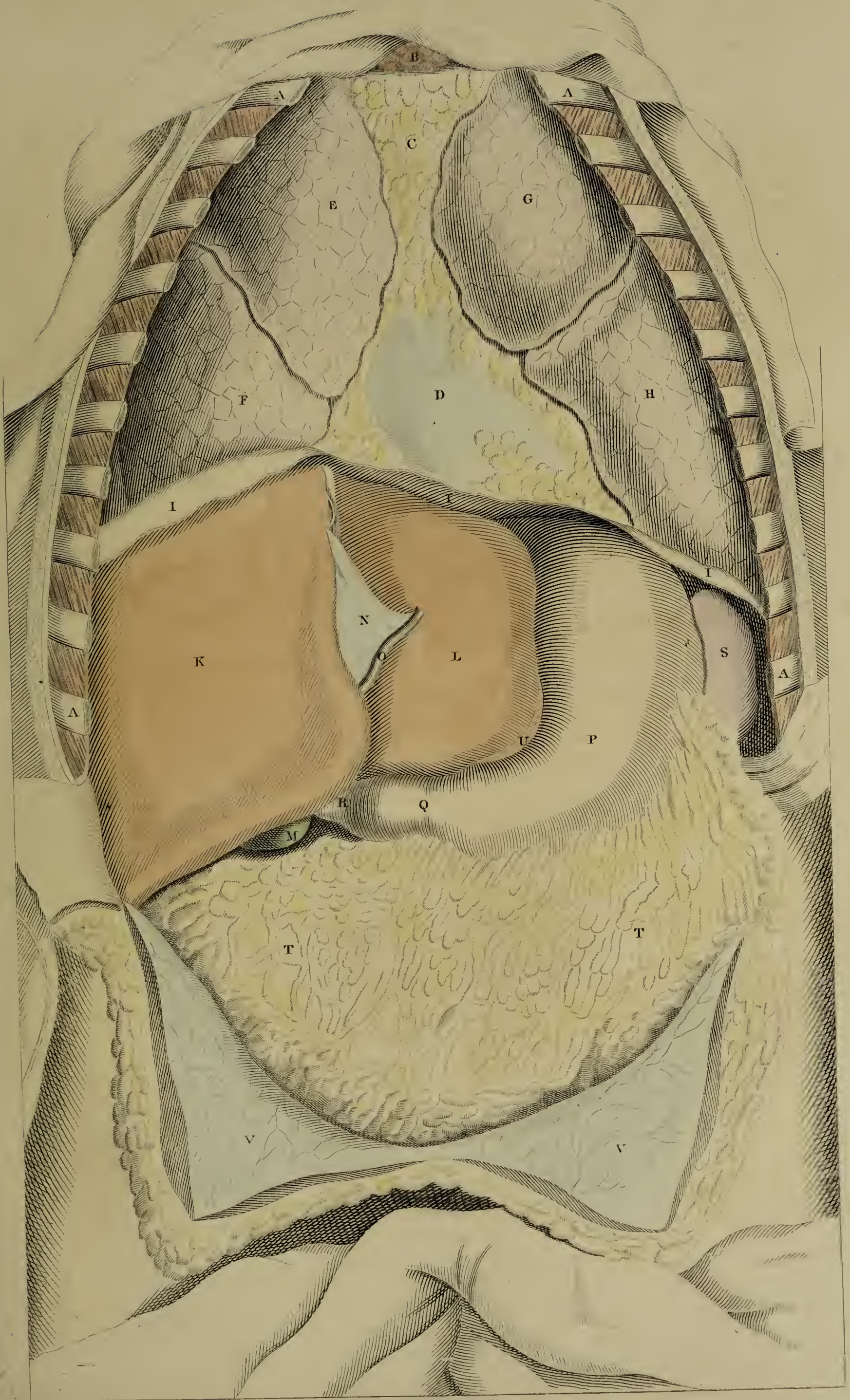


## T A B L E C I X.

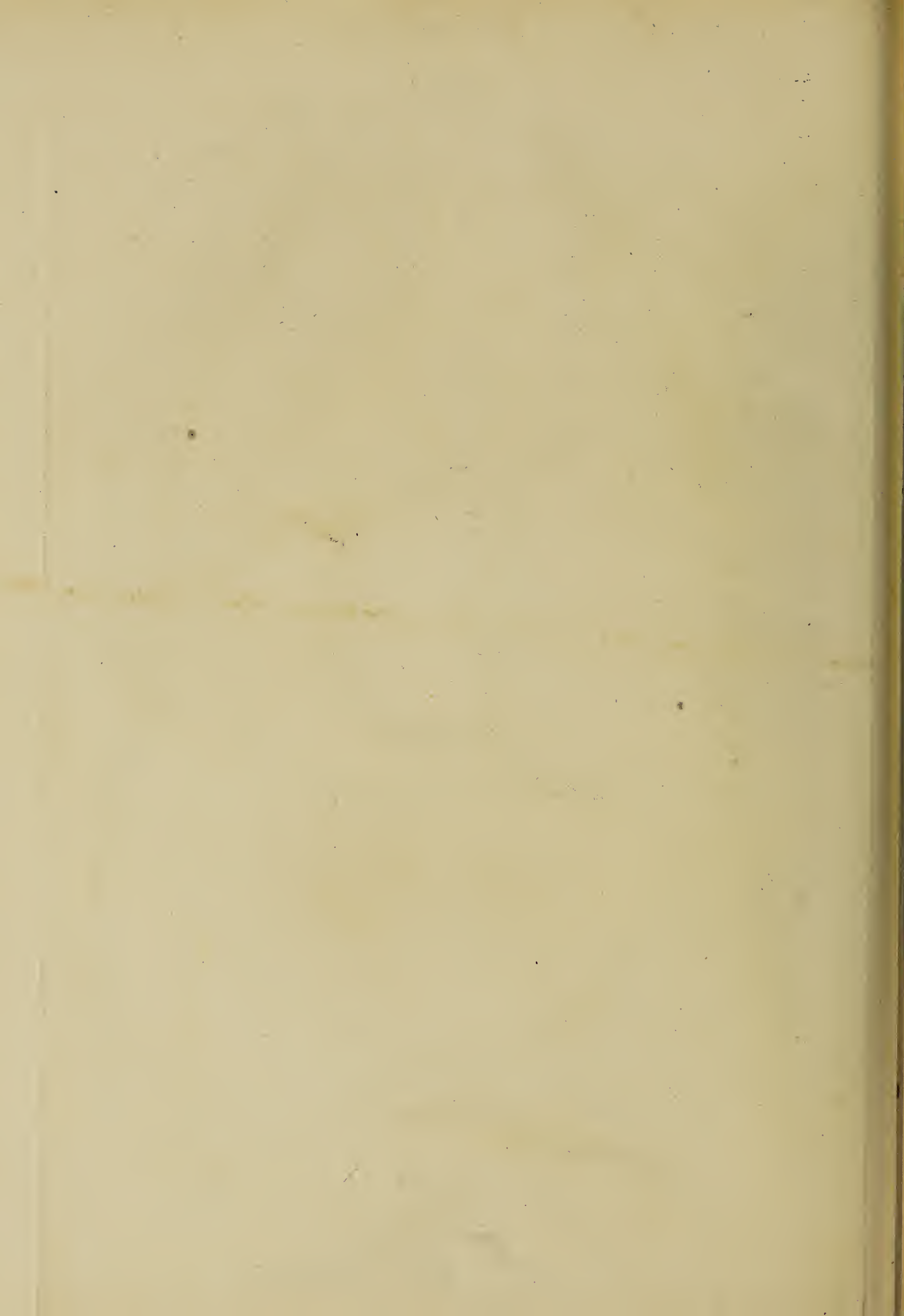
Exhibits the Situation of the VISCERA of the THORAX and ABDOMEN. The Integuments and Muscles of the Fore Part of the Thorax are dissected away; the Sternum, with the Anterior Part of the Ribs and Diaphragm, are removed; the Pleura is opened; the Integuments of the Abdomen, with the Muscles and Peritoneum, are cut and turned back.—The Subject of the Figure was a Fat Woman of Forty-two years of age.

- 
- |   |   |
|---|---|
| <p>A, A, The ten uppermost ribs.</p> <p>B, Part of the thyroid gland.</p> <p>C, The situation of the thymus gland, which is covered with much fat.</p> <p>D, The pericardium.</p> <p>E, F, The upper and middle lobes of the right lung.</p> <p>G, H, The upper and under portions of the left lung.</p> <p>I, I, I, The diaphragm.</p> <p>K, L, The right and left lobes of the liver.</p> <p>M, The bottom of the gall-bladder.</p> | <p>N, The suspensory ligament of the liver.</p> <p>O, The round ligament of that viscus.</p> <p>P, The stomach.</p> <p>Q, The pylorus.</p> <p>R, The first curvature of the duodenum.</p> <p>S, Part of the spleen.</p> <p>T, The omentum majus.</p> <p>U, U, Part of the omentum minus.</p> <p>V, V, The peritoneum, which, with the abdominal muscles and integuments, are turned down.</p> |
|---|---|

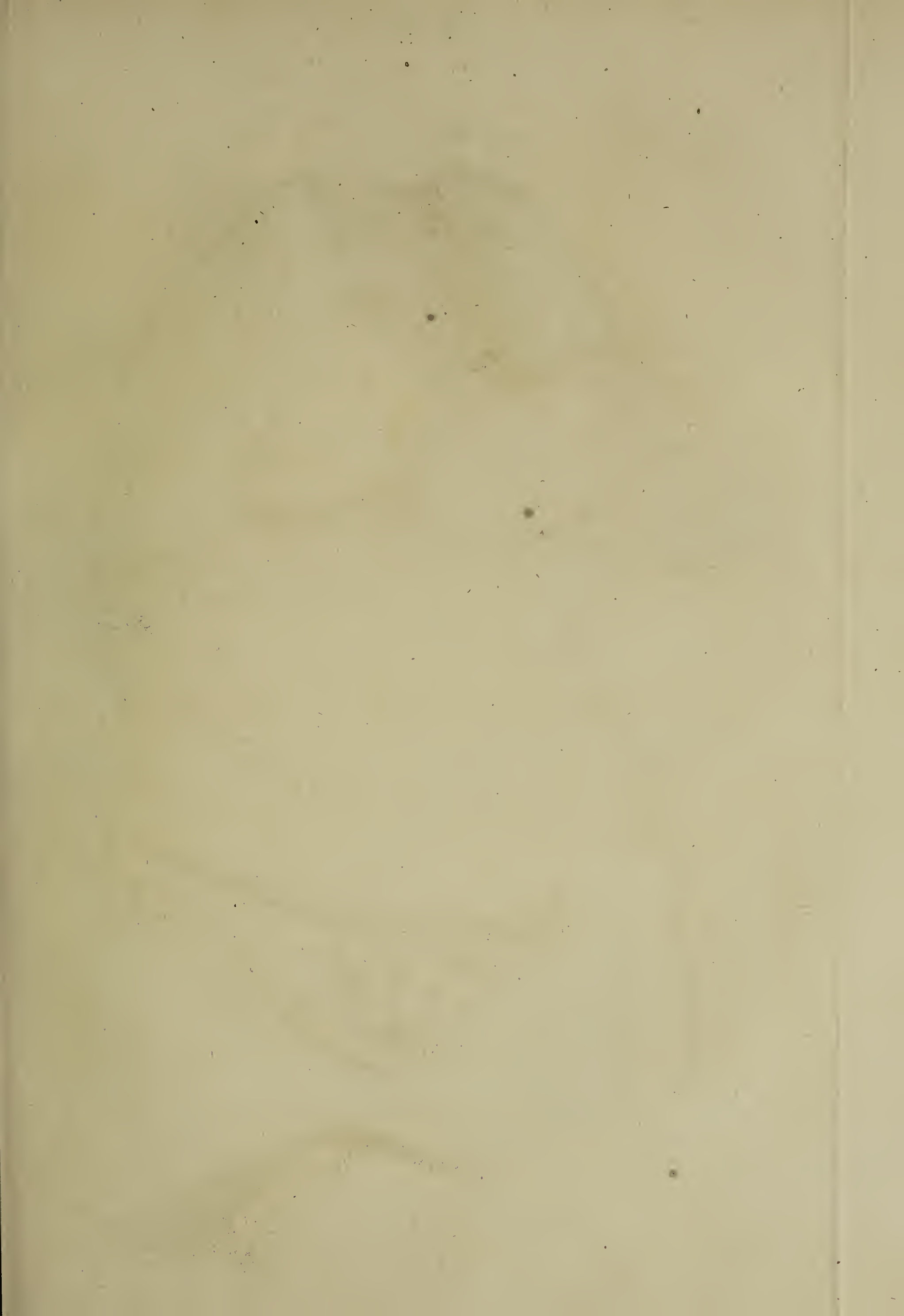


















## T A B L E C X.

The Situation of the HEART and STOMACH.—The Fat which covered the Large Vessels is removed. The Pericardium also is laid open. The Liver is raised, and turned to the Right Side, that the Stomach might be more sufficiently exposed. Part of the Omentum is cut away.

- 
- A, A, The upper ribs, of which four are seen in the right, and nine in the left side.  
 B, Part of the thyroid gland.  
 C, The trachea.  
 D, The upper lobe of the right lung.  
 E, F, The upper and under lobes of the left lung.  
 G, H, I, The heart. G, The right ventricle; H, The corresponding auricle; I, The left ventricle.  
 K, The pulmonary artery.  
 L, The arch of the aorta.  
 M, The trunk common to the right carotid and subclavian arteries.  
 N, The left carotid, and,  
 O, The left subclavian artery.  
 P, The right, and,  
 Q, The left thoracic jugular vein, terminating in,  
 R, The superior cava.  
 S, S, The remains of the diaphragm.  
 T—W, The concave surface of the liver. T, The right lobe; U, The lobus quadratus; V, The left lobe;  
 W, The SPIGELIAN lobe, covered by the omentum minus, which extends to the small curvature of the stomach.  
 X, The pons hepatis.  
 Y, The gall-bladder collapsed.  
 Z, A pin introduced by the foramen of WINSLOW, and seen shining through the omentum minus.  
*a—e*, The stomach. *a*, The cardia; *b*, The saccus cæcus ventriculi; *c*, The small curvature, and, *d*, The large curvature of the stomach; *e*, The pylorus.  
*f*, The first turn of the duodenum.  
*g*, The spleen pulled a little forwards.  
*h, h*, The omentum majus.  
*i, i*, The intestinum ilium.  
*k*, Part of this intestine proceeding to the cæcum.  
*l—n*, The colon. *l*, The colon dextrum; *m*, The colon transversum; *n*, The colon sinistrum.  
*o, o*, The iliac flexure of the colon.  
*p, p*, The peritoneum, and other parts of the parietes of the abdomen, reflected.



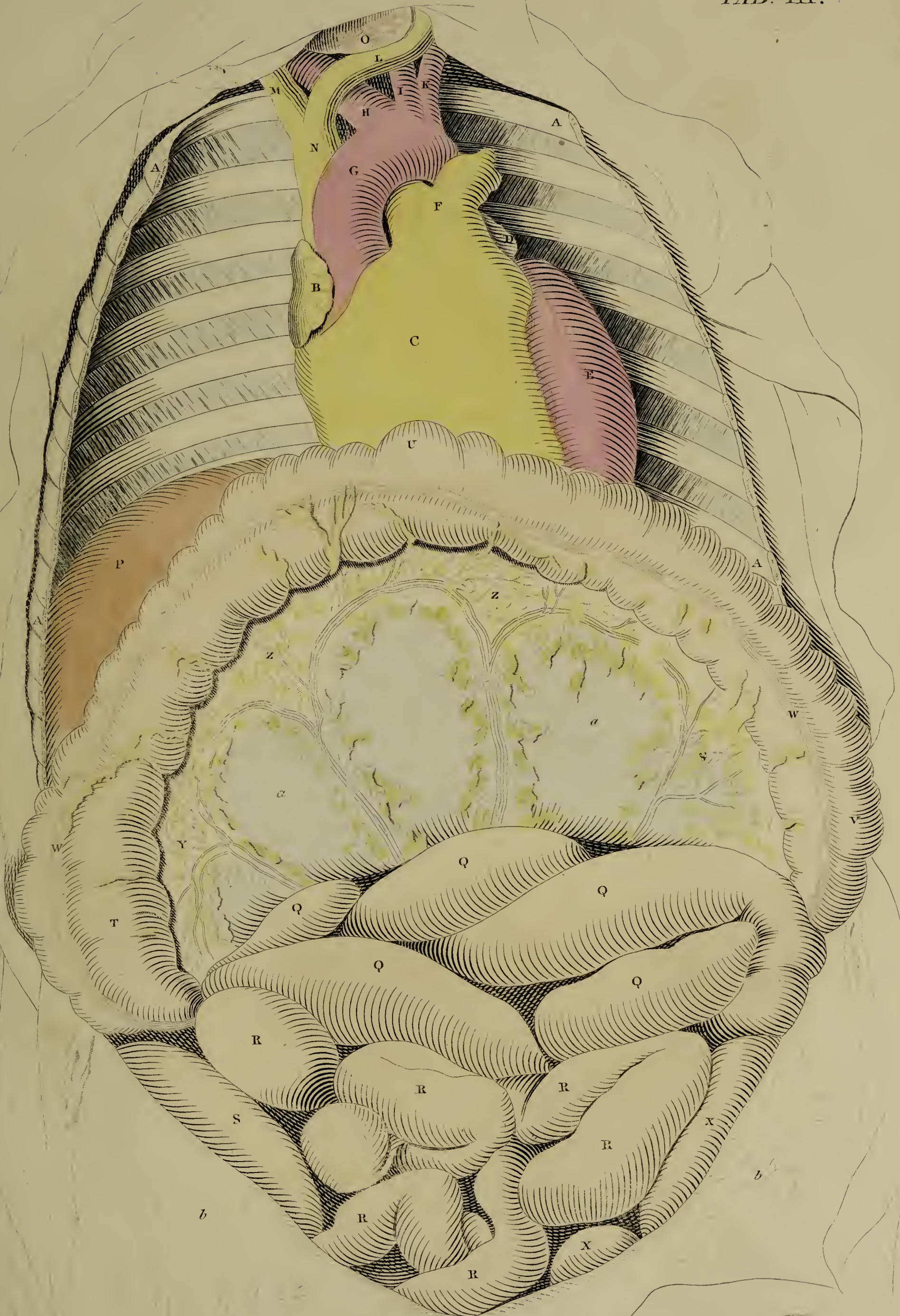
## T A B L E C X I.

The HEART and SMALL INTESTINES seen in their natural Situation.—The Lungs, with the Bronchi and Trachea, are removed. The Colon is turned up, after dividing the Omentum Majus.

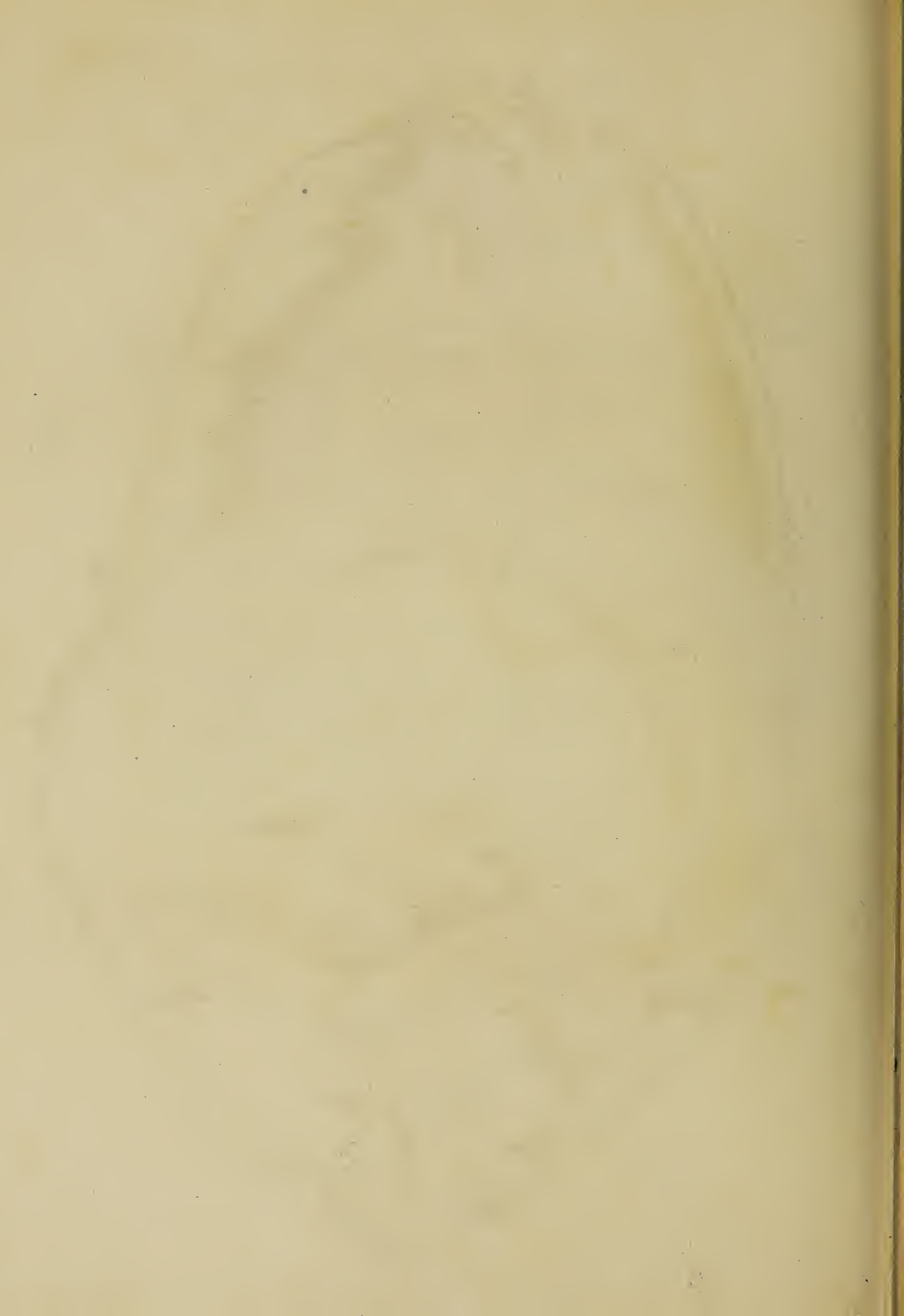
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- A, A, The ribs, from the first to the seventh inclusive.  
B—E, The heart. B, The right auricle, or appendix of the sinus venosus dexter; C, The right ventricle; D, The left auricle, or appendix of the sinus venosus sinister; E, The left ventricle.  
F, The trunk of the pulmonary artery, divided into its two branches.  
G, The arch of the aorta.  
H, The trunk common to the right carotid and subclavian arteries.  
I, The left common carotid, and,  
K, The left subclavian artery.  
L, The left thoracic jugular, and,  
M, The right thoracic jugular vein.  
N, The vena cava superior.  
O, The under part of the thyroid gland.  
P, Part of the diaphragm.  
Q, The intestinum jejunum.  
R, S, The ilium. S, Part of that intestine proceeding to the cæcum.  
T, U, V, The colon. T, The colon dextrum; U, The colon transversum; V, The colon sinistrum.  
W, The anterior ligament of the colon.  
X, X, Part of the sigmoid or iliac flexure of the colon.  
Y, Z, &, The mesocolon. Y, The dextrum; Z, The transversum; &, The sinistrum.  
*a*, Part of the mesocolon, which, in this subject, was destitute of fat.  
*b*, The peritoneum, which, with the muscles and integuments of the under part of the abdomen, are turned down.

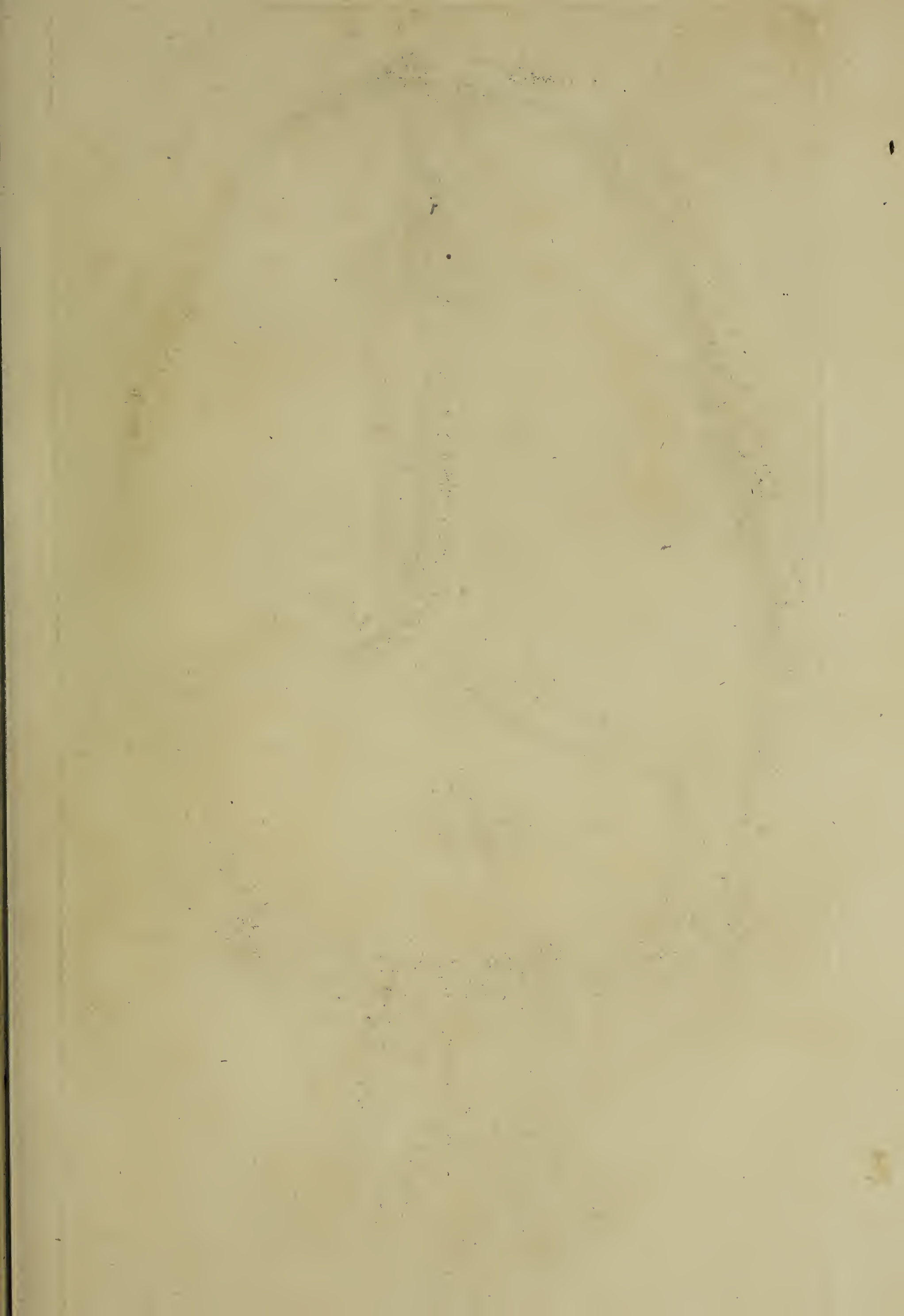




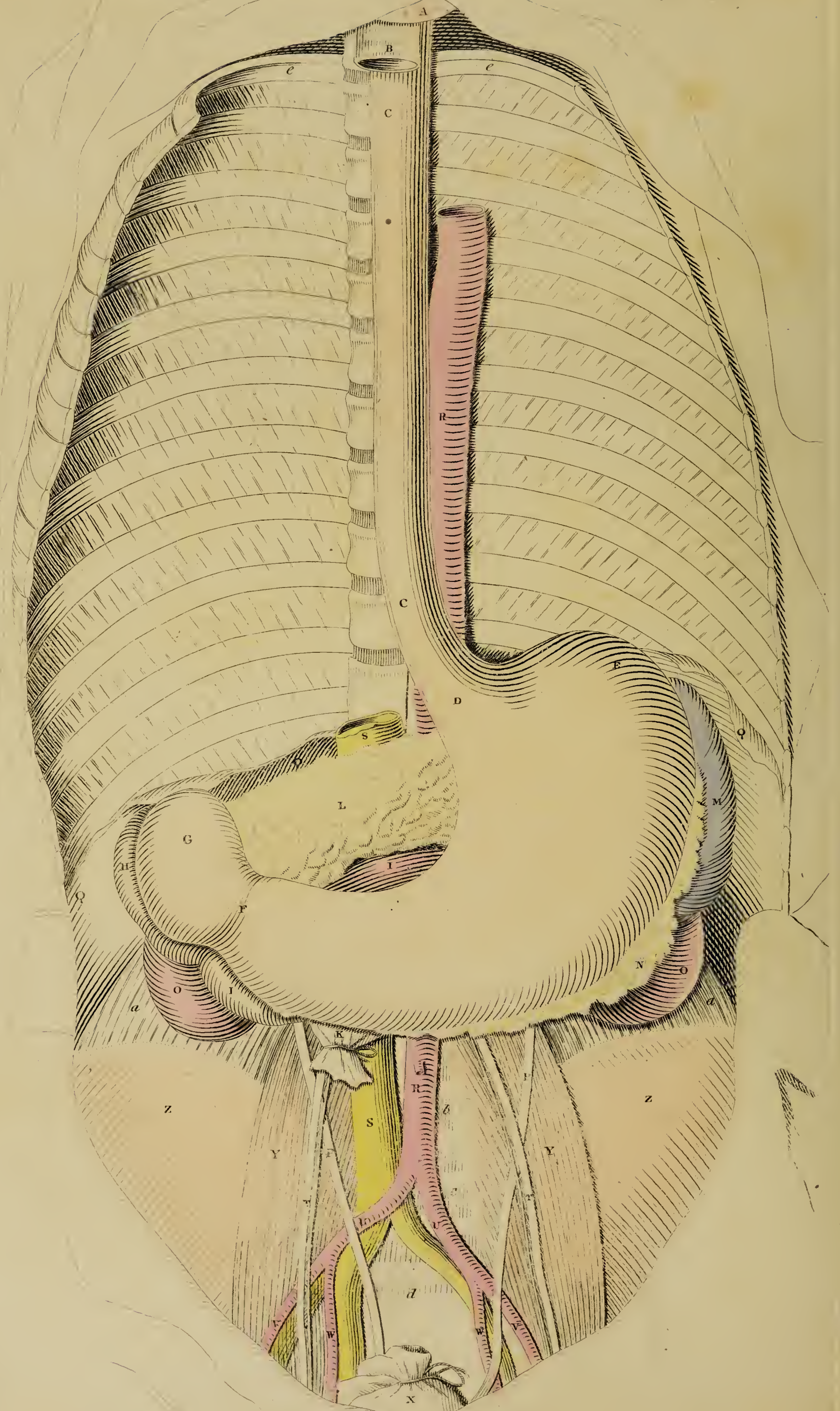














## T A B L E CXII.

Exhibits the Situation of the ESOPHAGUS and STOMACH.—All the Thoracic Viscera are removed. Almost the whole Diaphragm, with the Intestines, are cut away, except the Duodenum. The Peritoneum is raised from the Kidneys and Great Vessels.

A, The thyroid gland.

B, The trachea.

C, C, The esophagus, the longitudinal muscular fibres of which being removed, the cellular substance appears.

D, E, F, The stomach, moderately distended with air.

D, The cardia; E, The saccus cæcus ventriculi; F, The pylorus.

G, H, I, I, The first, second, and third curvatures of the duodenum.

K, The beginning of the cut jejunum, tied with a thread.

L, The pancreas.

M, The spleen.

N, The remains of the omentum gastro-colicum.

O, O, The right and left kidneys.

P, P, The two ureters.

Q, Q, The root of the diaphragm.

R, R, The aorta.

S, The inferior vena cava.

T, T, The internal spermatic artery and vein.

U, U, The iliac artery and vein.

V, V, The crural artery, with its vein.

W, W, The hypogastric artery, with its vein.

X, Part of the intestinum rectum distended, and tied with a thread.

Y, Y, The psoas major.

Z, Z, The iliacus internus.

a, a, The quadratus lumborum.

b, c, The fourth and fifth lumbar vertebræ.

d, The promontory of the os sacrum.

e, e, The first pair of ribs. The rest are easily understood.



## T A B L E C X I I I .

This TABLE represents the Situation of the ESOPHAGUS, STOMACH, AORTA, &c. of a New-born Child. The Thoracic Viscera are removed, the Diaphragm is cut away, with all the Intestines except the Duodenum. The Peritoneum, also, is raised from the Kidneys and Large Vessels. The Neck is so supported, that it is stretched and elongated; and the Clavicles appear at a distance from the Ribs.

- 
- |   |  |
|---|--|
| <p>A, A, The thyroid gland.<br/>           B, B, The sterno-thyroideus cut and turned back.<br/>           C, C, The thyro-hyoideus.<br/>           D, The thyroid cartilage.<br/>           E, E, The clavicles.<br/>           F, The trachea.<br/>           G, The esophagus, the longitudinal fibres of which appear, the cellular substance being removed.<br/>           H—K, The stomach somewhat distended.<br/>           H, The cardia.<br/>           I, The saccus cæcus ventriculi.<br/>           K, The pylorus.<br/>           L—N, The duodenum.<br/>           L, Its first,<br/>           M, Its second, and,<br/>           N, Its third curvature.<br/>           O, The pancreas.<br/>           P, The spleen.</p> | <p>Q, Q, The two kidneys.<br/>           R, Part of the right renal gland.<br/>           S, The remains of the cut diaphragm.<br/>           T, The arch of the aorta, with its three great branches.<br/>           U, A section of the ductus arteriosus.<br/>           V, The thoracic descending aorta.<br/>           W, The abdominal descending aorta.<br/>           X, The vena cava.<br/>           Y, Y, The iliac arteries.<br/>           Z, Z, The iliac veins.<br/> <i>a, a</i>, The internal spermatic arteries and veins.<br/> <i>b, b</i>, The ureters slightly distended.<br/> <i>c</i>, The remaining portion of the intestinum rectum.<br/> <i>d</i>, The urinary bladder pulled downwards.<br/> <i>e, e</i>, The umbilical arteries.<br/> <i>f</i>, The urachus.<br/> <i>g, g</i>, The first pair of ribs.</p> |
|---|--|



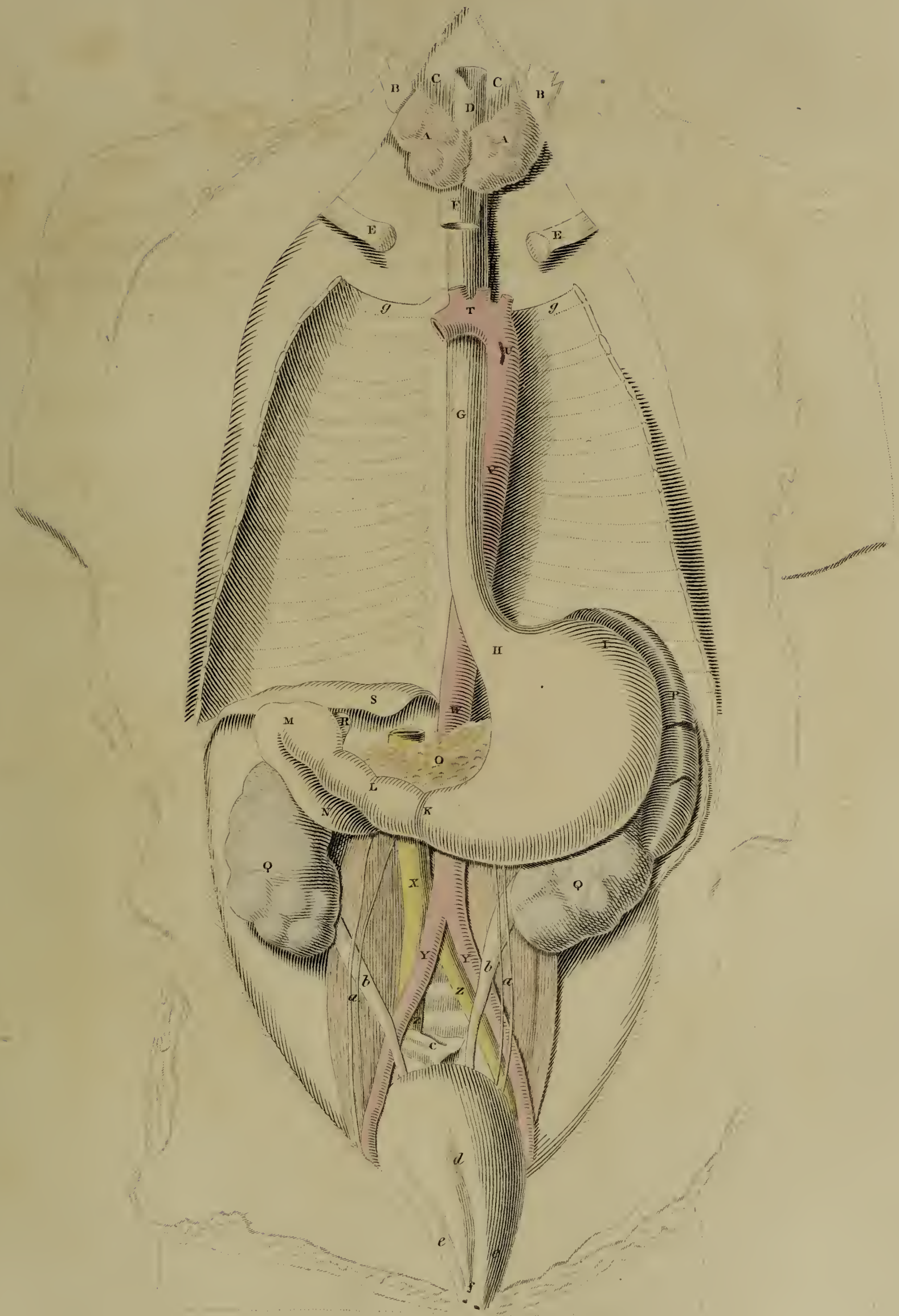












FIG. I

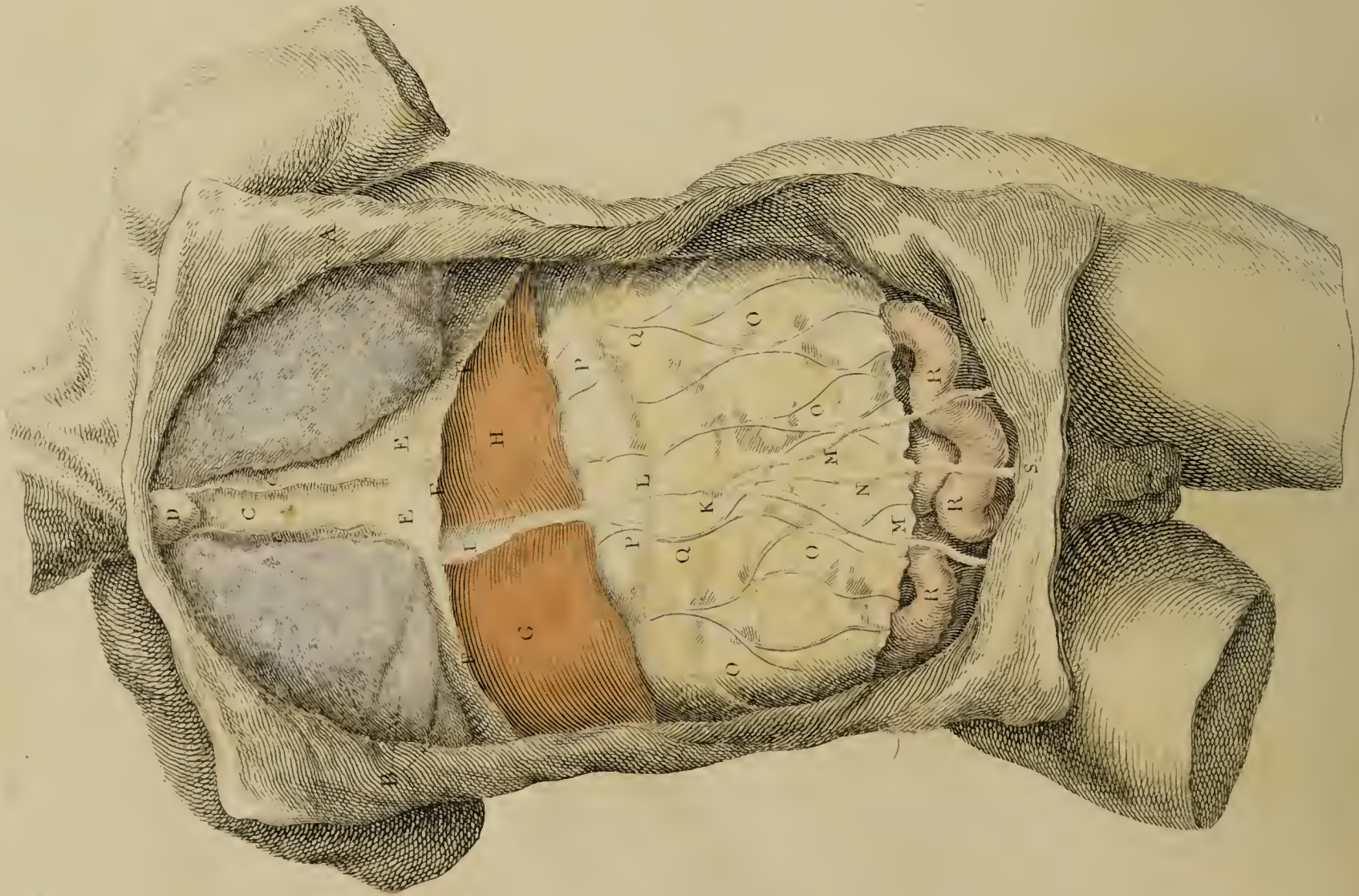
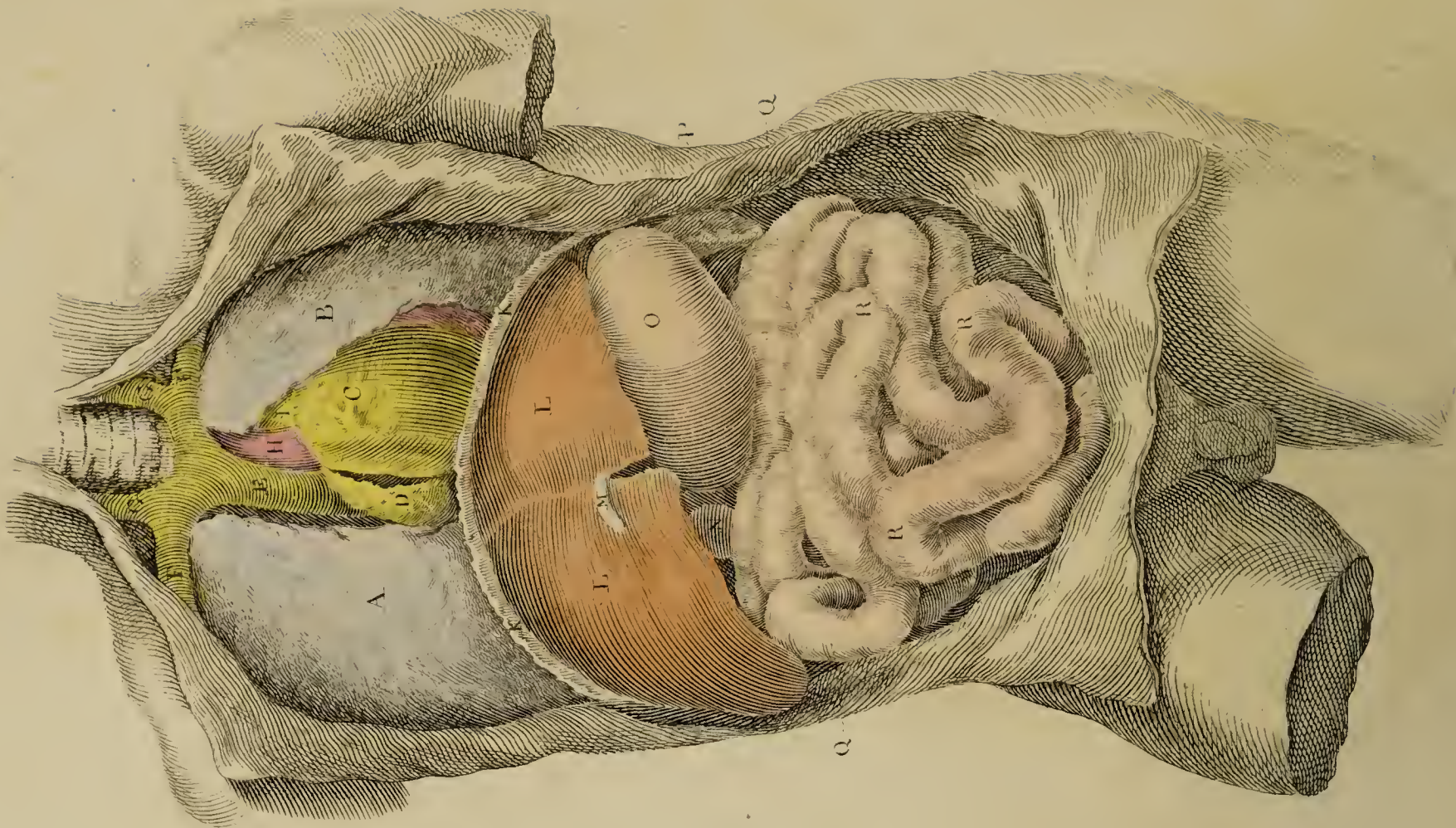


FIG.





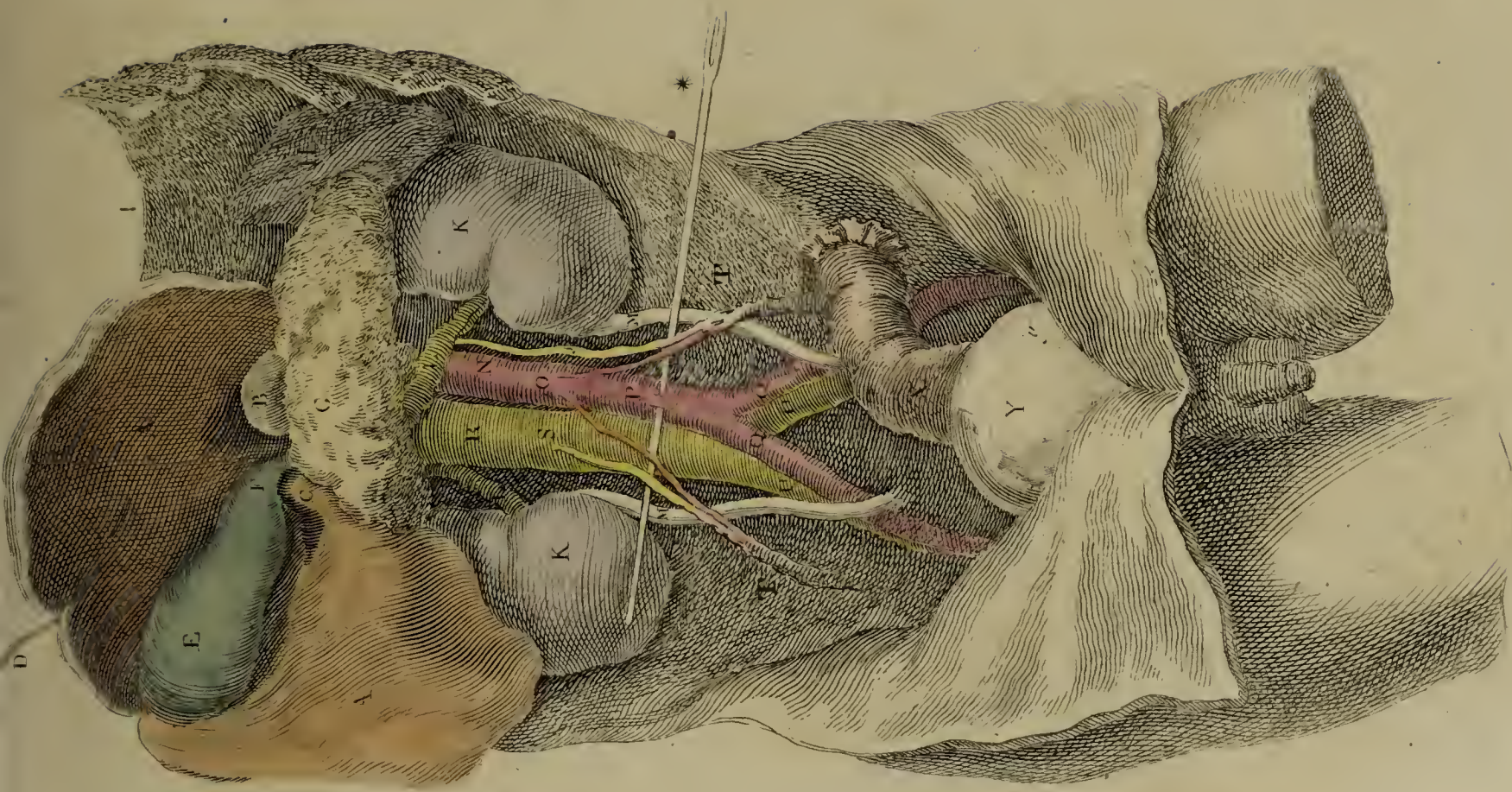
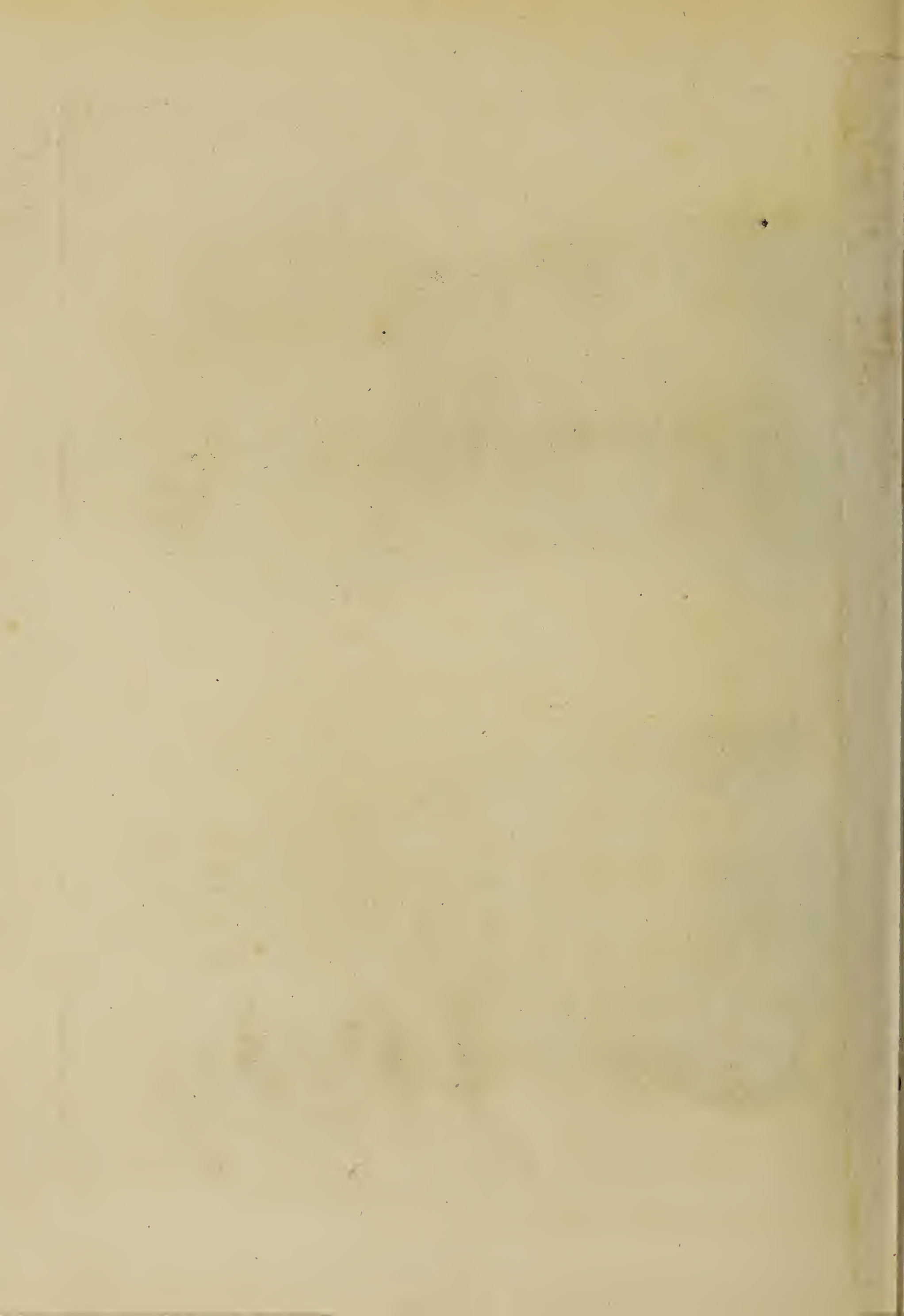


FIG. III







## T A B L E CXIV.

Represents the Situation of the THORACIC and ABDOMINAL VISCERA.

FIG. 1.

*The STERNUM, part of the RIBS and ABDOMINAL MUSCLES removed, and the INTEGUMENTS turned back, to obtain a View of the VISCERA situated in the Fore Part of the THORAX and ABDOMEN.*

- A, The two lobes of the left side of the lungs.
- B, The three lobes of the right side of the lungs.
- c, c, The pleura, going to form,
- C, The anterior part of the mediastinum.
- D, The thymus.
- E, E, The pericardium.
- F, F, F, A section of the diaphragm.
- G, H, The right and left lobes of the liver.
- I, The ligamentum latum of the liver.
- K, The umbilicus.
- L, The umbilical vein, changed into the ligamentum rotundum.
- M, M, The umbilical arteries, changed into ligaments.
- N, The urachus, ascending from the fundus of the bladder, to be fixed to the umbilicus.
- O, O, O, O, Q, Q, The omentum majus, with its blood-vessels.
- P, P, The stomach.
- Q, Q, The large arch of the colon, shining through the omentum.
- R, R, R, The under part of the small intestines:—The upper part is seen obscurely through the omentum.
- S, The fundus of the bladder.

FIG. 2.

*A View of the CONTENTS of the THORAX and ABDOMEN, after removing the OMENTUM, URACHUS, and UMBILICAL ARTERIES in the latter, and the THYMUS, MEDIASTINUM, and PERICARDIUM in the former.*

- A, The right lung, part of which is cut off, to shew the large blood-vessels.
- B, The left lung.
- C, The right ventricle of the heart.
- D, The right auricle of the heart.
- E, The vena cava superior.
- F, F, The subclavian veins.
- G, G, The internal jugular veins.

- H, The aorta ascendens.
- I, The pulmonary artery.
- K, K, The diaphragm.
- L, L, The right and left lobes of the liver, with the vestige of the ligamentum latum between them.
- M, The ligamentum rotundum.
- N, The fundus of the gall-bladder.
- O, The stomach pressed by the liver towards the left side.
- P, The spleen.
- Q, Q, That part of the intestines which conceals the kidneys.
- R, R, The convolutions of the small intestines.

FIG. 3.

*Represents the Situation of the DUODENUM. The Figure is taken from the BODY of a FÆTUS; but, according to the Author of the Figure, there is no essential difference between the DUODENUM in this and in the Adult state.*

- A, The liver, proportionally larger than in the adult.
- B, The umbilical vein.
- C, The gall-bladder full of bile, and more pyriform than in the adult.
- D, The stomach distended with air.
- E, The seat of the pylorus, and beginning of the duodenum.
- F, The duodenum making a turn to go across the spine.
- G, The termination of the ductus communis choledochus in the duodenum.
- H, The pancreatic duct terminating in the duodenum, at the side of the common biliary duct.
- I, The duct of the pancreas minus, ending in the pancreatic duct.
- K, The mesenteric artery and vein, cut as they pass in the niche between the pancreas and pancreas minus.
- L, The remains of the omentum.
- M, The continuation of the duodenum, drawn considerably down, along with the other intestines, so as to have a full view of its other parts.
- N, N, The cut ends of the great arch of the colon turned aside.
- O, O, The turns of the jejunum and ilium.
- P, The right kidney.

FIG.



## FIG. 4.

*The Situation of the VISCERA in the Upper, Back, and Under Part of the ABDOMEN.*

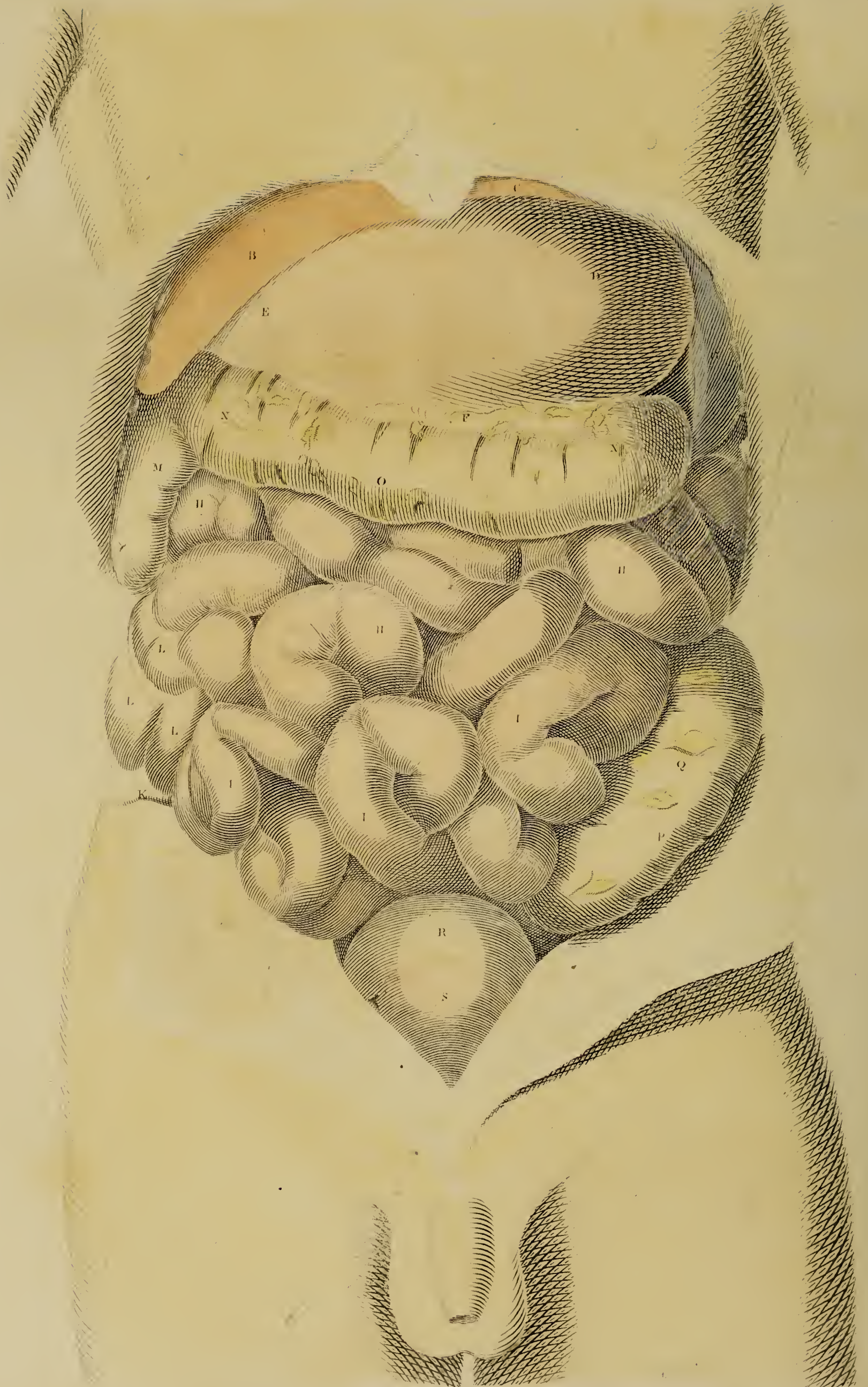
- A, The hollow or inferior surface of the liver, turned upwards and to the right side.  
 B, The lobulus SPIGELII.—Between B and C, the porta.  
 D, The ligamentum rotundum.  
 E, The gall-bladder.  
 F, The beginning of the cystic duct.  
 G, The pancreas.  
 H, The spleen.  
 I, The ribs.  
 K, K, The kidneys.  
 L, L, The renal veins.  
 M, M, The ureters.  
 N, The aorta.

- O, The spermatic arteries.  
 P, The beginning of the inferior mesenteric artery.  
 \* A probe supporting the spermatic vessels, and beginning of the mesenteric artery.  
 Q, Q, The common iliac arteries.  
 R, The inferior vena cava.  
 S, s, The spermatic veins.  
 T, T, The spermatic arteries and veins closely embracing each other, in their way to the testes.  
 U, U, The common iliac veins.  
 V, The end of the colon.  
 X, The beginning of the rectum.  
 Y, y, y, z, The bladder of urine.  
 A, The part which is covered only by cellular substance.  
 y, y, z, Shews how far the peritoneum reaches down upon the fore part of the bladder.  
 z, The urachus.











## T A B L E CXV.

A VIEW of the ABDOMINAL VISCERA of a Young Adult, who suffered by the hands of the Public Executioner during the Summer of 1812.—The Parts are in the perfectly sound state, and the natural Situation is preserved as much as circumstances would allow. A CRUCIAL INCISION is made through the INTEGUMENTS, MUSCLES, and PERITONEUM, and the Flaps turned back. The Fore Part of the FALSE RIBS is cut and removed, and their remaining Portions gently drawn outwards, to obtain a more complete View of the VISCERA at the Upper End of the ABDOMEN. The STOMACH and INTESTINES are slightly distended, by air blown in at the ESOPHAGUS.

---

A, The outlines of the cartilago ensiformis.  
 B, B, A portion of the upper convex part of the liver ;  
 B, The right ; and C, The left lobe.  
 D, E, The stomach, lying nearly in the horizontal situation ; D, The great ; E, The small extremity.  
 F, A portion of the omentum majus, the rest of it being separated, to give a view of the parts which it covered.  
 G, The spleen, brought a little forwards from its natural situation.  
 H, H, H, The convolutions of the jejunum.  
 I, I, I, Those of the ilium.  
 K, The appendix vermiformis pulled outward.

L, L, L, The intestinum cæcum, with one of its longitudinal muscular bands.  
 M, The right portion of the colon.  
 N, N, The great arch of the colon, with its appendiculæ pinguedinosæ.  
 O, One of the longitudinal muscular bands of the colon, tucking it up into cells.  
 P, The sigmoid flexure of the colon, with its fatty appendages.  
 Q, One of the bands of the sigmoid flexure.  
 R, S, The bladder of urine distended ; R, shews how far the peritoneal coat descends on the fore part of that viscus ; S, The muscular coat.



## T A B L E CXVI.

Represents a Left LATERAL VIEW of the NATURAL SITUATION of the THORACIC and ABDOMINAL VISCERA.

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IN this Figure, the Superior and Inferior Extremity are separated from the Trunk. A Longitudinal Incision is made through the middle of the Anterior and Posterior parts of the Body, from the bottom of the Neck, as far as the Pelvis. The Integuments, with the Muscles and Bones covering the Left Half of the Thorax, Abdomen, and Pelvis, are removed.

- A, B, C, The cut edge of the integuments and muscles; —B, The umbilicus; —C, The anus.
- D, A section of the sternum.
- E, The os pubis of the right side covered with cartilage.
- F, F, The transverse processes of the dorsal vertebræ, with the pits to which the tubercles of the ribs were joined.
- G, G, The transverse processes of the lumbar vertebræ.
- H, H, The spinous processes of the dorsal vertebræ.
- I, I, ————— lumbar vertebræ.
- K, L, M, N, The os sacrum; —L, The lateral surface incrustated with cartilage, which formed a connexion between this bone and the os innominatum; —N, The lateral part of the bone to which the sacro-sciatic ligament adhered.
- O, P, The two lobes of the left lung dilated, and corresponding with the form of the thorax, so that the impressions of the ribs upon their surface in some measure appear. The great lobe extends to the sternum, and so embraces the pericardium, and accommodates itself to it, that only a small portion of that membrane appears.
- Q, The under and fore part of the pericardium exposed.
- R, S, T, U, V, W, X, The convexity of the diaphragm within the thorax, shewn by cutting the inferior part of the lung which descended between this muscle and the ribs; —R, The fleshy left part covered by the pleura; —S, The extremity which is inserted into the cartilage of the seventh rib; —T, That which adheres to the cartilage of the eighth rib; —U, That which adheres to the osseous and cartilaginous portions of the ninth rib; —V, That which is joined to the tenth rib and its cartilage; —W, That which was inserted into the osseous part of the eleventh rib, nearer its cartilage; —X, That which was fixed to the twelfth rib and its ligament.
- Y, Y, Y, The small intestines faintly appearing through the peritoneum covering them.
- Z, Z, The colon inclosed in the same membrane, descending to the sigmoid flexure; then ascending towards the middle of the os sacrum, before it forms the intestinum rectum.
- a, The intestinum rectum proceeding to the anus.
- b, The left kidney placed on the outside of the peritoneum. It is partly covered by the inferior portion of the diaphragm, and lies upon the transverse processes of the two uppermost lumbar vertebræ.
- c, The vesica urinaria, a little distended with fluid, situated on the outside of the peritoneum, yet so that the peritoneum covers the upper part of it.
- d, The prostate gland.
- e, Part of the left vesicula seminalis projecting above the prostate gland, and situated between the vesica urinaria and intestinum rectum.
- f, The left crus of the penis, separated from the corresponding crus of the os ischium.
- g, The subclavian artery tied and cut across.
- h, The corresponding vein.
- i, The left iliac artery.
- k, The concomitant vein.
- l, The spermatic cord.
- m, The vas deferens receding from the spermatic blood-vessels, and running towards the back part of the bladder, to terminate in the vesicula seminalis.
- n, n, The ureter, with its termination in the lateral part of the bladder.
- o, The sciatic nerve.
- The iliac and spermatic vessels, and the sciatic nerve, are a little displaced in removing the os innominatum.





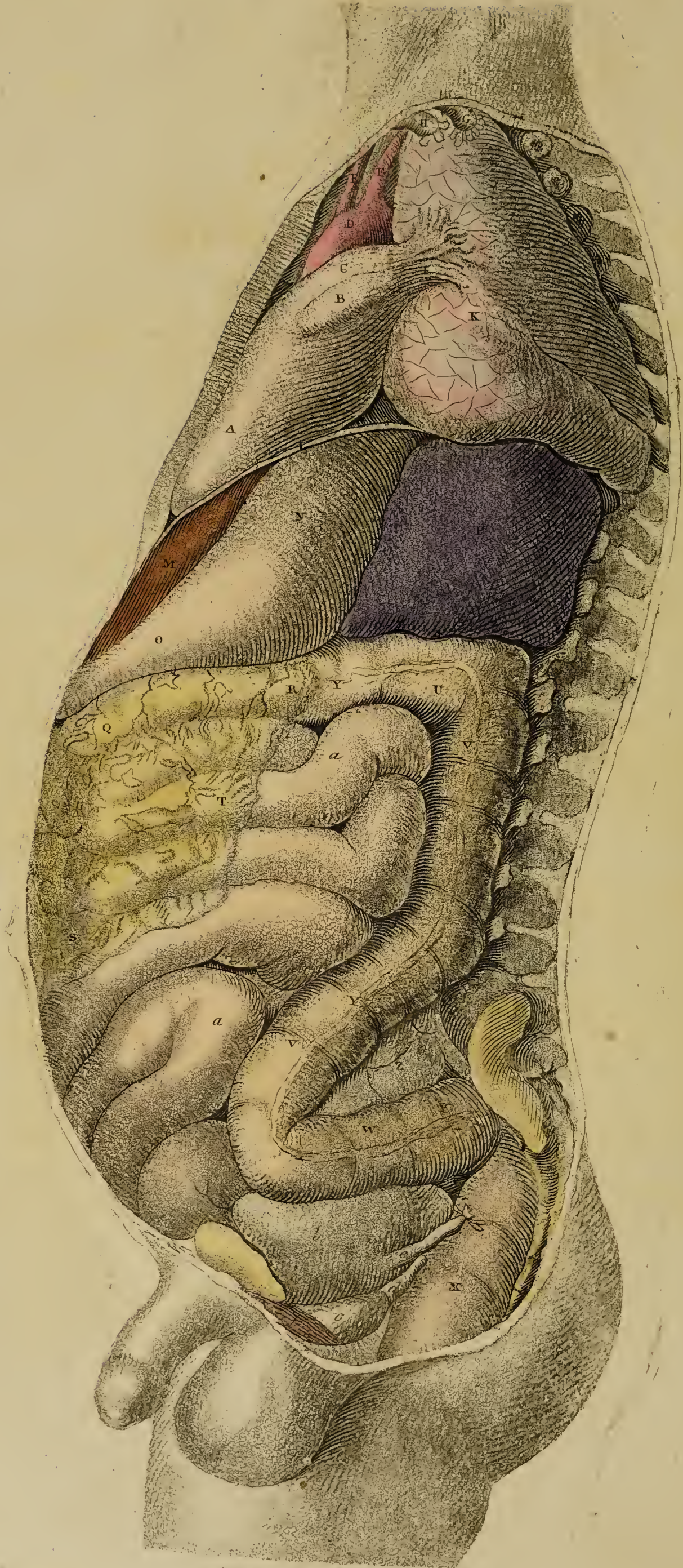














## T A B L E CXVII.

A VIEW of PARTS deeper seated than those seen in the preceding FIGURE.

THE Lateral Portion of the Diaphragm, over the Liver, Stomach, and Spleen, is cut off. The Left Lung is turned towards the Spine, that its Concave Surface which accommodates itself to the Pericardium, the bare Surface of the latter, and the Vessels proceeding from the Heart, may appear. The Kidney is raised from its place. The Iliac and Spermatic Vessels, the Ureter and Sciatic Nerve, and the Peritoneum covering this side of the Intestines, are dissected away, by which the Intestines and Omentum are brought into view.

A, B, C, The pericardium containing the heart and origin of the vessels;—A, The apex and left ventricle of the heart appearing through the pericardium;—B, The left auricle also somewhat conspicuous;—C, The pulmonary artery.  
D, The arch of the aorta, after emerging from the pericardium.  
E, The arteria innominata LOWERI, and,  
F, The left carotid artery arising from the aorta.  
G, H, The arteria and vena subclavia.  
I, One of the four pulmonary veins which terminate in the left auricle of the heart.  
K, The left lung turned towards the spine in such a manner, that what is naturally concave and embracing the pericardium, appears here convex.  
L, A portion of the diaphragm left *in situ*, after removing its lateral part; shewing how much it ascends into the cavity of the thorax.  
M, The left part of the liver lying over the stomach.  
N, O, The stomach a little distended with aliment;—N, The saccus cæcus ventriculi.—O, The great arch or curvature.  
P, The spleen, the figure of which in this subject was almost quadrangular. It is convex externally, and

concave internally, where it is accurately applied to the stomach.

Q, R, S, T, The omentum majus;—S, That part of it called gastro-colicum descending from the great arches of the stomach and colon over the small intestines, —very thin, and without fat.  
Q, R, U, V, V, W, X, The great intestine;—Q, R, U, The transverse part of the great intestine, termed *colon transversum*, and *zona coli*, running under the stomach and spleen to the last transverse process of the back, and first of the loins;—V, V, The left part of the great intestine, or the *colon sinistrum*, descending near the lumbar vertebræ and os ilium;—W, The inferior part of the colon sinistrum, or the bottom of the sigmoid flexure, ascending a little, and reaching the middle of the upper part of the os sacrum;—X, The extremity of the colon termed *rectum*, proceeding along the os sacrum and os coccygis to the anus.  
Y, Y, Y, One of the three ligaments which extends along the colon, from the intestinum cæcum as far as the beginning of the rectum.  
Z, Part of the meso-colon, through which the small intestines appear.  
S, T, a, a, The convolutions of the small intestines partly covered by the omentum.  
b, The vesica urinaria somewhat distended with fluid, placed between the os pubis and intestinum rectum.  
c, The prostate gland situated at the lower part of the bladder of urine.  
d, The vesicula seminalis of the left side.  
e, The ureter dissected a little from the bladder.  
f, The left crus penis separated from the corresponding crus of the os ischium.  
g, The place which the kidney of this side occupied, partly filled by the colon, though the true situation of it still appears.



## T A B L E C X V I I I .

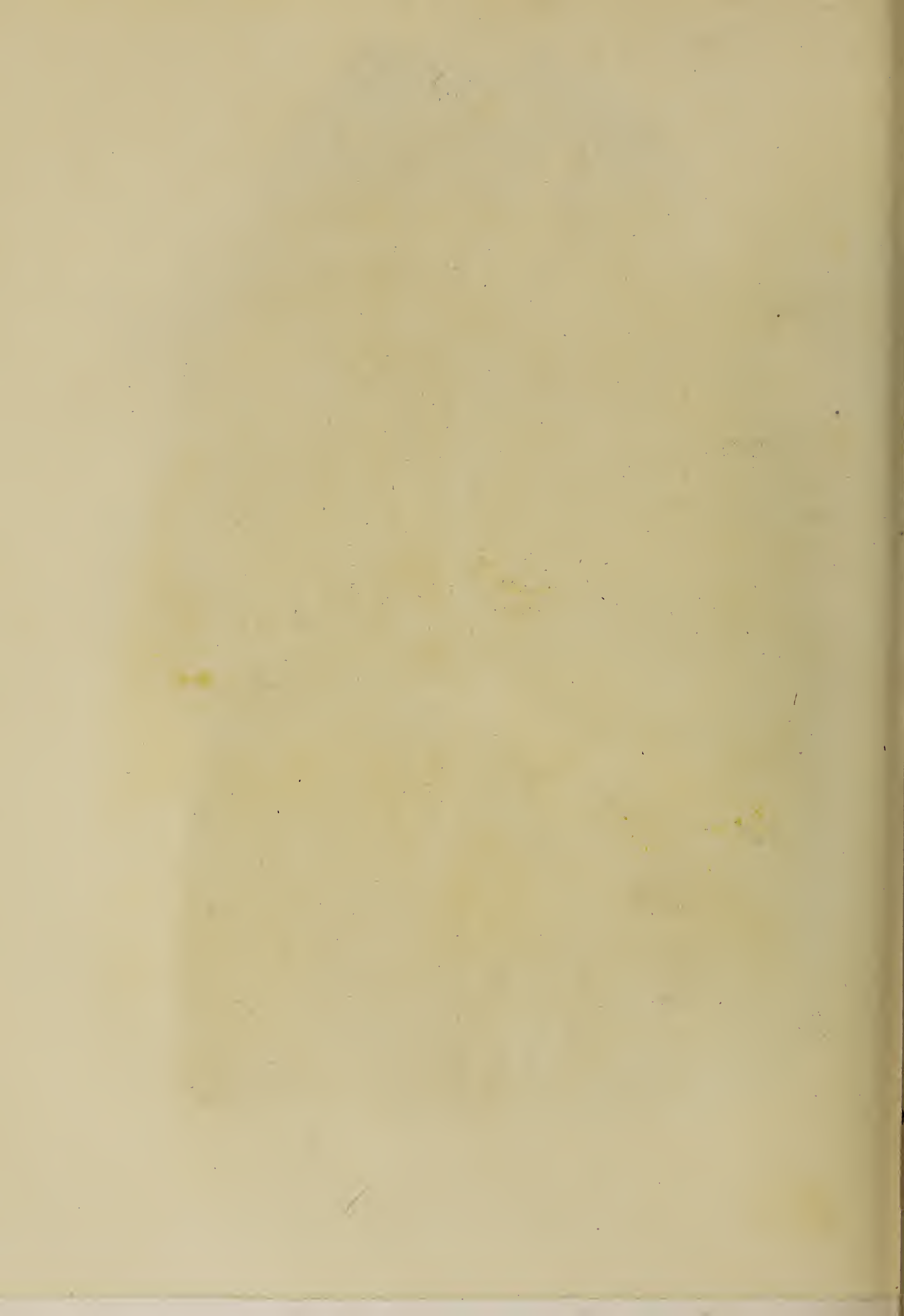
Sketch of the TONGUE, LARYNX, TRACHEA, HEART, and Left LUNG turned towards the Right Side, by which the PHARYNX, ESOPHAGUS, and DESCENDING AORTA, are brought into View.

- 
- 
- |   |   |
|---|---|
| A, The tongue.  | M, The beginning of the esophagus.  |
| B, The epiglottis.  | N, The esophagus descending to the abdomen on the fore part of the aorta. |
| C, The back part of the cricoid and arytenoid cartilages covered by their membrane. | O, The pulmonary artery.  |
| D, The trachea.   | P, The arch of the aorta.   |
| E, The part where it enters the lungs.  | Q, R, The right and left carotid arteries.                                |
| F, The palatum molle.   | S, The left subclavian artery.  |
| G, The uvula.   | T, The aorta descendens.  |
| H, The right amygdala placed between,   | U, The edge of the left lung.   |
| I, K, The anterior and posterior arches of the palate.                              | V, The upper part of the right lung.                                      |
| L, The pharynx laid open longitudinally.  | W, Sections of the clavicles.   |
|   | X, X, Sections of the ribs.   |

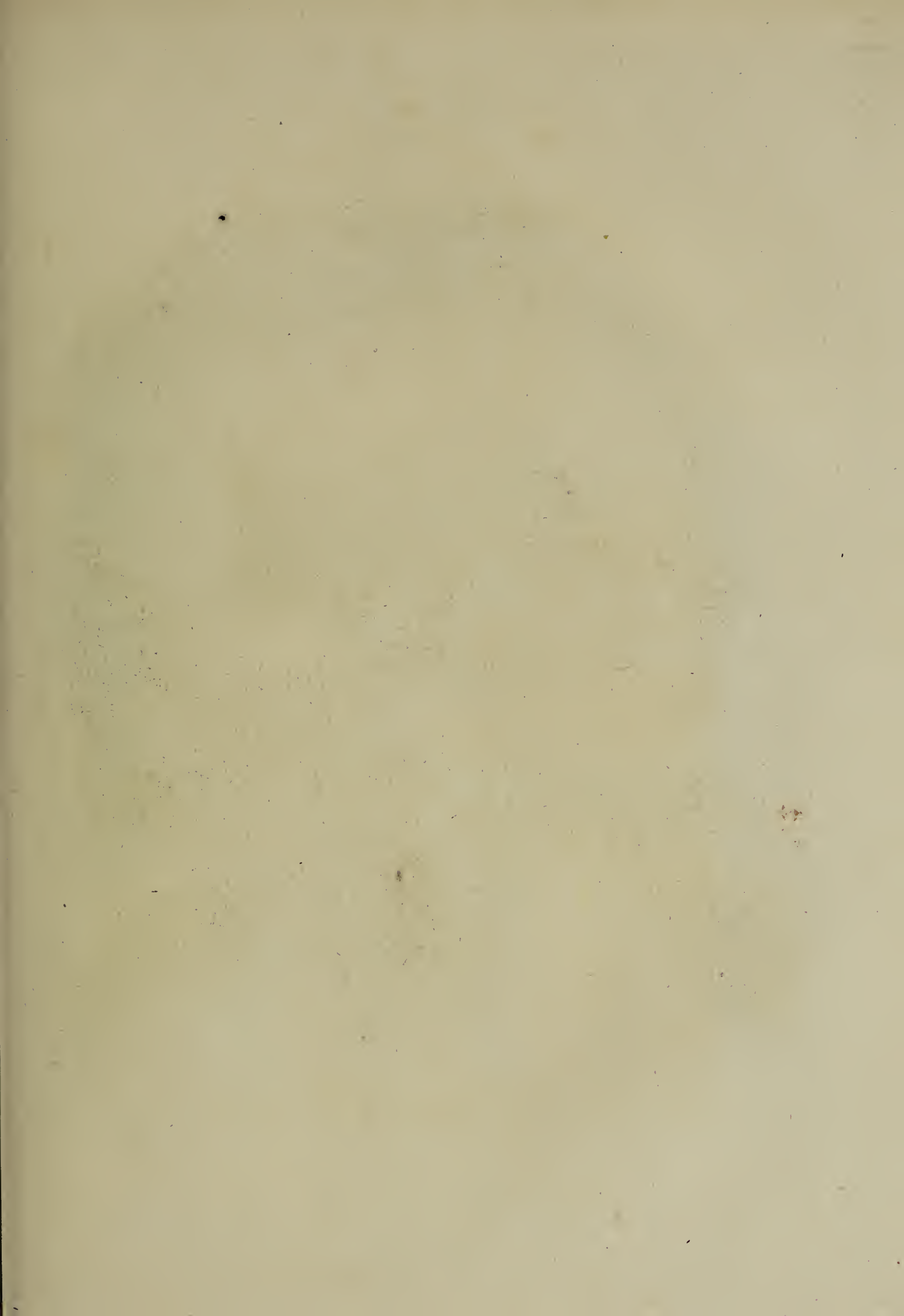




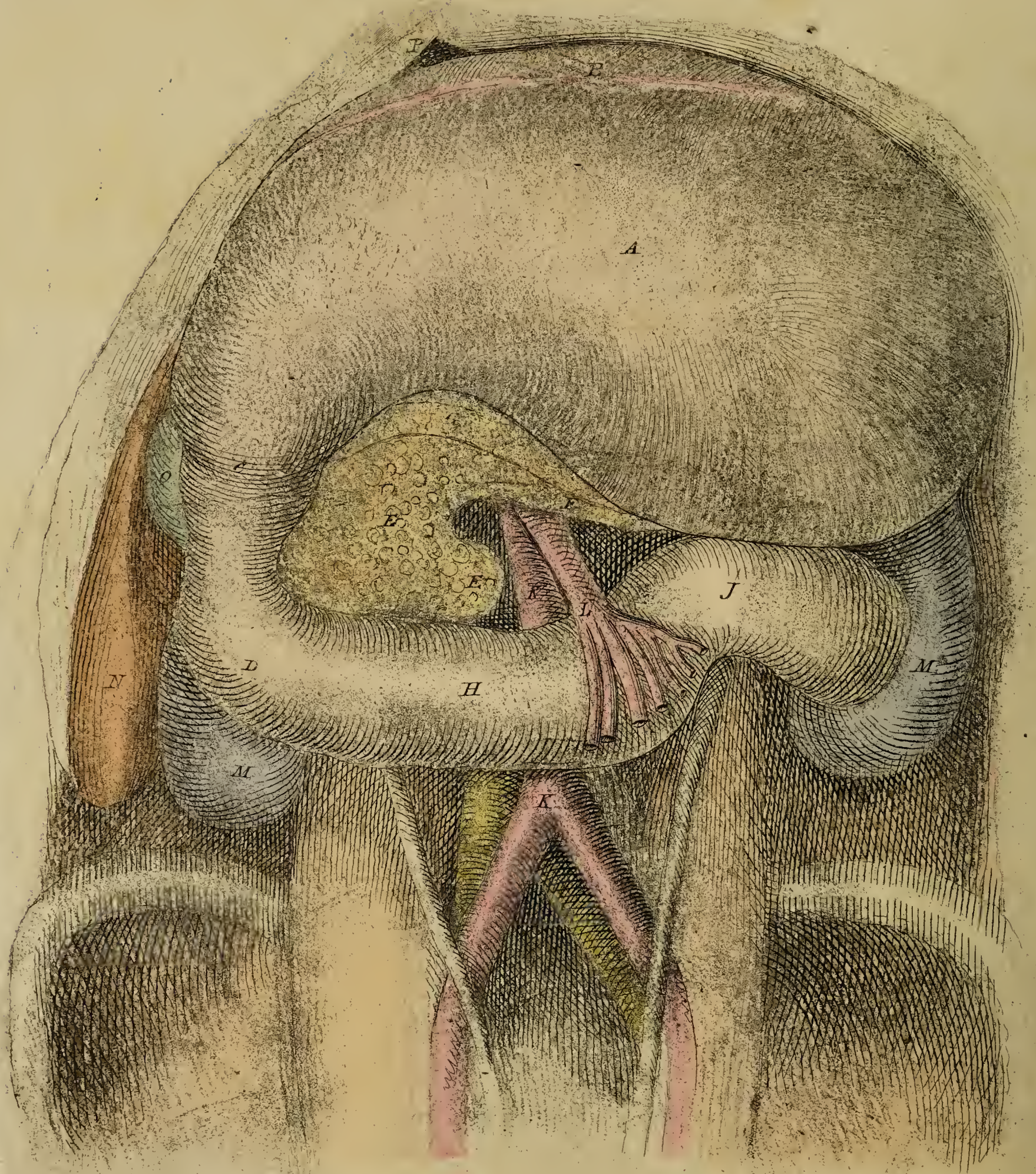














## T A B L E CXIX.

This Figure is intended to shew the Situation of the STOMACH and DUODENUM, with their connexion to some of the adjacent VISCERA, in a young Man who was executed for Murder. —The Figure is reduced to three-fourths of its natural size.

