

THE
MORBID ANATOMY
OF THE
HUMAN BRAIN;

ILLUSTRATED BY
COLOURED ENGRAVINGS.

BY ROBERT HOOPER, M.D. &c. &c.

ADVERTISEMENT.

WHEN the "Illustrations of the Morbid Anatomy of the Human Brain and its Membranes" went to press in 1826, it was the Author's intention to publish merely a series of coloured engravings, which would have embraced, when completed, representations of the most important morbid appearances to which the viscera of the human body are subject; and he intended those of the brain as a specimen of the manner in which the whole would be executed. He has since been induced to add considerably to those Illustrations of the Brain, and to form a complete account of the Morbid Anatomy of that organ; and he now announces that the volumes which will follow, will also contain the morbid anatomy of the several viscera, instead of their being mere illustrations of it by engravings.

The utility of this undertaking must be apparent to every one, when it is recollected that the object is to diffuse the knowledge of morbid structure, and enable the pathologist to distinguish organic diseases from one another, and thereby dispose them into classes, orders, genera, species, and varieties. When this is satisfactorily done, and the peculiar derangement of the functions of the living body ascertained, which arises from the particular organic disease, nosology will assume a new and permanent arrangement, and the practice of physic arrive at its greatest perfection.

To the accuracy of the delineations, and the faithfulness of the colouring, the greatest attention has been given, without regard to trouble or expence. The result is so satisfactory to the Author, that he is convinced the work will not only afford those who have the opportunity of making extispicial dissections, or of investigating diseased organs, the means of becoming acquainted with their structure and appearances on examination, but also put them in possession of a MUSEUM, in some respects more useful than the preparations themselves.

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THE
MORBID ANATOMY
OF THE
HUMAN BRAIN.

THE HISTORY OF THE

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THE
MORBID ANATOMY
OF THE
HUMAN BRAIN;
ILLUSTRATED BY
COLOURED ENGRAVINGS
OF THE
MOST FREQUENT AND IMPORTANT
ORGANIC DISEASES
TO WHICH THAT VISCUS IS SUBJECT.

BY **ROBERT HOOPER, M.D.**

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TO

SIR HENRY HALFORD, BART.

KNIGHT OF HANOVER,

PHYSICIAN IN ORDINARY TO THE KING,

PRESIDENT OF THE ROYAL COLLEGE OF PHYSICIANS IN LONDON,

F.R.S. F.S.A. &c. &c.

THIS VOLUME

IS RESPECTFULLY DEDICATED,

AS A MARK OF ESTEEM FOR HIS GREAT PROFESSIONAL TALENTS,

AND OF GRATITUDE FOR HIS UNIFORM FRIENDSHIP,

BY HIS SINCERE FRIEND,

THE AUTHOR.

P R E F A C E.

Two years have elapsed since my "Illustrations of the Morbid Anatomy of the Human Brain," was published, which contains the best and most instructive delineations that an unremitting attention to this department of pathology during more than thirty years, and an examination of, at least, four thousand subjects, could obtain. In these two years nearly the whole of the impressions have been sold; which circumstance, with the many gratifying encomiums I have received from the Professors of Anatomy and others, in various parts, has induced me to carefully revise them, and to complete the morbid anatomy of that organ. In doing so, I have studiously avoided entering into the causes of the several morbid structures and unnatural appearances, it being my intention to publish a practical work, in which the causes of all organic, as well as functional diseases, will be fully considered, and the best modes of attempting their cure, and palliating their symptoms, will also be fully entered into.

The present edition contains an account of all the morbid appearances and alterations which the brain and its membranes have been found to have undergone; and the most important of these, and all that could be represented by drawings, are illustrated by the same coloured engravings which, with the explanations, constituted the whole of the former edition.

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DISEASES

OF

THE BRAIN AND ITS MEMBRANES.

THE diseased appearances which have occurred within the cavity of the cranium are produced by inflammation; tumours; collections of fluids secreted between the membranes and into the cavities of the brain; extravasated fluids; or by diseased structures and unnatural appearances not attended with tumefaction.

A. INFLAMMATION.

INFLAMMATION and its effects produce the following changes: —

1. *Morbid vascularity*, or an increase of vessels. The vessels which, in a healthy state, carried red blood, have become morbidly distended: those which carried only the serous part are filled with red blood, are preternaturally distended, and a great increase of vascularity is apparent.

2. A *morbid secretion* next takes place, on serous and mucous membranes, and occasionally in the cellular tissue of the viscera, known by the appearance of a serous, albuminous, puriform, or fibrinous humid substance.

3. The third stage is characterised by the presence of blood-vessels which have penetrated the *secreted humid substance which now is become more solid*.

4. The *organisation* of this secretion is next apparent by its having become a *cellular tissue*, or a more *perfect membrane*, in which vessels are seen filled with red blood.

5. The cellular tissue or membrane becomes fibrinous and firm, and connects the opposed membranes by what is called *adhesions*.

6. In the substance of the brain, the inflammation secretes a fluid or humid substance like cream, called *pus*, and forms an *abscess*.

B. TUMOURS.

THESE are swellings caused either by an increase of the healthy substance of the brain ; or by morbid dilatations of its vessels, canals, or cavities ; or by the presence and growth of new materials which did not form any part of the viscus in a healthy state ; or they are formed by parasitical animals, which adhere to the membranes, or inhabit the substance of the brain. These are either solid, or fluid, or encysted. The solid tumours of the brain are, most of them, circumscribed, and not diffused, and so well defined that the naked eye can see where the disease terminates. They are in form either tuberculous, fungous, or excrescential: some, however, are so blended, and gradually vanish in the surrounding substance, that their limits are not so obvious. In their colour and feel they vary very much : the most usual appearance is one that comes near to that of the brain ; but some are brown, others red, and some are black : the greater part is soft and easily broken down between the fingers into a pulpy mass, and leave only a fibrous or spongelike trace of organisation : others are of the consistence of brain, some much firmer ; others of a cartilaginous or bony hardness, and the texture of some is peculiar. They are arranged into

a. *Tumours from an increase of the healthy substance.*

1. HYPERTROPHIA.* This is a tumid state of the brain, and the tumefaction is caused by an increase, universally throughout the whole viscus, of the natural or healthy constituent principles : so that, in hypertrophy of the cerebrum, nothing is found except a great increase of the size and weight of the brain ; and so also with the liver, lungs, spleen, &c.

b. *Tumours from morbid dilatations of pre-existing parts.*

2. ANEURISMA. A morbid dilatation of an artery, the coats of which are, here and there, thickened, subcartilaginous, or bony. The basiliary and internal carotid arteries have been found in this diseased state.

* This name has been given by Laennec, and other French pathologists ; and, as it conveys nearly the same meaning as Polysarcia and Hypersarcosis used by former writers on pathology, I have adopted it.

3. **HYGROCEPHALUS.** A collection of a fluid between the membranes, or in the natural cavities of the brain. This disease often produces a swelling of the head in the form of a large tumour in the fore part, top, or back of the head: but the lateral ventricles are the common seat of it.

c. *Tumours from the presence and growth of new materials.*

4. **HYGROMA.*** A tumour formed by a serous, albuminous, or puriform fluid in a cyst, or in the cellular tissue. It is not uncommon to find a portion of the brain converted into a cell or cavity filled with serum, nor for a tumour to be formed of a number of cells in the substance of the brain and in the membranes; and cysts or membranous bags filled with a fluid often occur.

5. **SCROFULA.** In this tumour the substance answers to the definition of scrofula in other parts of the body. It is a compound of fleshy and unorganised solid and humid substances, cheese-like, curdled, and the swelling is mostly circumscribed and tuberculous.

6. **HÆMATOMA. †** A soft, organised, vascular substance, mostly circumscribed, fungous or tuberculous; growing generally from the substance of the brain, or from a membrane or nerve, and resembling, when cut, coagulated blood with portions here and there of a firmer texture, like the albuminous part of blood when solidified. Sometimes the natural structure of the part in which it begins is wholly destroyed, and the viscus is much enlarged, and converted into a mass of this disease. When fungous, it generally grows from a broad base, and makes its way through the surrounding parts to the surface, where it increases to a great extent. It occasionally shoots forth from a small peduncle.

7. **CEPHALOMA. ‡** A soft, organised, vascular substance, mostly circumscribed, fungous, or tuberculous; growing either in the substance of the brain or from a membrane or nerve, and resembling brain in appearance and feel. It is much less vascular than hæmatoma, and differs from it in appearance.

* From *ύγρòς*, a humour or fluid, and *ωμα*, the Greek final, which usually imports external protuberance; hence *hygroma*, or hygromatous tumour.

† From *αἷμα*, blood, and *ωμα*, the Greek final: hence *hæmatoma* or blood-like tumour, usually called *fungus hæmatodes*.

‡ From *κέφαλή*, the brain, and *ωμα*, the Greek final: hence *cephaloma* or brain-like tumour, called by the French *encephaloïde*.

8. LIPOMA. * A firm, organised, somewhat vascular substance, composed principally of an adipose or suety material. It is generally circumscribed, tuberculous; of a yellowish colour, and is not so often found in the brain as in the other viscera or cellular membrane.

9. MELANOMA. † A soft, organised substance, mostly circumscribed, and tuberculous, and of a black colour. The cut surface is smooth, of the colour of Indian ink, and very moderate pressure sends out a thick fluid like the pigmentum nigrum of the eye.

No part of the body, in a healthy state, bears any resemblance to this diseased structure, except the gland-like bodies about the bifurcation of the trachea, which are occasionally of a blackish-blue colour, but very different in texture from melanoma: this disease is therefore named from its colour, by which it is immediately known.

10. CHONDROMA. ‡ A hard, organised substance, of the structure of cartilage. It is always circumscribed in flat plates or portions, or tuberculous.

Some tumours of this genus have an exact resemblance to cartilage in appearance, hardness, and structure: others are softer, but gristly, and when dry are as transparent as cartilage. This genus is therefore divided into,

- a. *Chondromatous*, or perfectly cartilaginous tumours; and,
- b. *Subchondromatous*, or imperfectly cartilaginous tumours.

Perfectly cartilaginous tumours, though common in other parts, are very rare in the substance of the brain; and, although frequently mentioned in pathological writings, they have not yet occurred to my observation: but I have often seen the glands of Pacchioni of this structure, and cartilaginous formations are very common in the dura mater.

11. OSTEOMA. § A hard organised substance of the structure of bone. It is circumscribed, excrescential, or tuberculous, and is occasionally found in the brain and its membranes. This tumour is not vascular to the naked eye, and consists principally of phosphate of lime with cellular tissue and animal matter.

To this genus I have thought proper to bring the unorganised depositions called calcareous and earthy tumours.

* From λιπος, fat, and ωμα, the Greek final: hence *lipoma* or adipose tumour.

† From μελας, black, and ωμα, the Greek final: hence *melanoma* or black tumour.

‡ From χονδρος, a cartilage, and ωμα, the Greek final: hence *chondroma* or cartilaginous tumour.

§ From οσσειον, a bone, and ωμα, the Greek final: hence *osteoma* or bony tumour.

Encysted tumours are those which are formed of a cyst, the contents of which are either solid or fluid. Those already described may be, and often are, surrounded by a cyst of a condensed cellular tissue, or more perfect membrane; but encysted tumours generally contain a fluid either serous, albuminous, or puriform, or pus, and come under the genus hygroma. The cyst of such tumours is, in most instances, formed of one membrane, which cannot be separated into laminæ. It is often of the thickness and texture of the pericardium or dura mater; but in some it is remarkably thin, and easily torn. The thick cysts are firm and opaque; the thin ones delicate and transparent, and look like animal hydatids. The organisation of these cysts is apparent by a fibrous or ligamentous texture, and by vessels carrying red blood ramifying on their surface.

The parasitical animalcules which form tumours are, most of them, *animal hydatids*. Of these there are three genera.

12. ACEPHALOCYSTIS.* The headless hydatid. This genus consists of a simple membrane filled with a fluid like water. It is mostly globular or oval; but in some instances irregularly shaped. It is always enclosed in a membranous apartment or cell, which is within, or is attached to, the substance of the brain, the dura or pia mater, or the membrane which lines the cavities. The animal cyst is a beautifully transparent membrane, and the fluid is mostly of a crystalline clearness, so that the animalcule looks like a piece of glass. This appearance, however, is only when it is alive; for when its vitality departs, the cyst becomes opalescent, and distinctly fibrous or lamellated, and the fluid loses its clearness.

The fluid of this animalcule sometimes contains smaller animalcules one within another, like a nest of pill-boxes, and also occasionally an immense number of small pearl-like bodies, about the size of a mustard-seed, which are supposed to be young ones.

13. CYSTICERCUS. † A genus of animalcule, the body of which is not more than half an inch in length, is nearly cylindrical, depressed and narrow like a pin, and terminates by a caudal vesicle. It is filled with a serous fluid, mixed with a little albumen, and is enclosed in a membranous cyst. There are several species.

* From ἀκεφαλῆ, without a head, and κυστis, a bladder or cyst: hence *acephalocystis* or headless cyst, the name now generally adopted by the French pathologists, and first used by Laennec.

† From κυστis, a cyst or bladder, and κερκος, a tail: hence *cysticercus* or bladder-tailed worm.

14. POLYCEPHALUS.* This genus, which is commonly met with in horses, cattle, and sheep, has been supposed to exist in man:—the *Polycephalus hominis* of Goetze, Zeder, Jordens, and Laennec.

The species which is found within the skull of sheep has its tail or bag the size of a pigeon's egg, is filled with a serous fluid, and several hundreds of points or heads are visible on the surface, each of which terminates by four suckers.

C. DISEASED STRUCTURES, AND UNNATURAL APPEARANCES, WITHOUT TUMEFACTION.

THESE are flaccidity, firmness, pulpiness, unnatural colour, extension, condensation, and destruction of parts.

1. MORBID FLACCIDITY. A softness which is found to a great extent in the substance of the brain, and sometimes in the membranes.

To ascertain whether the substance of the brain be morbidly soft, flaccid, or flabby, and not so from natural and accidental causes, the attention must be directed to the time of the year, the situation of the cadaver, &c.; and the person who determines should be very familiar with such investigations. No difficulty attends this enquiry in some instances, and much in others.

2. MORBID FIRMNESS, HARDNESS, OR INDURATION. This is not uncommon in the substance of the brain. It is the very opposite condition of the cerebral molecules to that which exists in the soft or flaccid state. It occurs now and then in aged persons, and in some cases of mania. It is mostly accompanied by a dark hue of the brain. With this preternaturally great cohesion of its particles, the brain feels not merely firm, but morbidly hard throughout, and the cut surface does not show the natural number of blood-vessels in the medullary substance, nor does it receive the impression of the finger readily; and when the finger is removed, it quickly rises to its level; and in some instances the elasticity is so great, that the brain stretches considerably before it tears.

* From *πολυς*, many, and *κεφαλή*, the head; hence *polycephalus*, or many-headed worm. This worm is called *Echinococcus hominis* by Rudolphi: from *εχινος*, a hedge-hog, and *κοκκος*, a berry, it resembling a berry covered, as the hedge-hog is, with bristles.

The brain is generally of an unnatural hardness when its substance has been long pressed on by a fluid gradually collecting in its ventricles, and enlarging their cavities to a great extent. In most instances of chronic hygrocephalus the substance of the brain is preternaturally hard, and even tough.

3. PULPINESS, OR GANGRENE. Great softness and disorganisation of the parts, like the apple or pear when it is rotten.

This is a very different condition of the brain from mere softness or flaccidity, or want of healthy firmness. Morbid softness pervades the whole brain, whereas pulpiness is partial: but the essential difference is this — in pulpiness there is a disorganisation and decomposition of the brain, which, in consequence, is become pap-like, so that the handle of the knife or probe will pass in without any resistance, and will bring some of it with it when withdrawn. It is mostly found in the centre of the brain, and frequently in the corpus striatum and thalamus nervi optici; but I have found it in most parts. The second figure of Plate VIII. is a very fine illustration of this condition. The pulpy part is generally a little discoloured, and sometimes very much so. The extent of the pulpiness can mostly be traced by the difference of the colour from that of the healthy brain. I am very much inclined to consider this state as analogous to gangrene in the other internal parts.

The colour of the cineritious part of the brain on the convolutions and in the corpora striata is generally destroyed when they become pulpy. Large portions of the brain are sometimes found in this state, and sometimes portions of small size.* With regard to the degree to which this pulpiness extends, it is varied.