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- |   |  |
|---|--|
| A, The stomach applied closely to the diaphragm and liver, and viewed from its under and fore part. | K, The aorta.  |
| B, Vestiges of the vessels upon the great curvature of the stomach.                                 | L, The superior mesenteric artery and its branches, crossing over the duodenum.  |
| C, The pylorus.   | M, M, The kidneys.   |
| D, That part of the duodenum where the biliary and pancreatic ducts enter.                          | N, The great lobe of the liver in the right hypochondriac region.  |
| E, E, The head of the pancreas.   | O, The bottom of the gall-bladder.   |
| F, F, The body of the pancreas.   | P, The round ligament of the liver.  |
| G, The omentum minus.   | The other parts shew the inferior margin of the thorax, —the crista of the ossa ilia,—the psoæ and internal iliac muscles,—the ureters and the iliac blood-vessels, all of which are but slightly expressed. |
| H, The course of the duodenum across the spine.   |  |
| I, The duodenum ending in the ilium.  |  |



## T A B L E CXX.

Represents the LIVER and STOMACH, &c. of their natural size, the former being turned a little upwards.—The relative situation of the STOMACH is not preserved, being drawn a little to the right side, on account of the smallness of the Plate.

- 
- |   |  |
|---|--|
| A, The concave or under surface of the great lobe of the liver. | <i>b, b, b</i> , The large curvature of the stomach.   |
| B, A small part of the convex or upper surface of the liver.    | <i>c, c</i> , The omentum minus.   |
| C, The concave or under surface of the small lobe of the liver. | <i>d</i> , The point of the lobulus SPIGELII.  |
| D, Part of the ligamentum latum.                                | <i>e, e, e</i> , The superior coronary vessels, sending numerous branches to the stomach.                                |
| E, The gall-bladder.  | <i>f, f, f</i> , The inferior coronary vessels, also sending numerous branches to the stomach, and to the omentum majus. |
| F, The cystic duct.   | <i>g, g, g</i> , The beginning of the omentum majus.   |
| G, G, G, G, The sinus portarum.                                 | <i>h</i> , The large or left extremity of the stomach.   |
| H, The hepatic duct.  | <i>i</i> , The small or right extremity of the stomach.  |
| I, The ductus communis choledochus.                             | <i>k</i> , The cardia, or upper orifice of the stomach.  |
| K, The hepatic artery.  | <i>l</i> , The pylorus, or under orifice of the stomach, with a small part of the duodenum surrounding it.               |
| L, The vena portæ.  | <i>m</i> , The anterior edge of the spleen.  |
| <i>a, a, a</i> , The small curvature of the stomach.            |  |





T. A. B. 120.







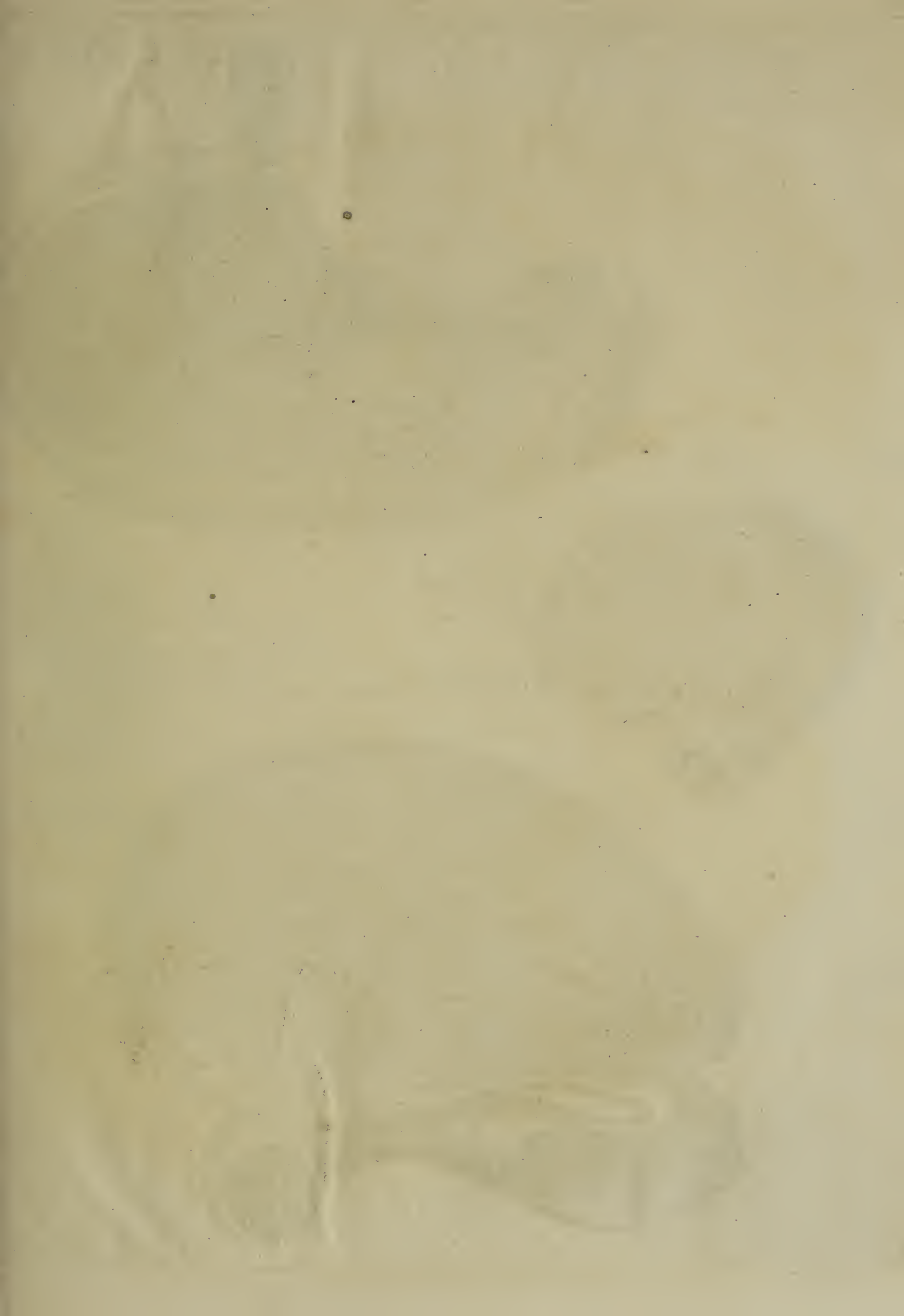




Fig. 1.

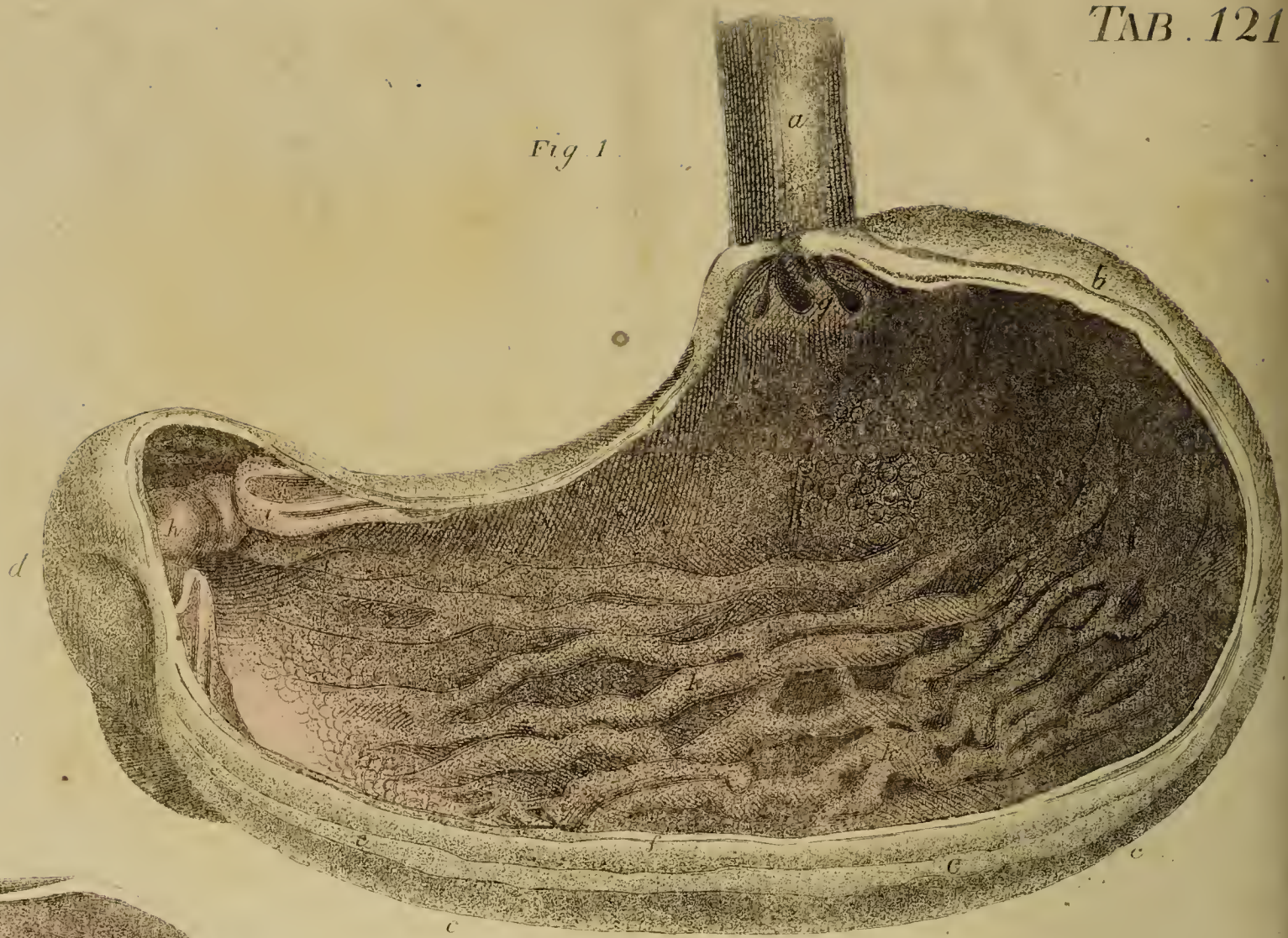


Fig. 2.



Fig. 3.





## T A B L E CXXI.

### VIEWS of the INNER SURFACE of the Stomach and DUODENUM.

FIG. 1.

*The upper and Fore Part of the STOMACH cut and removed to shew the Inner Surface of its POSTERIOR PORTION.*

- a*, The esophagus.
- b*, The saccus cæcus ventriculi.
- c, c*, The arcus major, or fundus ventriculi.
- d*, The duodenum.
- e, e*, The part from whence the omentum sprung.
- f, f*, The cut edge of the stomach.
- g*, Plicæ at the cardia, which, when joined together, form a kind of star.
- h*, The pylorus.
- i*, The cut edge of the pylorus.
- k, k*, Rugæ within the stomach, more or less prominent.

FIG. 2.

*Part of the Right Extremity of the Stomach, so dissected*

*and immersed in water as to represent the form and nature of the PYLORUS.*

- a*, The interior surface of the stomach.
- b*, The duodenum.
- c, c*, The valve of the pylorus, which in the original figure is said to be expressed and delineated with the greatest diligence.

FIG. 3.

*The Inferior Surface of the STOMACH and DUODENUM, the Inferior Portion of these VISCERA being removed.*

- a, a*, The inner surface of the upper portion of the stomach.
- b*, The rugæ of the cardia.
- c*, The pylorus.
- d, d*, The thickness of the same.
- e*, The inner surface of the duodenum.



## T A B L E CXXII.

## VIEWS of the OMENTUM.

## FIG. 1.

Represents the OMENTUM MAJUS, and that part of it called GASTRO-COLICUM.

- A, A, The liver turned upwards.  
 a, The gall-bladder, shorter than the liver, as is usual in children.  
 b, The umbilical vein and fossa.  
 B, The *Lobulus SPIGELII*, appearing through the omentum minus.  
 c, The large curvature of the stomach, appearing through the inflated omentum.  
 d, The right gastro-colic artery and vein.  
 e, The seat of the pylorus.  
 f, The point of the spleen, projecting between the stomach and colon.  
 g, A ligament produced from the peritoneum, which supports the spleen.  
 C, C, &c. The omentum majus, or gastro-colicum.  
 h, A line separating the omentum from the meso-colon.  
 i, i, The origin of the omentum gastro-colicum from the large curvature of the stomach, from which the anterior lamina is produced.  
 k, k, A line pointing at the origin of the omentum majus from the colon, or the lamina posterior.  
 l, The left blind termination of the omentum.  
 m, m, The *Omentum Minus* of WINSLOW, or *membrana macilentior*.  
 n, The *Omentum Colicum* of HALLER, which is an appendix of the omentum majus.  
 o, Part of the meso-colon.  
 D, D, The convolutions of the small intestines.  
 E, E, The containing parts of the abdomen turned back.  
 F, F, The thighs.

## FIG. 2.

Shews all the PARTS seen in Fig. 1. but the OMENTUM

MAJUS is collapsed on each side, and the INTESTINUM COLON pulled a little downwards, to obtain a View of the FORAMEN of WINSLOW.

- A, The liver turned upwards;—the letter is placed upon the lobus anonymus.  
 B, the gall-bladder.  
 a, the umbilical vein.  
 C, The stomach, almost empty.  
 D, The *Lobulus SPIGELII*, appearing through the omentum minus.  
 b, The pylorus, from which the first turn of the duodenum passes upwards and backwards.  
 c, The omentum gastro-colicum, collapsed.  
 d, d, A line marking the connexion of the omentum gastro-colicum and colicum with the colon.  
 e, e, The *Omentum Minus* of WINSLOW.  
 f, f, The transverse part of the duodenum appearing through the meso-colon.  
 E, E, g, g, Various parts of the colon;—E, E, Its great arch.  
 h, Part of the duodenum, upon which the gall-bladder rests.  
 i, The descending part of the duodenum, into which the biliary and pancreatic ducts enter.  
 k, The ligamentum hepato-colicum, formed of membranes passing from the gall-bladder and liver across the duodenum, to be connected with the colon.  
 l, The ligamentum hepato-renale.  
 m, The right kidney, a small part of which is covered by the peritoneum.  
 n, The *Meatus*, or *Foramen WINSLOII*, between k, the ligamentum hepato-colicum, and l, the hepato-renale.  
 o, The colon, with its *appendiculæ pinguedinosæ*.  
 F, F, F, The convolutions of the small intestines.  
 G, G, G, The containing parts of the abdomen cut and reflected.



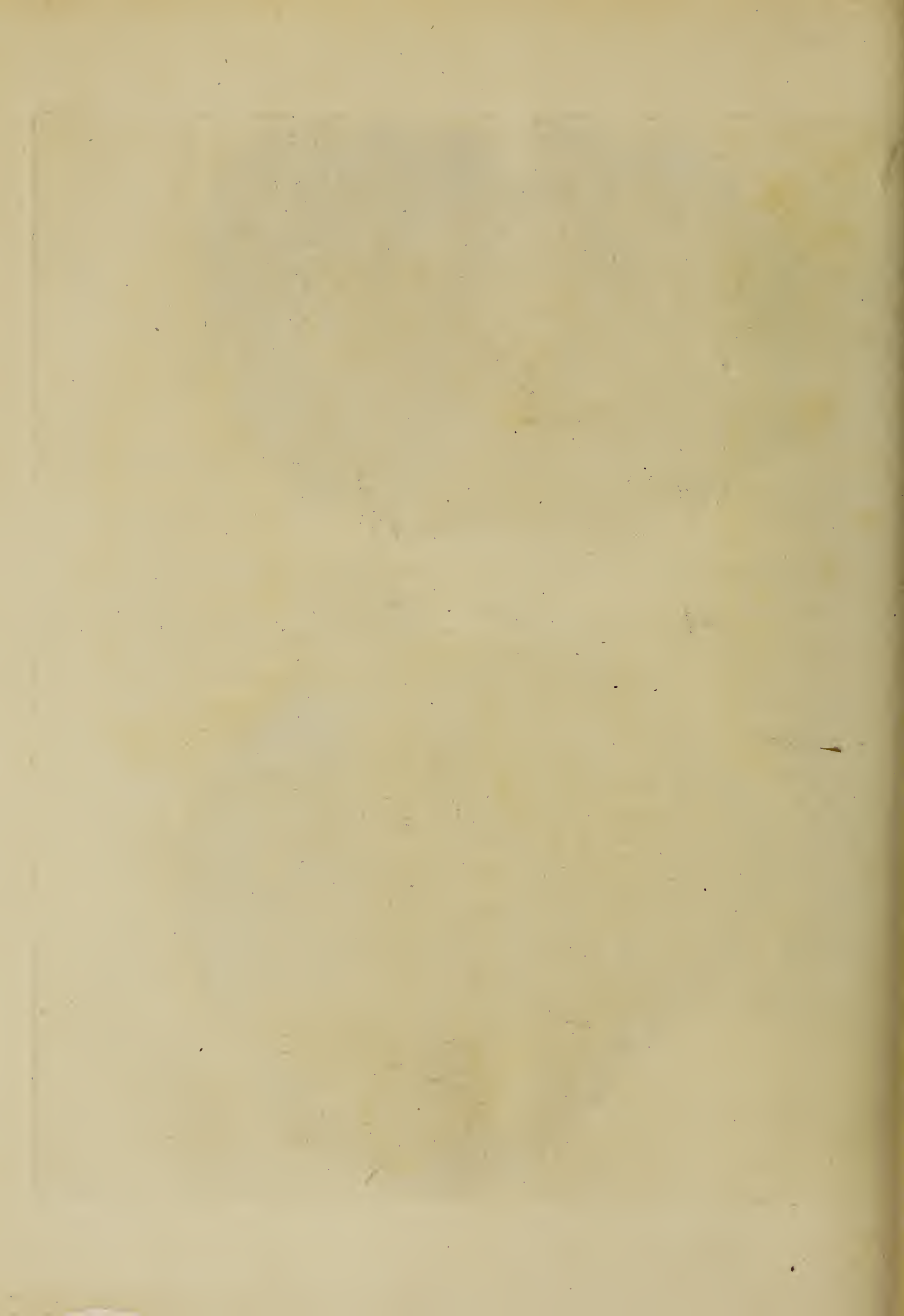
Fig. 2.



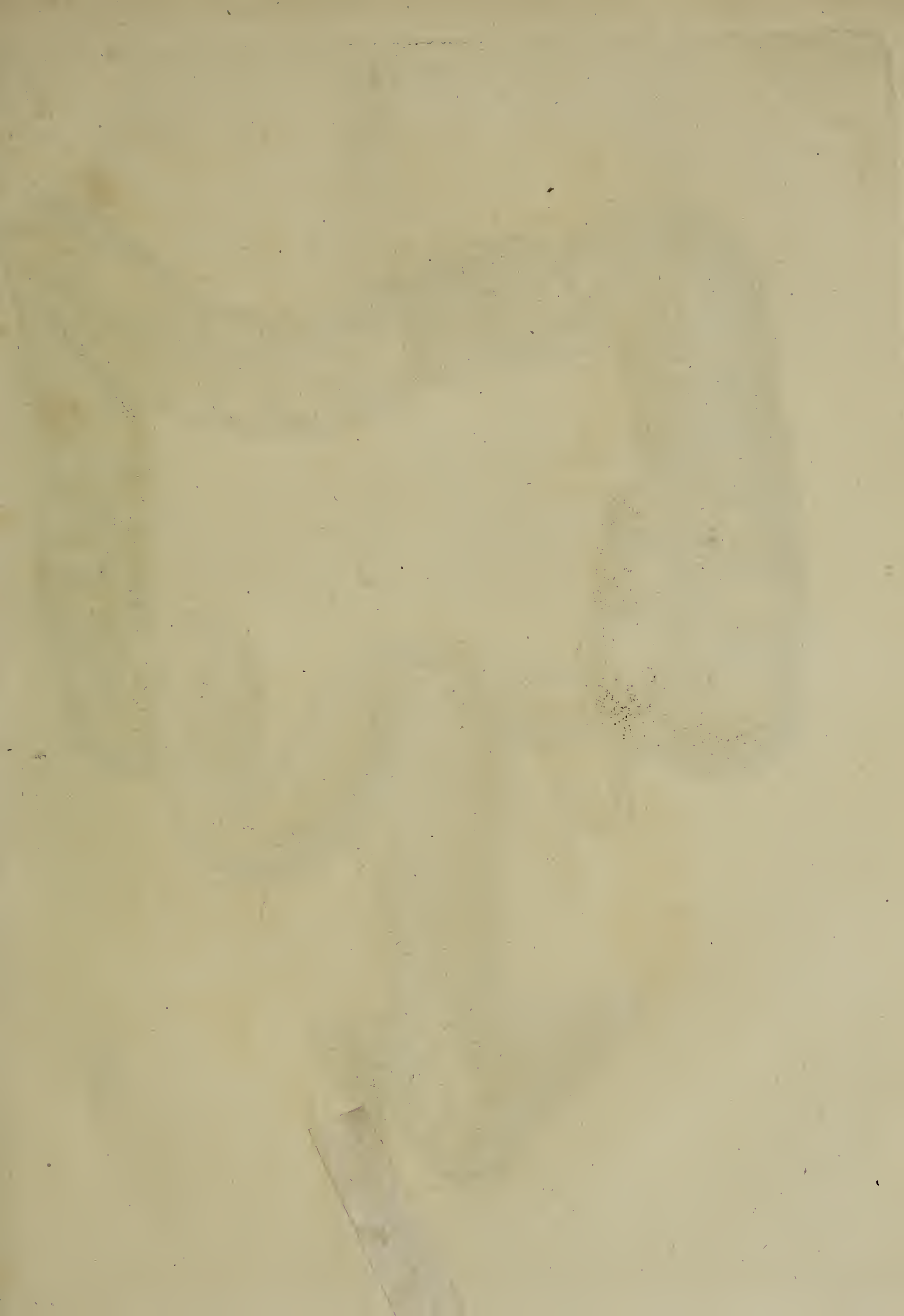
Fig. 1.



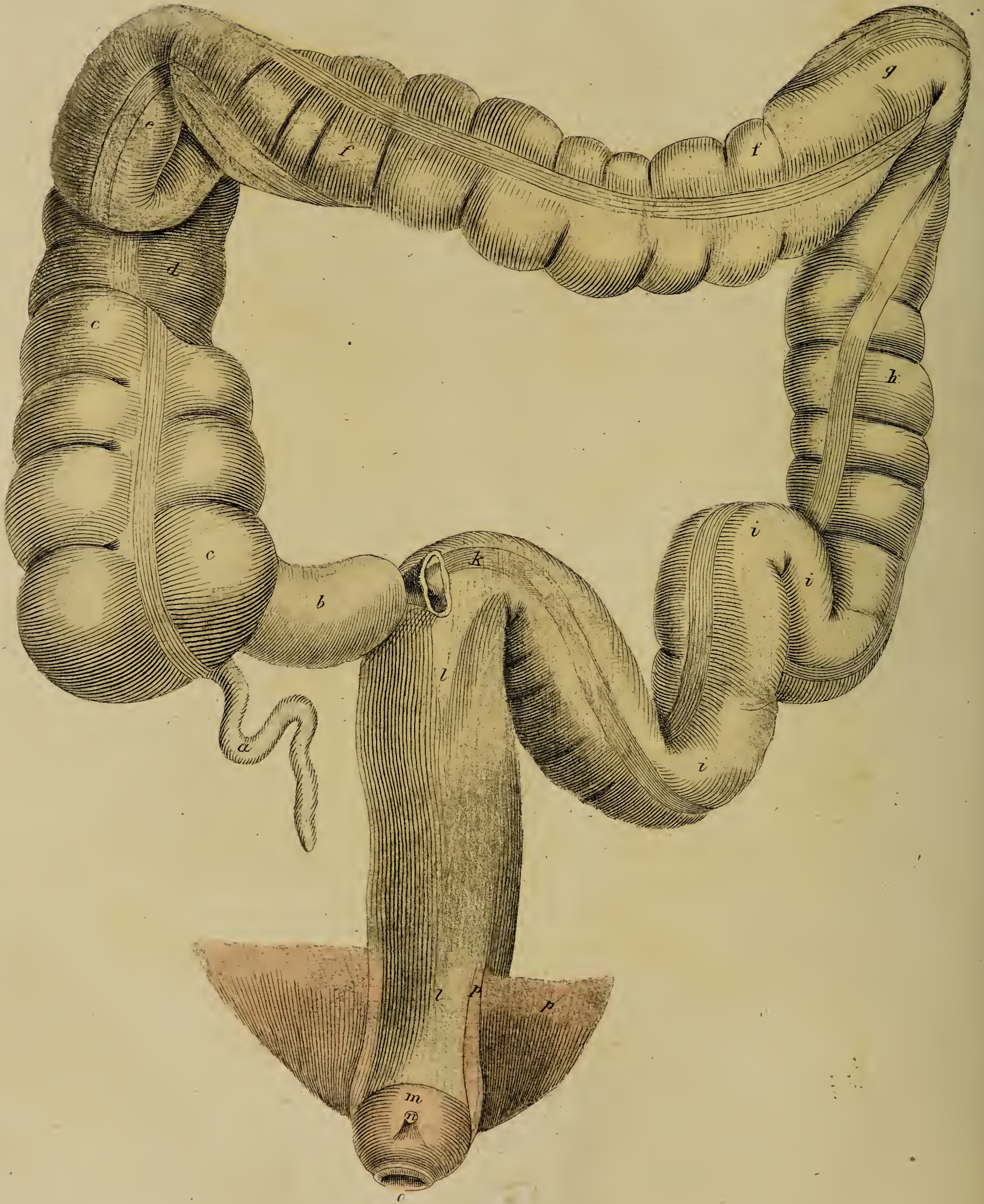














## T A B L E CXXIII.

The COLON represented under the same Disposition as it appears in the Subject.

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- |  |  |
|--|--|
| <p><i>a</i>, The appendix vermiformis.</p> <p><i>b</i>, The end of the ilium.</p> <p><i>c, c</i>, The cæcum.</p> <p><i>d</i>, The right portion of the colon, where it lies on the corresponding kidney.</p> <p><i>e</i>, That portion which makes a flexure on itself, under the liver.</p> <p><i>f, f</i>, The straight part of the colon termed its <i>Arch</i>, where it lies under the stomach.</p> <p><i>g</i>, Where it ascends somewhat to the region of the spleen.</p> | <p><i>h</i>, Where it descends over the left kidney.</p> <p><i>i, i, i</i>, The sigmoid flexure, where it is situated in the left iliac region.</p> <p><i>k</i>, Where it ascends upon the last lumbar vertebra.</p> <p><i>l, l</i>, The intestinum rectum.</p> <p><i>m</i>, The sphincter ani.</p> <p><i>n</i>, What the Author of the figure calls the <i>Dilatator Urethræ Posticus</i>.</p> <p><i>o</i>, The anus.</p> <p><i>p</i>, The levator ani.</p> |
|--|--|



## T A B L E CXXIV.

Gives Different Views of the INTESTINUM CÆCUM.

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FIG. 1.

*The CÆCUM, and part of the COLON, inflated with Air and dried, and the Fore Part of the CÆCUM cut off, to shew the VALVE of the COLON.*

- a*, The extremity of the ilium, first a little dilated, then contracted, where it is inserted between the rugæ of the cæcum and colon.
- b*, The cavity of the cæcum, in which are seen plicæ formed by its inner membranes.
- c, c*, The inner side of the colon, also with duplicatures within it. Two duplicatures larger and more prominent than the rest; one formed by the cæcum, another by the colon, and composing the valvula coli.
- d*, The opening of the ilium between the plies of the valve.
- e, e*, The extreme parts of the valve, forming the *Retinacula MORGAGNI*.

FIG. 2.

*The CÆCUM distended with Air, dried and cut open.*

- a*, The end of the ilium.
- b*, The appendix vermiformis.
- c, c*, The colon.
- d, e*, The upper and under lips of the valve of the colon.
- f, f*, The retinacula valvulæ coli.
- g*, The opening of the appendix vermiformis, in which the Author of this Figure says he has frequently found a valve.

FIG. 3.

*The end of the Small, and beginning of the Great Intestines of an Adult Man, cut longitudinally through the middle, and exposed in water.*

In this are observed the coats of the intestines, the valvulæ conniventes, and the formation of the valve of the colon.



Fig. 2.

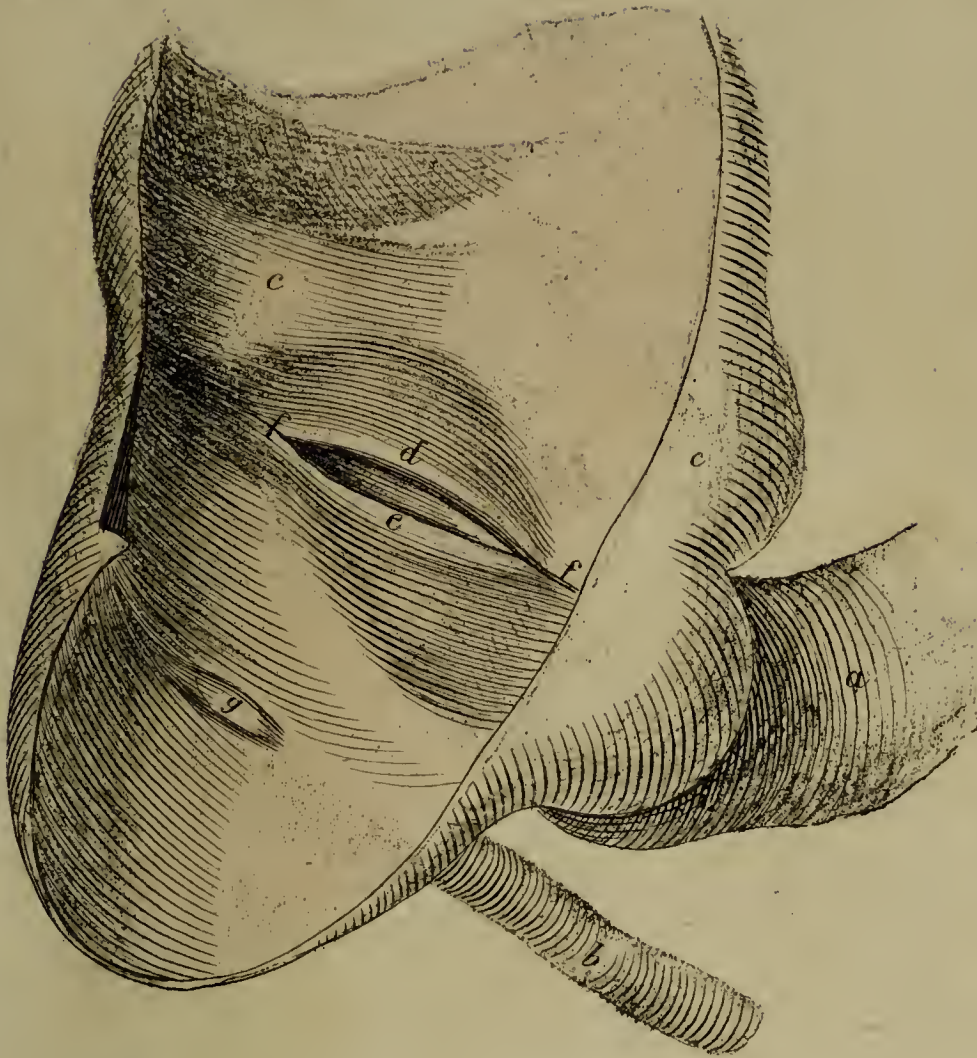


Fig. 3.

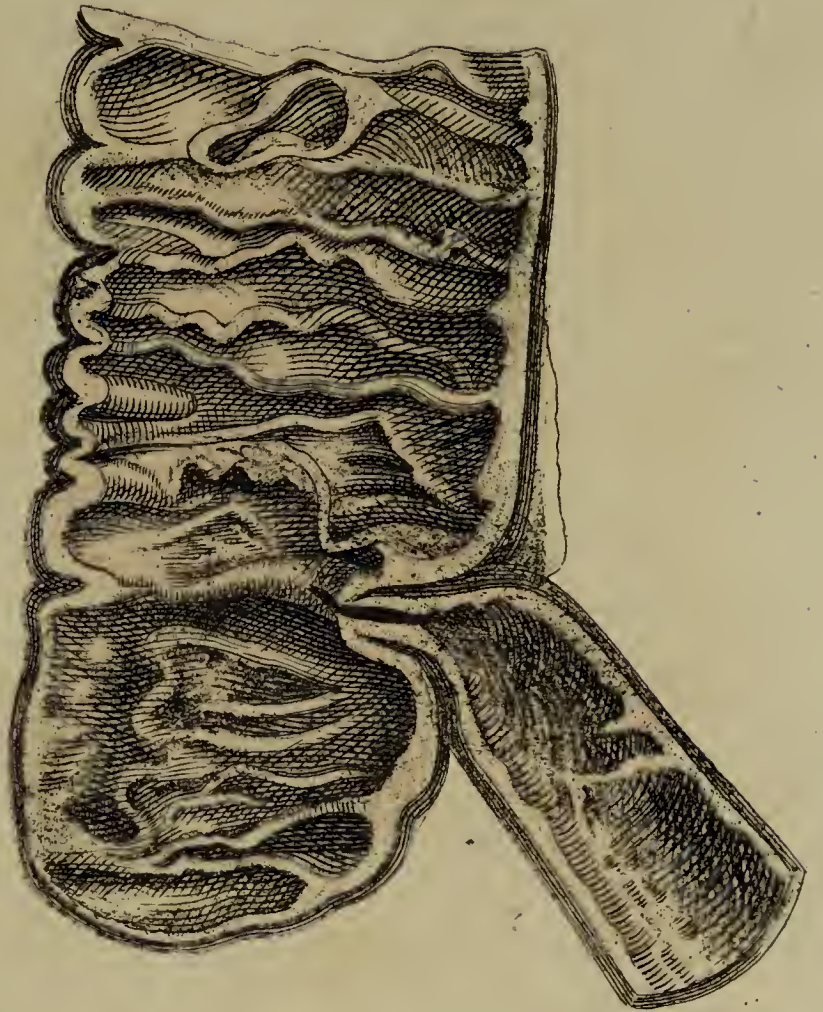
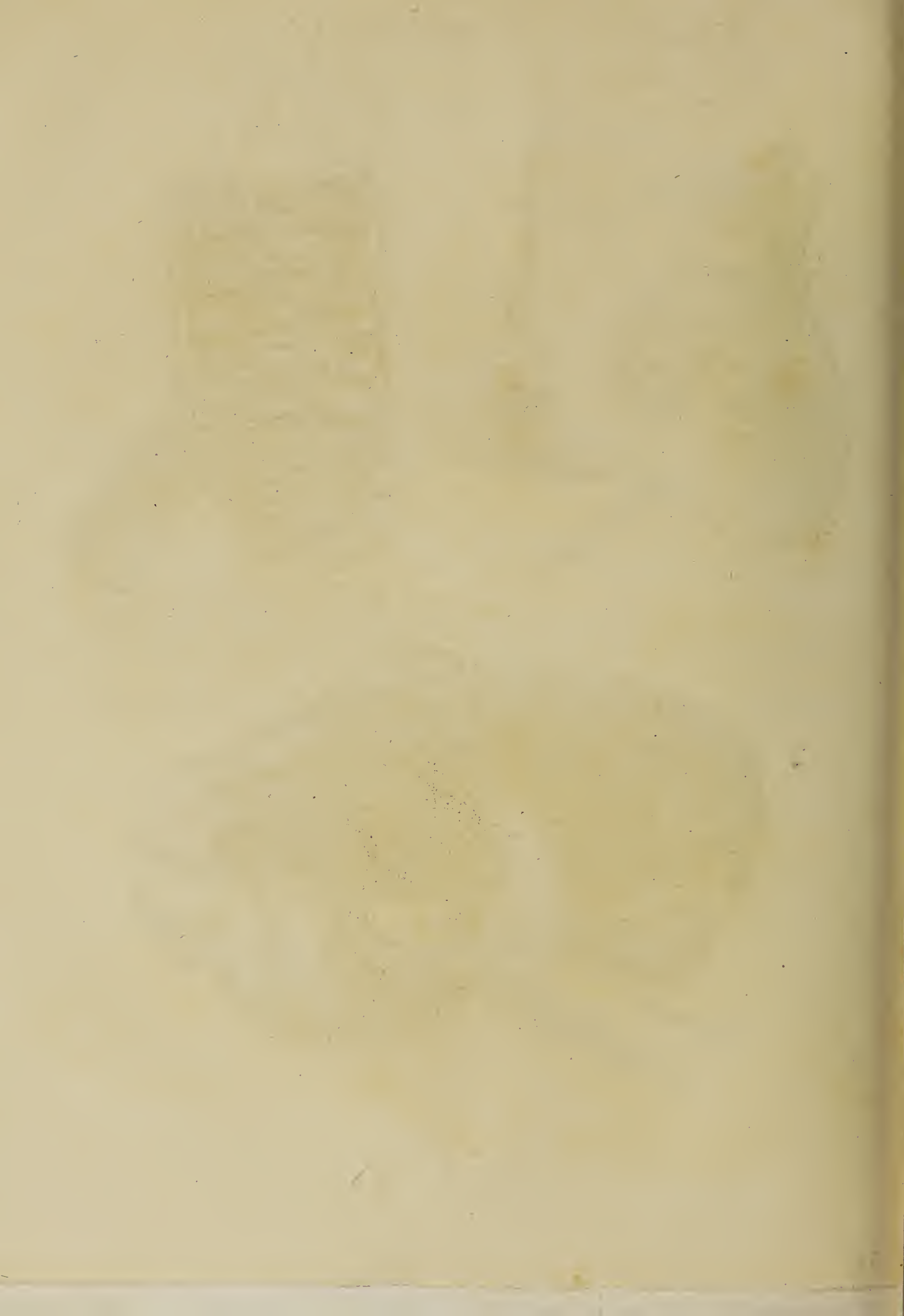


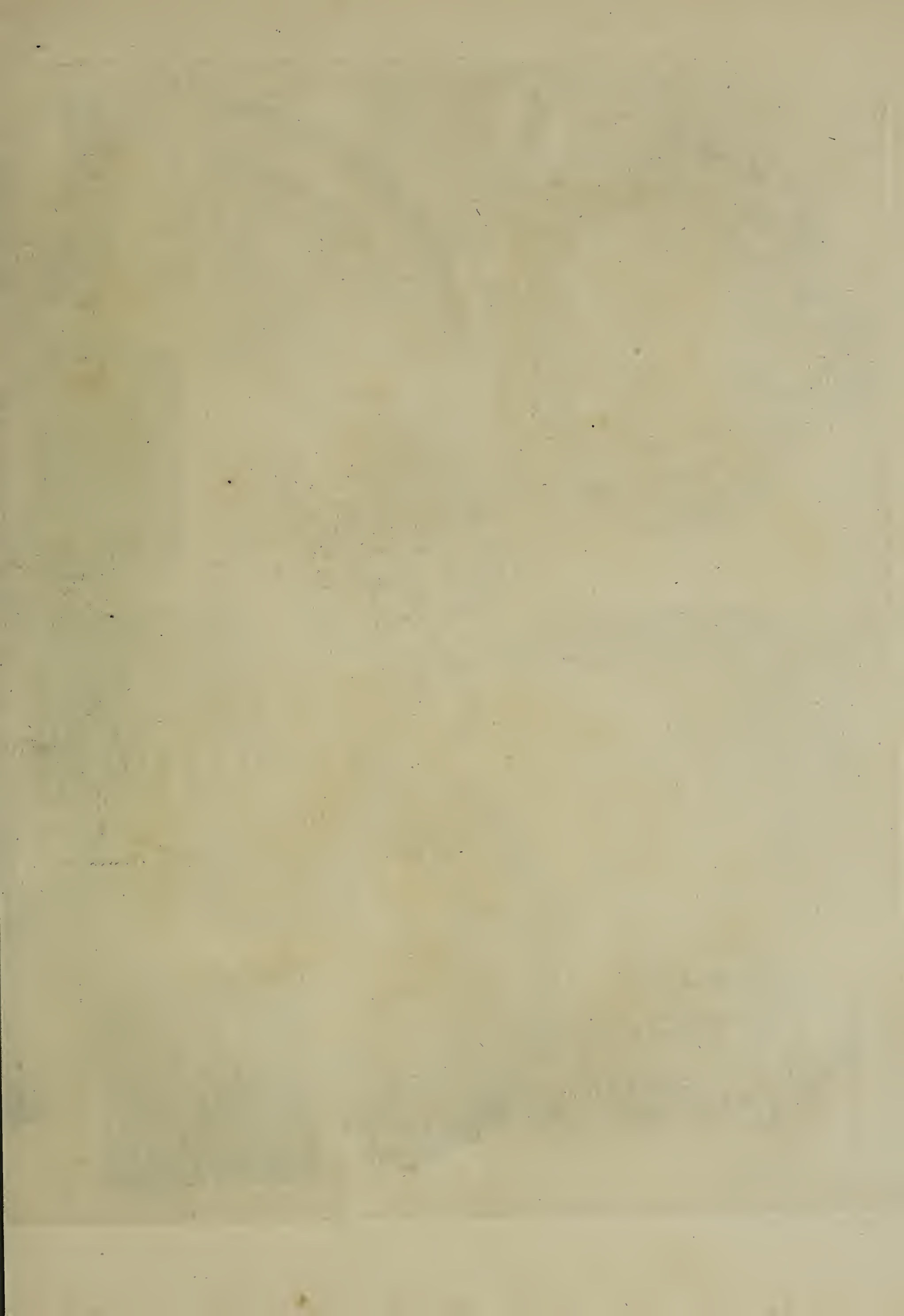
Fig. 1.













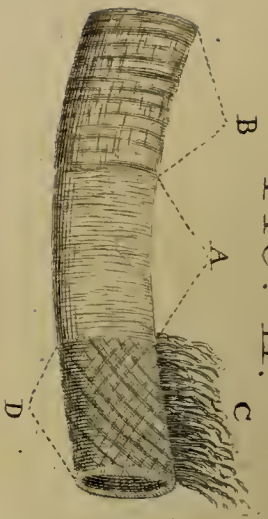


FIG. 11.

FIG. 20.

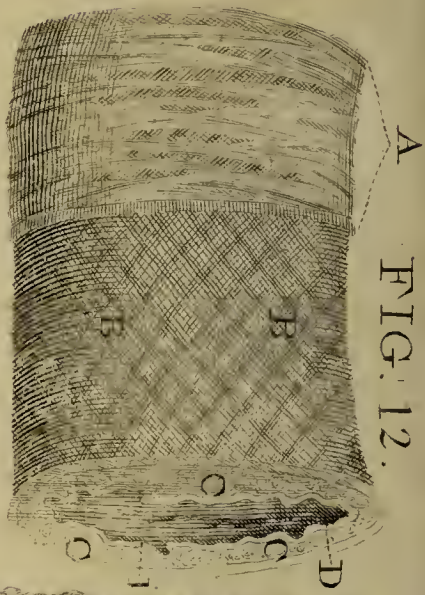


FIG. 12.

FIG. 18.

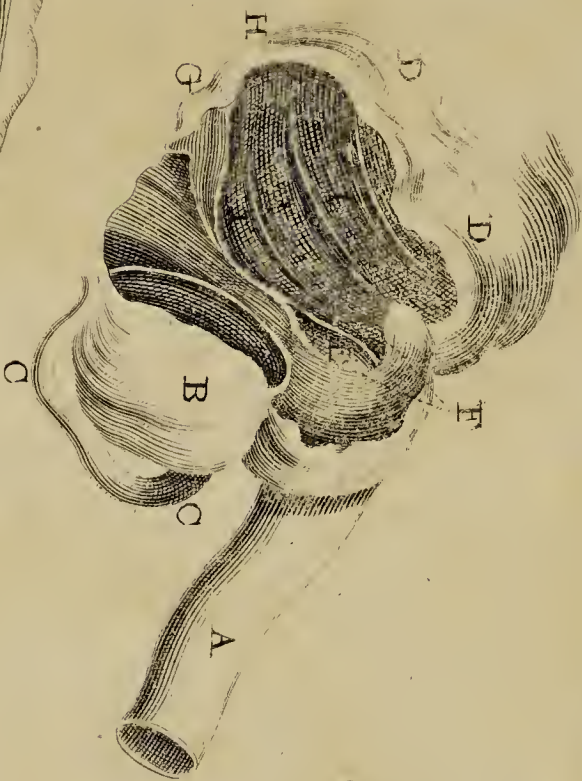


FIG. 13.

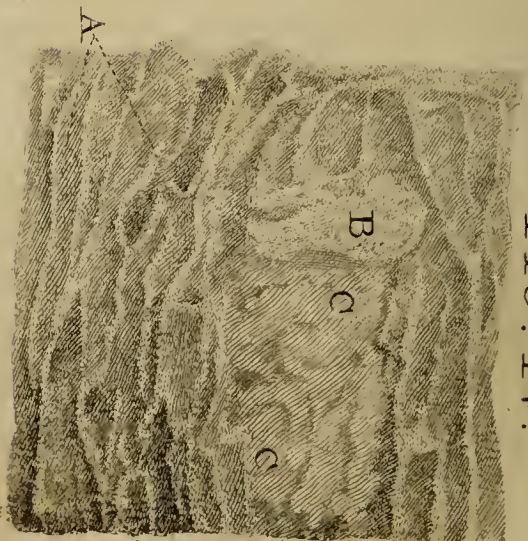
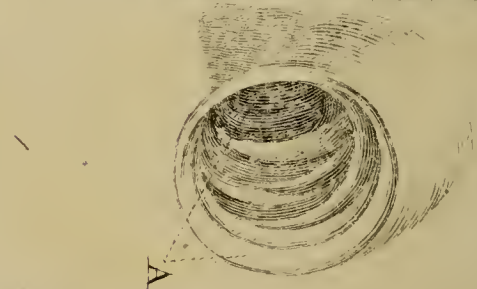


FIG. 14.

FIG. 19.



FIG. 17.

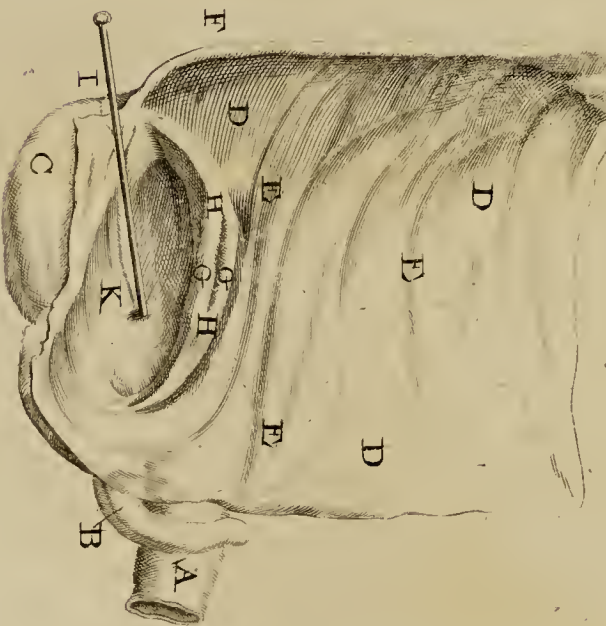


FIG. 15.

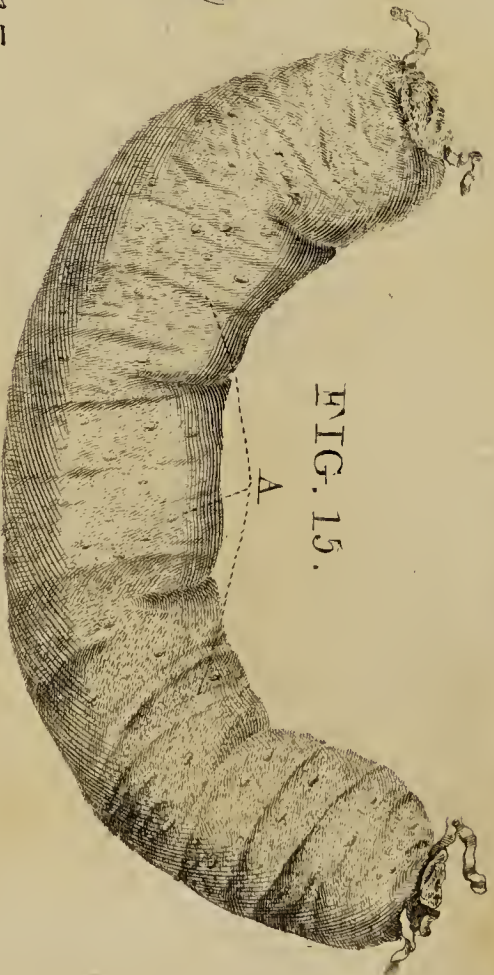
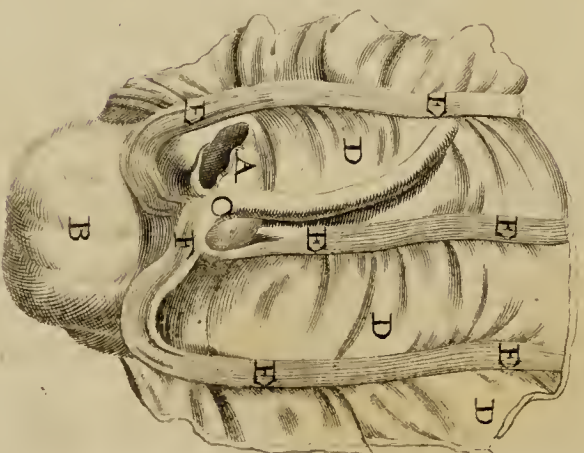


FIG. 16.





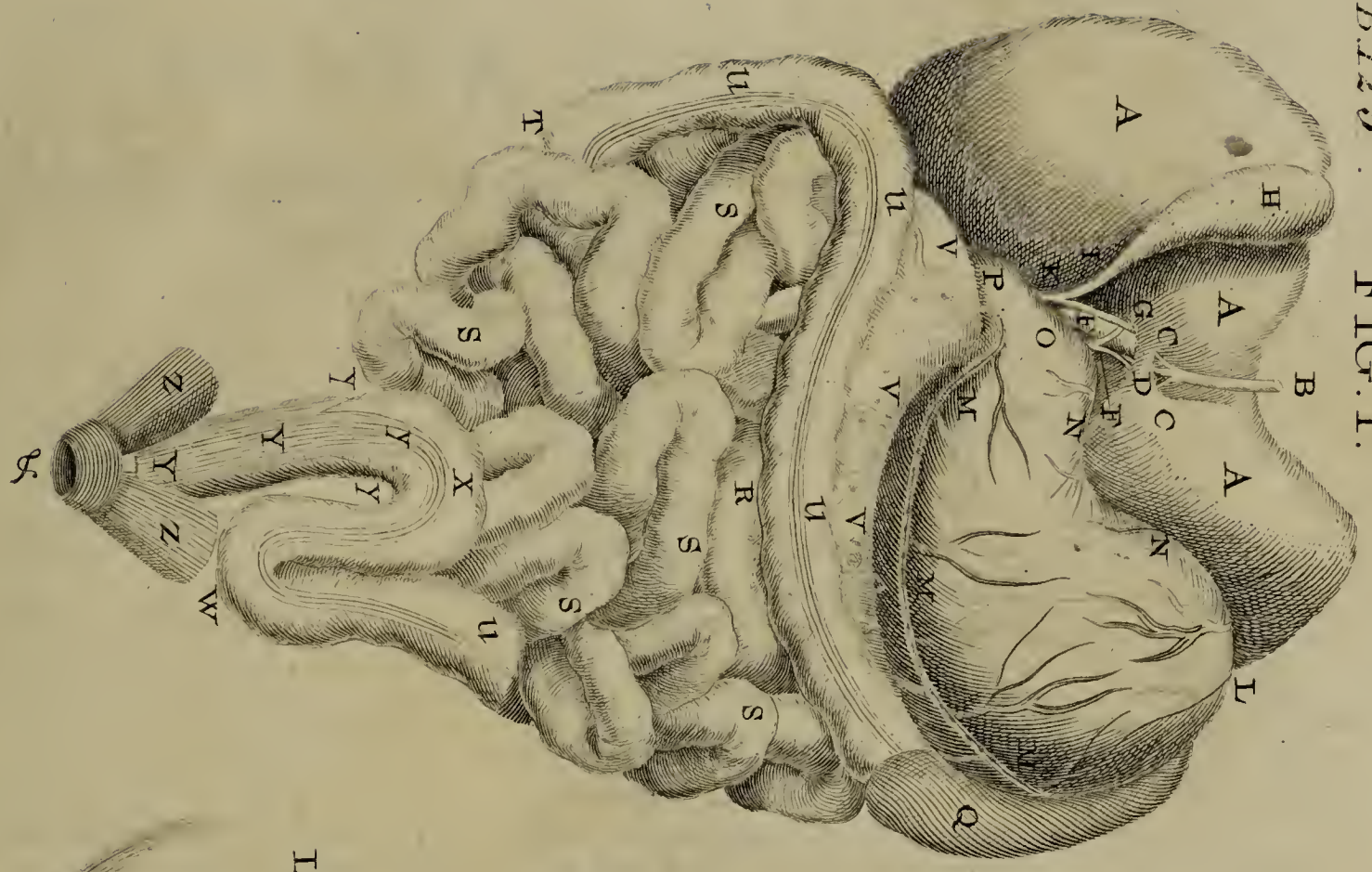


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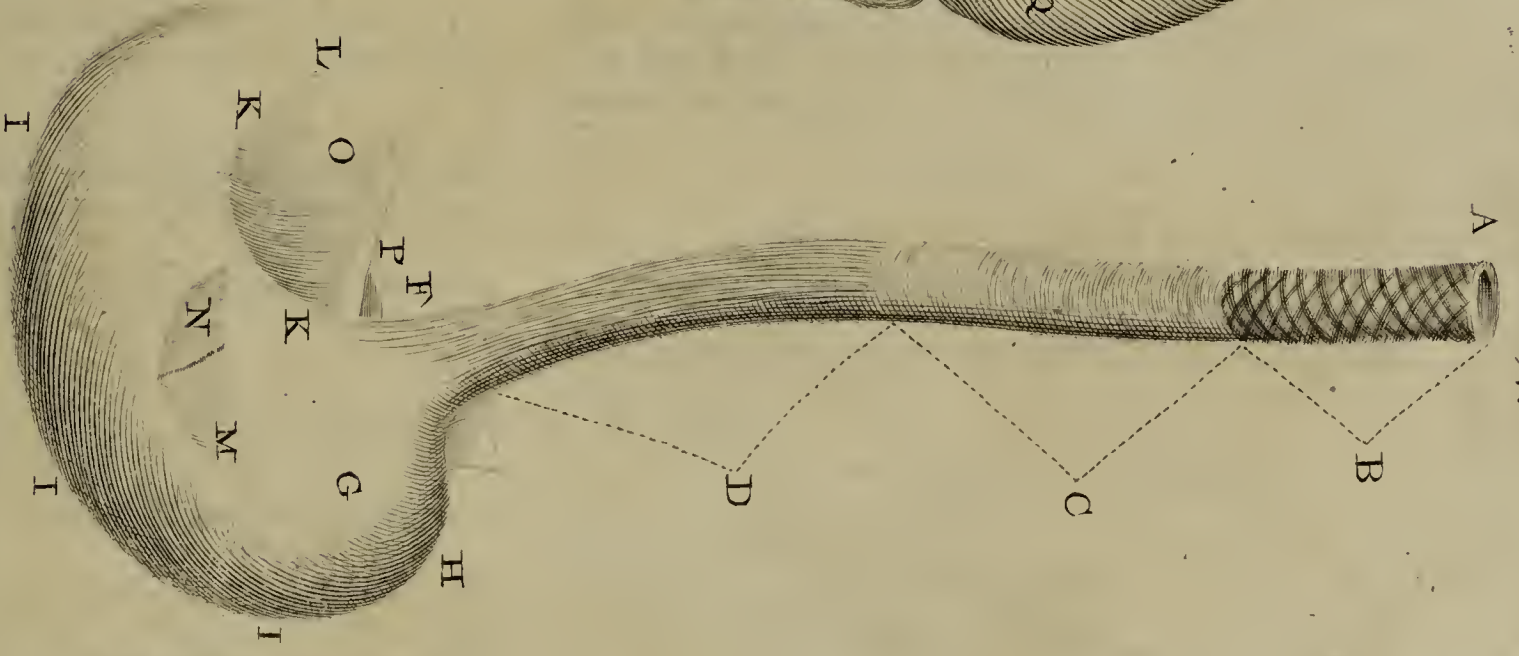


FIG. 3.

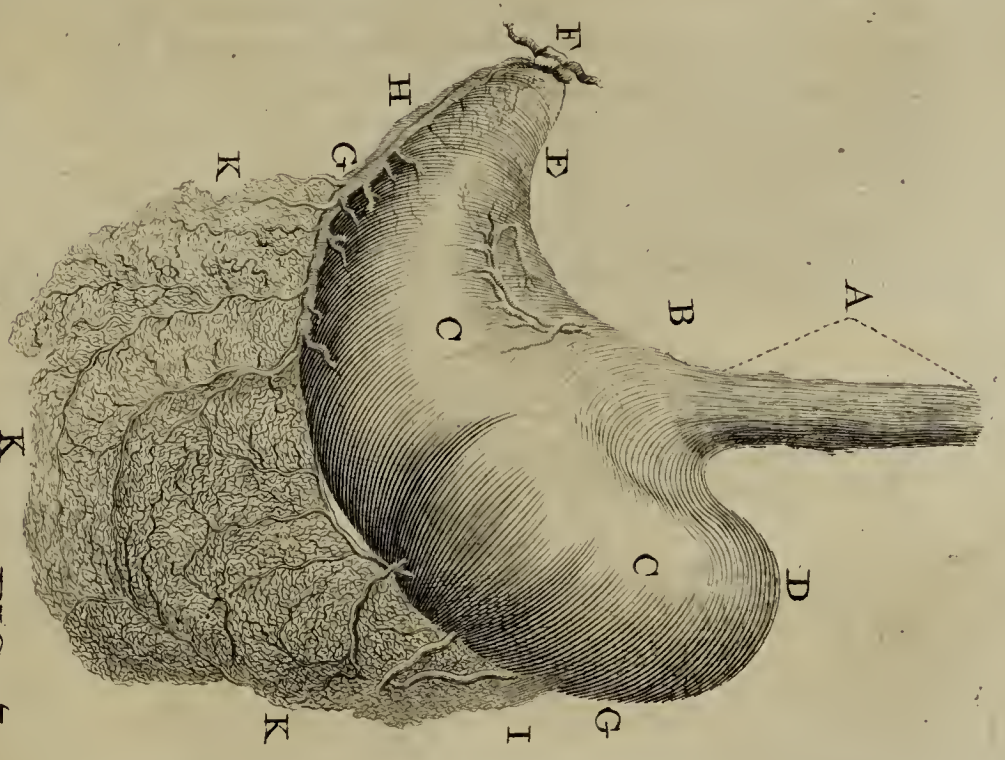


FIG. 6.

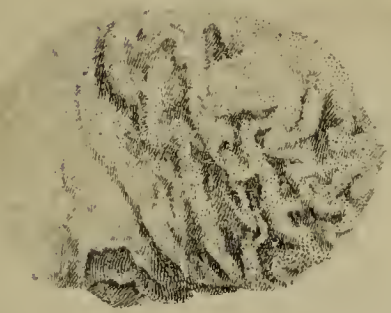


FIG. 8.

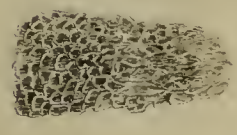


FIG. 7.



FIG. 4.

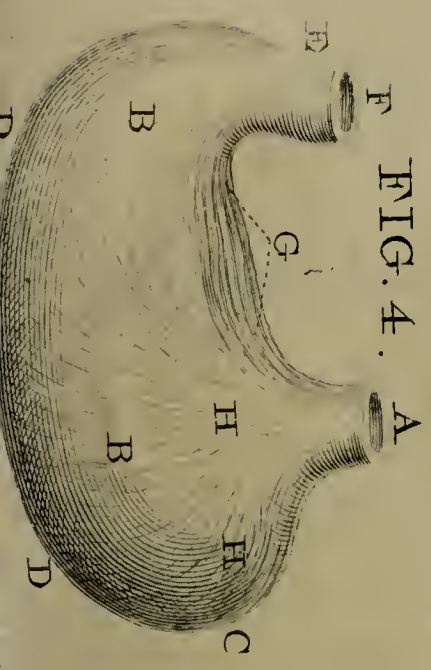


FIG. 5.



FIG. 9.

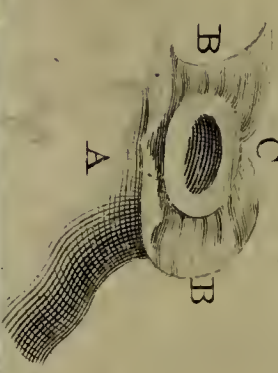
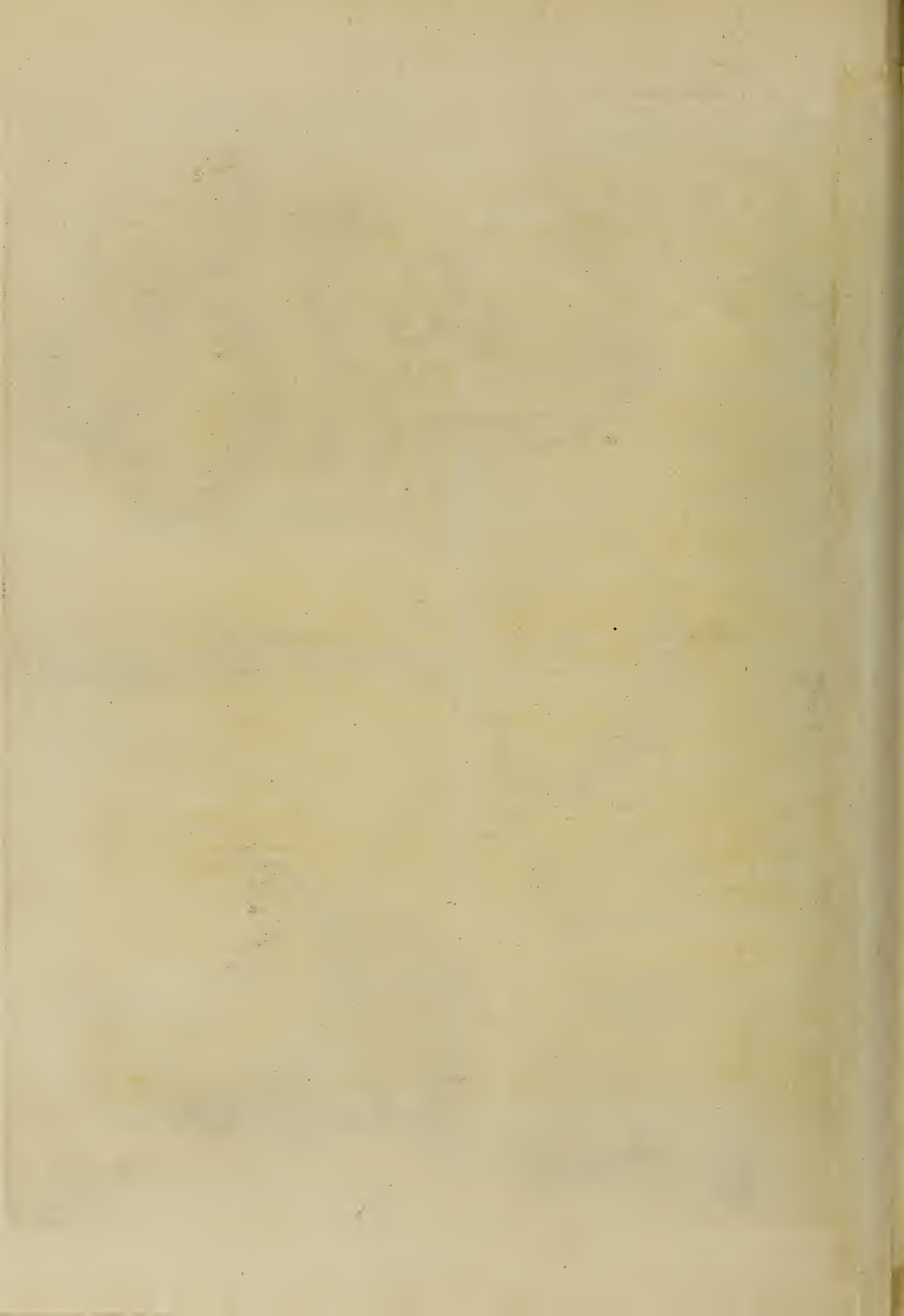


FIG. 10.









## T A B L E C X X V .

Represents the CHYLOPOIETIC and ASSISTANT-CHYLOPOIETIC VISCERA, with the STRUCTURE of the ALIMENTARY CANAL.

F I G. 1.

*Shows the CHYLOPOIETIC and ASSISTANT-CHYLOPOIETIC VISCERA, taken out of the BODY.*

- A, A, A, The concave part of the liver turned up.
- B, The ligamentum rotundum ;
- C, Its passage under,
- D, The isthmus of the liver.
- E, The vena portæ.
- F, The arteria hepatica.
- G, The ductus hepaticus.
- H, The gall-bladder.
- I, The ductus cysticus.
- K, The ductus communis choledochus. The rest of the viscera are placed in the same manner as when in the body.
- L, The great, or left extremity of the stomach.
- M, M, M, The great curvature, and gastro-epiploic vessels, the branches of which are represented too large.
- N, N, The small curvature.
- O, The small extremity of the stomach, and seat of the pylorus.
- P, The duodenum.
- Q, The spleen.
- R, S, S, The convolutions of the jejunum and ilium.
- T, The intestinum cæcum.
- U, U, U, U, The colon, along which one of its muscular ligaments is seen.
- V, V, V, The meso-colon, with its blood-vessels and glands.
- W, X, The sigmoid flexure of the colon, with the ligament continued.
- Y, Y, The intestinum rectum.
- y, y, y, The three ligaments of the colon expanding upon the rectum.
- Z, Z, The levatores ani.
- &, The anus, surrounded by the sphincter ani.

The white spot above the sphincter ani points out the seat of the prostate gland.

F I G. 2.

*A View of the Fore Part of the ESOPHAGUS, and Upper and Fore Part of the STOMACH.*

- A—F, The esophagus.
- A, A section of it immediately below the pharynx.

- B, The cellular coat.
- C, The inner transverse muscular fibres.
- D, The outer longitudinal muscular fibres.
- F, The cardia.
- G, The stomach ;
- H, Its great or left extremity ;
- I, I, I, Its great or anterior curvature ;
- K, K, Its small or posterior curvature ;
- L, The small or right extremity :—The letter also points out the situation of the pylorus, and beginning of the duodenum.
- M, Part of the external or peritoneal coat, separated and turned back, to shew,
- N, Part of the second or muscular coat.
- O, P, The continuation of the external membrane of the stomach, forming the omentum minus, &c.

F I G. 3.

*A View of the STOMACH, with part of the ESOPHAGUS and the OMENTUM of a CHILD.*

- A, A portion of the esophagus, with its external longitudinal muscular fibres.
- B, The cardia.
- C, C, the superior-anterior surface of the stomach.
- D, The great or left extremity.
- E, The small extremity.
- F, The stomach, tied at the pylorus.
- G, G, the great curvature.
- E, B, the small curvature, upon which are seen branches of the superior coronary artery.
- H, The right gastro-epiploic artery, sending off principal branches which plunge immediately into the substance of the stomach, and others which take a long course, and divide into innumerable branches upon the omentum majus.
- I, Branches of the splenic artery, termed *Arteriæ Breves*, supplying this part of the stomach and the omentum.
- K, K, K, The omentum majus.

F I G. 4.

*Represents the EXTERNAL MUSCULAR FIBRES of the STOMACH, after the PERITONEAL COAT has been removed.*

- A, The cardia.
- B, B, The superior-anterior surface of the stomach ;
- C, The



- C, The left extremity;  
 D, D, The great arch.  
 E, The pylorus.  
 F, The beginning of the duodenum.  
 G, A bundle of muscular fibres continued from the esophagus along the small curvature of the stomach, towards the duodenum.  
 H, H, Muscular fibres from the esophagus, which spread out upon the anterior surface of the stomach, and run to its right extremity.

FIG. 5.

Muscular Fibres of the Stomach, deeper seated than those in the former Figure. They are seen collected into Bundles, which run in different directions.—The letters, referring only to the direction of these Fibres, need no explanation.

FIG. 6.

A Portion of the Stomach inverted to shew its Rugæ. In this Figure, innumerable Pores are likewise represented.

FIG. 7.

A Portion of the Stomach inverted, cut off above the Pylorus.—In the Upper Part of the Figure, instead of Rugæ, little Prominences appear; in the Under Part, the Interstitial Cells are shewn.

FIG. 8.

A Portion of the Stomach, with the Interstitial Cells magnified,—the Peritoneum having been removed.

FIG. 9.

*The Right Side of the STOMACH distended and dried, to shew the PYLORUS.*

- A, The right side of the stomach.  
 B, B, A section of the beginning of the duodenum.  
 C, The pylorus placed somewhat obliquely, surrounding the passage from the stomach to the duodenum.

FIG. 10.

Represents the Pylorus in the natural state, in which it is more contracted than when distended and dried.

FIG. 11.

*A Portion of the SMALL INTESTINE, to shew its COATS.*

- A, The peritoneal coat.  
 B, The muscular coat, composed of longitudinal and transverse fibres, the peritoneal coat being supposed to be removed.  
 C, The muscular coat, raised to shew,

D, The cellular coat, which is here represented too uniformly checkered.

FIG. 12.

Gives another View of the Muscular and Cellular Coats of Intestines, but upon a larger scale than Fig. 11.

FIG. 13.

*A Portion of the INTESTINUM JEJUNUM.*

A, The valvulæ conniventes, as they appear in a dried preparation.

FIG. 14.

*The Inner Surface of a Portion of the INTESTINUM JEJUNUM.*

- A, A, The tunica villosa, lining the valvulæ conniventes.  
 B, A portion of the villous coat, raised to shew the nervous or cellular coat.  
 C, C, The cellular coat, in which, after the villous has been removed, nothing but the vestiges of the valvulæ conniventes appear.

FIG. 15.

A Portion of the Intestinum Jejunum of a Child, inverted and inflated, to shew the Mucous Glands, which are placed partly on, and partly between the Valvulæ Conniventes.

FIG. 16.

*Represents the INTESTINUM CÆCUM, and part of the COLON, slit open along the right side, then spread out, and viewed Exteriorly, to shew the rise of the three LIGAMENTS of the COLON.*

- A, The termination of the intestinum ilium in the cæcum.  
 B, That part of the intestines which was considered as the true cæcum by the ancients.  
 C, The appendix vermiformis drawn upwards, to shew,  
 E, E, E, &c. The three ligaments of the colon beginning from it.  
 D, D, The outer surface of the intestine.

FIG. 17.

*An Inner View of the same Part of the INTESTINE as that seen in the former Figure.*

- A, The ilium, cut across near its termination in the cæcum.  
 B, The appendix vermiformis brought into view.  
 C, The beginning of the cæcum entire.  
 D, D, D, The inner surface of the cæcum, and part of the colon.

E, E, E, The



- E, E, E, The cells of this part of the gut ;  
 F, Its cut edge.  
 G, G, The end of the ilium projecting into the cæcum, and forming the valve of the colon.  
 H, H, The fræna, or retinacula of the valve.  
 I, A probe put into the orifice of the appendix vermiformis.  
 K, The cavity of the cæcum of the ancients.

## FIG. 18.

*A Portion of the INTESTINUM ILIUM, the CÆCUM, and Part of the COLON, with the VALVULA COLI.*

- A, The ilium ascending obliquely, and passing into the left side of the cæcum.  
 B, Part of the cæcum entire.  
 C, The appendix vermiformis turned upwards.  
 D, D, D, Part of the cæcum and colon laid open.  
 E, The aperture of the valve of the colon.  
 F, F, H, Membranes supporting the valve, called its *retinacula*.  
 G, The lower part of the valve.  
 I, I, The cells of the colon.

## FIG. 19.

*Shews the MESENTERY, with the ARTERIES, VEINS, ME-*

*SENTERIC GLANDS, and INTESTINES, turned aside, according to the course of the MESENTERY.*

- A, A, The intestinum jejunum, and ilium, spread out.  
 B, B, The colon turned up, one of the ligaments of which is seen.  
 D, E, F, G, The mesentery expanded.  
 D, E, The superior mesenteric vein and artery.—Upon the mesentery are seen little dark-coloured spots, which represent its glands.  
 H, The sigmoid flexure of the colon.  
 I, One of its ligaments.  
 K, The rectum.

## FIG. 20.

*A Portion of the SMALL INTESTINE and MESENTERY, with the LACTEAL VESSELS.*

- A, A, Part of the jejunum, through which its rugæ slightly appear.  
 B, B, The lacteals, which the author of the figure says he found much more numerous than are here represented.

## FIG. 21.

*Part of the Intestinum Jejunum inverted, to shew the Valvulæ Conniventes, as they appear when suspended in Water, or in diluted Spirit of Wine.*



## OF THE LIVER.

THE *Liver* is the largest of the Conglomerate Glands, and its weight nearly equal to that of the Brain. It forms a solid Mass, of a dusky red or brown colour, situated immediately under the Diaphragm, extending downwards to the Margin of the Thorax, but in the sound state not going beyond it.

It is placed partly in the Right Hypochondrium, which it in a great measure fills, and partly in the Epigastrium, reaching over a little way into the Left Hypochondrium. Tab. CXV. B, C.

It is *convex* and very *smooth* on the upper Surface, where it is opposed to the Diaphragm, though a little flattened on the upper part of its left side, where it is opposed to the Heart.

It is *irregularly concave* on the under side, where it rests upon the Stomach and Intestines, and is perforated by several large Blood-vessels.

It is *thick* on its right and posterior part, and becomes gradually *thinner* towards the left side; is *obtuse* or *blunt* posteriorly, where it is opposed to the Lumbar Vertebrae, and *acute* or *sharp* on its anterior edge, where it follows the Margin of the Right False Ribs.—It is considerably broader from one side to the other, than from before backwards.

It is divided into *Prominences* or *Lobes*, two of which, called *Great* and *Small*, or *Right* and *Left Lobes*, are so considerable as to form the Body and whole upper part of the Liver:—The other Lobes, which are very inferior in size, are placed upon the under side of the former.

The *Great Lobe* is situated obliquely in the Right Hypochondriac Region, following the Curve of the Diaphragm, and rests upon the Pylorus, Colon, and top of the Right Kidney. Tab. CIX. Tab. CXIV. Fig. 1. 2.

The *Small Lobe*, which is diminutive in size when compared with the Great one, is distinguished from the latter by a broad Ligament, and is placed almost horizontally, chiefly in the Epigastric, only a small portion of it lying in the left Hypochondriac Region. Tab. CIX. CXIV.

The other Lobes are,

The *Lobulus SPIGELII*, which is small when compared with the two former Lobes, but is the principal one below.

It is situated near the Spine, upon the left side of the Great Lobe, and is of a pyramidal form, projecting like a Nipple, between the Cardia and Vena Cava, at the Small Curvature of the Stomach. Tab. CXXVI. Fig. 2. N. Tab. CXXII.

The *Lobulus Caudatus*, which is merely the Root, or

one of the Angles of the *Lobulus SPIGELII*, advancing towards the middle of the lower side of the Great Lobe, and representing a kind of Tail.

The *Lobulus Anonymus*, vel *Quadratus*, which is placed between the passage of the Round Ligament and the Gall-bladder, and is less prominent, but broader than the former Lobule. Tab. CXXII. CX.

From the *Lobulus Anonymus*, a Bridge, called *Pons* vel *Isthmus Hepatis*, runs across the passage for the Substance termed *Round Ligament*, to be joined to the Left Lobe:—The *Pons Hepatis* is sometimes wanting. Tab. CX. X.

Upon the under side of the Liver, there are several Depressions and Fissures, which are occupied by the contiguous Viscera, of which the following are the principal:—

The *Great Fissure*, called *Fossa Umbilicalis*, between the Right and Left Lobes, at the under and fore part of the Liver, for the passage of the Umbilical Vein in the Fœtus, or the Round Ligament of the Liver in the Adult.

The *Fossa Umbilicalis* is terminated by a Notch at the fore part of the liver,—of different depths in different Bodies;—and behind, it is commonly covered with the *Pons Hepatis*.

The *Principal Fissure*, termed *Sulcus Transversus*, vel *Sinus Portarum*, extending from right to left, between the Great and Small Lobes, and bounded by these Lobes at its extremities; by the *Lobulus Anonymus* before, and the *Lobulus SPIGELII* behind; the two latter forming parts compared by the Ancients to a Gate, and therefore called *Porta*. Tab. CXXVI. Fig. 2. R, R, R.

The *Porta* receives the great Blood-vessels and the Nerves which go into the Liver, and transmits the Biliary Ducts and deep-seated Absorbents out from it.

The *Depression*, between the Great Lobe and *Lobulus SPIGELII*, for the passage of the Inferior Vena Cava, which has frequently a Bridge over it, forming it into a Canal. Tab. CXXVI. Fig. 2.

A *Small Depression*, called *Fossa Ductus Venosi*, continued from the *Fossa Umbilicalis*, between the Left Lobe and *Lobulus SPIGELII*, running a little obliquely from right to left side, and receiving a Ligament, formerly a Branch of the Umbilical Vein in the Fœtus. Tab. CXXVI. CX.

The Liver is connected to the Body by different *Processes*, termed its *Ligaments*; all of which, excepting one, are formed by Doublings of the Peritoneum, viz.

The *Ligamentum Latum*, vel *Suspensorium Hepatis*, placed between the Right and Left Lobes above, and extending



extending below into the Fossa Umbilicalis. Tab. CIX. CXIV.

The Ligamentum Latum is fixed obliquely to the Diaphragm and tip of the Ensiform Cartilage, and then descends in the same oblique direction, adhering to the inner edge of the Vagina of the Rectus Abdominis of the right side, as far as the Umbilicus.

The Ligamentum Rotundum, which was the Umbilical Vein in the Fœtus, placed in a Doubling of the under part of the Ligamentum Latum, and fixed to the Umbilicus.

These two Ligaments have been supposed to resemble a Falx, with the edge turned uppermost, from which circumstance the Ligamentum Latum is sometimes also called *Falciforme*.