In all cases the pulpy part feels soft, and the divided blood-vessels make larger dots of blood than the vessels of the surrounding healthy parts, or they lie in the pulp like filaments or red hairs.

* Dr. Abercrombie has given a fine illustration of an extensive disease of this kind. “The brain externally appeared healthy; but when a thin section was cut from the upper part of the left hemisphere, a cavity was exposed, through which a probe passed in every direction, without any resistance, through nearly the whole extent of the hemisphere. This, upon further examination, was found to arise from the whole hemisphere being in such a remarkable state of decomposition, or softening, that it formed one great cyst, full of soft pultaceous matter, enclosed in a very thin covering, formed by the healthy cerebral matter on the surface. The healthy portion forming this covering, in many places, did not exceed a quarter of an inch in thickness; and at the thickest parts, which were on the upper surface of the brain, did not exceed one half or three-fourths of an inch. The contained matter was a thin soft pulp, mixed with portions of a pellucid albuminous substance, which coagulated when they were thrown into boiling water.” See *Monro’s Morbid Anatomy of the Brain*, p. 197.

In a more advanced state the part has lost all traces of organisation: the cut surface falls below the level of the healthy part, and when the brain is struck there is a displacement of some of the pulp. In this state there is mostly a mottled appearance, and mixture of brown, yellow, greenish, and red colours, and, perhaps, some extravasated blood or albuminous portions.

4. MORBID COLOUR. The membranes, as well as the substance of the brain, are occasionally found of a brown, and also of a yellow colour, in cases of severe and long-continued jaundice. A part of the brain is frequently found of an unnatural colour, without any other morbid appearance; and an unnatural colour is sometimes found universally throughout the brain.

5. EXTENSION. The membranes and the substance of the brain are, in those diseases which enlarge the head, extended in proportion to the extent of the disease; and as they are extended they mostly become thinner and more firm. The cases in which there is an extension of the substance of the brain, are those in which the ventricles are distended with a fluid, and also those in which tumours grow to a great size. In proportion to the quantity of fluid will be the distention of the cavities, and a proportional extension of their parietes. In young subjects, whose skulls are extensible, the bones separate, the head enlarges, and the extension of the brain is considerable. It has been found without convolutions, and resembling a bladder.*

6. DESTRUCTION OF PARTS. In chronic hydrocephalus, where there is a great quantity of fluid in the ventricles, many parts are destroyed; the septum lucidum has vanished, and the ventricles become one large cavity. "In several instances that I have examined," says the present Professor, *Monro*, "there was no appearance of corpus callosum, and no septum lucidum: when the fornix remains, it is split by the accumulation of water in the third ventricle,

* "When the accumulation of fluid," *Dr. Monro* observes, "within the head, amounts to several pounds, the brain resembles a bladder filled with water, the greater number of the convolutions being effaced. Upon examining the parietes of this bag with attention, they are found to be various in point of thickness, in different instances, and also in the same case in different places: and in some there is no vestige of the brain to be discovered on that side on which the patient used to lie in bed; and the internal surface of the enlarged ventricles is white.

"The distinction between the grey and white matter of the brain is not always to be observed; and, when obvious, these are disposed in a horizontal direction in respect to each other, the brain being unfolded by the accumulated water, a circumstance described by *Bertin and Vater*." Vide *Osteologie*, tom. ii. p. 500. Paris, 1754; and *Miscellanea Curiosa*, &c.

and the communication between the lateral ventricles is so much extended as to equal an inch in diameter.”

The late Mr. Allan Burns, of Glasgow, says, that in a case of chronic hygroccephalus which he examined, “the little of the brain that remained resembled a thin film, lining the inner surface of the pia mater, and even this was in some places wanting.”*

7. CONDENSATION. Condensation of the lung from the pressure of a fluid is a common morbid occurrence; and though the same thing takes place occasionally in the brain, it is not so frequently ascertained.

When the ventricles of an adult are found very much enlarged from the accumulation of a fluid, the brain is proportionally condensed and hardened; and on a minute examination it is often found to look as if its structure were fibrous; and this appearance is sometimes better seen when a part is torn.

This condensation and hardness are seldom noticed in the cerebellum.

D. COLLECTIONS OF FLUIDS BETWEEN THE MEMBRANES AND IN THE CAVITIES OF THE BRAIN.

THE membrane which lines the internal surface of the dura mater, and covers the upper surface of the pia mater, and which also lines the ventricles of the brain, has similar functions in the animal economy with the pleura, pericardium, peritoneum, and tunica vaginalis of the testis, and the other serous membranes. Its surface is always covered with a serous humidity, that is irrorated by secreting arteries, and its accumulation is prevented by absorbents.

When the balance between the secreting and absorbing powers is destroyed, the surface of these membranes becomes either dry or unusually humid, and disease from attrition, or the collection of a fluid, results. Whether, in a healthy state of the membrane which lines the cavities of the brain and its investing membranes, there exists a gaseous fluid merely, or one in the form of a visible and serous fluid, and if the latter, in what quantity, has long been a controversial point with pathologists.

* See Monro's Morbid Anatomy of the Brain, vol. i. p. 30.

Those who have had opportunities of dissecting the brain of persons who were guillotined or decapitated, have found a small quantity only within the ventricles; and of the very many which I have myself examined, who were killed in one moment, both by accidents and sudden bursting of aneurisms and large vessels, the greater part certainly had some fluid in the lateral ventricles; but in no instance more than a fluid drachm, and in some the quantity was scarcely any.

The diseased fluids which have been found within the cavities of the brain and between the membranes are either serum, albumen, or pus, more or less pure or mixed.

1. They are mostly *serous*, and generally a limpid fluid, often as pale as spring water, of great transparency, sometimes the same in composition as the serum of the blood, but mostly with more albumen. This kind of fluid often exists in the cavities of the brain and between the tunica arachnoides and pia mater.

2. An *albumino-serous* fluid is occasionally found in the same situations as the former. It affords more coagulated albumen by heat than the serum of the blood does.

3. *Pus* is very rarely met with except from accidents.

The membranes between which these fluids have been found are,

1. *The dura mater and tunica arachnoides.* Serous fluids are said to collect here very commonly; and though I have often thought it escaped as the opening was made to remove the upper part of the skull, in the usual way of examining the brain, I have seldom been certain there was any except about the base of the skull. I once removed more than two fluid ounces of a purulent fluid not coagulable, from between the dura mater and tunica arachnoides, on neither of which membranes was there any appearance of disease, except a little opacity of the arachnoid.

2. *The tunica arachnoides and pia mater.* A serous fluid is very often found in this situation, and particularly in the cellular tissue of the intergyral spaces, in which it collects so as to raise the arachnoid membrane, and form an obvious cellular cavity. Blood-vessels are sometimes seen beautifully ramifying on the tissue in these cavities.

The fluid is generally secreted universally over the brain, on the under as well as the upper surfaces, and very often the theca vertebralis is filled with it. I have measured four fluid ounces in one instance, and very frequently three. When a serous fluid is collected between these membranes, the arachnoid is

mostly thickened and opaque, and sometimes bears vessels carrying red blood, and there is also a serous fluid in the ventricles.

Small portions of a yellow albuminous secretion are occasionally met with under the tunica arachnoides, and though mostly solid, they are in some cases otherwise.

3. *In the lateral ventricles.* The ventricles of the brain are lined with a very delicate secreting membrane, and they contain the choroid plexus, through which the blood is circulated to the torcular of Herophilus. From these sources a vapour is constantly secreted, which, in children more especially, often collects and becomes a fluid that presses and disturbs the functions of the brain, and soon kills. This constitutes the watery head, or hydrocephalus.

The fluid found in these cavities is mostly serum, of the same quality as the serum of the blood. It is, almost always, as clear and pale as crystal. With heat, alcohol, and mineral acids, it affords the same constituent principles, and in the same proportions, as the healthy serum of the blood.*

* Dr. Marcet's analysis of the fluid found within the ventricles of the brain is as follows:—

| The solid contents of 1000 grains of the fluid appeared to consist of, | |
|--|--------|
| Water | 990.80 |
| Muco-extractive matter, with a vestige of albumen | 1.12 |
| Muriate of soda | 6.64 |
| Subcarbonate of soda, with a vestige of an alkaline sulphate | 1.24 |
| Phosphates of lime, with traces of phosphates of magnesia and iron | .20 |

Dr. Trail of Liverpool has published the following analysis of the fluid drawn off by tapping the brain during life, in the *Edinburgh Medical and Surgical Journal*, vol. xvii. p. 237:—

“ The first, in July 1817, was a very pale fluid, containing very little albumen, and had rather the characters of a mucus than of serum. This arose from the presence of lactates, with a minute proportion of albumen. Its specific gravity was only 1.0058: it did not coagulate when boiled, but by evaporation afforded a thin, semitransparent pellicle, which, when thrown into water, became soft and yellowish, like mucus. The hydrocephalic fluid was not precipitated by infusion of galls. It afforded a copious precipitate with nitric acid, and with superacetate of lead. With this last, the precipitate exceeded that which serum, drawn from a patient under ascites, affords to the same re-agent. The saline contents of the hydrocephalic fluid were, a considerable quantity of muriate of soda; an alkali not fully saturated with acid, for the fluid rendered vegetable infusions green; phosphate of soda; and some salt of lime, for oxalic acid gave traces of the presence of the latter.

“ Some months after the first tapping, the child's head was again punctured, and eight ounces of fluid were abstracted. This, however, had all the characters of diluted serum. Its specific gravity was now slightly increased, being 1.0080. When slowly evaporated, it formed a pellicle, which was slightly opalescent; but when near the boiling heat, it yielded an opaque, yellowish white coagulum, indicating the presence of a considerable quantity of albumen. This, when slowly dried at a temperature a little above 212°, became brittle and corneous in appearance. It was now cut in pieces, and well washed in distilled water, to separate the saline matters, and again dried. The albumen then = 151.6 grains. The washings afforded, by spontaneous evaporation, many cubic crystals of muriate of soda. The whole was digested in

As the fluid collects in the ventricles, the substance of the brain is compressed. In young children, who are mostly the subjects of this accumulation, the bones of the skull are often expanded, the brain enlarged to a great size, and the head becomes distorted; but this diastasis, or separation of the bones, never takes place in adults.

The brain is almost always much softer than in a healthy state, and often so much so as to appear to be pulpy. The septum lucidum is, in some cases, strong though extended, in consequence of the two membranes of which it is composed having become thickened; but in the generality of cases it is soft, here and there pulpy and reticular.

The openings under the anterior crura of the fornix — the foramina of Monro — are enlarged, and there is, consequently, a free communication between the ventricles. The membrane which lines the ventricles is mostly thickened.

The posterior crura of the fornix are mostly very soft, and the psalterium breaks down when touched.

The quantity of fluid in hydrocephalus is very variable. In the acute forms it is seldom much, — perhaps a table-spoonful; from that to four and six fluid ounces. In the chronic forms, the fluid accumulated is always considerable. I have removed two pints; and cases are on record in which the quantity was much greater.

4. *In the third ventricle.* There is always some fluid found in this cavity, when the lateral ventricles are much distended, and it would seem that as the fluid collects in those cavities, it opens the foramina of Monro, which in such cases become more perfect foramina, and let the fluid through them into the third ventricle.

I have seen the third ventricle very much enlarged and filled with fluid, and in one case the floor of this ventricle admitted a half-crown piece.

5. *In the fourth ventricle.* I have never seen this cavity enlarged, nor have I ever found any fluid in it. In those instances of great collections in the other ventricles, this does not undergo much alteration, and the valvula magna cerebri is

alkohol. There remained in the capsule little friable whitish lumps, which, when dry, adhered together by the intervention of a gummy-looking matter, which seemed to be some compound of lactic acid. The rest of this portion seemed to consist of earthy salts, and equalled 1.9 grain. The soluble salts, when dried at a temperature of 212°, = 28 grains, chiefly consisting of muriate of soda, a little muriate of potash, with some small quantity of lactates and subcarbonate of an alkali.”

not affected: so that the opening from the ventricles into the spine is neither enlarged nor diminished.

6. *In the fifth ventricle.* I have removed two fluid drachms of a clear, pale, serous fluid from this cavity, when there was not any appearance of dropsy elsewhere.

In some instances, where a great quantity of fluid was within the enlarged cranium, this cavity has been found to contain some.

E. EXTRAVASATED FLUIDS.

THE only fluids which can be extravasated are those of the absorbents and blood-vessels. Of the first we know nothing in the human brain.

Extravasated blood is frequently found within the skull, independent of accidents: —

1. *Between the bones of the skull and the dura mater.* This is very rare, indeed, from internal causes, but very common from accidents.

In the only instance which has fallen under my observation, there was a scrofulous disease in the temple, which had caused a caries of that bone. About two fluid ounces of blood were pent up between the dura mater and the bone, of a dark colour, and partly coagulated.

2. *Between the dura mater and tunica arachnoides.* Extravasated blood is seldom found here; and in the few instances which I have seen, it came from under the pia mater where a vessel had ruptured.

3. Blood is not uncommonly found immediately *under the pia mater.* When a vessel gives way in this membrane, there is a diffused extravasation, sometimes very small, in others very extensive.

A diffused redness, of the size of a shilling, is not very uncommon.

4. Extravasated blood is frequently found *in the substance of the brain*, the consequence of the rupture of a blood-vessel. When this happens, the blood which escapes from the broken vessel destroys the cortical or medullary substance, and breaks down the walls of the ventricles, if near to them, and collects within their cavities. See Plate XV. letter B.

The blood is sometimes quite fluid; more frequently partly coagulated; in some instances perfectly so. Occasionally it is very firm and less humid; and the extent and degree of coagulation and firmness seem to depend on the time that elapsed from the rupturing of the vessel and the death of the person. The quantity is subject to great variety: in some cases it is only a few drops, in others a tea-spoonful, and sometimes nearly half a pint is found.

It is, in most instances, collected in one cavity, formed in the substance of the brain, which is very little altered in appearance; or it is soft and broken down. The blood is extravasated mostly in one place only; but now and then there are two or three distinct portions, and I have seen it in the pons Varolii disposed in strata. In these latter instances several vessels had burst nearly at the same time.

That part of the brain which surrounds the extravasation is either in a soft or pulpy state, or there is a diseased state of the arteries, or both: but this is not always the case, for I have examined several in which the surrounding brain was perfectly healthy, and no unnatural appearance could be found in the blood-vessels.

There is a circumstance connected with this diseased state of the brain, which cannot have escaped the observation of pathologists, viz. the organisation of the extravasated blood, and the absorption of a part or of the whole. The following appearances, which have been frequently noticed and compared with the histories of the cases, are, it is presumed, proofs of what is natural to suppose, viz. that nature attempts the absorption of it in every instance; and often effects its organisation or its removal where the quantity is not considerable.

1. A state of *complete coagulation* of the blood, which is soft, and cuts like jelly.

2. A much *more firm condition of the coagulum*; so firm that it can be turned out from the brain, when it appears like a solid body, without any tremulous movement when shook. In this state there is an appearance like a membrane or lamina around the coagulum adhering to the sides of the cavity.

3. A *ball* sufficiently firm to require much pressure to break it. The external lamina is here more distinct. The cut surface is of a liver colour, and often of a bright bloody hue in the centre; and the outer margin is closely cemented to the brain.

4. A *ball of a brownish colour*, which cuts as firm as a portion of liver. This is closely connected by an organised and vascular tissue to the surrounding brain.

5. A *cell* which contains a *serous fluid*, sometimes of a turbid and of a dark colour, in other instances clear and pale. See *Hygroma of the Brain*.

These several appearances have occurred in the brains of those who have died soon after, and at remote periods, from attacks of apoplexy; — from a day to one and two weeks; as many months and years; and in persons who have been under my own observation. Such alterations are, I have no doubt, caused by the attempts of nature to absorb and remove the extravasated blood: and it is worthy of remark, that in all the instances in which the persons survived the shock for more than a month, the brain which surrounded the extravasated blood was healthy, and in the others, who did not, it was pulpy.

Spots like *Purpura*, of different sizes, are sometimes found under the pia mater, from extravasated blood. I have seen this appearance in two instances: it was very general over the surface of the brain, and in these cases the same appearances were found in some of the other viscera.

The ossified condition of the arteries and the pulpy state of the brain which are found when blood is extravasated, have already been considered.

These several diseases are treated of in the following order:—

- A. The membranes of the brain:—the dura mater, the tunica arachnoides, the pia mater, and its productions.
- B. The cerebrum, cerebellum, medulla oblongata, pineal gland, and pituitary gland.
- C. The nerves and blood-vessels.

A. DISEASES OF THE MEMBRANES OF THE BRAIN.

1. DURA MATER.

INFLAMMATION.

THE dura mater is very frequently found inflamed both universally and partially, and the inflammation is almost always confined to the internal surface. I do not recollect to have seen the surface of the dura mater which is next to the bones of the cranium in a state that I considered to be inflammation, except from external injuries.

A part of the internal surface only is affected in most instances, and generally that part which covers the hemispheres. In the basis of the skull it is uncommon, unless there is a very considerable and universal state of inflammation.

Inflammation of the internal lamina of the dura mater presents the following appearances:—

1. *An increase of vascularity*, which is evidently superficial. With this there is scarcely any thickening, or other unnatural appearance.

2. *A soft pulp*, like dirty paste, lying on the internal surface. When this is found, the dura mater is somewhat thickened, and rather softer than in a healthy state. This pulp is an albuminous or albumino-purulent secretion from the internal and inflamed surface of the dura mater, and in some cases, perhaps, it is secreted by the arachnoid which covers the pia mater, but more frequently by the former only, as the secretion is often found without any morbid state of the tunica arachnoides of the pia mater. When scraped off by the scalpel, the surface appears dull and rather rough, but not vascular.

3. *A transparent membrane*, perfectly organised, as delicate and diaphanous as the arachnoid in a healthy state, or the capsule of the crystalline lens of the eye; containing numerous blood-vessels filled with red blood, and ramifying in all directions. This adventitious membrane is the production of inflammation, and the vessels can readily be traced by the naked eye, from the portion of the

dura mater which it is in contact with. Plate I. has a beautiful demonstration of this membrane.

4. A thick and *opaque membrane* of considerable firmness, adhering loosely to the dura mater, and from which it can be easily separated. It is mostly of a whity-brown colour. This opaque membrane is perfectly organised, although vessels carrying red blood are seldom seen in it, except just as they proceed from the dura mater, and are dipping into it. In some instances, this adventitious membrane acquires great thickness. Plate II. contains two figures which represent these circumstances extremely well.

These appearances mark the progressive stages of the inflammation, and prove that the disease is confined to the internal lamina of the dura mater.

TUMOURS.

The tumours which have been found in the dura mater are the scrofulous, the cartilaginous, the bony, the hæmatomatous, and the cephalomatous.

1. The *scrofulous tumour* is sometimes found on the internal surface, like an indurated mass of an organised fleshy substance; and it is very uncommon to have this form of scrofula without some other part being also diseased and connected with it.

I have never met with a tumour on this membrane that had the external character, or the internal structure, of a scrofulous gland, such as is met with in the mesentery or glands of the neck. The tumour above described, and of which I have only seen two instances, was a considerable thickening of the whole membrane, with a diseased state of the bone.

2. The *chondromatous tumour*. This genus of tumour is frequently found attached to, or within the laminæ of, the dura mater. Though cartilaginous in texture and composition, the species vary in perfection and firmness. Some are perfectly cartilaginous, resembling the cartilages of the larynx or other parts in feel and appearance: others are firm and rather gristly, but not so perfectly cartilaginous, and, therefore, do not look nor feel like cartilage, and are not known to be of that nature until they have been carefully and closely examined.

The perfectly cartilaginous tumour is not uncommon. It is found in patches of different forms, between the laminæ of the dura mater, and mostly in the falciform

process and tentorium, and is often accompanied by bony tumours or ossifications; and in some instances the cartilaginous tumours are partly ossified. A case is related in Dr. Monro's *Morbid Anatomy of the Brain*, by Mr. Watson, of a tumour, of the size of an entire walnut, and of a cartilaginous consistence, with some bony matter towards the centre, growing from the dura mater.

The subcartilaginous tumour is mostly tuberculous, of a dirty white colour. There are often many of these tumours, and they are always distinct, of various sizes, from a pea to a hazel-nut. As they increase in size, they encroach principally on the brain, and not much on the dura mater or superincumbent bone; so that when the dura mater is raised up, they leave corresponding depressions or cavities, which give the surface of the brain a singular appearance. These tumours mostly have a broad base, and are formed under the internal lamina of the dura mater, by which they are consequently covered. They have a firm and cartilaginous feel; cut clean, and expose a smooth surface of the same colour as the external surface; and there is no appearance of vascularity. In Plate VI. there is an excellent display of this species of tumour.

3. The *bony tumour* of this membrane is mostly in flat plates; sometimes irregularly spicular; not often in the form of tubercle; and there are seldom more than two or three in the same subject. They are more frequently met with than the other tumours. They occur generally in the falciform process; occasionally in the tentorium and other parts; and are formed by a deposition of bony matter between the laminæ of the dura mater. They are composed of phosphate of lime and animal matter. Plate V. contains several illustrations of this disease.

4. The *hæmatomatous tumour*. This is of the colour of venous blood; fungous; sometimes tuberculous, with a broad base. It is soft to the touch; the external surface is covered with a delicately-lamellated tissue, thinner than silver paper; and the portion of the arachnoid membrane with which it is in contact was, in every instance that has fallen under my observation, thickened and opaque. An incision exposes a spongy, vascular structure. Hæmatoma of the dura mater is far from common. I have seen but three instances of it. See *f* in Plate VI.

5. The *cephalomatous tumour* is not common, but it occurs oftener than the last genus. It is mostly fungous; seldom tuberculous; and seems to be a growth from the inner membrane of the dura mater. The cut surface is cellular and spongy, and gives out a pap-like humid substance when pressed. See Plate VII.

6. *Hygroma*. “ A small quantity of water has sometimes insinuated itself between the laminæ of the dura mater. Such a case lately fell under the notice of Dr. Duncan, junior, of Edinburgh. The tumour was small, and did not occasion any inconvenience to the patient.” *

7. *Acephalocystis*, or the headless hydatid. This animal has been found beneath the dura mater, but it has never come under my observation.

DISEASED STRUCTURES AND UNNATURAL APPEARANCES NOT ATTENDED WITH
TUMEFACTION.

1. *Absorption of the Dura Mater*. An uncommon degree of thinness has been found in some parts of the dura mater, and some of its processes have been wanting, not from original conformation, but from absorption; in some instances without any obvious cause, but more frequently from the gradual pressure of a tumour of the brain or some other morbid enlargement. The falciform process and a part of the tentorium have been wholly removed, and the large portions of the dura mater and its processes have been found as thin as silver paper.

2. *Unnatural Colour*. The dura mater has been found of a deep yellow colour throughout its whole extent. In these instances every part of the body except the bones was jaundiced.

2. TUNICA ARACHNOIDES.

INFLAMMATION.

IN a natural state, this membrane is so delicate, so perfectly transparent, and so closely adhering to the pia mater, except about the cerebellum and medulla oblongata, that it is with difficulty demonstrated.

1. Small patches of a beautiful *vascularity* are now and then, though very rarely, seen about the optic nerves, and between the lobes of the cerebellum; and

* Vide Morbid Anatomy of the Brain, by Alex. Monro, M. D. vol. i. p. 9.

the surrounding arachnoid membrane is opaque, and adhering to inflamed portions of the pia mater: but it is very uncommon, even in extensive inflammations of these membranes, to find red vessels on the arachnoid.

2. The most common result of inflammation of this membrane is a *thickness* and a *secretion* under it, that raises, and somewhat separates it, from the pia mater, particularly at the intergyral spaces. This secretion is mostly a serous and beautifully transparent fluid, but sometimes it is turbid and albuminous.

3. Another appearance from inflammation is a considerable *thickness* and *opacity*, to an extent not only to obscure the vessels of the pia mater, but likewise the whole of the membrane which is under it.

4. A more unusual state than the former is a *humid puriform substance*, under an opaque and thickened state of the membrane, giving the appearance of a diffused suppuration. See *Inflammation of the Pia Mater*.

ADHESIONS OF THE TUNICA ARACHNOIDES TO THE DURA MATER.

It is a very common thing to find the dura mater adhering to the tunica arachnoides by a firm and vascular cellular tissue. This is mostly the result of inflammation of both membranes, and of the organisation of the pulpy substance which is secreted on the dura mater when inflamed.

The internal surface of the whole of the dura mater over both hemispheres has been found strongly connected to the arachnoid membrane, in several instances; and in most cases of disease of the bones of the cranium, and also of organic disease of the brain near the surface, of long standing, these membranes are connected by adhesions.

3. PIA MATER AND CHOROID PLEXUS.

INFLAMMATION.

It is sometimes difficult to determine whether the vessels of this membrane are in a state of congestion or inflammation. The pia mater often appears to have an unusual degree of *vascularity* on the uppermost part of the convolutions; and

when this appearance is in patches, it is mostly caused by inflammation. See *Congestion of Blood in the Vessels of the Pia Mater*.

When the pia mater is inflamed, it is readily separated from the convolutions of the brain, which it closely embraces, and from which it receives numerous vessels: and when detached, the small vessels torn from the cortical substance of the brain are always very much loaded with blood.

Inflammation of this membrane is mostly accompanied by a thickened and an opaque state of the tunica arachnoides; a considerable quantity of serous fluid is generally found between them, particularly in the intergyral spaces; and it is not unusual, in such cases, to find a fluid also in the ventricles.

Patches of a *yellow, albuminous, or albumino-puriform, humid substance*, are frequently found on the upper surface of the pia mater, between it and the tunica arachnoides. These patches are generally small; but in some cases they are very large, extending over the whole of one hemisphere, or the greater part or the whole of one lobe, or covering the pons Varolii. I have seen it so universal in the base of the brain as to envelope most of the nerves. With this extensive state of disease all the membranes are inflamed, and the blood-vessels loaded with dark blood. See Plates III. and IV., in which the puriform secretion is very well displayed.

TUMOURS.

1. *Scrofula*. I have never met with an instance of this disease affecting the pia mater. It has, however, occurred in the form of small tumours adhering to the internal surface. There is a specimen preserved in the museum of St. Bartholomew's Hospital of yellow tumours, which seem formed of a solid, inorganic substance, like scrofulous pus, the size of small hazel-nuts, which appear to arise from, or to be connected with, the pia mater, although they are embedded in the substance of the brain, close to the surface.

2. The *bony tumour*. Ossification of the pia mater is very uncommon. I have a specimen of a small bifid portion of bone, not larger than a split pea, which grew from the internal surface of this membrane, and penetrated into the medullary substance of the brain. See Plate V. figure 2.

3. The *subcartilaginous tumour*. Tumours of a subcartilaginous nature are occasionally found in the choroid plexus. They are mostly of the size of a pea,

or a tamarind stone ; hard ; tuberculous ; round or oval ; hanging from the most posterior part into the horn of the ventricle. They are of a whitish colour, solitary, or never more than one in each ventricle. The cut surface exposes a laminated structure, with small particles of cartilage, like nuclei, in the centre. They are covered with a delicate vascular membrane. See Plate XII. figures 5. and 6.

4. *Hygroma*. It is unusual to find tumours in the pia mater containing a fluid, except in the choroid plexus, where they frequently occur ; and where they have a beautifully transparent appearance, like drops of pure water. These vesicles or bladders are formed of a transparent delicate membrane, filled with a clear, limpid, and serous fluid. There is sometimes only one, in other cases two, three, and more, and in some instances very many in both plexuses. When solitary, the vesicle is never larger than the pip of an orange ; and when there are many, they are much less, and in clusters. See Plate XII. figure 4.

These vesicles have been supposed to be animal hydatids ; but they are merely cysts containing a very serous fluid, the same nearly in composition as the serum of the blood.

5. *Acephalocystis*, or the *headless hydatid*. I have never seen an instance of an animal hydatid in the pia mater. See *Acephalocystis in the Substance of the Brain*, page 42.

6. *Cysticercus*, or the *bladder-tail worm*. Of this genus five species have been detected, adhering to the membranes of the brain.*

a. *Cysticercus tenuicollis*. Dr. Brera found a great quantity of this species in the choroid plexus of a man who died of apoplexy.

b. *Cysticercus Fischerianus*. This is not larger than a linseed seed. It has been found in two instances, and well described by Mr. Fischer of Leipsic, after whom it receives the specific name, in the choroid plexus.

c. *Cysticercus dicystus*. This species is remarkable for having two vesicles of the same size, the one caudal, the other embracing the body anteriorly. Dr. Laennec found this in the ventricles of a subject that died of apoplexy.

d. The *Cysticercus punctatus* is another species, found by Dr. Treutler in the choroid plexus of a female who died at the age of twenty-two. The caudal bladder of this species is globular, and has little white points here and there.

* See *Dictionnaire de Médecine*. Art. *Cysticerque*.

e. *Cysticercus finna*. Another species first noticed by Werner in the human subject. It is found in great quantities in the hog. Its body recoils into the caudal bladder.

CONGESTION OF BLOOD IN THE VESSELS OF THE PIA MATER AND PLEXUS CHOROIDES.

The vessels of the pia mater are frequently found very turgid, and much enlarged by a dark-coloured blood. When this is the case, the small vessels are also very much distended, and those which penetrate the substance of the brain are likewise larger than is natural, and apparently more numerous than when the larger vessels are not so filled. This is a state of congestion, and not of inflammation. See also *Inflammation of the Pia Mater*.

The choroid plexus, that beautiful net-work of vessels under the fornix, called the velum interpositum, and the vascular plexus of the fourth ventricle, which are all productions of the pia mater, are often found remarkably distended with blood, and their veins varicose, when the parent membrane has its vessels overcharged.

DISEASED APPEARANCES OF THE MEMBRANE WHICH LINES THE VENTRICLES.

In a healthy state, this membrane is extremely thin, and perfectly transparent. Its tenuity and delicacy equal that of the capsule of the crystalline lens of the eye. No blood-vessels are seen on any part, except those which ramify over the corpora striata and thalami nervorum opticom to their trunks, which pass by the side of the tenia semicircularis.

The vessels of this membrane are sometimes found much enlarged and distended with blood, especially when a fluid is collected in the ventricles so as to increase the size of these cavities. In this state of the ventricles the membrane is found not only carrying more blood-vessels, but it is also very much thickened and very firm: so much so, that I have in several instances pared off the medullary substance of the brain from the roof of the lateral ventricles, and thus exposed the thickened and hardened membrane, as large as a goose's egg, on each side of the corpus callosum, distended with a fluid.

The septum lucidum is sometimes as thick as the dura mater, and very firm; but, in the generality of cases, those parts of the membrane which are thickened, and rendered opaque by disease, are soft and pulpy.

Coagulated albumen is occasionally found on the surface. I have seen several layers of it on the corpus striatum, and the thalamus of the optic nerve of the same side.

Ulceration, the consequence of inflammation, is occasionally seen on the surface of the ventricles. I have found an ulcer on the corpus striatum, and in another subject one on the outer wall of the right lateral ventricle: and, in both instances, it seemed as if a small abscess, the size of a split pea, had ruptured into the ventricle, which contained a large quantity of a turbid serous fluid.

An inflamed state of this membrane to a great extent, with ulceration and much pus, is often found with lesions of the brain from accidents and injuries.

B. DISEASES OF THE BRAIN, THE PINEAL AND PITUITARY GLANDS.

1. THE CEREBRUM, CEREBELLUM, AND MEDULLA OBLONGATA.

INFLAMMATION.

THE cerebrum, cerebellum, medulla oblongata, and the medulla spinalis, have two structures, which occupy distinct parts of these viscera, and which are distinguished by the names of cineritious or cortical, and medullary substances. The cineritious, which encompasses the medullary structure, is extremely vascular; but that which appears in the corpora striata, and other parts, is not more so than the medullary substance, which has but few vessels carrying red blood.

Inflammation does not occur so often in the medullary as in the cineritious substance which is on the outside of the convolutions.

The mere *increase of vascularity* is seldom noticed from inflammation of the substance of the brain: but occasionally this is observed here and there in patches.

When the inflammation is universal, the vessels are very numerous throughout the brain ; its venal system is gorged with dark blood, and *serous* or *puriform fluids* are *secreted*.

The cortical substance is sometimes the seat of inflammation, the disease not proceeding far into the medullary substance. In these cases the part is soft, and here and there pulpy ; and this alteration of firmness and structure extends, perhaps, a little way into the medullary substance, which has become of a light brown hue. The pia mater, immediately over this inflamed part of the convolutions, is always in a highly vascular and inflamed state ; the tunica arachnoides is opaque and thickened, and a serous or puriform fluid is found between them.