The Ligamentum Coronarium, considered by some as merely Cellular Substance, and by others as a reflection of the Peritoneum, or both.—It unites the root or posterior part of the Liver to the Tendinous portion of the Diaphragm.

The Ligamentum Dextrum, or Right Lateral Ligament, which is short, and connects the back part of the right extremity of the Great Lobe to the Diaphragm. Tab. CXXVIII. Fig. 4. E.

The Ligamentum Sinistrum, or Left Lateral Ligament, which is longer than the former, and connects the left extremity of the Small Lobe to the Diaphragm. Tab. CXXVIII. Fig. 4. C.

The two Lateral Ligaments are merely the extensions of the Coronary Ligament.

Besides the Ligaments already mentioned, two others are described by HALLER; one called *Hepato-colicum*, Tab. CXXII. Fig. 1. *k*, which passes from the Gall-Bladder and contiguous Sinus Portarum, across the Duodenum, to the Colon;—another termed *Hepato-renale*, Tab. CXXII. Fig. 1. *l*, which descends from the root of the Liver to the Kidney.—These, as well as the other Ligaments of the Liver in general, are productions of the Peritoneum.

The Ligaments of the Liver preserve it in its proper situation, and of course prevent it from inclining too much in any direction, at the same time allowing it to change place in a small degree, according to the different states of Respiration, and to the change of situation of the other Viscera near it.—The Stomach and Intestines support it when in the erect posture, and the Diaphragm when the Body is in the inverted position.

The Liver has a simple Coat adhering closely to it, which it derives from the Peritoneum, that gives it a shining appearance externally. It is every where covered by this Membrane, excepting behind, where it adheres to the Diaphragm by Cellular Texture.

The Liver is composed of several kinds of Vessels, the extreme Branches of which are intermixed in such a manner, as to form numerous Pulpy Corpuscles, named *Acini*, from their supposed resemblance to the stones of a Grape, but which are only about the size of Mustard Seeds. These, when minutely examined, are ob-

served to be composed of Vessels in the form of radiated *Villi* or *Penicilli*.

The Vessels of the Liver are, the *Hepatic Artery*, *Vena Portarum*, *Venæ Hepaticæ*, *Absorbents*, and *Biliary Ducts*.—It has likewise numerous *Nerves*.

The Trunks of the Hepatic Artery, Vena Portæ, Biliary Ducts, and Nerves, with the Absorbents and Lymphatic Glands, form a large *Cord* at the under side of the Liver.

The Artery is situated in the left part of the Cord, the Vein in the right, with the common Trunk of the Biliary Ducts before it;—The Nerves, Lymphatic Vessels, and Glands, surrounding the Trunks of the Blood and Biliary Vessels. Tab. CXXVI. Fig. 2. See also Vessels and Nerves of Liver in Vol. III.

The Cord of Vessels and Nerves is intermixed with much Cellular Substance, and covered externally by a Reflection of the Peritoneum, continued from the Omentum Minus, which has obtained the name of *Capsule of GLISSON*.

The Branches of the Vessels and Nerves accompany each other through the Substance of the Liver, forming small Fasciculi, in a manner somewhat similar to the Fasciculus of which the Cord is formed by their Trunks.

In their course through the Liver, the Branches of the different Vessels and Nerves, but particularly those of the Vena Portæ, are inclosed in a large portion of Cellular Substance, which is also frequently called *Capsule of GLISSON*, from that Author supposing it to be a continuation of the Capsule which covers the Vessels before they enter the Liver.

The *Hepatic Artery* is derived from the Cœliac, and is dispersed throughout the whole Substance of the Liver, and also upon the Coat which covers it, and is so small, when compared with the Bulk of the Liver, as to have been generally thought to be destined for the nourishment merely of that Viscus; but, from Injections passing from the Artery to the Biliary Ducts, and from other causes, it has been supposed by some Anatomists, that the Hepatic Artery is not only intended to nourish the Liver, but is capable of secreting part of the Bile;—and this supposition is farther confirmed, from the Vena Portæ having, in a recent case, been found wanting, while at the same time the Hepatic Artery was larger than usual, and the Veins, which commonly form the Vena Portæ, terminated in the Vena Cava.

The *Vena Portæ* is named from its situation with respect to the Porta of the Liver. Tab. CXXVI. Fig. 2. L.

It partakes of the nature of an Artery and a Vein:—Like the former, it carries the Blood from the Trunk to the Branches, and, like the latter, it carries it to the Heart;—or it is peculiar in the Blood flowing in one part as in a Vein from the Branches to the Trunk, and in another, as in an Artery from the Trunk to the Branches, and performing a Secretion.

It



It is formed by the Veins of the Stomach and Intestines, joined to those of the Spleen, Omentum, and Pancreas, and approaches to the nature of an Artery in the thickness of its Coats, though it has no Pulsation.

It passes to the Porta, where, from its great size, which is about three times that of the corresponding Artery, it is named *Sinus Venæ Portæ*, and divides into Branches which accompany those of the Artery in their course through the Substance of the Liver, terminating at last in the Pulpy Corpuscles.

The *Vena Portæ* serves to carry Venous Blood to the Liver, for the secretion of the Bile. It receives even the Blood which returns through the Veins of the Gall-Bladder, to assist in performing this Secretion. Some experiments seem to shew, that it may assist, in a small degree, in the nourishment of the Liver.

The *Venæ Hepaticæ* are numerous. They are reflected partly from the extremities of the Artery, and partly from those of the *Vena Portæ*. They unite by degrees, and accompany the other two Sets of Vessels; but, at the root of the Liver, they form two or three large Trunks which terminate in the *Vena Cava*, where it is about to perforate the Diaphragm. Tab. CVI. U, U, U. They likewise send off some small Branches which terminate in the *Cava*, where that Vein lies behind the Liver.

The *Venæ Hepaticæ* receive the Blood from the Hepatic Artery and *Vena Portæ*, after the Bile has been secreted, and return it to the *Vena Cava*, to be conveyed by it to the Heart.

The Vessels of the Liver communicate with each other in such a manner, that, after Death, a good Injection may be made to pass from the Artery into the *Vena Portæ*, *Venæ Hepaticæ*, and Biliary Ducts, though into these last with difficulty.

The *Lymphatics* of the Liver are so numerous as to cover almost the whole of its outer Surface. See *Lymphatics of Liver* in Vol. III. They discharge their contents partly into the beginning of the Thoracic Duct, and partly into a Plexus situated behind the Sternum.

The *Nerves* of the Liver are also numerous. They arise from the Great Sympathetics and Eighth Pair, and accompany the Blood-vessels. Vol. III.

The *Biliary Ducts*, Tab. CXXVI, Fig. 2. T, U, V, W, arise by extremely minute Branches, termed *Pori Biliarii*, vel *Tubuli Biliferi*, chiefly from the extremities of the *Vena Portæ*, in the Substance of the Corpuscles, through the whole of the Liver.

The *Pori Biliarii* run in company with the Branches of the Artery and Veins, and unite into larger and larger Branches, which afterwards join into two, and these again into a single Trunk, called *Ductus Hepaticus*, in the *Sinus Portarum*.

The *Ductus Hepaticus* serves to carry the Gall or Bile from the Liver,—and to convey it, by the power of the Heart, Hepatic Artery, and *Vena Portæ*, assist-

ed by the pressure of the surrounding Muscles, to the Duodenum, and partly to the *Vesicula Fellis*.

#### GALL-BLADDER.

The *Vesicula vel Cystis Fellis*, or *Gall-Bladder*, is a small oval or Pyriform Bag, but varying in figure and size in different individuals, and consists of a Fundus, Body, and Cervix, situated upon the concave side of the Great Lobe of the Liver, and placed in a transverse direction from behind forwards. Tab. CXX. CXXVI.

It extends from the *Sinus Portarum*, where the Cervix is situated, to the anterior edge of the Liver, and, when distended, advances beyond the edge of that Organ, so as to touch the Cartilage of the Ninth Rib, and sometimes to have its Fundus opposed to the soft parts of the Abdomen, under the edge of the False Ribs.

The Fundus, which is the larger extremity, is a little lower than the Cervix, when the Person is in the erect posture. It then also inclines a little to the right side, and rests upon the Colon at the beginning of the Duodenum.

The Gall-Bladder is composed of several *Coats*, the *external* of which is a continuation of the Membrane of the Liver. This, however, is only a partial one, covering that part of the Gall-Bladder which is not attached to the Surface of the Liver.—It serves to give strength to the Gall-Bladder, and to fix it to the Liver.

Under the former Coat, a few pale scattered Fibres, running in various directions, are sometimes observed, which have been considered as a *Muscular Coat*; and under this there is some Cellular Substance, intermixed with a Plexus of Vessels, which has obtained the name of *Nervous Coat*.

The *Inner Coat*, sometimes called *Villous* or *Mucous*, is full of Reticular Rugæ or Folds, appearing somewhat like the cells of a honey-comb. The Cells become extremely minute towards the Cervix, where they run in a longitudinal direction. Tab. CXXVII. CXXVIII.

The Surface of this Coat is every where perforated by the Ducts of small Follicles, which discharge a Viscid Mucus, to defend it from the stimulant nature of the Bile.

The Gall-Bladder is connected through its whole length to the Liver by Cellular Substance, Blood-vessels, and Absorbents.

In many Brute Animals, the Gall-Bladder is connected to the Liver also by a Set of Ducts, called *Hepato-Cystic*, which convey the Bile found in the Gall-Bladder immediately from the Liver. No such Ducts, however, are demonstrable in the Human Body, though, in former times, the contrary has been maintained by different Authors.

The Gall-Bladder has Blood-vessels, Absorbents, and Nerves, in common with those of the Liver.—Its Veins pass into the *Vena Portæ*.

The Cervix or Neck of the Gall-Bladder is twisted and



and folded against itself, and afterwards contracts and sends out a Duct called *Cystic*, which runs at the right side of the *Ductus Hepaticus*, and then joins it, at a sharp Angle, to form the *Ductus Communis Choledochus*.

The *Ductus Cysticus* is smaller than the *Ductus Hepaticus*, and differs from it also in having a number of imperfect Partitions or *Plicæ*, running in a somewhat Spiral direction, and forming it into Cells, which retard the flow of the Bile. Tab. CXXVII. CXXVIII.

The Gall-Bladder serves as a receptacle for the Bile, when the Stomach and Intestines are empty, and have no need of it, and retains it till wanted for the purpose of Digestion.—The Bile is afterwards discharged from the Gall-Bladder, when the Stomach is full, into the *Ductus Communis*, and from that to the Duodenum, chiefly by the pressure of the surrounding Viscera, and partly, as some Anatomists suppose, by a small degree of contractile power in the Gall-Bladder itself.

The whole of the Bile contained in the Gall-Bladder is found, by experiment, to pass from the Liver through the Hepatic Duct to the *Ductus Communis*, and from that by the *Cystic Duct* into the Gall-Bladder.

The *Ductus Communis Choledochus* is about the size of a Goose-quill, and is considerably larger than either of the Ducts which open into it; and, like the *Ductus Hepaticus*, is much smoother internally than the *Cystic Duct*.

It descends at the posterior and left side of the first portion of the Duodenum, and getting behind the right extremity of the Pancreas, passes for some way obliquely between the Muscular and Inner Coats of that Intestine.

It terminates in the left, posterior, and nearly in the under part of the second turn of the Duodenum, by a projecting Orifice, which is rounded above, and pointed below, and which, with the obliquity of the passage of the Duct, has the effect of a Valve, in preventing the reflux of the Bile to the Liver or Gall-Bladder. Tab. CXXVI. Fig. 2. X.

The Structure of the *Ductus Choledochus*, and of the Biliary Ducts in general, is of the same nature, being composed of an outer and inner Membrane. The inner Surface of the different Ducts also agrees in being perforated by numberless Pores which are the Mouths of Mucous Follicles, similar to those upon the inside of the Gall-Bladder.

The *Ductus Communis*, and Ducts which form it, are firm and strong; but in cases where their terminations are obstructed, as by Gall Stones, by Tumors, or by the want of a Gall-Bladder, they are sometimes observed greatly dilated.

The Secretion of the Bile is found, by experiment, to be constant, and to the quantity of from half a pound to a pound in the twenty-four hours, but always flowing in greatest abundance soon after taking in nourishment. The Bile has a bitter taste, and is of a viscid consistence, of a yellowish colour changing to green, but occasionally varying a little in this respect. It is fre-

quently of a brownish-yellow, and sometimes, especially in cases of Schirrous Liver, colourless.

The Bile returning from the Gall-Bladder, is observed, from the thinner parts being absorbed, to be more tenacious, acrid, and bitter, and of a deeper colour, than that which flows from the Liver.

According to the experiments of THENARD, one of the latest Writers on Bile, 1100 parts of this Fluid, taken from the Human Body, contain 1000 of Water, from 2 to 10 of yellow insoluble Matter, 42 of Albumen, 41 of Resin, 5.6 of Soda, 4.5 of Phosphate of Soda, Sulphate of Soda, Muriate of Soda, Phosphate of Lime, and Oxide of Iron. THENARD did not find Picromel in the Human Bile; but BERZELIUS found it here, as well as in the Bile of the Ox.

The Bile serves to mix the different parts of the Food properly together, for the formation of the Chyle, to which purpose it is well adapted, uniting with different substances somewhat after the manner of Soap,—to combine with the excrementitious part, and prevent its absorption,—to correct too great a disposition to acidity, and to excite the Peristaltic motion of the Intestines, and thereby to facilitate the evacuation of their contents.

## SPLEEN.

The *Spleen* is a soft, very Vascular Substance, and of a purple colour.

It is somewhat depressed, is of a long oval form, and of considerable size, but varying in this last respect in different Subjects. Tab. CXXVIII. Fig. 1. See also Tab. with Nerves of Spleen near end of Vol. III. Its medium length is about five or six inches; its weight, twelve or fourteen ounces.

In the upright position of the Body it is situated almost vertically, in the left Hypochondriac Region, between the large extremity of the Stomach and corresponding False Ribs;—its under end lying behind the Colon, and over the top of the Left Kidney. Tab. CIX. CX. CXV. CXXVI.

The Situation of the Spleen varies a little, according to the state of Respiration, and to the fulness or emptiness of the Stomach;—rising or falling as the Lungs are less or more dilated,—and becoming more oblique in its situation, with its inferior extremity turned more forwards, in proportion as the Stomach becomes more distended. Its form and size also vary a little, according to the degree of pressure it receives from the Stomach.

Its *External Surface* is convex, and uniform like that of the Ribs, &c. to which it is opposed.

Its *Internal Surface*, or that next the Spine, is irregularly concave, and is divided into an Anterior and a Posterior Plane, by a longitudinal Groove or Fissure, where the Vessels and Nerves enter.

The Anterior Plane is more concave than the Poste-



rior corresponding to the contiguous convexity of the Stomach, with which it is in close contact.

The Spleen has frequently deep *Fissures* upon its edges:—sometimes it has small *Appendages* attached to it, and not unfrequently there is one or more *Spleens*, though very small, connected with it.

At the inner side, it is fixed to the Omentum, and by means of that and Blood-vessels, to the Stomach and Pancreas.—Behind, it is connected to the Diaphragm, and below, to the Left Kidney and Colon, by Reflections of the Peritoneum, and by Cellular Substance.

It is covered by a *double Membrane*, one Layer of which is a production of the Peritoneum, the other proper to the Spleen itself, but so closely connected to the common Coat, that they appear in the Adult Body to be one and the same Membrane.

The Substance of the Spleen is remarkably soft, and it is by much the most tender of the Abdominal Viscera.

It consists of a Congeries of Blood-vessels, Lymphatics, and Nerves, joined together and supported by a large quantity of Cellular Substance. Tab. CXXVIII. Fig. 2.

The extreme branches of the Blood-vessels put on the appearance of *Penicilli*, which have been mistaken for Glands.

These Vessels are so tender, that when an injection is forcibly thrown either into Artery or Vein, particularly the latter, it bursts into the common Cellular Substance, and gives the appearance of Follicles or Cells; and such were described by MALPIGHI as existing naturally between the extremities of the Artery, and beginnings of the Veins.

The *Blood-vessels* of the Spleen are among the largest of the Body, in proportion to the size of the Viscus in which they are dispersed.

The *Artery* is a principal Branch of the Cœliac.—It runs in a serpentine direction, which lessens the force of the Blood sent to this tender Organ. After sending Branches to the Pancreas, &c. and the *Arteriæ Breves* to the left end of the Stomach, it goes into the Substance of the Spleen, where it is subdivided into Branches which are crowded together, and run in every direction, forming at length Plexus and Penicilli, which terminate in the Branches of the corresponding Vein.

The *Vein*, like that in most other Viscera, is larger than the Artery: It receives the Blood immediately from the terminations of the Artery, without the intervention of Cells.

The Splenic Vein receives the *Venæ Breves* of the Stomach, the Pancreatic Veins, &c. and forms one of the principal Branches of the Vena Portæ.

The *Lymphatics* from the superficial parts of the Spleen join the deep-seated Absorbents at the Fissure where the Blood-vessels enter, and afterwards pass through several Conglobate Glands lying over the Splenic Artery.

They intermix with Lymphatics belonging to several other Viscera, and terminate in the Thoracic Duct.

The *Nerves* of the Spleen, which are small, but considerable in number, are Branches of the Great Sympathetic and Eighth Pair, and form an irregular Plexus which surrounds the Vessels.

No Excretory Duct has been found to proceed from the Spleen, in consequence of which very various hypotheses have been entertained with respect to the Use of this Organ.

Many of the Ancients were of opinion,—that besides the Bile of the Liver, there was an *Atra Bilis*, or *Black Bile*, and that the Spleen was the receptacle of it.

Others have thought a particular *Menstruum* was secreted in it, and conveyed to the Stomach for the purpose of Digestion.

Others again,—that the Blood of the Spleen promotes the sluggish circulation of the Blood of the Vena Portæ.

The late MR HEWSON, who has written particularly on this Viscus, was of opinion, that it concurred with the Thymus and Lymphatic Glands in forming the red Globules of the Blood, and that these Globules were rendered complete in the Spleen.

It has been also supposed,—that as the Stomach becomes full, the Spleen is compressed by it, in consequence of which a greater quantity of Blood is sent to the Pancreas, for the secretion of the Pancreatic Juice.

But the present most prevalent opinion is,—that the Blood undergoes some change in it, which renders it useful in the secretion of the Bile; and the opinion is supported from the great quantity of Blood with which this Organ is known to be supplied, and from its Vein, not only in Man, but in other Animals, passing to the Vena Portæ. A late opinion is, that the Spleen forms the oleaginous part of the Bile.

## PANCREAS.

The *Pancreas* is a flat Gland of the Conglomerate kind, from six to eight inches in length, an inch and a half in breadth, and of the same nature with the Salivary Glands, of which it may be reckoned the largest.

It is situated in the Epigastric Region, and is placed transversely in the back part of the Abdomen, between the Stomach and Spine. Tab. CXII. L. Tab. CXXVII. Fig. 7. A.

It has a large or Right Extremity, and a small or Left one, an Anterior and Posterior Surface, and an Upper and Under Edge.

The Right Extremity is attached to the left side of the second turn of the Duodenum, or to that part where the Intestine is about to go across the Spine.

From the under part of the Right Extremity, the Pancreas sends down an Elongation or Process, which adheres closely to the Duodenum. Tab. CXXVI. Tab. CXXVII. Tab. CXXVIII. Fig. 7. B.

This



This Process was discovered by WINSLOW, and termed by him *Pancreas Minus*.—It is also called *Head of the Pancreas*.

The Pancreas passes before the upper edge of the transverse portion of the Duodenum, and over the Aorta, Vena Cava, and part of the Splenic Vessels, to all of which it is attached.

It becomes gradually narrower and thinner towards its Left Extremity, which is rounded, and is fixed to the Spleen, through the medium of the Large Omentum. Tab. CXXVI. Fig. 2.

The Pancreas is covered anteriorly by the two Layers of the root of the Meso-colon, which assist in retaining it in its place;—posteriorly, it is only covered by Cellular Substance, which connects it to the Vertebrae.

It is of a pale red colour, bordering upon yellow, and is composed of minute Granulae termed its Acini, which form small Glands or Lobes, that are connected loosely by Cellular Texture, in such a manner as to give an appearance of uniformity and smoothness to its External Surface.

By a good Injection, each of the Acini is found to be composed of an assemblage of Blood-vessels, and of the origins of an Excretory Tube.

The Arteries of the Pancreas are derived, partly from the Hepatic, but chiefly from the Splenic, by several small Branches, which pass at various places into its Substance, in a transverse direction.

The Veins correspond in name and general course with the Arteries, and assist in forming the Vena Portae.

The Lymphatics run to the Splenic Plexus, and terminate in the Thoracic Duct.

The Nerves of the Pancreas are small. Like those of the other Viscera of the Abdomen, they are derived from the Great Sympathetic and Eighth Pair.

From the different Acini of the Pancreas, small Ducts arise, which join into larger ones, running transversely in the Substance of the Pancreas, and forming a common Duct, called *Ductus Pancreaticus*. Tab. CXXVI. CXXVII. Tab. CXXVIII. Fig. 7.

The *Pancreatic Duct*, termed also *Ductus WIRTSUNGI*, after the Discoverer of it in the Human Body, is remarkably thin in its Coats, of a white colour, and semi-transparent.

It begins at the Left Extremity of the Pancreas, runs somewhat Serpentine in the Substance of the Gland, a little below its middle height, becoming gradually larger in consequence of receiving the different Branches which compose it,—and is at last somewhat larger than a Crow-Quill. Tab. CXXVII.

At the right Extremity of the Pancreas, it receives the principal Duct of the *Pancreas Minus*, and terminates obliquely in the Duodenum by an Orifice common to it and the *Ductus Communis Choledochus*.—In some rare cases, however, it terminates at a little distance from the Biliary Duct; and sometimes also, the Duct of the *Pancreas Minus* ends separately in the Duodenum.

The Pancreas secretes a *Liquid*, (to which no great attention has been paid), but it resembles the Saliva in quality and appearance, and discharges it by its excretory Duct into the Duodenum. Tab. CXXVI. Fig. 2. F.

The *Pancreatic Juice* incorporates the Bile with the Alimentary Mass, blunts the Acrimony of these, or of Acids which may be formed in the Canal, and may be said also to answer some of the purposes to the Contents of the Intestines, which the Gastric Juice does to those of the Stomach: or, it finishes that Digestive Process in the Intestines, which was begun in the Stomach.



## T A B L E CXXVI.

The LIVER, SPLEEN, PANCREAS, and DUODENUM, with the insertion of the BILIARY and PANCREATIC DUCTS.

---

### FIG. 1

*A View of the GALL-BLADDER, and of the BILIARY and PANCREATIC DUCTS.*

- a*, The gall-bladder ;
- b*, Its fundus ;
- c*, Its cervix ;
- d*, The cystic duct.
- e, e*, The right and left branches of the hepatic duct.
- f*, The hepatic duct.
- g*, The ductus communis choledochus.
- h, h*, The branches of the pancreatic duct.
- i, i*, Their termination in the pancreatic duct.
- k, k*, The trunk of the pancreatic duct.
- l*, The termination of the ductus communis choledochus, and pancreatic duct, in the duodenum.
- m*, The inner surface of part of the duodenum.

### FIG. 2.

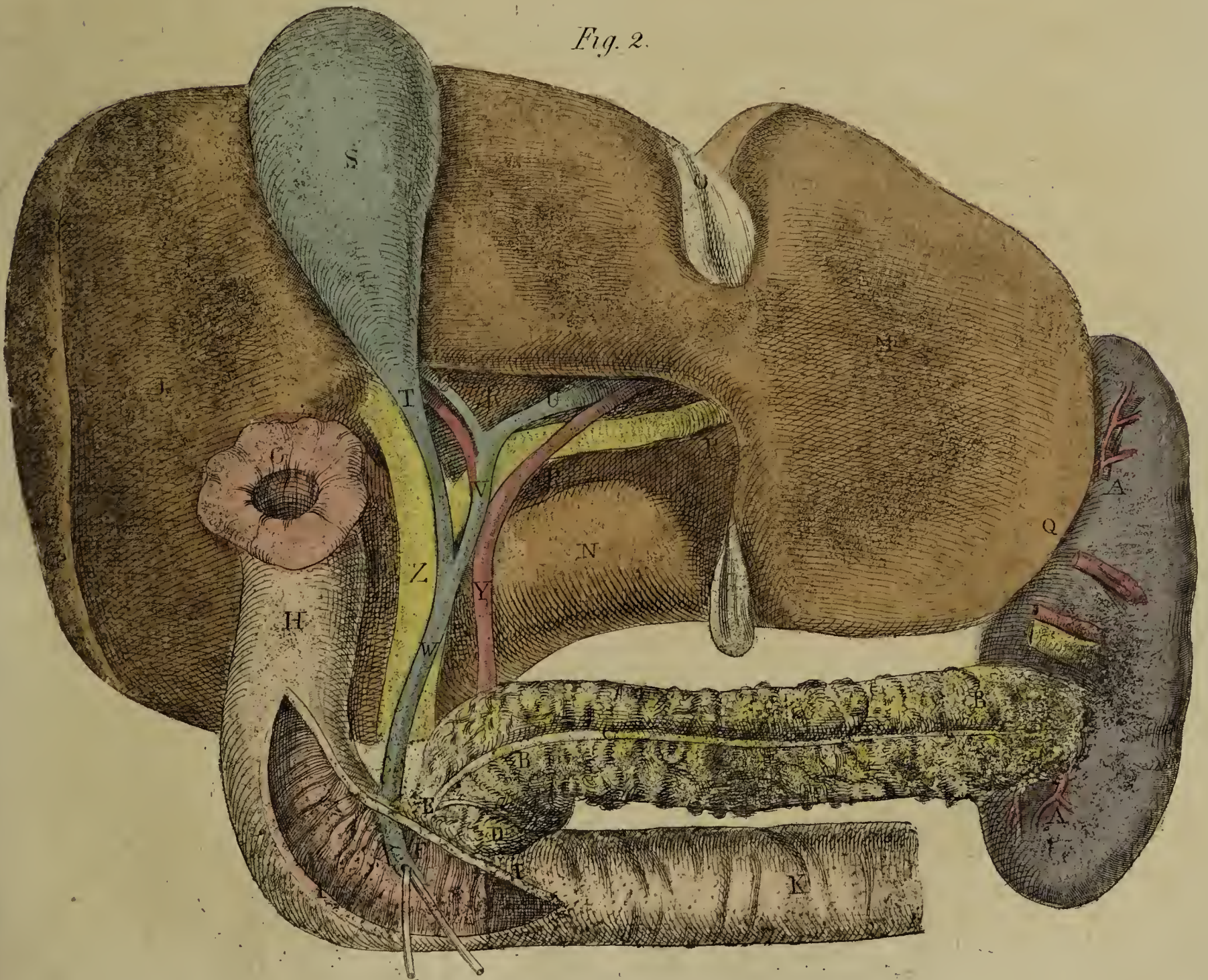
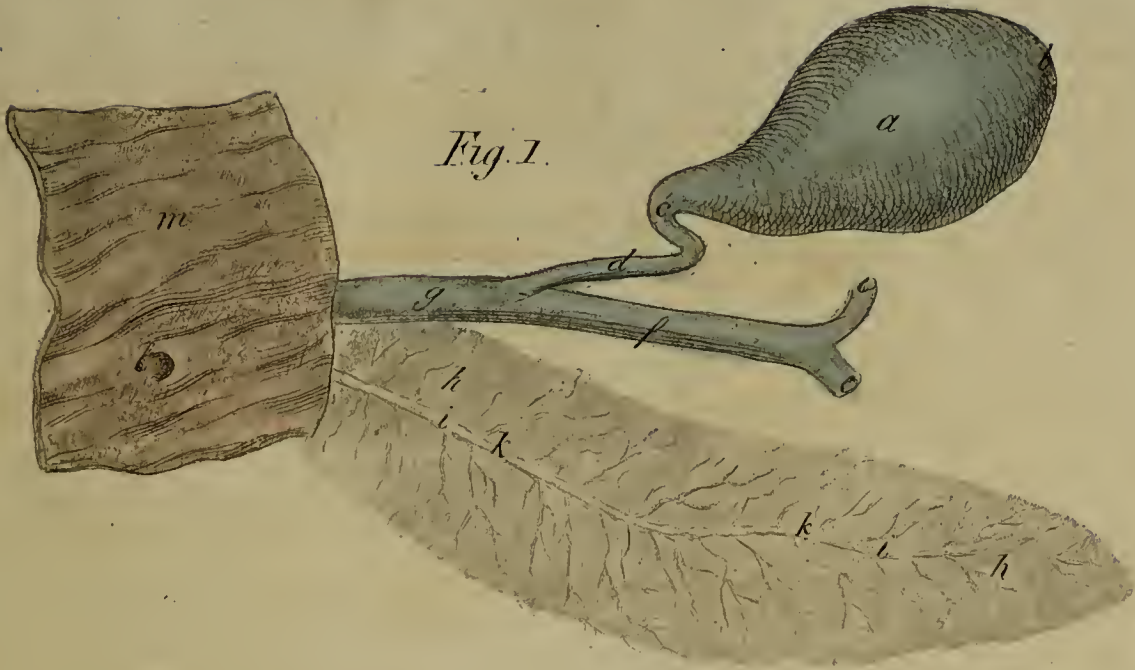
*Represents the Under Surface of the LIVER, and the Anterior Surface of the SPLEEN, PANCREAS, and DUODENUM.*

- A, A*, The anterior and inner part of the spleen, with its blood-vessels slightly represented.
- B, B*, The pancreas fixed by one end to the spleen, and by the other to the duodenum.
- C, C*, The pancreatic duct.
- D*, The pancreas minus.
- E*, The duct of the pancreas minus terminating in that of the pancreas majus.

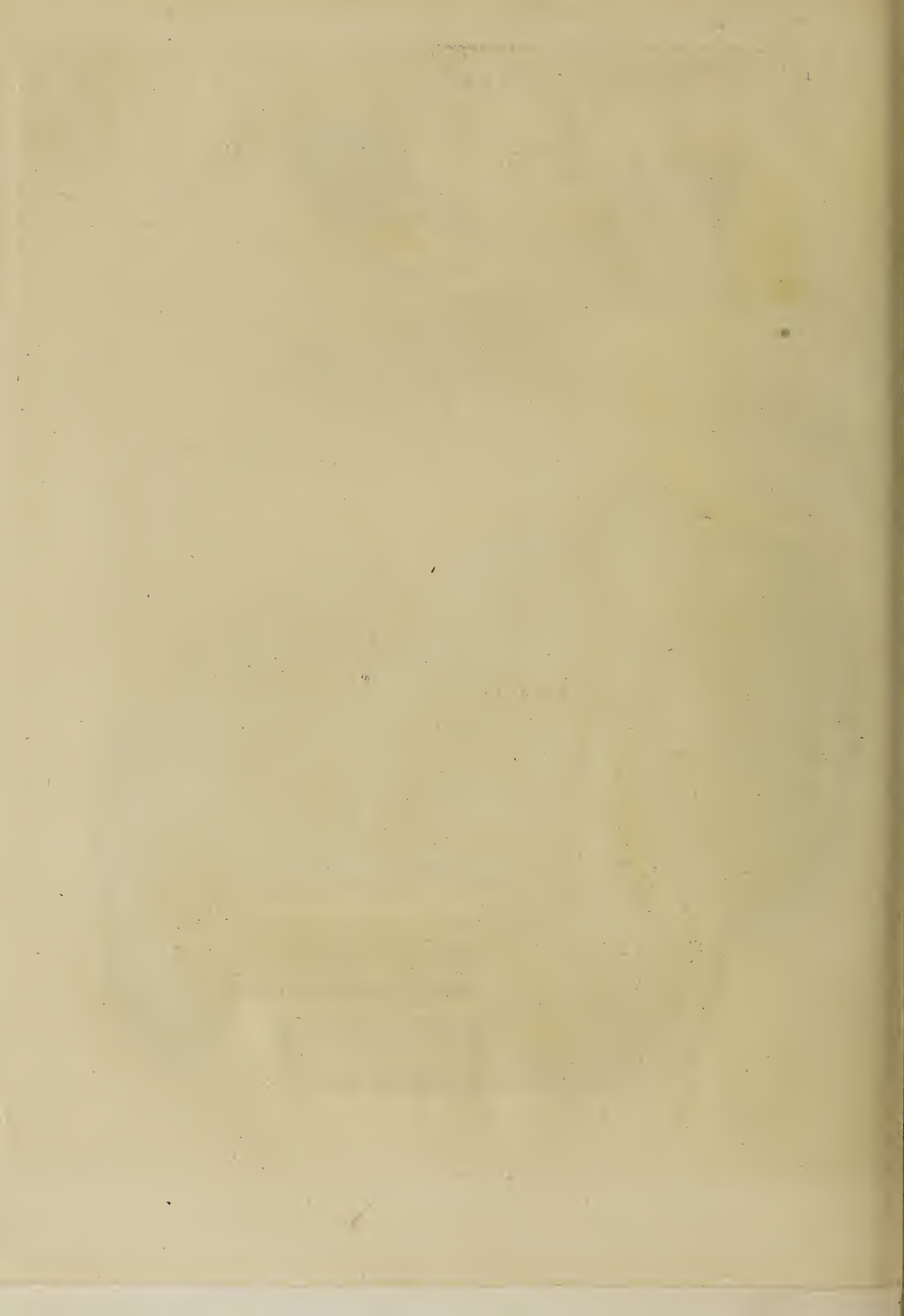
- F*, The pancreatic duct, terminating in the duodenum.
- G*, The pylorus, with a small portion of the stomach.
- H*, The upper part of the duodenum, which is covered by the liver when *in situ*.
- I, I*, The curvature of the duodenum, slit open, to shew the rugæ, and the common orifice of the biliary and pancreatic ducts.
- K*, The continuation of the duodenum.
- L*, The under surface of the great lobe of the liver.
- M*, That of the small lobe.
- N*, The lobe of SPIGELIUS.
- O*, Part of the broad and round ligaments.
- P*, Part of the upper or convex surface of the liver :—  
The letter is placed upon the part to which the right lateral ligament was connected.
- Q*, The part to which the left lateral ligament was fixed.
- R, R, R*, The sinus portarum, by which the great blood-vessels enter the liver.
- S*, The gall-bladder.
- T*, The cystic duct.
- U, U*, The right and left branches of the hepatic duct.
- V*, The hepatic duct.
- W*, The ductus communis choledochus.
- X*, The ductus communis choledochus terminating in the duodenum, after having run for some way obliquely between its coats.
- Y*, The hepatic artery dividing into two principal branches.
- Z*, The vena portarum, also dividing into two principal branches.



TAB. 126.









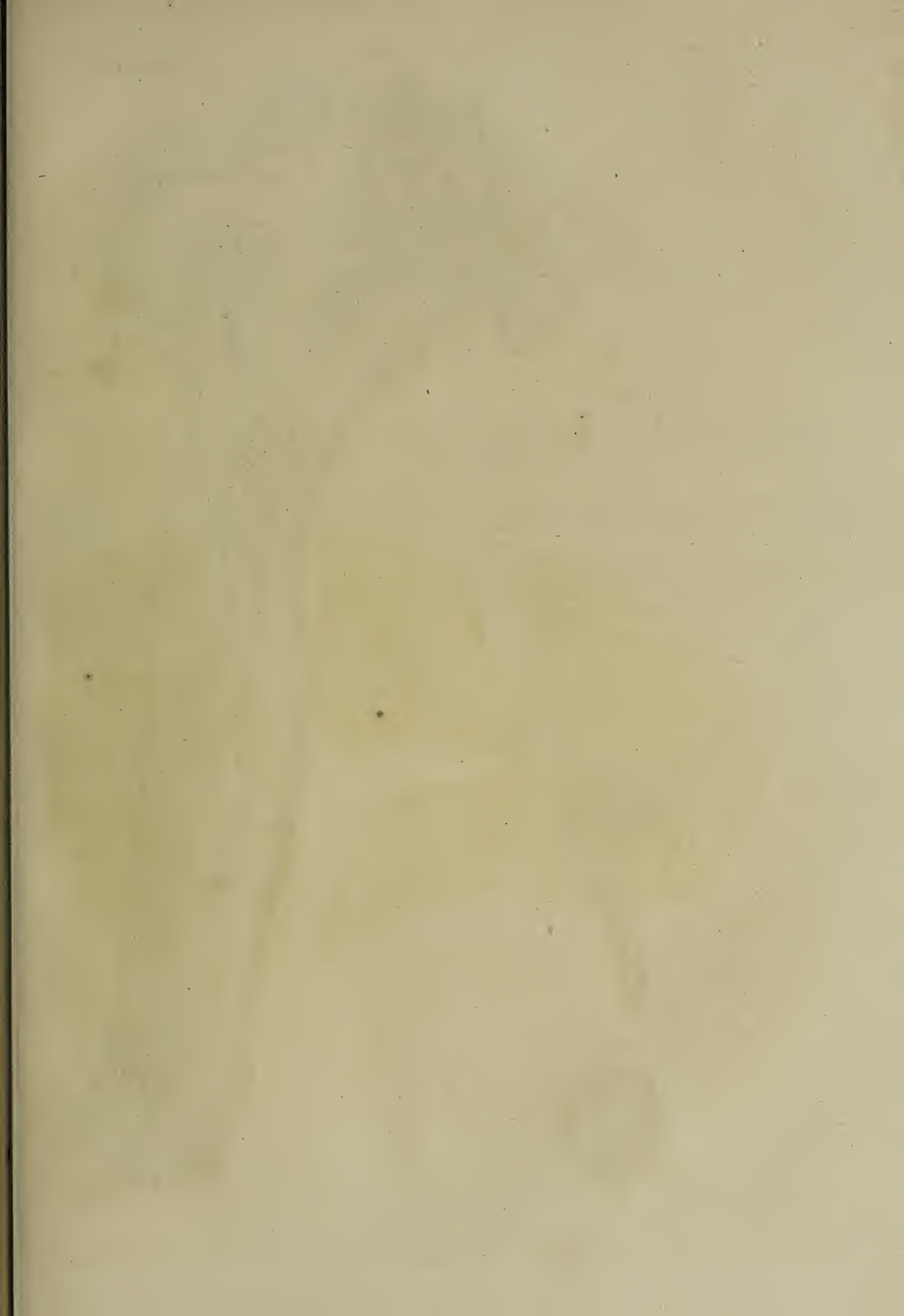






Fig. 2.

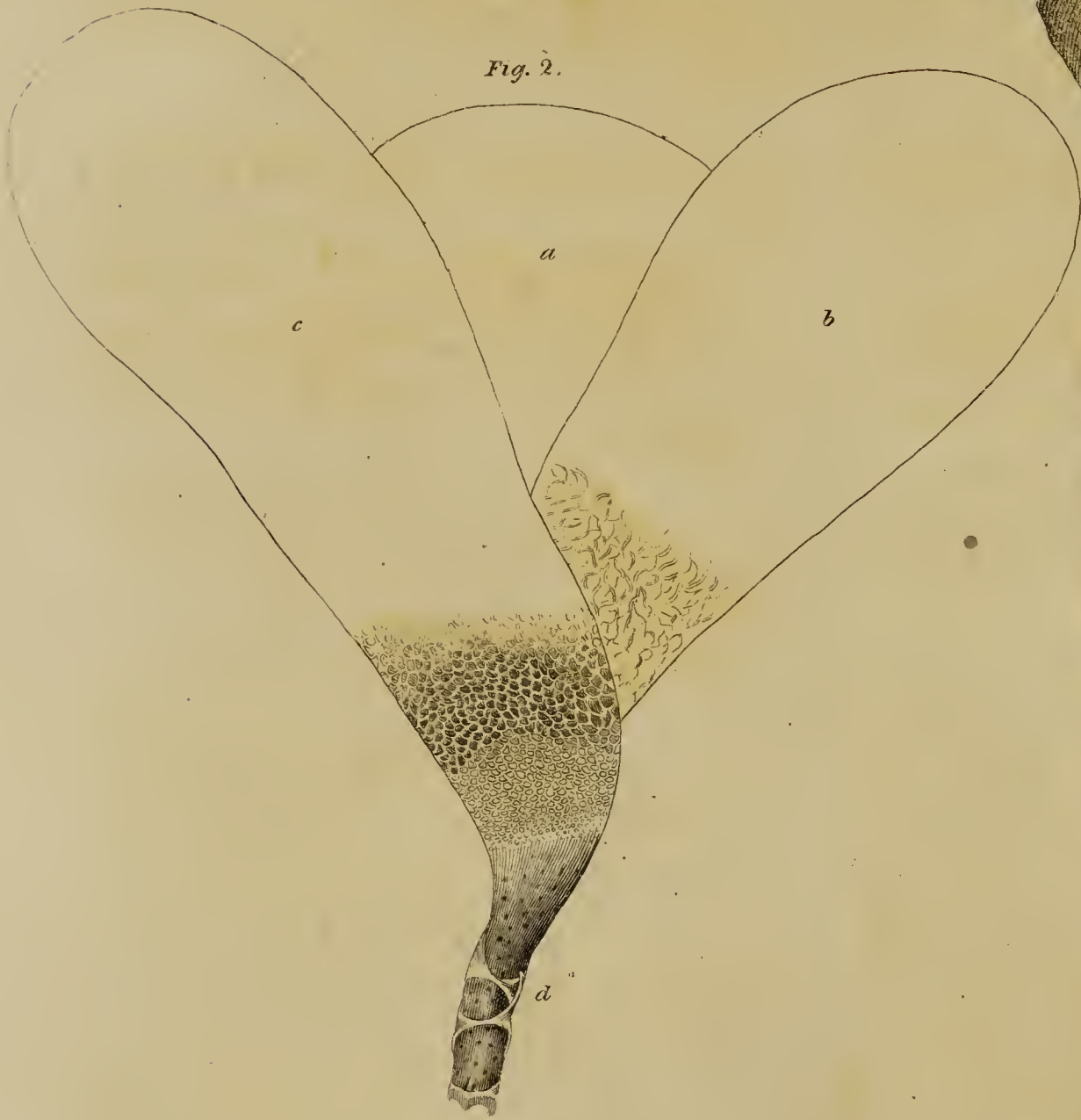


Fig. 1.





## T A B L E CXXVII.

Represents the Structure of the BILIARY and PANCREATIC ORGANS.

---

FIG. 1.

*Shews the BILIARY DUCTS arising from one of the ACINI of the LIVER, much magnified.*

FIG. 2.

*Part of the COATS of the GALL-BLADDER separated from each other.*

- a, The tunica externa.*
- b, The membrana nervea, with its blood-vessels.*
- c, The tunica interna vasculosa, in which terminate the arteries, veins, and nerves.*
- d, The valvulæ in the cystic duct, with the orifices of the mucous follicles.*

FIG. 3.

*The PANCREATIC DUCT filled with wax. The DUODENUM is cut Longitudinally, that the PAPILLÆ may appear by which the DUCT terminates among the Plicæ of the INTESTINES.*

- a, a, The anterior part of the pancreas, so dissected as to shew the excretory duct running in the axis of that viscus.*
- b, b, The common trunk of the pancreatic duct, with the numerous branches from the different parts of the pancreas which compose it.*
- c, The duct of the pancreas minus terminating in that of the principal duct.*
- d, The papilla by which the pancreatic duct terminates in the duodenum.*



## T A B L E CXXVIII.

The Situation and Structure of the ASSISTANT CHYLOPOIETIC VISCERA, with different Views of the VESICA URINARIA, and ORGANS of GENERATION.

FIG. 1.

*A View of the SPLEEN, with its BLOOD-VESSELS injected.*

- A, A, The internal concave part of the spleen next the stomach and pancreas.
- B, B, The arteries.
- C, C, The veins, which, like the arteries, form various contortions before they enter the spleen.

FIG. 2.

*A Portion of the SPLEEN, with its VESSELS, some of which are unfolded.*

- A, The extremities of some of the blood-vessels completely unfolded, resembling wool or cotton.
- B, The extremities of others, partly unfolded.
- C, A portion of the surface of the spleen, not unfolded.
- D, The splenic artery.
- E, The splenic vein.

FIG. 3.

The Common Cellular Texture of the Spleen, which has been mistaken for Cells peculiar to that Organ.

FIG. 4.

*A View of the Concave or Under Surface of the LIVER.*

- A, The left, and,
- B, The right lobe of the liver.
- C, The left lateral ligament.
- D, D, The surface by which the liver adhered to the diaphragm.
- E, The right lateral ligament.
- F, G, The vena cava inferior.
- H, A portion of the liver which surrounds the vena cava.
- I, The sinus where the ductus venosus of the foetus runs.
- K, A sinus where blood and biliary vessels penetrate, which belong chiefly to the left lobe of the liver.
- L, M, Eminences between which,
- N, The vena portæ enters.
- H, I, L, The lobulus SPIGELII.
- O, The hepatic duct.
- P, The ductus communis choledochus.
- Q, The cystic duct.
- R, The gall-bladder, projecting beyond the edge of the liver.

- S, The isthmus, under which a portion of the vena portæ joins the umbilical vein.
- T, The sinus where the round ligament enters.
- U, The broad ligament, in the edge of which the round one is inclosed.

FIG. 5.

*A Section of the GALL-BLADDER and BILIARY DUCTS.*

- A, The inner surface of the gall-bladder, to shew its reticulated appearance.
- B, A portion of the hepatic duct.
- C, The common duct.
- D, The cystic duct.—In the cystic duct, the cells, and in the gall-bladder and biliary ducts in general, the orifices of the mucous ducts are represented, though not very distinctly.

FIG. 6.

*A View of the Tortuous Course and Cells of the BILIARY CYSTIC DUCT, with Part of the GALL-BLADDER.*

- A, The neck of the gall-bladder.
- B, B, The cystic duct, cut open to shew its cellular appearance.

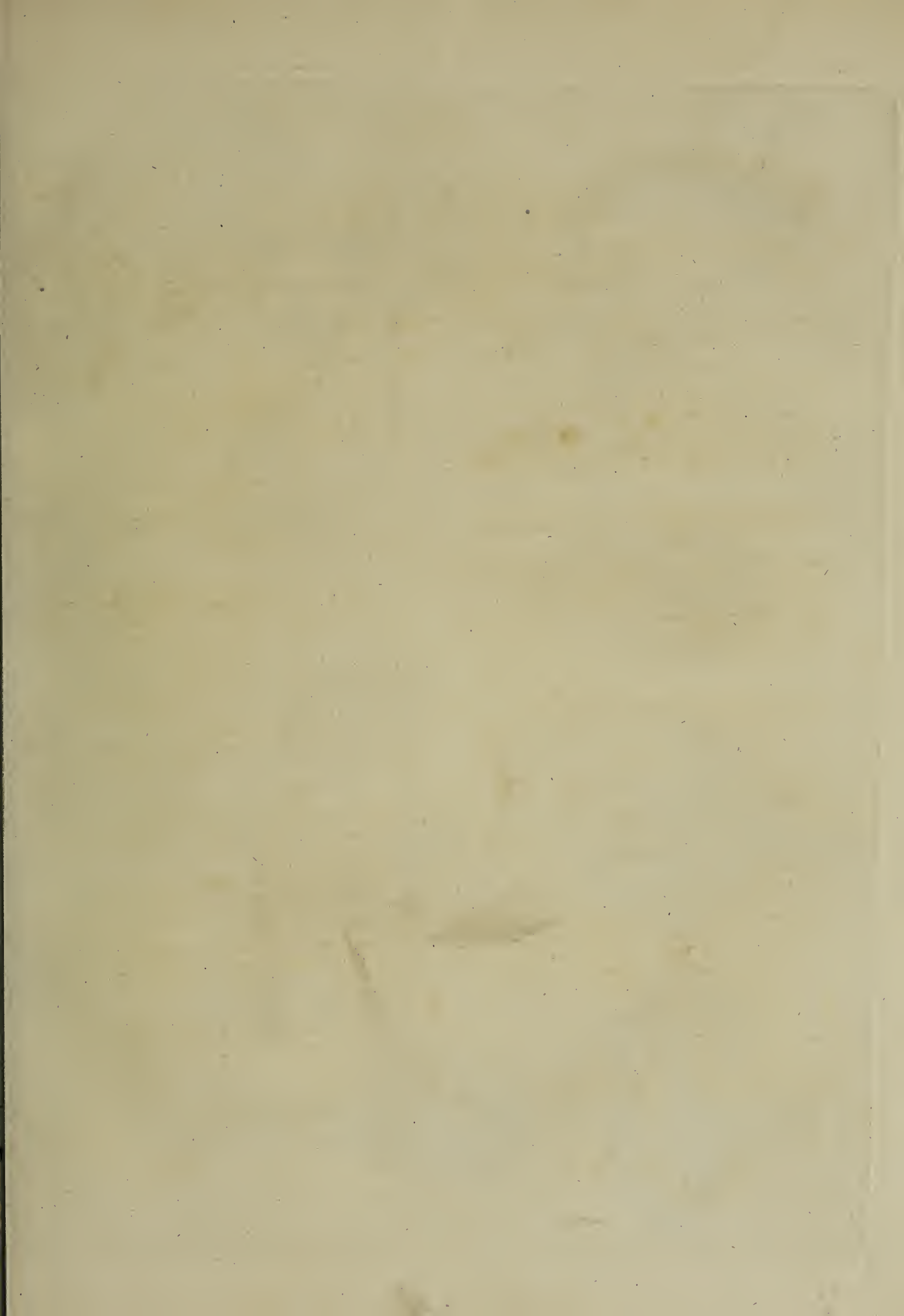
FIG. 7.

*A View of the PANCREAS, and of the Insertion of the PANCREATIC and BILIARY DUCTS in the DUODENUM.*

- A, A, &c. The pancreas.
- B, The pancreas minus of WINSLOW.
- C, C, C, The pancreatic duct, running through the whole length of, and receiving many branches from, the substance of the pancreas.
- D, The pancreatic duct joining the common biliary duct, and ending in the duodenum, part of which is slit open.
- E, E, The ductus communis choledochus.
- F, The cystic duct.
- G, The hepatic duct.
- H, Part of the pancreas, cut from the ductus communis, which it covers.
- I, The right extremity of the stomach.
- K, The pylorus.
- L, The duodenum.
- M, Its passage behind the mesentery.

N, The







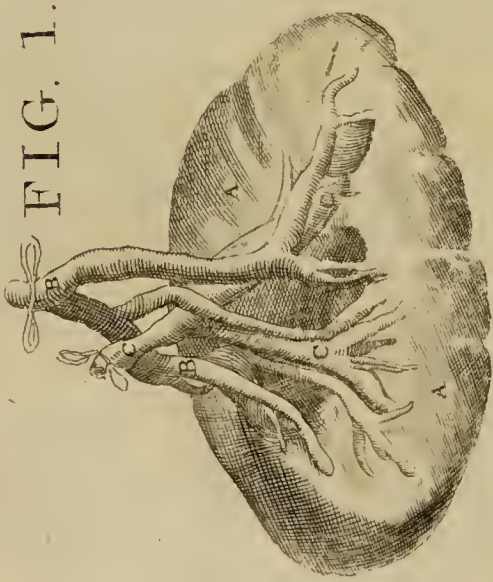


FIG. 1.



FIG. 2.

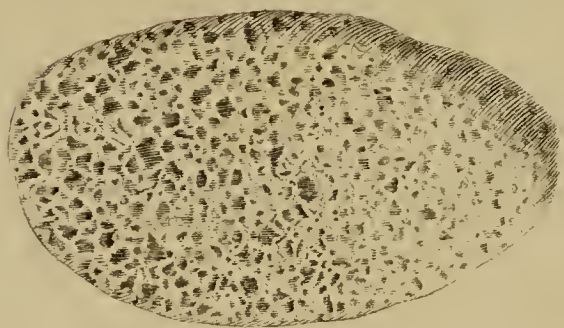


FIG. 3.

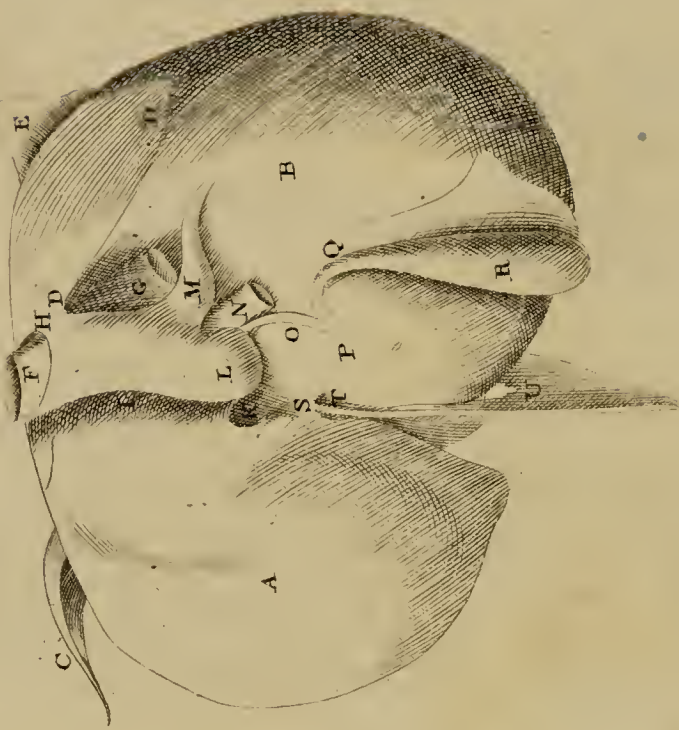


FIG. 4.



FIG. 5.



FIG. 6.

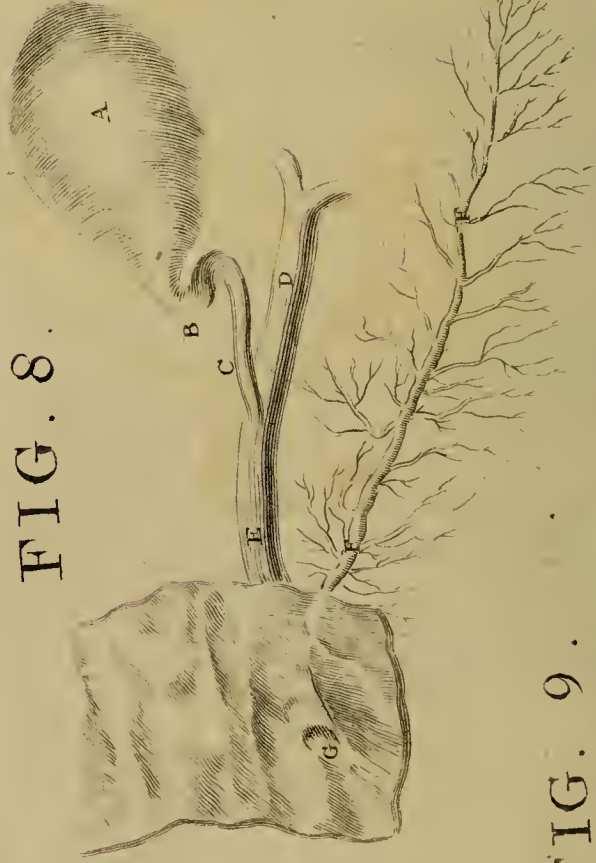


FIG. 8.



FIG. 7.



FIG. 9.

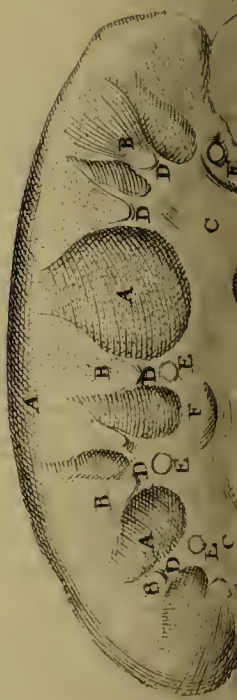


FIG. 10.

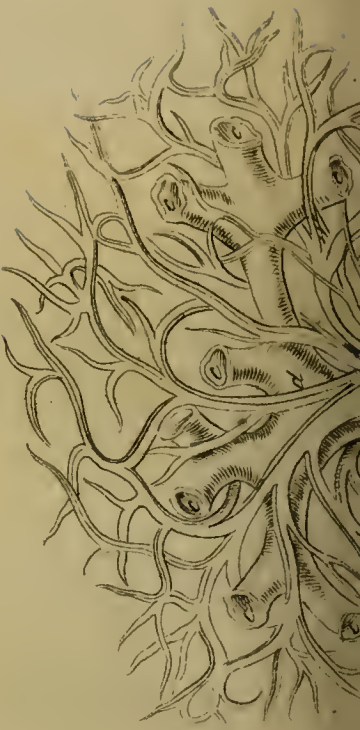


FIG. 11.



FIG. 12.



FIG. 13.

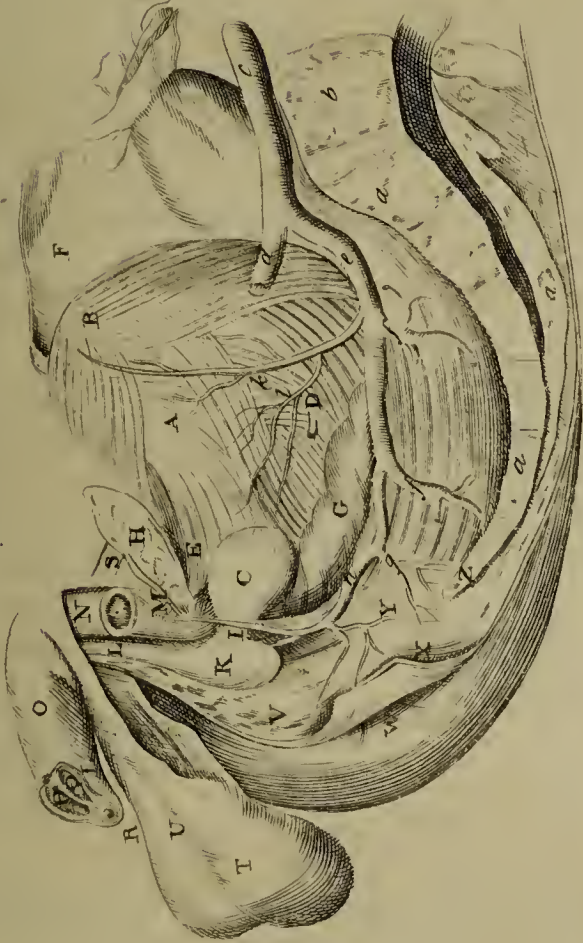


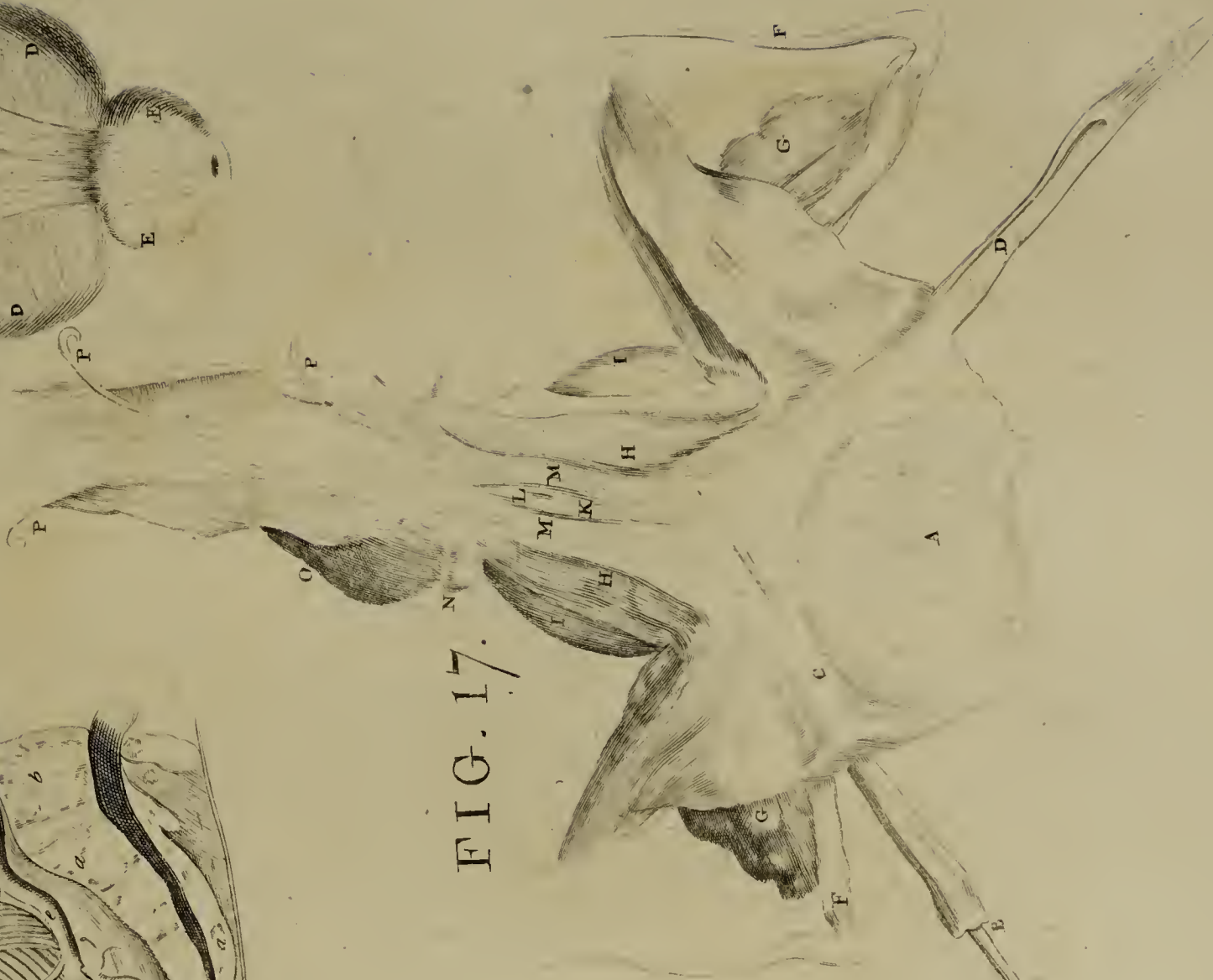
FIG. 14.



FIG. 16.



FIG. 17.









- N, The same intestine emerging upwards in the left hypochondrium, where it obtains the name of *Jejunum*.  
 O, O, The mesentery.  
 P, The vena mesenterica.  
 Q, The arteria mesenterica.

FIG. 8.

A View of the Gall-bladder, Biliary and Pancreatic Ducts, with their Termination in the Duodenum.

FIG. 9.

*Represents the KIDNEYS, with their BLOOD-VESSELS.*

- A, A, The kidneys;—the right one somewhat larger and lower than the left.  
 B, B, The renal glands, the right also represented larger than the left.  
 C, The aorta.  
 D, The inferior cava.  
 E, E, The renal arteries, the right longer, lower, and more oblique than the left.  
 F, F, The renal veins of the right side, shorter, lower, and more oblique than the left.  
 G, G, Veins belonging to the kidney and renal glands.  
 H, The spermatic arteries.  
 I, I, ———— veins.  
 K, The inferior mesenteric artery, represented a great deal too small.  
 L, L, The ureters.

FIG. 10.

*Shews the KIDNEY and its PELVIS, divided through the middle from the Outer Edge to the URETER.*

- A, A, &c. The cut surface of the cortical substance.  
 B, B, &c. A section of the uriniferous substance, with radiated fibres ending in papillæ.  
 C, C, A section of the pelvis of the kidney.  
 D, D, &c. A section of the branches of the pelvis, called *Infundibula*.  
 E, E, E, Some of the papillæ entire.  
 F, The beginning of the ureter;  
 G, Its continuation.

FIG. 11.

*The Distribution of the Large BLOOD and URINIFEROUS VESSELS in the Substance of the KIDNEY.*

- a, The renal, or emulgent artery, dividing into branches in the substance of the kidney.  
 b, The corresponding vein.  
 c, c, &c. The beginning of the infundibula, uniting into trunks, which form,  
 d, The pelvis.  
 e, The ureter continued from the pelvis.

FIG. 12.

*A Section of the KIDNEY, to shew the Course of its minute VESSELS.*

- A, A, The minute branches of the renal artery, running

in a serpentine course, and many of them degenerating into uriniferous tubes.

- B, A portion of the external surface of the kidney.  
 C, C, &c. The uriniferous ducts.  
 D, D, &c. The papillæ.  
 E, A section of the pelvis.  
 F, The ureter.

FIG. 13.

*The Contents of the MALE PELVIS, viewed on the Left Side.*

- A, The vesica urinaria, the outer coverings of which are removed, to shew the different orders of its fleshy fibres.  
 B, The fundus vesicæ.  
 C, The prostate gland surrounding the neck of the bladder.  
 D, The entrance of the ureter into the bladder.  
 E, The tendinous ligaments of the bladder.  
 F, The peritoneal coat reflected.  
 G, One of the vesiculæ seminales.  
 H, A section of the os pubis near its symphysis.  
 I, The membranous part of the urethra.  
 K, The bulb of the urethra.  
 L, The urethra.  
 M, The corpus cavernosum penis of the right side.  
 N, A section of the left corpus cavernosum penis.  
 O, A portion of the penis entire.  
 P, Q, The corpora cavernosa penis, between which the septum is seen.  
 R, The corpus cavernosum urethræ, surrounding the urethra.  
 S, The suspensory ligament of the penis.  
 T, The scrotum.  
 U, The raphè which extends from the anus along the middle of the scrotum.  
 V, A section of the integuments.  
 W, The anus.  
 X, The sphincter ani.  
 Y, The levator ani.  
 Z, The os coccygis.  
 a, a, a, The os sacrum.  
 b, The last lumbar vertebra.  
 c, The trunk of the common iliac artery.  
 d, The beginning of the external iliac artery.  
 e, The internal iliac artery.  
 f, f, Branches which go through the great notch of the os ilium to the muscles.  
 g, The external hæmorrhoidal branches.  
 h, The arteria pudenda communis.  
 i, A branch from this artery to the bulb of the urethra.  
 k, The umbilical artery.  
 l, Branches of this artery to the vesica urinaria, vesiculæ seminales, and prostate gland.

FIG. 14.

*A View of the Anterior Part of the MALE BLADDER of URINE inflated; the PERITONEAL COAT and CELLULAR SUBSTANCE being removed.*

- A, The urachus.

B, The



- B, The muscular coat of the bladder, called *Detrusor Urinæ*, running down upon the prostate gland.  
 C, C, The ureters.  
 D, D, The under and lateral parts of the bladder, thinner and more dilated than the upper part.  
 E, E, The prostate gland.

FIG. 15.

*A Posterior View of the same BLADDER of URINE.*

- A, B, C, D, as in Fig. 14.  
 E, E, The vesiculæ seminales, and,  
 F, F, The vasa deferentia, turned down to shew the posterior part of the detrusor urinæ.  
 G, The tough ligamentous substance between the vasa deferentia.

FIG. 16.

*An Anterior View of the FEMALE BLADDER of URINE, divested of FAT and MEMBRANES, to shew its Situation upon the VAGINA.*

- A, The orifice of the bladder, close to,  
 B, B, The circular muscular fibres, or sphincter, from which part of the detrusor arises.

- C, C, The circular fibres, or sphincter of the vagina.  
 D, The inside of the vagina, upon which the rugæ appear.

FIG. 17.

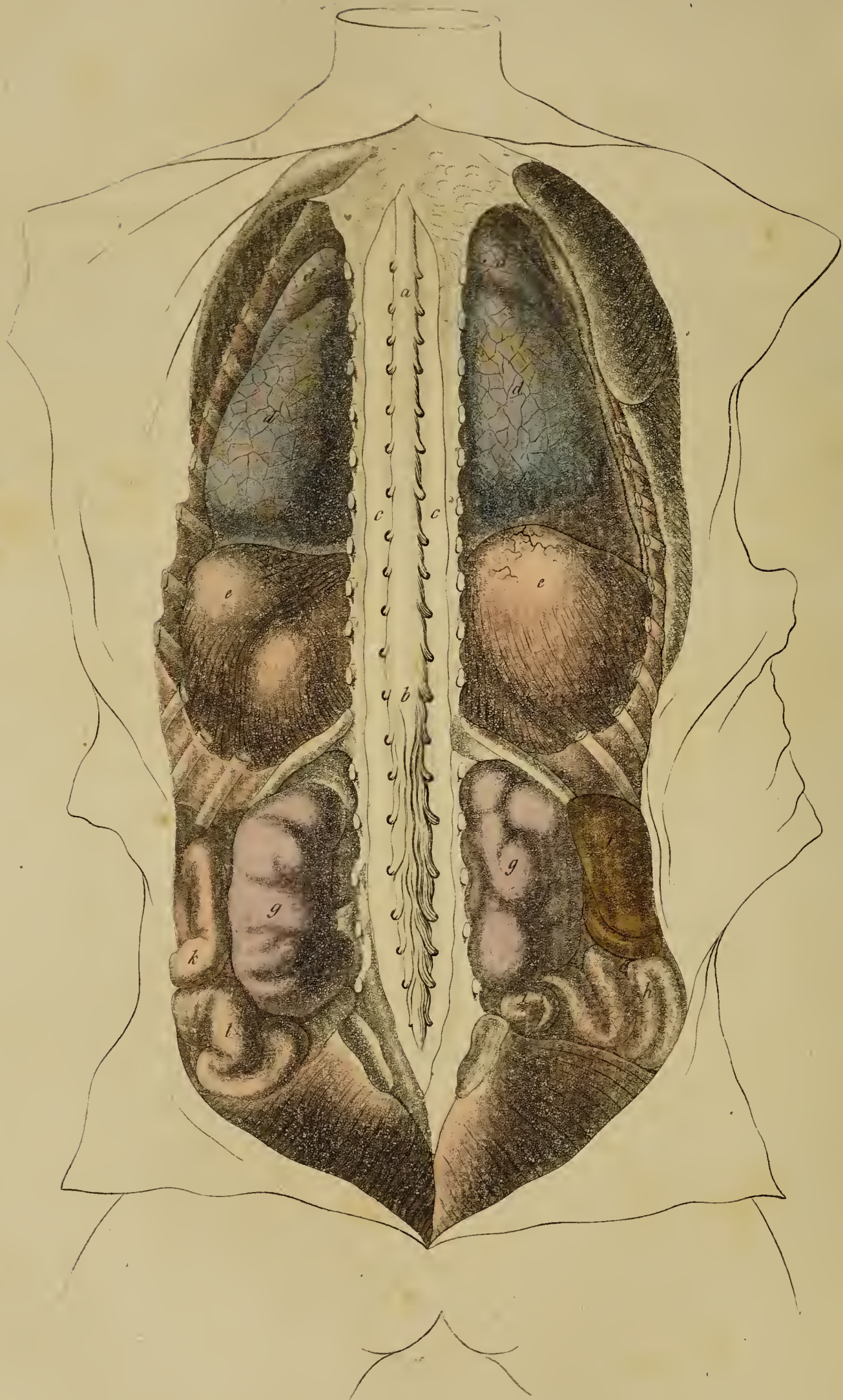
*The Under Part of the BLADDER, and Beginning of the URETHRA, in the Male, slit open, and viewed Anteriorly.*

- A, The bladder.  
 B, A probe in the termination of the left ureter.  
 C, The ureter running obliquely between the coats of the bladder.  
 D, The termination of the right ureter slit open.  
 F, F, The vasa deferentia.  
 G, G, The vesiculæ seminales.  
 H, H, The neck of the bladder, surrounded by,  
 I, I, The prostate gland.  
 K, A projection in the beginning of the urethra, forming the caput Gallinaginis.  
 L, The termination of the seminal ducts.  
 M, M, The part where the ducts of the prostate gland terminate.  
 N, One of COWPER's glands.  
 O, The bulb of the urethra.  
 P, P, P, Probes put into some of the ducts of the urethra.











## T A B L E CXXIX.

Represents the CONTENTS of the THORAX and ABDOMEN, seen from behind,--in a CHILD.

---

- The Common Integuments, Muscles, Bones, and any other parts which might obstruct the View, are dissected away. The Section is continued from the upper part of the Thorax to the lower part of the Spine. The Os Sacrum, and back parts of the Vertebrae, and of the Ribs, excepting the Twelfth Pair, are removed, to exhibit the Spinal Marrow with its Coverings. A small portion of the Cristæ of the Ossa Ilii is cut off, to shew the deep-seated Intestines.
- |   |  |
|---|--|
| <p><i>a</i>, The spinal marrow, with the origins of the spinal nerves.</p> <p><i>b</i>, The spinal marrow increasing in size towards the Cauda EQUINA, and opposite to the twelfth pair of ribs, its conical extremity sending off the ligamentum piæ matris.</p> | <p><i>c, c</i>, The dura mater slit open, and spread out upon the transverse processes of the vertebrae.</p> <p><i>d, d, &amp;c.</i> The lobes of the lungs. They are conical above, and elevated behind; their under part is seen opposite the sixth pair of ribs. The lobules also are distinctly seen in this Figure.</p> <p><i>e, e</i>, The diaphragm, with its arched posterior surface; the elevations and depressions corresponding with the subjacent viscera.</p> <p><i>f</i>, The apex hepatis projecting under the diaphragm, and over the intestines.</p> <p><i>g, g</i>, The kidneys lobated in the child.</p> <p><i>h</i>, The intestinum ilium advancing towards the cæcum.</p> <p><i>i</i>, The appendix vermiformis.</p> <p><i>k</i>, The left portion of the colon.</p> <p><i>l</i>, Its sigmoid flexure.</p> |
|---|--|



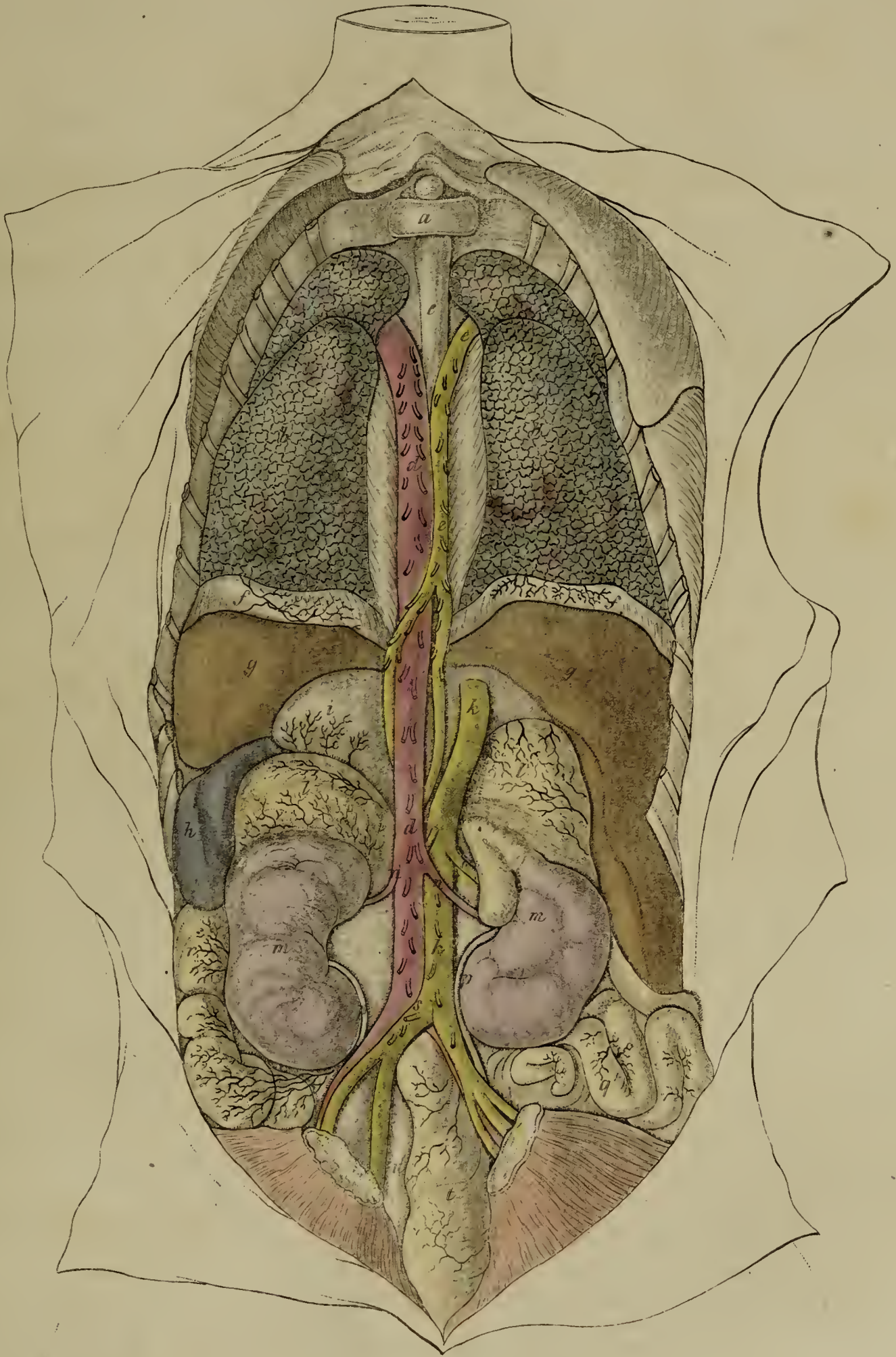
## T A B L E CXXX.

In this TABLE, besides the Parts cut off in the former one, the DORSAL and LUMBAR VERTEBRÆ, with the Os Sacrum, and Part of the CRISTÆ of the OSSA ILII, are removed, that certain VISCERA, deeper seated than those represented in the preceding Figure, may appear.

- 
- |  |   |
|--|---|
| <p><i>a</i>, The sixth cervical vertebra.</p> <p><i>b, b</i>, The lungs, the lobules of which are less accurately represented than in the former Table.</p> <p><i>c</i>, The esophagus.</p> <p><i>d, d</i>, The aorta, in which are seen the origins of the intercostal, lumbar, and sacral arteries, and its passage through the diaphragm.</p> <p><i>e</i>, The vena azygos arising in the abdomen, and perforating the diaphragm near the aorta.</p> <p><i>f, f</i>, The diaphragm, the posterior part of which is cut off, to shew the viscera which it concealed.</p> <p><i>g, g</i>, The liver proportionally large in the child.</p> <p><i>h</i>, The spleen.</p> <p><i>i</i>, A portion of the stomach.</p> <p><i>k, k</i>, The vena cava inferior, with the termination of the lumbar veins. It is seen receding from the aorta upon approaching the liver.</p> | <p><i>l, l</i>, The glandulæ supra-renales, the left surrounded by the stomach, spleen, and kidney, and therefore a little compressed, the right more conical, lying under the hollow surface of the liver.</p> <p><i>m, m</i>, The kidneys lobated and surrounded with a proper membrane.</p> <p><i>n, n</i>, The renal arteries.</p> <p><i>o</i>, The renal veins.</p> <p><i>p, p</i>, The ureters emerging from the pelvis of the kidneys.</p> <p><i>q</i>, The termination of the small intestines, the cæcum, and appendix vermiformis.</p> <p><i>r</i>, The left, or descending portion of the colon.</p> <p><i>s</i>, The aorta sending off, and the vena cava receiving, the iliac branches.</p> <p><i>t</i>, The intestinum rectum.</p> <p><i>u</i>, Part of the uterine vagina.</p> |
|--|---|

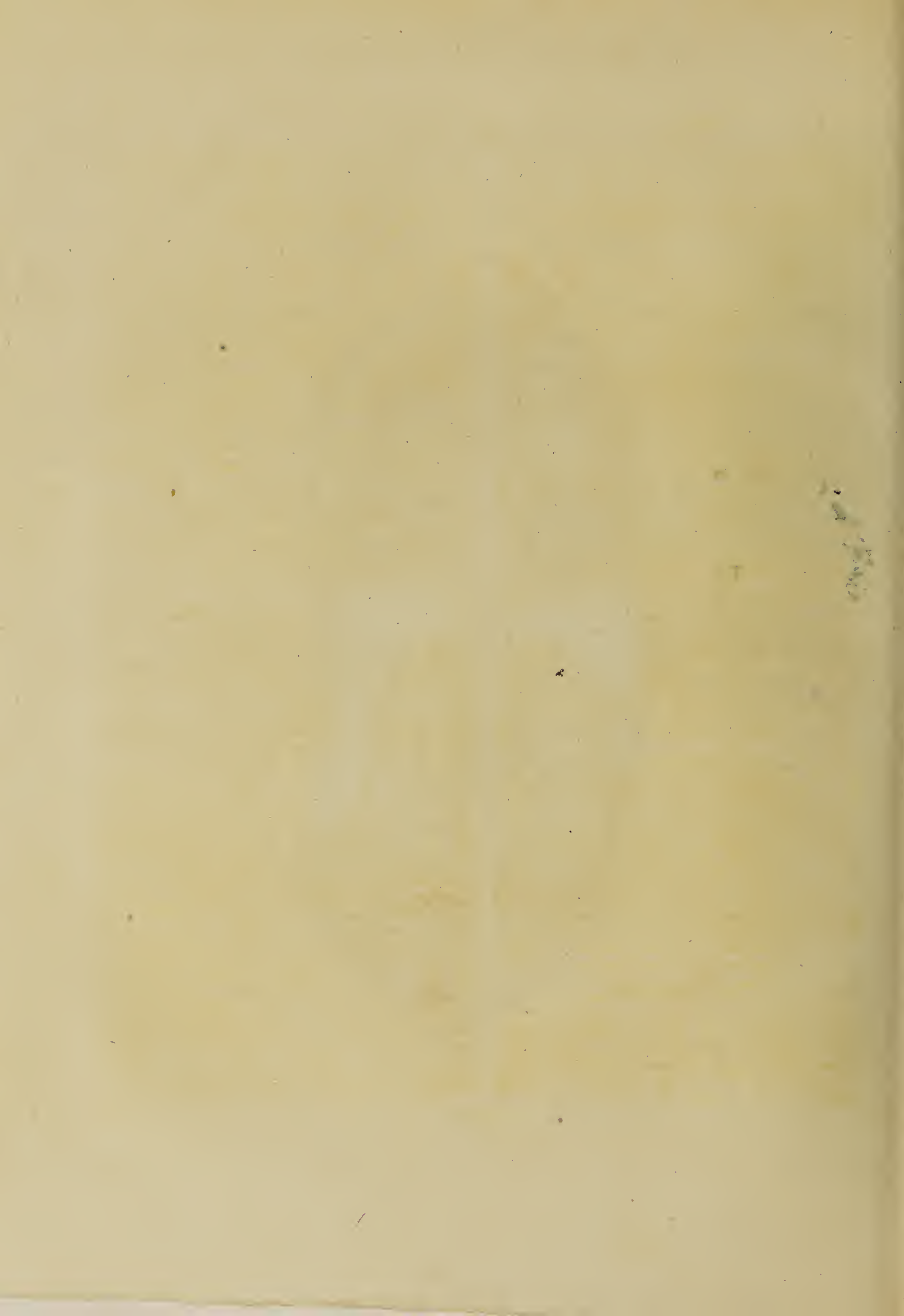


TAB. 130.



*Aquatinted by A. Pyle.*







## OF THE ORGANS OF URINE AND GENERATION.

## KIDNEYS.

THE *Kidneys* are two Glandular Bodies of a pale red colour, situated in the upper and back part of the Abdomen, in the Lumbar Region. Tab. CXIV. Fig. 4. K, K.

They are placed one on each side of the Spine, extending from the eleventh pair of Ribs to near the Crista of the Ossa Iliæ, and rest upon the Diaphragm, large Psoæ, Quadrati Lumborum, and Transversales Abdominis. Tab. CXII.

The Right Kidney is situated at the under and back part of the large Lobe of the Liver, behind the Colon, and is commonly a very little lower than the Left, being supposed to be affected by the Great Lobe of the Liver.

The Left Kidney is placed at the under and back part of the Spleen, and behind the left portions of the Stomach, Pancreas, and Colon.

The Kidney is between four and five inches in length, but considerably less from the outer to the inner side, and less still from before backwards; or, it is compared in shape to a *French* or *Kidney Bean*.

It is rounded anteriorly, flattened posteriorly, convex and uniform at its outer margin, and has a deep Depression or Sinus towards the Vertebrae, surrounded with unequal edges, where the Renal Vessels and Nerves enter. Tab. CXXXIX. Fig. 1. 2.

It is a little broader behind than before, and a little broader and more curved above than below; from which circumstances, but more particularly from the disposition of the Vessels, to be afterwards mentioned, it is easy to distinguish the Right from the Left Kidney when taken out of the Body.

The Right Kidney is connected to the Liver and Duodenum, the Left to the Spleen, and both to the Muscles on which they are placed, and to the Renal Glands and Colon, by Cellular Substance, and by the Peritoneum; which last, reflected from the Liver and Spleen to the Kidneys, have by some been called the *Ligaments of the Kidneys*.

They are also connected to the Aorta and Vena Cava by their Blood-vessels, and to the Bladder of Urine by the Ureters.—They accompany the motions of the Liver and Spleen in the different states of Respiration.

Each Kidney is surrounded by loose Cellular Substance, which commonly contains a considerable quantity of Fat, from which it is termed *Tunica Adiposa*.

The *Tunica Adiposa* covers not only the Kidney, but the large Vessels, and defends them from the pressure of the surrounding Viscera.

Under the *Tunica Adiposa*, there is a *Membrane* composed of the original proper Coat and Cellular Substance incorporated, which adheres closely to the Kidney, and is reflected over the edges of the Sinus, to be joined to the Pelvis and large Vessels.

The surface of the Kidney is commonly smooth and uniform, though sometimes it is irregular, in consequence of the Lobes which originally formed it not being completely incorporated. It consists of an outer part called *Cortical*, and an inner termed *Medullary*.

The *Cortical Substance*, termed also *Secerning*, surrounds the Kidney, and is about a fourth or third part of an inch in thickness.—It likewise sends in Partitions, which separate the Medullary parts from each other. Tab. CXXXIX. Fig. 2. a, a.

The *Medullary*, termed also *Tubular* or *Uriniferous Substance*, is more compact and of a paler colour than the former, and is divided into a number of distinct Columns, each of which terminates in a Projection called *Papilla*, vel *Processus Mammillaris*. Tab. CXXXIX. Fig. 2. b, b.

The *Papillæ* are merely the continuation of the Uriniferous part, though frequently considered as a third division of the Substance of the Kidney.

Each Kidney has one, and sometimes more *Arteries*, of great proportional size, which run transversely from the Aorta, and a *Vein* still larger than the Artery, which terminates in the Cava.—They enter at the Sinus of the Kidney, and are included in Cellular Substance, which accompanies them throughout their course. Tab. CXXXIX. Fig. 1. A, B.

The Right Renal Artery is longer than the Left, in consequence of the Vena Cava, behind which it passes, being placed upon the right side of the Aorta.

The Artery, as it approaches the Kidney, is divided into Branches, which are afterwards minutely distributed through the Cortical Substance, forming Arches and Anastomoses; but these are found to be much less frequent than are commonly described; for a fine Injection thrown into a Branch of the Artery, fills only the Ramifications belonging to that Branch.

The Small Branches, after turning and winding in various directions, pass partly towards the Surface of the Kidney, where they form irregular *Stars*, some of which supply the proper Membrane.

Others turn inwards in a waving direction, and form *Corpuscles*, or *Acini*, disposed somewhat after the manner of *Clusters of small Berries*, which can only be seen distinctly by the assistance of Glasses, after a minute Injection.

The *Corpuscles* were considered by DR NICHOLS, as the



the Globular Terminations of Blood-vessels, and called by him *Globuli Arteriarum Termini*; but these Globuli were afterwards observed by MR HEWSON, and others, to consist of small Vessels intimately intermixed.

A fine Injection thrown into the Artery sometimes appears to fill the Uriniferous Tubes, and thereby to imitate the secretion of Urine; but this experiment is more readily performed in some of the Brute Creation, as the Horse, where the structure of the Kidney seems to be more simple than in Man.

The *Veins* returning from the extremities of the Arteries, unite in the Cortical Substance of the Kidney.

The Branches of the Renal Vein are much larger than those of the Artery; they communicate freely, especially on the Surface of the Kidney, but correspond with them in their course.—They form a large Trunk on each side, which lies anterior to the corresponding Artery, and runs transversely to the Cava; the left, which is the longer of the two, passing across the fore part of the Aorta.

The *Lymphatics* of the Kidney run from without inwards, and terminate in the Lumbar Glands, and afterwards in the Thoracic Duct.—The Superficial Lymphatics are so small as seldom to be seen, excepting in the diseased state of this Organ.

The *Nerves* are from the Semilunar Ganglion, formed by the Great Sympathetic and Eighth Pair. They compose a Plexus which surrounds the Blood-vessels, and accompanies them in the Kidney.

From the minutē extremities of the Renal Artery, in the Corpuscles situated in the Cortical Substance, the *Uriniferous Tubes* arise. They are mixed with some extremely small Blood-vessels, and constitute the Medullary Substance of the Kidney.

By degrees they unite into larger Tubes, which run in a radiated manner, the direction being from the outer edge or circumference, towards the Sinus or inner part of the Kidney. Tab. CXXVIII. Fig. 10. B, B.

The radiated Tubes, becoming still larger in their passage, terminate in the *Papillæ*, which are of a compressed conical form, and at a little distance from each other. Tab. CXXVIII. Fig. 10. B.

The *Papillæ* are twelve or more in each Kidney, the number varying according to that of the original Lobes of which the Kidney is composed, and likewise from some of the *Papillæ* being occasionally incorporated with each other.

Upon the Points of the *Papillæ* are the Terminations of the Uriniferous Tubes,—large enough to be distinguished by the naked Eye,—through which the Urine distils from the Substance of the Kidney.

Round the root of each *Papilla*, a Membranous Tube arises, termed *Infundibulum* or *Calix*, which receives the Urine from the *Papilla*. Tab. CXXVIII. Fig. 10. D, D.

The *Infundibula* are commonly the same in number with the *Papillæ*; the number, however, varying in

different Subjects, two or more of the *Papillæ* sometimes opening into the same *Infundibulum*.

The *Infundibula* join into two or three large Trunks, at the Sinus of the Kidney, which afterwards form a Dilatation of considerable size, of the shape of an inverted Cone, and termed *Pelvis* of the Kidney. Tab. CXXXIX. Fig. 2. f. f.

The *Pelvis* is placed between the principal Branches of the Renal Artery and Vein, partly within, but the greater part of it without the Body of the Kidney, and contracts into a long Tube, about the size of a Goose-quill, called *Ureter*. Tab. CXXXIX. Fig. 2. D.

The *Ureters* are commonly one to each Kidney, though in some rare instances they are double on one or on both sides.

The Artery of the Kidney is placed uppermost,—the Vein in the middle and fore part,—and the continuation of the *Pelvis* and beginning of the *Ureter* at the under and back part of the Blood-vessels; which disposition of the Vessels serves as a distinguishing mark between the Right and Left Kidney, when separated from the Body. Tab. CXXXIX. Fig. 1.

The *Ureters* descend in the Loins obliquely inwards behind the Peritonæum, and go over the Psoæ and Iliac Vessels, opposite to the anterior and lateral part of the Os Sacrum. Tab. CXIV. Fig. 4. M, M. Tab. CXII.

They pass afterwards into the *Pelvis*, and terminate obliquely in the under, outer, and back part of the Bladder. Tab. CXXXII. U. Tab. CXLII. W.

In their descent, they do not run in a straight, but in a waving direction, somewhat similar to the Italic *f*;—neither are they cylindrical, as they form slight dilatations and contractions in their course, two of which contractions are more observable in their passage over the Psoæ Muscles, and at their insertion into the Bladder.

The *Ureters* are covered anteriorly by the Peritonæum, and composed of an *external Membranous Coat*, a *Middle Muscular* one, formed chiefly of Circular Fibres, and an *Internal Coat*, sometimes called *Villous*, but which is a real Mucous Membrane.

The Inner Coat is very Vascular, and is perforated by the Mouths of small Ducts, which line it with a Mucus to defend it from the Urine.

The Vessels and Nerves of the *Ureters* are from those of the contiguous parts.

The Kidneys secrete the Urine from the Blood, and convey it by means of *Ureters* to the Bladder.

## RENAL GLANDS.

The *Renal Glands*, termed also *Capsulæ Atrabiliaræ*, *Capsulæ Renales*, *Renes Succenturiati*, and *Glandulæ Supra-Renales*, are two small, flat, Glandular-like Bodies, of a dark yellow colour, lying in the upper and back part of the Abdomen.

They



They are situated at the upper, inner, and fore part of the Kidneys, having a concavity which corresponds with the rounded edges of these Organs. They lie over the large Psoæ Muscles and Diaphragm, and higher than the Renal Vessels. Tab. CXXVIII. Fig. 9. B, B. Tab. CXXX. 1, 1. Tab. CXXXI.

They are of an irregular figure, somewhat triangular, and are about a couple of inches in length, but much larger proportionally in the Fœtus than in the Adult; in the latter case being only about a fifteenth part of the size of the Kidney.

The right one is connected to the Liver, the left to the Spleen and Pancreas, and both to the small Muscle of the Diaphragm, and to the Psoæ Muscles and Kidney, by Cellular Substance. They are likewise retained in their place by numerous Vessels and Nerves which are spread over them.

They are surrounded by Cellular Texture, which is part of the Tunica Adiposa of the Kidneys, and have a thin proper Coat, which adheres firmly to them.

Their inner parts are softer than the outer, are of a brown colour, and can be easily separated from the outer, after which the Glands have the appearance of being real Capsules. They are frequently observed to be hollow, and to contain a dark coloured Bilious-like matter, which is considered by many Anatomists as the Internal very Vascular and tender parts melted down by Putrefaction.

Their *Arteries* come from those of the adjacent parts, particularly from the Renal, and also from the Aorta and Diaphragmatic Arteries.

Of the principal *Veins*, the Right goes to the Vena Cava, and the Left to the Renal Vein.

The *Lymphatics* go chiefly to those of the Kidneys.

The *Nerves* come principally from the Renal Plexus.

No Excretory Ducts have been discovered to belong to them.

The Renal Glands have been supposed to furnish Lymph for the dilution of the Blood returning in the Renal Veins, after the secretion of the Urine;

Or, to restore to the Blood of the Vena Cava, the irritable parts lost in the secretion of the Urine and Bile: Or, to convey something useful to the Thoracic Duct: Or, in the Fœtus, to divert the Blood from the Kidneys, and thereby lessen the quantity of Urine.

But their use is still undiscovered; though it is supposed, from their Vicinity to the Kidneys, not only in Man, but in many other Animals, that they are subservient to these Organs, particularly in the Fœtus.

## VESICA URINARIA.

The *Vesica Urinaria*, or *Bladder of Urine*, is a large Musculo-membranous Sac situated in the Pelvis, in the bottom of the Hypogastic Region. Tab. CXIV. Fig. 4. Y.

It is placed in the fore Part of the Pelvis, behind the Ossa Pubis,—before the upper, and above the under portion of the Intestinum Rectum. Tab. CXVII. CXXXII.

When completely empty, as is sometimes the case, but by no means always, in those who have suffered a violent death from suspension by the Neck, it is contracted into a small size; is then somewhat triangular, but rounded at the corners; occupies only the under and fore part of the Pelvis, See Tab. with Vessels and Nerves of Pelvis near end of Vol. III.; when moderately distended, it is still contained in that Cavity; but, when much dilated, it rises above the Ossa Pubis, and sometimes, as in a retention of Urine, ascends to within a little distance of the Umbilicus, so as almost completely to fill the Cavity of the Pelvis, especially if the Rectum be empty. Tab. CXXXII.

When moderately dilated, it is of a roundish, or irregular oblong form, but a little flattened before, more convex behind, and broader at its anterior and posterior than towards its lateral parts,—a little more capacious, also, below than above, especially at its posterior part.

In People advanced in life, and of a relaxed habit, the Bladder is sometimes divided at its under part, into two Lateral Portions, in which Calculi are occasionally lodged.

The Bladder is distinguished into *Fundus*, *Body*, and *Cervix*; the first of which is placed upwards and a little forwards, and the last at the under and fore part.

It is connected below to the Rectum, and at the sides to the Pelvis, by the reflected Peritoneum and Cellular Substance; the former of which, when the Bladder is empty, has the appearance of Lateral Ligaments.

It is attached, at the fore part of its Body, by Cellular Substance, somewhat condensed, to the Ossa Pubis, without the intervention of the Peritoneum; this becomes thicker and stronger towards the Neck of the Bladder, and has sometimes of late been called *Fascia Vesicalis*. Tab. CXLII.

It is also fixed to the Umbilicus by three Ligaments situated between the Peritoneum and Abdominal Muscles.—They are formed of the Urachus running upwards from the Fundus, and of the shrivelled Umbilical Arteries passing obliquely from the sides of the Bladder. Tab. CXIV. Fig. 1. Tab. C.

The Bladder, as well as the under end of the Rectum, is supported below by the Muscles, and by various Tendinous Fasciæ running between these.

The firmest connexion is by means of two Ligamentous Expansions, which run from each side of the Neck of the Bladder and Prostate Gland, to be fixed to the under and inner part of the Symphysis of the Ossa Pubis.—It is connected also at this place to the Penis, by the Urethra.

It is composed of different *Coats* joined together by loose Cellular Substance; the first of which is only a partial



partial one continued from the Peritoneum. Tab. CXIV. Fig. 4. *y, y.* Tab. CXXXII. U.

The *Peritoneal* or *Common Coat*, recedes from the Abdominal Muscles at the top of the Pubes, and passes over the superior, and down upon the posterior and lateral parts of the Bladder to its end, or to near the termination of the Ureters, where it is about a finger's length from the Anus, and is there reflected upon the Rectum, and back and lateral part of the Pelvis, forming a kind of *Cul de Sac*.

When the Bladder is much distended, it carries the Peritoneum with it, and leaves a space between that Membrane and the Pubes, of such length, that an Incision has frequently been made here, and large Calculi extracted from the Bladder, without penetrating into the Cavity of the Abdomen, or wounding the Peritoneum.

The *Second Coat* is termed *Muscular*.—It is composed of distinct Flethy Fibres, though of a pale colour, interwoven with each other, and formed into Fasciculi. Tab. CXXVIII. Fig. 13.—16.

The External Fibres run chiefly in a longitudinal direction, and are connected, at the under and fore part of the Bladder, with the Ossa Pubis.

More internally, are Fibres which run in all directions, many of them appearing like flat Bands, which are intermixed with each other in the form of an irregular net-work.

The Muscular Fibres are contracted about the Neck of the Bladder, and form what has been termed *Sphincter Vesicæ*;—these, however, are merely the continuation of the other Fibres. Tab. CXXVIII. Fig. 16. B, B.

The Muscular Coat, by its contraction, occasions the complete evacuation of the Bladder.—The Fibres about the Neck of the Bladder, by acting separately from the rest of the Muscular Coat, prevent the involuntary discharge of the Urine.

The Cellular Substance under the Muscular Fibres is in considerable quantity, and is frequently termed *Nervous Coat*.

The *Inner Coat*, often called *Villous*, is smooth like the inside of the Peritoneum, but is a real Mucous Membrane. It is thin, yet so dense as to prevent the exudation of the Urine.

This Coat is rendered somewhat unequal by the projection of the Fasciculi of the Muscular Fibres; and when the Bladder is empty, it forms large Wrinkles or *Rugæ*.

The inside of the Bladder is very irritable, in consequence of which the desire to expel the Urine is excited. It is lined, however, by a Mucus discharged from its Arteries, which prevents it from being constantly irritated by that Fluid.

The under part of the Bladder is perforated by *three Openings*; of which one is placed anteriorly, and two posteriorly.

The anterior Opening is the beginning of the Passage

called *Urethra*, and is surrounded by the Neck of the Bladder. Tab. CXXVIII. Fig. 17. H, H. Tab. CXXXIV. Tab. CXXXI. V.

It comes off almost at a right Angle from the Bladder, about an inch or so above the undermost part, without any tapering of that Viscus.

The inner lining of the Urethra at the posterior part of the Neck of the Bladder is frequently formed, in old people, into longitudinal Folds. These, in the diseased state of the Prostate Gland, assist in the formation of the Lobes, which often project so much into the Cavity of the Bladder, as to have the effect of a Valve in closing up the Orifice of the Urethra.

The other two Openings of the Bladder are formed by the terminations of the Ureters, which run obliquely forwards and inwards, between the Muscular and Inner Coats of the Bladder. Tab. CXXVIII. Fig. 17. C, D. Tab. CXXXV. CXLII.

They terminate in the Bladder at a little distance from each other, and at the same distance behind the beginning of the Urethra, each by a somewhat oval opening, which is more contracted than the Ureter is immediately above it. Tab. CXXVIII. Fig. 17. C, D.

Each of these Openings is fixed by a Retinaculum formed by the inner Coat of the Bladder. This passes obliquely inwards and forwards, but is more distinctly seen when a Probe is introduced into the Orifice, and the part gently raised.

Between the terminations of the two Ureters, and extending from these to the beginning of the Urethra, is a space of a triangular form,—the *Trigone* of LIEUTAUD, which is sometimes distinguished by being of a whiter colour than the rest of the Bladder.

The *Arteries* of the Bladder come from various sources, but chiefly from the Umbilicalis and Pudenda Communis.

The *Veins* return to the Internal Iliacs:—They form a Plexus of considerable size upon each side of the Bladder, particularly about its Neck.

The *Lymphatics* accompany the principal Veins on the Bladder, and at the under part and sides, pass into the Iliac Glands.

The *Nerves* are Branches of the Great Sympathetic and Sacral Nerves.

The Bladder receives the Urine from the Ureters by drops; and sometimes by small Thread-like streams or squirts, till, by its accumulated quantity and acrimony, it forces the Organ to contract and expel it.

The Urine is expelled, partly by the contraction of the Bladder itself, and partly by the action of the Abdominal Muscles and Diaphragm pressing the Intestines against the Bladder, the Sphincter Vesicæ being at the same time relaxed.

The frequency of the evacuation depends upon the size and sensibility of the Bladder, upon the quantity of Urine secreted, and the degree of acrimony it possesses.

Certain



Certain states of the Mind, also, are apt to affect the Urinary Organs. Fear and anxiety sometimes produce sudden desire for evacuating the Bladder.

The Urine, when recently discharged from a healthy Person, is of a pale yellow colour, has a peculiar odour, and a bitterish taste, and is of an acid nature. After standing some time, it becomes alkaline, depositing an Acid, called *Lithic* or *Uric*.—But the state of this Fluid varies much according to the age and constitution of the Person, the nature of the Aliment taken into the Stomach, and the time the Urine has been retained in the Bladder.

According to the latest Authors, the following Sub-

stances are found in Urine, though variable in their proportions; viz. Water,—Muriates of Soda and Ammonia,—Phosphates of Soda, Ammonia, Lime, and Magnesia,—Carbonate of Lime,—Acetic, Carbonic, Uric, and Benzoic Acids,—Albumen,—Urea,—Resin,—and Sulphur.

Occasionally it contains other Substances, often Muriate of Potash, and sometimes Sulphate of Lime.

In Putrid Urine are chiefly found, Ammonia,—Carbonate, Phosphate, Urate, Acetate, Benzoate, and Muriate of Ammonia,—Phosphates of Lime and Magnesia,—Muriate of Soda,—besides Precipitated Gelatin, and Phosphate of Lime.

T A B L E



# T A B L E CXXXI.

## VIEWS of the URINARY ORGANS.

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FIG. 1.

*The RIGHT KIDNEY, of the Natural Size, with the CAPSULA SUPRA-RENALIS of a Man of 40 years of age.*

- a*, The anterior surface of the kidney, with its convex outer and concave inner edge.
- b*, The renal gland covering the superior extremity of the kidney.
- c*, The pelvis of the kidney.
- d*, The ureter.
- e, e, e*, The upper and under arteries of the kidney.
- f*, The emulgent vein.

FIG. 2.

*The Posterior Surface of the Right Renal Gland, with the Vein leading off from its Under Part.*

FIG. 3.

*A small portion of the Kidney greatly magnified to shew Corpuscles, termed *Globuli Arteriarum Termini* of DR. NICHOLS.*

FIG. 4.

*The Uriniferous Tubes in one of the Papillæ magnified.*

FIG. 5.

*The VESICA URINARIA and URETHRA laid open from their fore part, in a WOMAN about 40 years of age.*

- a, a*, The bladder cut in a crucial direction, and the flaps reflected.
- b*, The interior rugous surface.
- c, c*, The urethra laid open, with its mucous follicles.
- d, d*, The ureters.
- e, e*, The base of the corpus trigonum.
- f*, The apex of the trigon, vanishing in the neck of the bladder, about the origin of the urethra; forming there the uvula vesicæ, which is more conspicuous in the male.
- g, g*, The terminations of the ureters.



Fig. 3.



Fig. 4.



Fig. 2.

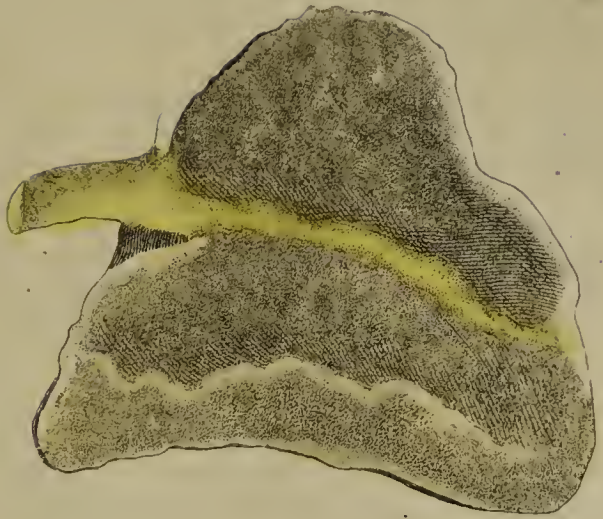


Fig. 5.



Fig. 1.









## TESTES.

The *Testes*, formerly termed *Didymi* or *Gemini*, are two Glandular Bodies situated in the Cavity of the Scrotum, and are the most important parts of Generation in the Male.

The *Scrotum*, Tab. CXIV. CXVII. which furnishes an External Covering to the Testes, is a continuation of the Common Integuments; has the same structure with the Skin in general; but is more plentifully supplied with Sebaceous Follicles; has no Fat in its Cellular Substance, and is occasionally relaxed and corrugated in a greater degree than the Skin in the other parts of the Body, in consequence of its very intimate connexion with the Cremaster.

Upon the Surface of the Scrotum, there is a Superficial, longitudinal, projecting *Line*, which divides it into two equal parts, and has the name of *Raphè*.

The Inner Surface of the Scrotum is lined with Cellular Substance, which is firmer and more Vascular than in other places.

The Cellular Substance of the Scrotum, in consequence of its redness, Fibrous appearance, and supposed power of contraction, has, by many Anatomists, been considered as a Muscle, and called *Dartos*.—This opinion, however, has been for many years past, justly rejected.

The Cellular Substance of the Scrotum involves each Testicle singly, and forms a *Septum* between the two, which prevents Air or Water from passing readily from one side of the Scrotum to the other.

The *Vessels* and *Nerves* of the Scrotum are chiefly from those of the neighbouring parts.

The *Blood-vessels* are Branches of the Pudendal and Femoral.

The *Lymphatics* go mostly to the Inguinal,—but some of them accompany those of the Testes to the Lumbar Glands.

The anterior part of the Scrotum derives its *Nerves* from the Lumbar, and the posterior from the Pudendal and Sciatic Nerves.

The Scrotum assists in supporting and protecting the Testes.

Under the Scrotum are two *Membranes* or *Coats*, proper to each of the Testes, the one termed *Vaginalis*, the other *Albuginea*.

The *Tunica Vaginalis*, Tab. CXXXVI. Fig. 1. C. Tab. CXXXV., named from its forming a Sheath, is of the same nature with the Peritoneum, being originally a Process of that Membrane, which, in the Fœtus, descends with the Testicle from the Abdomen.

It forms a shut Sac, which has no communication with any other part.

It incloses the Testicle as the Pericardium does the Heart, being only in contact with it, excepting behind, where it is *continuous* with the Albuginea.

It is considerably larger than the Testis which it incloses, reaching as high upon the Cord, and as much

below the Testicle, as to allow the latter a certain degree of motion.

It is connected by its external Surface to the Cremaster, and partly by that Muscle to the inner Surface of the Scrotum.

It assists the Cremaster in supporting the Testis, and by being constantly moistened within by a Fluid, exhaled from its Surface, and that of the Tunica Albuginea, it allows the Testicle to move easily.

The *Tunica Albuginea*, so called from its white colour, is, like the former Coat, a continuation of the Peritoneum, and invests the Body of the Testicle closely. Tab. CXXXVII. Fig. 1. A. Fig. 6. D.

It is a thick, strong, dense, and inelastic Membrane, of a glistening appearance.

It is remarkably smooth on the outside, but internally it is rough and unequal, adhering every where firmly to the Body of the Testis.

It covers both the Testis and Substance called *Epididymis*, connects them to each other, gives strength to them, and conducts their Vessels in the same manner as the Mesentery does those of the Intestines.

The Body of the Testis is of a yellowish colour, and has a pulpy appearance,—is of an oval form, and a little flattened at its outer and inner sides. The Testes are larger after than before the age of Puberty. Frequently one Testicle is a little larger than the other.

The Testes are placed obliquely, with one end upwards and forwards, and the other end backwards and downwards. Tab. CXXXVI. Fig. 2.

The *Epididymis* is situated at the outer and back part of the Testis, and is inclosed in the same Covering with it. Tab. CXXXVI. Fig. 2. G, H, I.

It begins at the upper part of the Testicle, immediately above the entry of the Blood-vessels; and this part of it being large and of a round form, is termed *Globus Major*, or *Head* of the Epididymis. Tab. CXXXVI. Fig. 2. G.

In its descent, it becomes somewhat smaller and flatter, and is attached behind to the Body of the Testicle, where the Blood-vessels enter; but it is loose at its fore part, the Tunica Albuginea dipping in this place, and forming a Cavity or Pouch between it and the Testicle.

The under part of it becomes more firmly attached to the Body of the Testicle, and forms the *Cauda*, or *Globus Minor*. It is then turned backwards upon itself, after which it sends out the Excretory Duct of the Testicle. Tab. CXXXVI. Fig. 2. I.

The Body of the Testis has numerous Arteries, Veins, Absorbents, and Nerves; but is principally composed of a collection of minute, tender, elastic Tubes, intricately convoluted, termed *Tubuli Seminiferi*, vel *Vasa Seminalia*.

The *Tubuli Seminiferi* are disposed in *Fasciculi* or Bundles, between *Septulæ* or *Partitions*, which are formed of Blood-vessels and Cellular Substance. Tab. CXXXVI. Fig. 8. A, A.



These Septulæ begin at the root or *Nucleus*, sometimes termed *Corpus Highmorianum*, situated at the back part of the Testicle, and extend in a radiated manner to the Tunica Albuginea. Tab. CXXXVI. Fig. 8. B, B.

The Testis is fixed behind by its Vessels, which are collected into a Cord termed *Spermatic*, but is loose and free before, to prevent it from being pinched.

The *Spermatic Cord*, Tab. CXXXVI. Fig. 2. A, B, strictly so called, extends obliquely from the Ring of the Obliquus Externus to the Body of the Testis, the obliquity being somewhat in proportion to the width of the Pelvis. It is composed of the Trunks of the different Vessels belonging to the Testicle, and of a quantity of Cellular Substance.

The Cord is covered by the Cremaster, and within it, by the same Process of the Peritoneum which forms the Tunica Vaginalis Testis, and which is here called the *Tunica Vaginalis* of the Spermatic Cord. In this part, however, the Process is so incorporated with the common Cellular Substance of the Cord, as to appear to form part of it. On the outside of the Cremaster, part of the Superficial Fascia, formerly described, is found, and which is sometimes termed CAMPER'S Fascia.

The under part of the Vagina of the Cord is separated by a Partition formed by the upper end of the Vaginal Coat of the Testicle, and by condensed Cellular Substance, so that no Liquor can pass easily from the Cord to the Testicle, or *vice versa*.

The Arteries of the Testes, termed *Arteriæ Spermaticæ* and *Arteriæ Preparantes*, arise, one on each side, from the fore part of the Aorta, a little below the Renal Arteries, opposite to, but at a little distance from, each other.

The *Spermatic Artery* crosses over the Psoas Muscles and Ureter, and descends near the Brim of the Pelvis, behind the Peritoneum, to the under part of the Abdomen.

At the lower part of the Abdomen, it gets into the Superior Abdominal Ring, under the edge of the Obliquus Internus and Transversalis, then perforates the Ring of the Obliquus Externus, and passes in the Spermatic Cord to the Testicle.

In its descent it gives Branches to the adjacent parts, and is so interlaced with the corresponding Veins, as to have been supposed by the Ancients to have large lateral communications with them.

After passing out of the Ring, it divides into Branches which go to the Testis at its posterior edge. They are partly dispersed upon the Epididymis, but the larger Branches run in a serpentine direction into the Substance of the Testicle, where they are minutely distributed upon the Surface of the Seminal Tubes.

Besides the Spermatic Artery, there is a smaller one from the Hypogastric, and frequently also a minute Branch from the Epigastric Artery, which accompany the Vas Deferens, and are dispersed along with the other Artery.

The Veins are much larger than the corresponding Arteries, and have several Valves in them, especially without the Abdomen, contrary to what belongs to the Veins of the other Viscera.

They form a *Plexus*, which accompanies the Artery on each side, and is sometimes called *Corpus Pampyniforme*, from a supposed resemblance to the Shoots of the Vine; or *Corpus Pyramidale*, from giving a Pyramidal form to the Cord.

The Plexus ascends in the Abdomen, upon the Surface of the Psoas; and about the part where it recedes from the Artery it forms a single Trunk, which, in the right side, terminates in the Vena Cava, nearly opposite to the origin of the Artery, and, in the left side, goes into the Renal Vein.

There is also a small inferior Spermatic Vein, which accompanies its Artery, and ends in the Hypogastric Vein.

The Nerves of the Testes are derived from the Renal, Aortic, and Lumbar Plexus, and though very minute, they give the Testicle a more exquisite feeling than is bestowed on any other Secretory Organ.

The *Tubuli Seminiferi*, Tab. CXXXVII. Fig. 4. in the Body of the Testicle, consist of numberless minute Ducts, which are of a Cylindrical form, have no division into Branches, and, when drawn out, are found to be several feet in length, and as small as so many fine Hairs.

They are first collected into Bundles between the Septulæ of the Testicle, and these again into others still smaller, each of the smaller being formed of a simple Tube, coiled up into a Conical form, with its Base forwards, and its Apex towards the posterior edge of the Testicle.

From the convoluted Seminal Tubes, an equal number of straight Vessels are sent out at the back part of the Testicle, under the name of *Vasa Recta*. Tab. CXXXVI. Fig. 6. h, h.

At the upper and back part of the Testicle, the *Vasa Recta* communicate, and form an irregular Plexus or Net-work, called *Rete Vasculosum Testis*. Tab. CXXXVI. Fig. 6. g, g.

The *Rete Testis* sends out from twelve to eighteen straight Tubes, termed *Vasa Efferentia*, which carry the Semen from the Testicle to the Epididymis.

Each *Vas Efferens* soon becomes convoluted, and forms a Conical Bundle with its Base towards the Epididymis, the whole getting the name of *Coni Vasculosi*.

The *Coni Vasculosi* are firmly connected by Cellular Substance, and are observed by DR MONRO, in his Treatise *De Testibus*, to compose somewhat more than a third part of the Epididymis.

The Vascular Cones gradually unite into a single Tube, which is many feet in length, and this, by its innumerable convolutions, constitutes the rest of the Epididymis, and though only about the size of a Hog's Bristle,



Bristle, transmits the whole of the Semen of that Testicle.

The single Tube becomes larger in its course and less convoluted, and at last, expanding its convolutions, it comes out greatly increased in size, and almost in a straight direction, under the name of *Vas Deferens*. Tab. CXXXVI. Fig. 6. a.

Besides the Ducts already described, a *Vas Aberrans* is sometimes observed, which is one of the Vascular Cones, wandering off, and terminating in the Epididymis lower than usual. Tab. CXXXV.

At other times, the same kind of Vessel passes a considerable way along the Spermatic Cord, and forms a *Processus Cæcus*, or Blind Duct, with a dilated Extremity, which does not communicate with any other part. Tab. CXXXV.

The Vas Deferens is about the size of a Surgeon's Probe, and is of a cylindrical form through the greater part of its length. It has no inflections in its course, but such as are necessary for its arrival at the place of its destination. Tab. CXXXVI. Fig. 2.

It ascends in the back part of the Spermatic Cord, having the Spermatic Blood-vessels on its fore part, but from which it is readily distinguished by its firmness.

At the under part of the Abdomen, it passes in through the Rings of the External Oblique Muscle, and at the Internal Abdominal Ring separates from the Blood-vessels, goes over the Psoas, and descends by the side of the Pelvis, covered by the Peritoneum.

In its descent in the Pelvis, it gets behind the Bladder, to which it closely adheres, follows the Curvature of that Viscus, gradually approaching its fellow till it arrives at the Vesicula Seminalis of the same side.

In this course it passes between the corresponding Umbilical Artery and Bladder, and also between the Bladder and Ureter, where it increases considerably in size, and becomes Cellular within. It continues under this enlarged appearance to near its termination, where it again contracts in its diameter, and becomes thinner and more tender in its Substance. Tab. CXXXII. Z, a.

The Vas Deferens is remarkable for the thickness and firmness of its Coats, and proportional smallness of its Cavity. Like most other Secretory Ducts, it is destitute of any visible Muscular Fibres, though it has been supposed by some Authors, that such a contractile power resides in the Seminal Ducts, as to assist the *Vis a Tergo* in propelling the Semen from the Testicle.

#### VESICULÆ SEMINALES AND PROSTATE GLAND.

The *Vesiculæ Seminales* are two small, white, Pyriform Receptacles, situated between the under and lateral parts of the Bladder and the Intestinum Rectum.—Each is about three inches in length, and near one in

breadth, and a little flattened. Tab. CXXXII. Tab. with Vessels and Nerves, near the end of Vol. III.

They are at a considerable distance from each other behind, but anteriorly they converge, and become contiguous to each other. Tab. CXXXVI. Fig. 9. D, D.

Each of them is shut at its posterior extremity, and is composed of a convoluted Tube, to the sides of which are attached a number of *Processes*, irregular in their form.

They are surrounded by a quantity of tough Cellular Substance, and by many Vessels and Nerves, but they have no Muscularity. Their Substance is somewhat similar to that of the Vasa Deferentia, but they are more tender.

Internally, they have a *Villous appearance*, and are formed of *Cells* which correspond with the irregularities on their External Surface, and communicate freely with each other.—Their shape, size, and general appearance, however, vary in different Subjects, and not unfrequently in the opposite sides of the same Person. Tab. CXXXVI. Fig. 10. D, D. Tab. CXXXVII. Fig. 7. 8.

Between the Vesiculæ Seminales, the ends of the Vasa Deferentia now become larger and Cellular, pass forwards till they arrive at the Prostate Gland, where each Vas Deferens again contracts, joins the Vesicula of that side at a very sharp Angle, but communicates so freely with it, that injected Fluids readily pass from the former to the latter. Tab. CXXXVI. Fig. 10. B, B, C, C.

From each Vesicula Seminalis and Vas Deferens of the same side, a *small Canal*, about a *finger's-breadth* in length, passes out, which is firmly connected to its fellow, without communicating with it, and becomes gradually smaller, piercing obliquely the Prostate Gland, and terminating in the under and back part of the Neck of the Bladder, a little before the beginning of the Urethra. Tab. CXXXVI. Fig. 10. E, E, F, F.

The *Orifices* of these Canals sometimes open in a Lacuna, which is covered behind by a Valve, that has its concave edge forwards; but more generally they are separated from each other by a *Caruncula*, or round projection of the Membrane of the Urethra, termed *Verumontanum*, from its supposed resemblance to a Javelin of the Ancients;—or *Caput Gallinaginis*, from its being broad behind, and rostriform before, and therefore compared to the Head and Beak of the Woodcock. Tab. CXXVIII. Fig. 17. K.

The Vesiculæ Seminales are commonly considered as Reservoirs of the Semen, receiving it from the Vasa Deferentia, and afterwards,—by a power inherent in themselves, assisted by the action of the neighbouring Muscles, particularly of the Levatores Ani,—propelling it into the Urethra.

The Semen is prevented from passing into the Bladder, the beginning of the Urethra being shut while that fluid is expelled.



gy Substance, but it is surrounded by a strong Ligamentous Membrane, which is stretched between the Crura of the Ossa Pubis, and forms the Interosseous Ligament, or the Triangular Ligament of former Authors. Tab. CXXXII. CXXXIV. Tab. near end of Vol. III.

Where the Urethra perforates this Ligament, it is more contracted than it is farther forwards, when it enters the Bulb, and this is the part where the principal resistance is found in the introduction of the Sound or Catheter.

At the upper side of the Bulb, the Urethra enters the Corpus Spongiosum, in which it is inclosed to its termination in the point of the Penis.

The inside of the Urethra is lined by a very *Vascular* and *sensible Membrane*, continued from the inner Coat of the Bladder, but which is observed to possess a certain degree of contractility, and is therefore presumed by several Anatomists to be endowed with Muscular Fibres.

Between the Corpus Spongiosum and Membrane which lines the Urethra, especially towards the Septum Penis, numerous *Lacunæ* of different sizes are situated, one or two of which in particular, next the Glans, are often considerably larger than the rest. Tab. CXXXVI. Fig. 11.

They run in a longitudinal direction from behind forwards, and, perforating the Urethra by Orifices large enough to admit a Bristle, they discharge a bland Mucus for the defence of the Urethra. Tab. CXXXV.

Besides the *Lacunæ*, two small Bodies of a yellowish colour, each about the size of a Garden-pea, are frequently met with, and are termed, from their Discoverer, COWPER'S *Glands*. They have likewise the name of *Anti-prostatæ* and *Prostatæ Inferiores*.

They are situated at the sides of the Membranous part of the Urethra,—between its Bulb and the point of the Prostate Gland, but nearer the former,—and covered by the Acceleratores Urinæ. Tab. CXXVIII. Fig. 17. N, N. Tab. CXXXII. e. Tab. CXXXIV. Fig. 5. Tab. CXXXV.

Each sends out a small Duct, which terminates obliquely in the Urethra, at the bulbous part.

They are observed to discharge a Fluid, which is supposed to serve the same purpose with that of the *Lacunæ*.

The *Arteries* of the Penis are chiefly from the *Pudicæ Communes*, which are Branches of the Internal Iliacs, and partly from the Femoral Arteries.

Each of the Pudic Arteries having passed out of the Pelvis through the great Notch of the Os Ilium, runs between the Sacro-sciatic Ligaments to the inner side of the Tuber Ischii, from which it passes along the Crus of that Bone and of the Os Pubis, to the root of the Penis.

In its course, it furnishes Branches to the adjacent parts, and afterwards gives off three principal Branches,

which belong to the Penis:—One of these goes to the Bulb of the Urethra, to be dispersed in the Corpus Spongiosum;—the other two, which are larger than the former, go to the Body of the Penis; one of them penetrating its Crus, and running in the axis of the Corpus Carnosum, as may be readily seen by a longitudinal section of this part, Tab. CXXXVI. Fig. 15.; the other passing between the Symphysis Pubis and joining of the Crura Penis, and extending along the Dorsum as far as the Corona Glandis.

The Branches which the Penis receives from the Femoral Artery communicate with those of the Pudics, and are chiefly dispersed upon the Integuments.

The Arteries of the Penis are divided into minute Ramifications, which communicate with each other, and with their fellows on the opposite side, and terminate partly in the corresponding Veins, and partly in the Cells of the Penis.

The *Veins* arise, some from the extremities of the Arteries, and others by large open Mouths from the Cells of the Penis.

The greater number of the Veins unite into a Trunk, called *Vena Magna Penis*, which runs in the superior Groove formed by the union of the Corpora Carnosa, and is furnished with Valves, and with thick strong Coats.

The *Vena Magna*, at the under end of the Symphysis Pubis, separates into Right and Left Plexus, which pass to the corresponding Iliac Veins.

To an obstruction of the course of the Blood through the Veins, by a Spasmodic contraction of the Veins themselves, and by the pressure of the Muscles at the root of the Penis, together with an increased influx through the Arteries, is owing that accumulation of Blood in the Corpora Carnosa and Corpus Spongiosum, which occasions a distension of the Penis.

The relaxation of the Penis happens from the causes which produced the distension being removed; the elastic Ligamentous Membrane which covers the Penis again forcing the Blood from the Cells into the Veins.

Upon the Surface of the Penis, there are small superficial Veins, which communicate with those deeper seated, and commonly terminate by one or more Branches in the Veins at the top of the Thighs.

These Branches assist in carrying on the circulation, and return part of the Blood during the distension of the Penis.

Of the *Lymphatics* of the Penis, those from the Prepuce and Skin, in general, go to the right and left Inguinal Glands, while the Lymphatics from the Glans and Body of the Penis accompany the Arteries into the under part of the Pelvis.

The *Nerves* of the Penis are large compared to its size, but are quite in proportion to the great sensibility of that Organ. They come from that part of the Spinal Nerves which gives origin to those termed *Sciatic*, and are



are distributed chiefly upon the Ligamentous Sheath which incloses the Corpora Cavernosa.

The most considerable of them are large Cords, situated upon the Dorsum Penis, more laterally than the Arteries which lie between them and the principal Vein.

*For the MUSCLES of the Penis, see Vol. II. p. 130.*

The Penis serves to convey the Urine from the Blad-

der, and to eject the Semen into the Vagina. The Cavernous Structure allows the Penis to be distended or relaxed as occasion may require. The distension of the Penis serves to give the proper degree of consistence for its introduction into the Vagina; the Glans, by Friction, exciting the feelings requisite for the expulsion of the Semen in the Male, and for conception in the Female.

TABLE

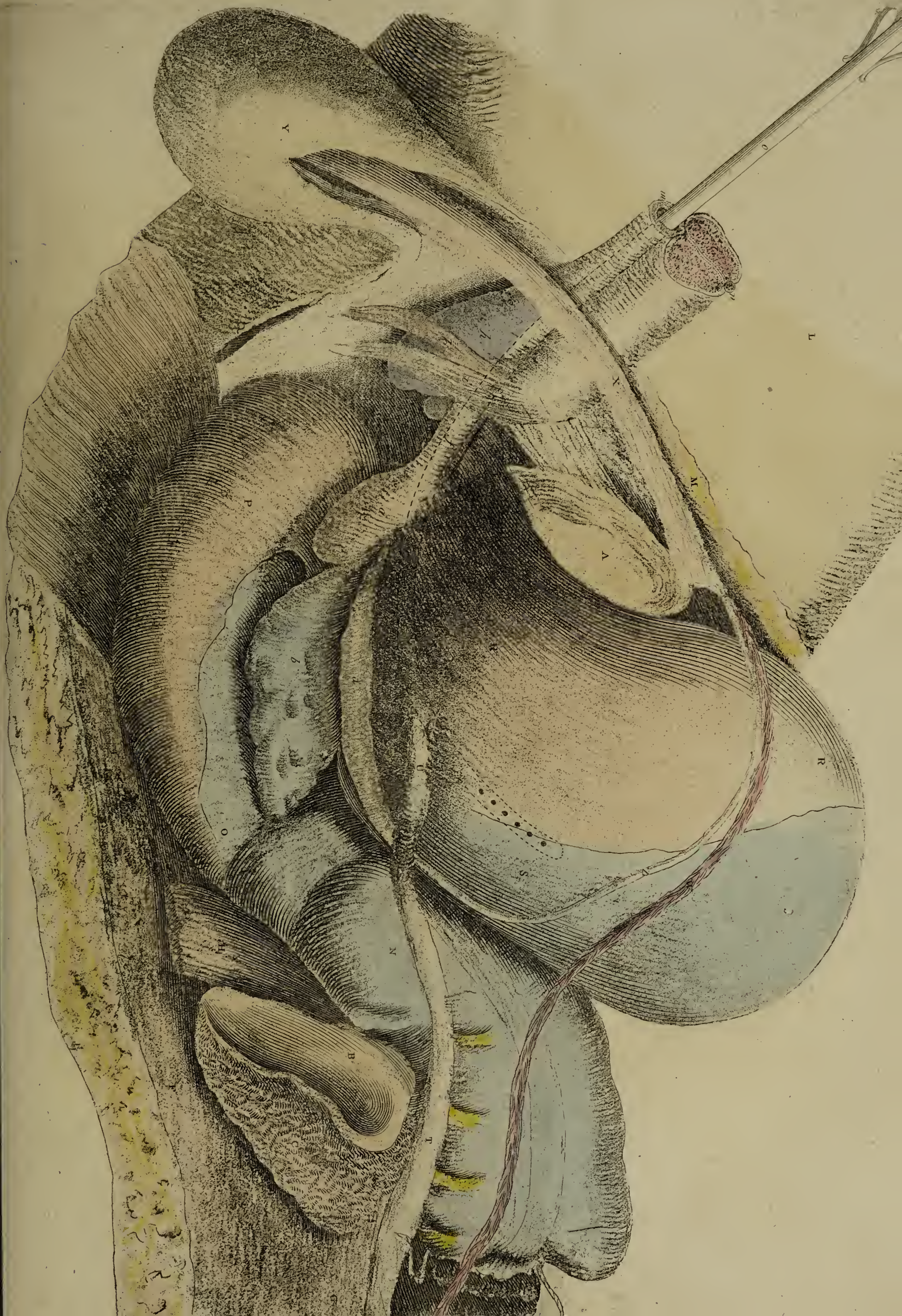


## T A B L E CXXXII.

A Side View of the MALE PELVIS, after separating the Left Os INNOMINATUM.

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- |   |   |
|---|---|
| <p>A, The cartilaginous surface of the right os pubis, forming part of the symphysis pubis.</p> <p>B, That of the os sacrum, forming part of the joint between this bone and the os ilium;</p> <p>C, A fibrous cellular substance, forming part of this joint.</p> <p>D, The situation of the point of the os coccygis, supposed to be seen through the rectum.</p> <p>E, The psoas muscle.</p> <p>F, G, A section of the muscles in the back part of the loins.</p> <p>H, A section of the pyriformis.</p> <p>I, ————— glutei.</p> <p>K, K, The levator ani turned back, a portion of it being removed to shew the situation of the anus.</p> <p>L, The right thigh.</p> <p>M, M, The integuments and fat.</p> <p>N, The intestinum rectum inflated, adhering to the anterior surface of the os sacrum.</p> <p>O, O, The peritoneum descending to the bottom of the pelvis.</p> <p>P, The dilated under end of the rectum.</p> <p>Q, Part of the anus.</p> <p>R, R, The bladder of urine in the distended state, rising a considerable way above the pubes.</p> <p>S, S, The upper and back part of the bladder, covered</p> | <p>by the peritoneum, the fore part being only covered by cellular substance.</p> <p>T, The ureter, with its contractions and dilatations.</p> <p>U, The termination of the left ureter in the under and lateral part of the bladder.</p> <p>V, The neck of the bladder, and beginning of the urethra.</p> <p>W, The spermatic blood-vessels.</p> <p>X, The cremaster muscle covering the spermatic cord.</p> <p>Y, The left testicle covered by the scrotum.</p> <p>Z, The left vas deferens.</p> <p>a, The dilated, cellular under end of the vas deferens.</p> <p>b, The left vesicula seminalis inflated.</p> <p>c, The beginning of the ductus communis seminiferis.</p> <p>d, The prostate gland surrounding the neck of the bladder.</p> <p>e, One of COWPER'S glands.</p> <p>f, The membranous part of the urethra.</p> <p>g, The ligamentum suspensorium penis.</p> <p>h, The bulb of the urethra.</p> <p>i, The left crus penis, and,</p> <p>k, Its erector turned aside.</p> <p>l, A section of the corpora cavernosa penis, and of,</p> <p>m, The corpus spongiosum urethræ.</p> <p>n, The cut end of the vena magna penis.</p> <p>o, A catheter introduced through the urethra into the bladder.</p> |
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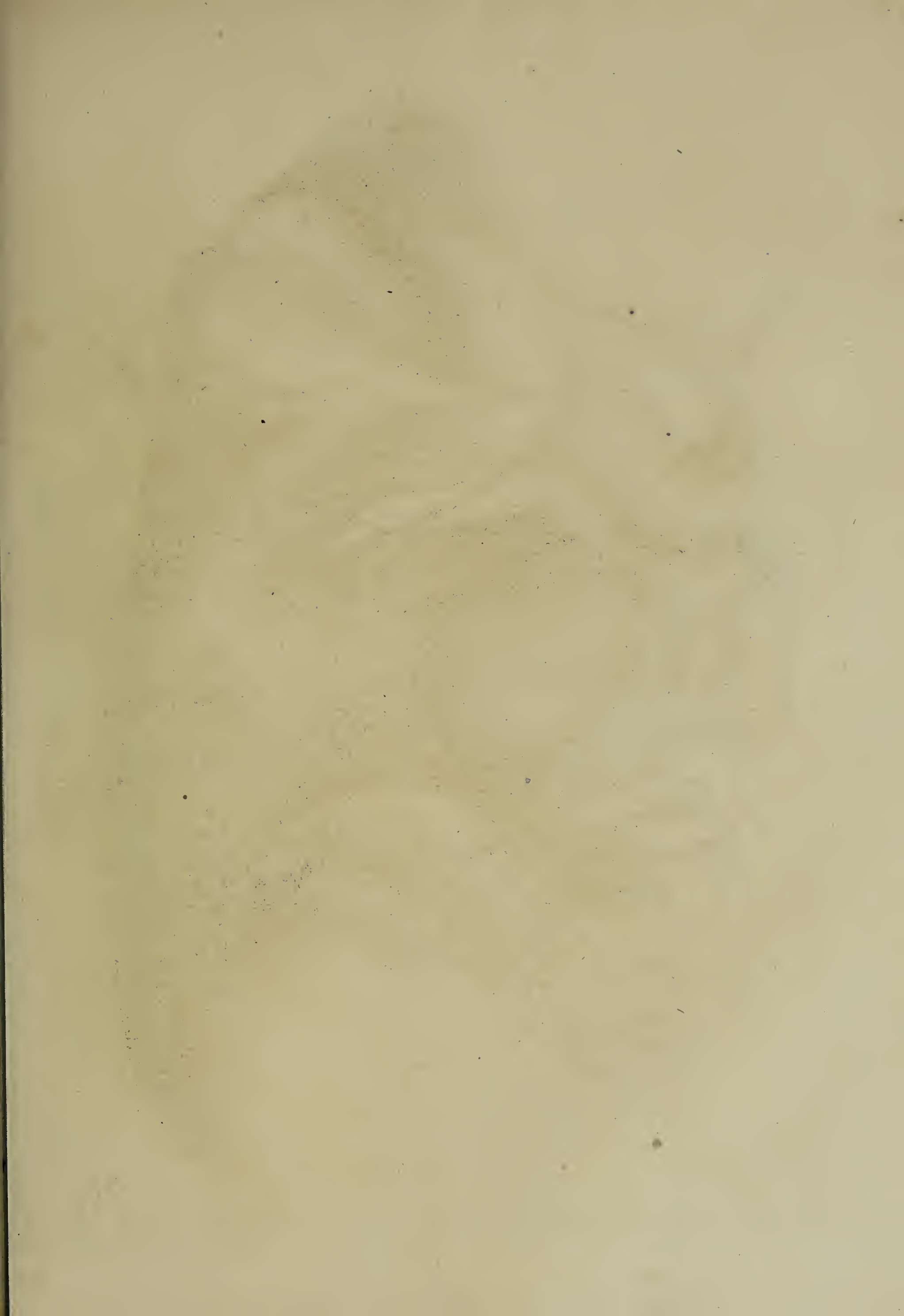


















## T A B L E CXXXIII.

Gives a View of the **BLADDER of URINE** and the **LEVATOR ANI *in situ***, as seen from the **Fore and Right Side**, after the **Symphysis** of the **Pubis** has been divided, and the **Ossa Pubis** separated a considerable way from each other. The **Figure** is three-fourths of the original size.

A, A, The thighs.  
 B, B, The cut edges of the integuments.  
 C, The scrotum with the testes, pulled to the left side.  
 D, The right spermatic cord, cut and turned down.  
 E, The penis, turned also to the left side.  
 F, The cut edge of the parietes of the abdomen.  
 G, The rectus abdominis of the right side.  
 H, H, The cut edges of the symphysis pubis.  
 I, The right erector penis, cut from its origin, and turned a little aside, to shew,  
 K, The corresponding crus penis, which is also cut from its origin.  
 L, The accelerator urinæ.  
 M, The transversalis perinei cut from its origin, and turned down.

N, The sphincter ani.  
 O, A probe introduced by the anus into the intestinum rectum.  
 P, Part of the gluteus maximus.  
 Q, Q, The levator ani, cut from its origin, and left in its place over the under part of the bladder and the prostate gland.  
 R, The point of the os coccygis.  
 S, Part of one of the ligaments of the bladder.  
 T, The bladder moderately distended.  
 U, The peritoneum reflected over the bottom of the bladder.  
 V, V, Turns of the intestinum ilium.



## T A B L E CXXXIV.

Gives various Views of the Parts about the ANUS and Root of the PENIS. The Figures are three-fourths of the original size.

FIG. 1.

*Represents the MUSCLES belonging to the Left Side of the ANUS and Root of the PENIS, most of which are concerned in performing the lateral operation of Lithotomy. The external Incision is made nearly in the same direction with that usually done in performing this operation.*

- A, The left thigh turned up.
- B, The cut edge of the integuments.
- C, The root of the left crus penis.
- D, The erector penis adhering to the crura of the os ischium and os pubis.
- E, The accelerator urinæ, pulled a little towards the right side.
- F, The transversalis perinei, covering part of,
- G, H, The levator ani.
- I, The sphincter ani, drawn a little to the right side.
- K, Part of the gluteus maximus.

FIG. 2.

*Shews the Parts deeper seated than those represented in the former Figure. After turning up the Thighs, a cut has been made from the Penis to the Back Part of the Anus, and the Integuments turned to each side.*

- A, A, The integuments, reflected.
- B, B, The crura penis covered by the erectores penis.
- C, The right transversalis perinei.
- D, D, The left levator ani.
- E, The sphincter ani.
- F, The acceleratores urinæ, covering the bulb of the urethra.
- G, The membranous part of the urethra exposed, after removing the upper or fore part of the levator ani.
- H, One of the glands of COWPER.
- I, I, The corpora cavernosa penis.
- K, The corpus spongiosum urethræ.

FIG. 3.

*Gives a View from the Right Side, of the Parts about the Neck of the Bladder and Root of the Penis.—See Tab. CXXXIII.*

- A, Part of the left thigh.
- B, B, The cut edges of the integuments.
- C, The right side of the scrotum.
- D, Part of the penis.
- E, The cut edge of the parietes of the abdomen.
- F, F, The cut surface of the symphysis pubis.
- G, The erector penis, higher than which is seen,
- H, The corresponding crus penis.
- I, The accelerator urinæ.

- K, The sphincter ani.
- L, The levator ani.
- M, That part of the levator ani which covered the prostate gland, reflected.
- N, Part of the levator ani which covered the membranous portion of the urethra, also reflected.
- O, Part of the gluteus maximus.
- P, The urinary bladder, with the peritoneum covering the upper part of it.
- Q, The prostate gland.
- R, The substance considered by Mr WILSON as a compressor urethræ.

FIG. 4.

*Represents Parts deeper seated than those seen in the former Figure.*

- A, Part of the penis.
- B, The cut edge of the parietes of the abdomen.
- C, The cut surface of the symphysis pubis.
- D, The crus penis turned up.
- E, The accelerator urinæ turned down from the bulb of the urethra.
- F, The substance considered by MR WILSON as a compressor urethræ, turned down.
- G, The prostate gland.
- H, The membranous part of the urethra.
- I, The bulb of the urethra.
- K, The bladder.

FIG. 5.

*Exhibits the Under Surface of the PROSTATE GLAND, the Membranous Part of the URETHRA, with the GLANDS of COWPER.*

- A, The prostate gland.
- B, The membranous portion of the urethra.
- C, C, COWPER'S glands, one of which is in its natural situation, the other is drawn outwards.
- D, Part of the bulb of the urethra.

FIG. 6.

*Shews the Form of the URETHRA, after it and the Bladder had been moderately distended. The Parts are seen from the Right Side.*

- A, The cut surface of the symphysis pubis.
- B, B, A section of the prostate gland.
- C, The neck of the bladder.
- D, The dilatation of the urethra in the prostate gland.
- E, The contraction of the urethra at the point of the prostate gland.
- F, The dilatation of this passage in the bulb of the urethra.
- G, The cylindrical part of the urethra.



Fig. 1.

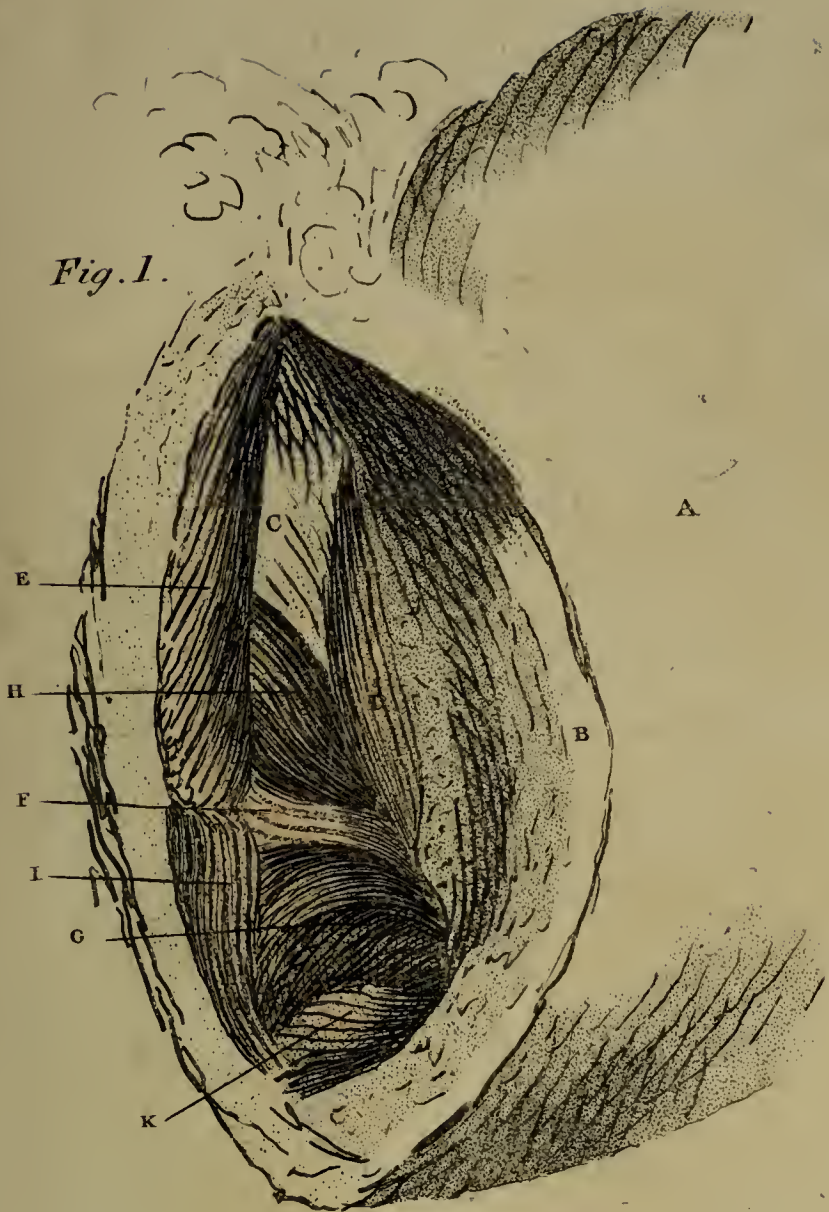


Fig. 2.



Fig. 6.

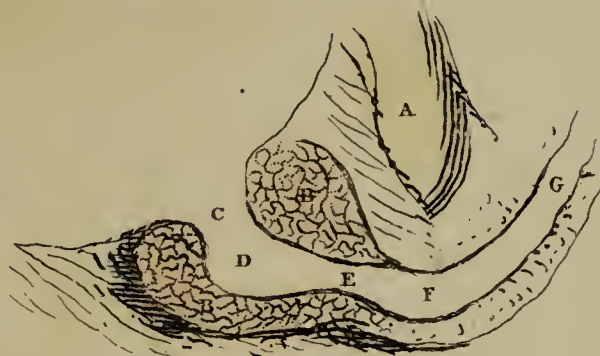


Fig. 5.

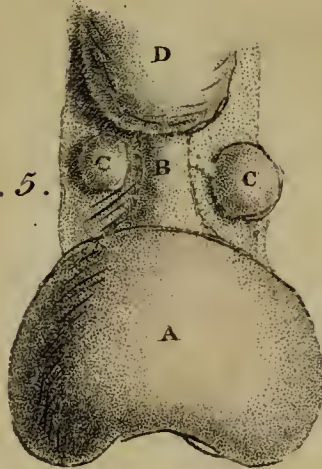


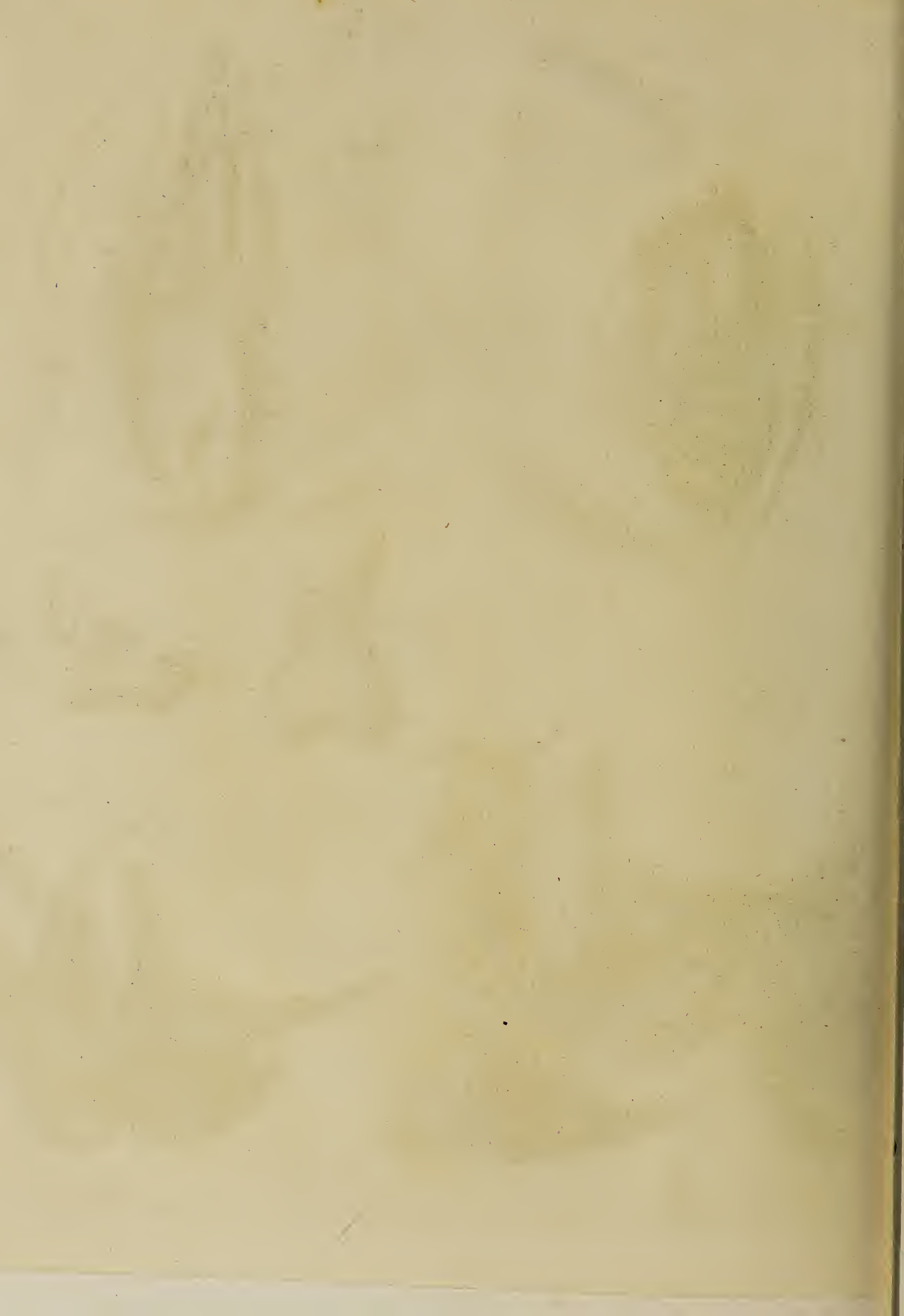
Fig. 3.



Fig. 4.









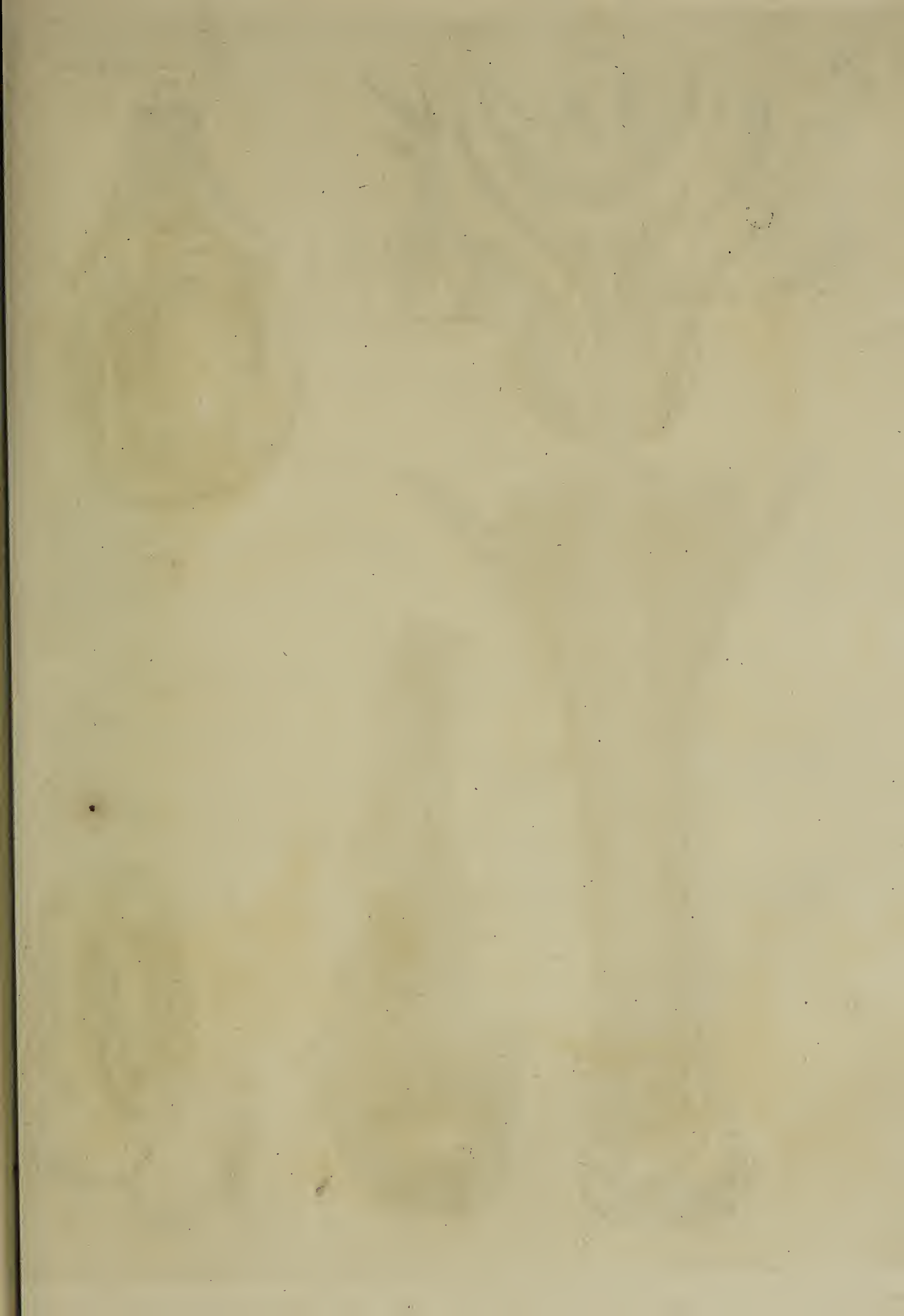




Fig. 1.



Fig. 2.



Fig. 4.



Fig. 5.





# T A B L E CXXXV.

## VIEWS of the BLADDER, PENIS, and TESTICLE.

FIG. 1.

*The BLADDER cut open, with the Penis Dissected.*

- a, a, a, a,* The reflected flaps of the bladder.
- b,* The right ureter.
- c, c,* The termination of the ureters in the bladder.
- d,* The base of the *Trigon*; *e,* the apex of its body, or *Uvula Vesicæ*.
- f,* The caput gallinaginis; *g,* its globose part; *h,* the apex in the urethra; *i,* its sulcus or sinus.
- k, k,* The prostate gland.
- l, l,* The orifices by which the seminal ducts open in the caput gallinaginis.
- m, m,* The orifices of the ducts of the prostate gland.
- n, n,* The membranous part of the urethra, or the isthmus.
- o, o,* COWPER'S glands.
- p, p,* The orifices by which their ducts open in the urethra.
- q, q,* The bulb of the urethra dissected.
- r,* The corpus spongiosum urethræ dissected.
- s,* The glans penis dissected.
- t, t,* The prepuce dissected and reflected.
- u, u,* The urethra dissected, its inner membrane shewn.
- v, v,* The corpora cavernosa penis.
- w, w,* The accelerator urinæ.
- x, x,* The erector penis.
- y, y,* The vas deferens lower than the ureter.

FIG. 2.

*The Spermatic Cord, Testicle, and Epididymis, covered by the Tunica Vaginalis.*

FIG. 3.

*The TESTICLE, with a number of the VASA SPERMATICA which had been Injected with Quicksilver thrown in by the Vas Deferens, and the parts afterwards dried. From the under end of the Testicle, a remarkable Vas Aberrans is seen passing into the Under part of the Epididymis.*

- a,* The testicle.
- b,* The epididymis pulled out to a single tube.
- c,* A vas aberrans.
- d,* The epididymis.

FIG. 4.

*The TESTICLE dried after an Injection of Quicksilver had been thrown into the Vas Deferens, till it reached the Body of the Testicle. From this a Vas Aberrans ascends some way along the Spermatic Cord.*

- a,* The body of the testicle.
- b,* The epididymis.
- c,* The vas deferens.
- d,* A vas aberrans terminating by a dilated extremity, from which the semen must return by regurgitation to the epididymis, or be taken up by the absorbents.



# T A B L E CXXXVI.

## Views of the MALE PARTS of GENERATION.

FIG. 1.

*Gives a View of the VAGINAL PROCESS of the SPERMATIC CORD inflated, to shew that there is no immediate communication between this and the VAGINAL COAT of the TESTICLE.*

- A, B, The vaginal process of the spermatic cord inflated.
- B, A partition formed by condensed cellular substance between the vaginal process and testicle.
- C, The testicle inclosed in its vaginal coat.

FIG. 2.

*A View of the SPERMATIC CORD and TESTICLE of the Left Side.*

- A, The vasa præparantia.
- B, The vessels of the testicle running in the spermatic cord, freed from their membranes.
- C, C, C, The arteries of the testicle.
- D, D, The corresponding veins.
- E, The tunica albuginea of the testicle.
- F, Part of the tunica vaginalis turned back.
- G, H, I, The epididymis ;
- G, Its globus major ;
- I, ——— minor.
- K, The end of the epididymis, or beginning of the vas deferens.
- L, A section of the vas deferens.

FIG. 3.

*Represents the BLOOD-VESSELS and SEMINAL DUCTS of the TESTICLE.*

- A, The spermatic artery.
- B, ——— vein.
- C, The vas deferens.
- D, The testicle, with its coats cut and pinned back.

FIG. 4.

*The Right TESTICLE viewed from the Fore Part.*

- a, The testicle.
- b, The vas deferens.
- c, The epididymis.
- d, d, d, Blood-vessels.

FIG. 5.

*A View of the opposite Side of the Testicle represented in Fig. 4.*

FIG. 6.

*Shews the SPERMATIC DUCTS of the TESTICLE, filled with Quicksilver.*

- a, The vas deferens ;
- b, Its beginning, at the under part of the epididymis.
- c, The middle of the epididymis, composed of serpentine ducts.
- d, The head, or anterior part of the epididymis.
- e, e, &c. The coni vasculosi, which compose the head of the epididymis, separated a little from each other.
- f, f, The vasa efferentia.
- g, g, The rete testis.
- h, h, The vasa recta.
- i, i, The substance of the testicle.

FIG. 7.

*Represents the BODY of the TESTICLE, and TUNICA ALBUGINEA.*

- A, The naked pulpy-like substance of the testicle. The lines running across seem to indicate the septulæ which divide the ducts of the testicle into bundles.
- B, The outer, and,
- C, The inner concave part of the tunica albuginea, which contains and adheres to the pulp of the testicle.

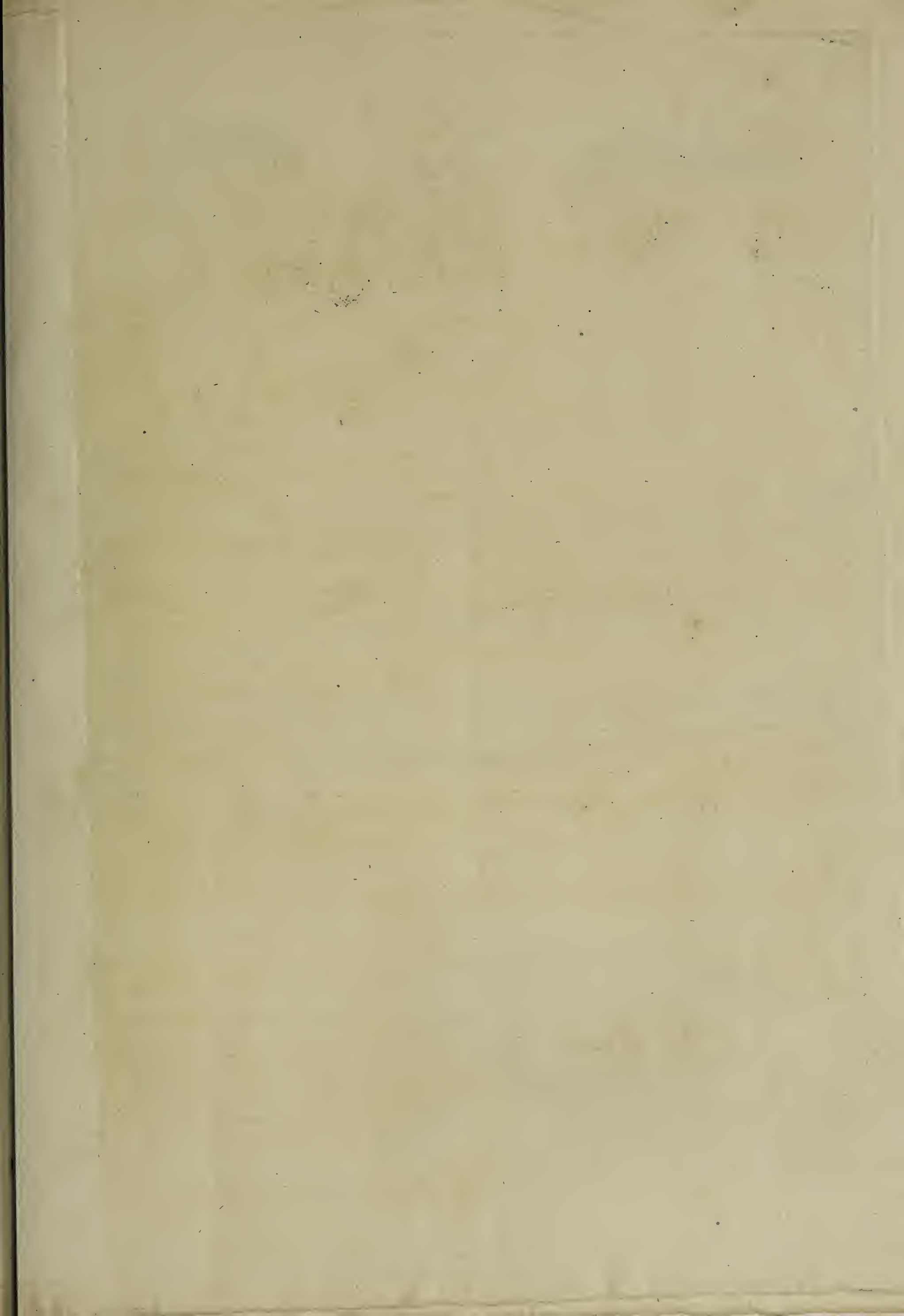
FIG. 8.

*The TESTICLE cut longitudinally from before backwards, to shew its INTERNAL STRUCTURE.*

- A, A, The seminal tubes collected into bundles between their septulæ.
- B, B, The seminal tubes running through the membranous substance of the testicle.
- C, C, A portion of the seminal tubes, cut across where they perforate the tunica albuginea.
- D, D, D, D, The tunica albuginea, cut at the fore part of the testicle, and turned back.

FIG.







TAB. 136.



FIG. 1.



FIG. 2.

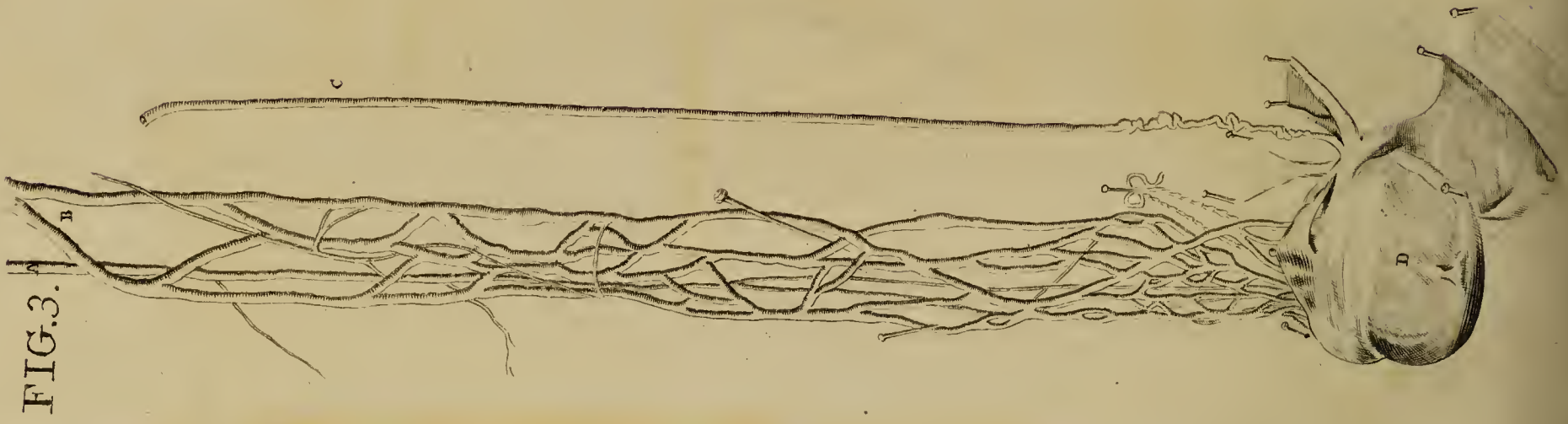


FIG. 3.