When the inflammation of the substance of the brain is partial, the part is of a more *florid colour* than the surrounding brain, and it is rather softer. The cut surface shows an unusual number of bloody points, which are the divided vessels. This appearance is occasionally noticed in the centre of the hemispheres, and the middle of the lobes of the brain.

In some cases, where the inflammation is partial, an albuminous secretion is deposited, here and there, in small portions. Figure 1. of Plate VIII. represents an instance of this kind.

An occasional result of inflammation in the substance of the brain is the formation of *pus*, and a *pulpiness* or *gangrene*.

ABSCESS OF THE CEREBRUM.

Cavities containing pus are not so rare as is generally supposed. They have been found of various sizes, and in most parts of the brain. Those which have come under my own observation may be arranged into,

1. The *common abscess* ; a cavity containing pus, the sides of which are formed by the surrounding brain, and partly, perhaps, by its membranes, if it be near to the outer part of the brain. The internal surface of this abscess is mostly uneven, as if granulations were forming, or irregular and shaggy ; but in some instances it is smooth. It is remarkable that very little inflammation surrounds these abscesses, and scarcely any alteration in the texture of the brain immediately around them.

Small abscesses have been frequently found near the outer surface of the cerebrum, not larger than a pea, which appeared to result from inflammation of the pia mater having extended to the substance of the brain. Abscesses as large as a walnut are not uncommon. See Plate IX. figures 2. and 4.

2. The *cellular abscess*. This consists of a number of small cells distended with a puriform fluid. The feel of this diseased portion of the brain is very soft, and there is a considerable vascularity of the surrounding parts.

The pus of this kind of abscess seldom appears like healthy pus, but is more plastic, or it is much thinner than good pus, which depends on the presence of either serum or albumen in the pus. See Plate IX. figure 5.

3. The *encysted abscess*. The pus in this species is contained in a firm organised cyst, and is thick like cream, and of a yellow colour. The cyst of these abscesses is remarkably firm, and formed of one membrane, which is of a ligamentous structure, and as thick as the pericardium. Blood-vessels are seen proceeding from the brain or its membranes, and penetrating its substance. There is no appearance of vascularity on its internal or secreting surface. See Plate IX. figure 3.

4. The *scrofulous abscess*. This resembles the common abscess in not having much alteration in the structure of the surrounding brain; but it differs from it in having a curdled pus, or a solid, unorganised, humid pus. See Plate IX. figure 1.

TUMOURS.

The cerebrum, cerebellum, and medulla oblongata have occasionally tumours within their substance, independent of, and distinct from, those of their investing membranes. These are,

1. *Hypertrophia*. A universal enlargement of the whole brain, from an excess of the cerebral substance. This occurs before the bones of the skull are perfectly united. The head is enlarged, and the fontanelles not diminished in size, but perhaps increased. The head of a child with this state of brain has been found as large as that of an adult; the brain firm, enlarged, and denser than usual.*

* Scoutettin, mentioned by Dr. Monro in his *Morbid Anatomy of the Brain*.

Professor Meckel relates the case “ of a child, one year old, which had exhibited all the symptoms of hydrocephalus, in which there was no water within the skull, but the mass of the brain, which, in its structure, was perfectly healthy, was so enlarged, that the cranium was greatly distended, and the ventricles almost entirely obliterated.” *

Dr. Duncan junior, of Edinburgh, gives a narrative of a child that died of an hypertrophy of the brain. † “ The patient, eight months old, has a mis-shapen head, with evident gaping of the sutures : the sagittal suture is found open to the middle of the frontal bones. The longitudinal diameter of the head is 6.3 inches ; the transverse 4.75 inches ; its horizontal circumference 18 inches. Sits with her head erect, and is rather a lively child ; but her body is emaciated and flabby, and her skin loose. In the evening she occasionally suffers acute head-ache, when she screams suddenly, and puts her hands to her head. . . . Was healthy during the first three months of her life, and nothing unusual was observed in the form of her head.” She was put upon a course of calomel and jalap for a vitiated state of the alimentary canal, which being remedied, she after some time was attacked with febrile symptoms, and could not lift her head. “ This seemed to have become larger, and the occiput in particular more prominent. . . . Her pupils were dilated, but still sensible to light. She suffered much pain before she died. I had no doubt that there was a considerable quantity of water within the brain, and my astonishment was great to find, *that it contained no more than the usual quantity, and that the brain was in every respect natural, except a little increased vascularity on the surface.* I regret that the head was not measured after death, as it appeared to me to have increased in size, and that the brain was not weighed, and its weight compared with that of the body.”

2. *Scrofula.* Tumours of a white colour, much harder than the surrounding brain, of a uniform close texture, mostly tuberculous, have been found of various sizes, embedded in the medullary substance, which have been considered as scrofulous. Dr. Baillie says, “ The brain adheres to this substance, and often appears round its edges more vascular than usual. This substance is scrofulous in its nature, for I have had an opportunity of seeing it converted into a scrofulous pus ‡ ;” and Dr. Kellie of Leith found “ two tubercles, each of the size of a garden

* Meckel's Manual of Pathological Anatomy, vol. i. p. 298. Leipsic. 1812.

† See Monro's Morbid Anatomy of the Brain, vol. i. p. 148.

‡ Baillie, vol. ii. p. 385.

pea, hanging pendulous from the tentorium, two others of the same size in the medullary substance of the right hemisphere, and one oblong tubercle, of the size of an almond, suppurated in its centre, and embedded in the pons Varolii. The cerebral tubercles were spherical, firm, grey coloured, and encysted, having but a very loose, if any, connection with the cerebral substance. The tubercle found in the medulla oblongata, which was softened and suppurated in its centre, could not be turned out of its nidus in the pons. There were also numerous tubercles in the lungs, liver, and spleen of this subject." These I should consider as scrofulous.

Dr. Monro removed "a scrofulous tumour which was situated over one of the lateral sinuses," from the brain of a child of a scrofulous habit that died of hydrocephalus, whose abdominal viscera were studded with yellow-coloured tumours, and whose lungs were much diseased.*

These tumours are sometimes found near the surface of the brain, and so loosely connected, that they are readily turned out, and leave a corresponding cell. There are sometimes two, three, and even more in the same brain.

Considerable portions of the cerebrum and cerebellum have been found converted into a mass of unorganised solid substances, like scrofulous pus in the other viscera. In Plate XI. an extensive disease of this kind is well pourtrayed, and I have other fine specimens in my collection.

3. *Chondroma*, or cartilaginous tumour.

a. The *perfectly cartilaginous* tumours are seldom met with. One of considerable size was found in the substance of one hemisphere. "There was," says Dr. Monro, "a very hard tumour of the size of the two fists, of a very irregular figure, having several knobs projecting from it, which consisted chiefly of cartilage, with an admixture of bony substance in its centre." †

b. The *subcartilaginous tumour*. I removed the cerebrum of an adult man, in the middle of the upper part or hemisphere of the left side of which was a large tumour, the size of a pot orange, differing very little in appearance from the medullary substance, but which was of a sub-cartilaginous hardness and texture. "Upon removing the dura mater," says Mr. Watson, "several clusters of small whitish tubercles were seen under the pia mater, on the upper part of the right

* See Monro's *Morbid Anatomy of the Brain*, vol. i. p. 187.

† *Ibid.* p. 194.

hemisphere of the brain. On cutting into the substance of the brain, particularly on the right side, small tubercles were found embedded, here and there, throughout both its medullary and cineritious parts. These tubercles were for the most part single, though some were in clusters. They were about the size of millet seeds, and of a semi-cartilaginous appearance. The lungs, liver, and mesentery, were affected with tubercles of the same description.” *

To this place belongs, most probably, a tumour which Dr. Monro describes under the title of *scirrhus*. “It is to the touch hard, has an irregular surface, and, when divided, somewhat resembles a section of a kidney. Being externally vascular, a number of cartilaginous striæ may be observed passing through the substance of the tumour.” See *Monro's Morbid Anatomy of the Brain*, p. 55.

4. The *hæmatomatous tumour*. Hæmatoma, though not common, has occurred in the substance of the brain. It is mostly fungous, arising from a small base. It generally separates the convolutions or parts about it as it enlarges, so as to appear externally upon the surface of the brain. See Plate X. It has a soft feel, is elastic, and covered with a shaggy membranous tissue. A humid substance adheres to the knife like cream, and the cut surface is mottled, of a whity-brown, and some parts of a bloody colour. Plate X. is a very fine illustration of hæmatoma of the substance of the brain.

Nodules of solid extravasated blood are occasionally found in the substance of the brain, which should not be mistaken for the morbid growth called hæmatoma. See *Extravasated Blood*.

5. *Cephaloma*. The brain-like tumour is a much more unusual disease in the brain than in other parts; but it occurs now and then. In this situation it is mostly fungous, rarely tuberculous, and of a whity-brown colour. The cut surface is smooth; the knife is covered with an unctuous substance; and very moderate pressure sends out a cream-like substance, most humid towards the middle of the tumour. Figure 1. of Plate XII. represents, most probably, a tumour of this nature, which has been called the common white tumour of the brain. See also *Baillie's Morbid Anatomy*, Fasciculus X. Plate VII.

6. The *bony tumour*. Two instances only of the formation of bone within the substance of the brain have occurred to me. This uncommon production was in the one case in the centre of the medullary substance of the right anterior lobe,

* See *Monro's Morbid Anatomy of the Brain*, vol. i. p. 199.

surrounded by a purulent fluid; the other was in the left lobe of the cerebellum, to the substance of which it was loosely connected by vessels.

Osteoma in the substance of the brain is tuberculous, and the surface lobulated or spicular. A very delicate vascular membrane surrounds it, and blood-vessels are seen coming from the neighbouring medullary substance.

In one instance the brain around the tumour was soft as pap; so much so, indeed, as to give the idea of the bony tumour being in the centre of an abscess of the brain. See Plate XII. figure 7.

Bony particles, about the size and form of saw-dust, are occasionally found in the substance of the brain, and each particle is generally attached to a small filamentous vessel. These portions of bone are nearly of the same colour as the brain, and are embedded in the medullary substance, so as not to be observed by the eye without a close inspection; but they are immediately detected by the finger. When taken out and viewed with a common lens, they are seen to be spicular and irregular in their shape. I have found these spicular portions of bone in the cerebrum and cerebellum.

Another unusual diseased state which belongs to this section is a very small granular tumour, which has a gritty feel. The portion of the brain which contains these is soft, but not disorganised, and it feels between the fingers as if particles of sand were in the substance of the brain. I have seen a great part of the medullary structure of one hemisphere converted into a brownish soft mass, full of these small tumours, none of which were visible to the naked eye, and which felt between the fingers as if sand were mixed with it. There was not any effervescence with dilute muriatic acid; so that it is most probably phosphate of lime.

7. *Lipoma.* The adipose tumour is rarely found in the brain. It is tuberculous, of the colour of fat, and has a considerable degree of firmness. When divided, it is found to be composed of an aggregation of small lobules.* I have never seen an adipose tumour of the brain.

8. *Melanoma.* The black tumour is occasionally seen in the brain, and is always tuberculous. I have found several in one brain, and in the cortical and medullary substance. These tumours are of a jet black colour, soft, distinctly circumscribed, and closely surrounded by very healthy brain. They are found of

* See *Wenzel de penitiori Structura Cerebri*, p. 104.

all sizes, from that of a mustard-seed to a walnut. They are so soft as to require a very sharp knife to cut them, which they soil. They are easily taken out of the brain with forceps, and leave a clean cavity without any cyst apparent to the naked eye, and if shook in water, they colour it black, and a flocculent substance remains. See Plate XII. figures 2. and 3.

In one instance, in which there were several of these tumours, some of them were of a blood or liver colour, and resembled hæmatoma; others were perfectly melanomatous; and several were of an intermediate colour: a circumstance which is very much in favour of the hæmatoma and melanoma having an intimate connection, if they be not one and the same disease, modified by particular circumstances.

9. *Hygroma.* The hygromatous tumours which have been found in the substance of the brain are of several kinds.

a. A *simple cell*, full of a fluid. Cavities of this kind are not uncommon, and they are mostly near the external surface of the brain. They are of the size of peas and nuts. The fluid they contain is generally transparent or of a yellowish or red colour, and is serous. There is no appearance of a membrane lining the cell; nothing like vascularity. The sides of the cavity are somewhat harder than healthy brain, occasionally rather rough and of a brownish hue, but mostly smooth and shining. These cells differ essentially from encysted hygromatous tumours, and they are, in my opinion, originally, extravasations of blood, or collections of lymphatic fluids.

b. Another species, is an *encysted tumour*, like a bladder or vesicle filled with water. It consists of an organised membranous cyst, distended with a serous fluid. The cyst is a simple membrane, extremely delicate, not thicker than the transparent and healthy omentum, and vessels are seen coming from the surrounding brain in which it is embedded, and ramifying over the vesicle. It contains a serous, colourless, and beautifully clear fluid, in composition like the serum of the blood.

This species of hygroma is occasionally found of a very small size in the substance of the brain, and solitary; but they are sometimes as large as pot oranges, and Plate XIV. has a representation of three embedded close together.

A careful dissection separates the medullary substance of the brain which embraces this kind of vesicle; but great nicety and management are necessary to expose the real character of the disease.

c. Another species consists in a *cyst*, which is *opaque* in some parts, and transparent in others, distended by a sero-albuminous fluid.

The cyst of this species is much thicker, and more firm, than the former. It does not, therefore, exhibit so beautiful a bladder-like appearance, nor any vascularity. The fluid is coagulated by heat, and there are often solid portions of albumen floating within.

d. In another species the *cyst* is *remarkably thick*, as much so as the pericardium. This species is mostly embedded in the medullary substance of the brain, and the contents of the cyst are a thick albuminous fluid. See Plate XIII.

10. *Acephalocystis*, or the headless hydatid. This animal is occasionally met with in the substance of the brain, though very rarely indeed; for I have never yet found one within the human skull, and I have examined several thousands. It has, nevertheless, been seen by others, enclosed in a cyst, and possessing the same characters with those animal hydatids that are often found in the abdominal viscera.*

The present Dr. Monro of Edinburgh relates the case of a patient of Dr. M'Kenzie, in which the brain, "on opening the right ventricle, presented a cyst, about the size of a goose's egg, filled with a watery liquor, and surrounded by a gelatinous matter, which did not adhere to the membrane lining the ventricle." Dr. Monro examined the cyst, which appeared to him "of the same structure as that of hydatids."

11. *Cysticercus*, the bladder-tail hydatid. I have never seen this worm; but Dr. Brera found a great quantity in the choroid plexus of a man who died of apoplexy.

2. THE PINEAL GLAND.

This small body, attached to the brain by two peduncles, has been found in the following diseased states:—

* Monsieur Rostan has seen them in the arachnoid cavity, and Monsieur Seville also. The latter found several under the dura mater; some of which adhered to the tunica arachnoides; others were immediately under it, and were sunk in a depression of the brain; and there were some in the corpus callosum: and he adds, there were several in the veins of the brain.

1. *Extremely flaccid.* This often occurs when there is no want of healthy firmness in other parts of the brain.

2. *Pulpy.* With this condition the organisation is destroyed, and it cannot be removed entire from its situation.

3. *Calcareous*, and *bony particles*, are frequently within or attached to it, or to its peduncles. This is so common an occurrence, that it has been considered by some as a natural circumstance, and not disease. The calcareous matter is sometimes visible externally. In most instances it is spicular, seldom larger than a mustard seed, and consists of phosphate of lime, with animal matter. It is sometimes, however, in the very substance of the gland, and then it has a gritty or sandy feel, when pressed between the fingers.

4. *Hardness.* This has never occurred to me but once, and in this instance the colour was like the medulla of the brain, and it resisted the knife much more than the brain did.

5. It is sometimes converted into a *cyst*, the whole of the natural structure being destroyed. This cyst is firm and membranous, and I have seen it of the size of a tamarind stone. The contents of one which I examined were, a turbid serous fluid, with small particles of solid albumen. See Plate XII. figure 8.

3. THE PITUITARY GLAND.

I have never seen this in a diseased state. It has been found of twice its natural size, and converted into a substance possessing an obscurely fibrous texture.

DISEASED STRUCTURES AND UNNATURAL APPEARANCES WITHOUT TUMEFACTION.

These are, softness or flaccidity, pulpiness, unnatural colour, increased humidity, dryness, hardness, or induration, extension, destruction of parts, and condensation.

1. *Softness or Flaccidity.* The whole of the brain is occasionally found in a flaccid state: sometimes the cerebrum only, the cerebellum having its natural firmness. I have noticed this in several instances. It has been found so in criminals who had forfeited their lives to the violated laws of their country when in the full enjoyment of their health; and the brain has been observed to be soft in cases of apoplexy, palsy, epilepsy, mania, &c. *

Morbid softness of the brain consists in a want of due cohesion between its molecules.

There is, in general, a paler colour attending this state than is natural, and sometimes to a great extent.

2. *Pulpiness.* See Page 17.

3. *Humidity.* It is not an uncommon thing to have this condition of brain. It appears like a subanasarcous state of the whole brain; is much softer than it should be; more pale in colour; without its due elasticity; and it easily receives, and retains for some time, the impression of the finger.

4. *Dryness.* This state occasionally pervades the whole of the brain. I have repeatedly found the cerebrum, cerebellum, and medulla oblongata deficient of humidity, while every other part of the body was natural.

5. *Hardness or Induration.* See Page 16.

6. *Unnatural Colour.* The colour of the brain is not subject to much change, and it is seldom noticed by pathologists unless the alteration is considerable. The natural and healthy colour of the brain is a fleshy grey or cineritious, in the cortical part; a clear, yellowish white in the medullary; and a dark brown in what is called the substantia nigra. These colours become of a deeper hue as life advances.

The colour of the cortical part is not subject to much change, nor the cineritious striæ of the corpora striata, nor that of the pedes hippocampi.

The colour of the substantia nigra seldom varies.

The delicate white colour of the medullary substance frequently undergoes a change. I have seen it of a pale stone or albine colour throughout; and in one instance of green jaundice, which had existed near two years, it had a decided yellow tinge, but in no other, although the subjects had been jaundiced a long time.

* See Monro's Morbid Anatomy of the Brain, p. 160.

Change of colour takes place in a part of the brain. Most organic diseases have their peculiar colours; and a part of the medullary substance is now and then found of a light red or brownish hue, without any other obvious change.

7. *Extension.* See Page 18.

8. *Destruction of Parts.* See Page 18.

9. *Condensation.* See Page 19.

C. DISEASES OF THE NERVES, BLOOD-VESSELS, SINUSES, &c. OF THE BRAIN.

1. THE NERVES.

A DISEASED state of the nerves within the cranium is as uncommon as an organic change in the nerves in the other parts of the body: both are very unusual. Nodules, like ganglia, but of a brown colour, have been met with on the nerves within the skull.

2. THE BLOOD-VESSELS AND SINUSES.

1. *Ossifications*, and opacities progressive to ossification, of the larger arteries of the brain, are extremely common. They mostly occur after the fiftieth year of a person's age; but I have occasionally found them as early as the thirtieth. The diseased state is most visible in the trunks of the vessels about the sella turcica and medulla oblongata, and when felt it is found hard and bony. The ossification surrounds the artery, and often extends some way along it, so as to completely

prevent it contracting. When the trunks are thus extensively diseased, the smaller branches are also ossified in patches, and a careful examination of the fine filamentous branches which penetrate the medullary substance, will often detect little nodules in them also.

In most instances of blood found extravasated in the substance of the brain, this condition of the arteries exists, and is, most probably, the cause of the extravasation; the vessel not being able to propel the blood, which becomes stagnant, or not being able to resist the impulse from a powerful contraction of the heart.

2. *Aneurism.* This, though very unusual, occurs now and then. I have found one of the left cerebral artery, close to the sella turcica, the size of a hazel-nut.

3. There is great difference with respect to the *quantity of blood* in the vessels of the brain and venous sinuses, which depends on a variety of casual circumstances. In general the sinuses are empty; but sometimes they are filled with a dark-coloured and coagulated blood; and occasionally there are firm portions of the fibrinous part of the blood similar to what is found in the cavities of the heart and arteries.

The large blood-vessels of the pia mater are frequently found very much distended with dark blood: when this is the case, the smaller branches, ramifying about the convolutions, are beautifully filled; and if the pia mater be pulled from the convolutions, its processes will be found loaded with over-distended vessels.

Partial congestions of blood in the vessels of the pia mater are not unusual when there is any organic disease within the cranium.

4. The internal surface of the sinuses is occasionally found of a vermilion colour, like that which is sometimes seen in the arterial system. What this unusual appearance is caused by is yet undetermined.

5. The membrane which lines the sinuses is subject to inflammation, which has proceeded to suppuration. Plate V. figure 4. is a rare and fine specimen of this.

3. THE GLANDS OF PACCHIONI.

These small subcartilaginous bodies are frequently found enlarged and hardened; and occasionally they cause an absorption of the dura mater, with corresponding depressions in the superincumbent bone.

The trabeculæ, or bands which cross the longitudinal sinus, are every now and then thickened, and more numerous than is natural.

INFLAMMATION OF THE DURA MATER.

THIS and the next plate represent the common effects of acute inflammation of the dura mater ; namely, morbid vascularity, and a secretion of albumen.

PLATE I.

The portion of the dura mater which covers the right hemisphere of the brain. It is so disposed that the eye looks on the internal surface, which is become extremely vascular.

EXPLANATION.

- A. The external surface of the dura mater.
- B. The longitudinal sinus.
- C. The falciform process.
- D. The internal and inflamed surface.

This appearance of the internal surface of the dura mater is rarely met with, because the inflammation generally proceeds much further before it kills, and a quantity of serum, or of an albuminous or a puriform fluid, is secreted ; and the morbid vascularity, so beautifully represented in this plate, is not discernible.



J. Howship, del^t

J. Wedgwood sculp^t

INFLAMMATION OF THE DURA MATER.

Fig. 1.



J. Howship. del^r

Fig. 2.



J. Wedgwood. sculp^t

INFLAMMATION OF THE DURA MATER.

PLATE II.

Two portions of inflamed dura mater, from the upper part or hemispheres of the brain. The inflammation in these instances is much more advanced than that represented in the former plate. The albuminous secretion is formed into a perfectly organised membrane, and vessels are seen shooting into it from the inflamed surface.

FIGURE 1.

- A portion of the dura mater from the upper part of the brain.
- A. The internal surface of the dura mater.
 - B. A beautifully transparent and perfectly organised membrane, into which vessels have extended from the inflamed surface of the dura mater. The red specks are particles of blood, coagulated in the vessels of this adventitious membrane by alcohol, into which the part was immediately immersed in order to preserve it.

The vessels of this membrane, the upper part of which is reflected, were as apparent in this preparation as in that of Plate I., before the coagulation of the blood by the spirit.

FIGURE 2.

- A portion of the dura mater from the left hemisphere of the brain.
- A. The internal surface of the dura mater.
 - B. A thick layer of an organised albumino-fibrinous membrane, separated from the dura mater at the upper part, and turned down. The vascularity of this adventitious membrane was not so observable to the naked eye as in the former instance, because the whole was opaque, and a great part humid and solid albumen. Vessels are, however, seen dipping into its substance from the inflamed surface of the dura mater.
 - C. Filamentous portions of albumen, hanging from the surface of the dura mater.

INFLAMMATION OF THE PIA MATER, AND TUNICA
ARACHNOIDES.

THE two following plates represent appearances very commonly produced by inflammation of the pia mater and tunica arachnoides ; viz. a great increase of vascularity, with a considerable congestion of blood in the larger vessels of the pia mater, and an opacity and thickening of the tunica arachnoides, with an albumino-puriform secretion between these two membranes.

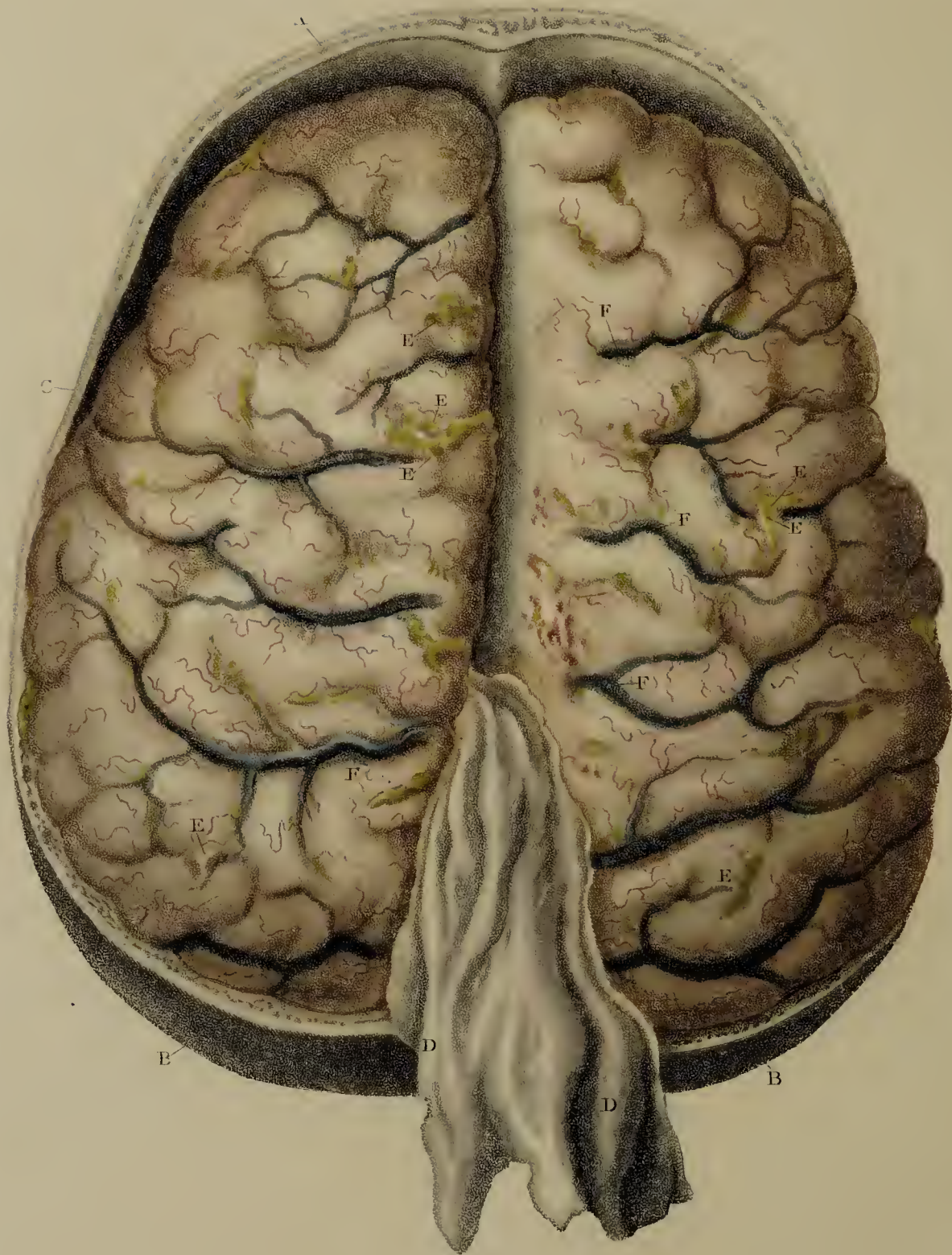
PLATE III.

The upper part of the cranium is removed, and the dura mater divided all around and turned down, so as to allow the whole of the two hemispheres to be seen.

The vessels of the pia mater are enlarged, and turgid with blood ; there is a considerable quantity of puriform albumen in patches between the two membranes, and the tunica arachnoides is, in many places, thickened and opaque.

EXPLANATION.

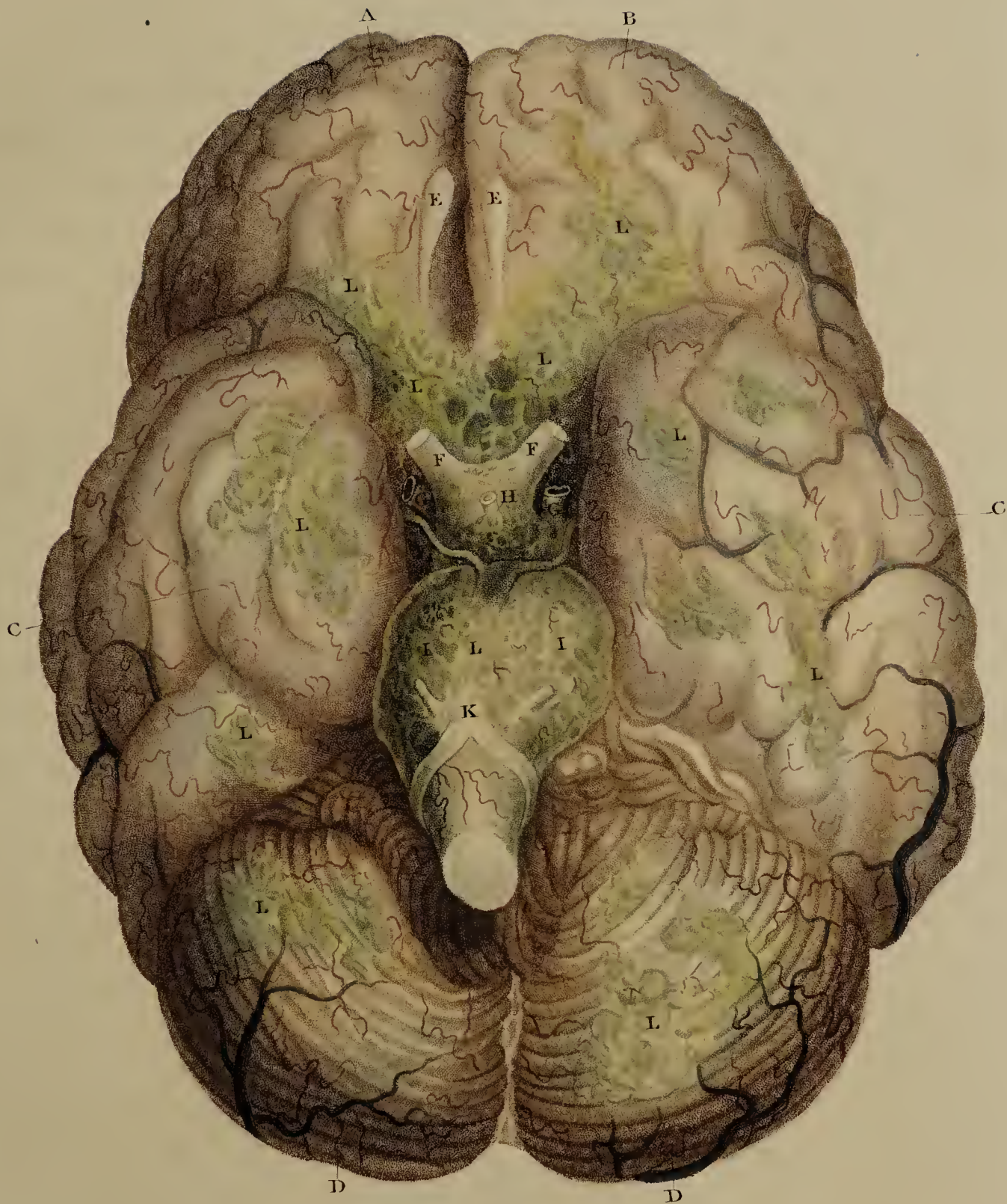
- A. The os frontis.
- B. The occipital bone.
- C. The left parietal bone.
- D. The dura mater, detached from the crista galli, and cut so as to be drawn back between the hemispheres.
- E. Yellow patches, which are portions of albumen, between the pia mater and tunica arachnoides, that very much resemble pus.
- F. The vessels of the pia mater loaded with blood.



J. Howship, del.

J. Wedgewood, sculp.

INFLAMMATION OF THE PIA MATER
and
TUNICA ARACHNOIDES.



J. Howship del^s

J. Wedgwood sculp^t

INFLAMMATION OF THE PIA MATER
and
TUNICA ARACHNOIDES.

PLATE IV.

The cerebrum and cerebellum so placed as to bring the whole of the base or under surface of the brain into view. The same diseased appearances are seen in this as in the former plate, but to a much greater extent : a puriform albumen is secreted on the surface of the lobes of the cerebrum, on that of the cerebellum, and over the whole of the medulla oblongata.

EXPLANATION.