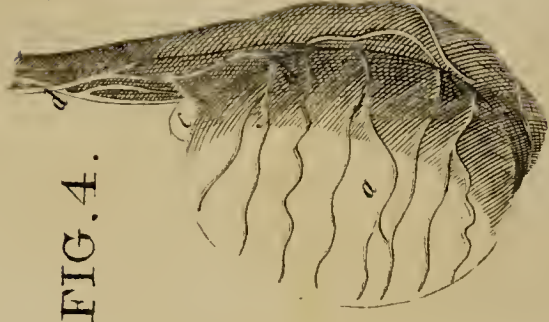


FIG. 4.

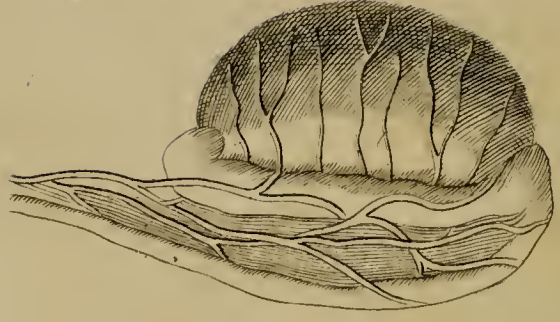


FIG. 5.

FIG. 6.

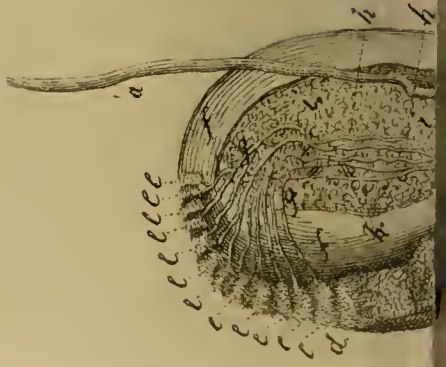


FIG. 7.

FIG. 8.



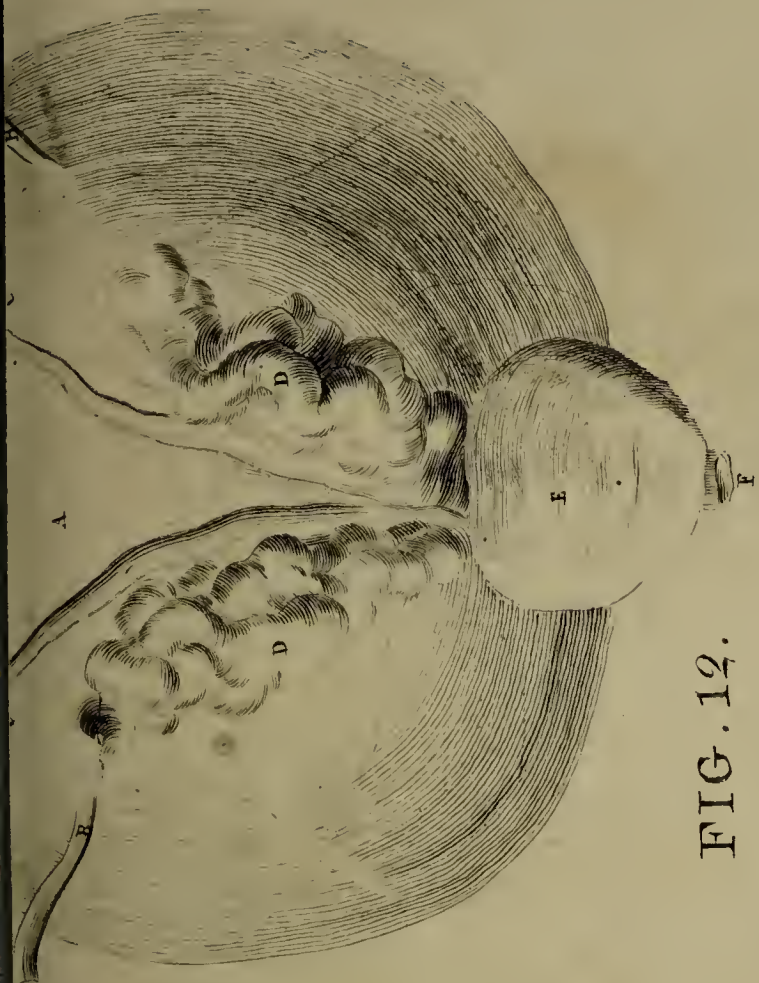


FIG. 12.



FIG. 15.

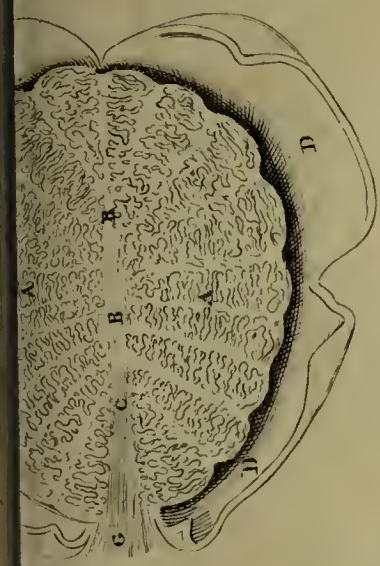


FIG. 11.



FIG. 10.



FIG. 13.



FIG. 14.

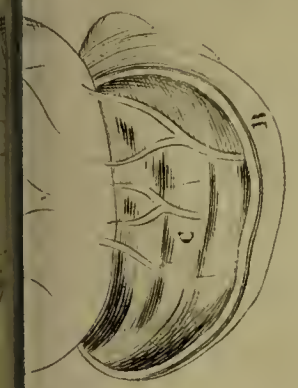
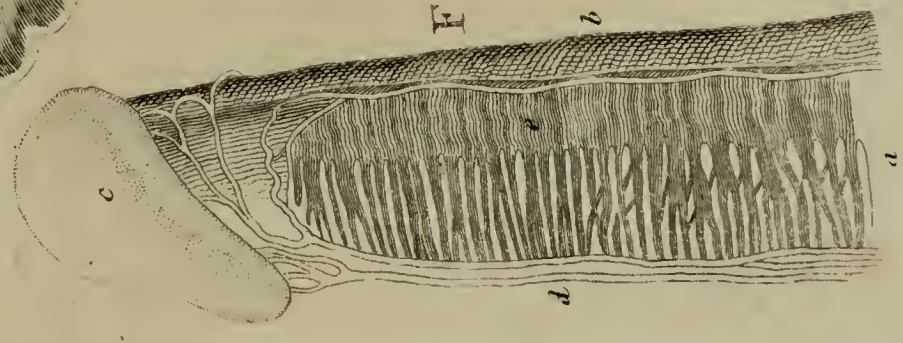








FIG. 9.

*A View of the Under and Back Part of the BLADDER, with the VESICULÆ SEMINALES and PROSTATE GLAND.*

- A, The under and back part of the bladder.
- B, B, The termination of the ureters in the bladder.
- C, C, The vasa deferentia.
- D, D, The vesiculæ seminales.
- E, The prostate gland.
- F, The urethra.

FIG. 10.

*Represents the Communication of the VASA DEFERENTIA with the VESICULÆ SEMINALES, their CAVITIES being laid open.*

- A, A, Part of the vasa deferentia, with thick sides and small cavities.
- B, B, The vasa deferentia, with thin sides and large cavities, where they approach the vesiculæ.
- C, C, The vasa deferentia again contracted, where they communicate with the vesiculæ.
- D, D, D, D, The vesiculæ seminales expanded, to shew their contractions and dilatations.
- E, E, The duct common to each vas deferens, and vesicula seminalis of the same side.
- F, F, The two common seminal ducts, adhering together, without any communication between their cavities.
- G, G, The part where the seminal ducts open into the urethra.
- H, H, Vessels running to the vesiculæ seminales.
- I, The membrane which connects the vesiculæ seminales and vasa deferentia to each other.

FIG. 11.

*A Section of the Anterior Part of the PENIS, with the URETHRA laid open. The back part of the Figure shews a Section of the Corpora Cavernosa, and of the Vena Magna Penis.*

- A, A, The corpus spongiosum urethræ and urethra, cut longitudinally at their under side, and spread out. Between B and C, the orifices of the mucous follicles are seen.
- D, One of the mucous follicles, larger than the rest, distended.
- E, The ligamentum suspensorium penis.
- F, F, A membrane continued from the ligamentum suspensorium, and represented as surrounding the penis.

- G, Part of this membrane separated from the body of the penis, and turned back.
- H, Part of the prepuce turned back.
- I, The frænum.
- K, The corona glandis, beset with many sebaceous follicles.—A few of these are likewise seen upon the frænum and inside of the prepuce.

FIG. 12.

*A Lateral and Longitudinal Section of the Fore Part of the PENIS.*

- A, A, The corpora cavernosa penis.
- B, B, The septum penis.
- C, The corpus spongiosum glandis.
- D, The outer surface of one of the corpora cavernosa.

FIG. 13.

*A Transverse Section of the PENIS.*

- A, A, The corpora cavernosa penis.
- B, The septum penis.
- C, The corpus spongiosum urethræ.
- D, The urethra.
- E, E, The partition between the corpora cavernosa penis and corpus spongiosum urethræ.

FIG. 14.

*The SEPTUM, and one of the CORPORA CAVERNOSA of the PENIS, inflated and dried.*

- a, A section of one of the corpora cavernosa.
- b, The urethra.
- c, The glans.
- d, The vena dorsalis penis.
- e, The septum between the corpora cavernosa, almost solid below, and pectiniform above.

FIG. 15.

*A Lateral and Longitudinal Section of the Fore Part of the PENIS, after an Injection of Wax had been thrown into the Arteriæ Pudicæ.*

- a, a, The corpora cavernosa.
- b, The septum penis.
- c, The glans.
- d, d, The arteriæ profundæ penis, running in the axes of the corpora cavernosa.



# T A B L E CXXXVII.

VIEWS of the TESTICLE and VESICULÆ SEMINALES;—the TUBULI SEMINIFERI having been filled with Quicksilver.

FIG. 1.

*A View of the TESTICLE and EPIDIDYMIS.*

- A, The tunica albuginea.
- B, The head of the epididymis, or globus major.—Between B and C, the body of the epididymis.
- C, The posterior and under part of the epididymis, named *Globus Minor*.
- D, E, The spermatic cord.—D, The vas deferens.

FIG. 2.

The Tunica Albuginea A, cut and drawn back, but left adhering to the Body of the Testicle, where some of the convoluted Seminal Vessels appear.

FIG. 3.

The Body of the Testicle, in the Anterior Part of which a Longitudinal Incision has been made, and the two sides separated a certain way from each other,—to shew the Situation of the Seminal Ducts, and their Course towards the Back part of the Testicle.

FIG. 4.

Explained in Tab. CXXXVI. Fig. 6.

FIG. 5.

*The SPERMATIC VESSELS of the TESTICLE of a BOAR.*

- A, The seminal convoluted ducts passing to the back part of the testicle.
- B, The vasa efferentia.
- C, C, The body of the epididymis.
- D, D, The vas deferens.
- E, E, Numerous lymphatic vessels arising from the body of the testicle, and ascending in the spermatic cord.

FIG. 6.

*The VAS DEFERENS, with Part of the EPIDIDYMIS, unravelled.*

- A, The vas deferens.
- B, The termination of the epididymis.
- b, b, The epididymis drawn out to a single duct.
- C, The beginning of the epididymis.
- D, The body of the testicle covered by the tunica albuginea.

FIG. 7. & 8.

*The VESICULÆ SEMINALES injected with Wax, and their Parts unravelled.*

- a, The vas deferens.
- b, The vesiculæ seminales.
- c, The duct common to the vas deferens and vesiculæ seminales.



Fig. 1.

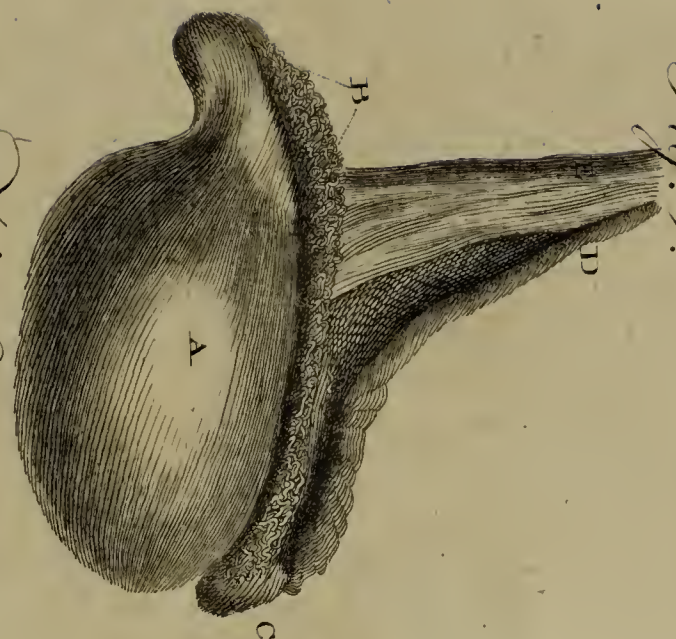


Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.

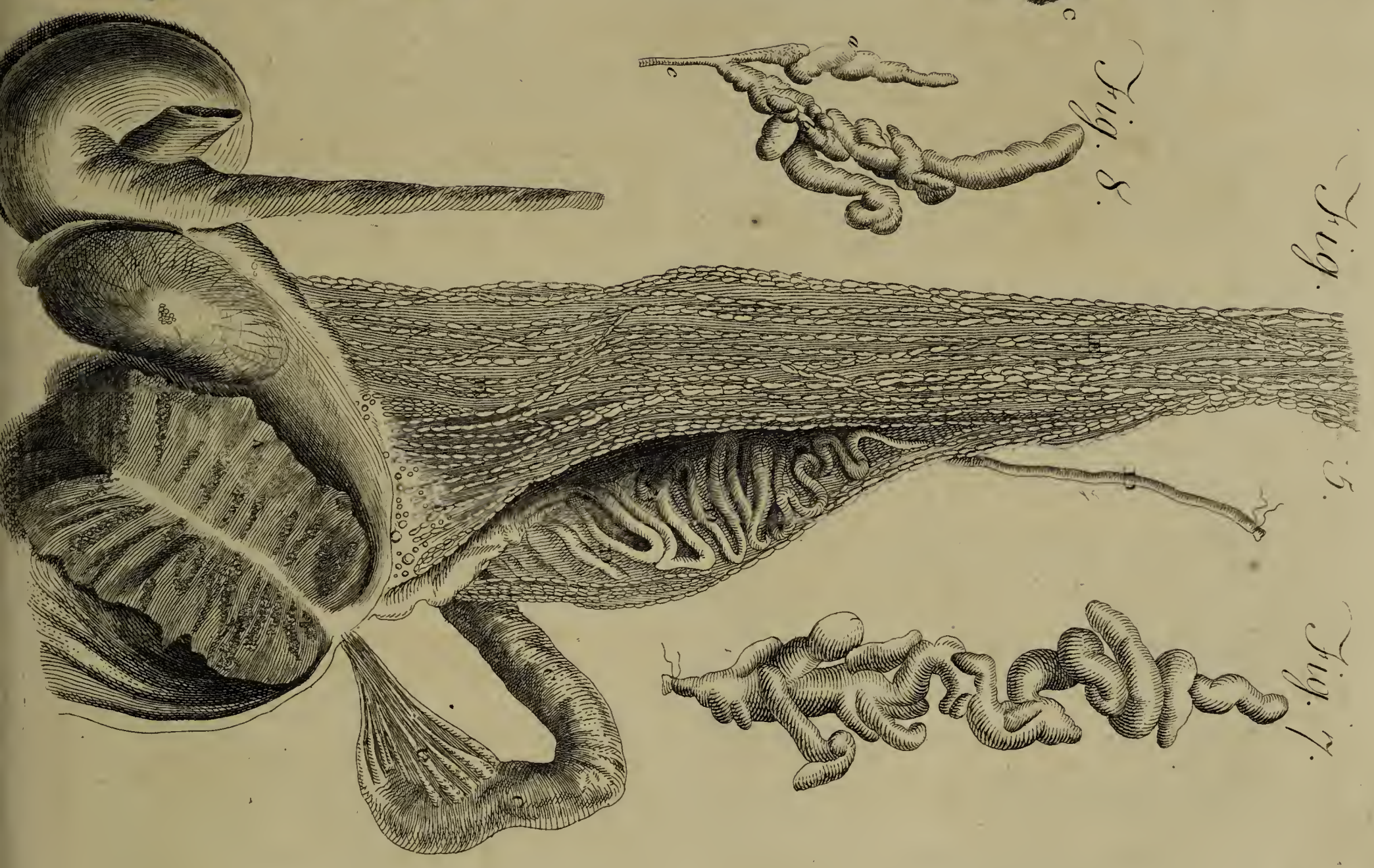


Fig. 8.



Fig. 7.

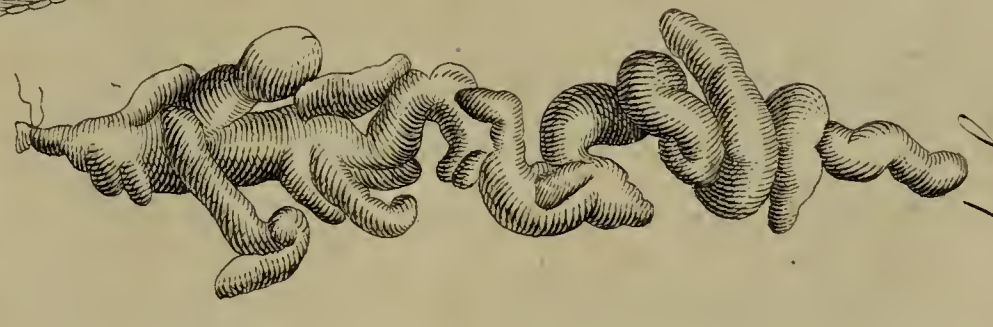
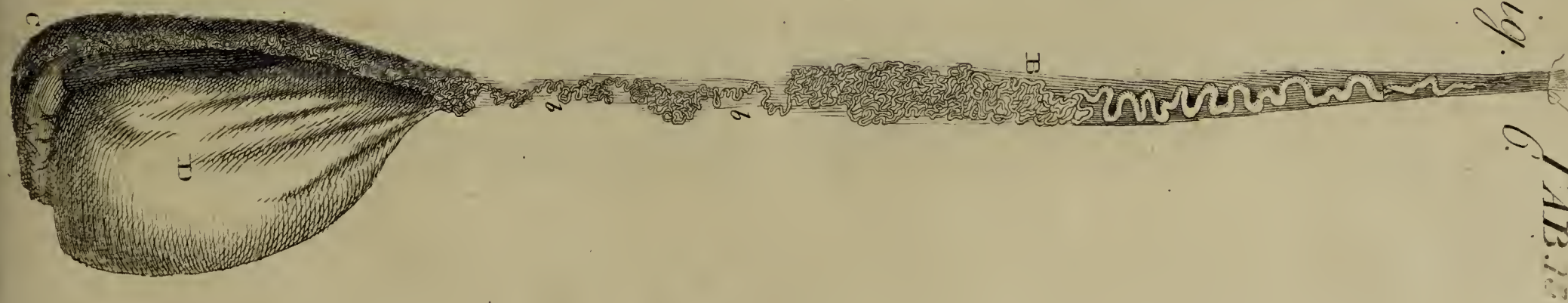
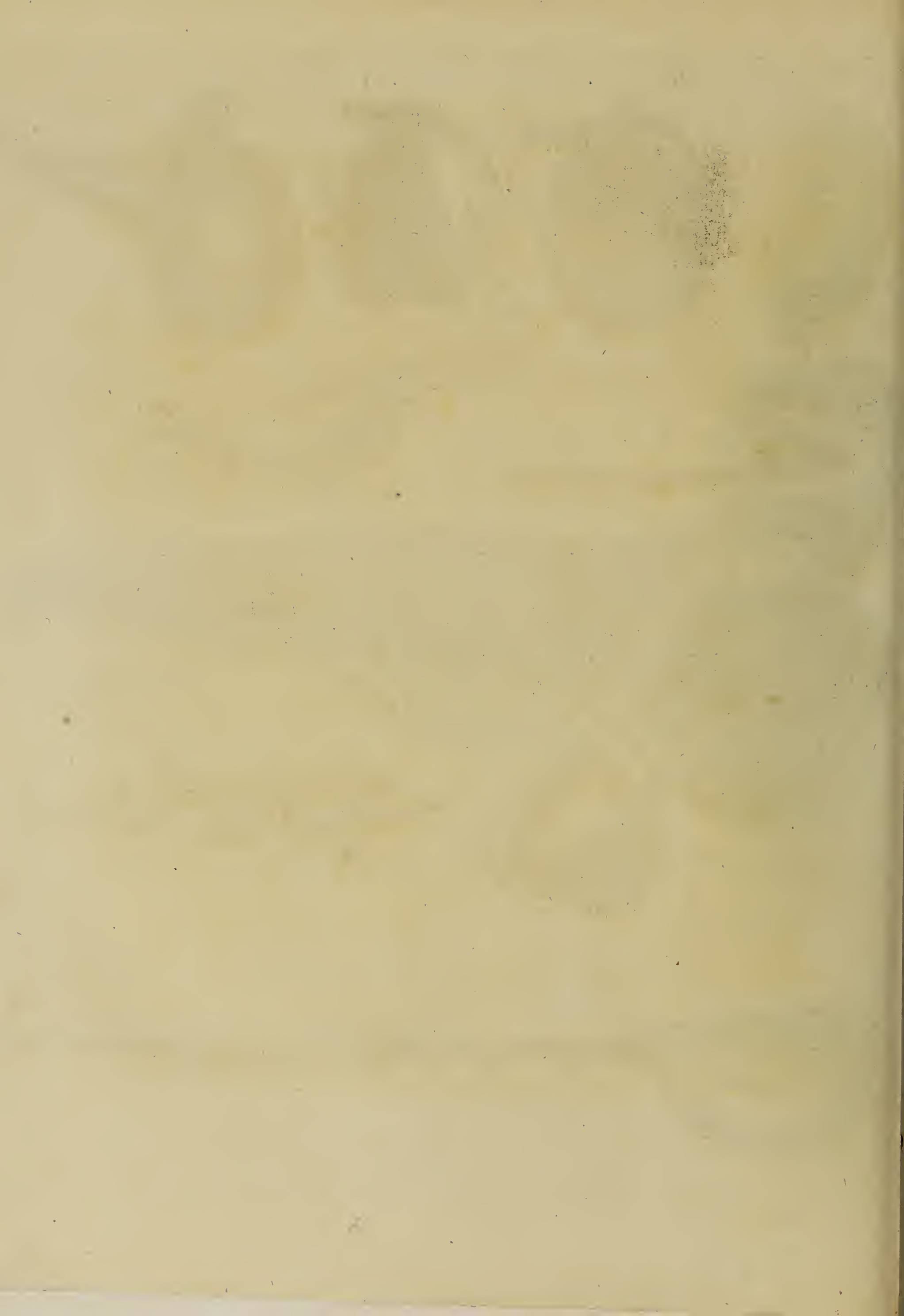


Fig. 6.









OF THE ORGANS OF URINE, AND UNIMPREGNATED PARTS OF  
GENERATION, IN THE FEMALE.

ORGANS OF URINE.

THE *Kidneys, Renal Glands, and Ureters*, have the same situation and structure as in the Male.

The *Bladder* also has the same situation behind the *Ossa Pubis*, but rises higher when it is in the distended state.

It is proportionally larger than the Bladder of the Male, and is broader from one side to the other, corresponding to the Cavity of the Pelvis to which it belongs, and to the quantity of Urine Females are sometimes under the necessity of retaining in it.

The *Urethra* is much shorter,—being only about an inch and a half, or from that to two inches in length,—and straighter than in the Male, having only a slight curve downwards between its extremities.

It is produced from the most depending part or Neck of the Bladder, and is directed almost horizontally under the Symphysis of the *Ossa Pubis*. It has no Prostate Gland, but is partly covered by the *Corpus Spongiosum Vaginæ*, and is furnished, as in the Male, with *Lacunæ*, which open into it, and discharge a Mucus to defend it from the Urine. Tab. CXLIII.

The Parts of Generation are divided into *Internal* and *External*. The former consist of the Uterus and its Appendages.

INTERNAL PARTS OF GENERATION.

The *Uterus, Matrix, or Womb*, is a hollow Viscus, situated in the Pelvis, between the Bladder and Rectum, with which it is connected. Tab. CXXXVIII. CXLII. It is naturally placed in an oblique situation, with its under end directed a little forward; but the obliquity must vary according to the state of the Bowels, with which it is in contact.

It is of a *triangular Figure*, and a little flattened before and behind, but more so anteriorly; is large above, small below, and has two angles at its upper and lateral parts, called *Corners* of the Uterus. Tab. CXLIII.

It is distinguished into *Fundus*, or upper part, which includes the space above the insertion of the Tubes called FALLOPIAN, the *Body* or middle, and *Cervix* or under part; the two last being nearly of equal length.

The extent and figure of the Uterus varies considerably in different Subjects.—In Women who have never

been pregnant, it is commonly about two inches and a half in length, from one inch and a half to two inches in breadth at the Fundus, and about half as broad at the Cervix.—It is near an inch in thickness, and is larger in Women who have born Children than in Virgins; yet in the former, when in advanced life, it shrinks by degrees to nearly the size it had in the Virgin state.

The Cavity, like the external part of the Uterus, is of a *triangular form*, but is small in proportion to the size of the Organ,—being scarcely capable of containing the Kernel of an Almond, and has its sides closely applied to each other. Tab. CXLIII. Tab. CXLVIII. Fig. 3.

It is covered externally through its whole length with a smooth polished Coat, continued from the Peritoneum, which also covers the posterior half of the under part of the Vagina, is reflected forwards upon the Bladder, backwards over the Rectum, and laterally towards the sides of the Pelvis.

Its Substance is of a compact, Cellular, and Fleishy nature, and plentifully supplied with Blood-vessels: The Fleishy Fibres, however, are only seen distinctly in the Gravid Uterus.

It is remarkably Vascular in its Body, less so in its Cervix, and is nearly of the same thickness throughout, excepting at its corners, where the Uterine or FALLOPIAN Tubes terminate.

It is lined with a fine and very Vascular Membrane, of a somewhat Porous and Villous appearance, in which the Arteries terminate which discharge the Menstrual Fluid.

The Cavity of the Cervix has *two small Longitudinal Lines* projecting in it, one in the anterior, the other in the posterior part, on each side of which are numerous *Rugæ*. Tab. CXLIII. Tab. CXLVIII. Fig. 3. K, K.

The *Rugæ* run in an oblique transverse direction, and are formed, not only by the Inner Membrane, but also by the Fibres which compose the Body of the Uterus.

Between the *Rugæ* are many small *Follicles*, which discharge a Mucus for lubricating the parts near which they are placed:—Some of them, being of a roundish form, were mistaken by NABOTH for Female Ovula. Tab. CXLIII. Tab. CXLVIII. Fig. 3. K, K.

The under part of the Cervix projects into the Vagina, somewhat in form of the Glans Penis, and is perforated by a transverse Slit, termed *Os Internum Uteri*;

or,



or, from the resemblance of this part to the Mouth of the Tench, *Os Tinca*. Tab. CXXXVIII. Fig. 3. D.

The *Os Tinca*, in a Virgin Uterus, is about the size of the Orifice of the Urethra in the Male, but nearly twice as large in the Uterus of a Woman who has born Children. Tab. CXLII. CXLIII. CXL.

It is smooth on its external Surface, is placed obliquely, in a direction towards the back part of the Vagina, and is surrounded with several Mucous Follicles. Tab. CXLII.

The *Appendages* of the Uterus are, the *Ligamenta Lata*, *Ligamenta Rotunda*, the *Ovaria*, the FALLOPIAN Tubes, and the *Vagina*.

The *Ligamenta Lata*, termed sometimes *Alæ Vespertilionis*, are two Membranous Productions or Doublings of the Peritoneum, sent from the edges of the Uterus and posterior extremity of the Vagina, in a transverse direction, to be fixed to, and to line the sides of the Pelvis. Tab. CXLI. Fig. 1. G, G.

The Anterior Layer of these Ligaments is continued to the sides of the Bladder, and the Posterior is continued in a similar manner to the Rectum, these two productions of the Peritoneum terminating below in two *Cul de Sacs*; one between the Bladder and Uterus, the other between the Uterus and Rectum.

The Uterus and *Ligamenta Lata* separate the Pelvis into anterior and posterior Cavities or Chambers, and the *Ligamenta Lata* are subdivided into large and small, or anterior and posterior *Alæ* or *Pinions*.

The *Ligamenta Lata* contain and support the *Ovaria* and *Uterine Tubes*, with part of the *Ligamenta Rotunda*, *Spermatic* and *Uterine Vessels* and *Nerves*, &c.; connect the Uterus to the sides of the Pelvis, and assist in retaining it in its place. In the time of Gestation, they become effaced by furnishing the distended Uterus with part of its external covering.

The *Ligamenta Rotunda* are two long and slender Cords, composed chiefly of Blood-vessels and Ligamentous Fibres. They arise immediately before and below the FALLOPIAN Tubes, from the corners of the Uterus, from which they descend obliquely in the *Ligamenta Lata*, diminishing a little in their course towards the Groins. Tab. CXXXIX. Fig. 3. K, K. Tab. CXLII.

They pass through the Rings of the Abdominal Muscles, in the same manner as the *Spermatic Cords* do in the Male, and are afterwards inserted by separate Branches into the upper and lateral parts of the *Pudendum*, where they are insensibly lost.

They assist the *Ligamenta Lata* in preserving the equilibrium of the Uterus.

The *Ovaria*, anciently called *Testes Muliebres*, are situated at the sides of the *Fundus Uteri*, about an inch distant from it, and are contained in the posterior *Pinions* of the *Ligamenta Lata*, which form a Coat to them, similar to the *Tunica Albuginea Testis*.

The *Ovaria* are plain above, and prominent and semi-oval below, flattened at their anterior and poste-

rior Surface; and the size of each, when in a state of the greatest maturity, is nearly equal to that of half of the Male Testicle. Tab. CXL. Fig. 1. D, D.

In the vigour of life they are large, uniform, and smooth, but become small, unequal, and shrivelled, in old Women, and in those who have born many Children. Tab. CXLII. CXLIII. CXLI. This unequal appearance, however, is greatly owing to the habit of Body, as it frequently occurs in a young Adult Virgin.

They are attached to the Uterus by the *Ligamenta Lata*, and by two small Cords, termed *Ligamenta Rotunda Ovarii*, which were mistaken by the Ancients for *Vasa Deferentia*, carrying a secreted Liquor to the Uterus.

They are composed internally of a loose whitish Cellular or Spongy Substance, intermixed with Vessels and Nerves, and contain a number of small Vesicles called *Ova*, filled with a limpid Fluid, which partakes of the qualities of the white of an Egg. Tab. CXLIII.

These Vesicles differ in the same Ovarium, from the size of a Mustard-seed to that of a small Garden-pea, and the largest are commonly placed nearest the Surface. Tab. CXL. Fig. 1. F. Tab. CXLIII.

The number of *Ova* is differently estimated by different Anatomists: from ten to about twenty having been found in one Ovarium.

According to experiments made by MR JOHN HUNTER, it is ascertained, that the number of *Ova* existing originally in each Ovarium, whether that number be great or small, may be diminished, but cannot be increased.

The *Ovaria* serve for the nourishment of the *Ova*, which contain the Rudiments of the Fœtus, and may be said to be of the same importance in the Process of Generation that the *Testes* are in the Male.

The *Uterine*, or FALLOPIAN Tubes, Tab. CXL. Fig. 1. K, K. Tab. CXLII. compared in shape, by FALLOPIUS, to that of a trumpet, are two Conical and Vermiform Canals, attached to the Corners of the Uterus, and terminating in it, each by a *small Opening* which scarcely admits the entrance of a Bristle. Tab. CXLVIII. Fig. 4. C.

They become gradually larger in their passage towards the sides of the Pelvis; near their outer extremity, they are convoluted and considerably dilated, but are afterwards suddenly contracted, and terminate by *open Mouths*, sufficiently large to admit the point of a Goose-quill. Tab. CXLI. Fig. 1. B, B. Tab. CXLII.

Their outer ends are free and fluctuating in the Pelvis, and expand into many irregular jagged or pointed Processes, called *Fimbriæ*, which are considerably longer at one side of the Tube than the other. Tab. CXLI.

The Tubes are commonly about four or five inches in length, and are contained in a Doubling of the *Ligamenta Lata*.—In their natural situation, they lie near the *Ovaria*; but when drawn out and extended, are a finger's-breadth distant from them.

The



The Structure of the Tubes somewhat resembles that of the Uterus, and, like it, they are capable of dilatation and contraction: Their inner side, however, is of a different nature, being furnished with many small longitudinal Plicæ, which have a Muscular appearance, and which are most conspicuous towards the outer extremities. They have a very large proportion of Blood-vessels, which run between their outer and inner Membranes.

The Tubes are supposed to convey the prolific part of the Male Semen from the Uterus to the Ovaria, in order to fecundate the Ova; and by grasping that part of the Ovarium where the ripest Ovum is situated, to carry the Ovum according to some Authors, or its contents only according to the opinion of others, to be mixed with the Male Semen, and to be lodged in the Cavity of the Uterus.

They have been observed, in a few instances, in Females who have been killed soon after Coition, embracing the Ovaria by means of their Fimbriæ.

The *Vagina* is a Membranous Canal, which extends from the Neck of the Uterus to the Opening of the Pudendum. Tab. CXXXIX. Fig. 3, M, N. Tab. CXLI. CXLII.

It is situated below the Urethra, and at the under and back part of the Bladder, and over the under part of the Intestinum Rectum; to each of which it is very closely connected by Cellular Substance. Tab. CXLII.

It begins a little above the internal Orifice of the Uterus, which it embraces, but reaches higher at the posterior than anterior part of that Opening; from which circumstance, together with a slight Curvature it has backwards, the Canal is found to be longer in its posterior than anterior Surface.

From the Os Tincæ it passes downwards and forwards, and terminates between the Labia Pudendi; the Axis of the Vagina forming a considerable Angle with that of the Uterus. Tab. CXLII.

The dimensions of the Vagina correspond with the size of the Penis in the Male, but vary according to the temperament of the Body, and become larger in Women who have born Children.

The Body of the Vagina is composed of thick, strong, Membranous parts, which are very dilatible, and plentifully supplied with Blood-vessels. It is furnished internally with numerous irregular *Rugæ* or Wrinkles, and Nervous *Papillæ*; the former of which considerably diminish the capacity of the Canal, and the latter add to its sensibility. Tab. CXXXIX. Fig. 3. Tab. CXLI. Fig. 1.

The *Rugæ* run in a transverse direction, and are so disposed as to divide the Vagina into anterior and posterior *Columns*, which join together laterally, and produce a *Raphè* at the right and left sides.

They are deepest, largest, and most crowded, upon the anterior and towards the outer part of the Vagina; are most conspicuous in Virgins, less so in married Women, and become more and more effaced in those who

have born Children.—The *Rugæ* augment the Friction during Coition, and facilitate the distension of the Vagina during Child-birth.

The whole extent of the Vagina, particularly towards its outer extremity, is furnished with small *Follicles*, the Orifices of which can frequently be seen.

They supply a Mucus, with which the Canal is always lubricated, and which is discharged, in the time of Coition, in such abundance, as to have been formerly considered as an emission of Female Semen.

The outer end of the Vagina is covered, on each side, by a Substance composed of Blood-vessels and Cells similar to those of the Penis, and described by DE GRAAF under the name of *Plexus Reteformis*, and by later Anatomists, under that of *Corpus Caverosum Vaginæ*.

The *Corpora Caverosa* are covered by the Sphincter Vaginæ, the action of which, joined to the dilatation of these Bodies, serves to contract the entry of the Vagina in the time of Coition.

The Vagina receives the Penis and Semen, and conveys from the Uterus the Menstrual Flux, the Fœtus, the Secundines, and the Lochia.

The Uterus, with its Ligaments, Ovaria, and Uterine Tubes, are supplied with Blood from the Spermatic and Uterine Arteries.

The *Spermatic Arteries* arise from the Aorta, as in the Male, and descend for some way through the Abdomen. They run next in the Ligamenta Lata, to be dispersed upon the Ovaria and Uterine Tubes, and afterwards upon the Fundus of the Uterus. In the progress of their course, they have a Serpentine appearance.

The *Uterine Arteries* are derived from the internal Iliacs, and are much larger than the Spermatics. They direct their course, first to the under part of the Uterus, after which each splits into the proper Uterine and the Vaginal Arteries. The Uterine Arteries ascend along the edges of the Uterus, and near its upper part join the Spermatic Arteries. The Vaginal Arteries run along the lateral parts of the Inner Portion of the Vagina.

Chiefly from the Uterine, and partly from the Spermatic Arteries, many small Branches are furnished, which run in a Serpentine manner, and communicate with their fellows in the opposite sides of the Uterus, so as to supply the whole Substance of that Viscus.

The Vagina is supplied on each side by the *Vaginal Arteries* from the Uterine, and by small Branches from the Umbilical, middle Hæmorrhoidal, and Pudic Arteries.

The *Spermatic Veins*, in passing from the Ovaria and Uterus, form a complicated Plexus. They have the same termination as in the Male, but are considerably larger.—The Uterine and the other Veins run into the Internal Iliacs.

The Lymphatics of the Uterus and its Appendages, like the Blood-vessels, run also in two Sets. Those of the



one Set accompany the Spermatic Blood-vessels, and, in a similar manner to the Absorbents of the Testes in the Male, go to the Lumbar Glands. Those of the other correspond with the Hypogastric Blood-vessels, and terminate in the Glands at the lateral parts of the Pelvis.

The *Nerves* are from the Lumbar, Sacral, and Great Sympathetics.

The Uterus, by means of the FALLOPIAN Tubes, receives from the Ovaria the Rudiments of the Fœtus,—nourishes it, and, after bringing it to maturity, expels it through the Os Internum Uteri and Vagina.

From the Arteries of the inner Surface of the Uterus, the Menstrual Evacuation is also discharged.

The *Menses* or Courses commonly make their appearance, in the Females of this Country, about the fourteenth year, but two or three years sooner in hot Climates, and often as much later in colder Regions. The commencement is affected also by the nature of the Constitution, and the manner of living.

After the periodical Evacuations have begun, they recur generally every fourth Week while the Person is in perfect health, though the period varies a little in different Women. They cease during Pregnancy and Suckling, but there are now and then instances to the contrary.

The duration of each Menstruation is also various; in general they continue to flow for three or four days, in which time five or six ounces are commonly discharged. But the duration and quantity are for ordinary less in the robust, and in cold Climates, and more in those of relaxed habits, or living in hot Countries.

From the Surface of the Vagina, part of the Menstrual Flux has by many been also supposed to be derived; but those who have seen the discharge from the Uterus, in cases of a Prolapsus of that Organ, do not take notice of having observed any evacuation directly from this passage.

The Menses for ordinary begin to be interrupted about the fortieth year, and commonly disappear about the forty-fifth, but soonest in Women where they have begun most early. After this period, Impregnation generally does not take place.

According to Experiments made by MR BRANDE, upon the Menstrual Discharge, collected from a Woman with a Prolapsus of the Uterus, it had the properties of a very concentrated solution of the Colouring Matter of the Blood in a diluted Serum, though he could detect no traces of Iron by the usual modes of Analysis. DR F. LAVAGNA concludes, from some experiments on the Menstrual Blood, that it differs from pure Blood only in the want of Fibrin.

#### EXTERNAL PARTS OF GENERATION.

The *External Parts*, called *Pudendum* or *Vulva*, are formed of two prominent sides, termed *Labia Pudendi*, *Labia Externa*, vel *Alæ Majores*. Tab. CXLIV. *b, b*.

Tab. CXLV. These are contiguous when the Limbs are not much separated, thereby preventing the access of Air to the Internal Parts, which they at the same time protect and conceal.

The upper part of the Pudendum, named *Pubes*, or *Mons Veneris*, is situated on the fore side of the Ossa Pubis, and is covered with Hair similar to that in the Male, to prevent the Skin from being injured by the approach of the Sexes. In both Sexes, the Hairs begin to grow about the same period of life.

The Pubes is composed of the Common Integuments, under which a considerable quantity of Fat is situated, rendering it thick, soft, and prominent.

The *Labia Pudendi* extend from the Pubes to within an inch of the Anus, the space between the Pudendum and Anus obtaining the name of *Perineum*, from a Moisture supposed to flow about this part of the Skin.—It is sometimes also called *Anterior Perineum*, to distinguish it from that part which extends from the Anus to the Coccyx, termed by some Anatomists, *Posterior Perineum*. Tab. CXLIV. *p*.

The Opening between the two Labia has the name of *Fossa Magna*.—It increases a little in size and depth as it descends, and forms a small boat-like Cavity at its under extremity, termed *Fossa Navicularis*.

The Labia are thickest above, becoming thinner below, and terminate in a transverse Fold of the Skin, called *Frænum*, *Furcula*, or *Fourchette*, which is frequently lacerated in the first Delivery.

The Labia are composed of the Skin elevated by a large quantity of Cellular Substance and some Fat, and lined by a very Vascular Membrane, which is thin, tender, and red like the inside of the Lips. They are also furnished with numberless Sebaceous Follicles, secreting a Liquor by which the parts are preserved smooth and moist.

Between the upper ends of the Labia, is the Substance termed *Clitoris*, and by some *Mentula Muliebris*,—not extending an inch in length, and little more than the third part of that in thickness, and tied down to the fore part of the Symphysis Pubis. Tab. CXLIV. *d*. Tab. CXLV.

It is extremely Vascular and Nervous, and is composed, like the Penis in the Male, of two *Crura* and *Corpora Caverosa*, which are occasionally distended with Blood, and are contained in a Ligamentous Sheath, with a Septum between them.

The *Crura* are upwards of twice the length of the *Body* of the Clitoris, and, together with Muscles belonging to them, arise, as the *Crura* of the Penis do in the Male, from the *Crura* of the Ossa Ischia and Ossa Pubis.

The Clitoris is also provided with a *Ligamentum Suspensorium*, by which it is connected to the Ossa Pubis, and with a *Glans*, which, like that of the Penis, is extremely sensible, but has no perforation in it for the passage of Urine. Tab. CXLIV. *f*.

It is covered by a continuation of the Skin of the Labia,



bia, which, at its inferior extremity, forms a Semilunar Fold, termed *Preputium Clitoridis*.

The Prepuce is furnished with *Glandulæ Odoriferæ* upon its inner Surface, and with a small Frænum below, which fixes it to the Glans.

The Clitoris possesses great sensibility. In the time of Coition, the Glans Clitoridis is supposed to produce nearly the same sensation in the Female, as the Glans Penis does in the Male.

At the under and outer part of the Clitoris are two Bodies, called *Nymphæ*, which arise narrow from the Prepuce and Glans, and run obliquely downwards and outwards along the inside of the Labia, increasing in breadth, but suddenly contracting again in size at their lower extremity. Tab. CXLIV. *g, g.* Tab. CXLV.

They are chiefly formed by a production of the inside of the Labia, have the same florid colour with them, and in their natural state are contiguous, and cover the Orifice of the Urethra.

They are sometimes of unequal size, and not unfrequently, particularly in warm Climates, project beyond the edges of the Labia. In Hottentot Women, they are said to hang pendulous between the Thighs.

Their internal Structure consists of Cellular Substance, with a large proportion of Blood-vessels: They have also many Nervous Papillæ, which render them very sensible; and Sebaceous Follicles, the contents of which, of a Fœtid nature, prevent them from being injured by the Urine.

The Nymphæ assist in directing the course of the Urine from the Urethra, and in preventing the Air from entering the Vagina.—They also tend to enlarge the passage for the Child in the time of Parturition.

Between the Perineum and Nymphæ, there is a *Vestibulum*, or smooth *Cavity*, which is most complete in Virgins, and leads to two Passages,—to the Urethra above, and to the Vagina below.

The *Orifice of the Urethra* is placed a little below the Glans of the Clitoris, and between the two Nymphæ, and is surrounded by a Vascular Spongy Eminence, which projects at its under part,—called by some Authors *Corpus Glandulosum*, vel *Glandulæ Prostatae Mulierum*. Tab. CXLI. Fig. 6. Tab. CXLIV. *h.* Tab. CXLV.

The *Corpus Glandulosum* is perforated by *Lacunæ*; some of which are of considerable depth, and discharge a Viscid Matter round the Orifice of the Urethra. Tab. CXLIV. *i, i, k.*

The *Corpus Glandulosum* directs the point of the Finger to the Orifice of the Urethra, without the assistance of the Eye, in discharging the Urine by the Catheter.

The *Orifice of the Vagina*, termed likewise *Os Externum Uteri*, is placed immediately under that of the Urethra, and is naturally straiter than the rest of the Canal; but in the Virgin state, is still more contracted by the Substance called *Hymen*, or *Circulus Membranosus*, which forms an incomplete Septum between the Vagina and External Parts. Tab. CXLIV. *l, l.* Tab. CXLV.

The *Hymen* is formed of a double Membrane, and is red and sensible like the Vagina itself, the inner part being derived from that Canal, the outer from the Labia Pudendi. It approaches to a circular figure, but the Circle is frequently incomplete next the Orifice of the Urethra, or the Membrane is of a Semilunar form, the broad part being turned towards the Perineum.

When the Hymen is ruptured, which is commonly in the first Sexual intercourse, it degenerates into small Conical Papillæ, termed *Carunculæ Myrtiformes*, from their supposed resemblance to Myrtle-berries.

The Hymen has been considered as a test of Virginity;—but neither the presence nor the absence of this Membrane can be depended on as a certain criterion.

Sometimes the Hymen is impervious, in which case the Menstrual Fluid is retained in the Vagina, till an incision is made to allow it to be discharged.

About the Orifice of the Vagina are several Mucous Follicles, similar to those round the Opening of the Urethra.

The *Blood-vessels* and *Nerves* of the External Parts are from the Pudic Branches, and are dispersed in numerous Ramifications upon the end of the Vagina, Labia Externa, and Clitoris.

The *Absorbents* pass partly to the Inguinal Glands, and partly to those placed at the sides of the Pelvis, or upon the Lumbar Vertebrae.



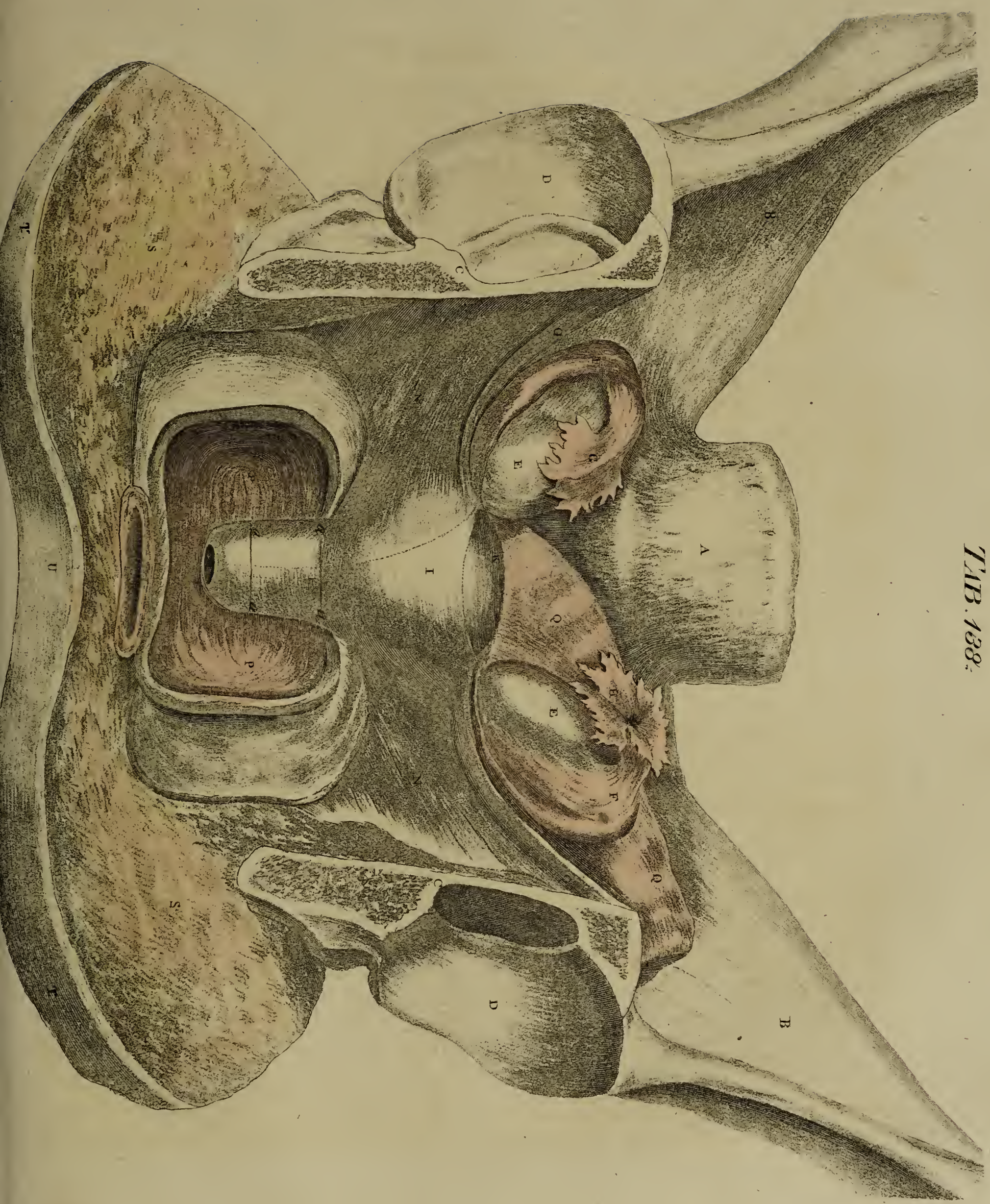
## T A B L E CXXXVIII.

Gives a VIEW of the CONTENTS of the FEMALE PELVIS.

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- |  |   |
|--|---|
| A, A, The last lumbar vertebra.  | <i>a, a, a, a</i> , That part of the uterus to which the neck of the bladder adhered. |
| B, B, The inner surface of the ossa ilia.  | M, The os tincae.   |
| C, C, A section of the os innominatum.   | N, N, The ligamenta lata.   |
| D, D, The acetabula.   | O, O, ————— rotunda.  |
| E, E, The ovaria.  | P, P, A section of the vagina.  |
| F, F, The FALLOPIAN tubes.   | Q, Q, The upper, and,   |
| G, The fimbriated extremity of the right tube embracing the corresponding ovarium. | R, The under part of the rectum.  |
| H, The fimbriae of the left tube, turned forwards to shew its orifice.             | S, The cellular substance between the integuments and muscles of the nates.           |
| I, The body,   | T, T, The integuments of the nates.   |
| K, The fundus,   | U, The part covering the extremity of the coccyx.                                     |
| L, The cervix of the uterus.   |   |

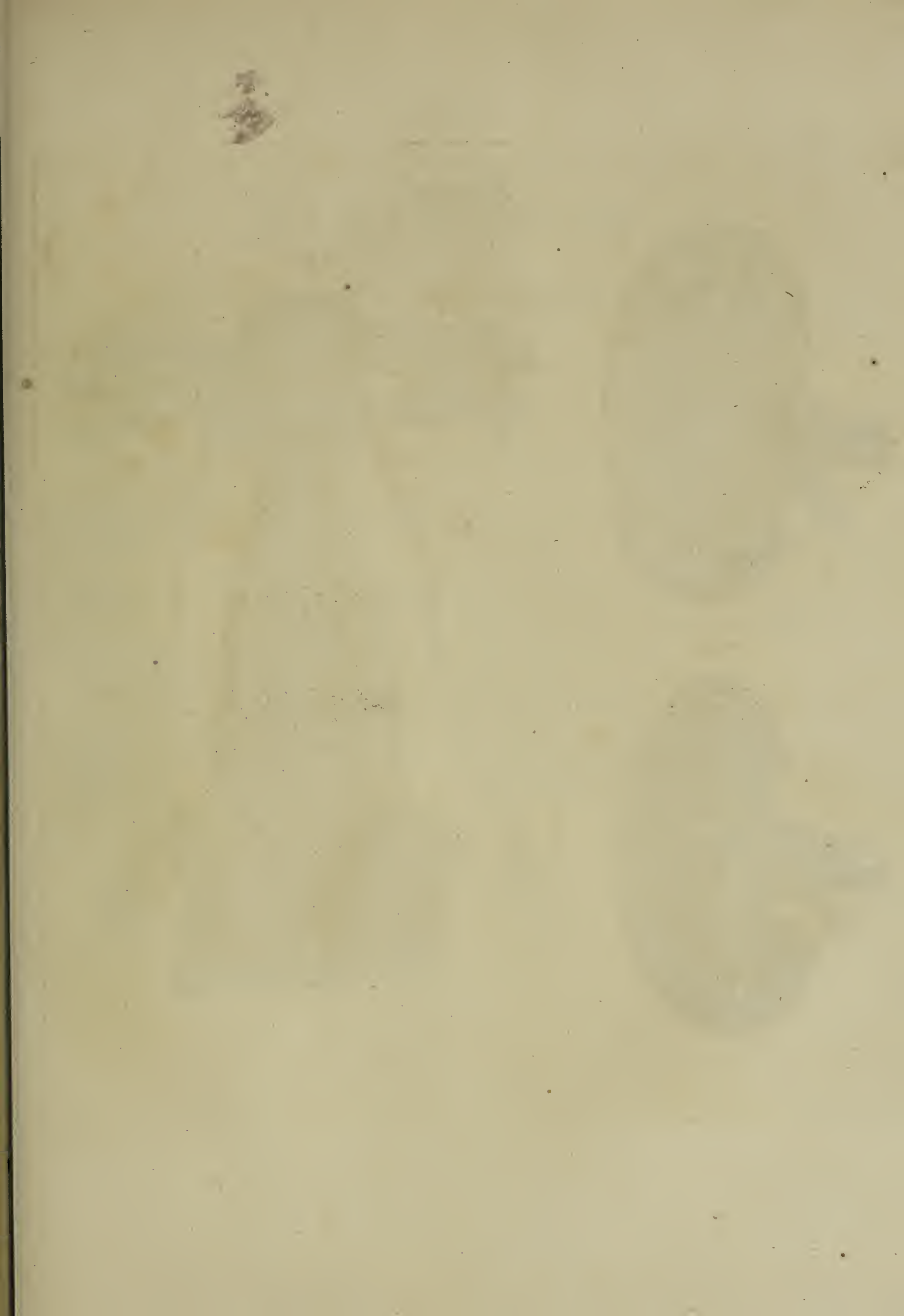














TAB 139.

Fig. 1.

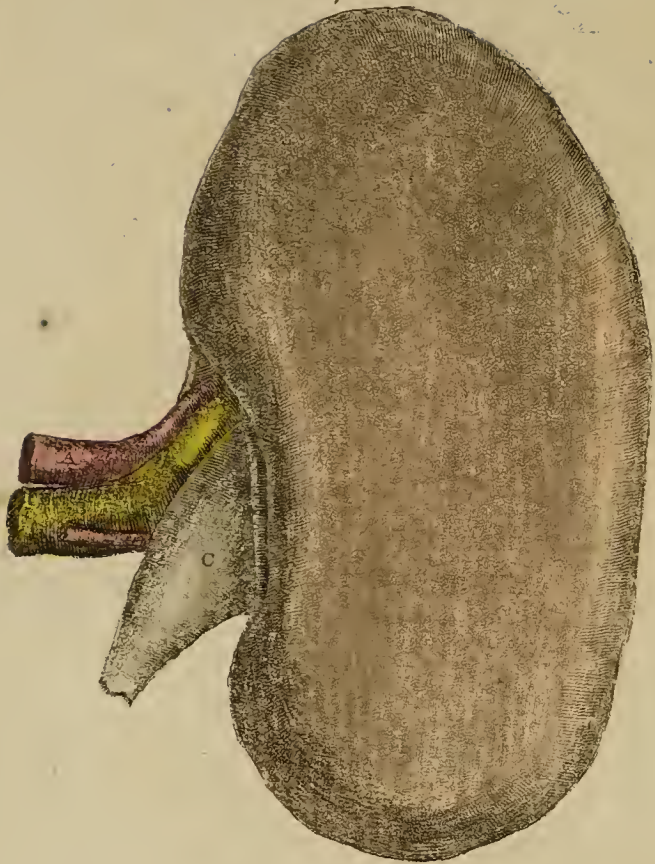


Fig. 2.

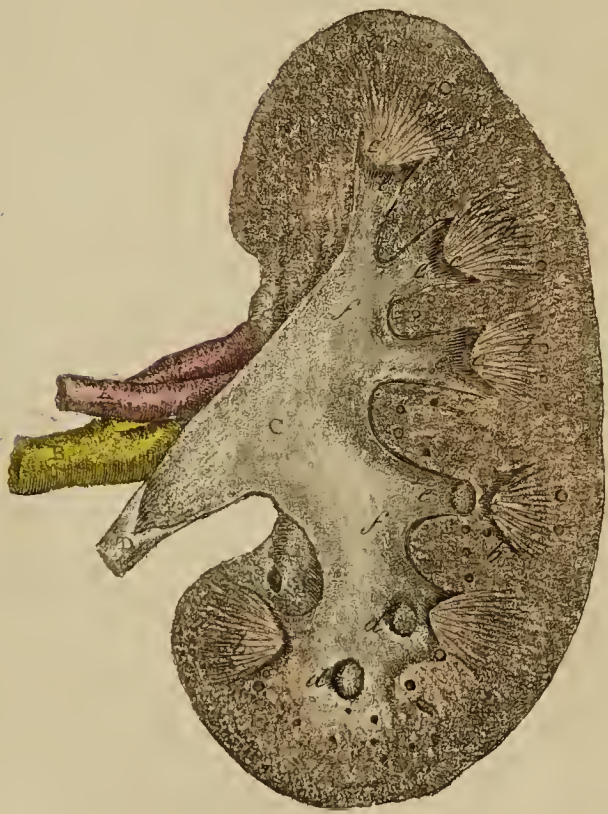


Fig. 3.





## T A B L E CXXXIX.

VIEWS of the ORGANS of URINE and PARTS of GENERATION in the FEMALE.

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FIG. 1.

*A Posterior View of the Right KIDNEY, with its Vessels injected.*

- A, The renal artery.
- B, The corresponding vein.
- C, The pelvis of the kidney forming the beginning of the ureter.

FIG. 2.

*A Longitudinal Section of a different KIDNEY from that of Fig. 1.*

- A, The renal artery.
- B, ——— vein.
- a, a, &c. The termination of the renal artery and vein in the cortical part of the kidney.
- b, b, &c. The uriniferous tubes, forming,
- c, c, c, The papillæ.
- d, d, d, The papillæ entire.
- e, e, &c. A section of the infundibula.
- f, f, The infundibula united into trunks, to form,
- C, The pelvis.
- D, The beginning of the ureter.

FIG. 3.

*Shews the UTERUS, &c. entire; the VAGINA cut open, on the Side next the INTESTINUM RECTUM.*

- A, The back part of the body of the uterus;
- B, Its fundus;
- C, Its cervix.
- D, The os tinæ.
- E, E, The FALLOPIAN tubes.
- F, F, The fimbriæ.
- G, G, The termination of the tubes in the uterus.
- H, H, The ovaria.
- I, I, &c. The ligamenta lata.
- K, K, ——— rotunda.
- L, L, Their extremities.
- M, The inside of the vagina, with its rugæ.
- N, N, The cut edge of the vagina.
- O, The orifice of the urethra.
- P, The glans clitoridis, surrounded by its prepuce.
- Q, Q, The labia externa.
- R, R, The nymphæ.



# T A B L E CXL.

## VIEWS of the UTERUS.

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### FIG. 1.

*A View of the UTERUS a few days after Impregnation.*

- A, A, The body of the uterus cut open, by which its thickness and cavity appear.
- B, The os tincae.
- C, C, The part to which the vagina adhered.
- D, D, The ovaria, one of which is cut open.
- E, An ovum fœcundated.
- F, Vesicles not fœcundated.
- G, Blood-vessels in the cellular substance.
- H, A prominence occasioned by the contained ova.

I, I, The ligaments of the ovaria.

K, K, The FALLOPIAN tubes cut open at their outer extremities.

L, L, Portions of the ligamenta lata.

M, M, ————— rotunda.

### FIG. 2.

*A View of the UTERUS of a WOMAN who was killed a few hours after Coition.*

A, B, A fluid found in the cavity of the uterus, and at the os internum uteri, supposed to be male semen.



Fig. 1.

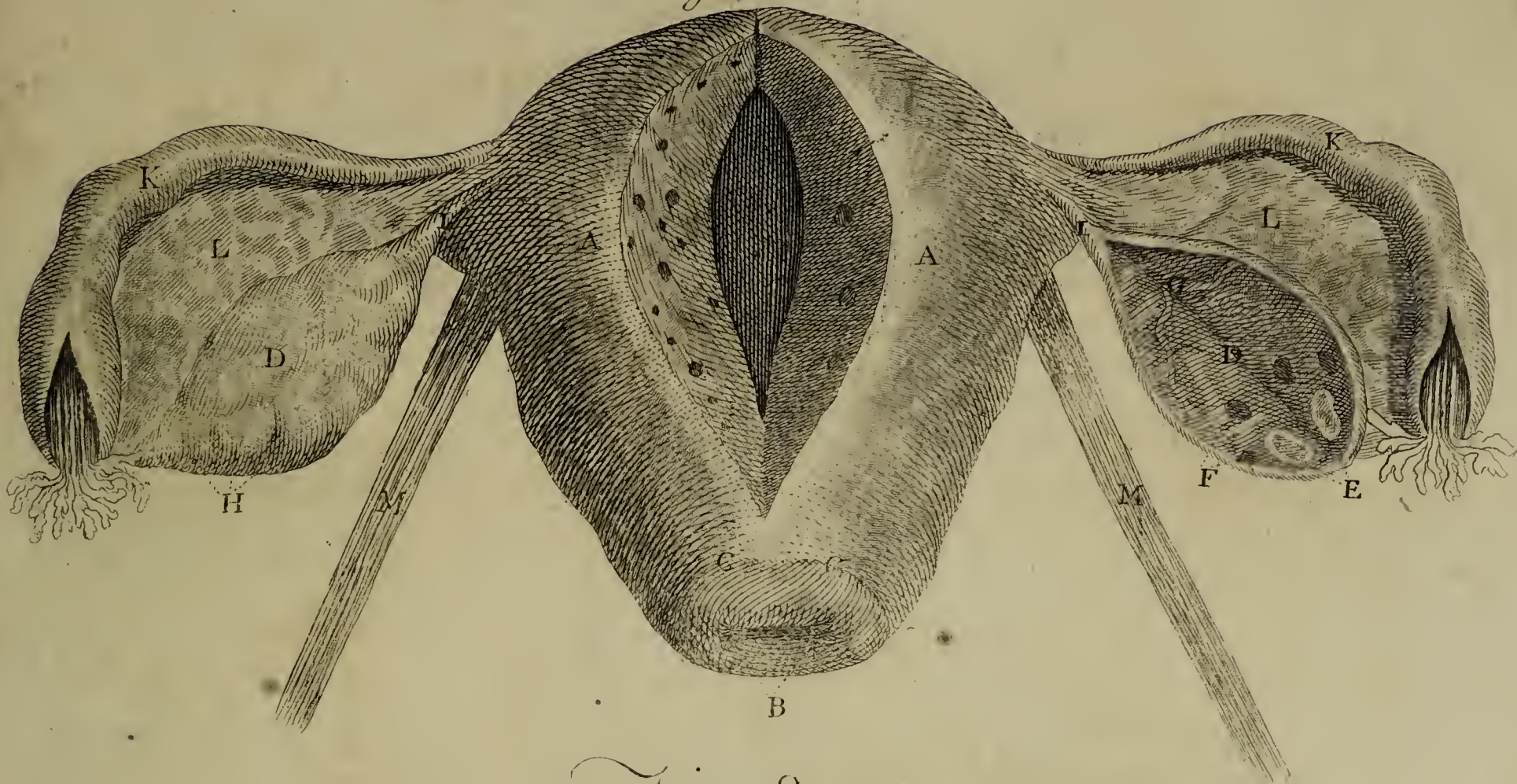
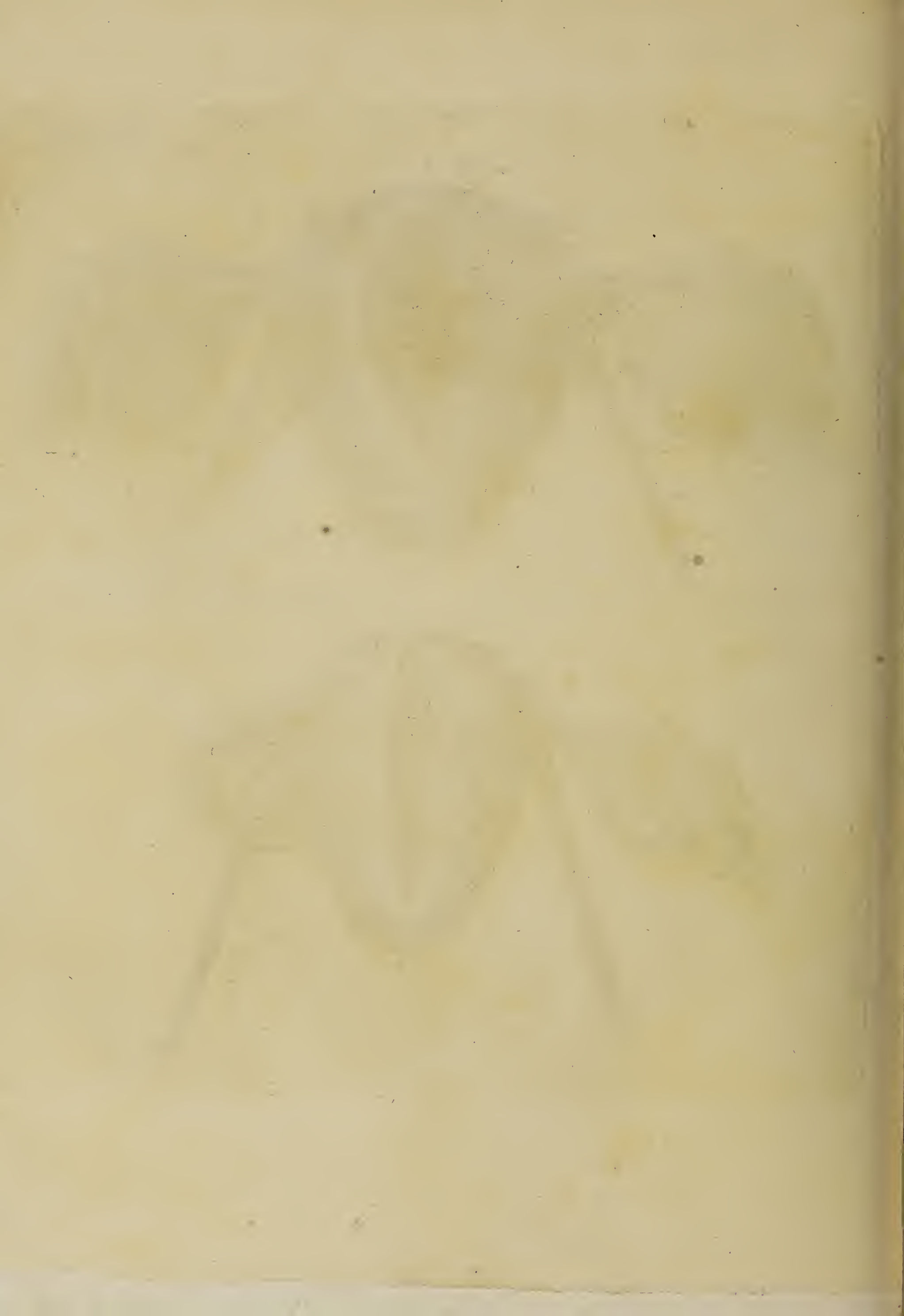


Fig. 2.









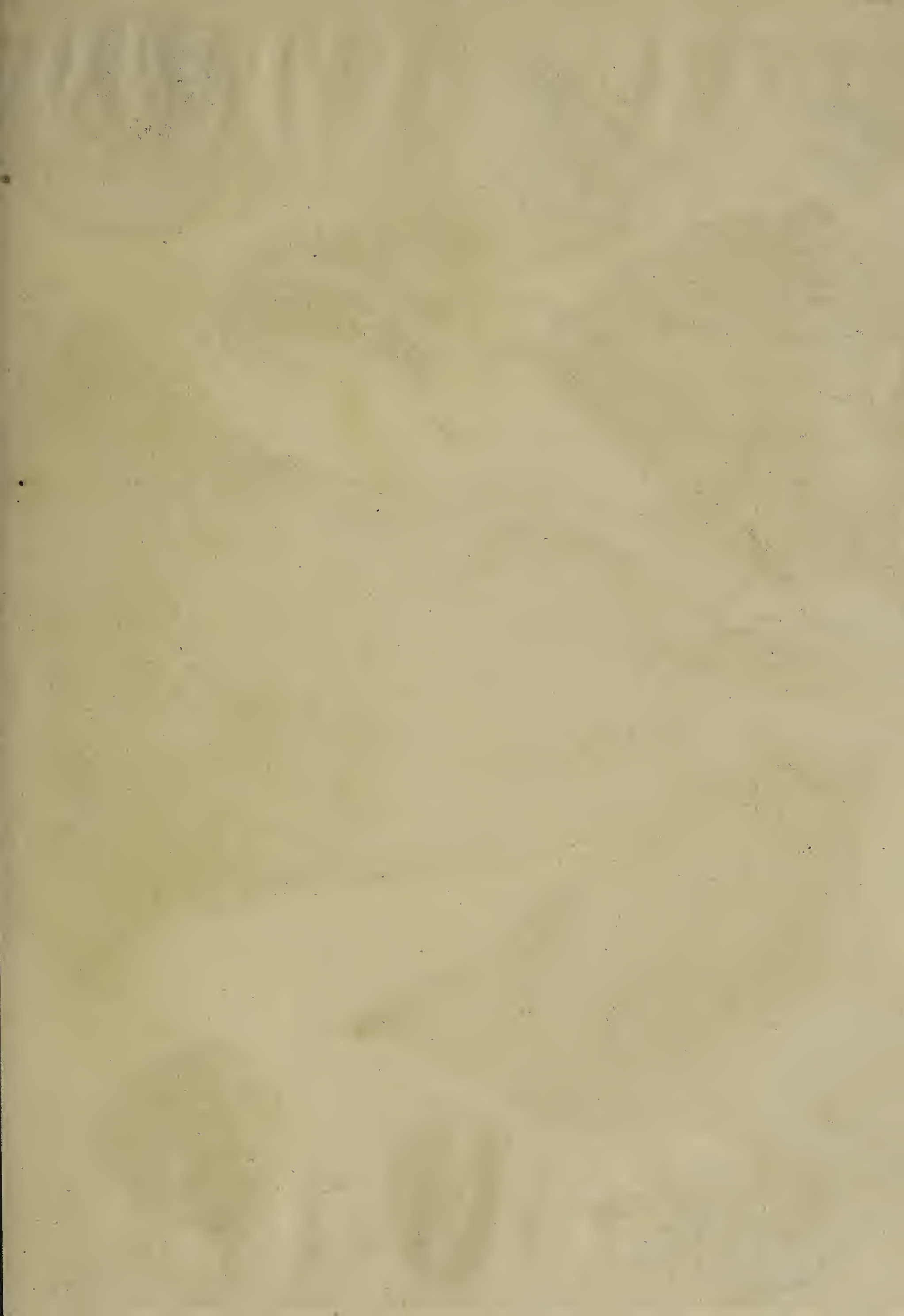






Fig. 1.

Fig. 2.

Fig. 6.

Fig. 3.

Fig. 4.

Fig. 5.



## T A B L E C X L I .

## VIEWS of the UTERINE SYSTEM.

FIG. 1.

*Represents the UTERUS and VAGINA laid open.*

- A, A, The ovaria, the left, which is dropsical, laid open.  
*a, a*, The ligaments of the ovaria.  
 B, B, The FALLOPIAN tubes, distended with air, introduced by their orifices *b, b*.—The air readily passed into the cavity of the uterus.—The large convolutions of the right tube are left out on account of the smallness of the plate:  
 C, C, The fimbriated extremities of the tubes.  
 D, D, A longitudinal section of the uterus.  
 E, E, The cavity of the uterus.  
*c*, A small excrescence in this uterus.  
 F, A similar excrescence obstructing the passage into the uterus.  
*d*, The os tincæ laid open.  
*e, e*, Hydatids upon the mouth of the uterus.  
 G, G, The ligamenta lata.  
*f, f*, ————— rotunda.  
 H, H, The vagina laid open. In the anterior part it is rugous, in the posterior part smooth.  
*g, g*, The lacunæ in the cavity of the vagina.  
 I, The orifice of the urethra placed in a glandular eminence.  
*h*, A lacuna situated upon the glandular body.  
*i, i*, Two ventricles appearing in the vestibule of the vagina.  
 K, The clitoris, with its surrounding prepuce.  
*k, k*, The lacunæ in the ventricles of the vestibule.  
*l, l*, The lacunæ, called *Ductus BARTHOLINI*.  
*m, m*, The carunculæ myrtiformes.  
*n, n*, A section of the labia.  
 L, L, The nymphæ preternaturally large.  
 M, M, The labia pudendi.

FIG. 2.

*A View of the Os INTERNUM and part of the VAGINA, in a Girl of fourteen years of age. The VAGINA is cut longitudinally upon the Right Side.*

- A, The rima transversa of the os uteri.  
 B, B, The vagina, with rugæ more simple than those found on its fore part.

FIG. 3.

*A View of the Internal Parts of the PUDENDUM of the same GIRL, as in the former Figure.*

- A, A, The labia pudendi.  
 B, The clitoris.  
 C, C, The nymphæ.  
 D, D, The hymen, of a semicircular figure.  
 E, The fossa navicularis.

FIG. 4.

*The External Parts of a CHILD a few weeks old.*

- A, A, The labia.  
 B, The clitoris.  
 C, The urethra.  
 D, D, The hymen, of a circular form.

FIG. 5.

*Represents the HYMEN large and Semilunar, in a GIRL of seven years of age.*

The letters point to the same parts as in Fig. 3.

FIG. 6.

Part of the Virgin Genitals, with the Hymen entire, which is surrounded with Mucous Lacunæ.



## T A B L E CXLII.

FIG. 1.

*A Side View of the Contents of the Pelvis in a Young Female ; the Left Os Innominatum being separated.*

- A, The anterior surface of the os sacrum, covered by cellular substance.
- B, The cartilaginous surface of the os sacrum, which was joined to the os ilium.
- C, The cartilaginous surface of the right os pubes, which formed part of the symphysis pubis.
- D, The psoas muscle.
- E, A section of the muscles placed in the back part of the loins.
- F, A section of the pyriformis.
- G, ————— glutei.
- H, The levator ani raised from its origin, and turned back, with a cut in it, to shew,
- I, The point of the os coccygis.
- K, Part of the sphincter ani.
- L, The transversalis perinei separated from the os ischium.
- M, The sphincter vaginæ covering the corpus cavernosum vaginæ.
- N, The erector clitoridis.
- O, The left crus clitoridis.
- P, The body of the clitoris, and the angle it forms with its crus.
- Q, The suspensorium clitoridis.
- R, The mons Veneris.
- S, The left, and,
- T, A part of the right labium pudendi.
- U, The right thigh.
- V, The left ureter ;
- W, Its termination in the bladder.
- X, X, The bladder of urine moderately distended, and covered above and behind by the peritoneum.
- Y, Y, The fleshy surface of the bladder.
- Z, The urethra, with a catheter introduced into the bladder.
- a, b, The end of the colon and the intestinum rectum distended, resting upon the lumbar vertebræ and top of the os sacrum.
- c, The cut edge of the peritoneum, and its depth in the pelvis, in this state of the viscera.
- d, The fleshy surface of the rectum.
- e, f, The posterior surface of the unimpregnated uterus, which is drawn upwards, so as to bring it fully into view ; e, its body ; f, its cervix.
- g, g, The ligamenta lata drawn upwards ; the left, with the parts connected to it, is expanded upon the side of the bladder ; the right, with the parts it includes, is turned backwards upon the side of the pelvis.
- h, The left ligamentum rotundum uteri obscurely seen.
- i, i, The two ovaria, with their flat upper, and rounded under edges.
- k, The left ligamentum rotundum ovarii.
- l, l, The uterine tubes ; their shape and size are distinctly seen, in consequence of their having been drawn in the distended state.
- m, m, The external orifices of the tubes, with the fimbriæ surrounding them, which are spread out, and considerably longer at one side of the tubes than at the other.
- n, n, The vagina cut open.
- o, The inside of the vagina, with its transverse rugæ, which are most numerous towards its outer extremity.
- p, The os tinçæ placed transversely at the posterior part of the vagina.
- q, The spermatic blood-vessels of the right side.
- \* \* \* are placed opposite to the external orifices of the urethra, vagina, and rectum.

FIG. 2.

*The Clitoris, with the Erectores Clitoridis, three-fourths of their Natural Size.*

- a, The upper part of the body of the clitoris.
- b, b, The crura clitoridis.
- c, The glans clitoridis.
- d, The preputium clitoridis.
- e, e, The erectores clitoridis.

FIG. 3.

*The Corpus Cavernosum Vaginæ, with its Cells distended with Wax.*















TAB. 143

Fig. 1.

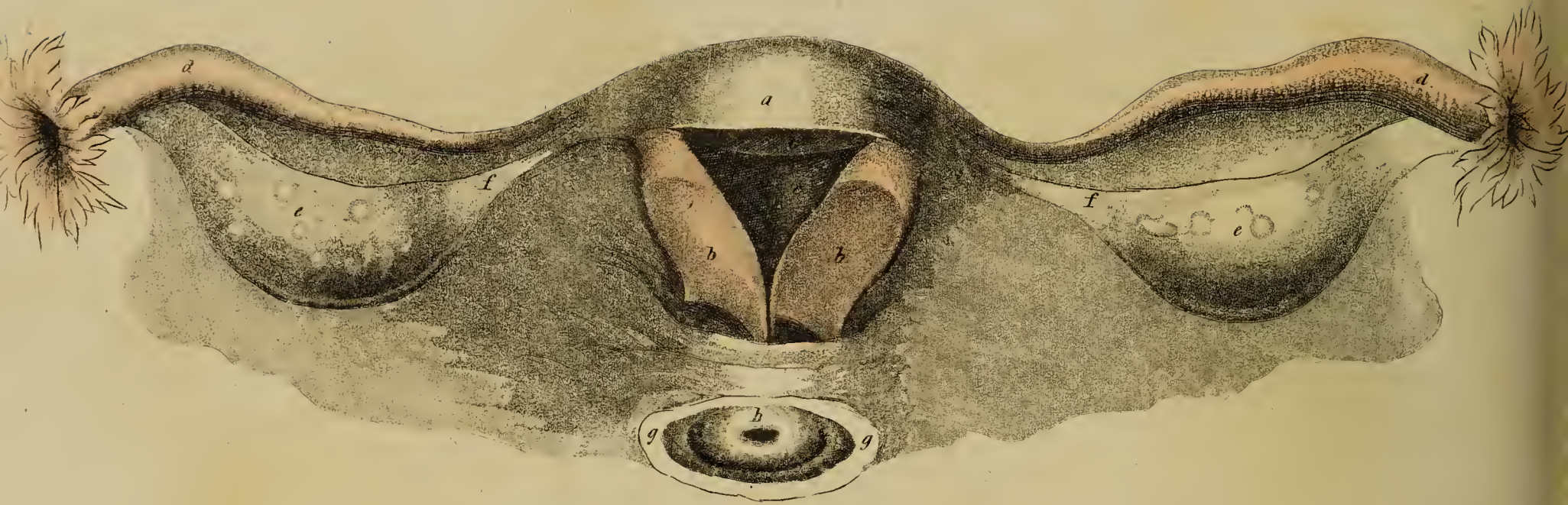


Fig. 2.

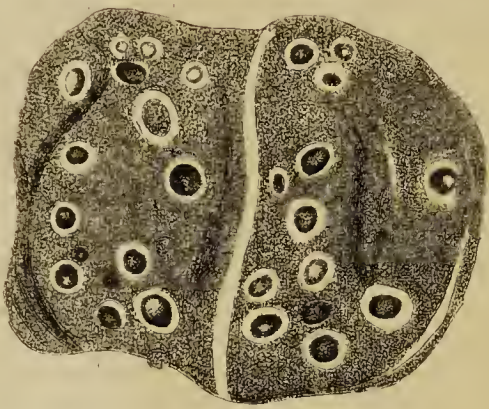


Fig. 3.

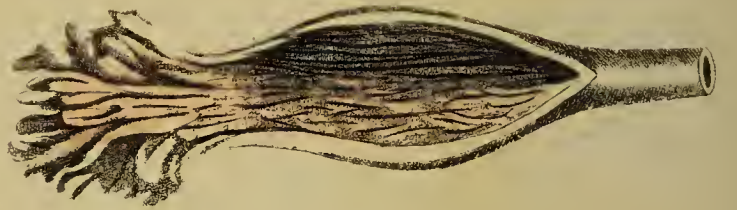


Fig. 4.





# T A B L E CXLIII.

Represents the Structure of the UTERUS and its Appendages.

FIG. 1.