- A. The right anterior lobe of the brain.
- B. The left anterior lobe.
- C. The middle lobes of the brain.
- D. The two lobes of the cerebellum.
- E. The olfactory nerves.
- F. The optic nerves.
- G. The carotid arteries.
- H. The infundibulum.
- I. The medulla oblongata covered with yellow albumen, which is deposited between the pia mater and tunica arachnoides, and around the basillary artery and the nerves of the medulla oblongata, so as to obscure their origin.
- K. The basillary artery.
- L. Portions of puriform albumen between the tunica arachnoides and pia mater.

The quantity of albumen secreted in this instance between the membranes is very considerable compared with what is usually found. The olfactory nerves, the optic and the fifth pair, are almost wholly enveloped and obscured ; also the infundibulum, the internal carotid, and the basillary arteries.

BONY TUMOURS OF THE DURA AND PIA MATER, AND
ABSCESS OF THE LATERAL SINUSES.

PLATE V.

THIS plate contains representations of depositions of bony matter in the membranes of the brain, both the dura and the pia mater; and also a very unusual disease, an abscess of the lateral sinuses of the dura mater.

FIGURE 1.

A portion of the dura mater with its falx, in which are several portions of bone.

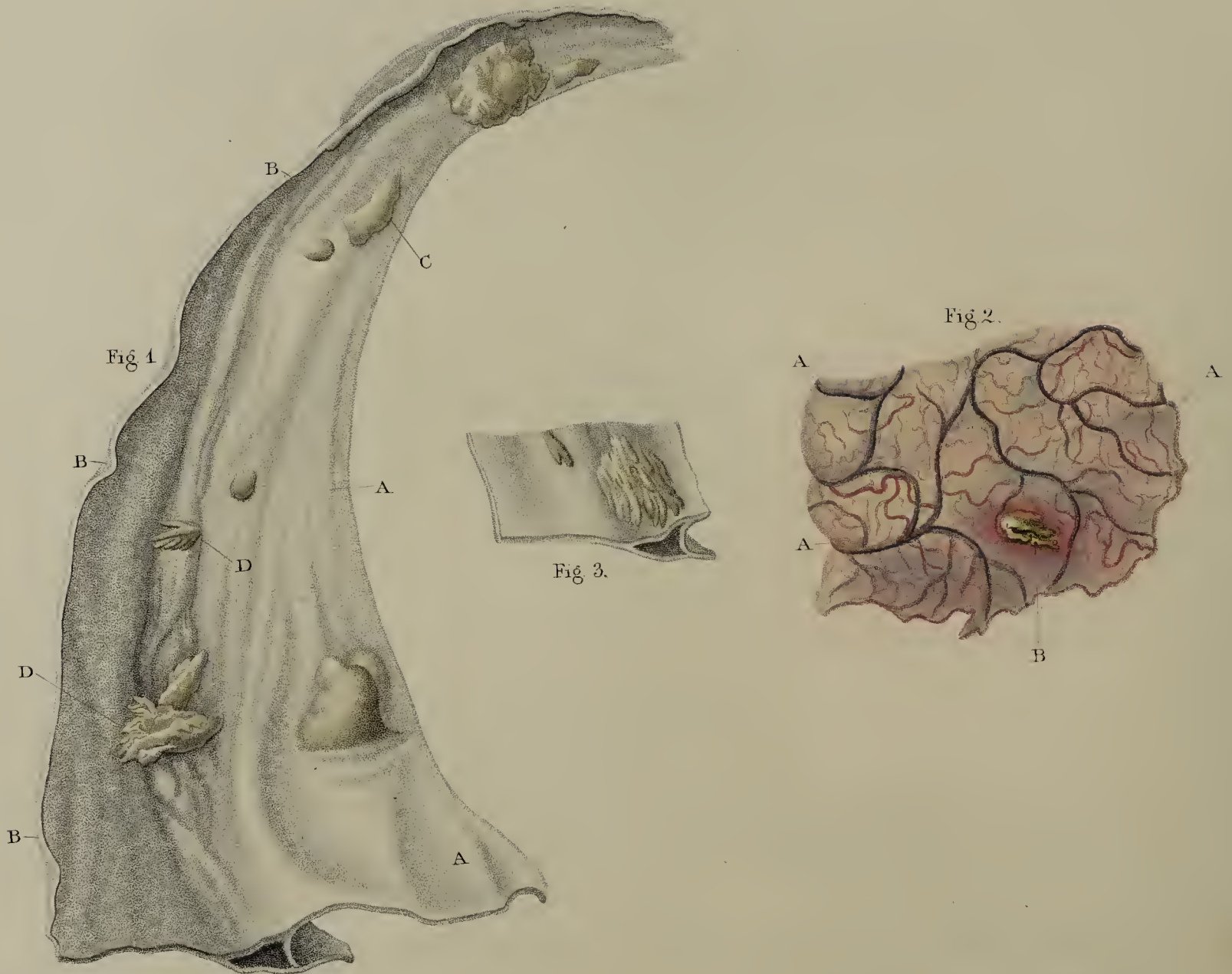
- A. The falciform process of the dura mater.
- B. The part of the dura mater which covers the right hemispheres of the brain.
- C. Smooth portions of bony matter deposited between the laminæ of the dura mater.
- D. Spiculæ of bone deposited on, and projecting from, the internal surface of the dura mater, and covered by a very delicate and transparent membrane.

FIGURE 2.

A part of the pia mater in which there is a small portion of bony matter, the base of which was towards the cortical substance of the brain, and the bifid or ragged point in contact with the dura mater.

- A. The vessels of the pia mater.
- B. The portion of bony matter.

PLATE V.



J. Howship del.

J. Wedgwood sculp.

OSSIFICATION OF THE DURA AND PIA MATER
and
ABSCESS OF THE LATERAL SINUSES.

FIGURE 3.

A small portion of the dura mater from another subject, with a considerable portion of bony matter, which was embedded in the substance of the subjacent brain.

FIGURE 4.

The portion of the dura mater in which the lateral sinuses are situated. It represents two abscesses cut open, one in each lateral sinus, the consequence of inflammation of the internal membrane.

A. The abscess in the left lateral sinus, the internal surface of which is covered with an albuminous secretion.

The pressure of this abscess on that part of the temporal bone which it covered, namely, the groove of the lateral sinus just above the foramen lacerum in basi cranii, caused a complete absorption of it: a tumour pointed externally, and pus was evacuated through the meatus auditorius externus.

B. The abscess in the right lateral sinus, which has ulcerated its side at A, so as to cause a small portion of the corresponding bone to become carious.

SUBCARTILAGINOUS TUMOURS AND HÆMATOMA OF THE
DURA MATER.

PLATE VI.

Two diseased appearances, both very uncommon, are represented in this plate. The one is the hard or subcartilaginous tumour: the other a fungous hæmatoma.

EXPLANATION.

The dura mater from the upper part of the brain is here suspended at the anterior part, so as to bring the whole of the internal surface into view, which is every where studded with tumours.

- A. The internal surface of the dura mater.
- B. The external surface of the dura mater.
- C. The falciform process.
- D. The longitudinal sinus.
- E. The subcartilaginous tumours of a tuberculous form. Their colour both externally and internally is a yellowish white, similar to that of the dura mater, by the internal lamina of which they are covered. They are externally smooth, and the cut surface exposes a smooth surface without the least appearance of vascularity.
- F. A soft, spongy, fungous tumour; of a red colour, and covered with a loose cellular tissue. By moderate pressure a pasty, red, humid substance was expelled, and the tumour became evidently spongy.

PLATE VI.



G Kirtland del^t

J Wedgwood sculp^t

TUBERCLES OF THE DURA MATER.

Published by D. Hooper Jan^y 1826.

PLATE VII.



G. Kirtland. del^s

J. Wedgwood. sculp^s

FUNGOID TUMOUR OF THE DURA MATER.

Published by D^r Hooper. Jan^r 1826.

CEPHALOMA OF THE DURA MATER.

PLATE VII.

A CEPHALOMATOUS tumour of the dura mater of a considerable size, arising by a large base from that part which covers the sphænoid bone, a little to the right of the sella turcica, and extending across the pons Varolii to the opposite side, enveloping all the nerves, and adhering firmly to the dura.

FIGURE 1.

- A. The dura mater.
- B. Subcartilaginous tumours, similar to those of the last plate.
- C. The tentorium.
- D. The cephalomatous tumour, a portion of which has been removed at *a* to expose its structure.
- E. The cerebellum.
- F. The divided medulla oblongata, in which the substantia nigra is seen.
- G. The pineal gland.

The colour of this unusually large fungous tumour was a pale, reddish brown ; it was soft, and easily compressed. The cut surface exposed great vascularity, and a spongy texture, from which a humid cream-like substance was expelled by pressure. It bore a striking resemblance to the uterine surface of the human placenta.

FIGURE 2.

A portion of the tumour which has become reticular and flocculent by maceration.

INFLAMMATION OF THE BRAIN.

PLATE VIII.

THE two diseased appearances represented in this plate are the consequence of acute inflammation in the substance of the brain. In the one there is a yellow albumen secreted in patches throughout the whole of the corpus striatum, the healthy texture of which is destroyed, and the same secretion is seen extended to a considerable portion of the adjoining medullary substance. The other is a very extensive destruction of the medullary substance, which had become very pulpy, and resembled an admixture of pus with the medulla of the brain.

FIGURE 1.

A portion of the brain from the left side: the upper part is removed by a section carried outward from the uppermost and lateral part of the ventricle, so as to remove the roof of that cavity.

- A. The anterior lobe of the cerebrum.
- B. The posterior lobe.
- C. The thalamus nervi optici covered with albumen.
- D. An immense mass of diseased structure, occupying the principal part of the middle of the medullary substance of the brain, and surrounded by many enlarged vessels, and an appearance like inflammation. The colour of the greater part of this morbid structure was that of a light yellow ochre: its texture pulpy, but it became as firm as the rest of the brain after being a short time in alkohol. The yellow specks are portions of albumen.

FIGURE 2.

A portion of the right half of the brain exposing the surface made by a section carried horizontally just above the corpus callosum.

- A. The anterior lobe of the cerebrum.
- B. The posterior lobe.
- C. C. C. These letters surround a considerable mass of pulpy and discoloured brain, portions of which are very like pus, mixed with the medullary substance of the brain.

PLATE VIII.



G. Kirland del^t

J. Wedgwood. sculp^t

DISEASED APPEARANCES SUBSEQUENT
TO INFLAMMATION.

Published by D^r. Hooper Jan^r 1826.

PLATE IX.

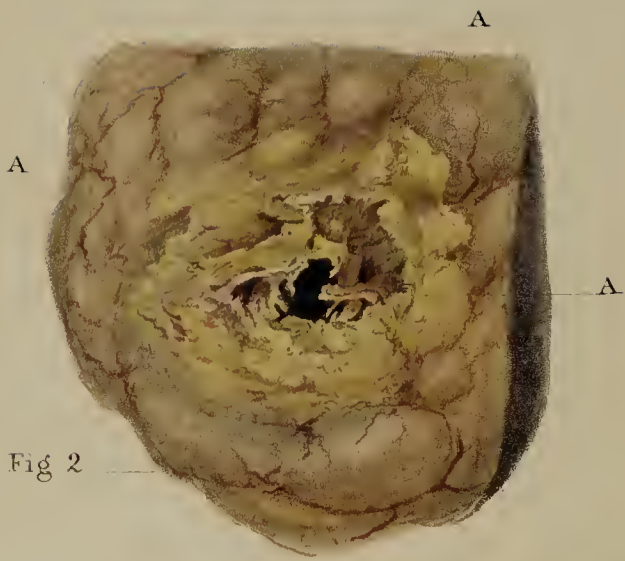


Fig 2

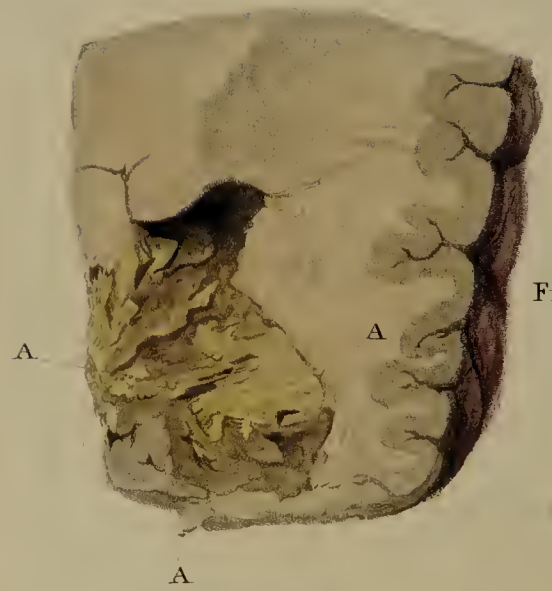


Fig 1



Fig. 3

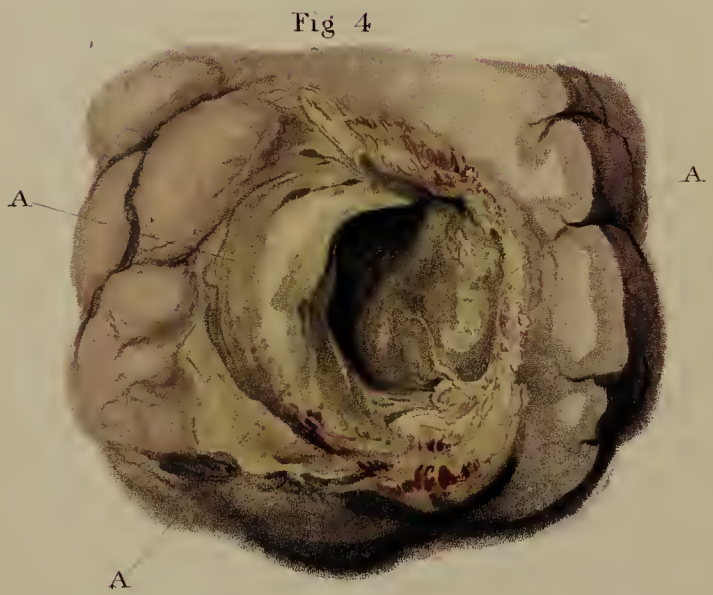


Fig 4

Fig 5



J. Stewart, Junr del.

J. Stewart, Senr sculp.

ABSCESS OF THE BRAIN.

ABSCESS OF THE BRAIN.

PLATE IX.

THIS plate contains representations of all the species of abscess of the brain.

FIGURE 1.

An abscess near the extremity of the anterior lobe of the brain, which came from a scrofulous subject, contained a dessert spoonful of curdled pus, and was probably, therefore, of a scrofulous nature.

The sides of the abscess, and the neighbouring medullary substance, were very little altered in their structure.

A. The abscess, the sides of which are covered with pus.

FIGURE 2.

A small abscess in the substance of the brain, between the lateral ventricle and the middle of the right hemisphere, which extended outward, and burst between the membranes. It contained near a fluid ounce of ill-conditioned pus.

A. The sides of the abscess, the uppermost portion of which was covered by the dura mater.

The surrounding part of the brain was pulpy, and very vascular, and the dura and pia mater much inflamed.

FIGURE 3.

An encysted abscess in the middle of the left anterior lobe of the brain.

A. The cyst, which contained between two and three ounces of pure fluid pus.

It is of a firm, dense, membranous texture, and of the thickness of the pericardium.

B. The cut surface of the brain.

C. The pia mater, the vessels of which are loaded with blood.

FIGURE 4.

An abscess in the extremity of the anterior lobe of the brain.

- A. The cavity of the abscess, the upper part of which is removed. The contents were a serous ichor or pus; and the sides appeared clean and shining, as if covered by a delicate membrane.

FIGURE 5.

A portion of the right anterior lobe of the brain, in the centre of which is a considerable abscess.

- A. The abscess formed by a number of cells, which contained a thin and serous pus.
- B. The boundary of the abscess.
- C. Part of the left anterior lobe of the brain.
- D. A portion of the dura mater connected by adhesions to the pia mater and brain.

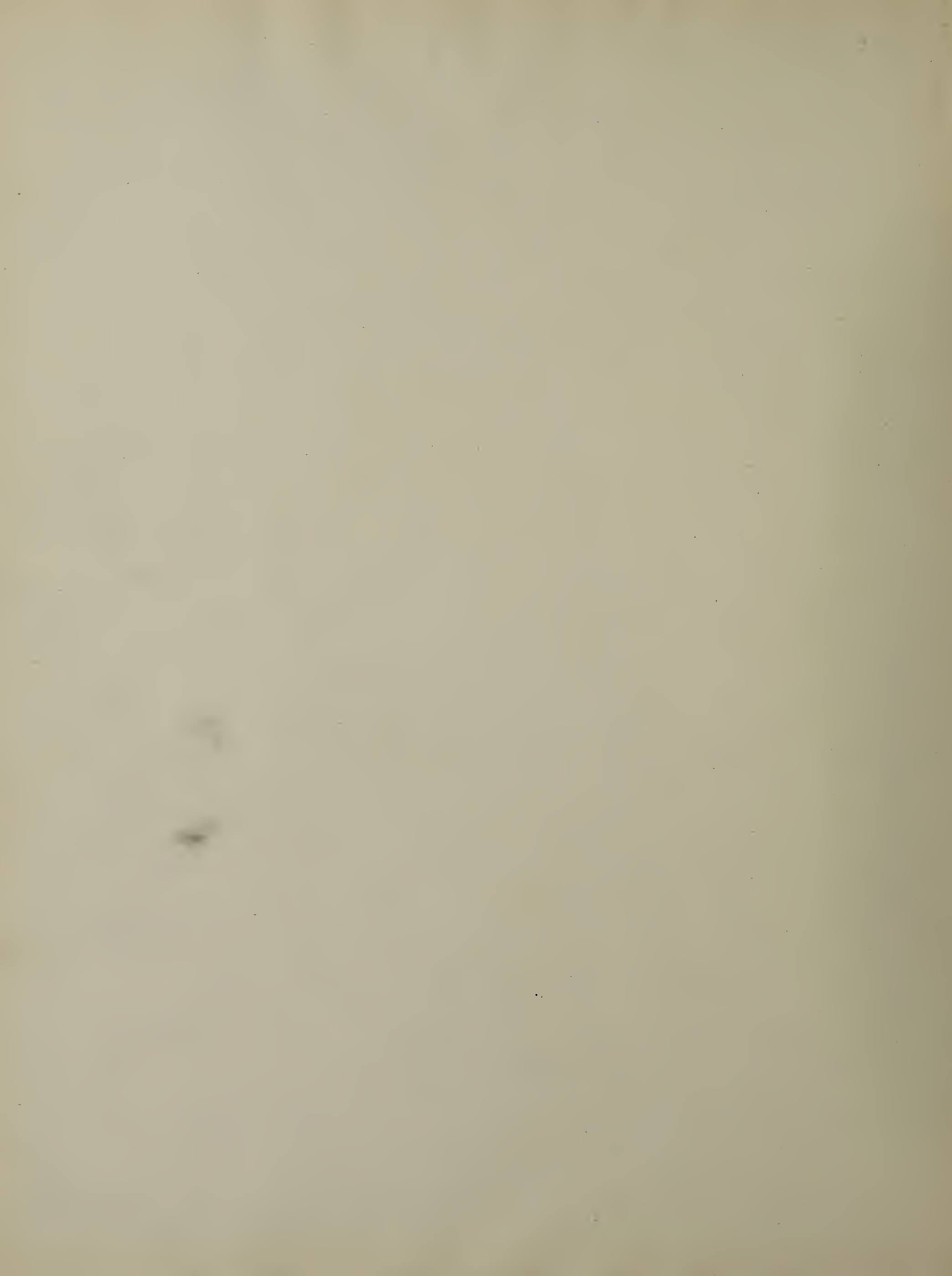
PLATE X.



J. Howship, del^t

J. Stewart, Sen^r sculp^t

HÆMATOMA OF THE BRAIN.



HÆMATOMA OF THE BRAIN.

PLATE X.

A BEAUTIFUL illustration of an hæmatoma of the brain, as it appeared when the dura mater was removed.

- A. The anterior lobe of the cerebrum.
- B. The posterior lobe.
- C. The middle lobe.
- D. The upper surface of the left hemisphere.
- E. The hæmatoma. This tumour is fungous, and takes its origin from the medullary substance of the cerebrum near the ventricle, but has no connection or communication whatever with that cavity. It has a broad base, and, in making its way outward, has separated the convolutions of the brain to some distance from each other.

Externally, it is covered by the pia mater, over which there is a very vascular, delicate membrane, which is either the arachnoid altered by the disease, or an adventitious membrane produced by inflammation. This fungus is irregularly lobulated. To the touch it feels soft, and is somewhat elastic. It cut as firm as brain, and presented a vascular, mottled surface, of a reddish-yellow colour, with portions, here and there, of a coagulated blood-like substance.

SCROFULA OF THE BRAIN.

PLATE XI.

A SCROFULOUS tumour of the cerebellum, being a mass consisting of a soft, brain-like structure, and a quantity of, apparently, an unorganised, cheesy substance, intercepted by portions of membrane, and occupying almost the whole of the left lobe.

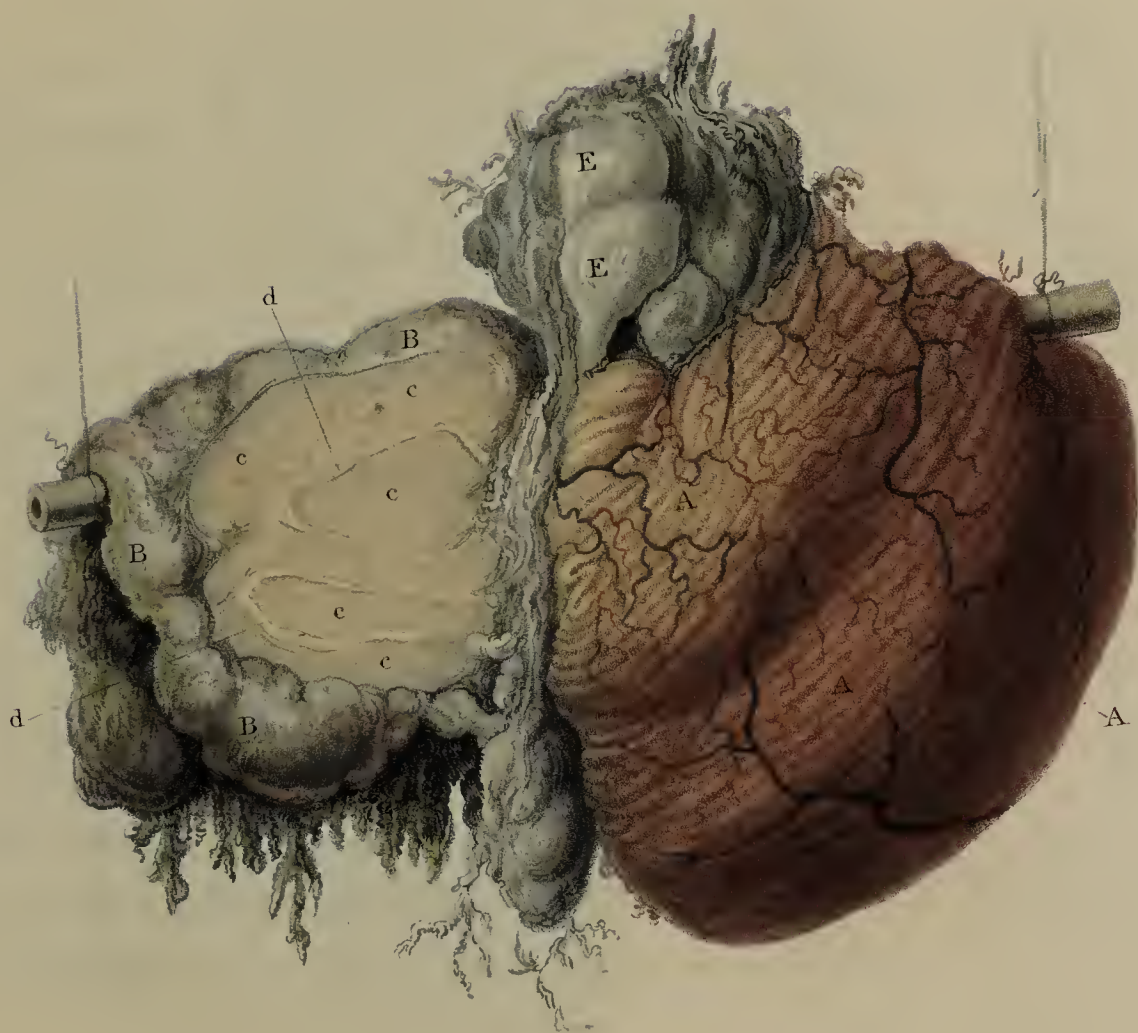
The subject from which this was taken had scrofula in various parts of his body; and the structure of this mass of disease so resembled that of a scrofulous mesenteric gland as to leave no doubt of its nature.

EXPLANATION.

A portion of the disease has been removed by a sharp knife, to show the internal structure.

- A. The right lobe of the cerebellum, not in the least diseased.
- B. The scrofulous substance, which was surrounded by a very thin portion of cerebellum. The adhesion of the dura mater to the other membranes was so firm, and the thin cerebellum so pulpy, that it could not be preserved.
- C. The cut surface.
- D. The membranous septa.
- E. The divided pons of Varolius.

PLATE XI.



G Kirkland del.

J. Stewart sculp.

SCROFULA OF THE CEREBELLUM.

Published by D^r Hooper, Jan^r 1826.

THE WHITE, BLACK, AND BONY TUMOURS OF THE BRAIN;
DISEASES OF THE CHOROID PLEXUS, AND OF THE PINEAL
GLAND.

PLATE XII.

IN this are representations of what are usually denominated the white, black, and bony tubercles, and also some of the diseases of the choroid plexus and pineal gland.

FIGURE 1.

The cerebellum and medulla oblongata dissected so as to expose the fourth ventricle, into which there is projecting, from the posterior part of the corpus annulare, a large cephalomatous tumour, commonly called the white tubercle.

- A. The lobes of the cerebellum, the greater part of which is cut away.
- B. The fourth ventricle laid open.
- C. The white tumour projecting into the ventricle, of a tuberculous or round form, firm in its texture, and not very vascular.
- D. The termination of the medulla oblongata, the pia mater covering of which is very vascular.

FIGURE 2.

A portion of the posterior part of the right hemisphere of the brain, studded with the melanomatous tumours.

- A. A black tubercle, the size of a hazel-nut.
- B. Lesser tubercles.

The largest tumour appeared, at first sight, as if it were merely a coagulum of very dark venous blood; but on a close examination it proved to be perfectly organised, of a pulpy, gelatinous consistence. It was easily broken down between the fingers, when it looked like the pigmentum nigrum of the eye, or soft Indian ink. It is surrounded by a very delicate membrane; is cellular; can easily be turned out of the brain, to the substance of which it adheres very loosely, except at one point, where the vessels enter by which it is formed and nourished.

FIGURE 3.

A small portion of the brain, with a black tumour hanging from its cavity by its vessels.

FIGURE 4.

That portion of the basis of the brain which supports the fornix, and over which the choroid plexus and velum interpositum are spread, but which are removed to bring the pineal gland and vesicles of the plexus into view.

- A. A. The thalami nervorum opticorum.
- B. The plexus choroides.
- C. Vesicles of the choroid plexus, of various sizes, in clusters.
- D. The pineal gland hanging from its crura, and lying upon the corpora quadrigemina.

FIGURE 5.

A gland-like tumour of the choroid plexus, hanging from its posterior part, so as to occupy the posterior corner of the lateral ventricle.

Fig. 1.

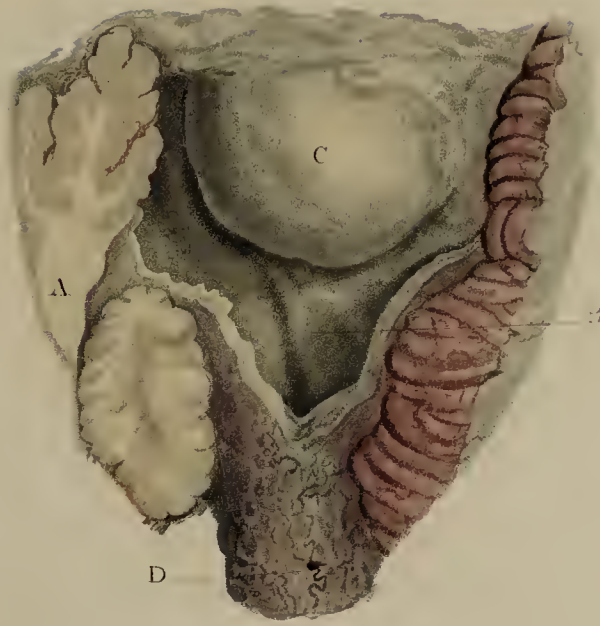


Fig. 7.



Fig. 8.

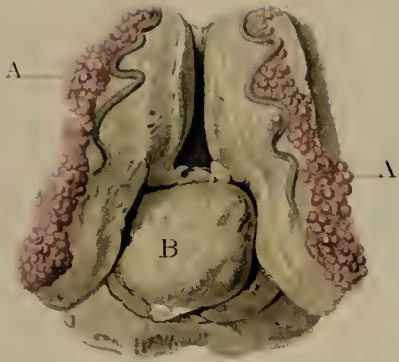


Fig. 3.

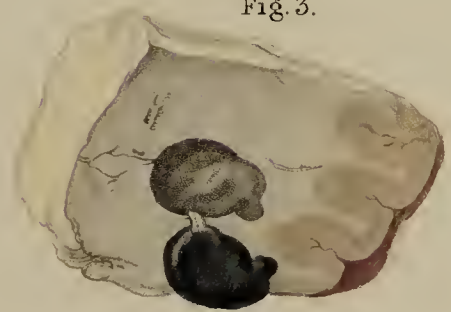


Fig. 4.

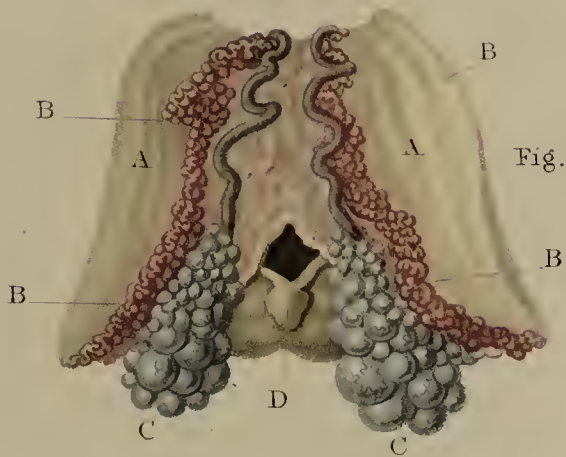


Fig. 2.



Fig. 5.



Fig. 6.



J Howship del^s

J Stewart sculp^s

TUBERCLES OF THE BRAIN
and
DISEASES OF THE CHOROID PLEXUS AND PINEAL GLAND.

FIGURE 6.

The same tumour cut open to show its structure, which was in this instance soft and fleshy, though generally of a subcartilaginous hardness. Two or three small nuclei are seen in the centre, which are cartilaginous.

FIGURE 7.

A bony tubercle which consisted of the same materials as healthy bone, with a little more animal matter. There is a large internal cavity.*

FIGURE 8.

The portion of the brain to which the pineal gland is attached.

- A. The plexus choroides.
- B. The pineal gland converted into a cyst which was four times the size of the gland, and contained an albuminous fluid.

* This was presented to the author by Dr. Simms, who removed it from an amaurotic girl, ten years of age, who had been blind, and had tremors of her limbs, for three or four years. It was found in the anterior lobe of the brain surrounded by a purulent fluid, and is represented by me because it is an exact resemblance, only a little larger, of the one I found in the left lobe of the cerebellum of an adult female, whose head I examined under circumstances which prevented me taking a drawing. It was the size and form of the eatable part of a walnut.

ENCYSTED TUMOUR OF THE BRAIN.