*A Posterior View of the UTERUS of a young Female who had never born Children.*

- a*, The uterus laid open.
- b, b, b*, The cut edges of the same.
- c*, Its cavity.
- d, d*, The FALLOPIAN tubes, with their fimbriæ.
- e, e*, The ovaria.
- f, f*, The ligamenta rotunda ovarii.
- g, g*, A section of the vagina.
- h*, The os tinæ.

FIG. 2.

*An Ovarium cut open, to shew the Ova in a Girl of nineteen years of age.*

FIG. 3.

*The FALLOPIAN Tube separated from the Uterus, and*

*laid open. In this are seen the Laciniaë or Fimbriæ, and the Fleshy Fasciculi which run between the outer and inner Membranes.*

FIG. 4.

*Another View of the Cavity of the UTERUS.*

- a, a*, The triangular cavity of the uterus.
- b*, The anterior, and,
- c*, The posterior labium of the os tinæ.
- d, d, d*, The thickness of the parietes of the uterus.
- e, e*, Bristles introduced into the orifices which lead to the FALLOPIAN tubes.
- f, f*, The cervix uteri.
- g, g*, The palmated rugæ in the cervix uteri.
- h, h*, The ovula NABOTHI.
- i, i*, The orifices of small mucous follicles.
- k*, The angle in which the anterior and posterior labia of the os tinæ are conjoined.



## T A B L E CXLIV.

The EXTERNAL PARTS of GENERATION of a FEMALE, in the Virgin State.

---

- |  |  |
|--|--|
| <i>A, A, A,</i> The drapery covering part of the abdomen and thighs. | <i>h,</i> The orifice of the urethra.  |
| <i>a,</i> The mons Veneris.  | <i>i, i,</i> The orifices of mucous lacunæ.  |
| <i>b, b,</i> The labia pudendi separated.                            | <i>k,</i> The orifice of the vagina, with some of the rugæ seen upon its internal surface. |
| <i>c,</i> The frænum labiorum.                                       | <i>l, l, l,</i> The hymen, somewhat of a circular form.                                    |
| <i>d,</i> The clitoris.  | <i>m,</i> The fossa navicularis.   |
| <i>e,</i> The preputium, and,  | <i>n,</i> The anterior perineum.   |
| <i>f,</i> The glans clitoridis.                                      | <i>o,</i> The anus.  |
| <i>g, g,</i> The nymphæ turned outwards.                             | <i>p,</i> The posterior perineum.  |





TAB. 144.











Fig. 1.



TAB. 145.

Fig. 2.





## T A B L E CXLV.

Additional Views of the EXTERNAL PARTS, of the Natural Size, in two Young ADULT FEMALES.

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FIG. 1.

*Shews the EXTERNAL PARTS, the THIGHS being turned up, and the LABIA EXTERNA separated as far as to bring into view the parts they concealed.*

- A, The mons Veneris.
- B, B, The labia externa separated a little from each other.
- C, The clitoris, with its prepuce.
- D, The glans of the clitoris.
- E, E, The nymphæ turned outwards.
- F, The orifice of the urethra surrounded by the corpus glandulosum.
- G, The orifice of the vagina.
- H, The hymen, of a crescentic form.
- I, The fossa navicularis.
- K, The furcula.
- L, The anterior perineum.
- M, The anus.

FIG. 2.

*Represents the EXTERNAL PARTS where the INFERIOR EXTREMITIES were brought over the edge of a Table.*

- A, The mons Veneris.
- B, B, The labia externa.
- C, The clitoris.
- D, D, The nymphæ lying nearly in their natural situation.
- E, The corpus glandulosum surrounding the orifice of the urethra.
- F, F, The hymen, of a circular form, surrounding the orifice of the vagina.
- G, The fossa navicularis.
- H, The labia meeting below, to form the frenum or furcula.
- I, The anterior perineum.
- K, The anus.



## T A B L E CXLVI.

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### FIG. 1.

*The EXTERNAL PARTS of an HERMAPHRODITE NEGRO, who was twenty-six years of age, and in shape perfectly Male.*

- a*, The clitoris, which, when erected, was said to be almost as large as the penis.
- b*, The glans clitoridis.
- c, c*, The labia, or a divided scrotum, in which were perfect testicles, with all the vessels.
- d, d*, The nymphæ.
- e*, The entrance into the vagina, where there were carunculæ myrtiformes.
- f*, The furca virginis.

### FIG. 2.

*The EXTERNAL PARTS of another HERMAPHRODITE, whose shape was said to be rather Female than Male; but too young to have Breasts like a Female, or a Beard upon the Face like a Male.*

- a*, The glans clitoridis.
- b, b*, The nymphæ.
- c, c*, The labia, with testicles in them, separated from each other, to shew the parts between them, but in their natural situation, like the labia represented in the preceding figure.
- d*, The entrance into the vagina.
- e*, The furca virginis.

### FIG. 3.

*The EXTERNAL PARTS of an HERMAPHRODITE CHILD, who died from a Disease in the ABDOMEN, when three years old.*

- a*, The mons Veneris furnished with red hair.
- b, b*, The labia as thick as those of a grown woman, but shorter, also furnished with some red hair. Their inner surface is white and rugous, the fine red skin not beginning till near the external orifice of the vagina.

*c*, The clitoris projecting, which is upwards of an inch in length, and about half an inch in diameter.

*d*, A thick wrinkled prepuce.

*e*, The glans of the clitoris, in which is seen an appearance of the orifice of an urethra, but which is only a deep channel descending to the vagina, and is like the male urethra slit open.

*f, f*, The nymphæ, which form the sides of the above-mentioned channel.

*g*, A longitudinal eminence like the veru-montanum.

*h*, The hymen, surrounding the orifice of the vagina.— Between the hymen and the glans, the orifice of the urethra is concealed.

The size and shape of the uteris belonging to the preparation from which this figure is made, is equal to that of a girl of fourteen years of age. The os tinæ is impervious.

The FALLOPIAN tubes are knotted in their course, like vasa deferentia.

The ovaria correspond in size to the developement of the other parts of the uterine system.

### FIG. 4.

*The EXTERNAL PARTS of an ADULT HERMAPHRODITE, which appear to be more perfect than those represented in any of the preceding Figures. The Figure is published in the Front of a Collection of Anatomical Paintings by GAUTHIER at Paris; but no history of the case is given in that Work.*

*a*, The pubes covered with hairs.

*b*, The penis.

*c*, The prepuce.

*d*, The glans penis.

*e, e*, Two testes.

*f, f*, A pudendum.

*g*, A glans clitoridis.

*h*, The appearance of a vagina.

*i*, The anus.



Fig. 1.



TAB. 140.

Fig. 3.



Fig. 2.



Fig. 4.









## OF THE GRAVID UTERUS.

WHEN the Rudiments of the Fœtus have been conveyed from one of the Ovaria into the Cavity of the Uterus, through the medium of the corresponding Uterine Tube, whether in the state of a Fluid only, or of a complete Ovum, *Impregnation* is said to have taken place.

The Rudiments of the Fœtus have been supposed to come from the Father, or from the Mother, or from both; at any rate, it is ascertained, that something absolutely necessary for Conception is derived from the Ovaria, and that, in consequence of a Stimulus given by the Male Semen, the Rudiments of the Child proceed from the Ovaria through the Tubes into the Uterus.

In the case of a single Child, the Rudiments come from one of the Ovaria, and go through the corresponding Tube. When there are Twins, one Fœtus sometimes comes from each Ovarium; at other times, the two come from one Ovarium only.

Some days after Impregnation, an *Ovum*, consisting of a Vesicle filled with a limpid Fluid, is found in the Cavity of the Uterus.

The Ovum, when first visible, is observed to have a smooth Surface, but in a short time thereafter it sends off flocculent Branches, the greater part of which are by degrees converted into a *Placenta* at that part of the Uterus where the Ovum happens to be first attached; the Branches covering the rest of the Ovum becoming matted together, form what is termed *Spongy Chorion*.

The Rudiments of the Fœtus, however, are not always conveyed to the Uterus after Impregnation, for sometimes a Fœtus is found in the Ovarium, Tab. CXLVII; at other times in one of the Uterine Tubes; and some rare instances have occurred, where the Embryo has dropped from one of the Ovaria or Tubes into the Cavity of the Abdomen, where a *Placenta* has been formed, by which it has been nourished. In these cases, which are called *Extra-uterine Conceptions*, the Uterus is also found to be somewhat enlarged during the time of Pregnancy.

The Ovum, at an early period of Gestation, consists of a thin *Membranous Capsule*, which incloses the Embryo or Germ with the Umbilical Cord and Waters; and the Capsule, again, consists of an Internal Membrane called *Amnios*, on the outside of which is another, termed *True Chorion*, which is thicker and stronger than the former, and thicker in the early than in the late periods of Pregnancy. This is covered with a Fi-

lamentous and Spongy Substance, named by RUYSCH *Tunica Filamentosa*, and by more modern Authors, the *False* or *Spongy Chorion*. Tab. CXLVIII. Fig. 7.—15. Tab. CL. Fig. 1.—5.

The *Spongy Chorion* is described by DR HUNTER as consisting, in early Gestation, of *two Layers*; one lining the Cavity of the Uterus, and termed by him *Membrana Decidua*, from being supposed to be cast off from the Uterus; the other, covering the outer Surface of the *True Chorion*, he terms *Decidua Reflexa*, Tab. CLII. Fig. 4.; the one appearing to be a continuation of, or reflection from, the other; of course, four Layers or Coats are found in the beginning of Pregnancy.

The *Decidua* is least distinct between the Uterus and Placenta, being there perforated by the Uterine Vessels. Near the edge of the Placenta, the *Decidua* and that part of it called *Reflexa*, are thickest and strongest, and decrease in thickness towards the other end of the Uterus and Ovum, in proportion as these become more expanded.

In advanced Gestation, the inner Surface of the *Decidua*, and outer one of the *Decidua Reflexa*, gradually approach each other, and unite into one Membrane, which retains the name of *Spongy Chorion*, or *Decidua*. They have been supposed to be formed originally by an efflorescence thrown out upon the parts on which they are placed, in the manner it is thrown out upon inflamed Surfaces.

Between the *Amnios* and *Chorion*, a large proportion of *Gelatinous Fluid* is contained in the early Months, which separates them at a considerable distance from each other. At this period a small *Bag*, filled with a milky-like Fluid, is observed on the *Amnios*, near the insertion of the Umbilical Cord, and is termed *Vesicula Umbilicalis*, vel *Alba*. Tab. CL. Fig. 2.

The *Vesicula Umbilicalis* is connected to the Cord by a Filament consisting of an Artery and Vein, derived from the Umbilical Vessels, which, with the Fluid and Bag, soon disappear. The use of this Vesicle, which has sometimes been mistaken for an *Allantois*, is not yet understood.

In early Gestation, the Ovum is large in proportion to the Embryo; but towards the latter period of Pregnancy, the proportion is reversed, as appears from the following observations.

No well-authenticated account has been yet received of the Embryo being observable till near the end of the third



third Week, when it is found to be about a line in length, and to appear like an oblong curved Vesicle floating in the Limpid Liquor of the Ovum. Tab. CL. Fig. 1.

In the fourth Week, the Ovum is about the size of a Pigeon's Egg, and the Embryo not larger than a common House-Fly.

At the end of the sixth Week, the Embryo is about as large as a Honey-Bee, with the head turned forwards, towards the farther extremity of the Trunk. The size of the Head is almost equal to that of the rest of the Body. The Eyes and Mouth appear evident.

In the eighth Week, the Ovum nearly equals the bulk of a Hen's Egg, and the Embryo is about an inch in length. The Nose and Ears now begin to be visible; the Limbs extend beyond the Trunk. The Cord is at this period almost as long as the Embryo, but the Vessels run parallel to each other, nor do they receive their twisted appearance till a few weeks afterwards.

About the end of the third Month, the Ovum is of the size of a Goose's Egg, and weighs about eight ounces, while the Embryo is between two and three ounces in weight, and three inches in length; and the Head and Extremities being now distinctly observable, it obtains the name of *Fœtus*, which it retains from this time till the end of Gestation.

Towards the end of the fourth Month, the motions of the Child begin to be felt by the Mother, in consequence of which the term *Quickening* has been applied.

In the sixth Month, the Placenta and Membranes weigh seven or eight ounces, the Fœtus twelve or thirteen. It is then eight or nine inches in length, and perfect in all its external parts.

In the seventh Month, the Fœtus is about a foot in length.

At birth the Secundines weigh between a pound and a pound and a half. The Fœtus is then about seven pounds, and is from eighteen to twenty inches in length. Still, however, from the difficulty of ascertaining when Pregnancy commences,—from the difference of Fœtuses of the same age in different Women, and in the same Women in different Pregnancies,—and from the Fœtus being frequently retained in the Uterus some time after it is dead, as well as from the inaccuracy of many of the Figures representing these parts,—the above observations are not altogether to be depended on.

#### CHANGES PRODUCED IN THE UTERINE SYSTEM BY IMPREGNATION.

Immediately after Impregnation, a large *Orifice* is constantly observed in the Ovarium, leading to a Cavity in that part of it whence the Rudiments of the Fœtus have been derived. Tab. CXLVII.

This *Cavity* appears first flocculent, and is afterwards filled up, during Gestation, though sometimes not till several Months afterwards, by a Granulous Substance, which has the name of *Corpus Luteum*, from the yellow

appearance it assumes, especially in Quadrupeds. Tab. CXLVII.

The *Corpus Luteum* projects from some part of the Surface of one of the Ovaria. It is of a roundish or oval form, and consists of an outer Vascular, and inner inorganic-looking, pale-coloured Substance, which has been considered by some Authors as the remains of the Ovum. Tab. CLII. Fig. 1. B. Tab. CXLVII.

A real *Corpus Luteum* is not found till after Impregnation, though diseased appearances of the Ova have sometimes been shewn as such. The *Corpus Luteum* continues till the end of Pregnancy, and for some time after Delivery, when it gradually vanishes, but leaves a *Scar* in the Ovarium, which continues for life. In the case of a single Child, a *Corpus Luteum* is only found in one Ovarium; when there are Twins, a *Corpus Luteum* is observed in each Ovarium, or two *Corpora Lutea* in one Ovarium, and none in the other; the number of *Corpora Lutea* always corresponding with that of the Ova impregnated.

After the Embryo is received into the Cavity of the Uterus, the Uterine Extremities of the Tubes are closed by the *Membrana Decidua*; the *Os Tincae* is shut by a *Ropy Mucus* secreted from the Follicles in the *Cervix Uteri*, which excludes the Air, and prevents the chance of Abortion; the *Menstrua cease to flow*,—and the Uterus by degrees is changed from a triangular to an *oval* form, though the oval appearance is not distinctly observed till the latter Months of Pregnancy.

From the influx of Blood to the Substance of the Uterus, and from the growth of the Ovum, the Cavity of the Uterus gradually enlarges, from a size capable only of admitting a decorticated Almond, to that which contains the full-grown Fœtus, the Secundines, and Waters; composing together a mass equal to nine or ten pounds in weight.

The size of the Uterus varies in different Women, according to the size and number of the Fœtuses, and the quantity of Fluid contained in the Ovum.

Some time after Impregnation, the *Fundus* and Body of the Uterus, being softer and looser than the *Cervix*, first yield to the parts which it contains, but continue somewhat flat through the whole period of Gestation, in consequence of pressure from the anterior and posterior parts of the Abdomen; the fore part of the Uterus, however, still continuing flatter than the back part.

For the two first Months, the Uterus increases so little as to remain in the Cavity of the Pelvis; and it is generally after the third Month, before the Tumour formed by it can be felt above the Symphysis Pubis.

In the fourth Month, the Body of the Uterus is about five inches in length, and it has acquired so much additional size and weight, that it is found lower than formerly in the Cavity of the Pelvis; in consequence of which, the *Os Tincae* is felt projecting nearer to the *Os Externum Uteri*.

After



After this time, its bulk increasing, it presses against the Pelvis, and ascends in the Abdomen, carrying the Os Tincæ higher than its original situation; at the same time elongating the Vagina.

In the fifth Month, the Uterus renders the Abdomen tense, and forms a sort of Ball between the Pubes and Umbilicus.

In the sixth Month, it extends about four inches above the Pubes, the length varying according to that of the Abdomen and Ovum.

It continues to rise through the whole remaining period of Gestation; and after ascending above the Pelvis, it commonly inclines, with its Fundus forwards, the Os Tincæ backwards, and is frequently also turned a little to one side; but the ascent is observed to be more in the first Gestations, and the inclination greater in later Gestations, owing to the nature of the Integuments of the Abdomen, less resistance being made by them after a Woman has born a number of Children.

The position of the Uterus also varies according to the height of the person, and the width of the Pelvis.

In the seventh Month it reaches the Umbilicus; in the eighth is half way between that and the Sternum. At last it touches the Scrobiculus Cordis, Stomach, and Colon, being now about a foot in length from the upper to the under extremity: occupying almost the whole of the Umbilical and Epigastric Regions, and having the Omentum and Intestines at the upper, lateral, and posterior parts of it, the fore side of the Uterus being in close contact with the Parietes of the Abdomen.

In the progress of Gestation, the whole Uterus becomes softer and looser, in consequence of which it readily changes its form, and accommodates itself to the pressure of the Child, or of any of the adjacent Viscera. It becomes now also more Vascular, and the Vessels are greatly enlarged in size; the proportional increase being nearly similar to that of the bulk of the Uterus.

The Arteries are now observed to have very frequent communications, and in their course are remarkably convoluted,—fully as much so as they are previous to Conception,—and greatly more so than the corresponding Veins. Tab. CXLVII. CLXI.

The Veins are much larger than the Arteries, their diameters being such as to have distinguished them by the name of *Sinuses*;—and to them the great bulk of the Uterus is chiefly owing. Tab. CLXI.

The Lymphatic, like the Sanguiferous Vessels, are also much increased in size, as well as in number, towards the latter period of Pregnancy. Many of them are larger than Crow-quills. They form a Plexus, which covers a great part of the Body of the Uterus.

The Substance of the Uterus was formerly supposed by some to be thicker, and by others to be thinner, in the Gravid, than in the unimpregnated state; but it appears now to be sufficiently ascertained, that it is nearly of the same thickness in both states, and during the whole term of Pregnancy, excepting at the end of

Gestation, when it becomes thinner towards the under extremity. For several days after Delivery, on the contrary, it is observed to be much increased in thickness, especially at its Fundus.

After the third Month, the Cervix Uteri begins to become softer, wider, and more Spongy, and continues to do so till the seventh or eighth Month, when it is so expanded as to form part of the Body of the Uterus.

During all this period, the Os Tincæ is undergoing similar changes. In proportion as the Cervix stretches, the Tubercle of the Os Uteri becomes less prominent, but its circumference is enlarged. At the latter Months it becomes thin, flat, and irregular on its edges, and the firmness of its texture is converted into the Spongy softness of the Body of the Uterus. Its Orifice is changed from a Transverse Slit into an Oval Pit; and in Women who have born several Children, it is considerably dilated near the end of Gestation. There is now merely the Mucus as a Septum between the Uterus and Vagina; this comes away before Parturition, along with the Liquor Amnii, the Follicles which form this Mucus throwing out, afterwards, a thinner fluid, to lubricate the parts.

The situation of the Appendages of the Uterus is also considerably altered. The Ovaria, with the Tubes and Ligaments of the Uterus, are situated lower, in respect to the Fundus Uteri, in proportion as it ascends, and at the full time lie close upon its Surface. The Round Ligaments are thicker and more Vascular, and the Ligamenta Lata, by assisting in forming a Covering to the Uterus, are nearly obliterated.

The Tubes descend by the sides of the Uterus; are straighter, thicker, and more Vascular; have the Muscular-like Plicæ more distinct, and the Fimbriæ more expanded than formerly.

In the enlarged state of the Uterus, the Muscular Fibres, though pale, are distinctly seen. They form Fasciculi which run in different directions, but cannot be traced far without interruption. They are variously described by different Authors; their course, however, is such, that they are capable of contracting the Uterus in all its dimensions during the time of Delivery.

According to DR HUNTER, the contractile power of the Muscular Fibres of the Uterus is in some parts slow, but in others quick; in some parts voluntary, and in others involuntary.

A description is given by RUYSCH of a *Circular Muscle* in the bottom of the Uterus, for the expulsion of the Placenta;—but the Placenta is found to adhere to other parts besides the Fundus Uteri; nor has such a Muscle been observed by later Anatomists. In DR HUNTER'S Plates, the Fibres are seen running transversely in the Body of the Uterus, and describing Concentric Circles about the Orifices of the FALLOPIAN Tubes.

The Muscular Fibres of the Uterus assist in the Delivery of the Child, and expulsion of the Placenta; and in a few weeks after Delivery, the Uterus, partly by the contractile



contractile power of these Fibres, and partly by that of the Blood-vessels, is restored to near its former dimensions.

CONTENTS OF THE UTERUS ABOUT THE END OF PREGNANCY.

The Contents of the Uterus, towards the end of Pregnancy, consist of the *Fœtus*, the *Umbilical Cord*, *Placenta*, *Membranes*, and *Waters*, all of which are discharged at each Delivery.

The Cord, Placenta, and Membranes, are named the *Secundines*, or *After-birth*, with which some include the Waters, though these are discharged previous to the expulsion of the Child.

The *Cord* is fixed by one end to the Umbilicus of the Fœtus, and by the other it is attached to the Placenta, at a little distance from the middle of this Organ; from which last circumstance the extraction of the Placenta is more easily effected. Tab. CLI.

It is commonly about two feet in length,—sometimes considerably shorter, and often much longer;—but in general it is sufficiently long to allow the Birth of the Child, while the Placenta adheres to the Uterus of the Mother.

Its thickness is nearly equal to that of one's Finger, but it is smaller and weaker at the extremity next the Placenta. It is seldom of a Cylindrical form, being marked with Sulci corresponding to the course of its Vessels.

It is composed of *two Arteries* and *one Vein*, Tab. CLXIII. Tab. CLXIV. the Vessels running in a spiral direction, like the twisting of a rope; in consequence of which the impetus of the Blood is broken in its course to the Child, or to the Placenta.

The Arteries, especially in cases where they have run some way in a straight course, or where they are of unequal length, frequently form short Coils upon themselves. Sometimes there is a knot upon the Cord. Now and then the Navel String forms one or more turns about the Neck of the Child. Sometimes, though very rarely, there is only a single Artery.

The Trunks of the Vessels are not provided with that strong external covering belonging to Blood-vessels in other parts of the Body, but are inclosed in a *Gelatinous*, *Ropy*, *Cellular Substance*, which adds to the strength and elasticity of the Cord, and allows the Blood to pass freely between the Fœtus and Placenta, without being in danger of interruption from pressure.

The *Vein* is much larger than the Arteries, its area being about equal to the area of both of these. It is destitute of Valves, and sends off no Branches while running in the Cord.

It arises from the Substance of the Placenta, and, after perforating the Umbilicus, it passes in the inferior part of the Ligamentum Suspensorium, to the under side of the Liver. Tab. CLI. Fig. 3. Tab. CLXIV.

The *Arteries* arise from the Iliac Arteries of the Fœtus, perforate the Umbilicus, Tab. CLXIV. and run to the Placenta, in the Substance of which they divide into their ultimate Branches, but send off no Ramifications in their course through the Cord. When they reach the Placenta, the Trunk of the one Artery frequently forms a large Anastomosis with that of the other, and the Ramifications of the Arteries communicate with those of the Vein, in the manner Arteries and Veins do in other parts of the Body.

The Cord, by means of the Vein, conveys pure Blood, of a Vermilion colour, from the Placenta, for the nourishment of the Fœtus, and, through the medium of the Arteries, returns what is not used in Nutrition, and which is here of a purple colour, again to be mixed with the Blood of the Uterus.—By the intervention of the Cord, also, the Placenta is more readily extracted.

The *Placenta*, or *Cake*, or *After-birth*, is a Spongy Mass, of a round form, though sometimes oval, or oblong, occupying near a fourth part of the Ovum, and is common to the young of many other Animals. Tab. CLIII.

It is about seven or eight inches in breadth, and upwards of one inch in thickness, though nearly the double of that when minutely injected; but is thinner at the edges where the Membranes go off. While attached to the Uterus, it is concave next the Child, and convex towards the Womb.

The external Surface, or that next the Uterus, is divided into Lobules with Fissures between them, while the Internal, or that next the Fœtus, forms a regular Mass, which has numerous large Branches of the Umbilical Vessels spreading out upon it in a radiated manner, and afterwards plunging into its Substance. After a good injection of the Blood-vessels of the Placenta, we observe,—on the side next the Child,—the Ramifications of the Umbilical Vessels, forming the principal part of its Substance, Tab. CLI;—on the side next the Mother,—Branches of the Uterine Arteries, almost of the size of Crow-quills, passing in a convoluted manner between the Uterus and Placenta, and terminating in the latter, Tab. CLVI;—Veins corresponding with these Arteries, but flat and of great size, running obliquely from the Placenta to the Uterus,—and, in the Substance of the Placenta, an appearance which has been supposed by many Authors to be common Cellular Membrane, of a tender nature, and easily ruptured by Injection, but which is considered by late Writers as a regular Spongy Substance, similar to that in the Body of the Penis, and, as in that Organ, the Cells communicating freely with each other.

The Placenta is connected to the Uterus on one side by Blood-vessels and by the Decidua, and to the Fœtus on the other, by means of the Umbilical Cord.

The common place of attachment is near the Fundus Uteri; though it is found at different times adhering to all the other parts of the Uterus, not even the Os Tincæ excepted.



In the case of Twins, there is sometimes only one, but most frequently two distinct Placentæ, adhering together by the intervention of a Membrane in which the Vessels of the two Placentæ occasionally communicate with each other.

There are in this case also two distinct sets of Membranes, which form two Apartments, separated by a Partition; each Apartment containing its own Fœtus, Waters, and Cord. Tab. CLX.

The Placenta receives Blood from the Uterus for the nourishment of the Fœtus, and, according to the opinion of modern Anatomists, purifies the Blood, in the same manner as the Lungs do in the Adult. In proof of which it is observed, that the Blood passing through the Umbilical Vein to the Child is of a pure Vermilion Colour, while that returning by the Arteries to the Placenta has all the qualities of Venous Blood.

SCHREGER supposes that the Uterine Arteries secrete a Serum, which is discharged into Cells in the Placenta, and that this is absorbed by Lymphatic Vessels existing in the Placenta and Umbilical Cord.

DR LAVAGNI has found, that the Blood collected from the Umbilical Vein contains a considerable proportion of Fibrin, while that from the Umbilical Arteries contains a very small proportion, from which he concludes, that the Uterus, in a gravid state, acquires the power of furnishing Blood provided with Fibrin, which is abstracted from it by the Embryo, for its own use.

The Membranes consist of the *Spongy Chorion*, or *Decidua*, the *True Chorion*, and the *Amnios*; and these are so closely connected to each other, as to appear at first sight as a single Layer; but they can be readily peeled off from each other.

The Placenta and Membranes form a complete Bag, which lines the Cavity of the Uterus, and incloses the Fœtus, Umbilical Cord, and Waters. Tab. CLX.

The *Spongy Chorion* is a thick opaque Substance, which adheres to the inner Surface of the Uterus, but separates from it at each Delivery. It forms the outer Layer of the Ovum, but scarcely penetrates between the Lobules of the Placenta, though, in the early Months, it enters more into the composition of that Substance.

Between the Uterus and Placenta it is less distinct than elsewhere, being perforated there, and in some degree concealed by the Blood-vessels proceeding from the inside of the Uterus.

It has a Spongy and Villous appearance, and is full of small Blood-vessels, which can be readily injected from those of the Uterus.

The *True Chorion* is thinner, smoother, and much denser, than the former, and is connected with the *Spongy Chorion* as far as the edge of the Placenta, where it separates from it. It is next reflected over that Surface of the Placenta which is opposed to the Fœtus, and is afterwards continued over the whole of the Cord, and terminates at the Umbilicus.

It is uniform in its texture, has a transparent appearance, adheres to the *Spongy Chorion* and Surface of

the Placenta by a delicate Cellular Substance, and has no Vessels visible to the naked Eye, or which can be injected.

The *Amnios* lines the whole Surface of the *True Chorion*, and, with it, is reflected from the Placenta over the whole length of the Cord, which it supplies with an external Covering.

It is thinner, (but at this period stronger), more dense, and transparent, than the *Chorion*, to which it adheres every where by a tough Jelly.

It is smooth and polished on the side next the Fœtus, and is destitute of Blood-vessels.

The Membranes, besides containing the Child and Waters, give origin to the latter, and, in the time of Labour, assist in opening the Orifice of the Uterus.

The *Waters*, called *Liquor Amnii*, are thinnest and clearest in the first Months, after which they acquire some degree of colour and ropiness.

The *Liquor Amnii* is chiefly composed of the Serum of the Blood. It has a slight whitish or yellowish tint, a weak pleasant odour, and a saltish taste. In its natural state, it has all the characters of the *Liquor Pericardii*, or of the *Liquors* exhaled from the Surfaces of other Membranes similar to the *Pericardium*. According to late Experiments, it consists, in 100 parts, of 98.8 of Water, the remaining 1.2 parts being Albumen, Muriate of Soda, Soda, Phosphate of Lime, and Lime.—It is supposed to be derived from the Exhalent Arteries of the *Amnios*.

It is proportionally greater in quantity in the first than in the last Months; at the full time there are generally about a couple of pounds; the proportion and quantity varying considerably in different Women, and in the same Woman in different Pregnancies.

Between the *Amnios* and *Chorion*, Water is frequently collected, but in much smaller quantity than in the *Amnios*, and is termed *False Water*, or *False Delivery*.—It is commonly discharged before the Birth of the Child. Frequently it comes away some days previous to this without any danger.

The *Liquor Amnii* defends the Child and Umbilical Vessels from the pressure of the Uterus, assists in distending the Uterus during Gestation, and allows the Fœtus a certain degree of motion; but forms no part whatever of the nourishment of the Child, that being accomplished entirely by the Blood from the Umbilical Vein. Nor does it appear that any part of the *Liquor Amnii* is swallowed by the Child, as full-grown Fœtuses have in different instances been born without a Mouth.

In the time of Labour, it also assists in dilating the Mouth of the Uterus, and, by lubricating the Vagina, facilitates Delivery.

#### POSITION OF THE FŒTUS.

In the first Months, the Embryo swims in the *Liquor Amnii*, free from the pressure of the surrounding parts; —and



—and from many Dissections and Observations made by the latest Anatomists, it is ascertained that the Head preponderates, and in general continues undermost during the whole time of Gestation.

Formerly it was supposed that the Embryo, in the first Months, was situated with the Head uppermost, and that, in the later Months, the attitude of the Fœtus was inverted.

The Fœtus, towards the end of Gestation, is observed to be coiled up into an oval form, so as to be properly adapted to the Cavity of the Uterus. Tab. CLI. CLII. CLV.

The Head is bent towards the Thorax, and the Arms are folded:—The Knees are drawn towards the Abdomen, and the Heels towards the Nates.

The Spine is bent into an Arch, and one side of the Body of the Fœtus is frequently turned forwards.

The Head is placed diagonally, with its long diameter corresponding to that of the Pelvis, and the Occiput opposed to the Os Tincæ.

#### PECULIARITIES OF THE FŒTUS.

ALL the Bones of the Fœtus, excepting a few, are *soft, yielding, and imperfect*, and many of them entirely in a *state of Cartilage*. The Gelatin is observed to be in greater proportion than in Adults, in whom the Fibrin, and Saline Matter found in them, predominate.

The Bones of the Fœtus are uniform on their Surface, while those of the Adult are marked by the Muscles. Their Internal Cavities, at this period, are filled with a Jelly, in place of Marrow.

The Head is *large* in proportion to the rest of the Body, and the Bones of the Cranium are united by *Membrane*, which admits of some alteration in the form of the Head, whereby its Passage is facilitated in the time of Delivery. Tab. XXXII.

The Cranium bears a large proportion to the Face in the Child, owing to the size of the Brain, and the want of Sinuses in the Head, and of Teeth in the Jaws; and the younger the Embryo is, the greater is the disproportion between the Head and the rest of the Body.

Between the Frontal and Parietal Bones, is the space called *Bregma*, formed of a quadrangular Membranous Substance, which commonly disappears before the Child is two years of age, the margins of the Bones being then united.

Between the middle of the Lambdoid, and posterior extremity of the Sagittal Suture, a Membrane of a triangular form is also described, and termed *Posterior Bregma*; but this does not exist in the Head of a sound and healthy Child.

—The other Peculiarities of the Bones of the Fœtus are taken notice of along with the description of the Bones of the Adult.—

The Fluids, in the Fœtus, are proportionably *larger*

in quantity, and the Solids generally *softer*, than in the Adult.

The Skin is of a *bright red colour*, in consequence of its greater degree of Vascularity, and is covered with an Unctuous Substance, which forms a Soap with Alkalis, and is supposed to be secreted from the Vessels upon its Surface.

That part chiefly of the Cellular Membrane is *Adipose*, which is near the Surface of the Body; scarcely any Fat being found in the more interior parts, till the Person arrive at a considerable time of life, when it afterwards gradually accumulates.

The Brain, Spinal Marrow, and Nervous System, are proportionally *larger*, but *softer*.

The Sanguiferous System, and Glandular Organs, are *larger*.

The Cornea is *thicker* and somewhat more *prominent*.

The Pupil of the Eye, in a young Fœtus, is occupied and completely covered by the *Membrana Pupillaris*, which arises from the inner margin of the Iris, Tab. LXXXV. Fig. 12. and continues there till the seventh Month, when it gradually vanishes, in consequence of being absorbed. It is a very Vascular Substance, and separates the two Camerae from each other. According to BLUMENBACH, it keeps the Iris expanded during the rapid increase of the Ball of the Eye.

The Crystalline Lens is almost *Spherical*, and has numerous *Vessels* dispersed upon its Capsule. Tab. LXXXIII. Fig. 4. a. Tab. LXXXV. Fig. 10.

The Meatus Auditorius is wholly *Cartilaginous*, and adheres by its extremity to an imperfect Ring of Bone, in which the *Membrana Tympani* is placed. The Membrane itself is more on a level with the side of the Head than in the Adult, and the Meatus being shorter, is more in danger of receiving injury.

The Meatus Externus, and *Membrana Tympani*, are lined by a *Mucous Membrane*, which is cast off after Birth. Tab. XC.

The Mammæ of the Fœtus in both sexes are in the form of Tubercles, from which a Fluid contained in them may be readily squeezed out.

The Thymus Gland, in the Fœtus, is a *large Substance*, situated in the upper part of the Thorax, between the Layers of the Anterior Mediastinum. Tab. CLXIV.

It lies over the Pericardium, occupies the space where the Aorta sends off the Carotid and Subclavian Arteries, and extends a short way into the fore part of the Neck.

It has *two Long Cornua* above, and *two Broad Lobes* below; is of a pale red colour, and becomes afterwards of a darker hue.

A *white Serous Liquor* can frequently be pressed from its Substance; but it has never yet been observed to have any Excretory Duct; nor is the use of the Fluid, nor of the Gland itself, yet ascertained.

Some Anatomists are of opinion, that the white Fluid is



is Chyle sent by a retrograde motion from the Thoracic Duct, and that the Thymus Gland is a Diverticulum to the Chyle, when too great a quantity of Lymph is sent to the Subclavian Vein.

Part of the Thymus Gland frequently remains distinct in young Adults; but in Persons advanced in life, it is so completely absorbed, that scarcely any thing but Cellular Substance remains in its place.

The Blood-vessels of the Thymus are Branches of the Subclavian and Internal Mammary; the Nerves come from the Great Sympathetics and Eighth Pair.

Its Lymphatics have not yet been very accurately traced.

The Lungs are small, firm, and dense, of a dark red colour, their weight to Water is as 22 to 21; they therefore *sink* when thrown into it, in consequence of the Bronchial Cells having not yet received Air, no Respiration taking place in the Womb. But if Air be admitted to them, by Putrefaction or otherwise, they *swim* in Water, in the same manner as if Air had been conveyed to them in consequence of Respiration.

From the observations of DR HUNTER on the uncertainty of the signs of murder in cases of concealed Labours, published in the 6th Volume of Medical Observations and Inquiries, it appears, that when Air has been respired, the Air-bubbles are hardly visible to the naked eye, while, in cases of Air existing in the Lungs from Putrefaction, the Air-bubbles are large, and are apt to run in lines between the Lobules of the Lungs;

That if a Child make but one gasp and instantly dies, the Lungs will swim in Water as readily as if it had breathed longer, and then been strangulated;

That a Child will very commonly breathe as soon as its Mouth is protruded from the Mother, and in that case may lose its life before its Body is born, especially in tedious Labours, that children are frequently born, who, from circumstances in their Constitution, or in the nature of the Labour, are but barely alive, and after breathing a short time die, in spite of all attention.

That when a Woman is delivered by herself, a strong Child may be born alive, and die in a few minutes from Suffocation, either by being upon its Face in a pool made by the natural discharges, or by wet cloths collapsing over it, and preventing it from breathing.

The Heart, in the Fœtus, is proportionally larger and more conical than in the full-grown Person. The Valve of EUSTACHIUS is *distinct* and *entire*, though frequently Cribriform in the Adult; is *larger* in proportion, and is supposed to direct the principal part of the Blood of the Inferior Cava directly through the Passage termed Foramen Ovale to the Left Auricle. Tab. CLXV. CLXVI.

In the back part of the Septum, between the Right and Left Auricles, is the *Foramen Ovale*, nearly equal in size to the Mouth of the Inferior Cava, bounded by a thick Muscular edge, termed *Annulus Foraminis*

*Ovalis*. Tab. CLXVI. Tab. CLXVII. Fig. 2. Tab. CLXIII. Fig. 8. 9.

The Foramen Ovale is placed obliquely, and has a loose floating Membrane upon the left side of it, which forms a distinct Valve, somewhat of a Crescentic form. This is more conspicuous some months before Birth than after it. By means of the Valve, and that portion of the partition of the Auricles, which constitutes the upper part of the Annulus Fossæ Ovalis, a short passage is formed, which allows part of the Blood of the Right Auricle to pass through this opening directly to the Left Auricle, but which completely prevents its return.

The Blood going through the Foramen Ovale, assists in keeping up the balance of Circulation between the two sides of the Heart, till the Lungs be ready to receive it.

The Pulmonary Artery divides into three Branches, the right and left of which run to the Lungs, while the middle one, called *Ductus Arteriosus*, larger than both the other Branches, and its Area nearly equal to that of the Foramen Ovale, passes in an oblique direction to the beginning of the descending Aorta. Tab. CLXV. U.

The Ductus, or Canalis Arteriosus, forms nearly one half of the Aorta, carries part of the Blood of the Right Ventricle into that Artery, without allowing it to pass to the Lungs, and thereby assists the Foramen Ovale in keeping up the balance of Circulation till the Child has breathed; and the Aorta, formed in this manner, receives the force of both Ventricles, by which it is more enabled to drive the Blood through the Umbilical Arteries to the Placenta.

The Abdomen is proportionally larger and more prominent on account of the bulk and nature of its contents, and the Diaphragm is straighter or less convex towards the Thorax.

The Stomach is of a *rounder* form than in the Adult, and commonly contains a small quantity of *Gelatinous Matter*.

The Omentum has a much smaller quantity of Fat between the Layers of which it is composed, than is found in the Adult.

The Valvulæ Conniventes on the inner side of the Small Intestines are only beginning to appear. The Appendix Vermiformis is *larger* in proportion, and is inserted into the extremity of the Colon, which at this time does not project to form a proper Cæcum. Tab. CLXIII. Fig. 5.

The Longitudinal Muscular Bands of the Great Intestines are less distinct in the Fœtus. The Colon, and frequently also the end of the Ilium, are filled with a *greenish-black Fæces*, of a viscid consistence, termed *Meconium*, which is considered to be a mixture of the Bile with Secretions from the Intestines.

The Liver is so *large* as to occupy both Hypochondriac Regions, and to extend some way beyond the Margin of the Thorax. The Right and Left Lobes are



are more nearly of an equal size than in the Adult. Tab. CLXIV.

The Gall-Bladder is filled with a Fluid of a dark green colour and bitter taste.

The *Umbilical Vein* passes from the Umbilicus, in a duplicature of the Peritoneum, behind the Recti Muscles, to the Fossa Umbilicalis of the Liver, and thence to the Left Branch of the Vena Portæ, and carries the Blood from the Placenta to the Liver. Tab. CLXV.

From the Trunk of the Umbilical Vein, where it terminates in the Liver, a Branch called *Ductus vel Canalis Venosus*, runs somewhat in a waving direction, and joins the Left Vena Hepatica, where that Vein enters the Cava. Tab. CLXV. o.

The Ductus Venosus is much smaller than the Trunk of the Umbilical Vein, and carries part of the Blood of that Vein directly to the Heart, without allowing it to enter the Circulation in the Liver.

The Umbilical Vein sends Branches to the Right Lobe of the Liver, but is principally distributed through the Left Lobe; while the Right Branch of the Vena Portæ carries the principal part of the Blood of the Splenic and Mesenteric Arteries to the Right Lobe of the Liver, a small portion only going to the Left Lobe by the corresponding Branch of the Vena Portæ. Tab. CLXV.

After Birth, the Left Lobe of the Liver, which was formerly more particularly supplied by the Umbilical Vein, receives an additional proportion of Blood from the Vena Portarum.

The reason why the Umbilical Vein goes partly to the Cava, and not entirely to the Heart, is not understood.

The Pancreas, like the other Glandular Viscera, is also somewhat enlarged in size.

The Kidneys are irregular on their Surface, being formed of *Lobes*, the number nearly corresponding with that of the Papillæ in the Kidney of the Adult.

Each of the Lobes consists of a Cortical and a Medullary part, with a Papilla, and is covered by a proper Membrane. Tab. CLXV. CXXX.

The Glandulæ Renales are almost as *large* as the Kidneys, but afterwards rather diminish than increase in size. Tab. CLXV. CXXX.

The Pelvis of the Fœtus is commonly so *small*, that the principal parts of the Viscera afterwards lodged in it, are at this time contained in the Cavity of the Abdomen. The longest diameter of the Pelvis is between the Ossa Pubis and Os Sacrum.

The Bladder of Urine is of a *long* form, and extends almost to the Umbilicus. The greater part of it is above the Pelvis, and is more particularly covered by the Peritoneum than in the Adult. The Urethra arises more directly from the lower Extremity of the Bladder than in the full-grown person.

The Muscular Coat of the Bladder is proportionally

a little thicker and more irritable than in the Adult, in consequence of which the Urine is voided more frequently, and with greater velocity, in the Child.

The Urachus, which is of a *Conical form* and *Fibrous texture*, ascends from the bottom of the Bladder, between the Umbilical Arteries, and between the Peritoneum and Linea Alba, to the Umbilicus, and vanishes by degrees in the Umbilical Cord. Tab. CLXIII. Fig. 3. Tab. CLXIV. T.

It is formed by a production of the Fundus Vesicæ, and in the Human Body is a solid Substance, constituting a Suspensory Ligament of the Bladder.

It has been sometimes found hollow at its beginning, and has been said to be so, in one or two instances, throughout its whole length.

In the Fœtal Quadruped, it is a large Tube, which transmits Urine from the Bladder to a Bag called *Allantois*, placed between the Amnios and Chorion.

The common Iliac Arteries divide, on each side, into a *small* External, and *large* Internal Branch, in consequence of which, the lower Extremities are less in proportion than in the Adult.

The principal part of the Internal Iliacs is occupied in forming the *Umbilical Arteries*, which mount by the sides of the Bladder, covered by the Peritoneum, and perforate the Umbilicus in their progress to the Umbilical Cord.

Soon after Delivery, the Foramen Ovale, Ductus Arteriosus, et Venosus, with the Umbilical Vein and Arteries, begin to contract, and are, in general, completely closed, and the Vessels shrivelled into Ligaments, within a year after Birth, though sometimes one or more of them remain open to a much later period.

This obliteration is produced by a contractile power in the parts, by the pressure of the surrounding Viscera, and by the Blood being directed through other channels.

The Testes are lodged, during the greater part of Gestation, in the Cavity of the Abdomen, over the Psoæ Muscles, and a little below the Kidneys. Tab. CLXVII. CLXVIII.

They constitute a part of the Abdominal Viscera, and, in a similar manner with them, are connected to the Body by a Production of the Peritoneum, which forms their Tunica Albuginea.

The Epididymis is placed more upon the back part of the Testicle, and is proportionally larger than in the Adult.

Between the Testicle and Scrotum, a Fibrous and Vascular Substance is extended,—called by MR HUNTER, *Gubernaculum*, vel *Ligamentum Testis*, which he considers as a principal agent in directing the course of the Testicle, and in making way for it in its descent. Tab. CLXVII. Fig. 4. m. Fig. 6. T, T. Tab. CLXVIII. Fig. 1. &.

The Ligamentum Testis is of a conical form, with the large end upwards, and fixed to the under part of the



the Testis and Epididymis, while the Lower Extremity is attached to the inner side of the Scrotum.

About the Eighth Month of Pregnancy, the Testis, by means not yet completely ascertained, passes gradually along to the Scrotum, a Process of the Peritoneum preceding it, which afterwards forms its Vaginal Coat.

Sometimes one or both Testes remain several Weeks after Birth in the Groins; and cases have been found where they have continued during life in the Abdomen.

The Testis, through the whole of its course, continues to be covered by the Peritoneum, is connected to the parts on which it rests, and has its Vessels passing to it from behind forwards, the same as when situated in the Abdomen.

While the Testicle is advancing through the Ring of the Abdominal Muscle, the Ligamentum Testis is found to be in some measure inverted, and to form the under and fore part of the Vaginal Coat, on which the Cremaster is expanded.

After the descent of the Testicle, the Peritoneal Process, which accompanies it, begins to contract at the Ring; and a firm adhesion of its sides, to within a little distance of the Testicle, is commonly found to be produced by the time of Birth, though in some cases it remains open during life.

The Prepuce of the Penis is so long in the Fœtus, as not only to cover the Glans, but to extend some way beyond it.

The Uterus is proportionally longer, and the Fundus Uteri, with the FALLOPIAN Tubes and Ovaria, much higher in the Abdomen than in the Adult, the Ovaria at this time having nearly the same situation with the Testes in the Male.

The External Abdominal Ring in the Fœtus has nearly the same situation with respect to the Crest of the Pubis, as in the Adult Body; but at this time the upper and under Rings are opposite to each other, and almost in contact.

By degrees the Upper Ring changes its position, and is situated nearer the Anterior Spinous Process of the Os Ilium, the Abdominal or Inguinal Canal increasing in obliquity and length, as the Pelvis increases in width.

The Prepuce of the Clitoris is proportionally so much larger in a young Fœtus than it is afterwards, that, in an Abortion, a Female Fœtus has frequently been mistaken for a Male.

#### CIRCULATION OF THE BLOOD IN THE FÆTUS.

The Blood is sent by the Arteries of the Uterus to the Substance of the Placenta, from which, according to the opinion of most of the ancient Anatomists, it passes to the Umbilical Vein by a direct communication of Branches; or, according to that of the greater part of modern Authors,—by Absorption.

By the Umbilical Vein, it goes principally to be circulated in the Liver; a small portion of it passing by the Ductus Venosus to the right Auricle of the Heart.

The Blood sent from the Inferior Cava is transmitted first to the right Auricle, then the larger portion of it goes by the Foramen Ovale, directly to the left Auricle; while the rest of it, with that of the Superior Cava, is transmitted to the right Auricle and Ventricle, and from thence to the Pulmonary Artery.

From the Pulmonary Artery one portion of it passes, by the Right and Left Pulmonary Branches, through the Lungs, as in the Adult, and another goes by the Ductus Arteriosus to the Aorta Descendens.

From the Lungs it is returned by the Pulmonary Veins to the left Auricle, where it mixes with that coming from the right Auricle by the Foramen Ovale. It goes through the Foramen Ovale in such proportions, as to allow equal quantities of Blood to circulate through the right and left sides of the Heart at the same time. The Blood is afterwards sent by the Aorta to the different parts of the Body, to be returned by the Veins.

From the Iliac Arteries, it is conveyed by the Umbilical Arteries to the Substance of the Placenta, where one portion of it returns by corresponding Veins to the Fœtus, the rest going to the Uterus in the manner it was discharged from the Uterine Arteries to the Branches of the Umbilical Vein.



## T A B L E CXLVII.

Represents the Changes produced in the OVARIIUM after Impregnation, and the appearance of the HUMAN OVUM.

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|--|---|
| FIG. 1.<br>A Hole in the Ovarium, five Months after Impregnation.          | FIG. 7.<br>A Corpus Luteum in the Ovarium two Weeks after Delivery.   |
| FIG. 2.<br>A Hole in the Ovarium, also five Months after Impregnation.     | FIG. 8.<br>A Corpus Luteum in the Ovarium some time after Delivery.   |
| FIG. 3.<br>A Hole in the Ovarium after Impregnation.                       | FIG. 9.<br>An Ovum about six Weeks after Impregnation, from which the Filamentous Covering has been almost entirely separated.  |
| FIG. 4.<br>A Hole in the Ovarium at the end of four Months after Delivery. | FIG. 10.<br>An Abortion of seven Weeks covered by the Filamentous Coat.   |
| FIG. 5.<br>A Corpus Luteum in the Ovarium, six Months after Impregnation.  | FIG. 11.<br>Represents an Extra-Uterine Fœtus of four Months, extracted from one of the FALLOPIAN Tubes. Probes are put into the Mouths of the Tubes, one of which, that contained the Fœtus, is seen much dilated. A Placenta and Membrane exist here, as in a Natural case. |
| FIG. 6.<br>A Corpus Luteum in the Ovarium immediately after Delivery.      |   |



Fig. 1.

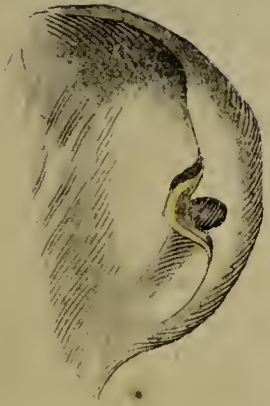


Fig. 2.

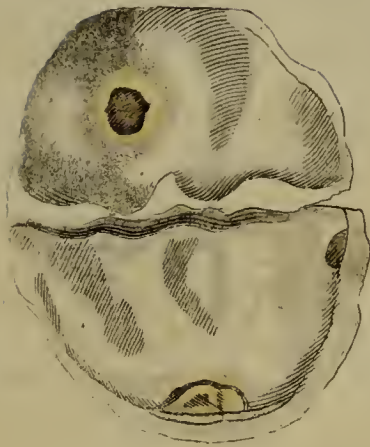


Fig. 3.



Fig. 4.

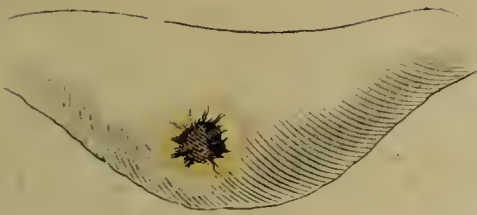


Fig. 5.

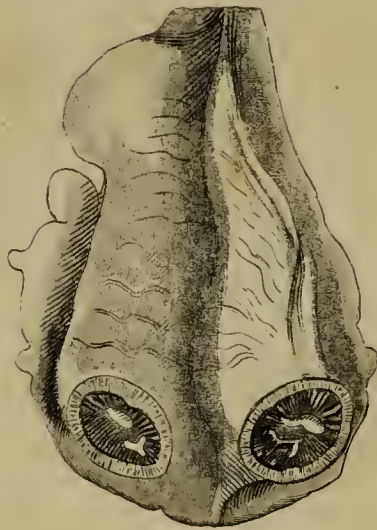


Fig. 6.



Fig. 7.



Fig. 11.

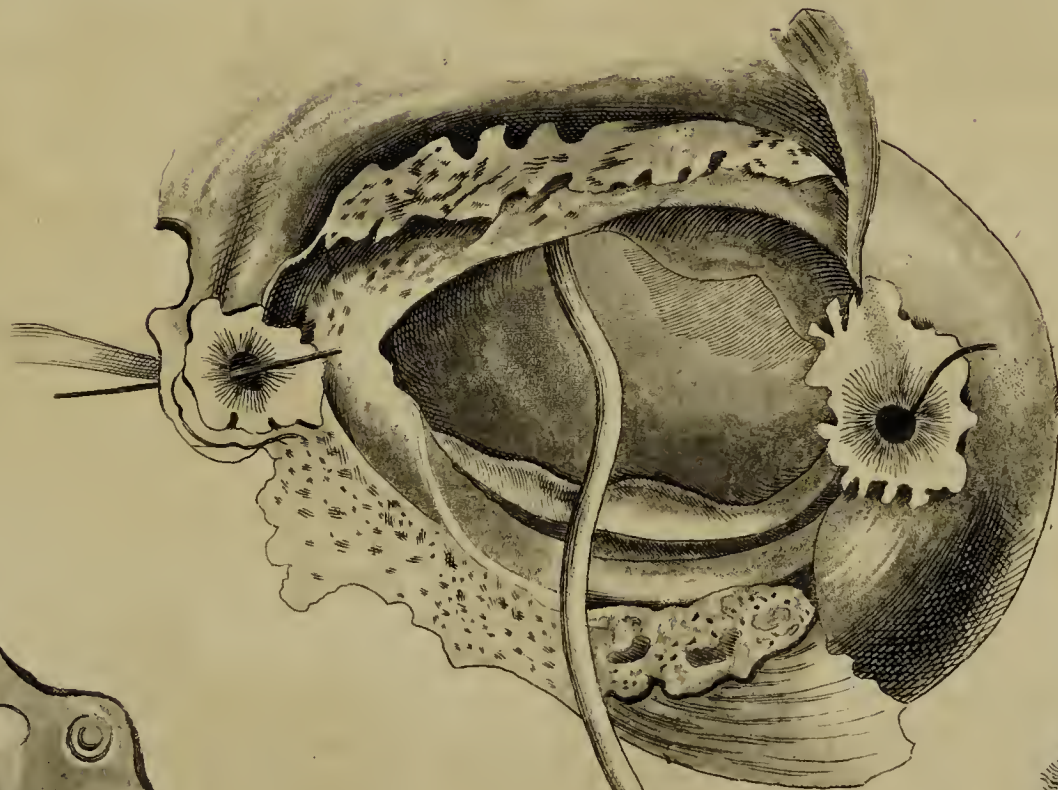


Fig. 9.



Fig. 8.

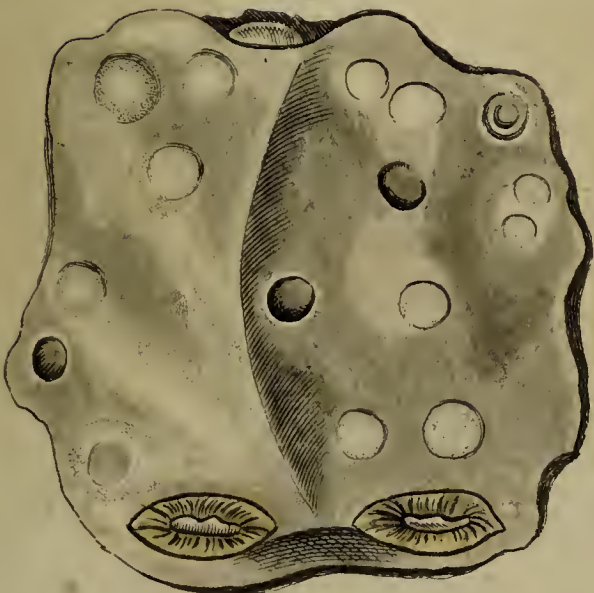
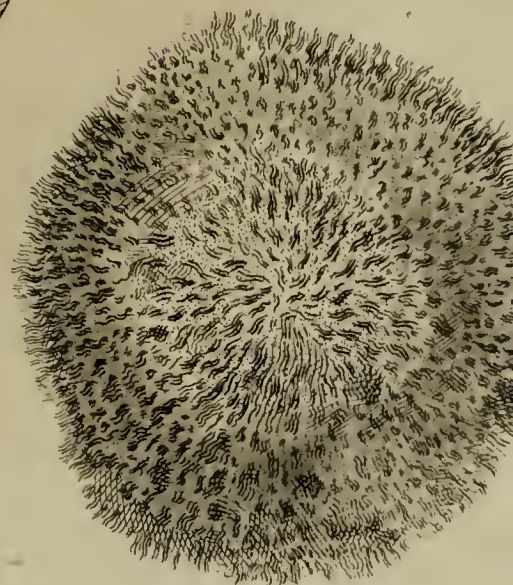
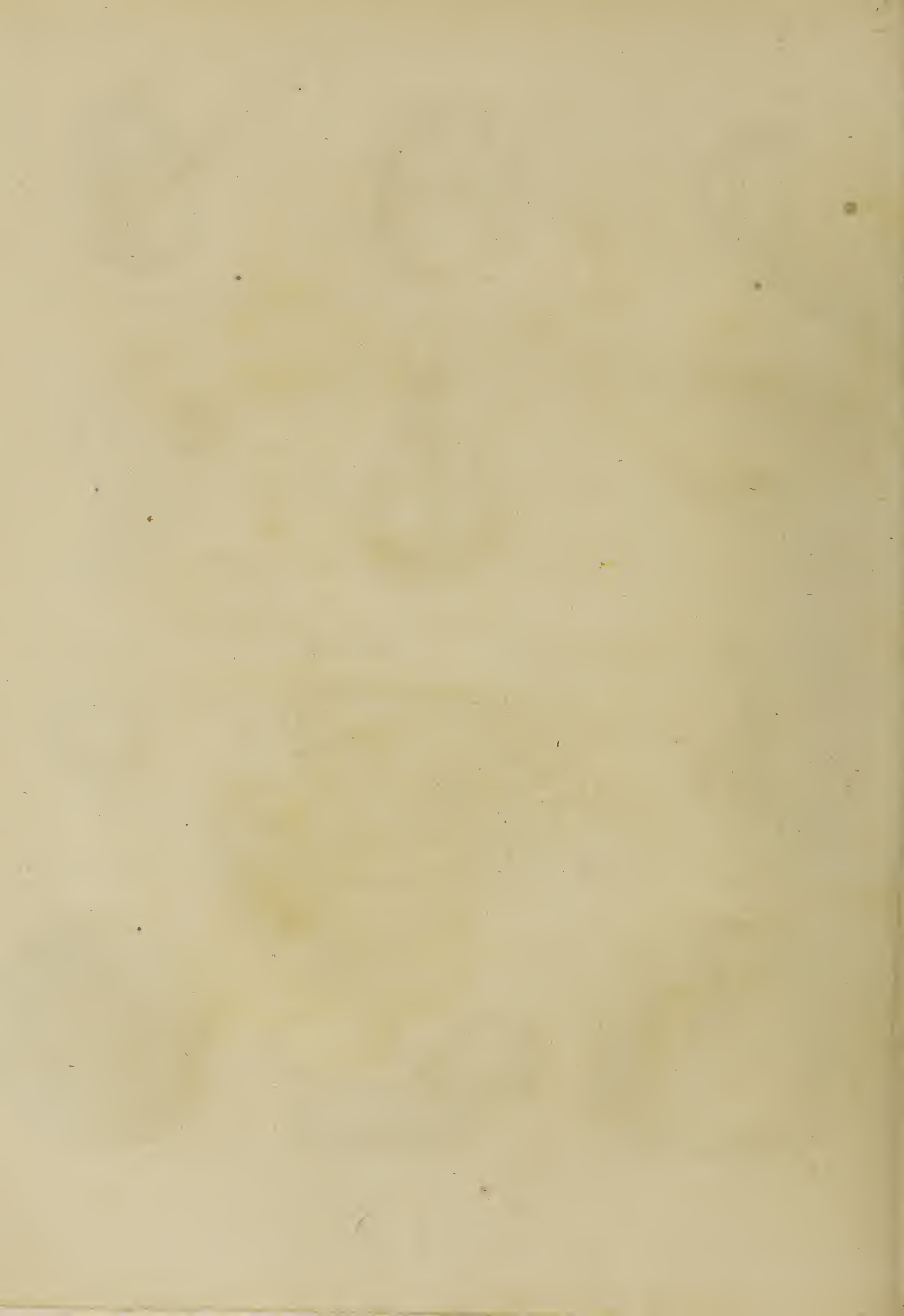


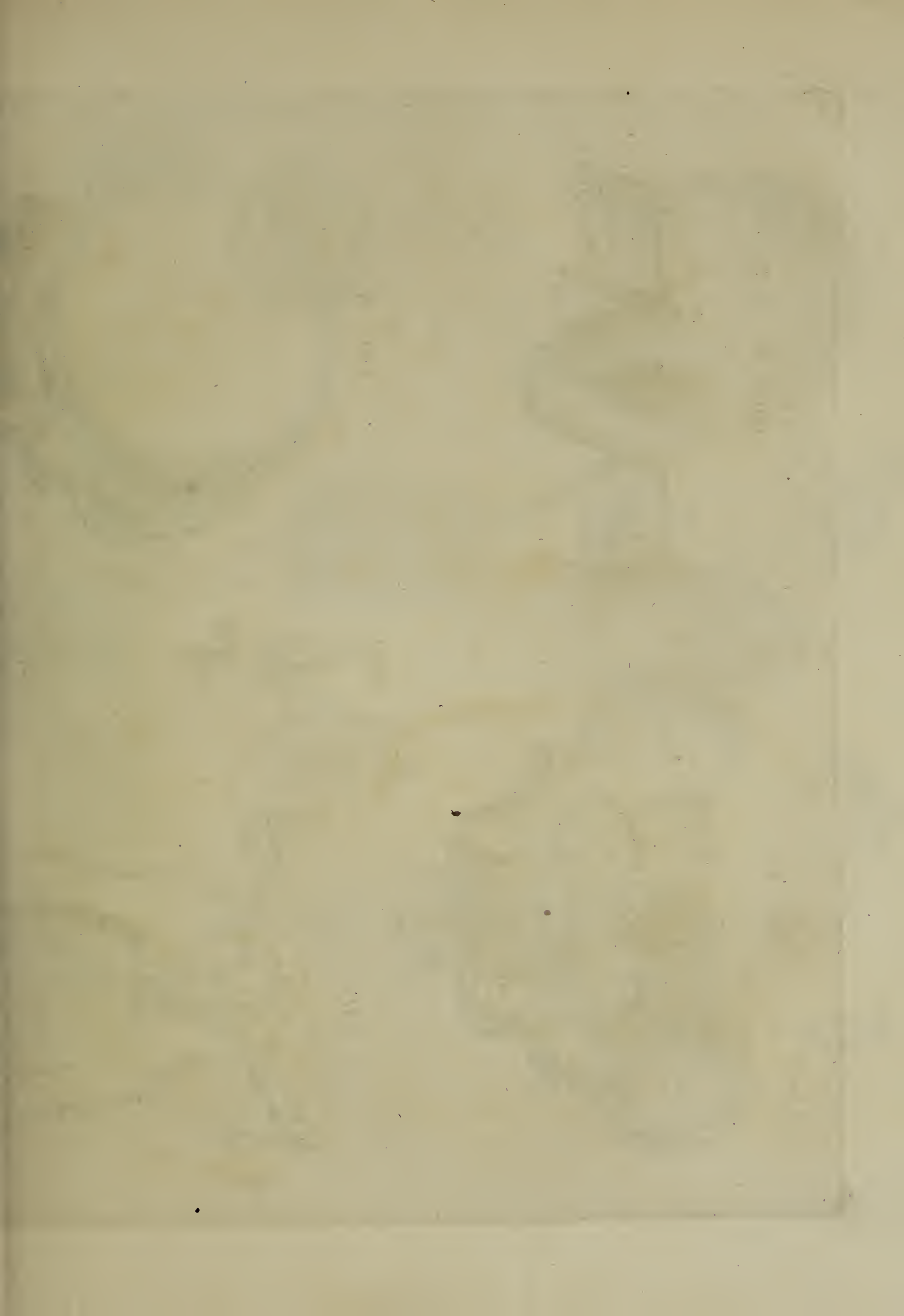
Fig. 10.













TAB. 148.

FIG. 1.



FIG. 2.



FIG. 5.

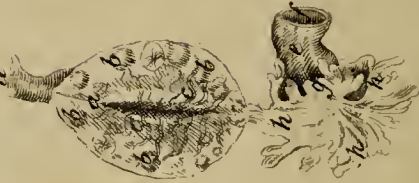


FIG. 6.



FIG. 3.



FIG. 4.





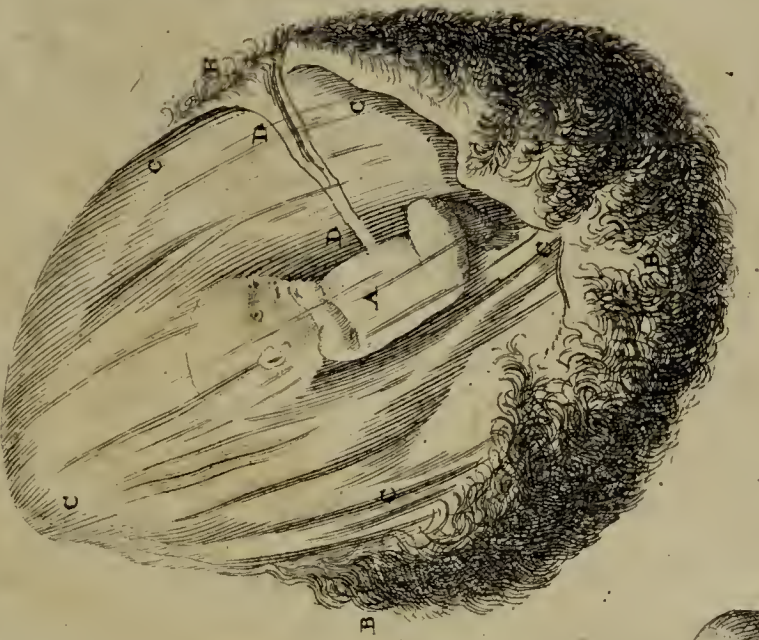
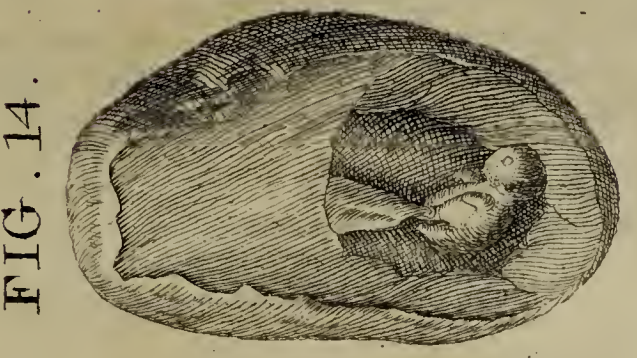
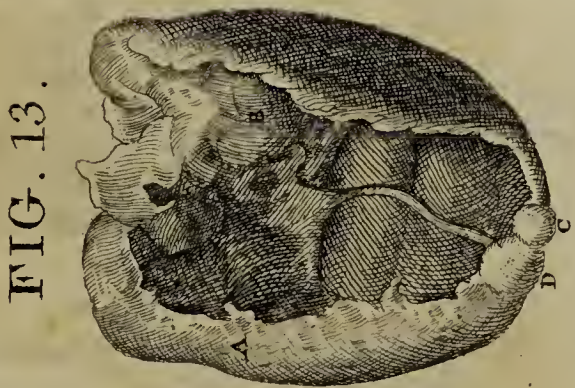
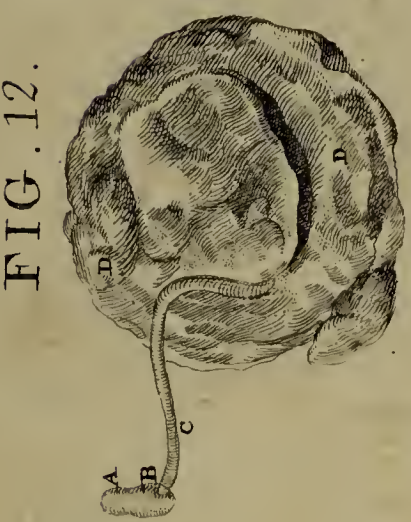
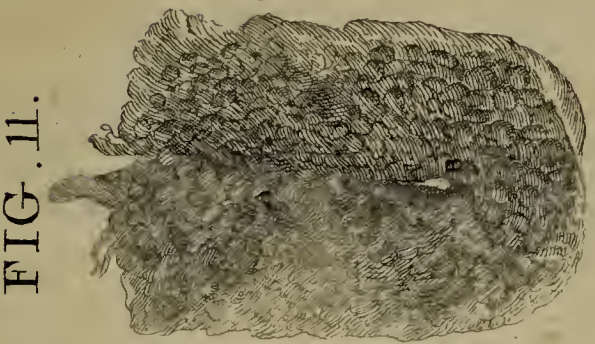
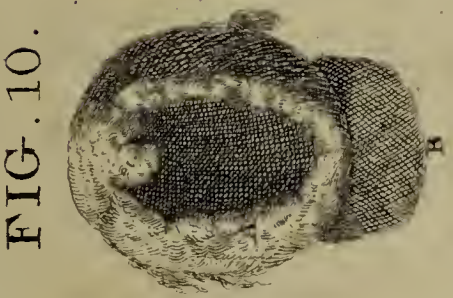
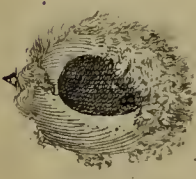
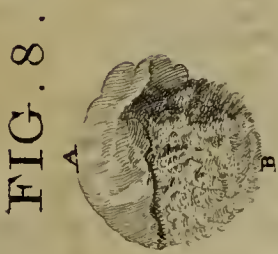
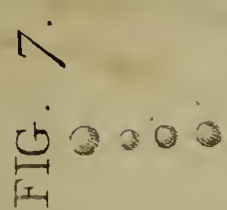
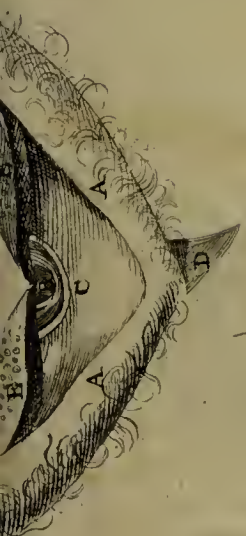


FIG. 8.

FIG. 10.

FIG. 11.

FIG. 12.

FIG. 13.

FIG. 14.

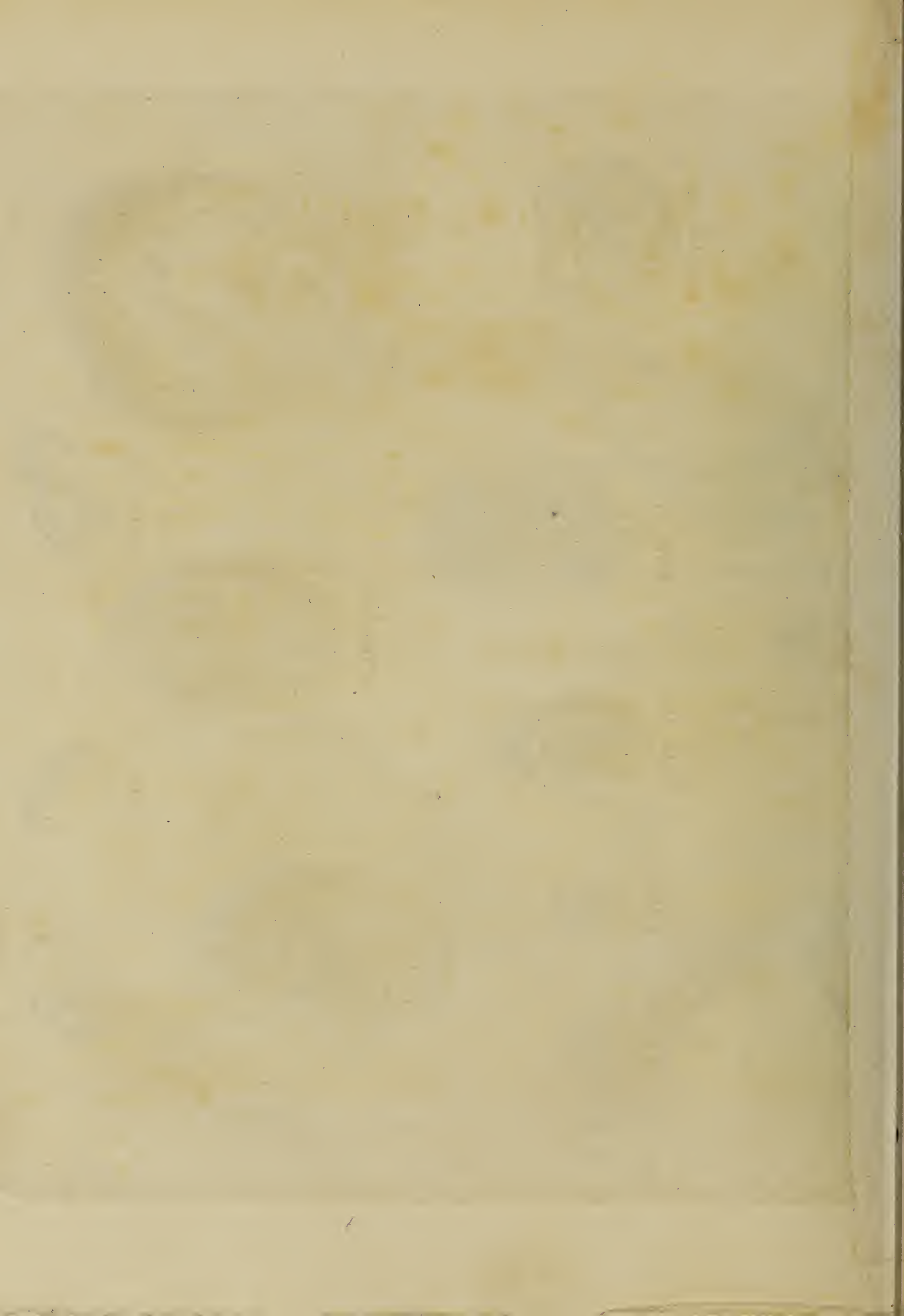
FIG. 15.

FIG. 16.

FIG. 17.

FIG. 18.







# T A B L E CXLVIII.

VIEWS of the FEMALE PARTS of GENERATION, and of the FŒTUS in EMBRYO.

---

## FIG. 1.

*A View of the FEMALE PARTS of GENERATION in situ.*

- A, A, The upper part of the os sacrum.
- B, B, The ossa ilia.
- C, C, Their connexion with the os sacrum.
- D, D, The ossa pubis.
- E, The symphysis of the ossa pubis.
- F, F, The tuberosities of the ossa ischia.
- G, G, The foramina thyroidea.
- H, H, The acetabula for the articulation of the thigh-bones.
- I, I, The brim of the pelvis.
- K, The intestinum rectum.
- L, The uterus.
- M, M, The FALLOPIAN tubes.
- N, N, The fimbriæ of these tubes.
- O, O, The ovaria, concealed by the ligamenta lata of the uterus.
- P, P, The ligamenta rotunda uteri.
- Q, Q, The insertion of the round ligaments into the pubes.
- R, The upper part of the bladder of urine.
- S, The vagina.

## FIG. 2.

*A View of the Uterus a few days Pregnant.*  
Explained Tab. CXL. Fig. 1.

## FIG. 3.

*A View of the FEMALE PARTS of GENERATION, the UTERUS and VAGINA being laid open Posteriorly.*

- A, A, The labia pudendi separated and turned downwards.
- B, The glans clitoridis;
- C, Its prepuce.
- D, The superior part of the ligamentum suspensorium clitoridis.
- E, E, The nymphæ, with their sebaceous glands.
- F, The meatus urinarius, near which are situated the orifices of the mucous follicles, or lacunæ, which belong to the glandular body with which the urethra is surrounded.

G, G, The hymen.

g, g, The extremities of the ducts of the lacunæ, which are placed before the hymen.

H, H, The vagina, with its rugæ.

I, The os tinæ.

K, K, The neck of the uterus, with its mucous follicles and rugæ.

L, L, L, The body and fundus of the uterus, in which are spots, such as MORGAGNI observed in a Virgin who was killed, during her menstrual period, by a blow on the head.

M, M, The extremities of the FALLOPIAN tubes, by which they open into the superior angles of the uterus.

N, N, The ligaments of the ovaria, by which these parts of the tubes next the uterus are covered in this Figure.

O, O, The testes, or ovaria.

P, P, The tubes delineated in that position in which the Author of this Figure most frequently found them.

Q, Q, Small portions of the ligamenta lata.

R, R, The ligamenta rotunda.

## FIG. 4.

*The UTERUS, dissected in such a manner as to shew the Passage of the TUBES into its CAVITY.*

A, A, A longitudinal section of the uterus.

B, B, The fundus of the uterus divided, to shew the entrance of the tubes into its cavity.

C, The origin of one of the tubes.

D, D, The progress of the tubes gradually dilating.

E, E, The ligaments of the ovaria.

F, F, The ligamenta uteri rotunda.

G, The cavity of the uterus.

H, ————— cervix, and its fibrous substance.

I, I, The proper membrane of the uterus.

K, The mouth of the uterus.

L, The contraction of the cervix uteri.

## FIG. 5.

*Shews the OVARIUM, with the annexed Extremity of the FALLOPIAN TUBE.*

a, The ovarium, opened longitudinally in the under part.

b, b, &c. Ova of different magnitudes, contained in the membranous substance of the ovarium.

c, c, Numerous



- c, c*, Numerous blood-vessels going to the ova.  
*d*, The ligament of the ovarium.  
*e*, A section of the FALLOPIAN tube.  
*f*, The cavity of the tube.  
*g*, The orifice in the extremity of the tube.  
*h, h*, The foliaceous part of the tube, attached to the ovarium.

FIG. 6.

*A* View of the UTERUS, some months pregnant, to shew its Proportional Size with respect to the PELVIS, and the height to which it rises above the PUBIS.

- A*, The uterus.  
*B, B*, The uterine tubes.  
*C, C*, The ligamenta lata.  
*D, D*, ————— rotunda.  
*E*, The bladder of urine.

FIG. 7.

*Ova of different Sizes.*

FIG. 8.

*An OVUM fœcundated, excluded from the UTERUS entire.*

- A*, The rudiment of the membranes.  
*B*, ————— blood-vessels forming the elements of the placenta.

FIG. 9.

*A* Fœcundated OVUM, of nearly the same size with that of Fig. 8. opened: No Solid Substance was found in its Cavity.

- A*, The outer vascular part of the ovum;  
*B*, Its cavity.

FIG. 10.

*The Rudiment of a PLACENTA of the minutest HUMAN EMBRYO.*

- A*, The crude element of the vessels.  
*B*, Coagulated blood adhering firmly to this crudity.

FIG. 11.

*The Rudiment of the PLACENTA, to which the EMBRYO adheres by means of the UMBILICAL CORD.*

- A*, The rudiment of the placenta.  
*B*, ————— embryo.

FIG. 12.

*Shews the HUMAN EMBRYO of the size of a Grain of Barley, adhering to the Rudiment of the PLACENTA by means of the UMBILICAL CORD.*

- A*, The head of the embryo.  
*B*, The body, not yet furnished with extremities.  
*C*, The umbilical cord.  
*D*, The rudiment of the placenta.

FIG. 13.

*Shewing the HUMAN EMBRYO, somewhat larger than the preceding, the HEAD of which is already distinct from the BODY, and the beginning of the EXTREMITIES observed in the form of very small Tuberosities.*

- A*, The outer surface of the rudiment of the placenta;  
*B*, Its inner surface.  
*C*, The head of the embryo.  
*D*, The body.

FIG. 14.

Represents the Embryo, still larger than the former, the Head of which is not only distinguishable from the Body, but the Rudiments of the Extremities also appear like large Tubercles; and, which is particularly to be noticed, the Umbilical Cord is nearly equal in thickness to the Embryo itself, which the Author of the Figure reports he has seen oftener than once.

FIG. 15.

*Represents an ABORTIVE FÆTUS of the Third Month, inclosed within its Membranes, as in an Egg, and floating in its own Liquor.*

- A*, The fœtus, with a large head and prominent eyes, as is generally the case in this state, appearing through the transparent liquor and membranes.  
*B, B, B, B*, The exterior layers of the chorion, full of vessels depending like small roots, which the Author of this Figure supposes were first delineated by him.  
*C, C, C, C*, The transparent coats of the fœtus, from which the vascular part has been separated, to shew the fœtus surrounded by its fluid.  
*D, D*, The umbilical cord.

FIG. 16.

*A* Fœtus, with a remarkably thick Umbilical Cord.

FIG. 17.

*A* Fœtus somewhat larger than the preceding. In this Fœtus, both the Fingers and Toes are visible, and the Umbilical Cord is much thinner than in some of the other Figures.

FIG. 18.

*A* Fœtus hanging by a Hair; it is larger than the former, but the Umbilical Cord very little thicker.



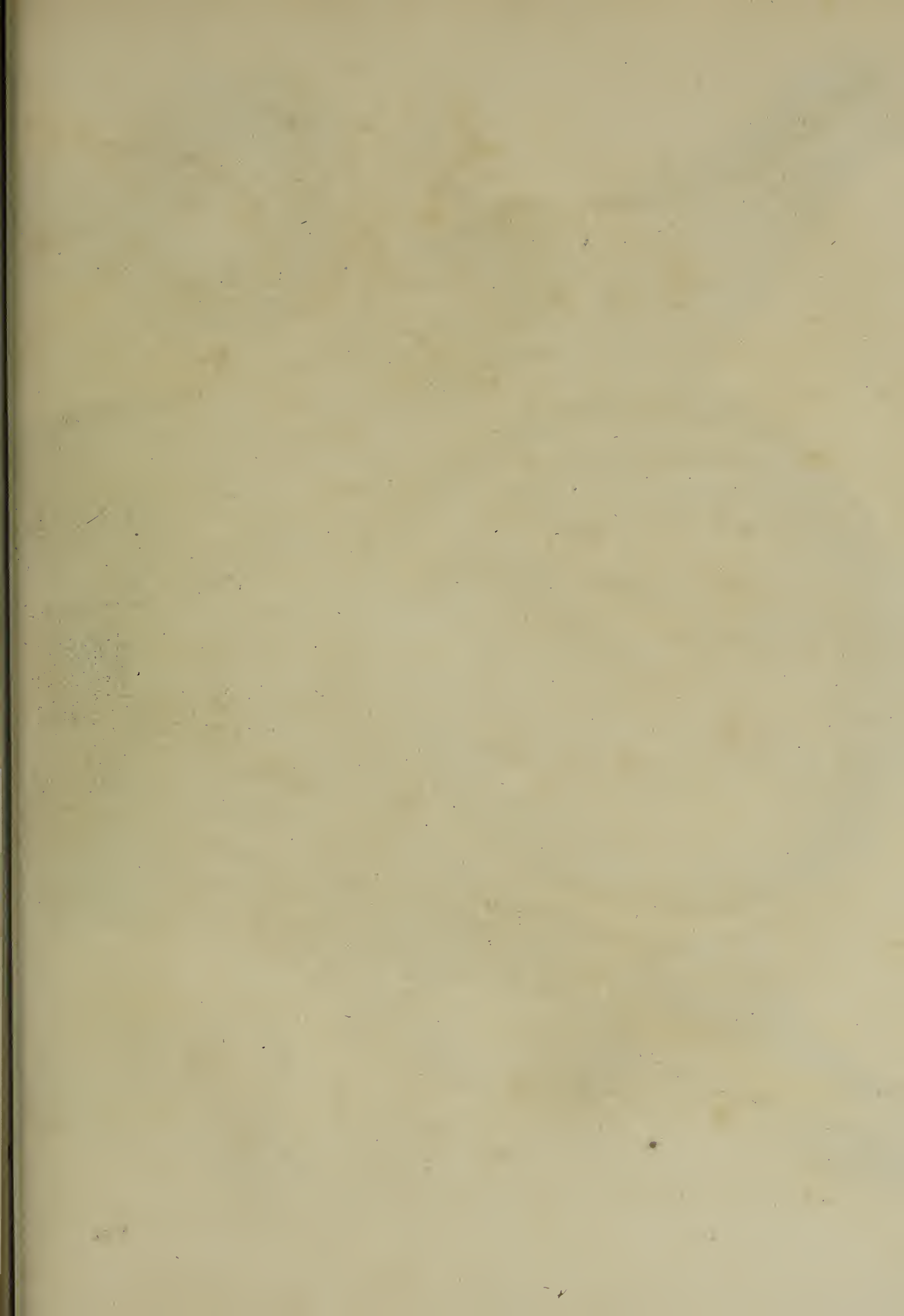






Fig. 3.

Fig. 2.



# T A B L E CXLIX.

## VIEWS of the GRAVID UTERUS.

FIG. 1.

*Represents the FÆTUS in UTERO in the Fourth or Fifth Month; the Fore Part of the UTERUS being cut off.*

- A, A, A section of the ossa innominata, as in Tab. CXXXVIII.
- B, B, A section of the uterus.
- C, The fœtus, with the head turned towards the under part of the pelvis.
- E, E, The umbilical cord.
- F, The placenta,—the side next the fœtus covered by the chorion and amnios.
- G, G, The membranes adhering to the uterus.
- g, g, g, g, The edges of the membranes somewhat detached from the surface of the uterus.
- H, The cervix uteri, from which the bladder has been dissected, shortened.
- I, The os internum uteri.

- K, K, The ligamenta lata.
- L, L, A section of the vagina.
- M, M, Cellular substance.
- N, N, The integuments of the nates.
- O, The anus.

FIG. 2.

A View of the Gravid Uterus in the Second Month, cut in a similar way with that represented in Fig. 1.—In this are to be seen, the Fœtus, the Umbilical Cord and its Branches, with the surrounding Membranes.—The Cervix Uteri is still of its natural length.

FIG. 3.

A similar View to the former, also in the Second Month, but the Parts more evolved, and the Cervix Uteri considerably shortened.



# T A B L E C L.

Exhibits FIGURES of the HUMAN FÆTUS at different Periods.

---

FIG. 1.

*Shews an ABORTIVE OVULUM in the Third or Fourth Week after Impregnation, containing a very small EMBRYO.*

The ovulum is completely covered with tomentum, which is formed of fibres proportionally long and thick, though upon about a third or fourth part of the ovulum they were found shorter and thinner. Among the fibres, little knots are every where interspersed, which are considered as belonging to the placenta. The ovulum was filled with a pure fluid, and contained a very small curved embryo, closely connected to it by a short umbilical cord. From the body, the upper and under extremities project, in the form of tubercles.

FIG. 2.

*An ABORTIVE OVULUM, about six Weeks after Impregnation.*

The filaments covering this are proportionally shorter and thinner than upon the former one, and without knots. The vesicula is of an oval form, and contained a clear fluid, apparently collected from the chorion and amnios. The chorion was found much thicker and harder than the amnios. The embryo adheres to the ovulum by a very short and thick umbilical cord; and is so much bent, that the tuber coccygeum almost touches the head. The size of the head nearly equals the rest of the body, without any appearance of either eyes or mouth. The extremities are in form of globular tubercles, the lower limbs separated by the tuber coccygeum. From the middle of the body, the substance termed *vesicula umbilicalis* arises, by a small filament, and is situated between the amnios and chorion.

FIG. 3.

*An EMBRYO, supposed to have completed the Sixth Week.*

The eyes and mouth are distinct, but no mark of a nose. The extremities are more distinct than in the preceding embryo. The thick umbilical cord is now longer.

FIG. 4.

*An EMBRYO about Seven Weeks, adhering by the Umbilical Cord to its Ovulum.*

The ovulum does not exceed that of the second Figure in size. The flocculi of the membrana decidua are fewer and shorter than in the second ovulum. The embryo immersed in the fluid of the amnios is bent, and larger than the preceding. In the eye the iris is distinguished by its blackness. Poruli mark the place of the nose. The aperture of the mouth is wide. In the upper limbs, the arm and fore-arm can be distinguished. Between the lower limbs, which are less conspicuous than the upper, the tuber coccygeum projects. The umbilical cord is longer, but more slender. The funnel-shaped process of the amnios is distinct round the cord. The sex not yet to be distinguished.

FIG. 5.

*An EMBRYO of full Seven Weeks, contained in an Ovulum of uncommon size.*

The body of the embryo is curved, the eyes, mouth, and nostrils are distinct, but the openings of the ears can scarcely be seen without the assistance of a glass. The abdomen, turgid and prominent towards the umbilicus, ends in the umbilical cord. In the superior extremities, though short, their different parts can be readily distinguished. The lower limbs now extend beyond the tuber coccygeum, but there is yet no appearance of toes. This embryo is supposed to be of the female sex, from two small holes seen in the lower part of the trunk.

FIG. 6.

*A Female EMBRYO, about Eight Weeks.*

The projections of the nose and ears now begin to be visible; the limbs extend beyond the trunk, the toes appear distinct; the umbilical cord becomes longer and smaller.

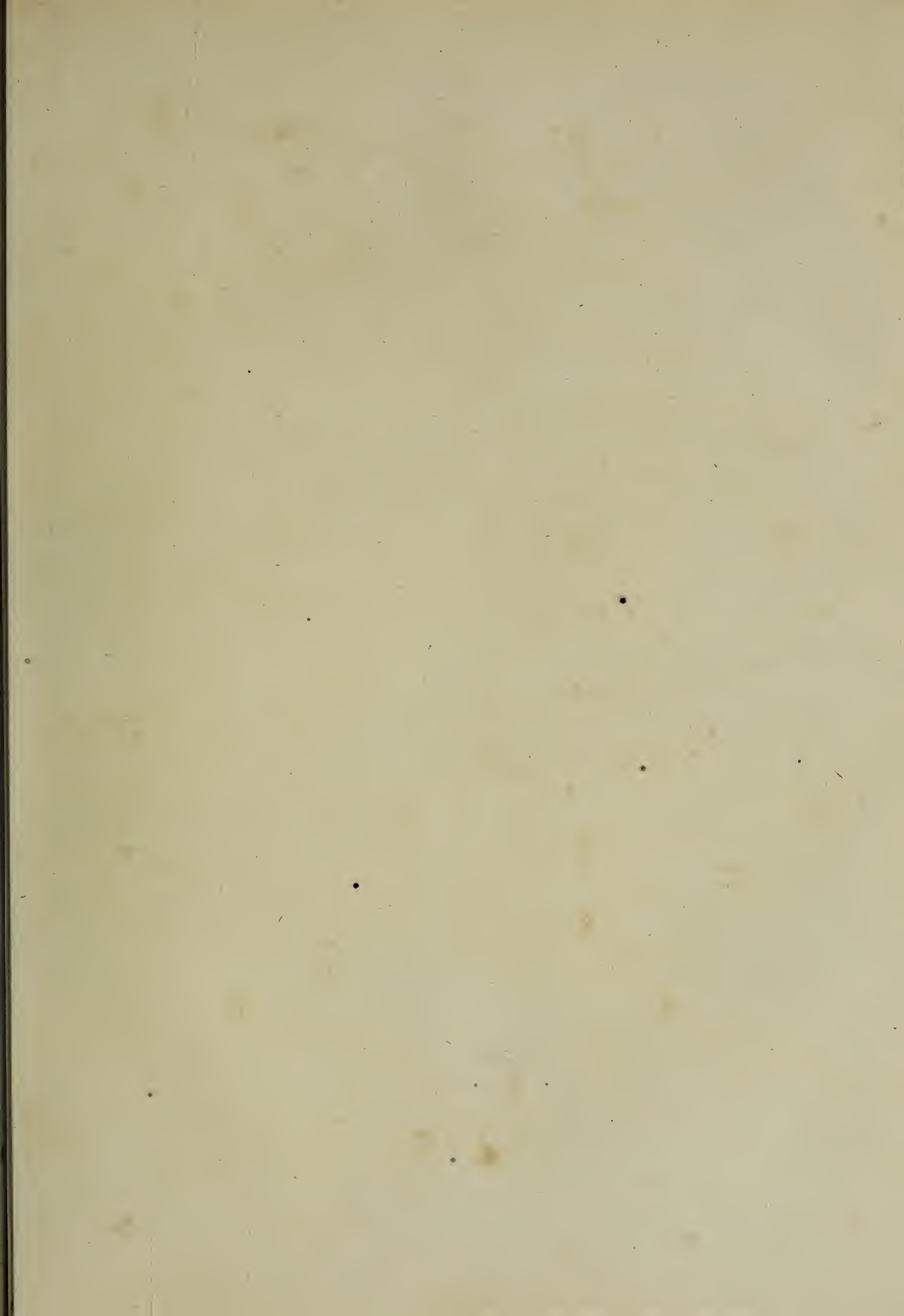
FIG. 7.

*A Female EMBRYO about Nine Weeks.*

The parts seen in the former figure become here more evident. The tuber coccygeum disappears.

FIG.







TAB. 150.

Fig. 1.

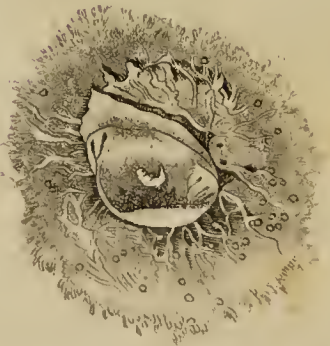


Fig. 2.

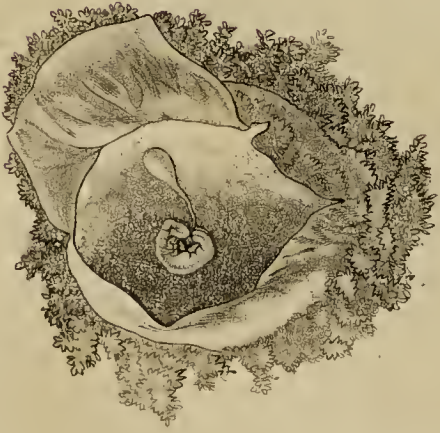


Fig. 3.



Fig. 4.



Fig. 5.

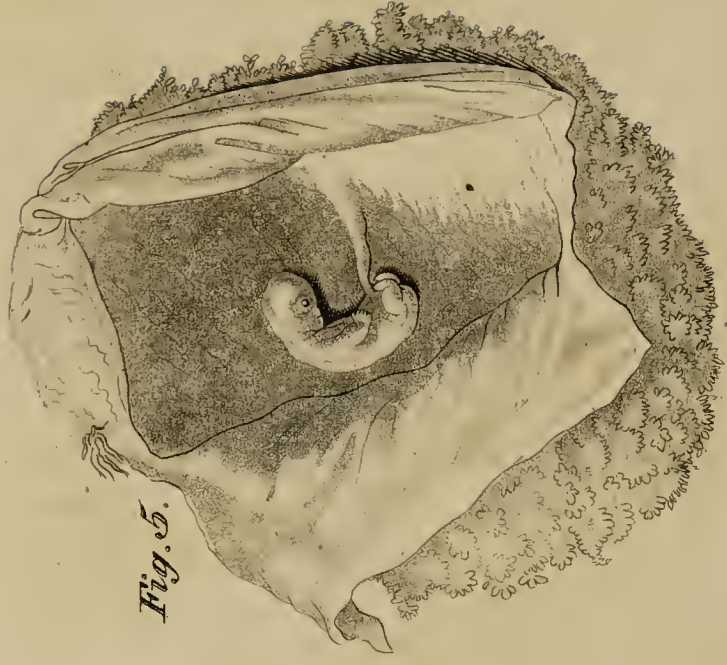


Fig. 6.



Fig. 7.



Fig. 8.



Fig. 9.



Fig. 10.



Fig. 11.

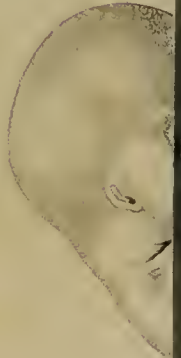


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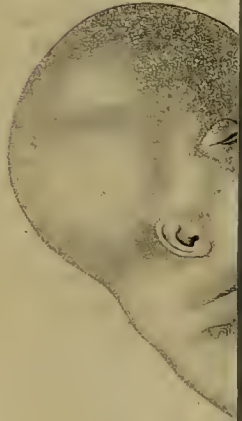
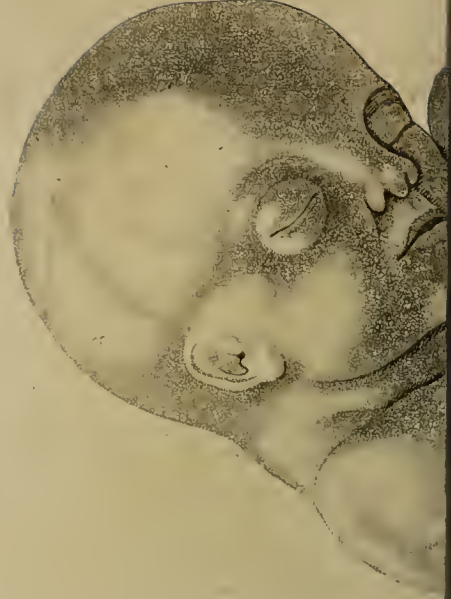


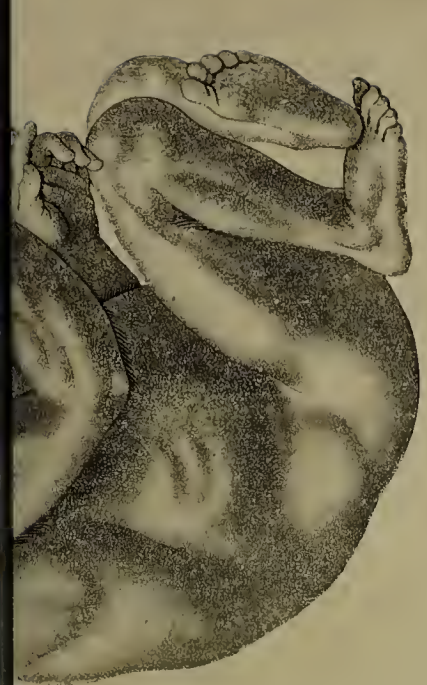
Fig. 13.



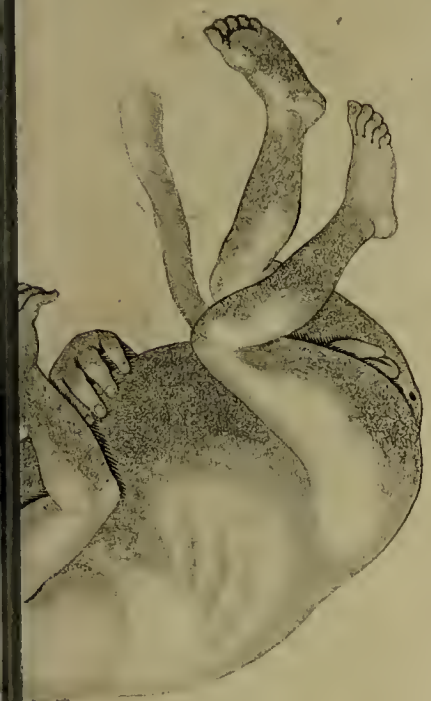
Fig. 14.



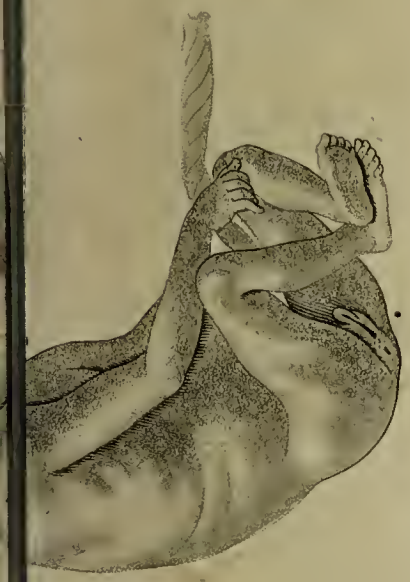




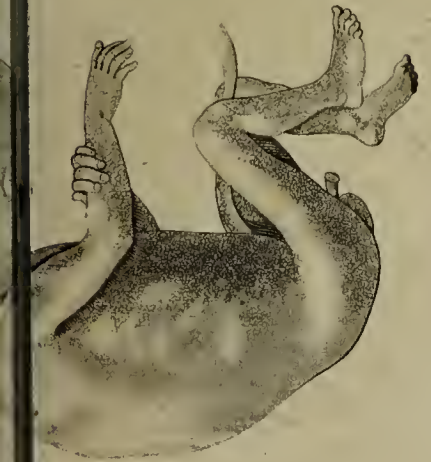
*Fig. 17.*



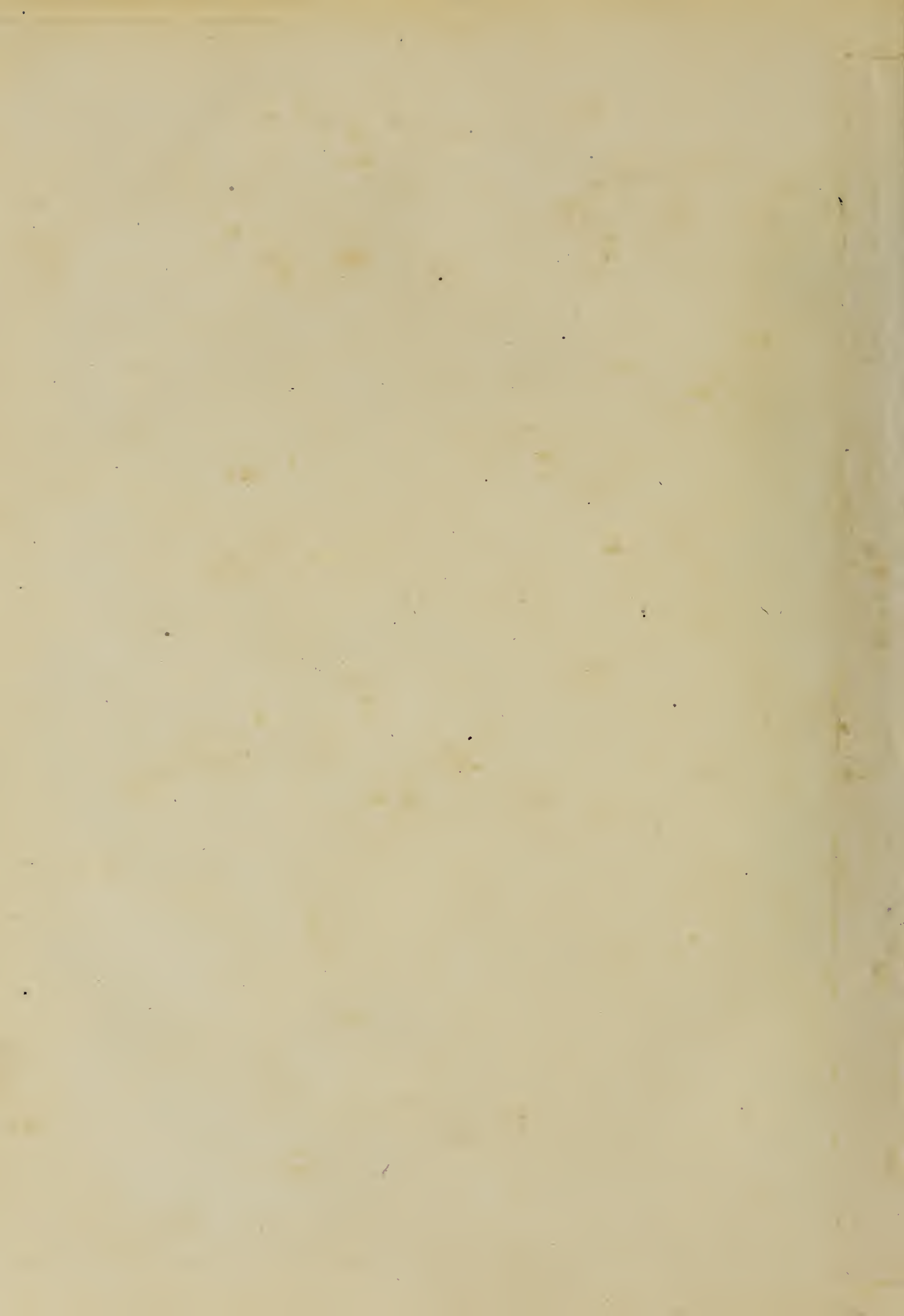
*Fig. 16.*



*Fig. 15.*









## FIG. 8.

*A Female EMBRYO about Ten Weeks.*

The palpebræ now appear, the mouth is almost shut, and the nose projects; the external parts of the body, in general, bear all the marks of the sex.

## FIG. 9.

*A Male EMBRYO, considered to be Eleven Weeks complete.*

The prominences of the nose and ears become now more perfect; the palpebræ are shut.

## FIG. 10.

*A Male FÆTUS, supposed to be Twelve Weeks complete.*

In this, bones appear in the head, trunk, and extremities, and the nails are observed on the fingers and toes. Scarcely any of the tuber coccygeum remains; the penis projects, the scrotum is empty.

## FIG. 11.

*A Male FÆTUS, perhaps exceeding Three Months.*

## FIG. 12.

*A Male FÆTUS, which has nearly reached the Fourth Month.*

The external parts of generation are distinct. The superior extremities are almost of the same length with the inferior.

## FIG. 13.

*A Female FÆTUS in the middle of the Fourth Month; more advanced and fuller than the preceding.*

## FIG. 14.

*A Female FÆTUS exceeding Four Months; much farther advanced than the former.*

## FIG. 15.

*A Male FÆTUS which appears to be Four Months.*

## FIG. 16.

*A Male FÆTUS of Four Months.*

The countenance and thorax in some measure indicating the sex; the penis is somewhat thick, the scrotum is empty.

## FIG. 17.

*A Beautiful well-formed Female FÆTUS of Four Months and a Half.*

The integuments have acquired a proper quantity of fat, the countenance is pleasant, the trunk and limbs well proportioned, the head regular, and a little oval, the fore-head round, the eyes large; the round arms, the hands and fingers, those of a female; the inferior extremities exceeding the superior in size.



## T A B L E C L I.

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FIG. 1.

*The HUMAN OVUM of Five Months discharged entire from the UTERUS, in consequence of the Woman having received a kick upon the Belly.*

In describing the ovum, the situation is here chosen, in which most of its parts, without changing their place, might appear through the pellucid membranes. The half of the surface of the ovum appears, which belonged to the inner and left side, while it remained *in utero*; from which it is to be observed, that the head of the foetus occupies the lowest part of the uterus; that it is turned towards the left and back part of the pelvis; and that the ovum has the form of the hollow pregnant womb, to which it clings. The liquor is less in proportion to the size of the foetus than in early gestation, but sufficient to keep the ovum equally distended, and of the oval form.

The surface of the ovum is every where covered with a filamentous substance, which, however, is more abundant and shaggy where the placenta is formed, as is seen at the upper and left side.

FIG. 2.

Shews the three Membranes of which the Ovum is com-

posed. The Spongy Chorion is seen on the outside, the True Chorion in the middle, and the Amnios, which is left entire, is observed on the inside. The Branching of the Umbilical Vessels is sufficiently distinct.

FIG. 3.

The foetus, which in Fig. 1. and 2. appeared through the membranes of the ovum, is here removed from the amnios, but the extremities are left in their natural situation: The umbilical cord is a little unfolded, and the placenta so placed, as to shew its inner surface. The foetus is so disposed, as to correspond not only with the other two figures of this, but with all the other figures of the former Table. The twisting of the umbilical cord is here observed, and also its insertion, not to the middle, but towards the edge of the placenta, where the covering of the cord is continued, to form the two inner membranes of the ovum. The umbilical arteries are seen dividing into branches, and the veins uniting to form a trunk. The placenta appears of an oval form; at one edge the membranes are turned back, to shew the spongy-like and vascular nature of this substance; and in a small portion, the minute vessels of which it is composed are shewn by maceration.



TAB. 151.

Fig. 1.

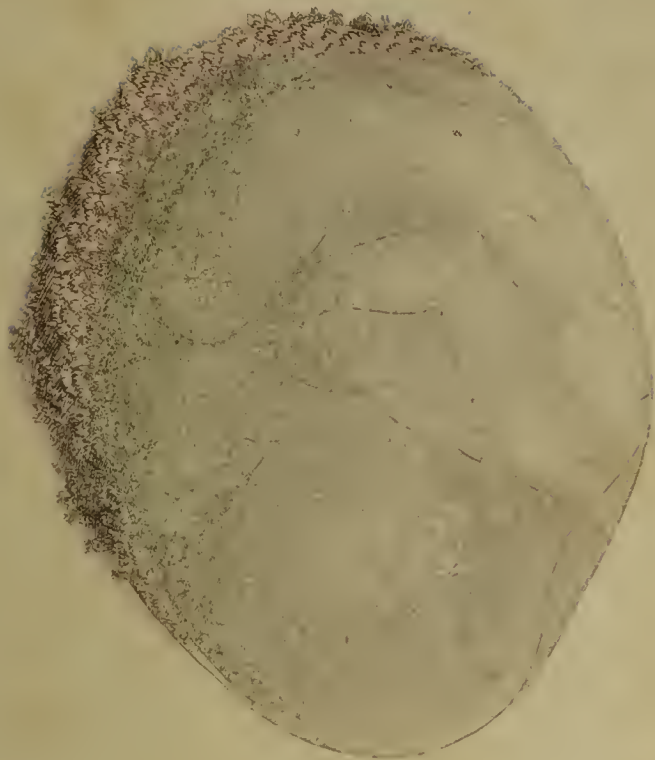


Fig. 2.

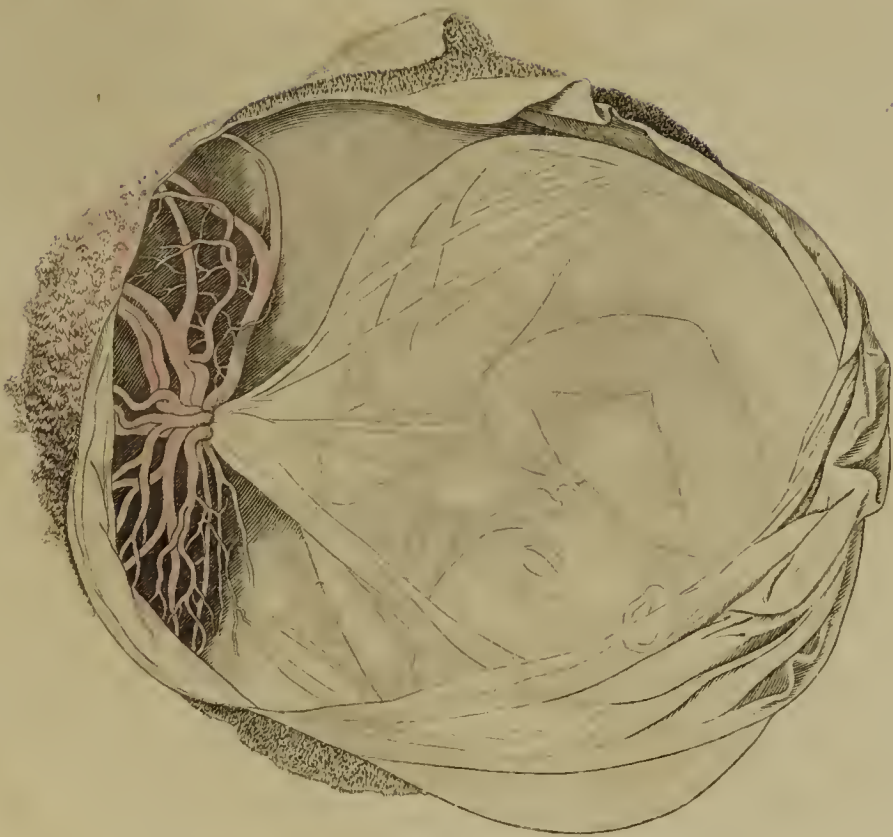
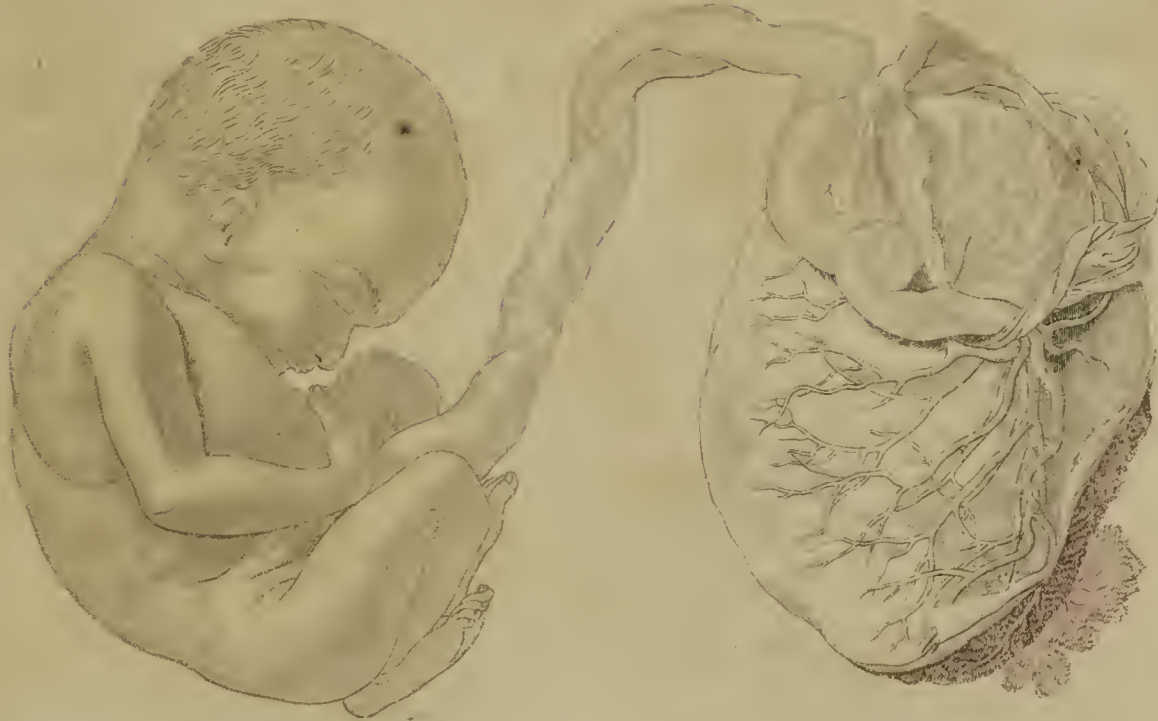
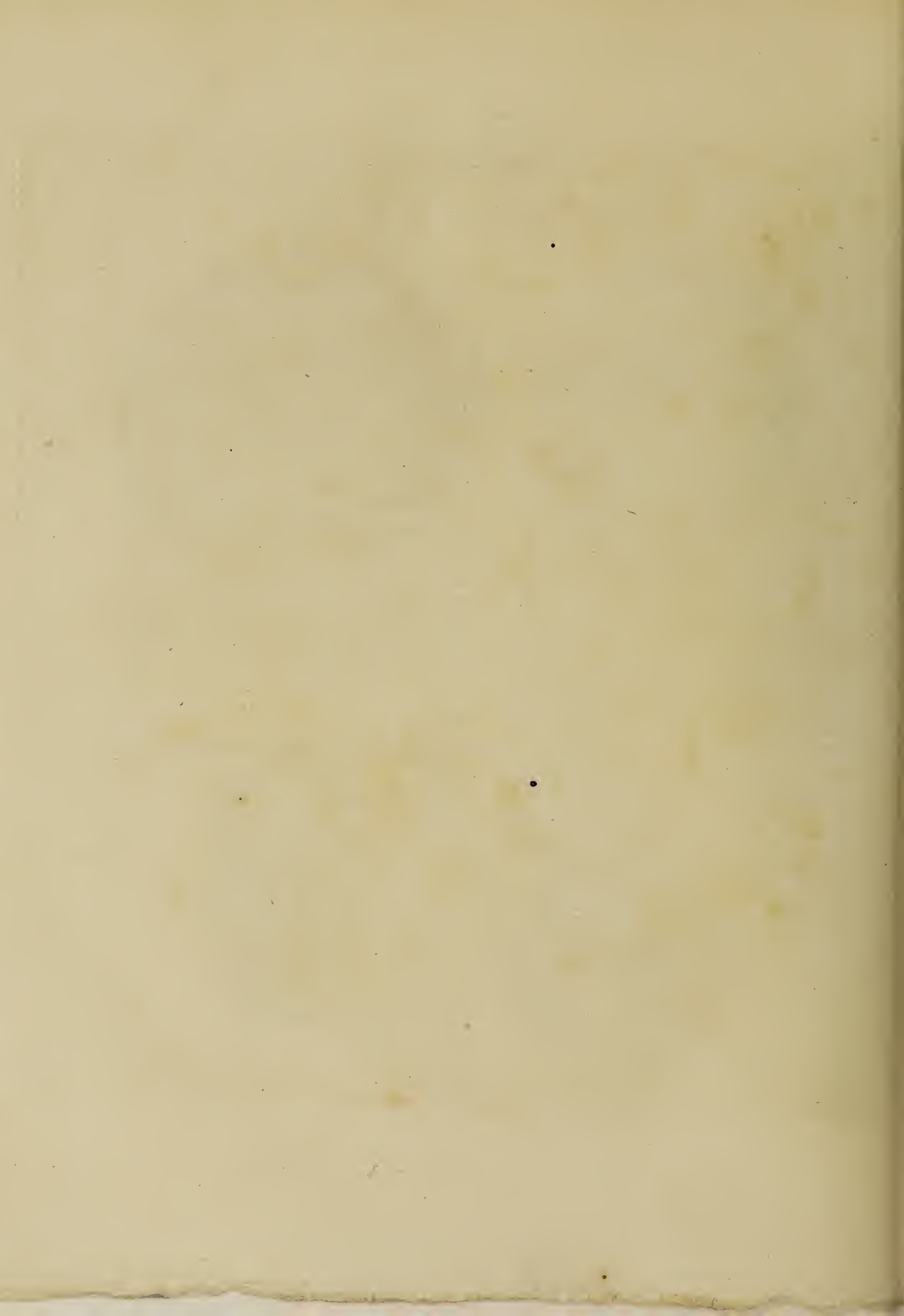


Fig. 3.



Aquatinated by A. Ryfz.







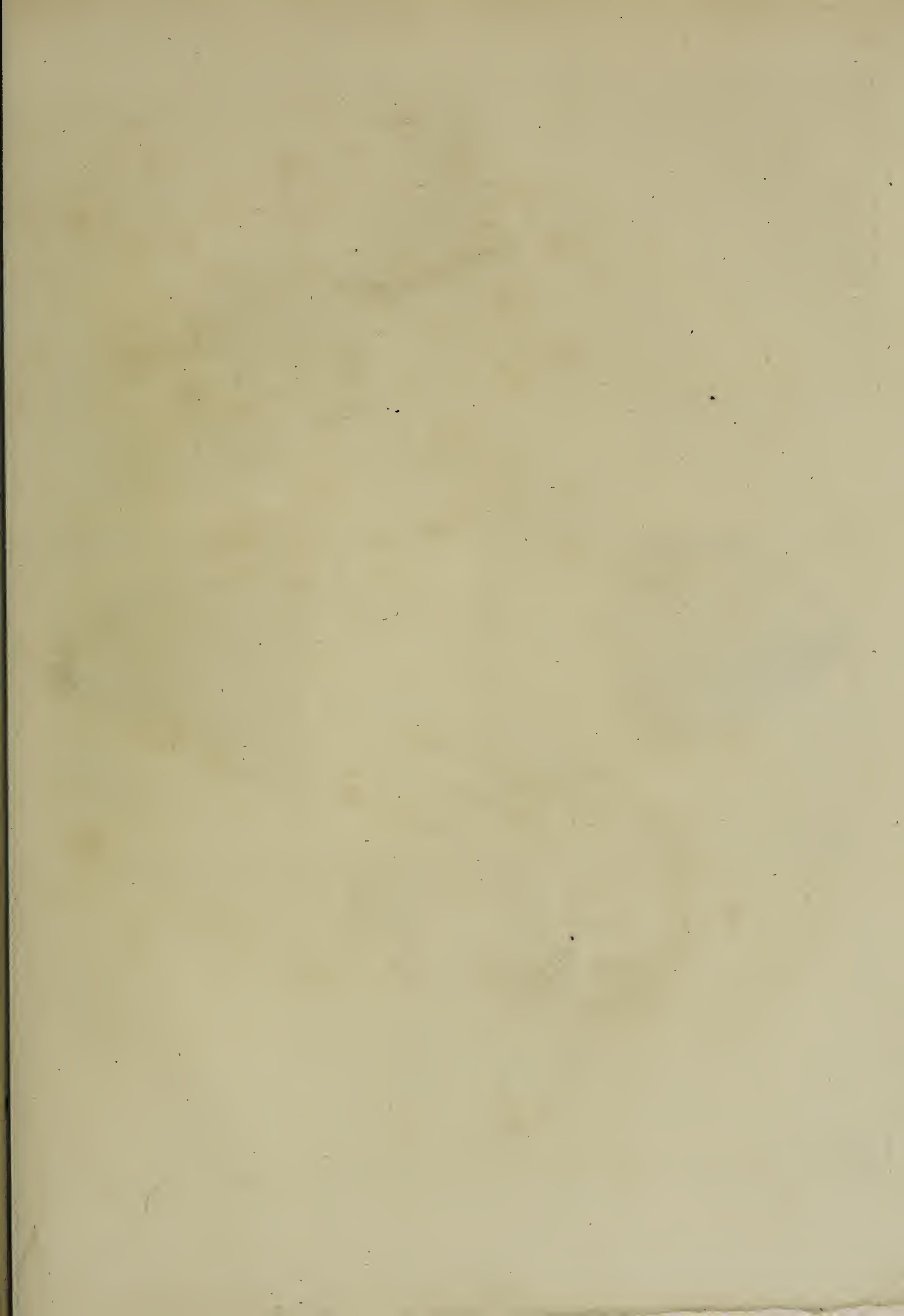




Fig. 1.

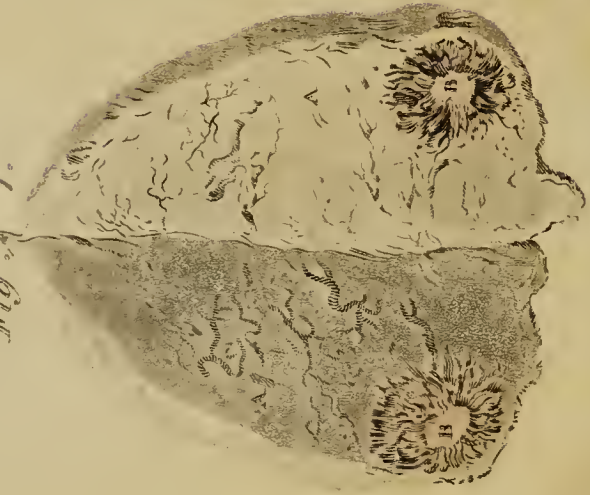


Fig. 4.

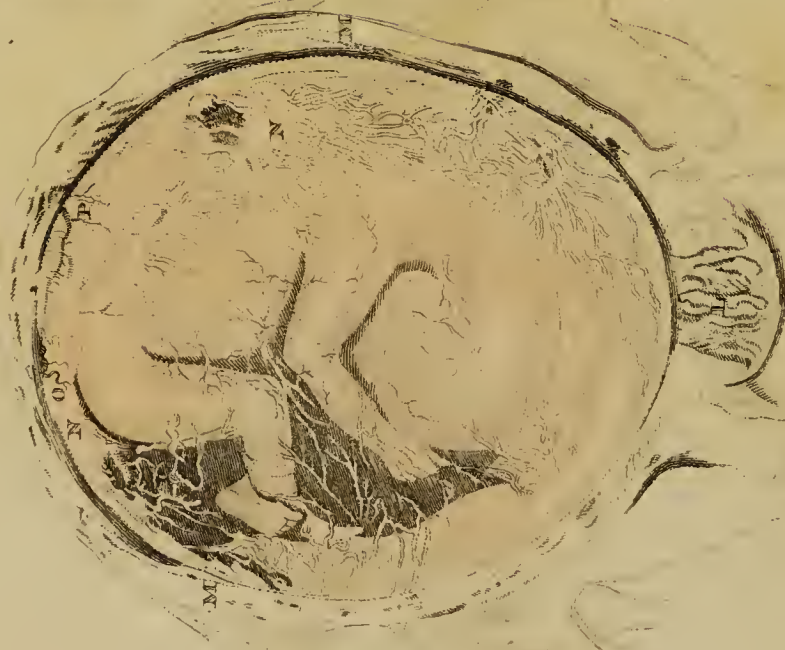
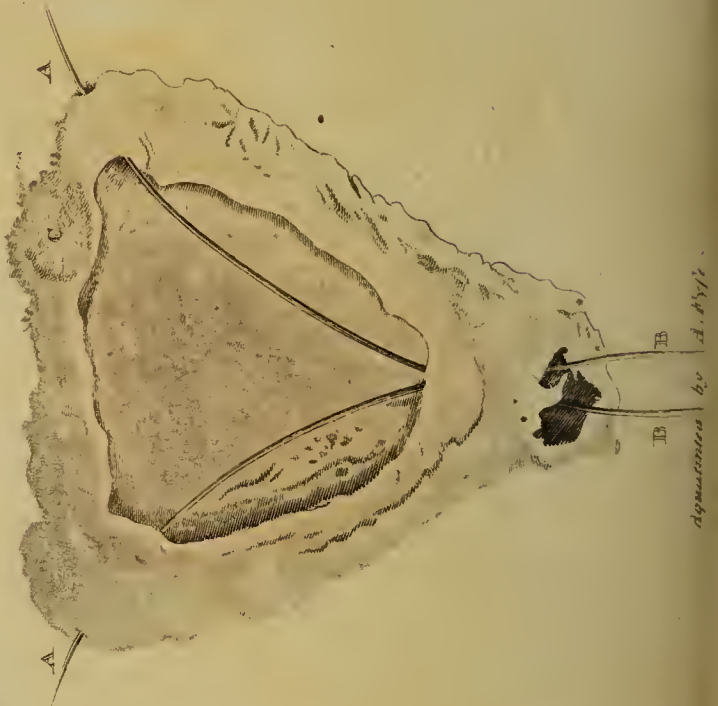


Fig. 3.



Fig. 2.





## T A B L E C L I I .

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### F I G . 1 .

*The RIGHT OVARIUM at the full time, cut open, to shew the CORPUS LUTEUM.*

- A, A, The substance of the ovarium, with numerous serpentine arteries interspersed.  
 B, B, The corpus luteum. No vessels appear in its centre, which is of a white colour; but all around the centre, its substance is very vascular.

### F I G . 2 .

*An OVUM of about Three Weeks, covered with the TUNICA FILAMENTOSA, cut open.*

- A, A, Bristles passed into the cavity of the ovum, through holes at the upper angles, which were supposed to be the termination of the FALLOPIAN tubes.  
 B, B, The same bristles coming out through a larger hole at the lower angle, supposed to be opposite to the cervix uteri.  
 C, A small hydatid projecting through the substance of the decidua, which had slender branching filaments shooting from the surface supposed to be the chorion.

### F I G . 3 . & 4 .

From a Subject in the beginning of the Fifth Month of Pregnancy. The Arteries and Veins were injected with Wax of different colours.

### F I G . 3 .

*A Back View of the UTERUS, with the VAGINA laid open, to shew the state of the CERVIX and Os UTERI.*

- A, The clitoris.  
 B, B, The nymphæ.  
 C, The orifice of the urethra.  
 D, D, The lower end of the vagina, which is rugous.  
 E, E, The upper end, which is more smooth, especially behind.  
 F, The orifice of the uterus, projecting into the upper end of the vagina.  
 G, G, The tubes.  
 H, H, The fimbriæ.  
 I, I, The ovaria.  
 K, K, The bundle of spermatic vessels passing up in the ligamenta lata to the ovaria, tubes, and fundus uteri.

### F I G . 4 .

*The same UTERUS fully opened, shewing the DECIDUA REFLEXA upon the CHORION, through which the Child appears; and the Inside of the CERVIX and Orifice of the UTERUS.*

- A—K, of Fig. 3. are little more than outlines in this figure.  
 L, The rugous inside of the cervix uteri, seen through the transparent membranes.  
 M, M, The substance of the uterus and of the decidua cut through.  
 N, N, The decidua reflexa covering the transparent membranes in white and opake striæ. It was become so thin, by extension, as to be rendered in many places almost transparent. It had not as yet contracted an adhesion with the decidua which covered it.



## T A B L E C L I I I .

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FIG. 1.

*From a Subject in the Fifth Month of UTERO-GESTATION. The UTERUS fully opened, and the FÆTUS taken out, to shew the exact Dimensions and Proportions of the Child, and the State of the CERVIX UTERI at this Period.*

- A, A, The opening made in the membranes for the extraction of the child, through which is seen the inside of the placenta around the termination of the umbilical cord.
- B, B, The collapsed amnios and chorion, covered externally with the decidua reflexa, which had not as yet contracted an adhesion to the decidua.
- C, C, The uterine tubes.
- D, D, The broad ligaments.
- E, The decidua, lining that part of the uterus where the placenta did not adhere to it.
- F, F, F, F, The section, from side to side, of the substance of the cervix uteri.
- G, The upper, narrower, and smaller part of the passage in the cervix uteri, where the decidua was evidently continued down into the inner membrane of that passage.
- H, The lower, wider, and rugous part of that passage.
- I, The inside of the posterior lip of the os uteri, studded with small bags of jelly.
- K, The inside of the adjacent parts of the vagina.
- L, L, The two small pieces of floating membranes present, though very imperfectly, two portions of the cuticular lining of the vagina, which, in this subject, was separated distinctly, as far up as the projection of the os uteri.

FIG. 2.

*From a Subject at Six Months. A Fore View of the UTERUS, which was injected; the Anterior Part, both of the UTERUS and of the MEMBRANES, having been cut away, and the LIQUOR AMNII taken out, to shew the FÆTUS, with Part of the PLACENTA and of the UMBILICAL CORD.*

- A, The bladder, in its situation with respect to the uterus. It is moderately distended, and is covered with some large branches of the hypogastric veins.
- B, The inside of the posterior part of the vagina.
- C, C, The hypogastric vessels, going into the neck of the uterus, and sending branches to the bladder and vagina.
- D, D, The spermatic vessels, going into the duplicature of the ligamenta lata.
- E, E, The uterine tubes.
- F, F, The fimbriæ.
- G, G, The posterior lamella of the ligamenta lata. The anterior had been removed by dissection, to give a clearer view of the spermatic vessels.
- H, H, The ligamenta rotunda. In the left is seen a large convoluted artery, descending from the spermatic.
- I, I, I, The section of the whole substance of the uterus, and of the membranes, by which the fore part of the uterus, and of the secundines, was removed, to expose their contents.
- K, The umbilical cord, near its termination in the placenta.
- The placenta adhered to the posterior part, and near the fundus of the uterus. The cord passed first downwards over the shoulder, and then upwards behind the body of the child, to its termination at the placenta.

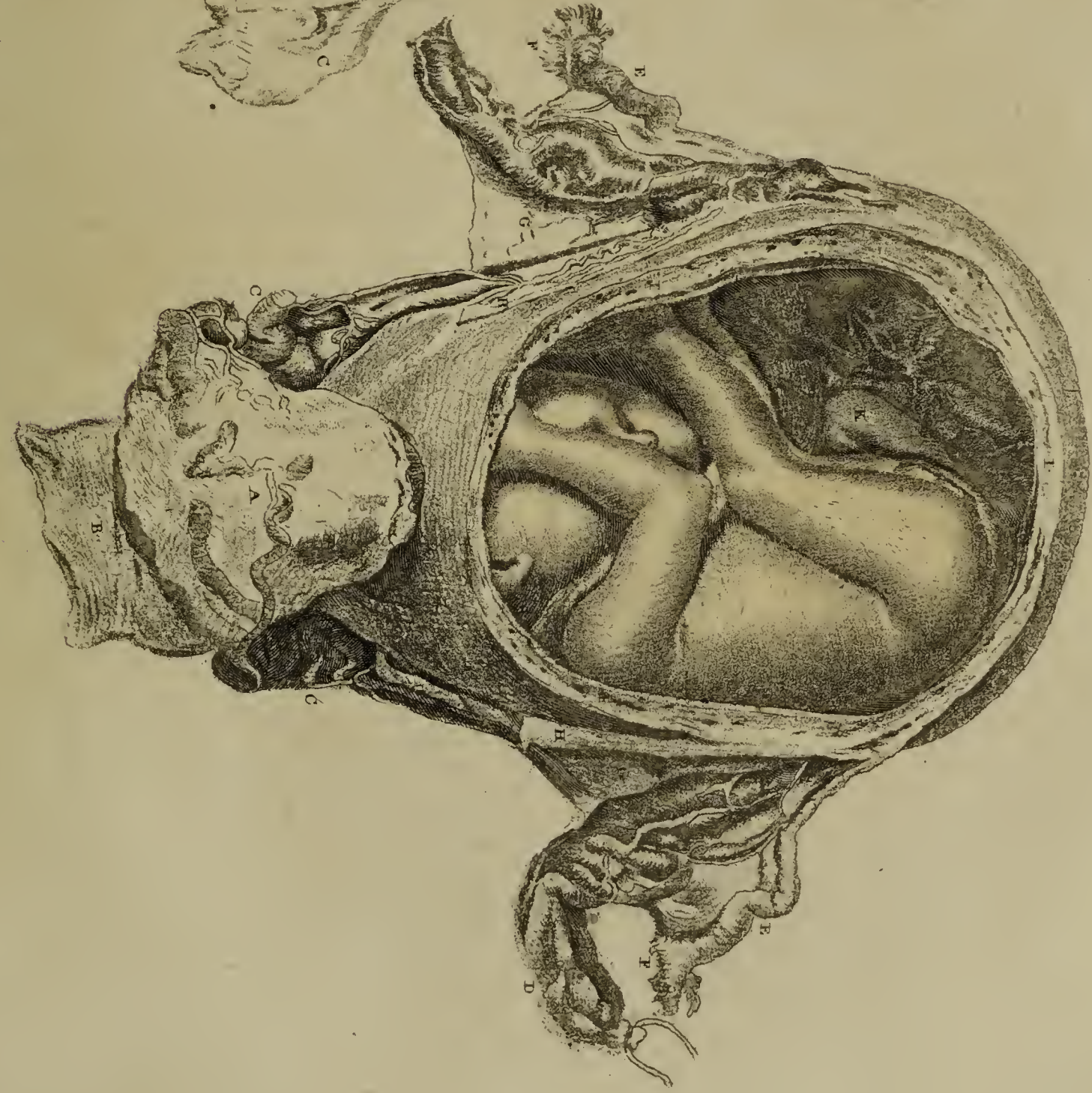


Fig. 1.



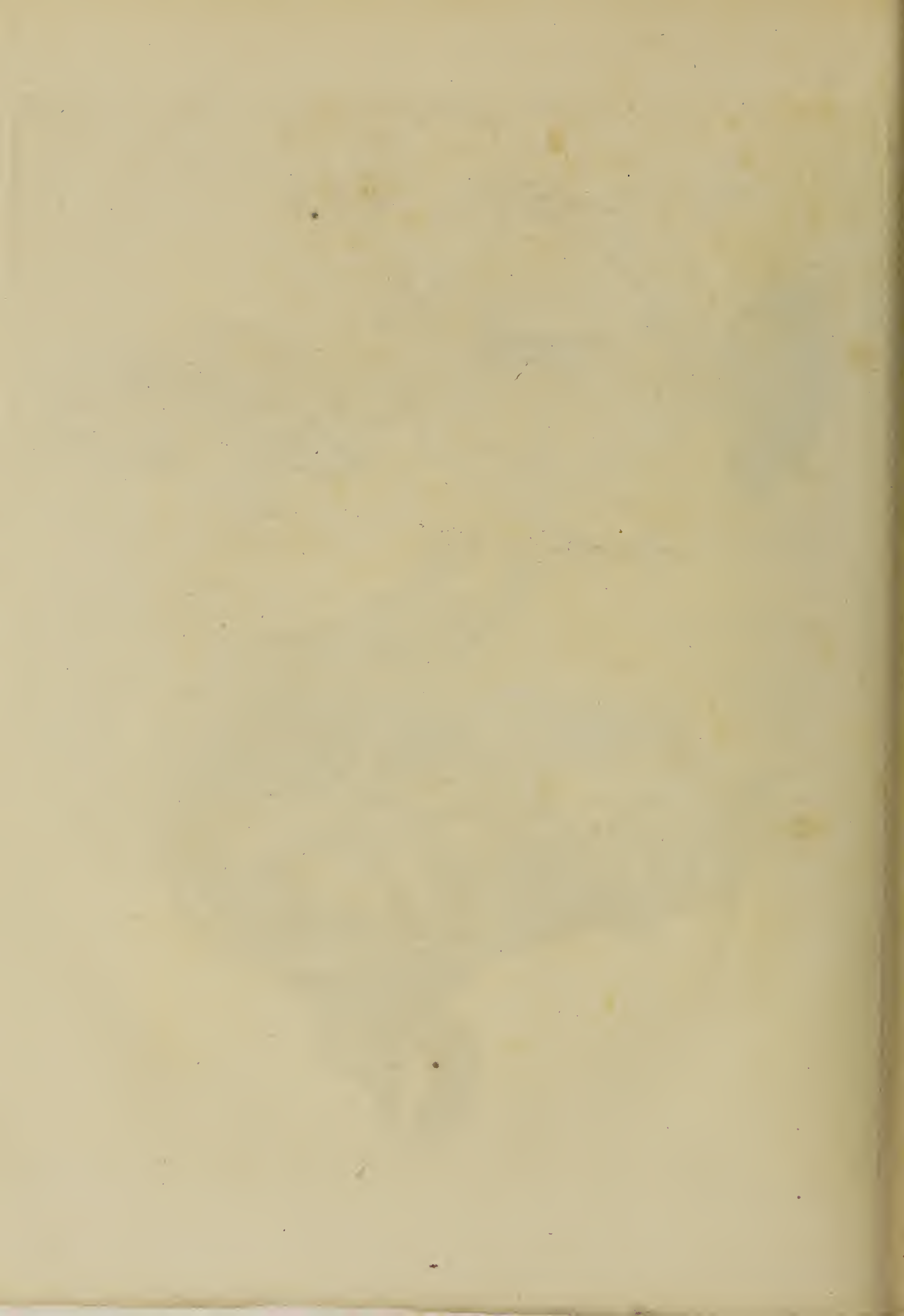
77 A B . 153.

Fig. 2.

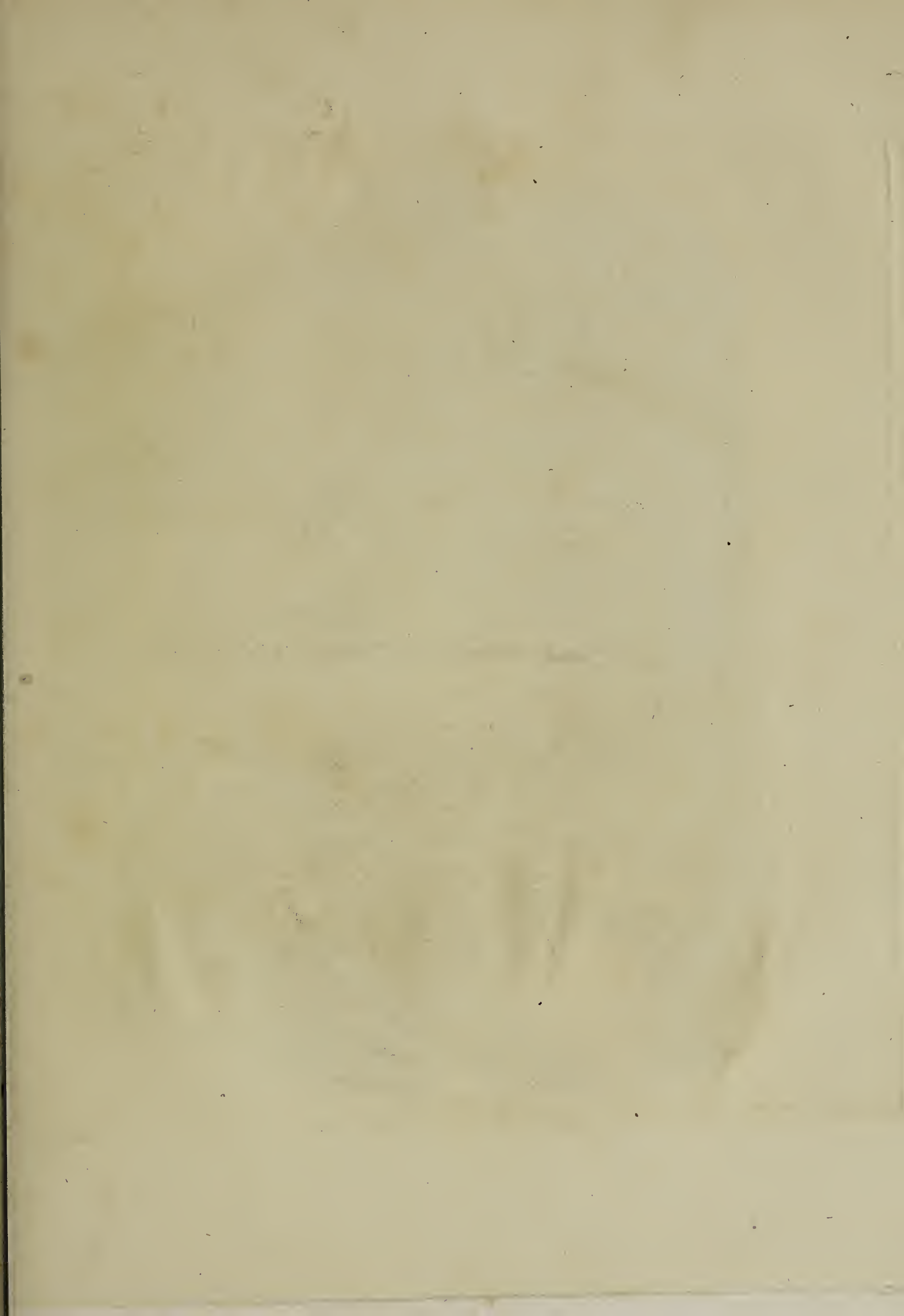


Engraved by A. Dyer.











TAB. 154.



Aquainted by A. Fyfe.



## T A B L E CLIV.

Shews the UTERUS, after Seven Months of Pregnancy.

- 
- A, A, A, A, The integuments of the abdomen divided and turned back.
- B, B, The muscles of the abdomen, with the peritoneum also turned back.
- C, The fundus uteri much enlarged, and in this subject inclining towards the right side.
- D, D, The veins of the uterus much dilated.
- E, E, E, The colon and part of the small guts appearing above the fundus uteri.
- In the right portion of the colon, one of its longitudinal bands of muscular fibres is distinctly seen.



## T A B L E CLV.

---

FIG. 1.

*From a Woman who died of a Flooding in the Ninth Month of Pregnancy. A View of the UTERUS and VAGINA fully opened on the Back Part, to shew the Situation of the CHILD, and of the Lower Part of the PLACENTA, at the inside of the Mouth of the UTERUS, under the Child's Head, and detached from the UTERUS; the cause of the fatal Hæmorrhage.*

- A, A, The FALLOPIAN tubes.
  - B, The left ovarium, at the lower end of which is seen,
  - C, The projecting corpus luteum.
  - D, The right ovarium.
  - E, The group of spermatic vessels approaching the side of the uterus.
  - F, F, F, The section of the substance of the uterus.
  - G, The inside of the vagina, which is laid open by a longitudinal incision, and spread out.
  - H, H, The mouth of the uterus.
  - I, The external lobulated surface of the lower part of the placenta, which had originally adhered to the inside of the neck and mouth of the uterus.
  - K, The membranes cut through where they were coming out from the edge of the placenta, and inclosing the most depending part of the child's head.
- The situation, and the several parts of the child, require no explanation.

FIG. 2.

*From a Subject in the Ninth Month of Pregnancy. A Fore View of the UTERUS, with the VAGINA and the*

*VESICA URINARIA, in which all the inclosing Parts were cut through, and turned up, to shew the Situation of the Child, with its Head upwards. The Vessels of the UTERUS had been previously injected.*

- A, The bladder in its natural situation with respect to the uterus.
- B, The upper and outer part of the vagina, which lies under the symphysis of the ossa pubis, and where the urethra is united with it.
- C, The cavity of the vagina exposed, where the labia and other external parts have been cut off, in taking this part from the body.
- D, D, The spermatic vessels, passing up towards the sides of the uterus.
- E, E, The tubes, of which the extremities or fimbriæ are concealed behind the group of spermatic vessels.
- F, The great vein on the right side of the uterus, formed by the anastomosing hypogastric, and spermatic veins.
- G, G, The round ligaments.
- H, H, The fore part of the womb, with that portion of the placenta which adhered to it, cut up, and turned back over the fundus of the uterus, to bring the child into view.
- I, I, I, The section of the substance of the uterus, and of the investing membranes.
- K, K, The same section carried through the substance of the placenta, which, in this case, was fixed to the fore part and right side of the uterus.
- L, The cord passing from the child to the placenta.











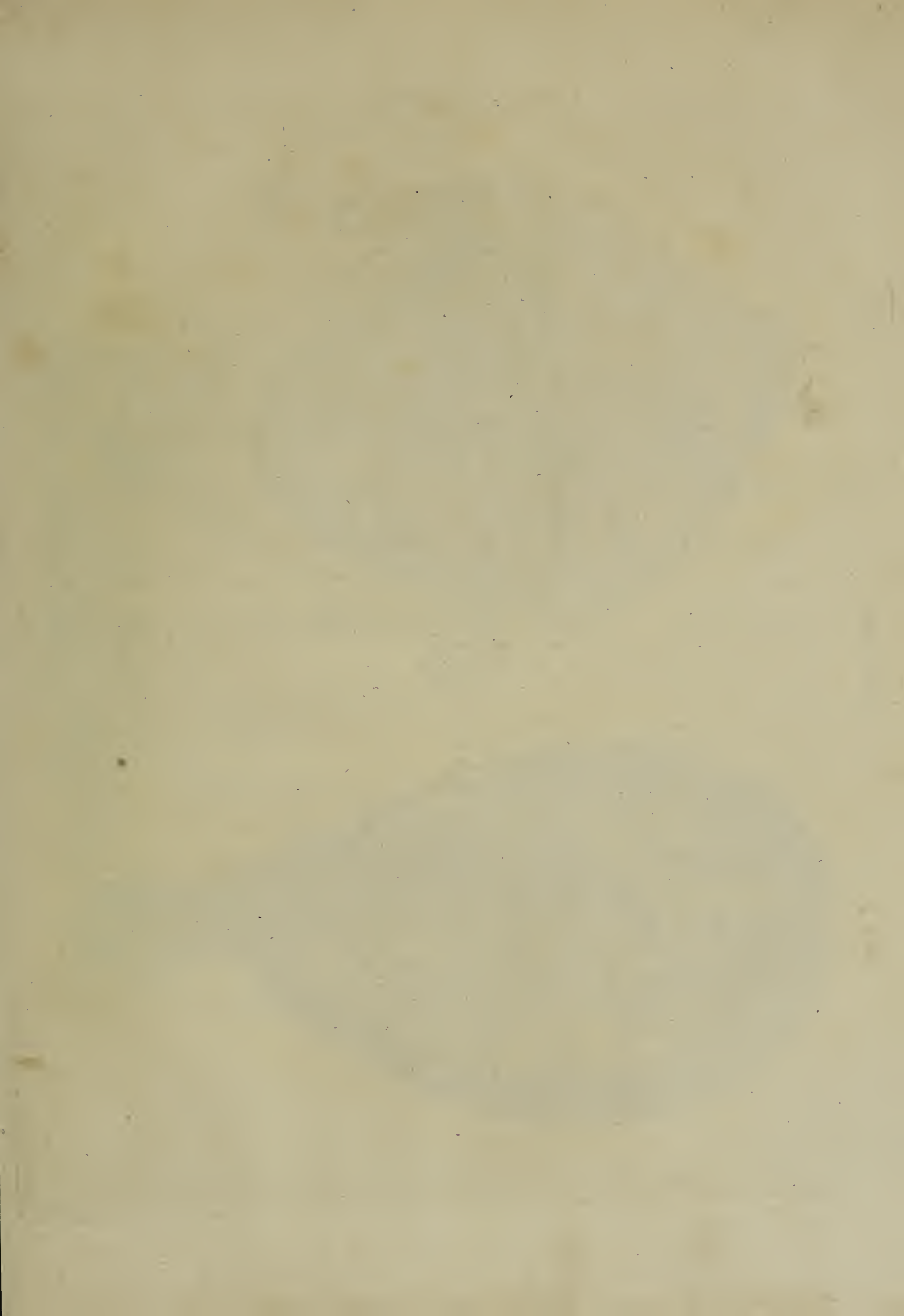
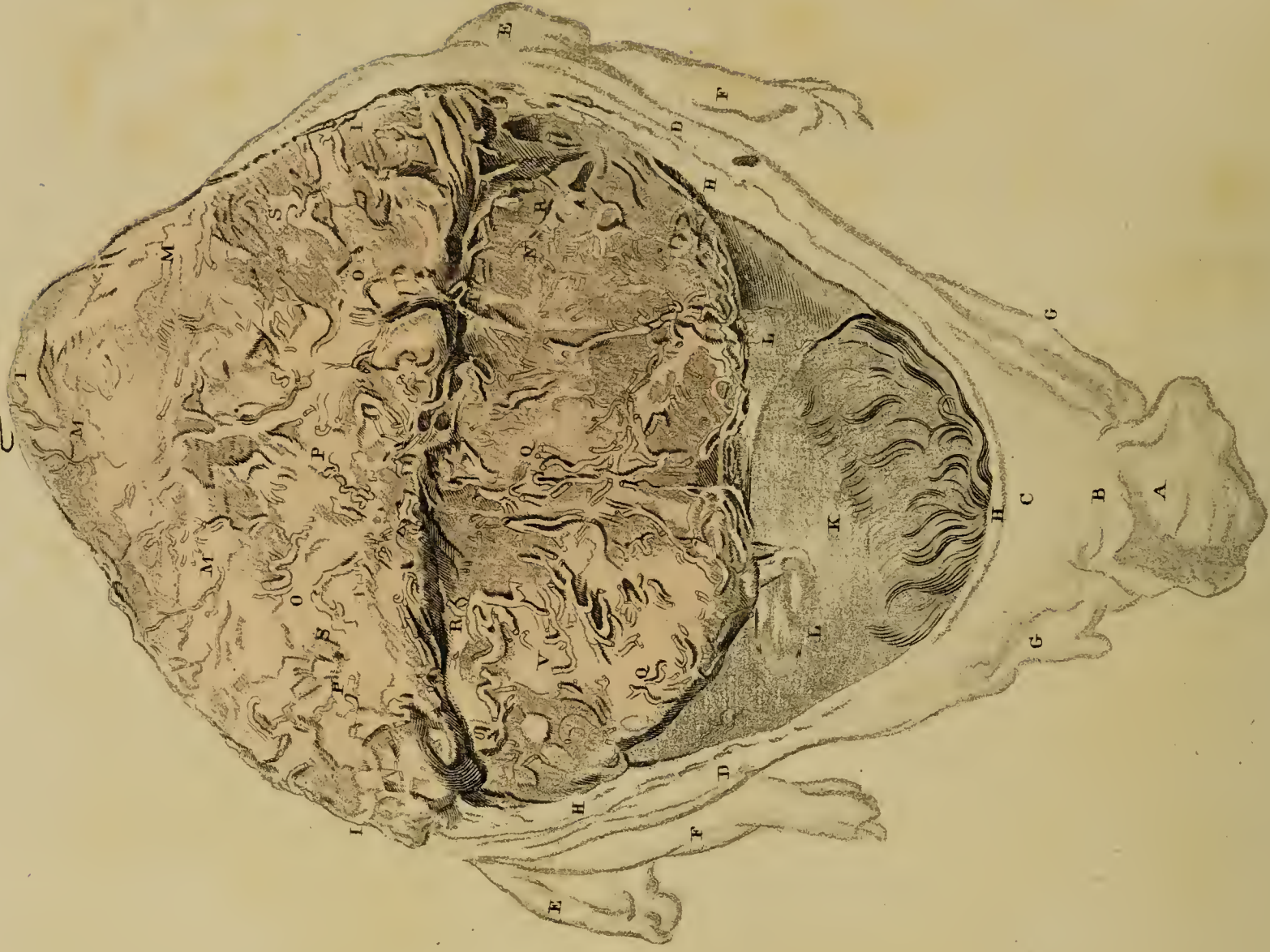




Fig 1



Fig 2





## T A B L E CLVI.

FIG. 1.

*From a Subject at Eight Months. A Side-View of the UTERUS, so injected and dissected, as to shew the Approach, and first general Branching of the UTERINE VESSELS. The Back Part of the UTERUS is still covered by the PERITONEUM; but at the Fore Part, to which the PLACENTA adhered internally, the Outer Stratum of the Substance of the UTERUS was removed by Dissection.*

- A, B, The outside of the neck of the uterus, which was not in the least dilated. The os uteri was opposite to B, from which downwards there is a part of the vagina left covered with fat.
- C, C, A stricture in the uterus, where it was surrounded by the brim of the pelvis.
- D, D, The tubes, behind which the ovaria lay concealed.
- E, E, The ligamenta rotunda dissected, to shew a vein which is twisted at its inferior part, and two arteries, all from the spermatic vessels.
- F, The hypogastric artery.
- G, \_\_\_\_\_ vein.  
Their vessels send down numerous branches to the vagina, and ascend upon the side of the uterus, to anastomose with the respective spermatics.
- H, The spermatic artery.
- I, \_\_\_\_\_ vein.  
These vessels, in their approach to the uterus, send up numerous branches, forwards to the tube, and backwards to the ovarium; then passing to the side of the fundus uteri, they anastomose with the hypogastric.
- The principal branches of both, in this case, go to the fore part of the fundus uteri, where the placenta was attached.
- K, K, The edge of the peritoneum, which covers the posterior surface of the uterus.

FIG. 2.

*From the same Subject. A Fore-View of the UTERUS. Its Substance is cut through, and turned up over the FUNDUS,*

*to shew a Part of the MEMBRANES, through which the Child's Head is obscurely seen, and about half of the PLACENTA; together with the corresponding Internal Surface of the UTERUS, and the VESSELS passing between the UTERUS and the PLACENTA. The External Parts of the UTERUS are represented in outlines only.*

- A, The upper extremity of the vagina laid open.
- B, The orifice of the uterus contracted.
- C, The neck of the uterus not stretched.
- D, D, The round ligaments.
- E, E, The tubes; the ovaria concealed behind them.
- F, F, The spermatic vessels.
- G, G, The hypogastric vessels.
- H, H, H, The substance of the uterus cut through.
- I, I, I, The fore part of the uterus raised from the secundines, and turned over the fundus.
- K, The chorion covering the amnios, through which the child's head appears.
- L, L, L, The decidua where it adhered in the inner surface of the womb, in which are seen some small vessels sent into it from the uterus.
- M, M, M, The corresponding inner surface of the uterus.
- N, N, The outer surface of that part of the placenta from which the uterus was separated.
- O, O, The corresponding internal surface of the uterus.
- P, P, Convoluted arteries upon the inner surface of the uterus, which had passed to the placenta, and were broken through in separating the uterus.
- Q, Q, The corresponding arteries on the surface of the placenta.
- R, R, Veins emerging from the substance of the placenta, and broken through at its surface, where they were passing into the uterus.
- S, S, The corresponding veins on the inside of the uterus.
- T, A convoluted artery, continued from the womb into the placenta.
- V, A corresponding vein near that artery, continued from the placenta to the uterus.



## T A B L E CLVII.

---

*From a Woman who died suddenly in the end of her Ninth Month of Pregnancy. The ARTERIES and VEINS were injected with Wax of different Colours.*

*The Plate represents the Object, as it appeared when the ABDOMEN was opened by a Crucial Incision, and the Four Angles of the containing Parts turned outwards; the Subject lying on its Back, with the Upper Part of the TRUNK considerably higher than the rest.*

- A, A, The under and fore part of the thorax.  
 B, B, The two upper angles of the integuments, muscles, and peritoneum, turned back over the cartilaginous margin of the thorax.  
 C, C, The two under angles turned down, and fixed by threads at the puckered appearance of their inferior edges.  
 D, The upper end of the longitudinal incision, beginning at the point of the cartilago ensiformis.  
 E, The lower end of the same incision continued to the symphysis of the ossa pubis.  
 F, The umbilical ligament of the liver.  
 G, G, The epigastric blood-vessels, projecting through the peritoneum.  
 H, The small or left lobe of the liver.  
 I, The omentum, spread over the small intestines in the epigastric region.  
 K, The lower and middle part of the omentum, which had been pushed up by the uterus, and lay in numerous small folds pressed together.  
 L, The omentum in the right side, descending some way behind that part of the uterus from which the right tube begins.  
 M, The omentum, in the left side, which descended before the FALLOPIAN tube, &c. turned a little outwards.  
 N, N, Two turns of the small intestines, which were partly covered by the portion of the omentum M.  
 O, The uterus, occupying all the umbilical and hypogastric regions. Its situation is a little oblique, and towards the right side. The letter is placed at the part which was opposed to the umbilicus.  
 P, A swelling towards the left side of the uterus, where the middle of the placenta adhered, and,  
 Q, A swelling on the right side, where the buttocks of the child lay.  
 R, R, The round ligaments of the uterus. The left is the longer of the two, on account of the oblique situation of the uterus.  
 S, S, Portions of the FALLOPIAN tubes.  
 T, T, The spermatic vessels, situated in the space between the round ligament and FALLOPIAN tube.

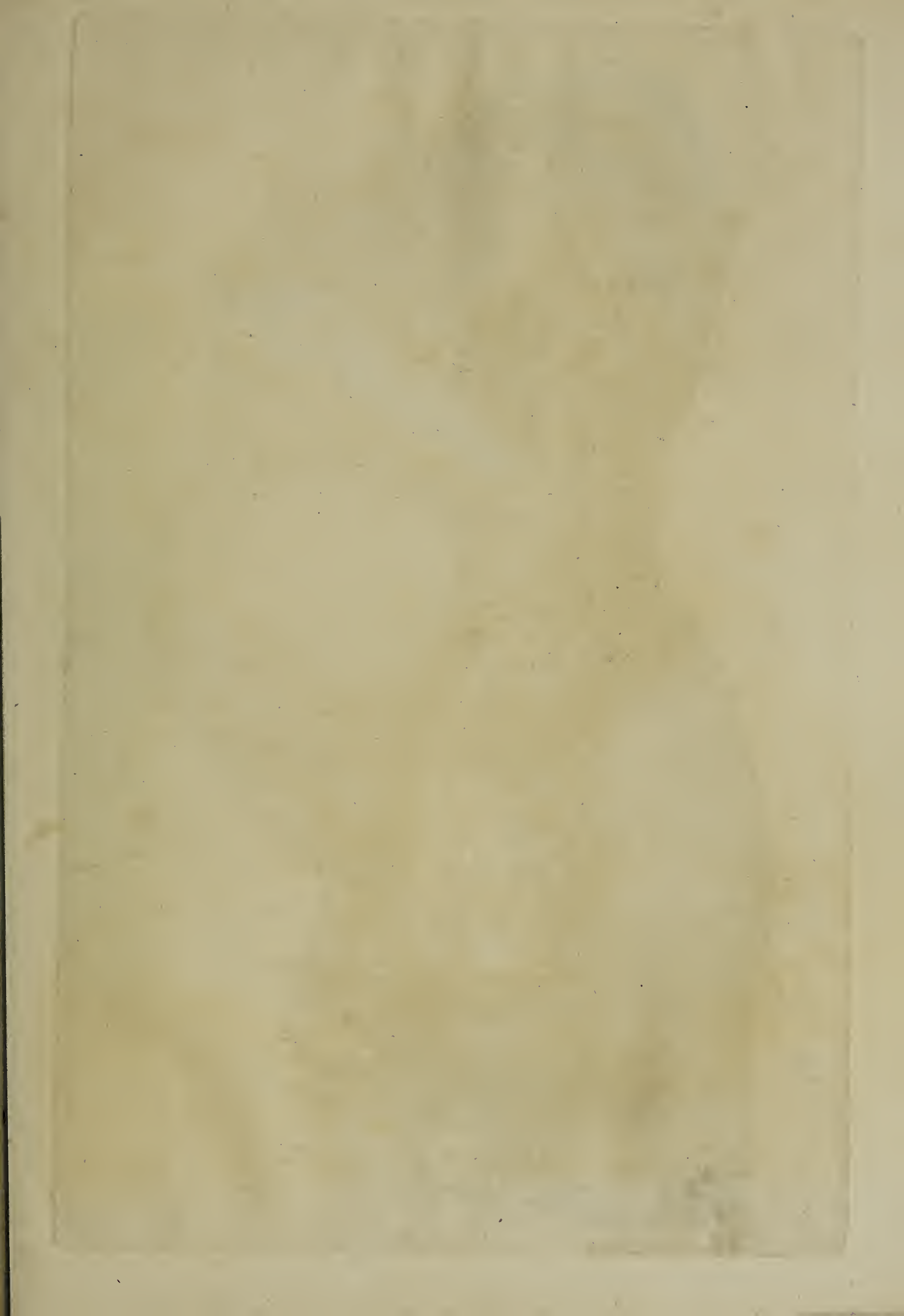
















PL. A. 73. 1588.

Figured by A. W. 1720.



## T A B L E    C L V I I I .

A VIEW of the same SUBJECT from the Right Side, after the Upper ABDOMINAL FLAP, and the Containing Parts of the Right HYPOCHONDRIUM, had been removed, that the whole Mass of the ABDOMINAL VISCERA might appear in its Natural Situation, the SUBJECT lying on its Back.

---

- A, A, The thighs, covered with a cloth where they had been cut through.
- B, The spine cut through above the diaphragm.
- C, Part of the eighth rib.
- D, D, The integuments and muscles at the back part of the thorax, cut through.
- E, F, The inferior flap of the abdominal muscles, &c. turned down over the thigh, as in the preceding figure.
- F, G, The mons Veneris divided and turned aside with the abdominal muscles.
- H, The margin of the thorax at the left side of the scrobiculus cordis, covered by peritoneum and muscles, which are turned over it. the
- I, The cartilago ensiformis.
- K, K, The lower ribs and other containing parts, cut down longitudinally, by which means all between this section and the scrobiculus cordis was removed, to expose the viscera in the right hypochondrium.
- L, The under and back part of the right cavity of the thorax.
- M, The aorta tied up where it was cut, and filled with injection.
- N, The esophagus also tied up.
- O, The upper convex surface of the diaphragm covered by the pleura, in its natural situation.
- P, That part of the centrum tendinosum of the diaphragm which is in the right side.
- Q, The trunk of the inferior cava tied, close to the diaphragm.
- R, The cut edge of the pleura, where it was reflected from the upper surface of the diaphragm to line the inside of the ribs.
- S, The cut edge of the peritoneum, where it was continued from the inferior surface of the diaphragm to the inside of the abdominal muscles.
- Between the cut edge of the pleura, R, and that of the peritoneum, S, is the attachment of the diaphragm cut off from the inside of the ribs.
- T, The inside of the transverse muscle of the abdomen covered by the peritoneum.
- U, The great or right lobe of the liver; the letter is placed opposite to the gall-bladder.
- V, The small lobe of the liver.
- W, The umbilical, or round ligament, cut off where it enters the fissure of the liver.
- X, The colon passing up from the cæcum towards the liver.
- Y, The colon with its appendiculæ adiposæ running towards the left side, between the liver and small guts.
- Z, The beginning or root of the omentum.
- a, a, a, a, Some turns of the small intestines exposed by cutting off part of the omentum which covered them.
- b, The uterus; the veins, which at first could only be distinguished by the colour of the injection in them, are here seen somewhat prominent, on account of the part having been a little dry, by exposure to the air.
- c, The round ligament.
- d, The FALLOPIAN tube. Between the tube and the ligament the spermatic vessels are seen, which go chiefly to the fore part of the uterus, where the placenta adhered.
- e, The prominent corners of the uterus, where the buttocks of the child were felt before the part was opened.