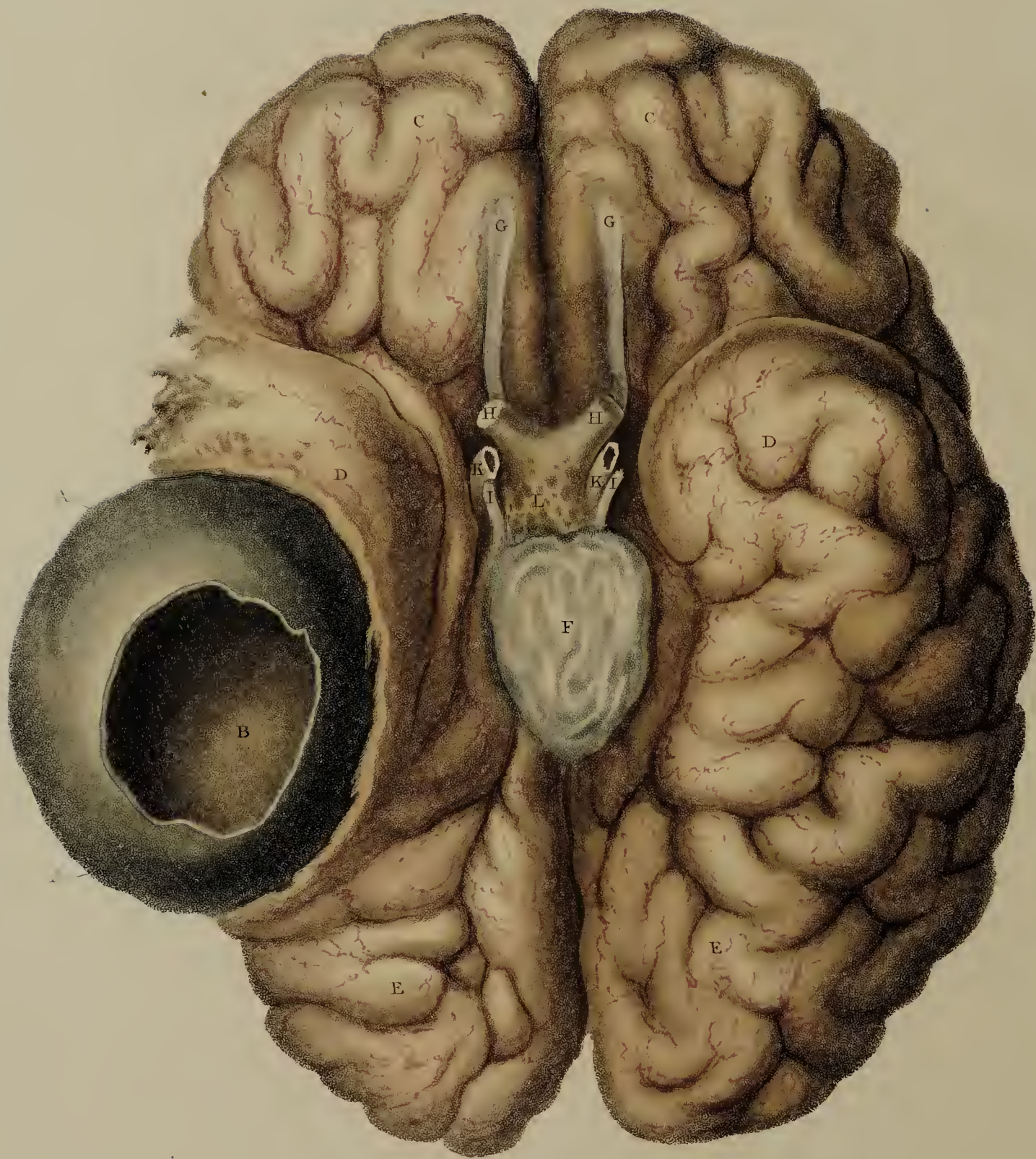
PLATE XIII.

A VIEW of the base of the brain, in which an encysted tumour is seen in the centre of the middle lobe of the right hemisphere. A small part of the cyst is cut away, to let out the contents, which were a puriform albumen of the consistence of cream.

EXPLANATION.

- A. The cyst formed of a firm membrane, smooth internally, and composed of one tunic.
- B. The cavity of the cyst.
- C. The anterior lobe of the cerebrum.
- D. The middle lobe.
- E. The posterior lobe.
- F. The pons Varolii cut through to separate the cerebellum.
- G. The olfactory nerve.
- H. The optic nerve.
- I. I. The third pair of nerves, or motores oculorum.
- K. The internal carotid artery.
- L. Portions of solid albumen secreted by the pia mater.

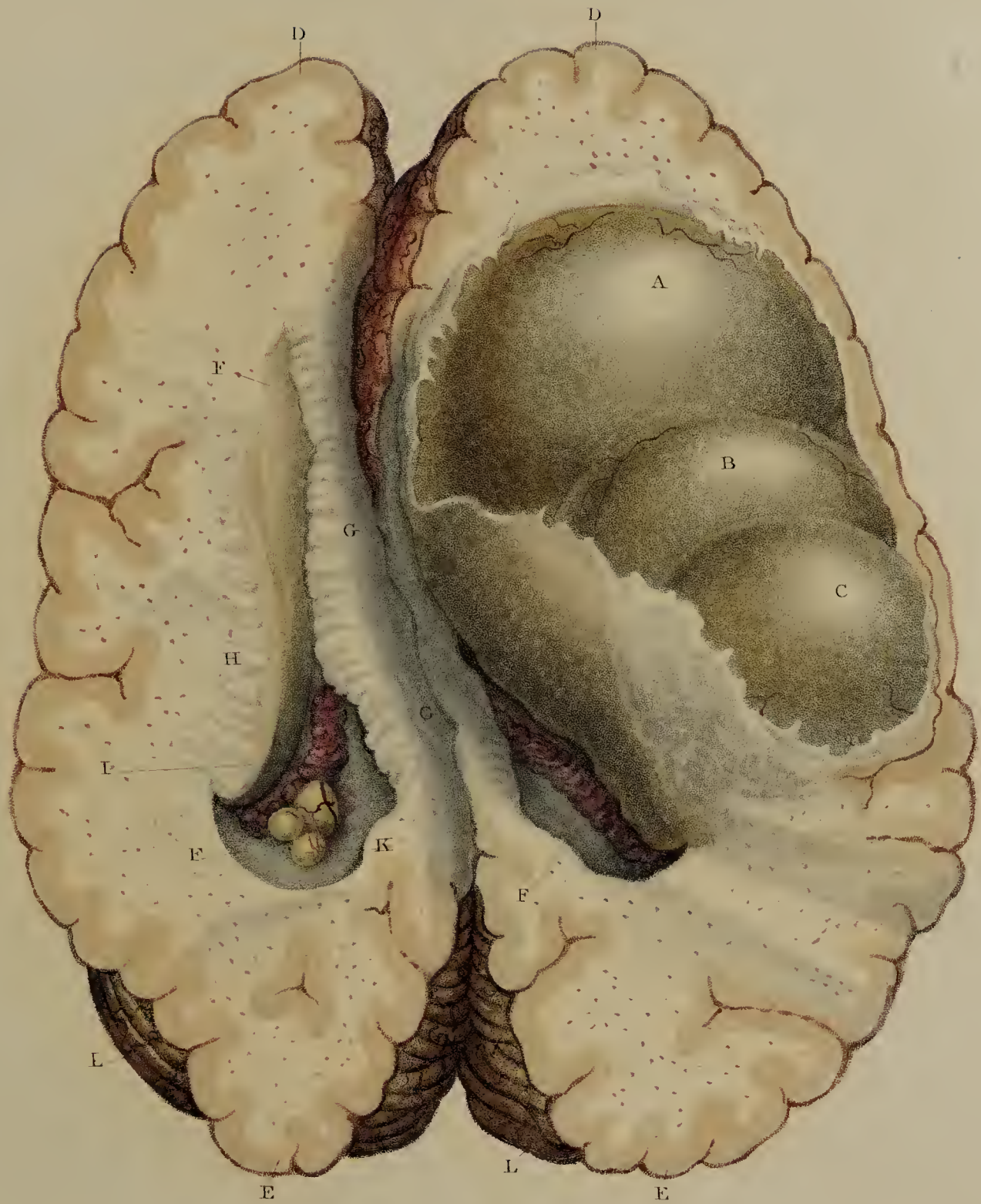




G. Kirtland del^s

J. Wedgewood sculp^s

ENCYSTED TUMOUR
of the
BRAIN.



J. Howship, del.

J. Stewart sculp.

VESICLES OF THE BRAIN.

PLATE XIV.

A REPRESENTATION of three vesicles, or encysted tumours, in the right hemisphere of the brain, occupying the greater part of the anterior and middle lobes.

These vesicles had very much the appearance of animal hydatids.

EXPLANATION.

Both hemispheres of the brain are cut away just above, and level with, the corpus callosum; and the medullary substance of the brain is carefully scraped off from the vesicles.

A. B. C. Three vesicles, on each of which are vessels ramifying very beautifully.

The fluid they contained was of a straw colour, and had very much the appearance of the serum of the blood. As the brain was immersing into alcohol, the vesicles broke, and a much greater quantity of albumen coagulated than is found in the same quantity of the serum of blood.

These cysts have no communication with each other, though in close contact. They are composed of a delicate, transparent, and vascular membrane, adhering firmly to, and embedded in, the substance of the brain.

D. The anterior lobe of the brain.

E. The posterior lobe.

F. The lateral ventricle.

G. The corpus callosum.

H. The corpus striatum.

I. The plexus choroides.

K. Three vesicles in the choroid plexus.

L. The cerebellum.

EXTRAVASATION OF BLOOD IN THE SUBSTANCE OF
THE BRAIN.

PLATE XV.

THIS plate represents the usual appearance that the brain exhibits when blood is extravasated from the spontaneous rupture of a vessel in its substance.

- A. An apoplectic cell, formed near four months prior to death in the right hemisphere, between the middle of the corpus striatum and the external and lateral surface of the brain. The contents were a sanguineous fluid, partly coagulated. The sides of this are more dense than is natural, and formed into a membranous-like surface, of a brownish colour, which gradually vanishes in the surrounding medullary substance.
- B. The left lateral ventricle, as it appeared when a great quantity of coagulated blood was removed, the third day after the apoplectic seizure which killed the person fifty hours after the attack.
- C. The part where the blood-vessel ruptured.
- D. The cineritious, or cortical substance of the brain.
- E. The medullary substance.
- F. The corpus callosum.

THE END.



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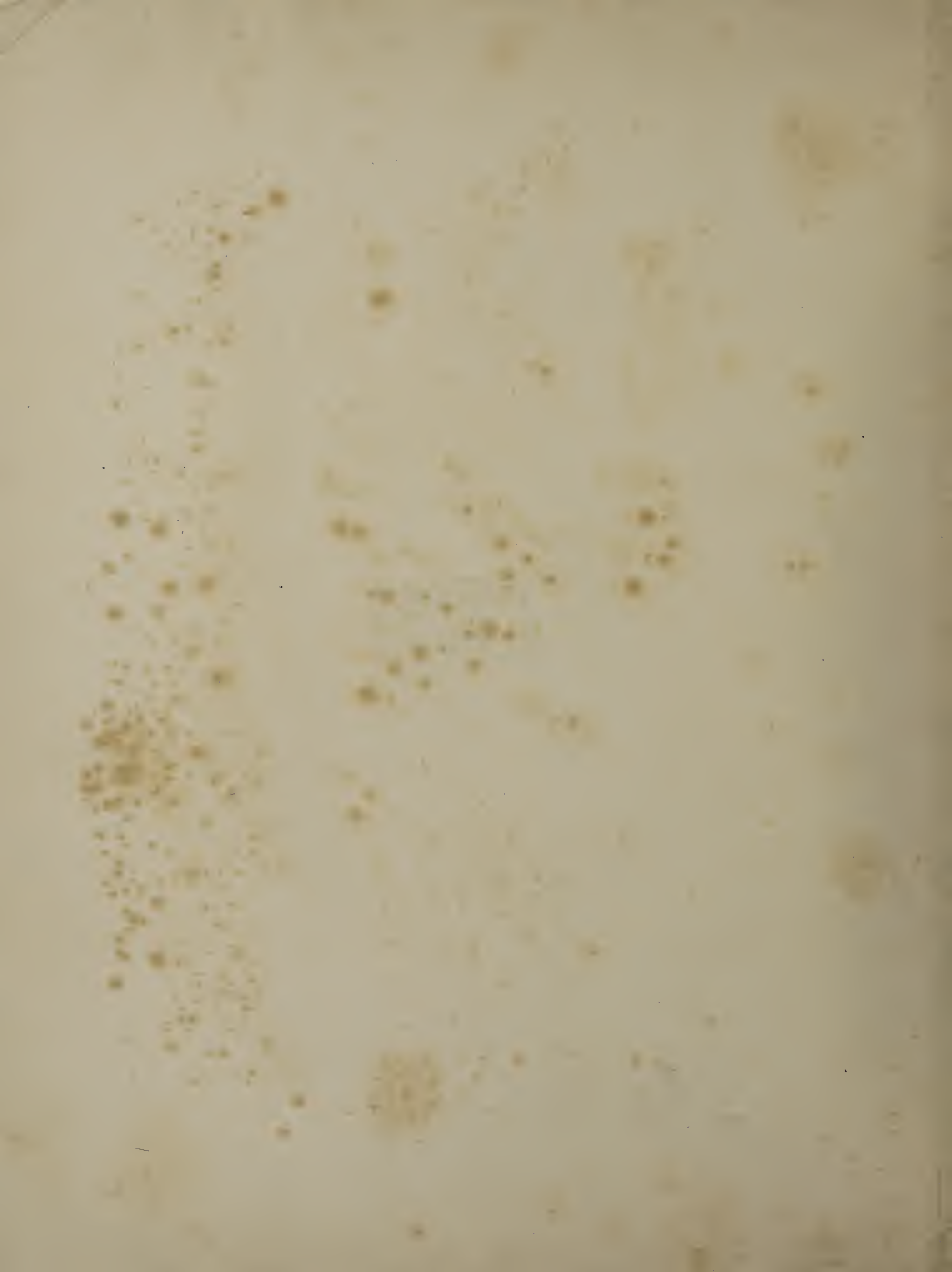
C. Kirtland del.

J. Wedgwood sculp.

EXTRAVASATION OF BLOOD
in the
BRAIN.

UNIVERSITY
COLLEGE
LONDON.





SCHEME FOR OBSERVING THE CLINICAL PHENOMENA

IN

DISEASES OF WOMEN.

Previous History.

Name. Age. Residence. Occupation. Single. Married. Widow.

If married, how long. If widow, how long.

Menstruation. (1) Date of commencement, with abnormal symptoms attending it, if any. (2) Periodicity: Duration, quantity, pain; effects on general health. (3) If modified by marriage. (4) Menopause, date and effects, if any, on general health.

Leucorrhœal discharge. Amount, character, habitual or occasional.

Pregnancies. (1) Number, with date of first and last. (2) Abortions: Number, and period of gestation. (3) Character of labours, with any important circumstance in pregnant or in puerperal state.

Hereditary disease. Cancer.

History of Present Illness.

Date and supposed cause.

General symptoms. Facial expression; pulse, temperature.

Uterine symptoms. (1) Pain, seat and character. (2) Effects of exertion, rest, or posture. (3) Menstruation: Painful, scanty, profuse, irregular; clots or other solid matter with discharge. (4) Metrorrhagia. (5) Vaginal discharge, amount and character.

Vesical symptoms. (1) Micturition: Frequent, difficult, painful. (2) Urine: Mucus, pus, blood.

Alvine symptoms. Defecation: Difficult, painful, attended by hæmorrhage.

Physical Examination.

Abdomen. (1) Large, tense, painful. (2) If any tumour—size, shape, mobility, consistence, fluctuating or not. (3) Palpation, percussion, auscultation. (4) Mammary appearances.

Perineum. Lacerated or otherwise.

Vulva. Eruption, as eczema or syphilides. Tumours or Cysts.

Urethra. Direction; contracted or dilated; growths at orifice.

Vesical. By sound, or by dilatation of urethra and introduction of finger.

Vaginal. (1) Pain: Site and character. (2) State of vaginal walls. Tumours or Cysts. (3) Position of os and cervix uteri. (4) Uterus: Direction of axis; mobility; size, if increased, whether symmetrical or not; consistence; sensitiveness. (5) Cervix: Size and position in relation to body; consistence; lacerations. (6) Os: Size; consistence of lips; tuberculated; ulcerated (simple or malignant).

Rectal. Hæmorrhoids: State of uterus; relation of pelvic tumour, if any.

Combined Examinations. Abdomino-vesical; abdomino-vaginal; abdomino-rectal; abdomino-vesico-vaginal; abdomino-recto-vaginal; vesico-vaginal; recto-vaginal; to investigate the conditions of (1) uterus, (2) ovaries, (3) Fallopian tubes.

Instrumental Examinations. (1) Sound: Length, capacity, and direction of uterine cavity; stenosis of external or internal os. (2) Speculum: os, colour of, surface; discharge from, if any, with character.

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SCHEME FOR OBSERVING THE CLINICAL PHENOMENA

IN

DISEASES OF WOMEN.

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