## T A B L E C L I X .

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*From the same Subject. This represents the UTERUS opened, to shew the CHILD in its Natural Situation. The Upper Part of the BLADDER is cut away, to shew the CHILD'S HEAD in the Lower Part of the UTERUS. All the Fore Part, both of the UTERUS and of the SECUNDINES, which included the PLACENTA, is removed. The UMBILICAL CORD is tied, cut, and turned to the left side, over the edge of the UTERUS. At the FUNDUS, the investing Membranes are likewise turned over the edge of the UTERUS, that they might be more apparent. The HEAD of the CHILD is lodged in the Lower Part of the UTERUS, or in the Cavity of the PELVIS, and its BODY lies principally in the Right Side. Its position is diagonal, or oblique; so that its Posterior Parts are turned forwards and to the Right Side of the MOTHER, and its Fore Parts directed backwards and to the Left Side. The Right FOOT appears between its Left THIGH and LEG. Its BODY was covered with a white Greasy Mucus, which is commonly seen on CHILDREN at their Birth.*

A, A, The thighs.

B, B, A portion of the lower corners of the containing parts of the abdomen, turned down over the ossa ilia. They are covered by the peritoneum, which was partly cut away, to shew the course of the epigastric vessels.

C, C, The ossa pubis cut through above the foramina ischia.

D, D, The ascending process of the ossa ischia cut through.

E, E, The inguinal arteries.

F, F, ———— veins.

G, G, H, H, The epigastric artery and vein of each side, the former of which is seen uppermost.

I, The obturator artery of the left side, a branch of the epigastric.

K, K, The round ligaments descending from the abdomen upon the outside of the epigastric vessels.

L, L, The section of the integuments and muscles in each groin, which was made in removing the anterior containing parts of the pelvis.

M, The anterior perineum.

N, N, The lower extremities of the labia pudendi.

O, The remains of the hymen.

P, The vagina.

Q, Q, The crura clitoridis.

R, The urethra slit on its upper part, through its whole length, and spread out.

S, The lower extremity of the uterus lodged in the cavity of the pelvis, and considerably more contracted than the portion above it, which lies in the yielding parts of the abdomen.

T, The cluster of spermatic vessels of the left side.

U, U, The cut edge of the uterus.

V, The umbilical cord.

W, The investing membranes turned over the edge of the uterus.



TAB. 159.

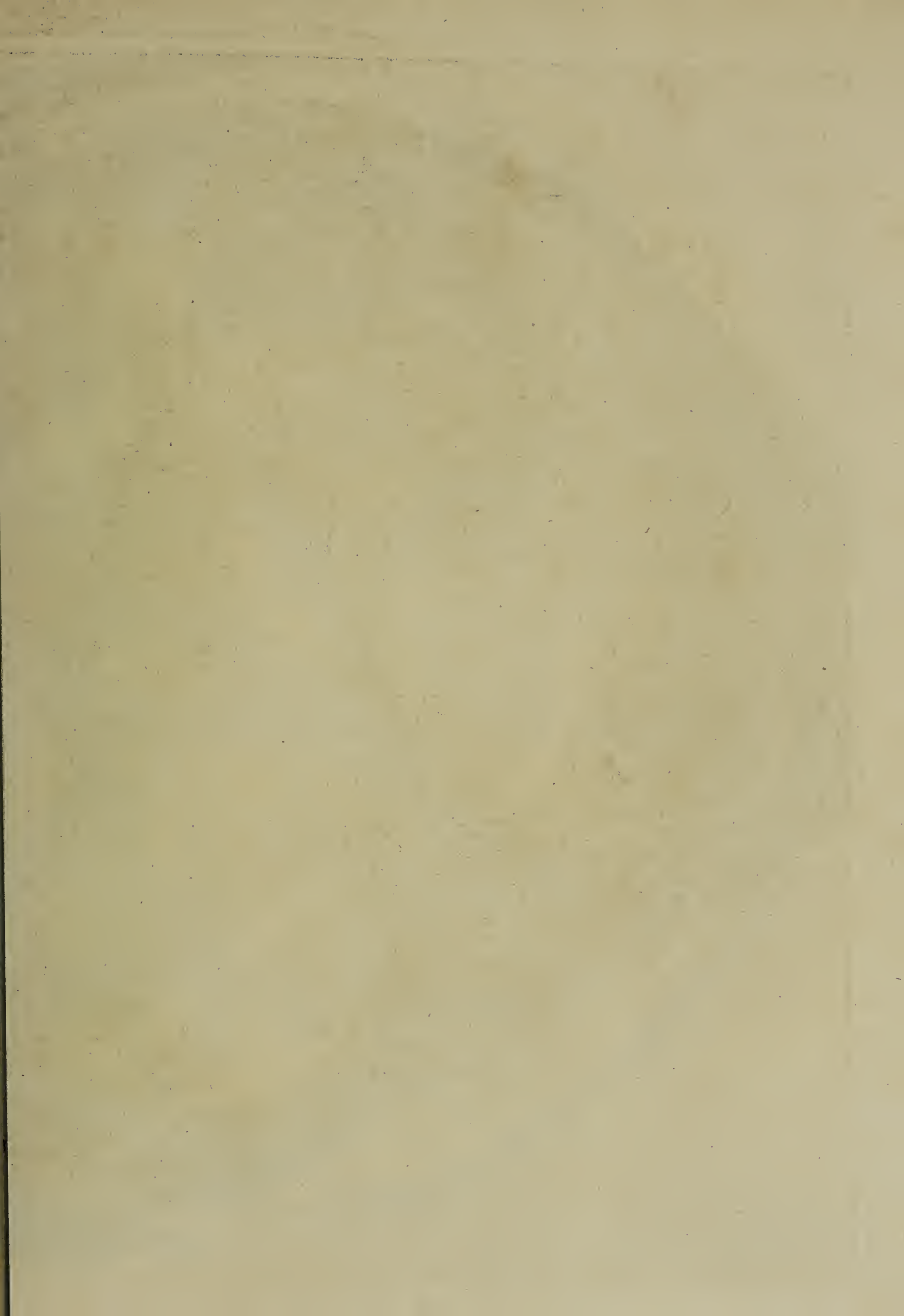


Aquainted by A. Fyfe.











TAB. 160.













## T A B L E CLX.

A Front VIEW of TWINS in UTERO, in the beginning of Labour, the Anterior Parts being removed.

---

*a, a,* The superior parts of the ossa ilia.  
*b, b,* The acetabula.  
*c, c,* A section of the ossa ischia.  
*d,* The os coccygis.  
*e,* The lower part of the rectum.  
*f, f,* The cut edge of the uterus, and of,  
*g, g,* The vagina.  
*h,* The os internum uteri dilated with the membranes and waters, in the time of parturition.  
*i,* The inferior part of the uterus stretched with the waters, which are below the head of the child.

*k, k,* The two placentæ adhering to the posterior part of the uterus. The two foetuses lie before the placentæ, one with its head in the natural position, in the inferior part of the uterus, the other situated preternaturally with the head to the fundus uteri. The body of each foetus is entangled in its proper cord, which is frequently found to happen in the natural as well as in the preternatural position.  
*L, L, &c.* The membranes belonging to each placenta.



## T A B L E CLXI.

The BLOOD-VESSELS of the UTERUS, injected with WAX.

---

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FIG. 1.

*Represents the UTERUS of a WOMAN who died thirty-six hours after Delivery.*

A, A, The hypogastric uterine arteries.  
B, B, The spermatic uterine arteries.

The Anastomoses of the Spermatic and Uterine Arteries, and of both with their fellows of the opposite side, are sufficiently obvious without the assistance of letters.

FIG. 2.

*Shows the UTERUS, twenty-four hours after Delivery.*

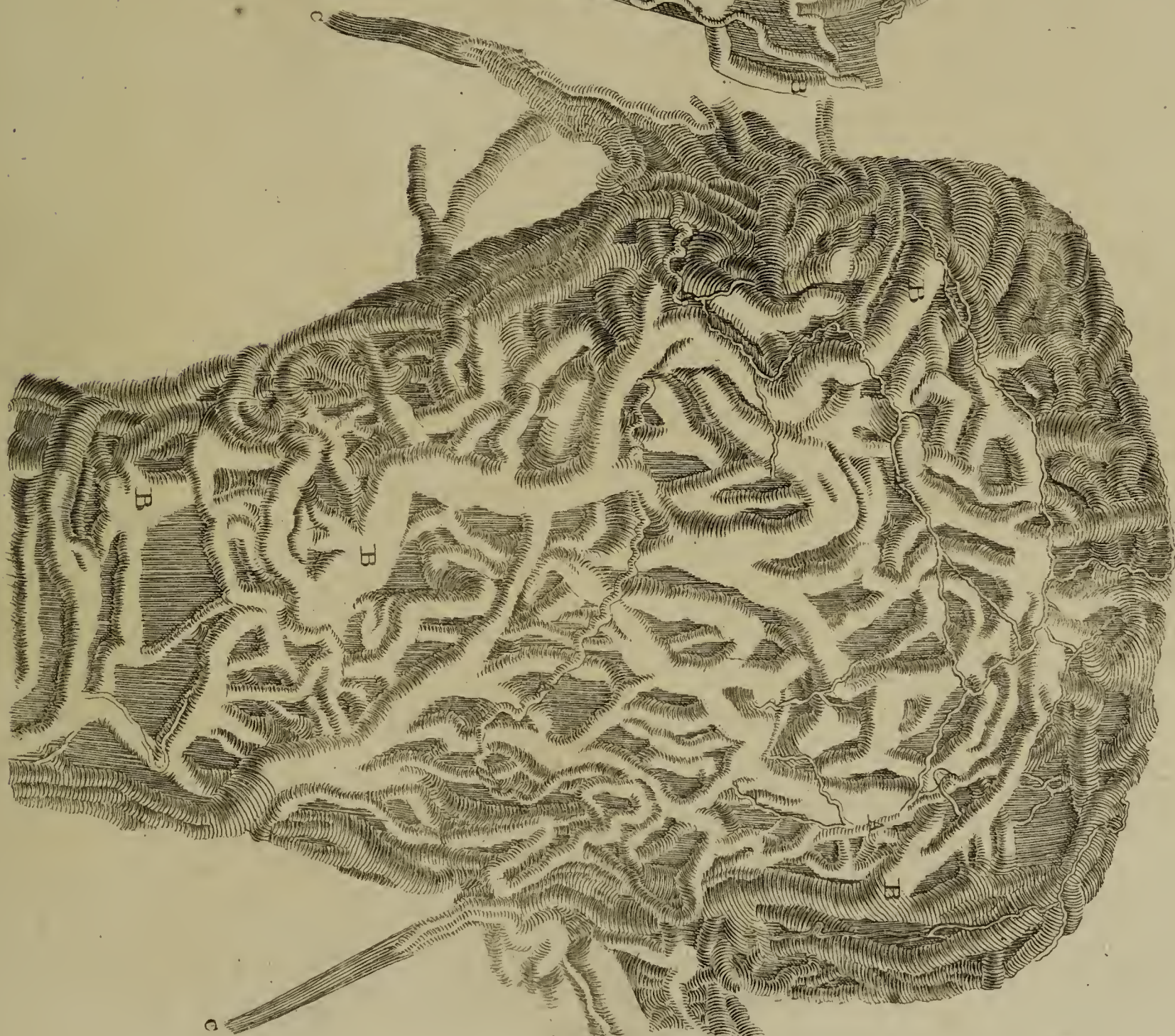
A, A, &c. The hypogastric and spermatic uterine arteries.  
B, B, &c. ————— veins, with their innumerable anastomoses.  
C, C, The ligamenta rotunda.





*Fig. 1.*

*Tab. 161.*



*Fig. 2.*











Fig. 1.



Fig. 2.





## T A B L E    C L X I I .

---

F I G. 1.

Shews a Lateral Longitudinal Section of the Uterus, immediately after Birth. The Arteries and Veins were injected with Wax, and the Preparation afterwards dried. In this are to be observed the great degree of Vascularity at that part of the Uterus where the Placenta adhered; the convoluted appearance of the ruptured Arteries occasioned by the separation of the Placenta; and the enlarged size of the Veins, which is very conspicuous in the cut edges of the Uterus.

F I G. 2.

*This SKETCH is exhibited to give an idea of the connexion that subsists between the Mother and Child. A Lateral Incision is supposed here to be made through the UTERUS and PLACENTA, from the FUNDUS, as far as the Os UTERI. The Membranes are represented as being separated some way from the UTERUS and from each other, for the sake of distinction.*

- A, A, The cut edge of the uterus.  
 B, B, A section of the placenta.  
 C, C, The membrana decidua of DR HUNTER.  
 D, D, The place where the membrane is considered as going partly between the uterus and placenta, where it is perforated by the blood-vessels passing from the

former to the latter,—and partly over the ovum, to form,

- E, E, The decidua reflexa. These two membranes are found to be distinct in early gestation, but united at an advanced period, so as to form, then, the spongy chorion.  
 F, F, The true chorion, lining the uterus, then covering the foetal side of the placenta, and afterwards the umbilical cord.  
 G, G, The amnios, lining the chorion at the inner side of the uterus, then continued to give a covering to the placenta, and to form the outer involucre of the cord.

At the fundus of the uterus, and in the maternal side of the placenta, are seen two sets of vessels, the smaller representing the arteries, the larger the veins. In the foetal side of the placenta, the vessels are observed which form the umbilical cord.

The space between the maternal and foetal vessels may be considered as occupied, either by minute ramifications, running from the uterine vessels directly into those which form the umbilical cord, or by intermediate cells, which receive the blood from the arteries of the mother, and from which it is absorbed by the branches of the umbilical vein. After being circulated through the child, it is next to be supposed as being returned to the mother by means of the cells of the placenta and the uterine veins.



## T A B L E CLXIII.

FIG. 1. and 2. of this TABLE represent the PLACENTA. From FIG. 3. to FIG. 11. the PECULIARITIES of the FŒTUS are shewn. FIG. 12.—16. give VIEWS of the DUCTS of the MAMMA.

## FIG. 1.

*A View of the PLACENTA and MEMBRANES.*

- A, B, C, The external convex surface of the placenta, with its fissures and lobules corresponding to the inequalities of that part of the uterus to which it adhered.  
D, D, E, The chorion.  
F, Part of the amnios.  
G, A portion of the umbilical cord tied.

## FIG. 2.

*A View of that Side of the PLACENTA and MEMBRANES next the FŒTUS.*

- A, A, The amnios separated from the chorion.  
B, B, A portion of the umbilical cord fixed to the inner side of the placenta, some way from its middle.  
C, C, The chorion adhering firmly to the inner concave part of the placenta.  
D, D, Branches of the umbilical arteries, distended.  
E, E, The branches of the umbilical vein, also distended.

## FIG. 3.

*A Front View of the CONTENTS of the ABDOMEN, after removing the INTESTINES.*

- a, a*, The thorax.  
*b, b*, The diaphragm.  
*c*, The large lobe of the liver.  
*d*, Its small lobe.  
*e*, The gall-bladder.  
*f*, The stomach.  
*g*, The pylorus.  
*h*, A section of the duodenum.  
*i, i*, The kidneys.  
*k*, The bladder of urine ascending almost to the umbilicus.  
*l*, The urachus.  
*m, m*, The umbilical arteries running along,  
*n, n*, The umbilical cord.  
*o*, The umbilical vein passing from the cord to the liver.

- p*, The symphysis of the ossa pubis.  
*q, r, s, t*, The testes, in their descent from the abdomen to the scrotum, inclosed in their vaginal coats.

## FIG. 4.

*A View of the CONTENTS of the ABDOMEN from the Left Side, after removing the INTESTINES.*

- a, a*, The ribs.  
*b*, The cartilago ensiformis.  
*c*, The stomach.  
*d*, The pylorus.  
*e*, A section of the duodenum.  
*f, f*, The convex surface of the small lobe of the liver, drawn a little up, to shew,  
*g*, The concave surface.  
*h*, ————— of the large lobe.  
*i*, A portion of the gall-bladder.  
*k*, The umbilical vein entering the liver.  
*l*, The left, and,  
*m*, Part of the right kidney.  
*n*, The right ureter.  
*o*, The vena cava inferior.  
*p*, The under end of the aorta.  
*q, q*, The common iliac arteries.  
*r*, The external iliac artery.  
*s*, The internal iliac artery, the continuation of which forms,  
*t*, The umbilical artery, ascending by the side of,  
*u*, The bladder of urine.  
*v*, The umbilicus.  
*w*, Part of the umbilical cord.  
*x*, The symphysis of the ossa pubis

## FIG. 5.

*The End of the SMALL, and Beginning of the GREAT INTESTINES, viewed from the Left Side.*

- a, a*, A portion of the intestinum ilium.  
*b, b*, The intestinum cæcum;  
*c, c*, Its vermiform process.  
*d, d*, The beginning of the colon.



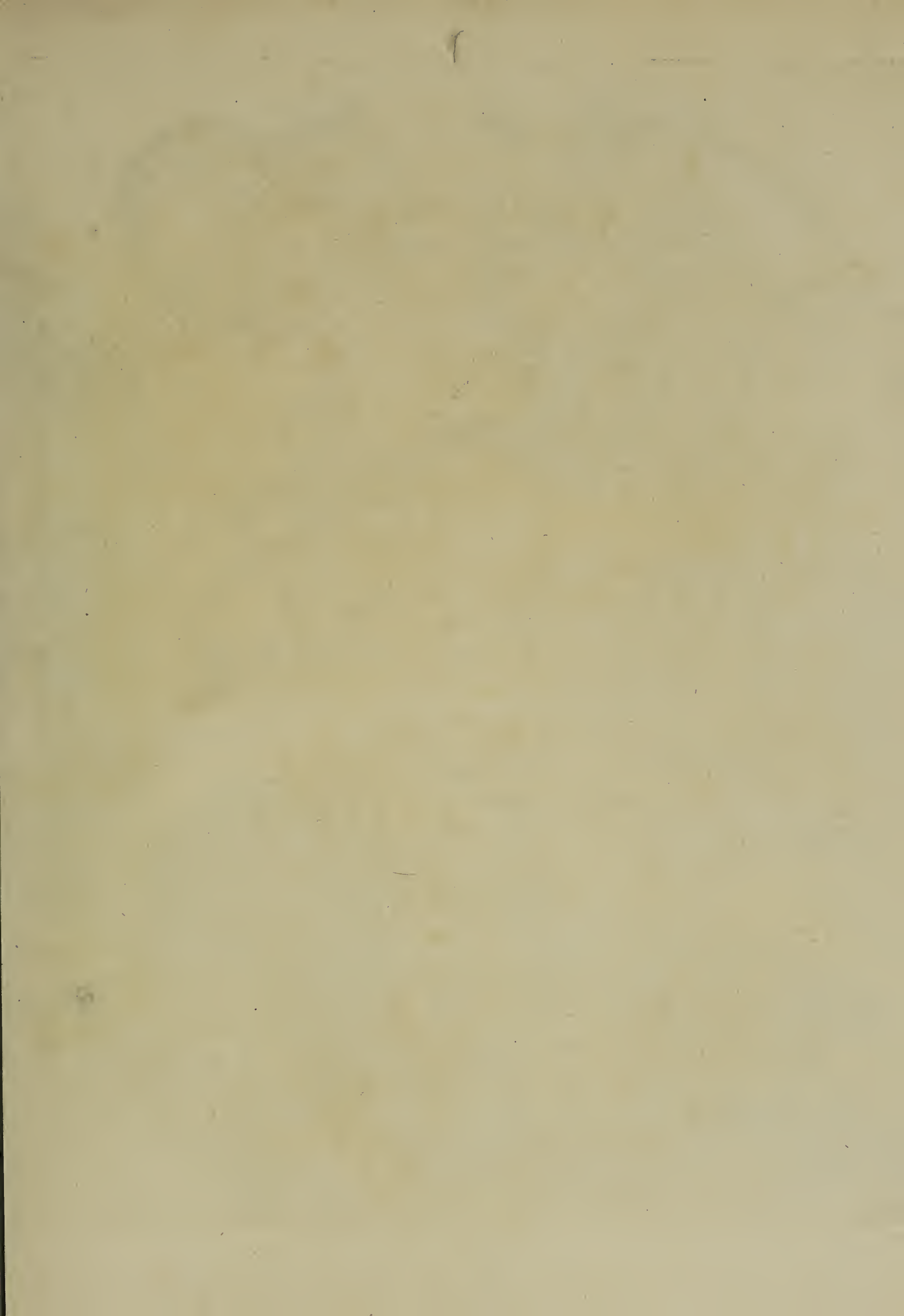




FIG. 1.



FIG. 2.

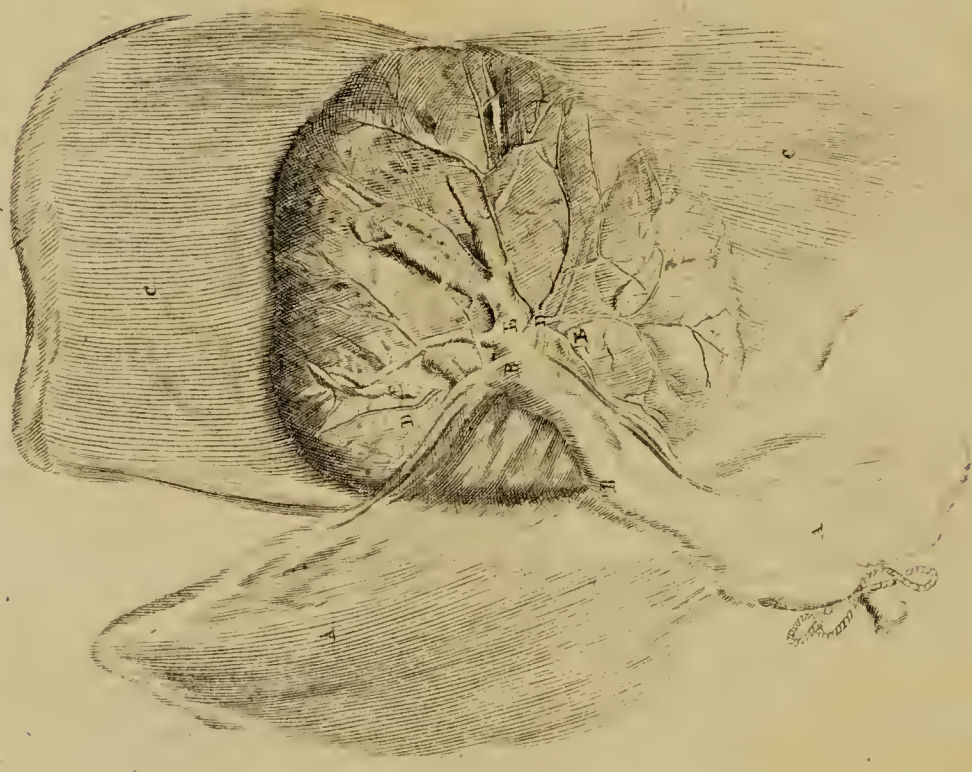


FIG. 3.

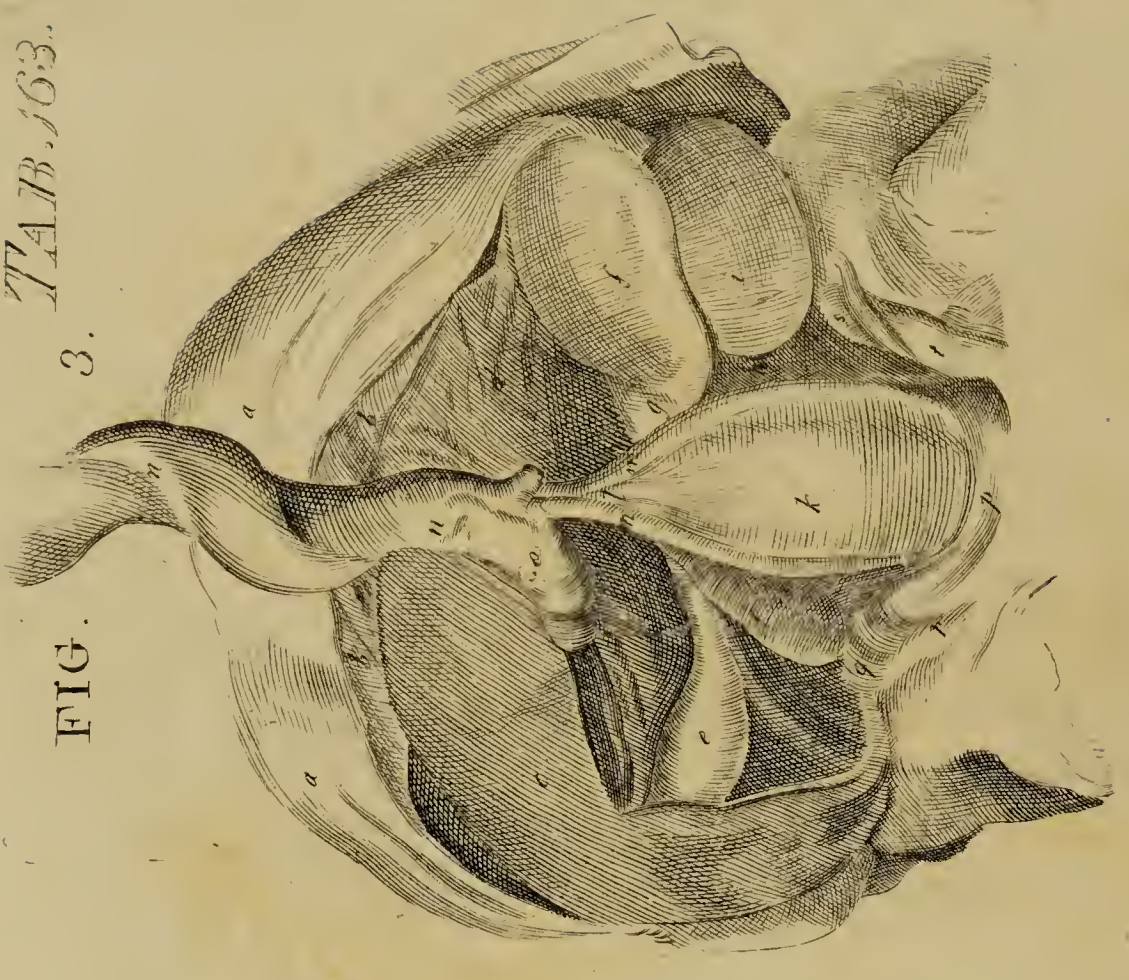


FIG. 4.

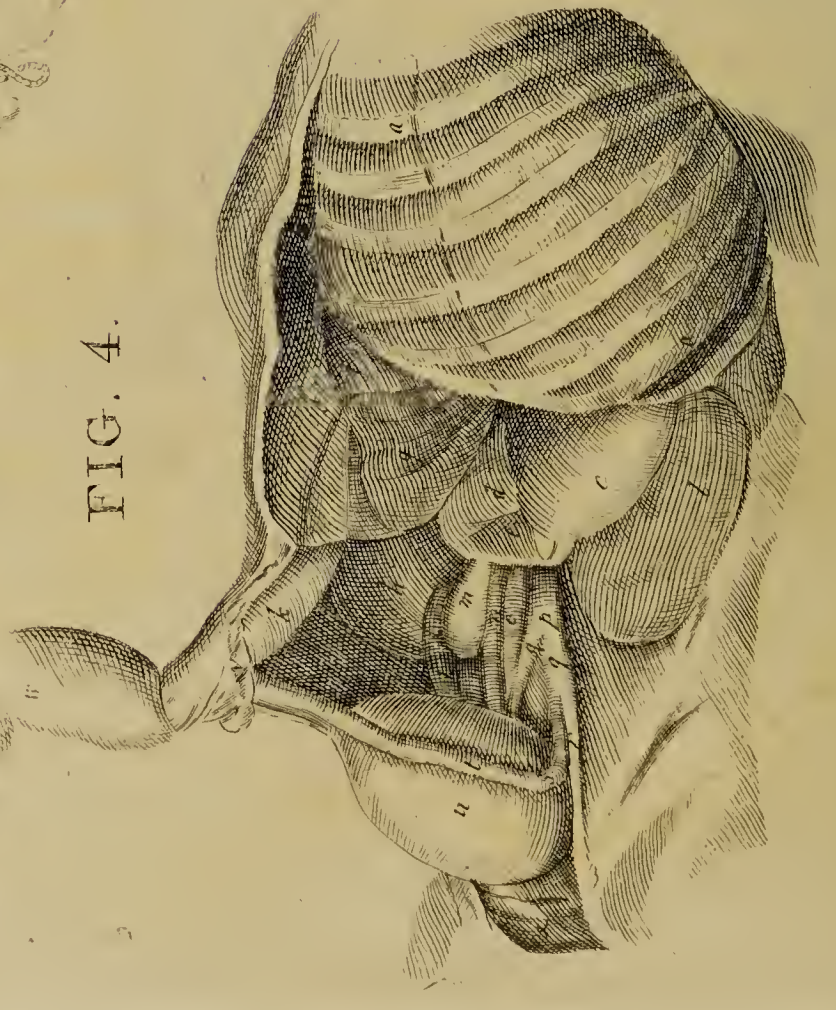


FIG. 5.



FIG. 6.



FIG. 7.

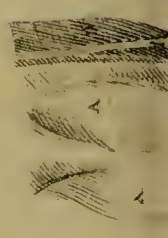


FIG. 8.



FIG. 9.



FIG. 16







FIG. 12.

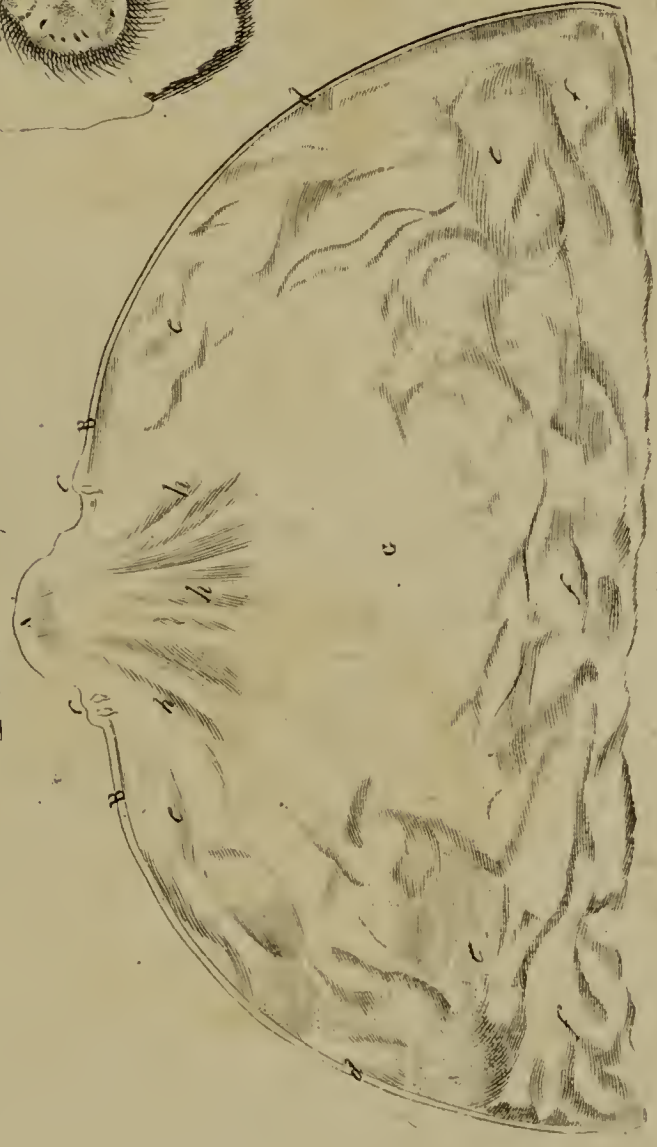


FIG. 15



FIG. 13.

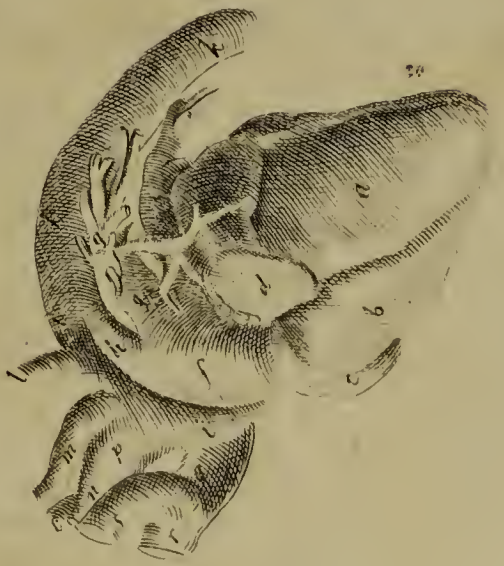


FIG. 10.



FIG 14

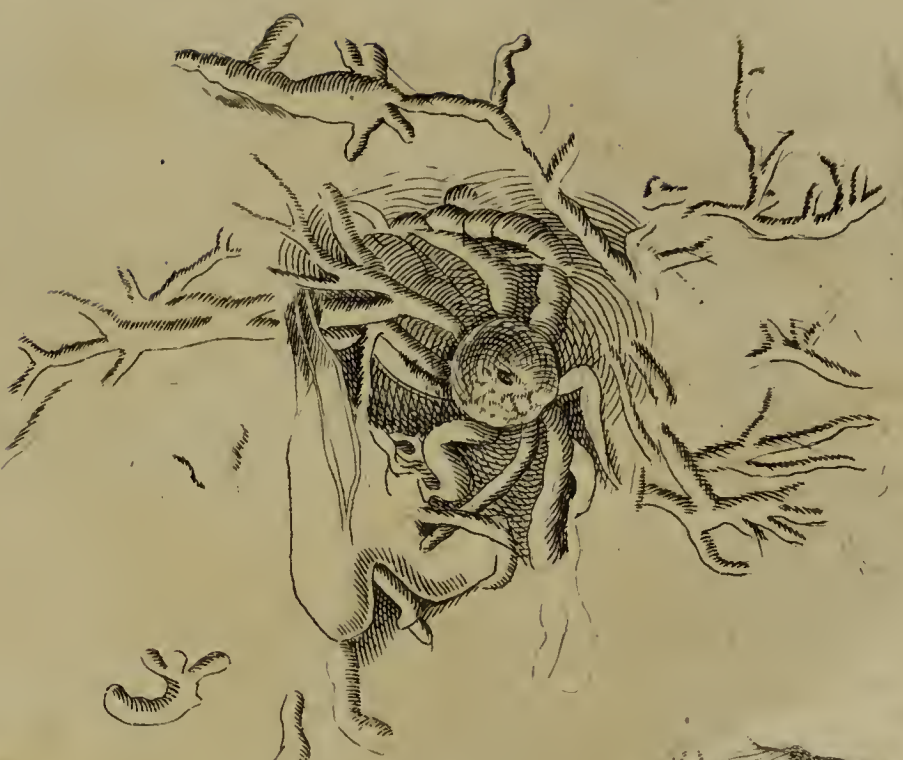


FIG. 11.

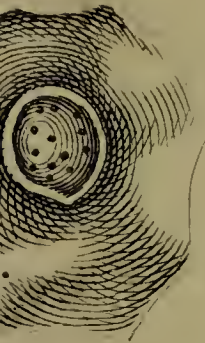
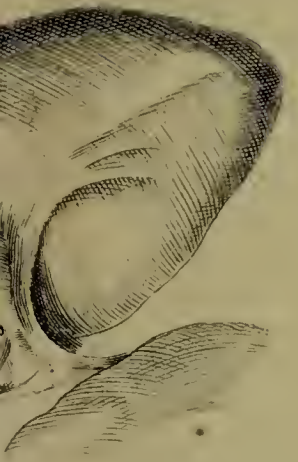








FIG. 6.

Shews the Form and Size of the Stomach of a Full-grown Fœtus, moderately distended.

FIG. 7.

Shews the following Parts of a Fœtus born at the full time, and which died immediately after Birth.

- A, A, The two lobes of the thyroid gland.  
 B, The trachea.  
 C, C, The right lobe of the lungs.  
 D, The bronchi of the left lobe cut off.  
 E, The left ventricle of the heart.  
 F, Part of the right ventricle.  
 G, A division between the two ventricles, very distinct in the fœtus.  
 H, The arch of the aorta.  
 I, The right subclavian artery.  
 K, The right carotid.  
 L, The left carotid.  
 M, The left subclavian.  
 N, The aorta descendens.  
 O, The trunk of the pulmonary artery ;  
 P, Its left pulmonary branch.  
 Q, The ductus arteriosus.  
 R, The left auricle.  
 S, S, The left sinus venosus.  
 T, Branches of the left pulmonary vein.  
 V, A small portion of the right lobe of the lungs.  
 X, X, X, A portion of the diaphragm.  
 Q, The trunk of the superior vena cava.  
 Z, ————— inferior vena cava.  
 a, a, a, The inferior surface of the small lobe of the liver.  
 b, The lobulus SPIGELII.  
 c, c, The eminence called Porta.  
 d, d, Part of the liver which surrounded the umbilical vein, divided.  
 e, The gall-bladder.  
 f, The umbilical vein laid open.  
 g, The vena portæ also laid open.  
 h, The orifice of the right branch of the vena portæ, going to the large lobe of the liver.  
 i, The left branch which goes to the small lobe, slit open.  
 k, The ductus venosus, opened longitudinally.  
 l, m, Its oblique terminations.  
 n, Part of the pharynx.  
 o, The esophagus.  
 p, The bottom of the stomach.  
 q, The pylorus.  
 r, Part of the colon.  
 s, ————— small intestines.  
 t, t, The left part of the eighth pair of nerves.  
 u, u, The recurrent branch of the eighth pair of nerves.

VOL. II.

FIG. 8.

The HEART, with the Right AURICLE opened and drawn aside, to obtain a view of the FORAMEN OVALE.

- a, a, The anterior part of the septum of the auricles.  
 b, b, The posterior part of the septum.  
 c, The valve of,  
 d, The foramen ovale.

FIG. 9.

The HEART, with the Left AURICLE opened.

- a, a, The pulmonary artery.  
 b, b, b, The cut edge of the opened auricle.  
 c, c, A probe passed from the left auricle through the foramen ovale, into,  
 d, d, The inferior vena cava.  
 e, e, The anterior part of the septum, the margin of which terminates in the right auricle.  
 f, f, The valve of the foramen ovale, which extends from the posterior part of the septum to the left auricle, where it is seen raised upon a probe.  
 g, The orifice of the left ventricle.  
 h, The left ventricle.  
 i, The right ventricle.  
 k, k, The division between the ventricles.

FIG. 10.

Shews the HEART of the Fœtus resting upon the Right VENTRICLE to bring into view the Connexion of the DUCTUS ARTERIOSUS with the PULMONARY ARTERY and AORTA.

- a, The left ventricle ;  
 b, The right one.  
 c, The apex of the right auricle.  
 d, The left auricle.  
 e, e, Branches of the left pulmonary vein.  
 f, The pulmonary artery.  
 g, g, The left branch of the same, with its divisions.  
 h, The ductus arteriosus.  
 i, i, The arch of the aorta.  
 k, k, The aorta descendens.  
 l, The left subclavian artery.  
 m, ——— carotid.  
 n, The right carotid, and,  
 o, ——— subclavian.  
 p, Their common origin.  
 q, The trunk of the vena cava superior.  
 r, The right, and,  
 s, The left jugular vein.

FIG.



## FIG. 11.

*Shews the HEART, with some of the adjacent Parts, from the same Subject, in an inverted Situation.*

- a*, The apex of the heart.
- b*, The vena cava inferior.
- c*, The oblique termination of the venous canal.
- d, d*, The esophagus.
- e, e*, The trachea.
- f*, The recurrent nerve.
- g, g*, The lungs.
- h*, The right subclavian artery.
- i, i*, ——— carotid.
- k, k*, The left carotid.
- l*, ——— subclavian vein.
- m*, The arch of the aorta.
- n*, The aorta descendens opened and expanded.
- o*, The mouth of the ductus arteriosus opening into the aorta.
- p*, The obliquity of this opening, acting as a valve upon the termination of this duct.

## FIG. 12.

*Represents a Perpendicular SECTION of the MAMMA, through the Centre of the PAPILLA.*

- A*, The papilla.
- B, B*, The boundaries of the areola.
- c, c*, A section of three of the sebaceous glands, where likewise a few lactiferous ducts sometimes terminate.
- d, d*, The integuments of the mamma.
- e, e, e, e*, The superior or exterior stratum of fat.
- f, f, f*, The inferior or interior stratum of fat.
- C*, The glandular part of the mamma, situated between the two strata of fat; of an irregular figure, compacted

into one large body, in the inner parts of which no remarkable intervals filled with fat are observed.

- h, h, h*, Large lactiferous ducts, as they appeared in this section, going from the glandular part to the papilla.

## FIG. 13.

*Gives a View of the Trunk and Branches of one of the Lactiferous Ducts, dilated.*

## FIG. 14.

*Part of the MAMMA of a Woman Thirty-six years of Age, whose Lactiferous Ducts were filled with Quick-silver,—seen from the Anterior Part, the Integuments being removed.*

- a*, The papilla. Surrounding this are seen twelve lactiferous ducts. A thirteenth the painter was obliged to omit, because too deep-seated. The other parts of the figure are formed by the glandular portion of the mamma placed in fat.

## FIG. 15.

*The Areola of the Mamma inverted. The Lactiferous Ducts are dissected where they pass under the papilla. The outer part of the figure shews the inner side of the Areola.*

## FIG. 16.

*An outside view of the Nipple and Areola; in the former are seen the orifices of thirteen Lactiferous Ducts, in the latter a few of the mouths of the Sebaceous Follicles appear.*











## T A B L E    C L X I V .

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*In a CHILD born at the full time, the INTEGUMENTS, BONES, and MUSCLES covering the Fore Part of the THORAX, cut and removed, to obtain a View of the VISCERA. The BLOOD-VESSELS were injected with Glue thrown into the UMBILICAL VEIN.*

- |   |  |
|---|--|
| <p>A, A, The cut edge of the integuments and muscles of the thorax.</p> <p>B, B, The upper part of the sternum divided, and drawn out.</p> <p>C, C, A section of the ribs and intercostal muscles.</p> <p>D, D, The flaps, formed by the under part of the integuments and muscles of the abdomen, turned down.</p> <p>E, E, The two lobes of the thymus gland lying over the great vessels at the upper part of the heart; the cornua ascending some way in the neck.</p> <p>F, Veins descending from the thyroid gland.</p> | <p>G, G, G, H, H, The three right, and two left lobes of the lungs, inflated.</p> <p>I, The right auricle, and,</p> <p>K, The right ventricle of the heart.</p> <p>L, L, The cartilaginous margin of the thorax.</p> <p>M, The cartilago ensiformis.</p> <p>N, O, The right and left lobes of the liver, the left extending into the hypochondrium of that side.</p> <p>P, The stomach.</p> <p>Q, Q, The small intestines.</p> <p>R, R, The colon.</p> <p>S, The bladder of urine inflated.</p> <p>T, The urachus.</p> <p>U, U, The two umbilical arteries.</p> <p>V, The umbilical vein.</p> <p>W, The umbilicus.</p> <p>X, The collapsed umbilical cord.</p> |
|---|--|

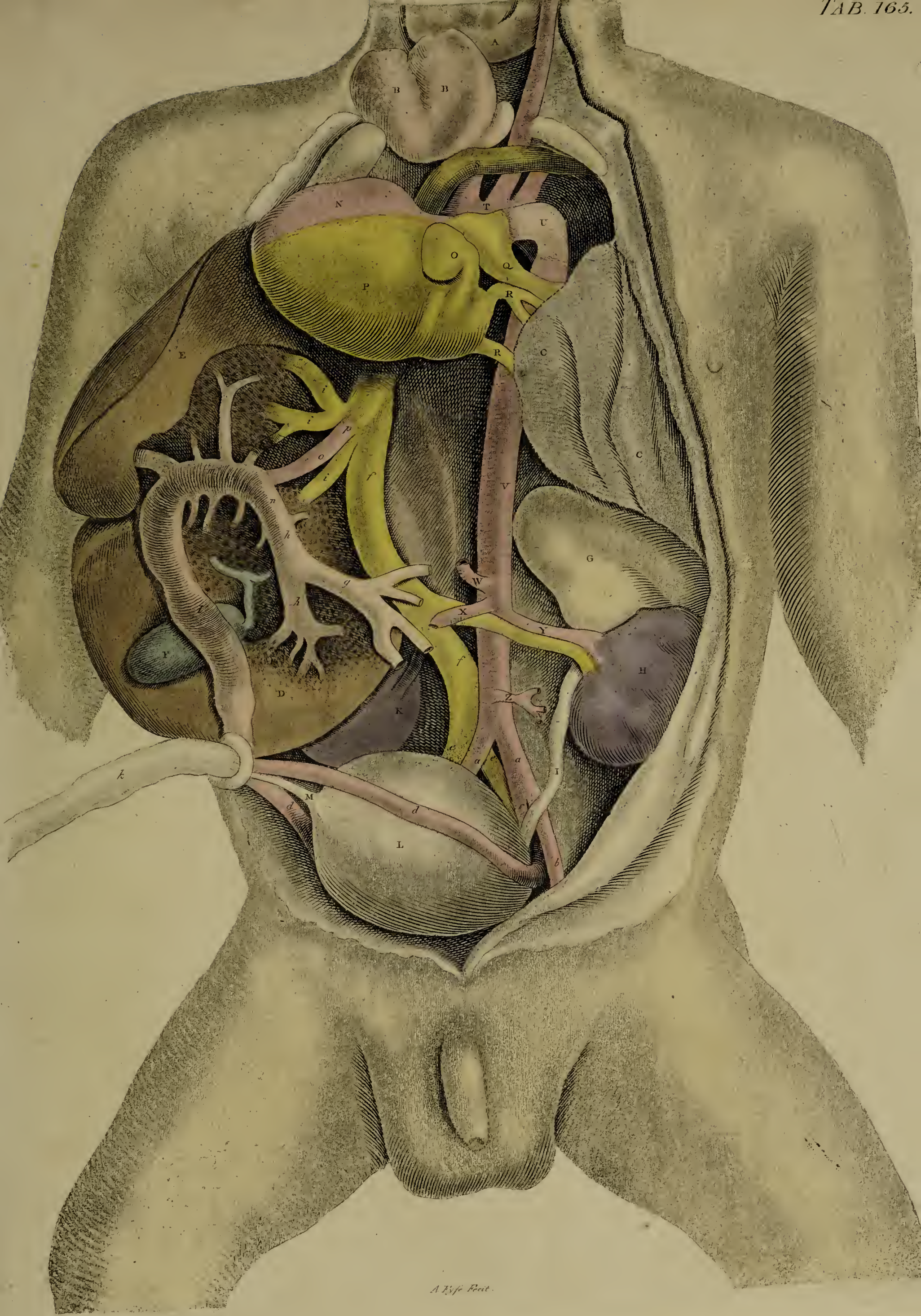


## T A B L E CLXV.

The Peculiarities of the BLOOD-VESSELS in the Fœtus, shewn from the same Subject with that represented in the former Table. To the real size of the VESSELS in the Subject of this Figure, particular attention was paid.

- 
- |  |   |
|--|---|
| A, The thyroid gland.  | V, The continuation of the aorta descendens.  |
| B, B, The lobes of the thymus gland turned up.   | W, The cœliac artery.   |
| C, C, The left lobes of the lungs.   | X, The superior mesenteric artery.  |
| D, E, The liver dissected and turned over to the right side; the inferior surface seen; D, the great, and, E, the small lobe. As much of the substance of the liver is dissected away, as to shew the veins which enter it, or come out from it. | Y, The right renal artery, with its corresponding vein.   |
| F, The gall-bladder, with the trunks of the biliary ducts.   | Z, The inferior mesenteric artery.  |
| G, The renal gland of the left side.   | <i>a, a</i> , The two common iliac arteries.  |
| H, The corresponding kidney.   | <i>b</i> , The external iliac artery of the left side.  |
| I, The ureter.   | <i>c</i> , The root of the internal iliac artery of that side.  |
| K, Part of the right kidney.   | <i>d, d</i> , The two umbilical arteries running along the sides of the bladder.  |
| L, The bladder of urine inflated.  | <i>e, e</i> , The common iliac veins.   |
| M, The urachus.  | <i>f, f</i> , The vena cava inferior.   |
| N, O, P, The heart drawn over to the right side; N, the right ventricle; O, the left auricle; P, The left ventricle.   | <i>g</i> , The vena portæ.  |
| Q, The left branch of the pulmonary artery.  | <i>h, h</i> , The right and left branches of the vena portæ.  |
| R, R, The corresponding veins, with their termination in the left auricle.   | <i>i, i, i</i> , The venæ cavæ hepaticæ.  |
| S, The subclavian vein.  | <i>k</i> , The collapsed umbilical cord.  |
| T, The arch of the aorta, with the three great arteries sent off from it.  | <i>l</i> , The umbilical vein.  |
| U, The ductus arteriosus, passing from the trunk of the pulmonary artery into the beginning of the descending aorta.   | <i>m</i> , The umbilical vein sending branches to the right and left lobes of the liver, but chiefly to the latter.                         |
|  | <i>n</i> , The trunk common to the umbilical vein and left branch of the vena portæ.  |
|  | <i>o</i> , The ductus venosus.  |
|  | <i>p</i> , Its termination, along with the left vena hepatica, in the vena cava, where that great vein is about to perforate the diaphragm. |





A. Visei fecit.



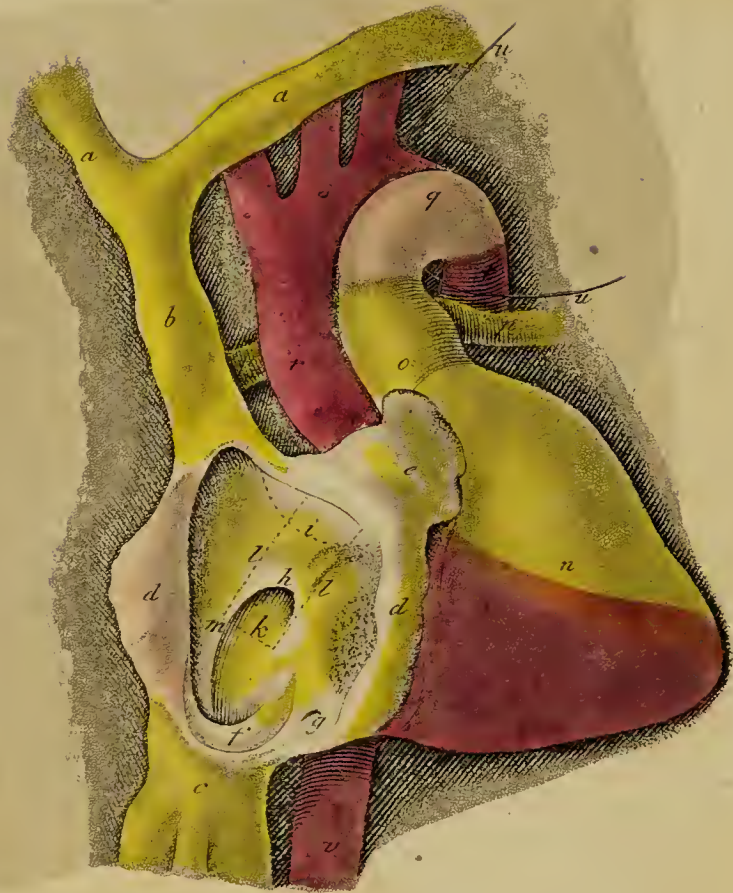








TAB. 166.





## T A B L E CLXVI.

The HEART of the FŒTUS represented in the two last Tables, with the RIGHT AURICLE cut open, to shew the FORAMEN OVALE. The HEART is pulled considerably over to the Left Side, to bring the Parts within the AURICLE properly into View.

- 
- |  |   |
|--|---|
| <p><i>a, a</i>, The two subclavian veins.</p> <p><i>b</i>, The vena cava superior, with its termination in the upper part of the right auricle.</p> <p><i>c</i>, The vena cava inferior, with the venæ hepaticæ terminating in it.</p> <p><i>d, d</i>, The right auricle cut open.</p> <p><i>e</i>, The proper auricle.</p> <p><i>f</i>, The valve of EUSTACHIUS over the mouth of the inferior cava, and its oblique situation seen with respect to the termination of the latter.</p> <p><i>g</i>, The termination of the great coronary vein at the side of the EUSTACHIAN valve.</p> <p><i>h</i>, The beginning of the foramen ovale, which passes obliquely up between the septum of the auricles, and its proper valve.</p> <p><i>i</i>, A dotted line opposite to the upper edge of the valve of the foramen ovale.</p> <p><i>k</i>, A dotted line at the root of this valve.</p> | <p><i>l, l</i>, Two dotted lines marking the size of the passage through the foramen ovale.</p> <p><i>m</i>, The anulus foraminis ovalis.</p> <p><i>n</i>, The right ventricle.</p> <p><i>o</i>, The pulmonary artery.</p> <p><i>p, p</i>, The two pulmonary branches of this artery.</p> <p><i>y</i>, The third branch of this artery, termed <i>Ductus Arteriosus</i>, terminating in the aorta descendens. The dotted lines mark the length of this duct.</p> <p><i>r</i>, The ascending aorta.</p> <p><i>s</i>, The arch of the aorta sending off the subclavian and carotid arteries.</p> <p><i>t</i>, The aorta descendens, after receiving the ductus arteriosus.</p> <p><i>u, u</i>, A crooked wire introduced between the ductus arteriosus and aorta.</p> <p><i>v</i>, The continuation of the aorta.</p> |
|--|---|



## T A B L E CLXVII.

A VIEW of the Peculiarities in the HEART and BLOOD-VESSELS, with the Situation of the TESTES in the FÆTUS.

FIG. 1.

*PECULIARITIES in the VESSELS of the LIVER.*

- a*, The umbilical vein.
- b*, The part where it enters the liver.
- b, c*, Branches from it to the liver.
- d*, The vena portarum.
- e*, The division of the vena portarum into two principal branches.
- f*, The left branch of the vena portarum joining the umbilical vein.
- g*, The right branch of the vena portarum to the liver.
- h*, The branch called *Ductus Venosus*.
- i*, The termination of the duct in the left hepatic vein.
- k*, The hepatic vein terminating in the inferior cava.
- l*, The right hepatic vein.
- m, m*, The inferior vena cava.

FIG. 2.

*A View of the Right Side of the HEART, with the AURICLE of that Side laid open, in a CHILD a few days old.*

- a*, The superior cava, and immediately below the *a*, the *Isthmus VIEUSSENI*, or *Anulus Fossæ Ovalis*.
- b*, The inferior cava.
- c*, The right sinus open near the hepatic veins.
- d*, The orifice of the coronary vein.
- e*, The foramen ovale.
- f*, The opening in the upper part of the foramen ovale, the rest being covered by its valve.
- g*, The right ventricle.
- h*, The left ventricle.

FIG. 3.

*The CAVITIES and Large ARTERIES of the HEART of a FÆTUS, distended with Wax, and viewed Anteriorly.*

- a*, The superior vena cava.
- b*, The right auricle.
- c*, The right ventricle.
- d*, The pulmonary artery.
- e, e*, The two pulmonary veins.

*f*, The ductus arteriosus, continued from the trunk of the pulmonary artery to the beginning of the aorta descendens.

*g, g*, The right and left pulmonary veins.

*h*, The left auricle.

*i*, The left ventricle.

*k*, The aorta descendens.

FIG. 4.

*Exhibits the LOINS and PELVIS of a FÆTUS at an early Period, to shew the TESTES in the ABDOMEN without any Covering, adhering by the PERITONEUM, with the SPERMATIC BLOOD-VESSELS and VASA DEFERENTIA at a distance from each other.*

- a*, One of the lumbar vertebræ.
- b, b*, The muscles of the loins, covered by the peritoneum.
- c*, The sigmoid flexure of the colon.
- d, d*, The kidneys, covered by the peritoneum.
- e, e*, The ureters.
- f*, The bladder of urine, a portion of which is cut off.
- g, g*, The spermatic blood-vessels.
- h, h*, The bodies of the testes.
- i, i*, The epididymis in each side.
- k, k*, The vasa deferentia.
- l*, The spermatic cord of the right side entering the ring of the external abdominal muscle.
- m*, The gubernaculum testis of HUNTER fixed to the bottom of the scrotum, which is here laid open.
- n*, The penis.
- o*, The scrotum.

FIG. 5.

*The PELVIS of an ABORTION of about Six Months, to shew the TESTES and other Parts a little more advanced than those represented in the preceding Figure.*

- a*, The third vertebra lumborum.
- b, b*, A section of the *psœ* muscles.
- c, c*, The peritoneum and muscles of the abdomen covering the *cristæ* of the *ossa ilia*.
- d, d*, The colon, at this time destitute of valves, filled with the *meconium*.

*e*, The



TAB. 167.

Fig. 1.



Fig. 2.



Fig. 4.

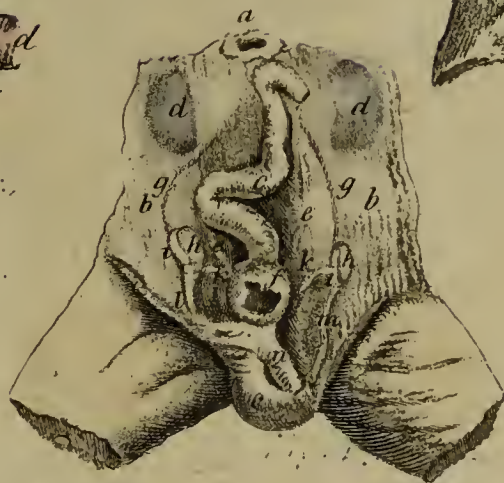


Fig. 5.



Fig. 3.

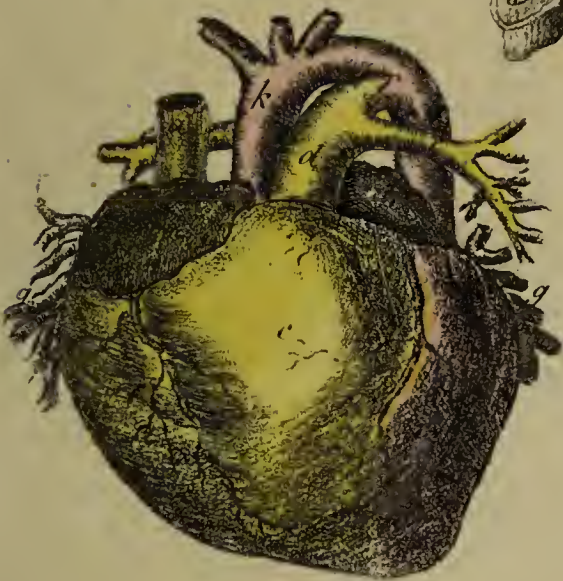
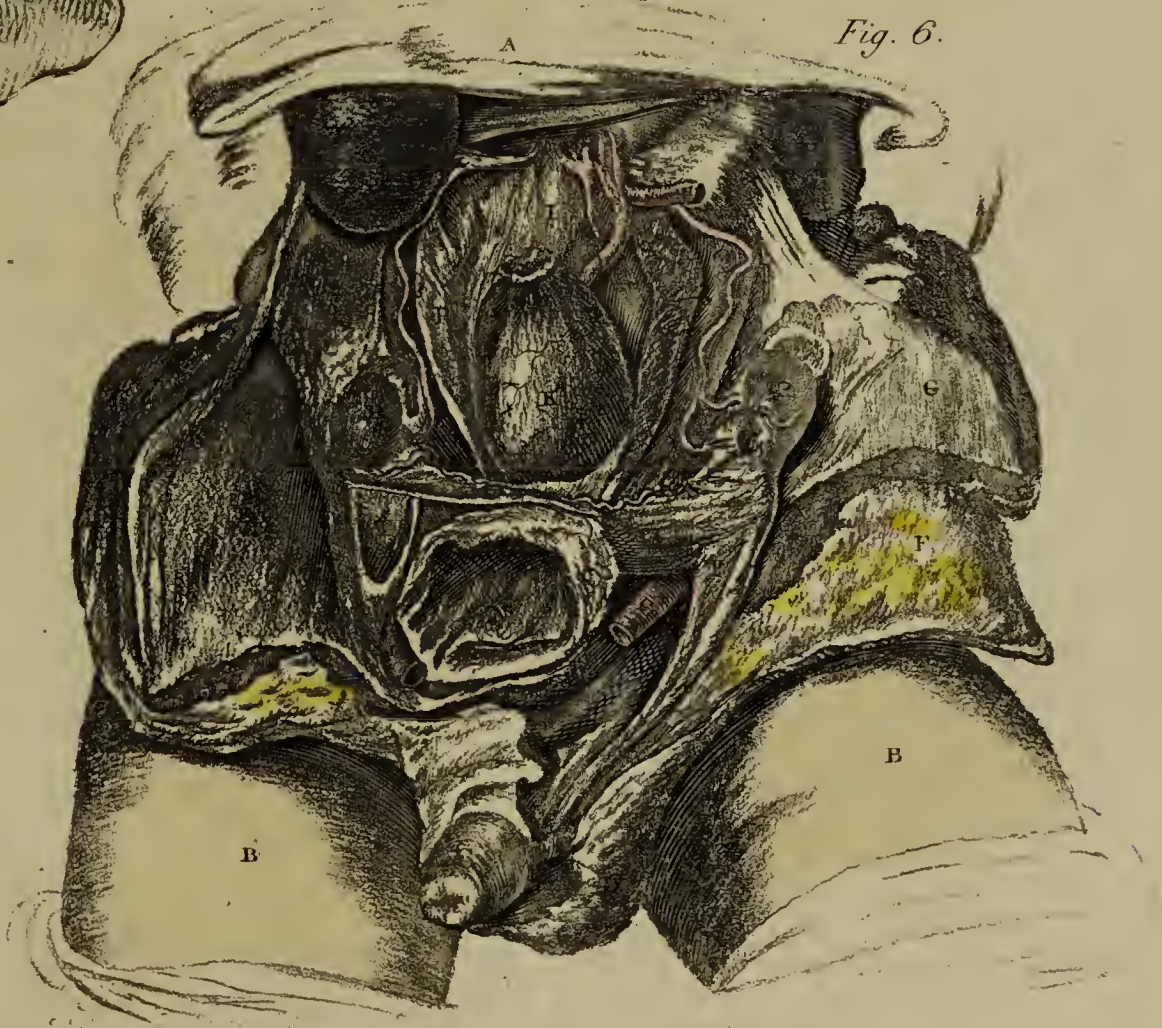
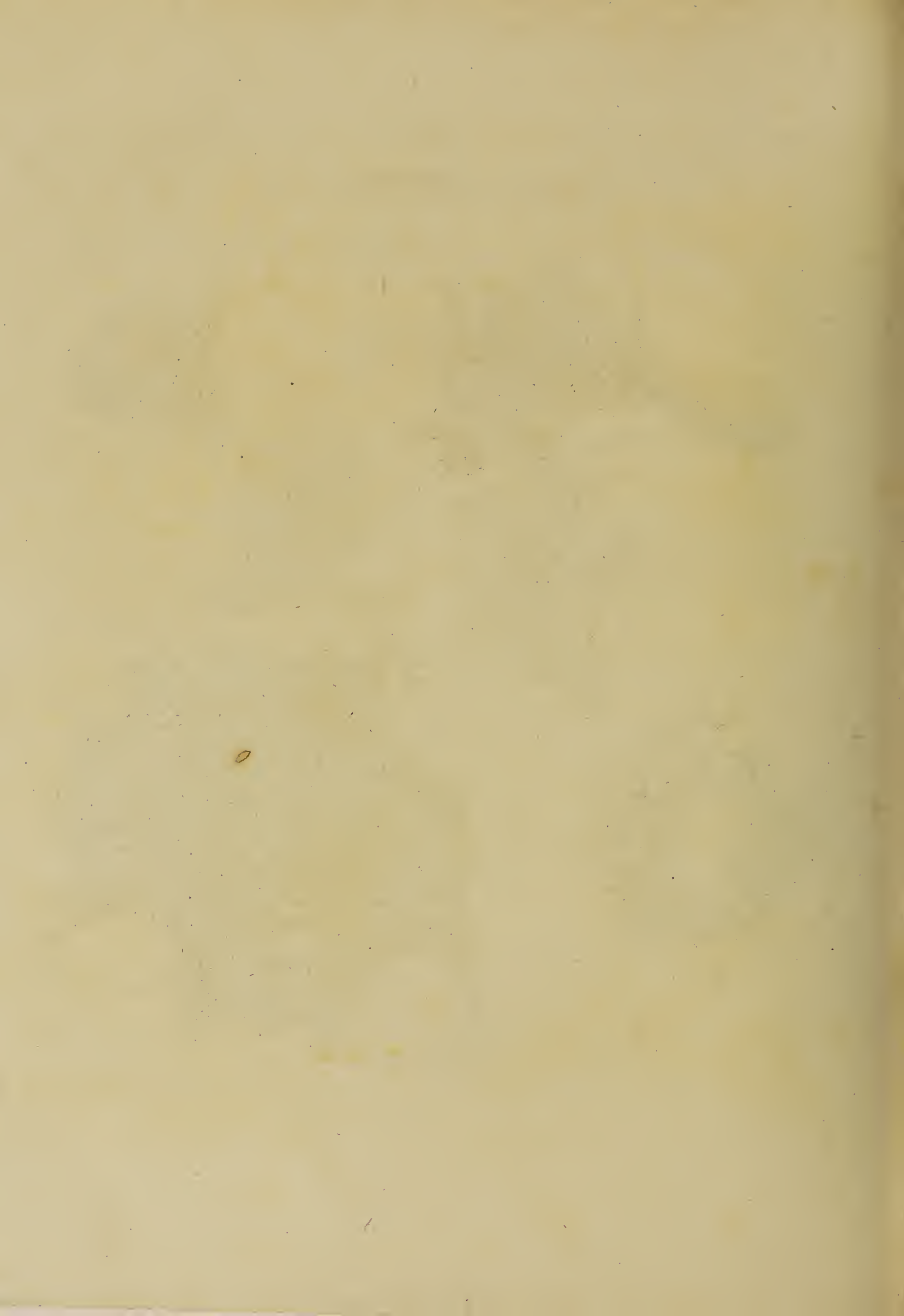


Fig. 6.









- e*, The meso-colon.  
*f*, The left ureter.  
*g*, The penis.  
*h*, The scrotum.  
*i, i*, The spermatic blood-vessels.  
*k, k*, The testes.  
*l, m*, A process on each side formed by the peritoneum; the left one, *m*, descending farther than the right.  
*n, n*, The vasa deferentia.  
*o*, The bladder of urine.  
*p, p*, The umbilical arteries.  
*q*, The urachus.  
*r*, The umbilical vein cut across.  
*s, s*, The anterior and under parts of the abdominal viscera turned down.

## FIG. 6.

*The Situation of the TESTES in the ABDOMEN of another FÆTUS, said also to be about Six Months. The Parts in the ABDOMEN are in general covered by the PERITONEUM.*

- A, The upper part of the abdomen covered with a cloth.  
 B, B, The thighs.  
 C, The penis.  
 D, The scrotum.  
 E, F, G, The flap of the integuments, abdominal muscles, and peritoneum, turned back.

- H, H, The lower part of the kidneys.  
 I, The projection formed by the vertebræ of the loins and large blood-vessels.  
 K, The rectum filled with meconium, tied at its upper part.  
 L, A branch of the inferior mesenteric artery which went to the colon.  
 M, A branch of the inferior mesenteric artery going to the pelvis.  
 N, The lower part of the bladder, the upper portion being cut off, to obtain a view of the parts behind it.  
 O, O, The hypogastric, or umbilical arteries.  
 P, P, The ureters passing over the psoæ muscles and iliac vessels.  
 Q, Q, The spermatic arteries, somewhat serpentine.  
 R, R, The testes placed before the psoæ muscles, a little higher than the groins, and turned somewhat outwards, to shew the passage of the spermatic vessels into them in the duplicature of the peritoneum. At the upper end of each testis is seen the beginning of the epididymis, the rest of it being hid by the body of the testis.  
 S, S, The vasa deferentia in their course to the vesiculæ seminales.  
 T, T, What MR HUNTER calls the *Gubernacula*, or *Ligaments* of the Testes.—The left ligament is entire, and is seen passing from the under end of the testicle, through the abdominal ring, to the scrotum: The right is cut away on its upper and fore part, to shew the beginning of the vas deferens.



## T A B L E CLXVIII.

Additional VIEWS to those in the former Table, of the Situation of the TESTES in the FÆTUS at different Periods.

FIG. 1.

*In a FÆTUS somewhat older than that represented in Fig. 6. of Tab. CLXVII. the State of the TESTES is shewn, when they have recently descended from the ABDOMEN into the SCROTUM. The Small INTESTINES are removed, the Large are left nearly in their Natural Situation.*

- a, a,* The liver in outlines.
- b, b,* The thighs.
- c,* The penis.
- d,* The middle of the scrotum, the fore part of the sides of which are cut away, that the testes may appear.
- e, e,* The integuments dissected from the abdomen, and turned down.
- f,* The intestinum cæcum.
- g, g,* The appendix vermiformis.
- h,* The arch of the colon.
- i,* The turn of the colon under the spleen.
- k,* The colon descending on the outside of the left kidney.
- l,* The sigmoid flexure of the colon, which in adults is seated lower in the cavity of the abdomen.
- m,* The beginning of the rectum.
- n,* Part of the abdominal muscles, with the peritoneum turned over the spine of the right os ilium.
- o, o,* The lower part of the obliquus externus of the left side.
- p,* The lower part of the rectus abdominis, so that the epigastric artery appears upon it.
- q,* The bladder of urine.
- r,* The urachus.
- s,* The femoral vessels passing behind the crural arch to the thigh.
- t,* The external surface of the spermatic cord of the left side.
- u,* The appearance of the testicle, when its tunica vaginalis, or process of the peritoneum, is a little distended with air or water poured into it from the cavity of the abdomen.
- v,* The right testis fully exposed, by laying open the peritoneal process through its whole length.
- w,* The epididymis of the same side.
- x, x,* The spermatic blood-vessels.

*y,* The vas deferens, which, with the spermatic vessels, is covered by the peritoneum.

*z,* The ureter.

*§,* The remains of the gubernaculum testis.

The part of the peritoneum which, in this figure, is carried down in the form of a hernial sac to a little below the testis, covers the testis, epididymis, spermatic vessels, and vas deferens, in the same manner as it covers the viscera in the cavity of the abdomen; the posterior part of the sac is united with them, and gives them a smooth covering, while the anterior part lies loose before them, and may be removed to some distance from them, as is the case when fluids are generated in the cavity of the sac.

FIG. 2.

*Represents the TESTES, &c. in the same Subject as Fig. 1. the Parts above the OSSA ILII being cut away, and the ABDOMINAL MUSCLES and BLADDER being turned down.*

*a, a,* The thighs.

*b,* The penis.

*c,* The middle of the scrotum, its lateral parts being removed to shew the testes.

*d, d,* The integuments of the abdomen turned down over the thighs.

*e, e,* Part of the abdominal muscles and peritoneum turned down at the groins.

*f, f,* The peritoneum covering the internal iliac muscles.

*g,* The intestinum rectum filled with meconium.

*h,* The bladder, with the umbilical artery at each side of it, turned a little forwards over the symphysis of the pubes.

*i, i,* The ureters passing over the iliac vessels to the pelvis.

*k,* The right testis exposed, as in Fig. 1. *v.*

*l,* The left testicle inclosed in the process of the peritoneum, as in Fig. 1. *u.*

*m,* The spermatic vessels of the left side, seen through the peritoneum which covers them.

*n,* The left vas deferens, seen through the peritoneum, in its passage from the mouth of the sac to the posterior part of the bladder.

*o,* The



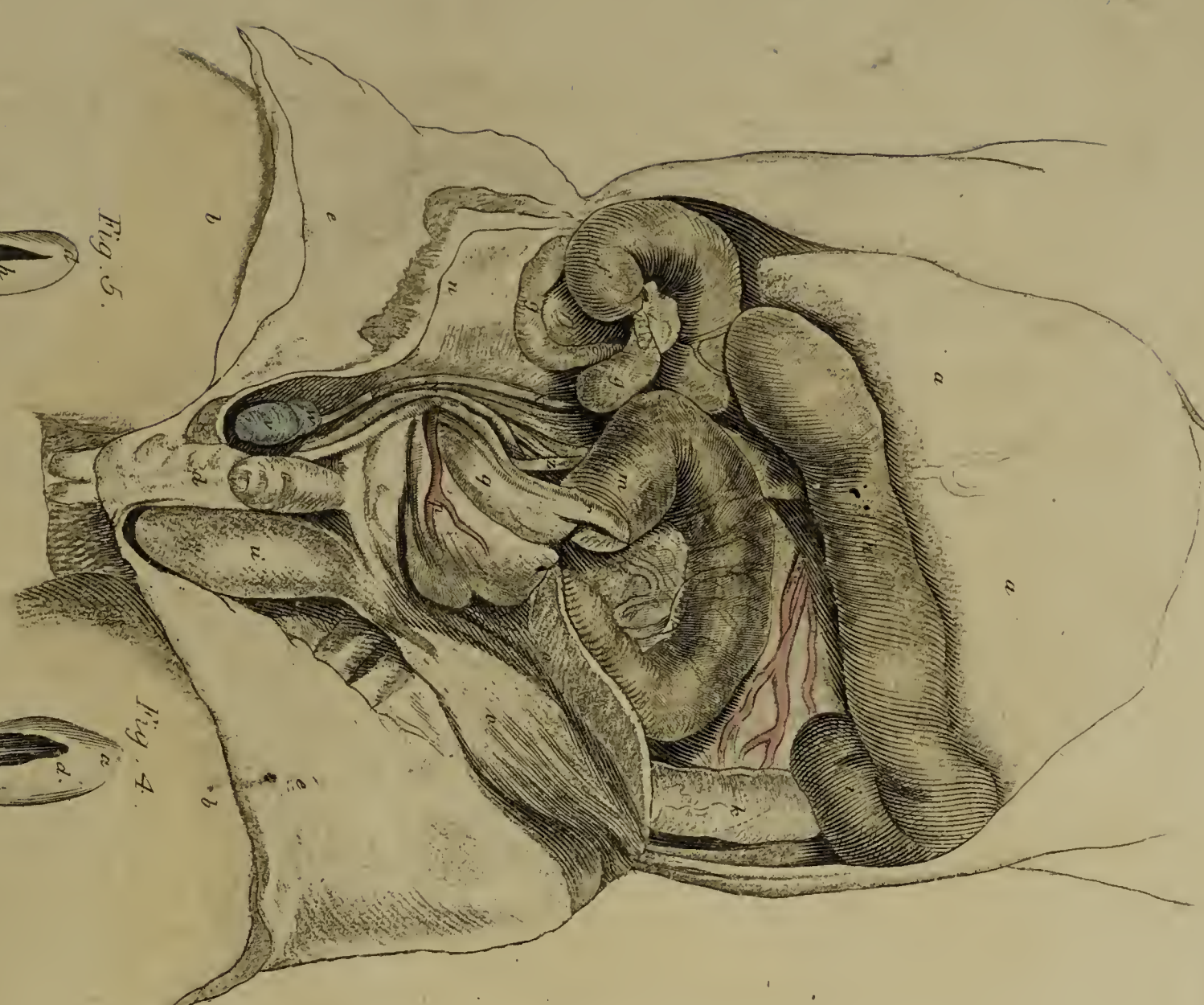


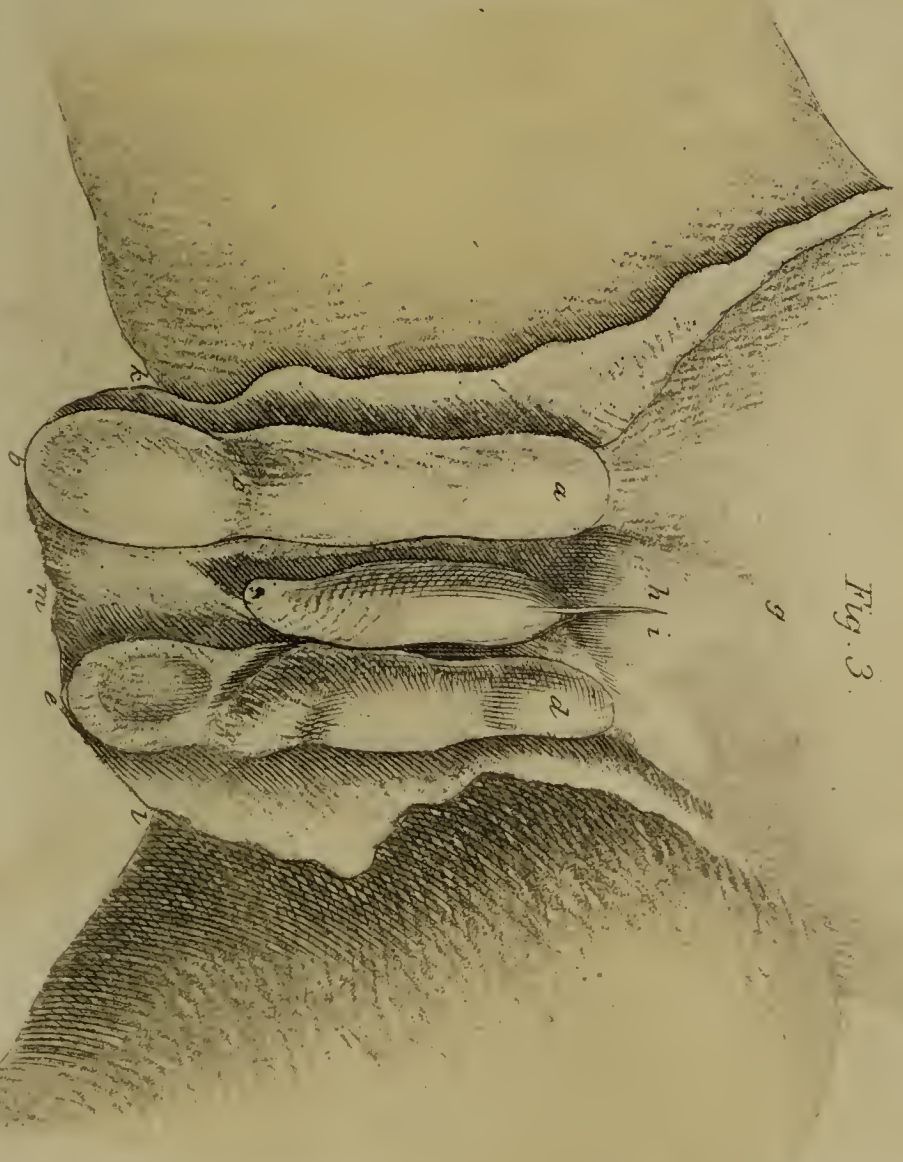
Fig. 5.



Fig. 4.



Fig. 3.









*o*, The aperture of the process of the peritoneum, by which it communicates with the cavity of the abdomen. This passage generally closes, and the membrane becomes smooth, soon after the testis has got into the scrotum.

*p*, The left epigastric, branching upon the inside of the rectus muscle, which is turned outwards.

FIG. 3.

*Exhibits, in a new-born CHILD, the MEATUS or PASSAGES of the two SPERMATIC CORDS, the Right entire, the Left surrounding the Cord only. The INTEGUMENTS of the ABDOMEN, GROINS, and SCROTUM, and of the Upper Half of the PENIS, are removed.*

*a, b, c*, The meatus dexter inflated; *c*, a stricture where the peritoneal process had begun to adhere to the spermatic cord.

*d, e, f*, The meatus sinister, which at *f* is united with the cord, forming *e, f*, the tunica vaginalis testis, and *d, f*, the vagina of the cord.

The tunica vaginalis testis was turgid with a reddish jelly, through which the testicle appeared obscurely, as at the shaded spot.

*g, h, i*, The muscoli pyramidales.

*k, l, m*, The integuments of the scrotum laid open.

The two meatus consisted of the processes of the peritoneum, with the cremaster muscles, and a covering from the muscles of the abdomen.

FIG. 4.

*The MEATUS DEXTER laid open, to shew its Internal Cavity entire.*

*a, b*, The meatus.

*c*, The stricture.

*A*, The testicle.

*B*, The epididymis.

*d, e*, The spermatic vessels.

FIG. 5.

*The MEATUS SINISTER opened, to shew the SPERMATIC VESSELS and TESTICLE.*

*e, f, i*, The tunica vaginalis testis.

*i, e*, The stricture where the cord and its coverings are united.

*d, i, e*, The vaginal coat of the cord.

*E*, The testicle.

*F*, The epididymis.

*f, g*, The spermatic blood-vessels.

*f, h*, The vas deferens.

END OF PART FOURTH,

AND OF

VOLUME SECOND.

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TABLE I

| Year | Population | Area          | Notes                 |
|------|------------|---------------|-----------------------|
| 1850 | 100,000    | 100 sq. miles | Initial settlement    |
| 1860 | 150,000    | 150 sq. miles | Expansion             |
| 1870 | 200,000    | 200 sq. miles | Further growth        |
| 1880 | 250,000    | 250 sq. miles | Continued development |
| 1890 | 300,000    | 300 sq. miles | Peak of settlement    |
| 1900 | 350,000    | 350 sq. miles | Stabilization         |
| 1910 | 400,000    | 400 sq. miles | Final stage           |

TABLE II

TABLE III

Continued from previous page



